Table of Contents

I. Executive Summary

In accordance with 30 Texas Administrative Code (TAC) §116.605, Standard Permit Amendment and Revocation, the Texas Commission on Environmental Quality (TCEQ or commission) issues an amendment to the air quality standard permit for concrete batch plants. This amendment updates the standard permit to reinstate an exemption that was previously included in the standard permit, but inadvertently removed during the 2012 amendment process. The exemption specifies that facilities that meet the conditions of the standard permit do not have to demonstrate compliance with the emissions and distance limitations listed in 30 TAC §116.610(a)(1), Applicability. During the development of the original standard permit an extensive protectiveness review addressed emission rates and distance limitations for these facilities, thus exempting the emissions and distance limitations listed in 30 TAC §116.610(a)(1). The standard permit is effective for standard permits issued after September 22, 2021.

II. Explanation and Background of Air Quality Standard Permit

The New Source Review Program under Chapter 116 requires any person who plans to construct any new facility or to engage in the modifications of any existing facility which may emit air contaminants into the air of the state to obtain a permit pursuant to 30 TAC §116.110, Applicability, or satisfy the conditions of a standard permit, a flexible permit, or a permit by rule, before any actual work is begun on the facility. A standard permit authorizes the construction or modification of new or existing facilities which are similar in terms of operations, processes, and emissions.

This amendment to the standard permit provides a preconstruction authorization that may be used for any concrete batch plant complying with the standard permit requirements and does not relieve the owner or operator from any other applicable provision of the Texas Health and Safety Code, Texas Water Code, rules of the TCEQ, or any additional state or federal regulations. The purpose of this amendment is to reinstate a previously included exemption from 30 TAC §116.610(a)(1) which requires a standard permit (including the concrete batch plant standard permit) to meet the emission limitations in 30 TAC §106.261 unless otherwise specified by the provisions of that standard permit. Upon adoption of the standard permit for concrete batch plants on September 1, 2000, and amendment on July 10, 2003, the standard permit included this exemption to the requirement to demonstrate compliance with the emissions and distance limitations listed in 30 TAC §116.610(a)(1) for concrete batch plant facilities which meet the conditions of this standard permit. However, during the 2012 amendment, this exemption was inadvertently deleted from the standard permit and was not formally adopted.

This amendment to the standard permit does not affect the protectiveness review conducted during the development of the original standard permit. The results of the protectiveness review using the maximum production limits established by the standard permit continue to demonstrate that the standard permit is protective based on the current effects screening level guidelines and current National Ambient Air Quality Standards. General requirements concerning distance limits, emissions limits, control requirements, and recordkeeping have not changed.

III. Overview of Amendment to Air Quality Standard Permit

The commission issues an amendment to the air quality standard permit for concrete batch plants under the authority of the Texas Clean Air Act (TCAA), 382.05195, Standard Permit, and 30 TAC Chapter 116, Subchapter F, Standard Permits. The amendment updates the standard permit to add the exemption from emissions and distance limitations in 30 TAC §116.610(a)(1), that was inadvertently removed during the 2012 amendment process. The commission also adopts minor word usage changes to subsections (3)(E) and (3)(F)(i) to clarify when owners or operators must comply with the

most recent version of the concrete batch plant standard permit.

IV. Permit Condition Analysis and Justification

Section (1) of the standard permit outlines applicability for use of the standard permit. Subsection (D) adds the exemption that states facilities that meet the conditions of the standard permit do not have to meet the emissions and distance limitations of 30 TAC §116.610(a)(1).

V. Public Notice and Comment Period

In accordance with 30 TAC §116.605, the TCEQ published notice of the proposed amended standard permit in the *Texas Register* and newspapers of the largest general circulation in Austin, Houston, and Dallas. The date of these publications was May 28, 2021. The public comment period ran from the date of publication until midnight on June 29, 2021. Written and oral comments were received.

The amended standard permit was considered by the commission for adoption. Upon adoption of the standard permit by the commission, the final standard permit and a response to all comments received is available on the TCEQ's website.

VI. Public Meeting

The commission held a public meeting on this amendment via telephone conference on June 28, 2021, and oral comments were received for approximately two hours.

VII. Analysis of Comments

The commission received comments from Representative Alma Allen (Texas House District 131), Representative Kyle Biedermann (Texas House District 73), Tamera Bounds (Mansfield City Council), Representative Nicole Collier (Texas House District 95), Representative David Crook (Texas House District 96), Representative Charles Dutton (Texas House District 142), Representative Jessica Gonzalez (Texas House District 104), Representative Sam Harless (Texas House District 126), Representative Ana Hernandez (Texas House District 143), Representative Ana Johnson (Texas House District 134), Representative Jarvis Johnson (Texas House District 139), Judge William Magers (Grayson County), Senator Borris Miles (Texas Senate District 13), Representative Christina Morales (Texas House District 145), Representative Andrew Murr (Texas House District 53), Representative Mary Ann Perez (Texas House District 144), Senator Beverly Powell (Texas Senate District 10), Representative Ron Reynolds (Texas House District 27), Representative Jon Rosenthal (Texas House District 135), Senator Charles Schwertner (Texas Senate District 5), Representative Reggie Smith (Texas House District 62), Representative Senfornia Thompson (Texas House District 141), Representative Tony Tinderholt (Texas House District 94), Representative Chris Turner (Texas House District 101), Mayor Sylvester Turner (the City of Houston), Anneliese Vogel (Chief of Staff for Rep. Alma Allen, House District 131), Representative Armando Walle (Texas House District 140), Senator John Whitmire (Texas Senate District 15), Representative Terry Wilson (Texas House District 20), Representative Gene Wu (Texas House District 137), Representative Erin Zwiener (Texas House District 45), Rafael Aguilar (on behalf of the Branding Hearts Home Health), Karen Anderson, Bo Baggs, Brittany Baum, Kathryn Bazan (on behalf of the East Dallas Greater Good), Allison Bedford, Michael Bell, Teri Berbel, Rita Beving, Kathy Blueford-Daniels, Frank Boosman, Michelle Bowman, Kim Brackeen (on behalf of the Parkhaven Dental Care), Regina Broughton-Smith, Alisa Brown, Ashley Bull (on behalf of the Climate Reality Project DFW and the Sierra Club), Terry Burns (on behalf of the Alamo Sierra Club), Michael Butler, Sherri Butler, Alvin Byrd (on behalf of the Prince Square Civic Association), Trude Cables, Rodrigo Cantu (on behalf of the Lone Star Legal Aid), Rick Chaffin (on behalf of the City of Gunter), Lindsay Chapman, Susan Cooper, Susan Cowger, Steve Crawford, Susan

