

**UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF LOUISIANA**

**ELIAS JORGE “GEORGE”
ICTECH-BENDECK,
Plaintiff**

CIVIL ACTION

VERSUS

**NO. 18-7889
c/w 18-8071,
18-8218, 18-9312**

**WASTE CONNECTIONS
BAYOU, INC., ET AL.,
Defendants**

SECTION: “E” (5)

Related Case:

**FREDERICK ADDISON, ET AL.,
Plaintiffs**

CIVIL ACTION

VERSUS

**NO. 19-11133
c/w 19-14512**

**LOUISIANA REGIONAL
LANDFILL COMPANY, ET AL.,
Defendants**

SECTION: “E” (5)

Applies to: All Cases

FINDINGS OF FACT AND CONCLUSIONS OF LAW

This case concerns the operation of the Jefferson Parish Landfill (the “Landfill”), and the resulting odors Plaintiffs allege were emitted from the Landfill causing damage from July 1, 2017 to December 31, 2019 (the “relevant time period”). *Ictech-Bendeck v. Waste Connections Bayou, Inc.* is a consolidation of several proposed class actions. Elias Jorge “George” Ictech-Bendeck; Savannah Thompson; Nicole M. Landry-Boudreaux; Larry Bernard, Sr.; and Mona Bernard, individually, and on behalf of similarly situated individuals, (the “*Ictech-Bendeck* Plaintiffs”) seek damages for violations of the

obligations of neighborhood under Louisiana Civil Code articles 667-669.¹ *Addison v. Louisiana Regional Landfill Co.* is a consolidation of two mass actions containing over 500 individual Plaintiffs (the “*Addison* Plaintiffs”). The *Addison* Plaintiffs seek damages for negligence under Louisiana Civil Code articles 2315, 2315.1, and 2316 as well as for violations of the obligations of neighborhood under Louisiana Civil Code articles 667-669.² Both the *Ictech-Bendeck* Plaintiffs and the *Addison* Plaintiffs (collectively, the “Plaintiffs”) name as Defendants Jefferson Parish, which owns and contracts with others to operate the Landfill; Aptim Corporation, which managed the gas and leachate collection systems of the Landfill from July 2017 to May 2019; and three entities that operated the Landfill from May 2013 to December 2020: Louisiana Regional Landfill Company (formerly known as IESI LA Landfill Corporation); Waste Connections Bayou, Inc. (formerly known as Progressive Waste Solutions of LA, Inc.); and Waste Connections US, Inc. (collectively, the “Defendants”).³

The parties agree resolution of the issue of “general causation” will help narrow the focus of the case and the issues at stake.⁴ The parties consented to the Court determining the issue of general causation.⁵ Before trial, the Court ruled⁶ on *Daubert* motions seeking to exclude expert testimony based on qualifications or methodology.⁷ The Court prohibited one of Plaintiff’s experts, Dr. Susan Schiffman, from testifying as to the ability

¹ No. 18-7889, R. Doc. 48. The *Ictech-Bendeck* Plaintiffs also made claims for negligence, gross negligence, and potential premises liability in their Amended and Superseding Master Class Action Complaint for Damages, but they have since clarified the only causes of action they bring are under articles 667-669. No. 18-7889, R. Doc. 66 at 4.

² No. 19-11133, R. Doc. 109.

³ No. 18-7889, R. Doc. 48 ¶ 2; No. 19-11133, R. Doc. 109 ¶ 2.

⁴ No. 18-7889, R. Doc. 162 at 2; No. 19-11133, R. Doc. 202 at 2.

⁵ No. 18-7889, R. Doc. 162 at 8; No. 19-11133, R. Doc. 202 at 8.

⁶ No. 18-7889, R. Docs. 214, 221 (Court’s rulings); No. 19-11133, R. Docs. 249, 256 (same).

⁷ No. 18-7889, R. Docs. 165, 166, 169, 170, 171, 172, 173, 174, 176 (*Daubert* motions); No. 19-11133, R. Docs. 206, 207, 208, 209, 210, 211, 212, 213, 214 (same).

of odors to produce certain physiological effects due to her lack of qualifications.⁸ The Defendants listed as witnesses several experts—Dr. Karen Vetrano, Dr. John Kind, and Dr. Pamela Dalton—who were offered to rebut the testimony of Dr. Schiffman. The Court excluded as irrelevant any testimony meant to rebut Dr. Schiffman on areas on which she was precluded from testifying.⁹ The Court also excluded testimony by Dr. Vetrano, Dr. Kind, and Dr. Dalton to the extent it is cumulative.¹⁰ The Court denied the remaining Daubert motions, which largely attacked the experts’ methodology, as going to the weight of the evidence.¹¹

The Court held a trial on general causation, which took place on January 31, February 1-4, and February 22-25, 2022.¹² At trial, the Court heard live testimony from Joseph Buller, Jr.; Brian DeJean; Jose Sananes; Dr. Jaana Pietari; James Lape; Dr. Susan Schiffman; Dr. Pamela Dalton; Dr. John Kind; Dr. Paolo Zannetti; Matthew Stutz; Dr. Tarek Abichou; Jeffrey Marshall; and Dr. Mark Yocke.¹³ The parties submitted excerpts of the Rule 30(b)(6) deposition of Waste Connections US, Inc., through corporate representative Brett O’Conner, and the Rule 30(b)(6) deposition of Jefferson Parish, through its representative Michael Lockwood. The Court admitted into evidence Exhibits 2-6, 6a, 7-9, 11, 13-18, 21, 23-27, 30, 32-40, 42-43, 49, 69-72, 75, 78, 80, 87, 124-126, 135, 137, 139, 214, 237, 249, 325-326, 330, 335, 342, 348-349, 351, 355, 361-362, 368, 370, 381, 397, 403, 407-408, 413-417, 421, 423, 429-430, 432, 434, 436-439, 441, 443, 446,

⁸ No. 18-7889, R. Doc. 214 at 3-4; No. 19-11133, R. Doc. 249 at 3-4.

⁹ No. 18-7889, R. Doc. 221 at 7; No. 19-11133, R. Doc. 256 at 7.

¹⁰ *Id.*

¹¹ No. 18-7889, R. Doc. 221 at 5-6; No. 19-11133, R. Doc. 256 at 5-6.

¹² No. 18-7889, R. Docs. 243-247, 256-259 (Minute Entries); No. 19-11133, R. Docs. 274-278, 286-289 (same).

¹³ The transcripts of the General Causation Trial are in No. 18-7889, R. Docs. 267-282; No. 19-11133, R. Docs. 294-309.

449-451, 453, 465, 467, 471, 471a, 502, 502a, 505, 514-516, 520-521, 544-546, 553, 696, 698, 927, 929-930, 1014-1015, 1047, 1058, 1186, 1197, 1204, 1206-1207, 1254, 1266-1267, 1275-1276, 1280, 1296-1313, 1314a, 1314b, 1314c, 1315a, 1315b, 1316, 1317a, 1317b, 1318, 1319a, 1319b, and 1319c. After trial, the Plaintiffs and Defendants submitted post-trial briefs, and the Plaintiffs submitted a reply brief.¹⁴

Having considered the testimony and evidence presented at trial, the depositions, the arguments of counsel, and the applicable law, the Court now issues these Findings of Fact and Conclusions of Law in accordance with Rule 52(a) of the Federal Rules of Civil Procedure. To the extent any findings of fact may be construed as conclusions of law, the Court adopts them as such. To the extent any conclusions of law may be construed as findings of fact, the Court adopts them as such.

CASE MANAGEMENT ORDER DEFINES GENERAL CAUSATION

In all seven versions of the parties' Case Management Order, "general causation" is defined as "the determination of whether odors and gases were being emitted by the Jefferson Parish Landfill during the relevant time period and whether any such odors and gases were capable of producing the injuries claimed by any one or more of the Plaintiffs in this case."¹⁵ This definition incorporates three elements: 1) whether odors and gases were emitted by the Landfill, 2) whether the gases and odors were emitted during the relevant time period, and 3) whether the emitted odors and gases were capable of producing the injuries claimed by any one or more of the Plaintiffs.

¹⁴ No. 18-7889, R. Docs. 261, 265, 266; No. 19-11133, R. Docs. 291, 292, 293.

¹⁵ See, e.g., No. 18-7889, R. Doc. 162 at 2 (Seventh Case Management Order); No. 19-11133, R. Doc. 202 at 2 (same).

FINDINGS OF FACT

I. Odors and Gases Were Emitted by the Landfill.

The Landfill is an active municipal solid waste landfill located at 5800 Highway 90 West, Avondale, Louisiana, on the West Bank of the Mississippi River in Jefferson Parish.¹⁶ The Landfill abuts the River Birch Landfill, the Highway 90 Construction and Demolition Debris Landfill, and undeveloped land.¹⁷

The Landfill is divided into distinct “phases” for purposes of operation, and each phase is developed, permitted, operated, and—where relevant—closed separately.¹⁸ Phases are composed of subunits called “cells,” which are areas separately prepared to accept waste materials.¹⁹ The active phase of the Landfill is phase 4A, which began accepting waste in approximately May 2013.²⁰ Phase 4A is composed of cells 20, 21, 22, 23, and 24.²¹

The Landfill accepted residential waste from households within Jefferson Parish and commercial waste from businesses within Jefferson Parish—known as municipal solid waste—as well as some industrial waste, which the Landfill was allowed to import from outside Jefferson Parish in limited amounts as “special waste.”²² In October 2016 the Landfill first began accepting “spent lime” as a special waste.²³ Spent lime is an industrial byproduct created when an industry uses lime-based sorbents to reduce the amount of sulfur dioxide in air emissions.²⁴ All spent lime contains some amount of

¹⁶ No. 18-7889, R. Doc. 242-2 at ¶¶ 1-2; No. 19-11133, R. Doc. 273-2 at ¶¶ 1-2.

¹⁷ No. 18-7889, R. Doc. 242-2 at ¶ 8; No. 19-11133, R. Doc. 273-2 at ¶ 8.

¹⁸ No. 18-7889, R. Doc. 242-2 at ¶¶ 15-16; No. 19-11133, R. Doc. 273-2 at ¶¶ 15-16.

¹⁹ Transcript of General Causation Trial, R. Doc. 267 at 21-22.

²⁰ No. 18-7889, R. Doc. 242-2 at ¶¶ 29-30; No. 19-11133, R. Doc. 273-2 at ¶¶ 29-30.

²¹ No. 18-7889, R. Doc. 242-2 at ¶ 27; No. 19-11133, R. Doc. 273-2 at ¶ 27.

²² Transcript of General Causation Trial, R. Doc. 267 at 15; No. 18-7889, R. Doc. 242-2 at ¶ 81; No. 19-11133, R. Doc. 273-2 at ¶ 81.

²³ No. 18-7889, R. Doc. 242-2 at ¶ 86; No. 19-11133, R. Doc. 273-2 at ¶ 86.

²⁴ No. 18-7889, R. Doc. 242-2 at ¶¶ 83-84; No. 19-11133, R. Doc. 273-2 at ¶¶ 83-84.

sulfate.²⁵ Sulfur-containing wastes may generate hydrogen sulfide gas under certain landfill conditions.²⁶

Hydrogen sulfide may be produced in a landfill when there is liquid water, a source of soluble sulfate, sulfate-reducing bacteria, organic material, an anoxic environment (*i.e.*, lacking oxygen), an appropriate pH range (between 4 and 9), and an appropriate temperature range (between 86°F and 100°F).²⁷ These conditions will “likely be present in a [municipal solid waste] co-disposal scenario.” Gypsum, chemically known as calcium sulfate dihydrate, and fly ash are sources of soluble sulfate.²⁸ Spent lime contains gypsum.²⁹

The source of the spent lime accepted by the Landfill beginning in 2016 was Rain CII Carbon LLC (“Rain Carbon”), which had plants in Norco and Chalmette.³⁰ Between October 17, 2016, and July 2018, the Landfill accepted as a special waste approximately 23,000 tons of spent lime from Rain Carbon.³¹ The Landfill received approximately 2,601 tons in 2016; 13, 905 tons in 2017; and 6,498 tons in 2018.³² Rain Carbon reported to the Landfill that its spent lime contained 5-20% gypsum.³³ Rain Carbon later reported to the Louisiana Department of Environmental Quality (“LDEQ”) that its spent lime contained 40-50% gypsum.³⁴ The Landfill disposed of the spent lime in phase 4A.³⁵ The Landfill originally disposed of the spent lime in the same way it disposed of other waste. Beginning

²⁵ No. 18-7889, R. Doc. 242-2 at ¶ 92; No. 19-11133, R. Doc. 273-2 at ¶ 92.

²⁶ No. 18-7889, R. Doc. 242-2 at ¶ 93; No. 19-11133, R. Doc. 273-2 at ¶ 93.

²⁷ Exhibit 441 at Bates No. 75384-85 (2017 Paper by Jeffrey Marshall).

²⁸ *Id.*

²⁹ Transcript of General Causation Trial, R. Doc. 279 at 1607, R. Doc. 280 at 1637.

³⁰ Transcript of General Causation Trial, R. Doc. 267 at 21; No. 18-7889, R. Doc. 242-2 at ¶ 85; No. 19-11133, R. Doc. 273-2 at ¶ 85.

³¹ No. 18-7889, R. Doc. 242-2 at ¶¶ 85-86; No. 19-11133, R. Doc. 273-2 at ¶¶ 85-86.

³² No. 18-7889, R. Doc. 242-2 at ¶ 85; No. 19-11133, R. Doc. 273-2 at ¶ 85.

³³ Transcript of General Causation Trial, R. Doc. 267 at 27; Exhibit 14 at Bates No. 333876.

³⁴ Transcript of General Causation Trial, R. Doc. 267 at 46-47; Exhibit 1275 at 10, 14; Exhibit 1276 at 10, 14.

³⁵ No. 18-7889, R. Doc. 242-2 at ¶ 88; No. 19-11133, R. Doc. 273-2 at ¶ 88.

in the second half of 2017, the Landfill also began to use the spent lime as a solidification agent in its solidification pit located within phase 4A on its southern edge.³⁶ The solidification pit is a dug-out pit in which liquid wastes were combined with a solidification agent in order to solidify the liquid waste so that the waste could be dug out and disposed of in the working face of phase 4A.³⁷ One of the liquid wastes solidified in the solidification pit was sewerage sludge.³⁸ This solidification process mixed sulfate-containing spent lime with liquid.

The Landfill also used fly ash as a solidification agent in the solidification pit.³⁹ Fly ash is another industrial waste product that contains sulfates.⁴⁰ The Landfill received fly ash on December 20, 2017; December 21, 2017; and June 21, 2018, for a total of 149.2 tons.⁴¹ This solidification process mixed sulfate-containing fly ash with liquid.