Crockett, Charles Crook, Caroline Crow (on behalf of the Lone Star Legal Aid), Katherine Culver, Neville Darlaston, Dirk Davidek, Mary Decker, Carol Dejean (on behalf of the Forest Heights Civic Club), Deirdre Diamond (on behalf of the Gunter Clean Air), Georger DiMatteo, Amy Dinn (on behalf of the Lone Star Legal Aid), Jane Doyle, Tim Duda, Karen Dyer, Neal Ehardt, Melinda Enochs-Baucom, Kim Feil, Margo Fendrich, Melissa Fitts (on behalf of Westward Environmental, Inc.), Adam Friedman (on behalf of the Protestants to Bosque Solutions, LLC's application for Registration No. 152013), Michael Gange (on behalf of the City of Dallas, Texas), David Garman, Roberto Gasparini (on behalf of Spirit Environmental, LLC), Julia Gibbs, Christopher Gonzales (on behalf of Sunrise El Paso), Rolando Gonzalez, Debbie Granato, Lauren Gray, David Griggs (on behalf of the Dallas Sierra Club Political Committee), Richard Guldi (on behalf of the Dallas Sierra Club), Jonathan Gulick, Tinnae Hamilton, Rick Hanna, Alexandra Holland, Victoria Howard (on behalf of the Dallas Sierra Club), Erica Hubbard (on behalf of the Progressive Fifth Ward Community Association), Eric Hudson-Thomas, Trevoir Hudson-Thomas, Heather Hultgren, Shelly Humphrey, Colin Hunter, Janet Hurlbut (on behalf of the No Neighborhood Concrete Plant Grass Root Volunteers), Roger Hurlbut (on behalf of the No Neighborhood Concrete Plant Grass Root Volunteers), Paula Hutchison, Etta Jamison (on behalf of the Yorkdale Civic Club), Joseph and Marian Jenson, Adrian Johnson, Stephanie Johnson, Gwendolyn Jones-Fields (on behalf of the Yorkdale Civic Club), Cliff Kaplan (on behalf of the Hill Country Alliance), Richard Keady, Melissa Kean, Roger Knudson (on behalf of The Climate Reality Project), Judy and Michael Krup, John Kucewicz (on behalf of the Panorama Fund LLC), Madeleine Lee, Josh Leftwich (on behalf of the Texas Aggregates and Concrete Association), Emily Lewis, Jeff Lindly, Frances Lovett, Liya Mar (on behalf of Climate Reality Dallas-Fort Worth), Christian Marquardt, Graham Marshall, Judy Marshall, Dennis Martini, Vlainda McAlister, Lariza McBean, Jonie McBee, (on behalf of the Climate Reality Project), Bob McClacherty, Ronnie Mestas, Karen Milam, Linda Mohr (on behalf of Protect Our Hill Country Environment), Anne Morton, Grace Murphy, Bridget Murray (on behalf of Achieving Community Tasks Successfully (ACTS)), James Notman, Kira Olson, Terry Olson, Kevin Overton, Nicholas Owens, Beverly Parker, Ronald Parry, (on behalf of Rice University), Poss, Melinda, Stephen Price, William Ramsey, Russel Randolph, Shane Rector, Cyrus Reed (on behalf of the Sierra Club, Lone Star Chapter), Don Ribbens, Dave Richardson, Anna Rivera, Gaspar Rivera, Molly Rooke, Morton Sager, Carolyn Salter (on behalf of the Sycamore Medical Clinic), Selena Samuel, Jennifer Schossow, Carrie Schweitzer, Isabel Segarra-Trevino (on behalf of the Office of the Harris County Attorney), Adrian Shelley (on behalf of Public Citizen), Peggy Shipman, Brandon Sifuentez, Michael Smith, Debbie Solis (on behalf of the Ledbetter Garden Community of West Dallas), Sue Stratton, Angela Stuart, Dr. M. Taylor, Diane Teter, Julie Thibodeaux, Jeff Thomas, Tilman Thomas, Carl Thompson, Janet Torres, Shawn Troxell, Sarah Utley (on behalf of the Office of the Harris County Attorney), William Vaughn, Sheldon Wayne (on behalf of the TCEQ Office of Public Interest Council), Amber Weber, Allyn West (on behalf of the Environmental Defense Fund and One Breath Partnership), Jon White (on behalf of the Travis County Transportation & Natural Resources Department), Rachel White, Terry White, Laura Wilder, Cory Williams (on behalf of Air Alliance Houston), Jennifer Woodard (on behalf of the Associated General Contractors of Texas), Traci Wright, Janet Young, Al Zaitoon, Angela Zarallo, and Latricia Zaitoon.

In general, the comments have been summarized except where appropriate specific commentor text is used. Comments are identified as being from elected officials (Group A), local governments (Group B), industry (Group C), advocacy groups (Group D) and citizens of the state (Group E).

COMMENT 1

Commenters requested the 30-day public comment period be extended to allow more time for comments. Groups A, B, D, and E expressed concern that a 30-day public comment period did not provide enough time to understand the proposed amendment, its impacts, or for the public to provide meaningful input. Commenters requested the public comment period be extended by 30, 60, or 90 days. Some commentors in Group A asked for public meetings to be held on the proposed amendment across the state and to increase the time of the question-and-answer session of the public meeting.

Group E is concerned that they did not learn of the proposed amendment until well into the 30-day comment period and commented that inadequate communication on the part of TCEQ effectively prevents meaningful public participation in the environmental decision-making process for most affected stakeholders.

RESPONSE 1

The TCEQ published notice of the proposed amendment in the *Texas Register* and newspapers of the largest general circulation on May 28, 2021, in the following metropolitan or regional areas: Houston, Dallas, and Austin. The public comment period ran from the date of publication until midnight on June 29, 2021. Because the TCEQ did not propose substantive changes to the Standard Permit for Concrete Batch Plants, the comment period was not extended. However, in accordance with 30 Texas Administrative Code (TAC) §116.603(c), the commission held a public meeting on June 28, 2021, to provide an additional opportunity for public comment. In addition, the public may participate at the Commissioners' Agenda currently scheduled for September 22, 2021, when the commissioners will consider this proposed rulemaking.

COMMENT 2

Commenters asked if the proposed amendment to include the exemption from 30 TAC §116.610(a)(1) was an administrative correction. Groups A, D, and E questioned the removal of the exemption as a "clerical error." They expressed concern that this was an error that went unnoticed for nine (9) years. Group E stated that the substance of the proposed amendment is more significant and technical than a clerical error.

RESPONSE 2

The Texas Clean Air Act (TCAA) and the TCEQ rules allow for the creation of standard permits that contain their own specific emissions and distance limitations. This allows for the creation and design of specific emissions and distance limitations for different standard permits based on the protectiveness review conducted during the development of each standard permit.

During the adoption of the initial concrete batch plant standard permit, the TCEQ conducted a protectiveness review to ensure emissions from these facilities are protective of public health and welfare. Based on the extensive protectiveness review, the standard permit contained language that specifically exempted applicants seeking to register for the standard permit from the requirements of 30 TAC §116.610 (which requires adherence to limits included in 30 TAC §§106.261 and 106.262). Thus, because the Standard Permit for Concrete Batch Plants includes its own emission requirements, applicants were required to meet those specific requirements rather than the general requirements contained in 30 TAC §§106.261 and 106.262. This exemption was inadvertently omitted during the 2012 amendments to the Standard Permit for Concrete Batch Plants.

In order to amend a standard permit, the commission must publish notice of its intent to amend a standard permit. The TCEQ published notice of its intent to amend the Standard Permit for Concrete Batch Plants in the newspapers of the largest general circulation in the Austin, Dallas, and Houston metropolitan areas on August 27, 2012. In addition, the TCEQ published notice in the *Texas Register*. *See* 37 TexReg 6819, 6960 (Aug. 31, 2012).

In the notice, the TCEQ explained the changes it intended to make in the 2012 amendment to the standard permit. Specifically, the notice stated that the proposed amendment would account for the 2006 AP-42 emission factors, address 24-hour particulate matter less than or equal to ten microns in diameter (PM_{10}), annual $PM_{2.5}$, and would include engine requirements as promulgated by the United States Environmental Protection Agency (US EPA). If the commission had intended to remove the exemption from 30 TAC §116.610(a)(1), an explanation of the removal of the exemption would have also been provided. The notice did not state that the TCEQ was intending to remove the exemption because it did not intend to do so. The purpose of this rulemaking is to amend the current Standard Permit for Concrete Batch Plants to include this provision that was inadvertently omitted.

COMMENT 3

Commenters stated that by including the exemption in 30 TAC §116.610(a)(1), the requirements for concrete batch plants would be relaxed. Groups A and B expressed concerns that the proposed amendment would diminish TCEQ's consideration of crystalline silica emissions in granting or denying standard permits.

Group A believes that this rule change will overturn a policy that has been in place since 2012 regarding crystalline silica. They are concerned that this is a significant change to agency policy and will lead to increased risk to the public.

Group D stated that their understanding of the standard permit amendment proposed by the TCEQ is that rather than complying with existing rules, the TCEQ is seeking to amend the standard permit and thereby avoid the consideration of crystalline silica emissions in the permitting process for the majority of concrete batch plants permitted to operate in the state.

Group E expressed concern that including this exemption in the standard permit will relax the requirements and reduce the protectiveness for local communities. They believe that the amendment will exempt concrete batch plants from showing how they will address emissions and distance limitations as outlined in 30 TAC §116.610(a)(1).

Groups D and E stated that this amendment is a direct reaction to address the Bosque decision. They believe that this amendment will remove any protections coming from that decision.

Groups D and E do not believe that concrete batch plants should be exempted from explaining how they would address emissions and distance requirements at their plants. Their concern is that the exemption specifies that facilities which meet the conditions of the standard permit do not have to demonstrate compliance with the emissions and distance limitations listed in 30 TAC §116.610(a)(1).

RESPONSE 3

The proposed amendment will update the standard permit to correct an administrative error by adding back in a previously included exemption from the general emissions and distance limitations listed in 30 TAC §116.610(a)(1).

During the development of the initial Standard Permit for Concrete Batch Plants, the TCEQ conducted a protectiveness review to ensure emissions from facilities authorized by the standard permit are protective of human health and the environment. A protectiveness review is a demonstration using air dispersion modeling to evaluate the potential impacts of the proposed operation as represented in the standard permit. The primary contaminant that has the potential to be emitted from facilities located at concrete batch plants is material handling of products of particulate matter having particle sizes less than or equal to 10 and 2.5 micrometers in aerodynamic diameter (PM_{10} and $PM_{2.5}$, respectively). Crystalline silica is a component of some types of particulate matter. The protectiveness review established maximum daily and annual production limits for the standard permit.

The results of the protectiveness review, using the maximum production limits, demonstrated that the standard permit is protective at the property line and beyond. In fact, the commission explicitly noted that the standard permit "eliminates any requirement for an applicant to submit modeling and impact analysis…" as part of the application because the technical requirements enumerated in the standard permit had already been evaluated during the protectiveness review and determined to be protective of human health and the environment.

The protectiveness review was conducted based upon worst-case assumptions of design, layout, and operation. The protectiveness review considered numerous variables including emission source types and associated emission parameters; meteorological data; a receptor grid; and model use parameters and techniques. The TCEQ developed the protectiveness review based on modeling that was inherently conservative and over-predicts ground-level concentrations of emissions from the proposed plant. All emissions sources were co-located to minimize bias due to source configuration and wind direction. This technique also provides conservative results since the impact from all sources is maximized.

In addition to the initial protectiveness review, the TCEQ recently conducted an analysis of the modeling data to estimate ambient crystalline silica concentrations allowed under the Standard Permit for Concrete Batch Plants. Even when using worst-case assumptions, the estimated crystalline silica concentrations are below TCEQ's health-based air monitoring comparison value, demonstrating that the standard permit is health-protective. A review of Texas silicosis data also affirms that crystalline silica from concrete batch plant production is not an at-risk activity. Exposure to unacceptably high levels of crystalline silica can cause silicosis, a lung disease that is specific to occupational exposure to crystalline silica, that must be reported to the Texas Department of State Health Services (TDSHS). TDSHS silicosis data demonstrates that silicosis is very rare and does not occur from exposure to ambient air, but rather is an occupational disease (in recent years it occurs primarily in workers who make granite countertops).

Based on the extensive protectiveness review conducted by the commission, the initial Standard Permit for Concrete Batch Plants, as well as a subsequent amendment, contained language that specifically exempted applicants from conducting additional air dispersion modeling and the requirements of 30 TAC §116.610 (which requires adherence to 30 TAC §106.261). In fact, in the initial issuance, the commission explicitly

stated that it “clarified that 30 TAC §116.610(a)(1) does not apply to concrete batch plants under this standard permit as the extensive protectiveness review addressed emission rates and distance limitations for these facilities.” Thus, because the Standard Permit for Concrete Batch Plants includes its own emissions limits and distance requirements, applicants were required to meet those requirements rather than the general requirements contained in 30 TAC §106.261.

The purpose of this rulemaking is to amend the current Standard Permit for Concrete Batch Plants to include this provision that was inadvertently omitted. However, this amendment does not alter the protectiveness review and will not authorize additional emissions, or the emission of air contaminants not previously authorized by the Standard Permit for Concrete Batch Plants.

COMMENT 4

Commenters asked that a new protectiveness review of the standard permit be conducted during this amendment. Group E requested a complete review of the standard permit because it has not been reviewed in almost 10 years.

Groups B, D and E are concerned that the protectiveness review conducted prior to the 2000 adoption and supplemented for the 2012 amendment of this standard permit are over 20 years old.

Group D commented that the permit is based on outdated science that only considered a broad pollutant class of particulate matter without considering specific subsets of particulate matter.

Groups D and E believe that the model used for the 2012 protectiveness review (ISCST3) was not the preferred air dispersion model and that AERMOD should have been used. The commenters requested that the protectiveness review be redone using AERMOD.

Group A questioned the impacts of modeled emission rates for 30 cubic yards/hour and 300 cubic yards/hour facilities.

Group D stated that the modeling conducted for the protectiveness review evaluated sources within 100 feet where the standard permit allows emission sources to be within 50 feet of the property line. They requested that the distance limits for stationary equipment, stockpiles, and vehicles be increased to 100 feet.

RESPONSE 4

As discussed above, when creating the Standard Permit for Concrete Batch Plants, the TCEQ conducted a protectiveness review to ensure emissions from the facilities are protective of public health and welfare. The maximum daily and annual production limits contained in the standard permit were based on the results of the protectiveness review. The results of the protectiveness review using the maximum production limits show that the standard permit is protective at the property line and beyond. There have been no changes since the last update to the standard permit that would require updating the protectiveness review.

AERMOD is EPA’s preferred model for major new source review; that is, those new major sources or major modifications that trigger federal review. Since the concrete batch plant projects authorized under a standard permit cannot be major, the TCEQ used the ISCST3 model (ISC) to conduct the protectiveness review. The TCEQ uses the

ISC model for minor source permitting. The TCEQ does not require the use of AERMOD for minor projects for two primary reasons: ease of use and continuity. The ISC model has been used in permitting for more than 25 years and continues to be an accepted model by the TCEQ. The model was developed to be easy to use and address complex atmospheric processes in a relatively simple way that can be understood by all users. The use of ISC provides a basis for technical consistency with other minor permit reviews.

The standard permit authorizes a variety of concrete batch plants (i.e., specialty, temporary, and permanent). The modeled emissions are representative of expected operations for each type of concrete batch plant. The emissions can vary due to different emission controls and operational limitations. These differences are reflected in the modeling and lead to different predicted concentrations between the different types of concrete batch plants. The predicted concentrations for all concrete batch plants authorized by the standard permit are protective at the property line and beyond.

The standard permit contains distance limitations which include a 50 feet buffer for all equipment, including vehicles, from the property line; a ≥ 100 feet buffer from the baghouse stack to the property line; and a ≥ 550 feet buffer from any rock and/or concrete crushing or hot mix plant. The distance limitations were developed based on the representations included in the protectiveness review. The protectiveness review evaluated material handling activities as a circular area source with a diameter of 100 feet. The edge of the area source was modeled 50 feet from the property line, which is consistent with the requirements of the standard permit. The results of the protectiveness review using the 50 feet setback distance demonstrate that the standard permit is protective at the property line and beyond.

COMMENT 5

Commenters are concerned the standard permit does not take into consideration the cumulative and additive impacts of adding new concrete batch plant emissions to existing emissions from other (local) industrial sources. The commenters stated that this is significant as concrete batch plants are often cited in close proximity to other industrial sources.

Groups A, B, D and E are concerned that the standard permit does not address the cumulative and additive impacts of clustered or co-located concrete batch plants. Groups B and E expressed concern with the number of concrete batch plants located near one another in specific geographic areas.

RESPONSE 5

As discussed above, a protectiveness review was completed during the development of the standard permit. The TCEQ evaluated the potential for cumulative or additive emissions during the protectiveness review. The maximum modeled concentration typically occurs at a relatively short distance from the source, so that the peak modeled concentrations represent the source's impact at only a relatively few receptors within the modeled area. The commission included site-wide production limits to avoid the potential for cumulative emissions that would be higher than what is authorized by the standard permit. The site wide production limit is 300 cubic yards per hour, not to exceed 6,000 cubic yards per day. As long as multiple plants on a site can meet the production limits, they are able to be authorized under the Standard Permit for Concrete Batch Plants. In addition, distance requirements to the nearest rock crusher, concrete crusher, or hot mix asphalt plant were also added to avoid potential cumulative emission higher than the permit limit. Therefore, the commission determined that a review of other off-site sources

is not necessary when determining approval of any particular standard permit application. In addition, based on the results of the protectiveness review, no adverse impacts are expected as a result of operations of multiple similar facilities, such as concrete batch plants, rock and/or concrete crushing plants, or hot-mix asphalt plants.

COMMENT 6

Commenters stated this amendment to the standard permit will exclude modeling, measurement, reporting, and control of crystalline silica emissions. Group A is concerned that the amendment would reduce the TCEQ's ability to consider crystalline silica emissions in permitting decisions.