Citizen odor complaints to Jefferson Parish began increasing in 2017 and continued unabated into 2018.⁴² Jefferson Parish employees and landfill consultants hired by the Parish were concerned that the use of spent lime and fly ash in the solidification pit was causing elevated hydrogen sulfide emissions. By May 2018, Jefferson Parish had retained Carlson Environmental Consultants (“CEC”) to assist with assessing the condition and operation of the Landfill’s gas collection and control system.⁴³ CEC performed an initial field assessment on May 14-18, 2018, and completed its

³⁶ No. 18-7889, R. Doc. 242-2 at ¶¶ 86, 89, 91; No. 19-11133, R. Doc. 273-2 at ¶¶ 86, 89, 91; Transcript of General Causation Trial, R. Doc. 267 at 32.

³⁷ Transcript of General Causation Trial, R. Doc. 267 at 26; No. 18-7889, R. Doc. 242-2 at ¶ 91; No. 19-11133, R. Doc. 273-2 at ¶ 91.

³⁸ Transcript of General Causation Trial, R. Doc. 267 at 40.

³⁹ No. 18-7889, R. Doc. 242-2 at ¶ 90; No. 19-11133, R. Doc. 273-2 at ¶ 90.

⁴⁰ Transcript of General Causation Trial, R. Doc. 267 at 26-27; Exhibit 441 at Bates No. 75384.

⁴¹ No. 18-7889, R. Doc. 242-2 at ¶ 90; No. 19-11133, R. Doc. 273-2 at ¶ 90.

⁴² Transcript of General Causation trial, R. Doc. 267 at 36; Exhibit 415 at Bates No. 00269999.

⁴³ No. 18-7889, R. Doc. 242-2 at ¶ 110; No. 19-11133, R. Doc. 273-2 at ¶ 110.

preliminary findings on May 31, 2018.⁴⁴ CEC “made a basic inquiry into the source of the elevated [hydrogen sulfide] emissions” and, citing a paper by Jeff Marshall attached to its report,⁴⁵ reported that fly ash used to solidify liquid wastes can cause odors, noting “[f]ly ash contains soluble sulfates that when mixed with water and the right conditions . . . can produce [hydrogen sulfide] gas.”⁴⁶ CEC also noted “[t]he [hydrogen sulfide] emissions noted at the facility were in the areas where the fly ash was used.”⁴⁷

Richard Buller, a landfill engineer employed by Jefferson Parish from November 1994 to July 27, 2018, testified at the trial. His job was to monitor the contractors operating the Landfill to ensure they were complying with their contracts and environmental permits.⁴⁸ After reading the preliminary findings from CEC, Mr. Buller “believe[d] that the same process that . . . [CEC] warned about with the fly ash was really applicable to the [spent] lime as well.”⁴⁹ He was convinced the solidification process was causing odorous emissions.⁵⁰ On June 28, 2018, Mr. Buller emailed Brett O’Conner, an engineer employed by Waste Connections. Mr. Buller referred to CEC’s findings and stated, “We need to consider closing the solidification pit. . . . Unless there is another solidification agent that does not contribute sulfate, then we need to stop this.”⁵¹ On July 2, 2018, Mike Lockwood, the director of the Jefferson Parish Department of Environmental Affairs, based on CEC’s findings, “asked that we institute a moratorium on the acceptance of liquid industrial wastes that require solidification with fly ash or

⁴⁴ Exhibit 4.

⁴⁵ Exhibit 441 at Bates No. 75384-85 (2017 Paper by Jeffrey Marshall).

⁴⁶ *Id.* at Bates No. 19685.

⁴⁷ *Id.*

⁴⁸ Transcript of General Causation Trial, R. Doc. 267 at 14, 19.

⁴⁹ *Id.* at 27; Exhibit 414.

⁵⁰ Transcript of General Causation Trial, R. Doc. 267 at 31.

⁵¹ Exhibit 414 at Bates No. 271260.

lime.”⁵² Mr. Buller forwarded this request to personnel from Waste Connections and explained, “[W]e are of the opinion that the sulfates added to the waste through the [spent] lime or fly ash solidification agent is increasing the production of [hydrogen sulfide] within the buried waste.”⁵³ Specifically, he stated “ we are concerned with odors being generated by wastes after they are buried.”⁵⁴ In July 2018, the Jefferson Parish Council passed a resolution approving the moratorium.⁵⁵

Measurements inside the landfill mass confirmed phase 4A of the Landfill was generating abnormally high amounts of hydrogen sulfide. During its field inspection on May 14-18, 2018, CEC used Draeger tubes to test the levels of hydrogen sulfide within the gas collection wells in phase 4A of the Landfill.⁵⁶ The highest level of hydrogen sulfide a Draeger tube can measure is 2,000 parts per million (“ppm”).⁵⁷ CEC measured hydrogen sulfide concentrations in six gas collection wells in phase 4A and documented concentrations in excess of 2,000 ppm.⁵⁸ A normal measurement of hydrogen sulfide in a landfill is around 50 ppm.⁵⁹

Brian Dejean is the chief operating officer of the gas plant at the River Birch Landfill, which is located next door to the Landfill.⁶⁰ During 2018 and 2019, he assessed the Landfill’s gas collection system. On August 31, 2018, Mr. Dejean and his team used Draeger tubes to test the levels of hydrogen sulfide within the gas collection wells in phase 4A of the Landfill.⁶¹ The Draeger tubes used to measure three gas collection wells in phase

⁵² Exhibit 415 at Bates No. 270000.

⁵³ *Id.*

⁵⁴ *Id.* at 269998.

⁵⁵ Transcript of General Causation Trial, R. Doc. 267 at 37.

⁵⁶ Exhibit 4 at Bates No. 19684.

⁵⁷ *Id.*; Transcript of General Causation Trial, R. Doc. 267 at 86.

⁵⁸ Exhibit 4 at Bates No. 19684.

⁵⁹ *Id.*

⁶⁰ Transcript of General Causation Trial, R. Doc. 267 at 71.

⁶¹ *Id.* at 85-86; Exhibit 361; Exhibit 544 at Bates No. 3492-93.

4A each measured 2,000 ppm, the maximum possible measurement.⁶² In comparison, Mr. Dejean testified that 100 ppm is the expected level of hydrogen sulfide in a gas collection well at the River Birch Landfill.⁶³ In May 2019, River Birch, with Mr. Dejean in charge, took over management of the gas collection system and leachate collection system at the Landfill.⁶⁴

Phase 4 of the Landfill contained excessive leachate. Leachate is a liquid that has passed through or emerged from solid waste and may contain soluble, suspended, or miscible materials removed from such wastes.⁶⁵ Leachate may come from rainwater infiltration or be generated within a landfill as waste degrades.⁶⁶ Each phase of the Landfill has a leachate collection system designed to remove leachate from the Landfill.⁶⁷ A leachate collection system consists of perforated pipes, called leachate risers, and pumps which are placed in an engineered low point at the bottom of a cell.⁶⁸ A transducer connected to the pumps transmits to a control panel a measurement of the depth of leachate in inches from the bottom of the cell.⁶⁹

LDEQ's regulations allow only one foot of leachate from the bottom of a cell.⁷⁰ During CEC's May 14-18, 2018, field inspection, only half of the leachate riser pumps on the Landfill were operational.⁷¹ On May 31, 2018, Mr. Buller found leachate riser 22N in phase 4A showed a fifteen-inch depth of leachate, and the "pump didn't appear to be

⁶² Transcript of General Causation Trial, R. Doc. 267 at 86; Exhibit 361; Exhibit 544 at Bates No. 3492-93.

⁶³ Transcript of General Causation Trial, R. Doc. 267 at 86.

⁶⁴ *Id.*

⁶⁵ No. 18-7889, R. Doc. 242-2 at ¶ 47; No. 19-11133, R. Doc. 273-2 at ¶ 47.

⁶⁶ *Id.*

⁶⁷ No. 18-7889, R. Doc. 242-2 at ¶¶ 48-49; No. 19-11133, R. Doc. 273-2 at ¶¶ 48-49.

⁶⁸ Transcript of General Causation Trial, R. Doc. 267 at 93-94, R. Doc. 268 at 144.

⁶⁹ *Id.* at 144.

⁷⁰ Transcript of General Causation Trial, R. Doc. 267 at 97; Exhibit 544 at Bates No. 3494.

⁷¹ Exhibit 4 at Bates No. 19682.

running.”⁷² The day before, leachate riser 22N showed a leachate depth of seventeen inches.⁷³ Leachate risers 20-22S in phase 4A had blank control panels, indicating a lack of power.⁷⁴ On July 31, 2018, Mr. Dejean and his team found four of the six leachate pumps in phase 4A were not working.⁷⁵ Of these four inactive pumps, two did not have power, and two had power but nevertheless were not working, showing “[h]igh level alarms” with liquid above fifteen feet.⁷⁶ On August 3, 2018, as noted by Mr. Dejean, 70% of the pumps in the entire Landfill’s leachate system did not work, and the leachate collection system overall was “flooded.”⁷⁷ In phase 4A, only one pump was working properly.⁷⁸ One transducer measured 152 inches of leachate, two transducers measured two inches of leachate, and three transducers gave an error code.⁷⁹ In the week ending June 6, 2019, according to Mr. Dejean and his team, four of the six pumps in phase 4A were not working.⁸⁰

The Landfill’s deficiencies in collecting leachate through the use of riser pumps contributed to the generation of hydrogen sulfide. When a leachate pump is not operating, the leachate sits and saturates the waste, and has the potential to flood the cell.⁸¹ Flooding of a cell may cause liquids to seep out onto the surface of the soil, known as a leachate breakout.⁸² Based on Mr. Dejean’s testimony, leachate breakouts did in fact occur at the

⁷² Exhibit 416.

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ Exhibit 351 at Bates No. 66.

⁷⁶ *Id.*

⁷⁷ Exhibit 348 at Bates No. 13-14; Transcript of General Causation Trial, R. Doc. 267 at 97-98.

⁷⁸ Exhibit 348 at Bates No. 13.

⁷⁹ *Id.*; Transcript of General Causation Trial, R. Doc. 267 at 147-49.

⁸⁰ Exhibit 335 at Bates No. 129.

⁸¹ Transcript of General Causation Trial, R. Doc. 267 at 97; Exhibit 544 at Bates No. 3494.

⁸² Transcript of General Causation Trial, R. Doc. 267 at 94; Exhibit 544 at Bates No. 3494.

Landfill.⁸³ On May 31, 2018, Mr. Buller found several leachate seeps on the surface of the Landfill.⁸⁴ The “largest” was uphill in cell 20 in phase 4A.⁸⁵

On June 22, 2018, LDEQ issued a Compliance Order to Jefferson Parish due to violations related to the Landfill’s leachate collection system, based on LDEQ inspections that took place on or about April 27, 2018, and April 30, 2018.⁸⁶ During these inspections, the LDEQ inspector documented “four areas where leachate was pooled and one area where leachate was flowing downhill.”⁸⁷ The inspector was informed by Mr. Buller that “the leachate collection system is not operating properly,” and the inspector concluded “[t]he facility has failed to maintain their leachate collection system in a pumped down condition.”⁸⁸ On September 18, 2018, LDEQ issued a Consolidated Compliance Order and Notice of Potential Penalty to Jefferson Parish due to violations related to the leachate collection system, based on inspections that took place on July 31, 2018, and August 7, 2018.⁸⁹ On March 11, 2019, LDEQ issued another Consolidated Compliance Order and Notice of Potential Penalty to Jefferson Parish alleging violations related to the leachate inspection system, based on inspections that took place between October 1, 2018, and November 30, 2018.⁹⁰

Landfills typically seek to control gas and odors through a gas collection system.⁹¹ A typical gas collection system consists of (i) vertical wells drilled into waste to extract gas, (ii) lateral piping and headers to convey collected gas, (iii) blowers that exert vacuum

⁸³ Transcript of General Causation Trial, R. Doc. 267 at 94.

⁸⁴ Exhibit 416.

⁸⁵ *Id.*

⁸⁶ No. 18-7889, R. Doc. 242-2 at ¶ 77; No. 19-11133, R. Doc. 273-2 at ¶ 77.

⁸⁷ Exhibit 553 at 2.

⁸⁸ *Id.* at 5.

⁸⁹ No. 18-7889, R. Doc. 242-2 at ¶ 78; No. 19-11133, R. Doc. 273-2 at ¶ 78.

⁹⁰ No. 18-7889, R. Doc. 242-2 at ¶ 80; No. 19-11133, R. Doc. 273-2 at ¶ 80.

⁹¹ Transcript of General Causation Trial, R. Doc. 268 at 188-89.

throughout the system, and (iv) a flare to destroy collected gases, a landfill-gas-to-energy system to beneficially reuse portions of the collected gas, or both.⁹² The vertical wells have perforations that suck gas into the collection system.⁹³ Vacuum is necessary to suck landfill gas through the perforations in the gas collection wells and into the gas collection system.⁹⁴

Phase 4A had no gas collection wells in 2016 or 2017.⁹⁵ Installation of gas collection wells in phase 4A did not begin until 2018.⁹⁶ Between January and February 2018, 10 vertical gas extraction wells were drilled in phase 4A: GW-500, GW-501 (overlapping phase 3B), GW-502, GW-509, GW-510, GW-511, GW-512, GW-513, GW-522, and GW-524.⁹⁷ Five additional vertical gas wells were then drilled and installed and became operational in Phase 4A between April and May 2018: GW-507, GW-516, GW-517, GW-518, and GW-519.⁹⁸ The gas collection system in phase 4A was expanded in January/February 2019 to include seven additional vertical gas wells: GW-514, GW-508, GW-515, GW-521, GW-523, GW-520, and GW-506.⁹⁹ These additional gas wells were operational by about February 1, 2019.¹⁰⁰

Even though a gas collection system finally was being installed in phase 4A in 2018, problems at the Landfill greatly impeded its efficiency throughout 2018 and 2019. By May 2018, the gas collection system being installed was not collecting as much gas as was

⁹² No. 18-7889, R. Doc. 242-2 at ¶ 54; No. 19-11133, R. Doc. 273-2 at ¶ 54.

⁹³ Transcript of General Causation Trial, R. Doc. 267 at 88.

⁹⁴ *Id.* at 88-89.

⁹⁵ Transcript of General Causation Trial, R. Doc. 267 at 49.

⁹⁶ *Id.*; No. 18-7889, R. Doc. 242-2 at ¶¶ 69-75; No. 19-11133, R. Doc. 273-2 at ¶¶ 69-75.