Groups B, D and E are opposed to any changes to the standard permit that would stop the measurement of crystalline silica at concrete batch plants.

An individual from Group B specifically requested that TCEQ conduct a protectiveness review for crystalline silica emissions.

Group D stated that information about silica exposure hazards has only multiplied since the 2000 and 2012 rulemaking and requested that the basis for the original 2000 "exemption" be reassessed and updated to reflect the current science. Group B is concerned that the current requirements of the standard permit are insufficient to preserve the health of residents and that the amendment will endanger the quality of life and public health of Texans.

RESPONSE 6

The proposed amendment does not alter the protectiveness review and will not remove any requirements previously authorized by the Standard Permit for Concrete Batch Plants.

Particulate matter is the primary air pollutant emitted from concrete batch plants. The particulate matter that is emitted from concrete batch plants is mostly composed of crustal material – that is, dust from sand and gravel. Some of the particles will be potentially more toxic, such as crystalline silica.

However, as with particulate matter in general, only tiny particles of crystalline silica (called respirable crystalline silica) have the potential to cause adverse health effects in the respiratory tract. Adverse health effects from exposure to particulate matter are dependent on the size of the particle. Less than 20% of the particles emitted from concrete batch plants are small enough to enter the lower part of the respiratory tract where oxygen enters the blood stream. Those particles, which are less than or equal to 2.5 micrometers (µm) in diameter (called $PM_{2.5}$) are the particles of the greatest toxicological concern.

Although the commission did not explicitly model the levels of crystalline silica emitted by a concrete batch plant in the 2012 protectiveness review for the standard permit, the agency recently estimated what those levels might be and compared them to the TCEQ's health-protective screening level. Even when using worst-case assumptions, the estimated crystalline silica concentrations are below TCEQ's health-based ESL, demonstrating that the standard permit is protective of human health and the environment. The TCEQ's health-based ESL is designed to prevent any adverse health effects, such as respiratory diseases, for all members of the general public including potentially sensitive subpopulations (e.g., children, the elderly, and those with pre-existing health conditions).

In addition, the protectiveness review conducted by the TCEQ in 2012 showed that the concentrations of $PM_{2.5}$ were below the levels of the National Ambient Air Quality Standards (NAAQS), which are set to protect public health with an adequate margin of safety.

COMMENT 7

Commenters expressed concerns about the potential for adverse health effects caused by emissions from concrete batch plants of various chemicals, including particulate matter, crystalline silica, and metals, from concrete batch plants. Groups B, D and E are concerned that crystalline silica is emitted from concrete batch plants in unknown quantities and exposure is associated with several adverse medical conditions. These conditions include silicosis, lung cancer, pulmonary tuberculosis, kidney disease, and COPD (chronic obstructive pulmonary disease). Commenters are concerned that adverse health effects from exposure may not be diagnosed for years after the exposure. They believe that there is a significant increase in the understanding of the potential health effects of emissions from concrete batch plants that should be used to complete an updated protectiveness review prior to amending the standard permit.

RESPONSE 7

Summary of Particulate Matter (PM) Health Risks and Monitoring Data

PM is the primary air pollutant emitted from concrete batch plants, and it mostly comes from materials used to make concrete (sand, gravel, cement, fly ash) being moved around the site and stored. Some emissions also occur from engines operating at the site. Health effects from exposure to PM are dependent on the size of the particle. Less than 20% of the particles emitted from concrete batch plants are small enough to enter the lower part of the respiratory tract where oxygen enters the blood stream. Those particles, which are less than or equal to 2.5 micrometers (µm) in diameter (called $PM_{2.5}$) are the particles of the greatest toxicological concern. More information about PM sources and toxicology are provided in the sections below, entitled *Particulate Matter Sources and Formation*, and *Particulate Matter Dosimetry and Toxicity*.

As discussed above, the Standard Permit for Concrete Batch Plants protectiveness review conducted by the TCEQ in 2012 showed that the concentrations of $PM_{2.5}$ were below the levels of the NAAQS, which are set to protect public health with an adequate margin of safety.

Evidence from ambient air monitoring also show that concrete batch plants do not substantially impact the amount of $PM_{2.5}$ in the air. Although there are few data measuring $PM_{2.5}$ around concrete batch plants specifically, there are monitoring data around sources with far greater potential for particulate matter production: aggregate production operations (APOs). Similar to concrete batch plants, APOs will have PM emissions from moving and storing sand and gravel, but they also include sources that can produce far more PM, such as rock crushers. TCEQ monitoring in the vicinity of APOs in central Texas shows that these facilities do not have an impact on measured $PM_{2.5}$ concentrations. This is consistent with studies in other parts of the country showing a lack of impact of APOs on ambient $PM_{2.5}$ concentrations.

Summary of Crystalline Silica Health Risks and Monitoring Data

The PM that is emitted from concrete batch plants is mostly composed of crustal material – that is, dust from sand and gravel. Some of the particles will be potentially more toxic, such as crystalline silica. However, as with PM in general, only tiny particles

of crystalline silica (called respirable crystalline silica) have the potential to cause health effects in the respiratory tract. In a concrete batch plant, these tiny crystalline silica particles only have the potential to be emitted from cement and fly ash, and they make up a just small fraction of cement (< 1%) or fly ash (< 7%). Although the agency did not explicitly model the levels of crystalline silica emitted by a concrete batch plant in the 2012 protectiveness review for the Standard Permit, the agency recently estimated what those levels might be and compared them to the TCEQ's health-protective screening level. Even when using worst-case assumptions, the estimated crystalline silica concentrations are below TCEQ's health-based Effects Screening Level (ESL), demonstrating that the standard permit is health-protective. More information about the estimates of crystalline silica concentrations is provided in the *Estimates of Crystalline Silica Emissions from Concrete Batch Plants* section below.

The TCEQ's health-based ESL is designed to prevent any adverse health effects, such as respiratory diseases, for all members of the general public including potentially sensitive subpopulations (e.g., children, the elderly, and those with pre-existing health conditions).

Exposure to high levels of crystalline silica for months to years is associated with a very specific disease: silicosis, which is an irreversible, progressive, and fatal rare lung disease. This disease is only associated with occupational exposure of workers for several years up to a lifetime to high workplace levels of fine particles of crystalline silica. Silicosis is not caused by community exposure to fine particles of crystalline silica.[1] This is reflected by the rarity of the disease: in 2016 the annual age-adjusted hospitalization rate for silicosis was just 4 per one million people, all of whom were occupationally exposed. More information about respirable crystalline silica-associated health effects is provided in the sections below entitled *Health Effects of Crystalline Silica, and Silicosis in Texas*.

Further, as with PM, there are monitoring data available for crystalline silica close to APOs, including sand mines that would be expected to generate far more respirable crystalline silica than a concrete batch plant. The TCEQ has reviewed ambient air crystalline silica levels measured near APOs in various locations throughout the United States where data are available. These data indicate that the contribution of crystalline silica from these facilities to ambient levels of respirable crystalline silica is negligible or minimal and the levels are generally below the health-based air monitoring comparison values for crystalline silica developed by the TCEQ. More information about crystalline silica ambient air monitoring is provided in the *Ambient Air Monitoring Near APOs* section below.

Other Potential Health Risks from Concrete Batch Plant Air Emissions

The PM that is emitted by concrete batch plants may contain small amounts of other chemicals, such as metals. In addition to PM, concrete batch plant operations can produce some gaseous chemicals as well if diesel engines are operating on site. Because of this, the TCEQ's 2012 protectiveness review of the Standard Permit for Concrete Batch Plants modeled concentrations of carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), formaldehyde, and particulate nickel. The modeling demonstrated that the estimated concentrations of these chemicals were below either the NAAQS (for CO, NO_2, and SO_2), or were below the TCEQ's health-based ESLs (for formaldehyde and nickel), demonstrating that the standard permit is protective of human health and the environment.

[1] Agency for Toxic Substances and Disease Registry (ATSDR). 2019. Toxicological profile for silica. Available from: www.atsdr.cdc.gov/ToxProfiles/tp211.pdf

Although other metals besides nickel could be found in the PM emitted from a concrete batch plant, nickel was chosen to model because it has the highest short-term emission rate and lowest ESL out of all the potential trace metals, and therefore if nickel levels are health-protective, then so too will concentrations of other metals.