⁹⁷ No. 18-7889, R. Doc. 242-2 at ¶ 70; No. 19-11133, R. Doc. 273-2 at ¶ 70.

⁹⁸ No. 18-7889, R. Doc. 242-2 at ¶ 71; No. 19-11133, R. Doc. 273-2 at ¶ 71.

⁹⁹ No. 18-7889, R. Doc. 242-2 at ¶ 72; No. 19-11133, R. Doc. 273-2 at ¶ 72.

¹⁰⁰ *Id.*

expected.¹⁰¹ In fact, based on field assessments in March and April 2019, as well as projections from the U.S. Environmental Protection Agency, the Landfill collected approximately 37.5% of its generated gas at that time.¹⁰² On September 18, 2018, LDEQ again issued a Consolidated Compliance Order and Notice of Potential Penalty to Jefferson Parish due to violations related to the gas collection and control system, based on inspections that took place on July 31, 2018, and August 7, 2018.¹⁰³ On March 11, 2019, LDEQ issued another Consolidated Compliance Order and Notice of Potential Penalty to Jefferson Parish due to violations related to the gas collection system, based on inspections that took place between October 1, 2018, and November 30, 2018.¹⁰⁴

CEC and Mr. Dejean identified several issues with the gas collection system. CEC found that leachate within the waste mass was the primary issue impeding efficient gas collection.¹⁰⁵ CEC stated that leachate covering perforations in the gas collection wells “severely restricts the recovery” of landfill gas.¹⁰⁶ Similarly, Mr. Dejean testified, “If water is covering the perforations, you’re not collecting the gas through liquids.”¹⁰⁷ During CEC’s May 14-18, 2018, field assessment, it found 95 of the total 225 gas collection wells on the Landfill had more than 50% of their perforations covered by leachate.¹⁰⁸ Of these 95 wells, 45 wells had over 100% of their perforations covered by leachate.¹⁰⁹ Of the gas wells installed over the three years prior to CEC’s assessment, which would include the

¹⁰¹ Transcript of General Causation Trial, R. Doc. 267 at 24-25 (Testimony of Rick Buller); Exhibit 4 (CEC’s Preliminary Findings).

¹⁰² Exhibit 544 at Bates No. 3492; Transcript of General Causation Trial, R. Doc. 267 at 74-76.

¹⁰³ No. 18-7889, R. Doc. 242-2 at ¶ 78; No. 19-11133, R. Doc. 273-2 at ¶ 78.

¹⁰⁴ No. 18-7889, R. Doc. 242-2 at ¶ 80; No. 19-11133, R. Doc. 273-2 at ¶ 80.

¹⁰⁵ Exhibit 4 at Bates No. 19677; Exhibit 2 at 15.

¹⁰⁶ Exhibit 4 at Bates No. 19678; Exhibit 2 at 15.

¹⁰⁷ Transcript of General Causation Trial, R. Doc. 267 at 103.

¹⁰⁸ Exhibit 4 at Bates No. 19677; Exhibit 2 at 15.

¹⁰⁹ *Id.*

wells installed in phase 4A in 2018, 33% of their perforations were blocked by leachate.¹¹⁰ Of the gas wells installed in 2018 alone, which also would include wells in phase 4A, five had more than 50% of their perforations covered by leachate.¹¹¹ When CEC issued its report on August 15, 2018, it concluded that there were elevated levels of hydrogen sulfide gas in the air surrounding Phase 4A of the Landfill; that subsurface liquids were contributing to the gas emissions and surface odors; that the hydrogen sulfide “may be from the lime and fly ash solidification process, but it may also be from a specific waste stream, sewage sludge, or other process;” that the Landfill was generating significant quantities of hydrogen sulfide which may contribute to odor problems; and that the Parish should make repairs and upgrades to the gas collection system.¹¹²

The levels of leachate in the gas wells reduced the gas collection system’s ability to collect gas by 20-50%.¹¹³ On August 3, 2018, Mr. Dejean noted a general issue of flooding in the Landfill’s gas wells.¹¹⁴ Based on assessments in March and April 2019, Mr. Dejean found that 51% of all gas collection wells on the Landfill had more than 50% of their perforations blocked by leachate.¹¹⁵ Of those flooded wells, 30% had 75% of their perforations blocked by leachate, and more than 20% had 100% of their perforations blocked by leachate.¹¹⁶ Based on various data from 2018 and 2019, the following percentages of gas well perforations in phase 4A were covered with leachate: 50% in GW-500, 100% in GW-501, 34% in GW-502, 0% in GW-506, 51% in GW-507, 85% in GW-508, 0% in GW-509, 79% in GW-510, 38% in GW-511, 51% in GW-512, 46% in GW-513,

¹¹⁰ *Id.*

¹¹¹ *Id.*

¹¹² Exhibit 2.

¹¹³ Exhibit 2 at 15 (CEC’s Final Findings).

¹¹⁴ Exhibit 348 at Bates No. 14; Transcript of General Causation Trial, R. Doc. 267 at 97-98.

¹¹⁵ Exhibit 544 at Bates No. 3494; Transcript of General Causation Trial, R. Doc. 267 at 99.

¹¹⁶ Exhibit 544 at Bates No. 3494.

43% in GW-514, 72% in GW-515, 70% in GW-516, 38% in GW-517, 6% in GW-518, 12% in GW-519, 17% in GW-R520, 80% in GW-R521, 105% in GW-522R, 80% in GW-R523, and 34% in GW-524.¹¹⁷

There also were issues with the vacuum in the phase 4A gas collection system.¹¹⁸ Mr. Dejean reported a “typical vertical well should have a vacuum capability of negative 30 inches of water column.”¹¹⁹ On July 31, 2018, Mr. Dejean noted a lack of vacuum in the gas collection system for phase 4A.¹²⁰ On August 3, 2018, Mr. Dejean found there was no vacuum in the east side of phase 4A due to a sag in the vacuum line caused by the main access road.¹²¹ Based on assessments in March and April 2019, Mr. Dejean found all of the gas collection wells had less than negative 5 inches of water column.¹²² Additionally, eleven wells in phase 4A had positive pressure due to a lack of vacuum.¹²³ Positive pressure is the opposite of a vacuum; instead of sucking the gas in, the pressure is pushing the gas out.¹²⁴ In the week ending June 6, 2019, 12 of the 25 gas wells in phase 4A had zero or positive pressure.¹²⁵ Mr. Dejean testified that the vacuum issue originally documented in phase 4A in August 2018 persisted through at least June 2019.¹²⁶

The Landfill also had issues with its cover. There are three types of cover: daily cover is a six-inch layer of soil or other materials applied at the end of each working day, interim cover is a twelve-inch layer of soil applied after thirty days if no waste has been

¹¹⁷ Exhibit 381 at Bates No. 471-72.

¹¹⁸ Exhibit 544 at Bates No. 3494 (Brian Dejean’s Assessment).

¹¹⁹ *Id.*

¹²⁰ Transcript of General Causation Trial, R. Doc. 267 at 89-90; Exhibit 351 at Bates No. 66.

¹²¹ Exhibit 348 at Bates No. 13; Transcript of General Causation Trial, R. Doc. 267 at 90.

¹²² Exhibit 544 at Bates No. 3494; Transcript of General Causation Trial, R. Doc. 267 at 99-103.

¹²³ *Id.*

¹²⁴ Transcript of General Causation Trial, R. Doc. 267 at 89.