Particulate Matter Sources and Formation

PM is composed of components that are directly emitted (primary PM) as well as formed through atmospheric chemical reactions involving gaseous precursors (secondary PM). Both primary and secondary PM contribute substantially to overall PM mass in the ambient air. Within an urban environment, most primary $PM_{2.5}$ emissions (particles with aerodynamic diameters ≤ 2.5 µm) are from anthropogenic (human-made) sources and include some combination of industrial activities, motor vehicles, cooking, and fuel combustion, including biomass burning. However, in many locations, secondary $PM_{2.5}$ formed from the precursors sulfur dioxide (SO_2), oxides of nitrogen (NO_X), ammonia (NH_3), and volatile organic compounds (VOCs), accounts for the majority of $PM_{2.5}$ mass. $PM_{10-2.5}$ (aerodynamic diameters between 2.5 and 10 µm) is almost entirely primary in origin. Crustal materials such as those from crushed stone, construction sites, and other sources (i.e., soil dust, fine sand particles from vehicle traffic on unpaved roads, and metallurgical operations) dominate the $PM_{10-2.5}$ fraction throughout the U.S., and fugitive dust has been identified as the largest source of measured PM_{10} (aerodynamic diameters ≤ 10 µm) in many locations in the western U.S. Mineral dust, biological material/organic debris, and sea spray have also been identified as mainly in the coarse (i.e., PM_{10}) fraction. Wildfires and dust storms are intermittent emissions sources.[2]

PM Components

Measurement of PM components can provide insight into what sources contribute to PM concentrations in ambient air. Additionally, sulfate, nitrate, ammonia, organic carbon (OC), elemental carbon (EC), as well as various elements can be measured to provide insight into what components may contribute to differential toxicity. It is also useful to distinguish between bulk PM components and more finely speciated components. The term bulk component refers to a large component category like OC, sulfate, nitrate, or crustal material. Some bulk components are a single species like sulfate, while others like OC and crustal material are composed of numerous compounds or elements that are usually present in lower amounts. Crustal material often makes the greatest contribution to $PM_{10-2.5}$ mass. However, the organic fraction also makes a substantial contribution (e.g., in the Southeast, OC and EC account for approximately 30% of $PM_{10-2.5}$), and primary biological aerosol particles (i.e., microorganisms and fragments of living things) can also account for a large fraction of $PM_{10-2.5}$ mass.[3]

PM Formation from Concrete Batch Plants

Emissions of PM_{10} and $PM_{2.5}$ from concrete batch plants in Texas must comply with the NAAQS as part of the standard permit requirements. Despite this requirement, neighbors may have complaints about dust/PM emissions from concrete batch plants. Of the PM emitted from concrete batch plants, including exhaust from any diesel engines operating onsite, about 50% are particles that are too large to enter the human respiratory tract (greater than 10 µm in diameter) and these particles are often visible as

[2] U.S. Environmental Protection Agency (US EPA). 2019. Integrated Science Assessment for Particulate Matter (December 2019). Center for Public Health and Environmental Assessment, Office of Research and Development, U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA/600/R-19/188

[3] USEPA (2019).

dust. And as previously mentioned, crustal materials such as those from crushed stone, construction sites, and other sources (e.g., soil dust, fine sand particles from vehicle traffic on unpaved roads) dominate the $PM_{10-2.5}$ fraction throughout the U.S. Since concrete's primary component is aggregate (i.e., crustal materials such as crushed stone, sand, gravel), it is not surprising that PM_{10} emissions predominate over $PM_{2.5}$ at concrete batch plants. The result of this emission difference can be seen from the modeled concentrations of PM_{10} compared to $PM_{2.5}$ in the 2012 protectiveness review for the Standard Permit for Concrete Batch Plants. For example, the annual average PM concentrations for the 30 cubic yards/hour scenario at 100 feet for PM_{10} was 39.24 $\mu g/m^3$, and for $PM_{2.5}$ was 9.31 $\mu g/m^3$. This shows that $PM_{2.5}$ was < 25% of the PM_{10} concentration.

Particulate Matter Dosimetry

Particle dosimetry characterizes the intake, deposition, and retention of PM in the respiratory tract. Understanding the dosimetry of particles is crucial to providing evidence for biologically plausible pathways that support the link between PM exposure and various health effects. A variety of factors influences the amount of inhaled particles deposited and retained in the respiratory tract. Generally, these factors include exposure concentration and duration, activity level, particle properties (e.g., particle size, moisture absorption, solubility in airway fluids), and breathing conditions (e.g., nose vs. mouth breathing, breathing rate). In humans, the fraction of oral versus nasal breathing is influenced by age, activity level, sex, disease status (e.g., allergies, upper respiratory tract infections), and perhaps body mass index, which ultimately contributes to the fraction of particles inhaled and reaching the lower respiratory tract. Recent evidence demonstrates the translocation of poorly soluble particles, generally less than 200 nm in diameter, from the respiratory tract into circulation with transport to other organs. The fraction of deposited particles that may move into circulation is small and dependent on particle size (e.g., in the range of ≤0.2% for particles between 5 and 200 nm but may reach a few percent for even smaller particles). [4]

Coarse particles are those with diameters generally larger than 2.5 µm and ≤10 µm ($PM_{10-2.5}$). These particles penetrate beyond the nasopharynx and deposit in the large airways, primarily the tracheobronchial region. High linear velocities in the bronchi cause coarse particles to concentrate in the areas of highest impaction, the airways' bifurcations. These areas have high particle densities per tissue surface area. The nose acts as the first line of defense against coarse particles. With its narrow air passages, mucosal folds, and mucous layer covering ciliated epithelial cells, the nose can effectively filter most coarse particles. Fine particles ≤ 2.5 µm in diameter are primarily deposited in the small peripheral airways and the alveoli (i.e., the pulmonary region). A large proportion of fine particles that reach the small airways and alveoli remain suspended in the airways and are subsequently exhaled.

PM Associated Health Effects

A large body of scientific evidence demonstrates that there are health effects attributed to both short-and long-term PM exposure, with the strongest evidence for a relationship between some health effects and $PM_{2.5}$. Data for health effects and exposures to $PM_{10-2.5}$ are more limited and uncertain, complicating the interpretation of the evidence. Because $PM_{2.5}$ can penetrate deep into the lungs (pulmonary region) and the scientific evidence for associated health effects is much stronger and more causally conclusive than for $PM_{10-2.5}$, $PM_{2.5}$ is generally considered the size fraction of most health concern.

[4] USEPA (2019).

To protect public health, there are NAAQS for both $PM_{2.5}$ and PM_{10}, which have been revised over time. The US EPA last revised the primary NAAQS for PM in 2013 to provide increased protection of public health. Regarding the current primary standards for $PM_{2.5}$ and PM_{10}, the levels of the standards are:

- $PM_{2.5}$ annual NAAQS= 12 µg/m^3
- $PM_{2.5}$ 24-hour NAAQS= 35 µg/m^3
- PM_{10} 24-hour NAAQS = 150 µg/m^3

Based on US EPA's latest analyses for the NAAQS, key findings for $PM_{2.5}$ and $PM_{10–2.5}$ are provided below.[5]

$PM_{2.5}$

- Epidemiologic studies report consistent positive associations between short-term (days-to-weeks) and long-term (years) $PM_{2.5}$ exposure and respiratory and cardiovascular effects and mortality.
- The strongest evidence of an effect of short-term $PM_{2.5}$ exposure on respiratory effects is provided by epidemiologic studies of asthma and chronic obstructive pulmonary disease (COPD) exacerbation. For long-term exposure, studies provide evidence of health effects such as effects on lung function and development in children, the development of asthma in children, and respiratory mortality.
- Animal toxicological and controlled human exposure studies provide coherence and biological plausibility for effects observed in epidemiologic studies of short- and long-term $PM_{2.5}$ exposure, particularly respiratory effects, cardiovascular effects, and mortality.
- Both animal toxicological and controlled human exposure studies, using concentrated ambient particle (CAP) exposures, provide evidence of a direct effect of PM exposure on various health effects (e.g., lung function decrements in laboratory animals due to short-term exposure).
- Epidemiologic studies that conducted co-pollutant analyses show that $PM_{2.5}$ associations with health effects remain relatively unchanged when adjusting for gaseous pollutants and other particle size fractions such as $PM_{10–2.5}$.
- Differences in risk estimates between different study areas is not attributed solely to differences in the composition of $PM_{2.5}$, but also reflects city-specific exposure conditions (e.g., housing, and commuting characteristics).
- For health effects where it was concluded that the evidence is suggestive but not sufficient to infer a causal relationship (i.e., short-and long-term $PM_{2.5}$ exposure and metabolic effects, male and female reproduction and fertility, pregnancy and birth outcomes, and short-term exposures and nervous system effects), epidemiologic and experimental studies report inconsistent evidence of an association/effect or there are relatively few relevant studies.

$PM_{10-2.5}$

[5] US EPA (2019).

- $PM_{10-2.5}$ concentrations are more spatially variable than $PM_{2.5}$, and micro -to neighborhood-scale data are not widely available, adding uncertainty to the interpretation of results from epidemiologic studies, especially for long-term exposure studies that rely on spatial contrasts to examine associations with health effects.

- Epidemiologic studies that examine associations between short- and long-term $PM_{10-2.5}$ exposure and various health effects use multiple methods to estimate concentrations, which has complicated the comparison of results across studies.

- For some health effects, few or no experimental studies have examined the relationship with short-and long-term exposure to $PM_{10-2.5}$, and the few studies conducted provide inconsistent evidence of effects due to $PM_{10-2.5}$ exposures, contributing to limited coherence and biological plausibility.

- The causality determinations for all health outcome categories for short-and long-term $PM_{10-2.5}$ exposure has been concluded to be either suggestive but not sufficient to infer a causal relationship or inadequate to infer the presence or absence of a causal relationship.

Subpopulations at Potentially Increased Risk from PM Exposure

Not all people respond to exposure to air emissions to the same extent. Sensitive groups, also called at-risk populations, are at increased risk for experiencing adverse air emissions-related health effects. These groups can be at increased risk due to intrinsic (i.e., biological) factors, extrinsic (i.e., external, non-biological) factors, higher exposure, and/or increased dose at a given concentration. The severity of the health effects that these groups experience may be much greater than in the general population. Groups that could be at increased risk of air emissions-related health effects include, for example: (1) people with heart disease, lung disease, or other pre-existing health conditions (e.g., diabetes); (2) children; (3) older adults; (4) people of lower socioeconomic status (SES); (5) current and former smokers; and (6) pregnant women and/or their developing fetuses.

Life stages that are often examined to assess whether there is evidence of increased risk include childhood (less than 18 years of age) and older adulthood (65 years of age and older). The following factors can increase risk in children: (1) children spend more time outdoors at greater activity levels than adults, resulting in higher exposures and higher doses of ambient pollution per body weight and lung surface area; (2) children are more likely to have asthma than adults; and (3) children's developing lungs are prone to damage, including irreversible effects through adolescence. For older adults, increased risk might be related to the higher prevalence of pre-existing respiratory or cardiovascular diseases found in this age group, as well as the gradual decline in physiological defenses that occurs with age.

As another example, various factors might increase the risk of pollution-related health effects in people with lower SES, including a higher prevalence of pre-existing diseases; limited access to medical care; increased nutritional deficiencies; and exposure to higher levels of pollutants due to the location of their homes, schools, and/or work environments.

For PM, evidence for the factors that increase risk from particle pollution comes from animal toxicology, controlled human studies, and epidemiological studies. Based on US EPA's latest analyses, of the factors considered, race and lifestage (children) were the only factors for which evidence was adequate to indicate an increase in risk for $PM_{2.5}$-

related health effects. In particular, evidence for both health effects (i.e., primarily mortality) and exposure demonstrate that nonwhite populations are at increased risk compared with whites. Several high-quality studies indicate that nonwhite populations across different geographical regions are exposed to higher concentrations of $PM_{2.5}$. In addition, a number of epidemiologic studies demonstrate stronger associations in nonwhite populations for $PM_{2.5}$-associated mortality. Increased risk for nonwhites compared with whites has also been demonstrated for other health outcomes including respiratory and cardiovascular effects and birth outcomes, but there is less confidence in the evidence for these outcomes.

There is strong evidence from studies examining health effects specific to children indicating that children are at increased risk to the effects of $PM_{2.5}$ exposure. Specifically, epidemiologic studies of long-term $PM_{2.5}$ exposure demonstrate associations with impaired lung function growth, decrements in lung function, and increased incidence of asthma development in children. The evidence from analyses that specifically investigate effects in children compared to adults provides limited direct evidence that children are at increased risk of $PM_{2.5}$-related health effects compared to adults. In addition, there is some evidence indicating that children can have higher $PM_{2.5}$ exposures than adults and that there are differences in how children breathe compared to adults that can contribute to higher doses.

In contrast, the evidence is only suggestive that populations with pre-existing cardiovascular or respiratory disease, populations that are overweight or obese, populations that have particular genetic variants, populations that are of low SES, and people who smoke are at increased risk for $PM_{2.5}$-related health effects. There is inadequate evidence to conclude whether pre-existing diabetes, elevated cholesterol, older adults, residential location (including proximity to source and urban residence), sex/gender, or diet modify risk for $PM_{2.5}$-associated health effects. [6]

Particulate Matter Air Monitoring

Although there are few data measuring $PM_{2.5}$ around concrete batch plants specifically, there are monitoring data around sources with far greater potential for PM production: APOs. Similar to concrete batch plants, APOs will have PM emissions from moving and storing sand and gravel, but they also include sources that can produce far more PM, such as rock crushers.

In October 2019, TCEQ began ambient air $PM_{2.5}$ monitoring at sites that are located within one mile of APOs in central Texas. There are currently five monitoring sites located predominantly downwind of APOs. Data indicates that APOs do not appear to have an impact on measured $PM_{2.5}$ concentrations. These data are consistent with a study sponsored by the National Stone Association (NSA) in which ambient air $PM_{2.5}$ concentrations were monitored near large permanent rock crushing facilities with typical processing equipment and quarries in Colorado, North Carolina, and Virginia.[7] That study indicated that rock crushing operations have negligible impact on ambient $PM_{2.5}$ concentrations.

Crystalline Silica Monitoring

[6] US EPA (2019).

[7] Richards J, T Brozell, J Hayden. 1999. Upwind-Downwind Ambient $PM_{2.5}$ Monitoring at Stone Crushing Plants. EM. August:17-22.

TCEQ has reviewed ambient air crystalline silica levels measured near APOs in various locations throughout the United States where data are available.[8] These data indicate that the contribution of crystalline silica from these facilities to ambient levels of PM and respirable crystalline silica is negligible or minimal and the levels generally are below the health-based air monitoring comparison values (AMCVs) for crystalline silica developed by the TCEQ.

For respirable crystalline silica (PM_4), the 24-hr AMCV is 24 µg/m^3, and the long-term AMCV is 0.27 µg/m^3. In urban areas throughout the United States, average annual ambient air concentrations of crystalline silica in $PM_{2.5}$ and in PM_{10} were 0 – 1.9 µg/m^3 and 0.3 – 5.0 µg/m^3, respectively. The range of respirable crystalline silica (PM_4) measured in samples collected for 24 or 48 hours near APOs ranged from 0 (many samples were below the limit of detection) to 2.8 µg/m^3. Health-based AMCVs are safe levels at which exposure is unlikely to result in adverse health effects. When compared to TCEQ's AMCVs for crystalline silica (24 µg/m^3 for 24-hour exposure; 0.27 µg/m^3 for long-term exposure) the ambient air concentrations of crystalline silica near APOs are generally not likely to cause acute or chronic adverse health effects and are not associated with silicosis.

Estimates of Crystalline Silica Emissions from Concrete Batch Plants

To estimate the concentrations of respirable crystalline silica from concrete batch plants operations, we can assess the fraction of crystalline silica in Portland cement and fly ash and compare that to the modeled PM concentrations attributable to those sources. This will allow for the estimation of the amount of crystalline silica in PM emitted from concrete batch plants.