¹²⁵ Exhibit 355 at Bates No. 129; Transcript of General Causation Trial, R. Doc. 267 at 92.

¹²⁶ Transcript of General Causation Trial, R. Doc. 267 at 93.

added, and final cover is applied when the cell reaches final design grade.¹²⁷ Cover is used in part to suppress odors and emissions.¹²⁸ Over time, cover may crack, allowing gases and liquids to seep upward and escape.¹²⁹ On July 3, 2018, seeping was found in the interim cover in phase 4A.¹³⁰ On June 22, 2018, LDEQ issued a Compliance Order to Jefferson Parish due to violations related to the insufficient daily cover, based on inspections that took place on or about April 27, 2018, and April 30, 2018.¹³¹ During these inspections, the LDEQ inspector stated “exposed waste was observed in the area near the working face and tipping area,” and he concluded “[t]he facility has failed to maintain daily cover” as required by regulations.¹³² On November 19, 2018, LDEQ again issued a Notice of Potential Penalty to Jefferson Parish due to violations related to daily cover, based on inspections that took place on October 10, 2018.¹³³ On March 11, 2019, LDEQ issued another Consolidated Compliance Order and Notice of Potential Penalty to Jefferson Parish due to violations related to interim and daily cover, based on inspections that took place between October 1, 2018, and November 30, 2018.¹³⁴

In June 2019, River Birch and CEC submitted a plan to Jefferson Parish for addressing these issues.¹³⁵ Jefferson Parish endorsed the plan and funded the improvements in phase 3B and 4A.¹³⁶ The plan called for rebuilding phase 4A.¹³⁷ Among the recommendations, the plan called for replacing the main pipe—called the header—

¹²⁷ *Id.* at 22.

¹²⁸ *See id.* at 79, 83.

¹²⁹ *Id.* at 39.

¹³⁰ Exhibit 415 at Bates No. 269998.

¹³¹ No. 18-7889, R. Doc. 242-2 at ¶ 77; No. 19-11133, R. Doc. 273-2 at ¶ 77.

¹³² Exhibit 553 at 2, 5.

¹³³ No. 18-7889, R. Doc. 242-2 at ¶ 79; No. 19-11133, R. Doc. 273-2 at ¶ 79.

¹³⁴ No. 18-7889, R. Doc. 242-2 at ¶ 80; No. 19-11133, R. Doc. 273-2 at ¶ 80.

¹³⁵ Exhibit 355; Transcript of General Causation Trial, R. Doc. 267 at 107-08.

¹³⁶ Transcript of General Causation Trial, R. Doc. 267 at 107-08.

¹³⁷ Exhibit 355 at Bates No. 122.

that carried leachate from the leachate collection wells in phase 4A to its destination for disposal, lift station 2.¹³⁸ The old header was four inches in diameter, but the plan called for a header ten inches in diameter in order to improve leachate flow.¹³⁹ The plan also called for fixing the vacuum issue in the phase 4A gas collection system and removing existing liquid from the gas collection wells.¹⁴⁰ The plan called for these improvements to be implemented between June 2019 and October 2019; however, no work actually began until November 2019.¹⁴¹ The work in phase 4A was not completed until approximately May 2020.¹⁴²

In its May 14-18, 2018, field visit, CEC used a Jerome meter to measure hydrogen sulfide levels in phase 4A.¹⁴³ There were emissions of up to 50 ppm in the air around some soil cracks, well pipe penetrations, and survey risers in phase 4A.¹⁴⁴ There was hydrogen sulfide in the air above phases 4A and 3B up to 0.2 ppm.¹⁴⁵ Fifty ppm equals 50,000 parts per billion (“ppb”), and 0.2 ppm equals 200 ppb. In approximately June 2018, Mr. Buller used a Jerome meter to take measurements of hydrogen sulfide emissions in phase 4A.¹⁴⁶ Hydrogen sulfide up to 50 ppm was measured close to the surface or near the opening he was measuring.¹⁴⁷ Fifty ppm is the maximum detection limit on the Jerome meter Mr. Buller used,¹⁴⁸ so the actual level likely was higher. On July 3, 2018, Mr. Buller stated in an email to Waste Connections personnel that he “measured higher than expected

¹³⁸ Exhibit 355 at Bates No. 122; Transcript of General Causation Trial, R. Doc. 267 at 109.

¹³⁹ Transcript of General Causation Trial, R. Doc. 267 at 109-10.

¹⁴⁰ *Id.* at 110-11.

¹⁴¹ Exhibit 355 at Bates No. 122; Transcript of General Causation Trial, R. Doc. 267 at 108-09.

¹⁴² Transcript of General Causation Trial, R. Doc. 267 at 109, 111.

¹⁴³ Exhibit 4 at Bates No. 19684.

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ Transcript of General Causation Trial, R. Doc. 267 at 59; *see* Exhibit 415 at Bates No. 269998.

¹⁴⁷ Transcript of General Causation Trial, R. Doc. 267 at 59-60.

¹⁴⁸ *Id.* at 59.

[hydrogen sulfide] concentrations down-wind of the working face and seeping from the interim cover in phase 4A.”¹⁴⁹ On July 15, 2018, Mr. Buller stated in an email, “The leachate riser in Cell 22S [in phase 4A] needs to be sealed. Gas is escaping and I can smell it 50 feet away.”¹⁵⁰ On August 3, 2019, Mr. Dejean witnessed “[g]as pouring out of [the] ground in Phase 4A.”¹⁵¹ Based on assessments during March and April 2019, Mr. Dejean noted “evidence of [hydrogen sulfide] was visually noted on the ground, and egg-like odors are prevalent in the area.”¹⁵² The odor of hydrogen sulfide is associated with rotten eggs.¹⁵³

Mr. Dejean implemented a hydrogen sulfide safety plan for work on or near phase 4A.¹⁵⁴ The safety plan required workers to wear a personal protective meter that would sound an alarm if hydrogen sulfide concentrations reached 5 ppm.¹⁵⁵ Five ppm equals 5,000 ppb. These alarms did go off.¹⁵⁶ Similarly, when CEC performed a field assessment in April 2019, on three occasions CEC employees’ personal protective meters, worn 3.5 feet above the ground, sounded alarms when the worker was in phase 4A due to detection of hydrogen sulfide in a concentration of at least 5 ppm.¹⁵⁷ During that visit, CEC employees actually smelled hydrogen sulfide gas in phase 4A and measured hydrogen sulfide between 45 and 60 ppm at the ground level in all tested cracks in phase 4A.¹⁵⁸ Forty-five ppm equals 45,000 ppb, and 60 ppm equals 60,000 ppb.

¹⁴⁹ Exhibit 415 at Bates No. 269998.

¹⁵⁰ Exhibit 417

¹⁵¹ Exhibit 348 at Bates No. 13; *see also* Transcript of General Causation Trial, R. Doc. 267 at 117.

¹⁵² Exhibit 544 at Bates No. 3493, 3504.

¹⁵³ Transcript of General Causation Trial, R. Doc. 267 at 36.

¹⁵⁴ *Id.* at 87-88; Exhibit 349.

¹⁵⁵ Transcript of General Causation Trial, R. Doc. 267 at 87.

¹⁵⁶ *Id.*; Exhibit 544 at Bates No. 3503.

¹⁵⁷ Exhibit 544 at Bates No. 3505 (Brian Dejean Assessment).