This analysis used the modeling parameters and PM concentrations presented in the 2012 memo: Concrete Batch Plant Standard Permit Protectiveness Review. The estimated PM concentrations for silo and fugitive emissions (these are emissions from cement and fly ash) were calculated as the fraction of silo + fugitive divided by total emissions for both PM_{10} and $PM_{2.5}$. The crystalline silica concentrations were estimated by assuming that 1.66% of those concentrations were composed of crystalline silica (based on high-end estimates in cement (1%) and in fly ash (7%), at a ratio of 89:11 cement: fly ash). To estimate the fraction of PM_4 crystalline silica, TCEQ averaged the $PM_{2.5}$ and $PM_{10\text{-}2.5}$ concentrations. This generated an estimated concentration of PM_4 crystalline silica of 0.225 µg/m^3 for 30 cu yd/hr, and 0.218 µg/m^3 for 300 cu yd/hr. Both concentrations are lower than the PM_4 crystalline silica long-term ESL of 0.27 µg/m^3.

These estimates are conservative (i.e., over-estimated) in the following ways:

- They assume old emissions rates that were about 50% higher than current worst-case emissions rates.
- They use the highest estimates of crystalline silica in Portland cement (assumes 1%, actual is probably < 0.1%), and in fly ash (assumes 7%, range is 1-7%).
- They assume that the PM_4 fraction is an average of $PM_{2.5}$ and $PM_{10\text{-}2.5}$ (in theory this would actually provide the $PM_{6.25}$ fraction).

Health Effects of Crystalline Silica

[8] Texas Commission on Environmental Quality (TCEQ). 2020b. Crystalline Silica. AS-202 (12/20). Available at: www.tceq.texas.gov/assets/public/comm_exec/pubs/as/202.pdf

Silica (silicon dioxide, SiO_2) is the most abundant mineral in the environment, with over 95% of the earth's crust made of minerals containing silica. Silica exists in two forms: crystalline and amorphous. Airborne silica, both in amorphous and crystalline forms, is ubiquitous in the environment, and may be found in airborne particles from various sources such as paved and unpaved roads, wind-blown soil, and agricultural activities, as well as industrial sources such as construction, foundries, glass manufacturing, abrasive blasting or any industrial or commercial use of sand and quartz, as well as mining and rock crushing operations.

Crystalline silica occurs naturally in four crystalline forms: (1) quartz, the most common, which is in granite, shale, and beach sand, and in trace amounts in soil, (2) cristobalite, (3) tridymite, and (4) tripoli. Crystalline silica is significantly more hazardous than amorphous silica and is recognized as an important occupational inhalation hazard. Workers exposed daily for several years up to a lifetime to high occupational levels of fine respirable particles of crystalline silica may develop silicosis, an irreversible, progressive, and fatal, but preventable, lung disease.[9]

In the United States, approximately 2.3 million workers in 676,000 workplaces are exposed to crystalline silica; this includes approximately 2 million workers in the construction industry. Occupations associated with exposures to respirable crystalline silica include construction, stone countertop fabrication, and hydraulic fracking. Virtually any process that involves movement of earth (e.g., mining, farming, and construction), mechanical disturbance of silica-containing products such as masonry and concrete or use of sand or other silica-containing products may potentially expose a worker to crystalline silica.[10]

Workers exposed daily for several years up to a lifetime to high workplace levels of fine particles of crystalline silica may develop silicosis. The effects of inhaled crystalline silica are strictly associated with occupational exposure to particles of respirable size - that is, small enough to be inhaled past the upper airways and penetrate the human lung (e.g., PM_4, PM with a diameter ≤ 4 µm). The size of the particles that cause silicosis is at least 100 times smaller than ordinary sand found on beaches and playgrounds. Because of the natural hardness of silica, high energy is required to fracture this mineral into a respirable size. Activities such as grinding, cutting, sawing, drilling, crushing, and abrasive blasting of stone, rock, concrete, mortar, or brick may generate respirable crystalline silica. Exposure in the workplace is regulated by the Occupational Safety and Health Administration (OSHA).

Despite the vast number of laborers working with silica-containing materials, targeted efforts in workplaces have largely been successful in minimizing potential exposure of workers to respirable crystalline silica and preventing silicosis. It is estimated that during 1987–1997, approximately 3,600–7,300 new silicosis cases were diagnosed yearly in the United States. As reported by the National Institute for Occupational Safety and Health (NIOSH) in 1994, 13,744 deaths with silicosis as a possible contributor (mentioned in the death certificate) occurred in the United States during 1968–1990. Since then, silicosis mortality has declined due to improved industrial hygiene standards and more stringent regulatory standards and guidelines for occupational exposure. A recent resurgence in occurrences of silicosis in younger workers involved with new tasks and occupations (e.g., quartz countertop installation and hydraulic fracturing) emphasizes the need for appropriate industrial hygiene practices. The cumulative dose

[9] ATSDR (2019).
[10] Occupational Safety and Health Administration (OSHA) 2016. Frequently Asked Questions: Respirable Crystalline Silica Rule.

of respirable silica in exposed workers (respirable concentration multiplied by duration of exposure) is the most important factor in the development of silicosis.[11]

The most recent prevalence data for silicosis in Texas is from 2016; in that year, the annual age-adjusted hospitalization rate for silicosis was 4 per one million residents. From 1999 to 2018, the total number of silicosis-associated deaths in Texas was 157, with an age-adjusted death rate of 0.4 per one million residents.[12]

It is important to note that the possible outcomes of community exposure to ambient crystalline silica do not include the potential silicosis risk associated with occupational exposure. Airborne silica, both in amorphous and crystalline forms, is a ubiquitous mineral that is not unique to areas near concrete batch plants, construction sites, and other silica-generating activities, and is not unique to Texas. Moreover, most airborne ambient crystalline silica is not small enough to be inhaled and reach deep into the lungs.

Silicosis in Texas

Silicosis is an occupational lung disease that is caused by long-term exposure to high workplace levels of respirable crystalline silica. Silicosis is a reportable disease in Texas, meaning that health-care providers, hospitals, laboratories, and other designated professionals report confirmed or suspected occupational cases of and deaths from silicosis to the Texas Department of State Health Services (TDSHS), which then reports the data to the Centers for Disease Control and Prevention (CDC).

In 2014, the TDSHS received a report of the first case of silicosis reported in the United States associated with silica dust exposure during fabrication of engineered stone countertops.[13] In 2019, the TDSHS received reports of an apparent cluster of 12 silicosis cases among workers at an engineered stone countertop manufacturing and fabrication facility.[14] Silicosis is defined as an occupational disease, meaning that workers who are exposed to high levels of silica occupationally are at risk of developing silicosis. The general public is not at risk of developing silicosis; however, some members of the general public could potentially be exposed to high levels of silica through hobbies, such as pottery making.Because the reporting rules of the CDC and TDSHS do not allow public reporting of deaths fewer than 10 and 5, respectively, for each year, the exact number of deaths in Texas from silicosis is not publicly available for each year, but they are generally below 10 from 2005-2016. The TDSHS provided data from 2011-2016 showing between 35 and 38 total deaths from silicosis in Texas, resulting in an approximate average annual age-adjusted silicosis death rate of 0.3 per one million Texas residents. In Texas, the total number of silicosis-associated deaths was 157 from 1999-2018, with an age-adjusted death rate of 0.4 per one million residents.[15]

[11] ATSDR (2019).
[12] Bell JL, JM Mazurek. 2020. Trends in Pneumoconiosis Deaths — United States, 1999–2018. MMWR. 69:693–698.
[13] Friedman GK, R Harrison, J Bojes, K Worthington, M Filios. 2015. Silicosis in a countertop fabricator – Texas, 2014. MMWR. 64:129-130.
[14] Rose C, A Heinzerling, K Patel, C Sack, J Wolff, L Zell-Baran, D Weissman, E Hall, R Sooriash, RB McCarthy, H Bojes, B Korotzer, J Flattery, JL Weinberg, J Potocko, KD Jones, CK Reeb-Whitaker, NK Reul, CR LaSee, BL Materna, G Raghu, R Harrison. 2019. Severe silicosis in engineered stone fabrication workers – California, Colorado, Texas, and Washington, 2017-2019. MMWR. 68:813-818.
[15] Bell and Mazurek (2020).

COMMENT 8

Group A asked why the TCEQ cannot deny a permit application when it is administratively complete and why the applicant is provided an opportunity to correct deficiencies in the application. Groups D and E are concerned that the standard permit application process does not take into consideration the reputation and prior history of the applicant. They state that an applicant should be required to demonstrate that there is no history of ignoring federal, state, or local laws, rules, and regulations and that if evidence is provided to TCEQ that the applicant does have a history of ignoring such rules, the applicant should not be allowed to have that permit.

RESPONSE 8

A thorough administrative and technical review is conducted for air permit applications to ensure they meet the requirements of all applicable state and federal standards. During the review, if additional information is needed or there are questions, the applicant receives a notice of deficiency (NOD) and is provided an opportunity to correct the information. The NOD process is common in all permitting processes at the TCEQ. Applicants who cannot provide sufficient information to demonstrate that the requirements for obtaining a permit are met will not be issued a permit.

During the technical review of the permit application, a compliance history review of both the company and the site is conducted based on the criteria in 30 TAC Chapter 60. Specifically, the agency will utilize compliance history when making decisions regarding the issuance, renewal, amendment, modification, denial, suspension, or revocation of a permit; enforcement; the use of announced investigations; and participation in innovative programs. The compliance history is reviewed for the five-year period prior to the date the permit application was received and includes multimedia compliance-related components about the site under review. These components include: enforcement orders, consent decrees, court judgments, criminal convictions, chronic excessive emissions events, investigations, notices of violations, audits and, violations disclosed under the Audit Act, environmental management systems, voluntary on-site compliance assessments, voluntary pollution reduction programs, and early compliance. However, the TCEQ does not have jurisdiction to consider violations outside of the State of Texas.

A company and site may have one of the following classifications and ratings:

- High: rating below 0.10 – complies with environmental regulations extremely well;
- Satisfactory: rating 0.10 – 55.00 – generally complies with environmental regulations;
- Unsatisfactory: rating greater than 55.00 – fails to comply with a significant portion of the relevant environmental regulations.

If the applicant has provided a demonstration they will construct and operate the plant in accordance with the standard permit, the Executive Director must approve the application and issue the permit or registration.

COMMENT 9

Commenters asked about the validity of authorizations under the standard permit for concrete batch plants issued since 2012. Group E asked if the concrete batch plants permitted since 2012 are noncompliant with the rules and if this amendment is designed to allow them to continue to operate.

Group D commented that time is needed to review the applicability of this rule change to hundreds of existing concrete batch plants, all over Texas.

RESPONSE 9

As discussed above, the TCEQ conducted a protectiveness review to ensure emissions from facilities authorized by the standard permit are protective of human health and the environment. The TCEQ based the technical requirements contained in the standard permit on the results of the protectiveness review and determined that emissions from facilities operating under the Standard Permit for Concrete Batch Plants are protective of human health and the environment.

The TCEQ is committed to ensuring that permits issued are protective of human health and the environment. The purpose of this rulemaking is to amend the current Standard Permit for Concrete Batch Plants to include this provision that was inadvertently omitted. However, this amendment does not alter the protectiveness review and will not authorize additional emissions, or the emission of air contaminants not previously authorized by the Standard Permit for Concrete Batch Plants. Thus, permits issued since 2012 remain protective of human health and the environment.

COMMENT 10

Groups A, B, D, and E are concerned that the standard permit does not include consideration for local communities' ability to participate in the permitting process. The commenters stated that concrete batch plants are often located in underserved neighborhoods, rural communities, communities of color, and low-income areas with a lack of resources, understanding, limited representation, or an inability to participate in the permitting process.

Group A, B, D, and E asked why the proposed amendment did not include notification to or representation of non-English speaking communities.

A commenter expressed concern for citizens who live in rural areas. Their concern is that citizens in rural areas are not receiving the same protections as urban residents where local ordinances may provide a more rigorous review process for applicants.

An individual in Group B commented that there are provisions in the Texas Water Code that would allow the TCEQ to consider environmental justice impacts as well as other things that may be considered outside of the scope of this proposed amendment.

RESPONSE 10

The commission appreciates the comments. The TCEQ is committed to ensuring that permits issued are protective of human health and the environment.

Air permits evaluated by the TCEQ are reviewed without reference to the socioeconomic or racial status of the surrounding community. The TCEQ is committed to protecting the health of the people of Texas and the environment regardless of location. Although there are no TCEQ rules addressing environmental equity issues, such as the location of permitted facilities in areas with minority and low-income populations, disparate exposures of pollutants to minority and low-income populations, or the disparate economic, environmental, and health effect on minority and low-income populations, the TCEQ has committed to address environmental equity.

Notice for the change to the standard permit was published in accordance with 30 TAC § 116.603, Public Participation in Issuance of Standard Permits. Specifically, notice was published in newspapers of general circulation in each of the following metropolitan and regional areas affected by the proposed activity: Houston, Dallas, and Austin. Additionally, notice was published in the *Texas Register*, and a press release was issued. Electronic notification was also provided to state and local officials. Bilingual notice was not required per state statute or rule.

The TCEQ also encourages participation in the permitting process. The Office of the Chief Clerk works to help the public and neighborhood groups participate in the regulatory process to ensure that agency programs that may affect human health or the environment operate without discrimination and to make sure that concerns are considered thoroughly and are handled in a way that is fair to all. You may contact the Office of the Chief Clerk at 512-239-3300 for further information.

More information on Environmental Equity may be found on the TCEQ website: www.tceq.texas.gov/agency/decisions/hearings/envequ.html

COMMENT 11

Commenters in Groups D and E identified specific issues related to quarries, cement kilns, and unidentified proposed concrete batch plants in Houston, Comal County, and the Canyon Lake area. In addition, commenters requested that additional changes be made to the standard permit such as adding requirements of the concrete batch plant with enhanced controls standard permit.

RESPONSE 11

The executive director appreciates the comments, but these issues are outside the scope of the proposed amendment. No change has been made to the standard permit in response to this comment.

COMMENT 12

Commenters are concerned that the standard permit for concrete batch plant does not require local air monitoring. They stated that emission monitoring is one tool that can be used to ensure concrete batch plants are complying with requirements as well as providing transparency to local communities who are concerned about emissions from concrete batch plants. Group D requested that the standard permit include monitoring and reporting requirements for concrete plant operations and that monitoring results be used to ensure compliance with enforceable limits and also be made available to the public. Groups D and E do not believe that the TCEQ has sufficient particulate monitoring capability near existing concrete batch plants.

RESPONSE 12

The executive director appreciates the comment, but this is outside the current scope of the proposed amendment. No change has been made to the standard permit in response to this comment.

COMMENT 13

Commenters asked that additional items be included in the standard permit application review, including that local requirements are met. Group E stated that concrete batch plants are detrimental to property values and pride of ownership and the economic impact of the concrete batch plant should be included in the application review process. Group E also requests that the TCEQ require reports of the percentage of children with asthma, birth defects, developmental abnormalities, autoimmune disease, cancer, etc. in nearby schools before approving additional sources of emissions. Group E are concerned that once a permit is issued, TCEQ does not have the ability or desire to inspect facilities or enforce the conditions of the standard permit.

RESPONSE 13

The executive director appreciates the comment, but this is outside the current scope of the proposed amendment. No change has been made to the standard permit in response to this comment.

COMMENT 14

Groups C, D, and E expressed appreciation for the efforts of the TCEQ staff and the opportunity to provide input to the process.

Group C expressed support for the proposed amendment. They recognize that the exemption was inadvertently removed in 2012 and noted that the amendment will bring the Standard Permit for Concrete Batch Plants back into alignment with the other construction materials industry standard permits (Concrete Batch Plants with Enhanced Controls, Temporary Rock/Concrete Crushers, Permanent Rock/Concrete Crushers, and Hot Mix Asphalt Plants).

RESPONSE 14

The executive director appreciates the support.

VIII. Statutory Authority

This standard permit is issued under Texas Health and Safety Code (THSC), §382.011, General Powers and Duties, which authorizes the commission to control the quality of the state's air, THSC §382.023, Orders, which authorizes the commission to issue orders necessary to carry out the policy and purposes of the TCAA, THSC §382.051, Permitting Authority of the Commission; Rules, which authorizes the commission to issue permits, including standard permits for similar facilities for numerous similar sources, THSC §382.0513, Permit Conditions, which authorizes the commission to establish and enforce permit conditions consistent with Subchapter C of the TCAA, and THSC §382.05195, Standard Permit, which authorizes the commission to issue standard permits according to the procedures set out in that section.