¹⁵⁸ *Id.*

There is no doubt there were hydrogen sulfide emissions at the Landfill during the relevant time period. Furthermore, emissions at the Landfill during the relevant time period were not limited to hydrogen sulfide. Based on assessments from March and April 2019, methane emissions in phase 4A, measured through surface emission monitoring, exceeded LDEQ's 500 ppm by volume limit in thirty-one locations.¹⁵⁹ Seventeen of these measurements were over 1,000 ppm, and one was as high as 10,000 ppm.¹⁶⁰ On May 21-22, 2019, CEC measured methane emissions in phase 4A through surface emission monitoring and found emissions exceeded LDEQ's 500 ppm by volume limit in eleven locations.¹⁶¹ When methane emissions exceed LDEQ's 500 ppm by volume limit—called an exceedance—under Louisiana law the Landfill has 120 days to fix the problem.¹⁶² On August 29, 2019, CEC wrote to LDEQ requesting an extension of time for Jefferson Parish to remedy the May 2019 exceedances because the Landfill was unable to eliminate the exceedances in the specified time period.¹⁶³

It also is clear emissions from the Landfill migrated off the Landfill site and into the surrounding areas. Throughout 2018 and 2019, LDEQ stationed its Mobile Air Monitoring Lab (“MAML”) in Jefferson Parish.¹⁶⁴ The MAML is a self-contained mobile laboratory capable of continuous, real-time sampling and analysis of ambient air quality, equipped with specialized air monitoring and support equipment as well as meteorological sensors to monitor wind speed, wind direction, temperature, barometric

¹⁵⁹ *Id.* at Bates No. 3492; Transcript of General Causation Trial, R. Doc. 267 at 77 (Testimony of Brian Dejean).

¹⁶⁰ Exhibit 368.

¹⁶¹ Exhibit 335 at Bates No. 18988.

¹⁶² *Id.* at Bates No. 18989; Transcript of General Causation Trial, R. Doc. 267 at 79-80.

¹⁶³ Exhibit 335; Transcript of General Causation Trial, R. Doc. 267 at 83.

¹⁶⁴ No. 18-7889, R. Doc. 242-2 at ¶ 114; No. 19-11133, R. Doc. 273-2 at ¶ 114.

pressure, and relative humidity.¹⁶⁵ The MAML was deployed to 9220 Jefferson Highway, River Ridge, Louisiana, from April 27, 2018, to May 2, 2018.¹⁶⁶ The MAML detected an odor event between 10:00 p.m. on April 28, 2018, and 4:00 a.m. on April 29, 2018.¹⁶⁷ Using the MAML, LDEQ staff measured various compounds in the air, including hydrogen sulfide, methane, and a variety of volatile organic compounds (“VOCs”).¹⁶⁸ The MAML measured the following hourly average concentrations of hydrogen sulfide during the odor event: 12 ppb between 10:00 p.m. and 11:00 p.m., 12 ppb between 11:00 p.m. and 12:00 a.m., 5 ppb between 12:00 a.m. and 1:00 a.m., 10 ppb between 1:00 a.m. and 2:00 a.m., 3 ppb between 2:00 a.m. and 3:00 a.m., and 2ppb between 3:00 a.m. and 4:00 a.m.¹⁶⁹ During the odor event, the MAML measured the wind direction as coming from the direction of the three landfills on the West Bank—the Landfill, the River Birch Landfill, and the Highway 90 Construction and Demolition Debris Landfill.¹⁷⁰ During the odor event, LDEQ staff took air grab samples for lab testing.¹⁷¹ LDEQ first took a grab sample at the MAML location in River Ridge at 10:43 p.m., then drove to Westwego on the West Bank and took a grab sample downwind from the landfills at 11:05 p.m., and finally drove back to the MAML location in River Ridge and took another grab sample at 12:55 a.m.¹⁷² The LDEQ staff reported the odor in Westwego smelled the same as the odor in River Ridge.¹⁷³ Analysis of the grab samples revealed “similar results.”¹⁷⁴ The first grab sample in River Ridge contained 110 ppb of hydrogen sulfide, the grab sample in

¹⁶⁵ No. 18-7889, R. Doc. 242-2 at ¶¶ 115-16; No. 19-11133, R. Doc. 273-2 at ¶ 115-16.

¹⁶⁶ No. 18-7889, R. Doc. 242-2 at ¶ 120; No. 19-11133, R. Doc. 273-2 at ¶ 120.

¹⁶⁷ Exhibit 26 at Bates No. 158133, 158150-51.

¹⁶⁸ *Id.* at Bates No. 158136-42.

¹⁶⁹ *Id.* at Bates No. 158150-51.

¹⁷⁰ *Id.* at Bates No. 158139, 158143.

¹⁷¹ *Id.* at Bates No. 158140.

¹⁷² *Id.* at Bates No. 158140, 158143.

¹⁷³ *Id.*

¹⁷⁴ *Id.* at Bates No. 158143.

Westwego contained 100 ppb of hydrogen sulfide, and the second grab sample in River Ridge detected 120 ppb of hydrogen sulfide.¹⁷⁵

After analyzing the data collected during the odor event on April 28-29, 2018, LDEQ staff concluded, “The sample results combined with the wind direction during the odor incident seem to indicate that one or more of the three landfills were the source of this odor incident.”¹⁷⁶ LDEQ ruled out the Wood resources facility on the West Bank as a possible source of the odor event because “several inspections during this project revealed very little chances of this facility being the source.”¹⁷⁷ LDEQ also ruled out the Cornerstone Chemical plant in Waggaman on the West Bank as being a possible source for the odor event because “this facility is highly unlikely to be capable of being the source of a combined hydrogen sulfide and methane plume.”¹⁷⁸ In a subsequent report to Jefferson Parish, Pivotal Engineering, LLC (“Pivotal”) concluded the April 28-29, 2018, odor event “originated from or behind the Jefferson Parish Landfill.”¹⁷⁹

In July 2018, the MAML again detected several odors coming from the directions of the landfills.¹⁸⁰ The MAML was deployed to 9220 Jefferson Highway, River Ridge, Louisiana, from July 20, 2018 to July 25, 2018.¹⁸¹ The MAML measured the following hourly average concentrations of hydrogen sulfide on July 20, 2018: 9 ppb between 8:00 p.m. and 9:00 p.m., 7 ppb between 9:00 p.m. and 10:00 p.m., and 5 ppb between 11:00 p.m. and 12:00 a.m.¹⁸² While LDEQ’s report did not visually show the wind directions

¹⁷⁵ *Id.* at Bates No. 158141.

¹⁷⁶ *Id.* at Bates No. 158143.

¹⁷⁷ *Id.*

¹⁷⁸ *Id.*

¹⁷⁹ Exhibit 78 at Bates No. 19296.

¹⁸⁰ Exhibit 27.

¹⁸¹ No. 18-7889, R. Doc. 242-2 at ¶ 121; No. 19-11133, R. Doc. 273-2 at ¶ 121.

¹⁸² Exhibit 27 at Bates No. 163072.

measured during these times, the landfills are southwest of the location of the MAML, and the measured wind direction during the hours of these measurements came from the southwest.¹⁸³ On July 21, 2018, the MAML measured an hourly average concentration of hydrogen sulfide of 14 ppb between 9:00 p.m. and 10:00 p.m., and the wind direction during the hours of these measurements came from the southwest.¹⁸⁴ On July 22, 2018, the MAML measured an hourly average concentration of hydrogen sulfide of 8 ppb between 5:00 a.m. and 5:00 a.m., and the wind during that time came from the direction of the landfills.¹⁸⁵ On July 24, 2018, the MAML measured the following hourly average concentrations of hydrogen sulfide: 8 ppb between 1:00 a.m. and 2:00 a.m., 9 ppb between 2:00 a.m. and 3:00 a.m., and 9 ppb between 3:00 a.m. and 4:00 a.m.¹⁸⁶ The wind direction during that time came from the direction of the three landfills on the West Bank.¹⁸⁷

From July 25, 2018, to July 28, 2018, the MAML relocated to the corner of Dandelion Drive and River Road in Waggaman on the West Bank.¹⁸⁸ From 10:00 p.m. on July 25, 2018, to 4:00 a.m. on July 26, 2018, the MAML detected the following hourly average concentrations of hydrogen sulfide: 6 ppb between 10:00 p.m. and 11:00 p.m., 7 ppb between 11:00 p.m. and 12:00 a.m., 3 ppb between 12:00 a.m. and 1:00 a.m., 11 ppb between 1:00 a.m. and 2:00 a.m., 10 ppb between 2:00 a.m. and 3:00 a.m., and 5 ppb between 3:00 a.m. and 4:00 a.m.¹⁸⁹ While LDEQ's report did not visually show the wind directions measured during these times, the report states the landfills were southwest of

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ *Id.*

¹⁸⁶ *Id.* at Bates No. 163074.

¹⁸⁷ *Id.*

¹⁸⁸ No. 18-7889, R. Doc. 242-2 at ¶ 121; No. 19-11133, R. Doc. 273-2 at ¶ 121.

¹⁸⁹ Exhibit 27 at Bates No. 163080.

the MAML, and the measured wind directions during these elevated odors all came from the southwest, except between 11:00 p.m. and 12:00 a.m.¹⁹⁰ On the evening of July 26, 2018, the MAML detected the following hourly average concentrations of hydrogen sulfide: 29 ppb between 8:00 pm. and 9:00 p.m., 17 ppb between 9:00 p.m. and 10:00 p.m., and 25 ppb between 10:00 p.m. and 11:00 p.m.¹⁹¹ The wind during that time came from the direction of the landfills.¹⁹² On July 27, 2018, the MAML detected the following hourly average concentrations of hydrogen sulfide: 14 ppb between 4:00 p.m. and 5:00 p.m., 12 ppb between 5:00 p.m. and 6:00 p.m., 4 ppb between 6:00 p.m. and 7:00 p.m., 40 ppb between 7:00 p.m. and 8:00 p.m., and 37 ppb between 8:00 p.m. and 9:00 p.m.¹⁹³ Except for between 8:00 p.m. and 9:00 p.m., the wind direction during that time came from the direction of the landfills, which was just outside the southwesterly range.¹⁹⁴ After analyzing the data collected by the MAML in River Ridge and Waggaman during July 2018, LDEQ found that conditions at the Landfill “would certainly explain some of the horrendous odors” experienced by residents, but LDEQ did not rule out that the other landfills and other nearby industrial facilities could be “contributing factors.”¹⁹⁵

Dr. Susan Schiffman, one of the Plaintiffs’ experts, opined in her report and testified at the trial that in her opinion the July 2018 odors came from the Landfill.¹⁹⁶ As described above, during July 2018, LDEQ took various air field samples in River Ridge and Waggaman.¹⁹⁷ Later lab analysis showed the components in the air included volatile

¹⁹⁰ *Id.*

¹⁹¹ *Id.* at Bates No. 163081.

¹⁹² *Id.*

¹⁹³ *Id.*

¹⁹⁴ *Id.*

¹⁹⁵ *Id.* at Bates No. 163066.

¹⁹⁶ Exhibit 453 at 19-20.

¹⁹⁷ Exhibit 27 at Bates No. 163063-66.

organic compounds (“VOCs”).¹⁹⁸ Between November 4, 2019, and November 8, 2019, Ramboll US Consulting, Inc. (“Ramboll”) took air field samples at the Landfill, and later lab analysis revealed exactly which compounds were found in the air and specifically which VOCs.¹⁹⁹ Dr. Schiffman compared the VOCs found in the air collected in River Ridge and Waggaman in July 2018 to the VOCs found in the emissions from the Landfill in November 2019.²⁰⁰ She found that, of all the compounds found in the air collected in River Ridge and Waggaman, only three were not found in the air at the Landfill.²⁰¹ Additionally, of the forty-one compounds collected from the air at the Landfill, thirty-three were found in the air collected in River Ridge and Waggaman.²⁰² Dr. Schiffman opined that “there’s a unique chemical signature for what’s coming off the landfill,” and the probability that thirty-three of the compounds coming from the Landfill came into the community from another source is extremely low.²⁰³

Jefferson Parish has acknowledged the Landfill experienced increased hydrogen sulfide generation and emission rates during the relevant time period. On December 18, 2019, the Parish submitted the Landfill’s Operating Permit Renewal and Modification Application to LDEQ.²⁰⁴ In the application, the Parish explains that it has “become aware that elevated levels of hydrogen sulfide (H₂S) were present in the site’s landfill gas,” and recalculation of its emissions estimates with new hydrogen sulfide concentration data results in a “substantial increase in potential fugitive H₂S emission rate.”²⁰⁵ As a result,

¹⁹⁸ *Id.*

¹⁹⁹ No. 18-7889, R. Doc. 242-2 at ¶ 136; No. 19-11133, R. Doc. 273-2 at ¶ 136; Transcript of General Causation Trial, R. Doc. 272 at 692.

²⁰⁰ Transcript of General Causation Trial, R. Doc. 272 at 679-680; Exhibit 453 at 19-20.

²⁰¹ Transcript of General Causation Trial, R. Doc. 272 at 679.

²⁰² *Id.* at 684.

²⁰³ *Id.* at 655, 687.

²⁰⁴ Exhibit 521.

²⁰⁵ *Id.* at Bates No. 315310-11.

the Parish applied for approval of an increase in hydrogen sulfide emissions from the Landfill from 0.78 to 165.63 tons per year.²⁰⁶

The Plaintiffs have proven by a preponderance of the evidence that gases and odors were emitted from phase 4A of the Landfill.

II. Emissions of Gases and Odors from the Landfill Occurred During the Relevant Time Period.

By 2016 and continuing into 2017 the Landfill was accepting large amounts of spent lime and fly ash, substances capable of generating large amounts of hydrogen sulfide emissions from phase 4A.²⁰⁷ Hydrogen sulfide has a disgusting smell, generally identified as smelling like rotten eggs.²⁰⁸ Resident complaints of this kind of odor began in 2017, soared in 2018, and continued into 2019. Mr. Buller testified odor complaints from Harahan and River Ridge increased between August and October 2017, around the time the Landfill began accepting waste from Rain Carbon.²⁰⁹ Jefferson Parish received so many complaints it set up a Landfill complaint hotline for residents.²¹⁰ LDEQ also accepted complaints directly.²¹¹ In 2017, the total number of complaints made to the Landfill hotline and to LDEQ was 222.²¹² In 2018, the total number of complaints made to the Landfill hotline and to LDEQ was 2,620.²¹³ In 2019, the total number of complaints made to the Landfill hotline and to LDEQ was 627.²¹⁴ Residents in the Harahan/River Ridge area established an Air Quality Facebook group for the reporting of odor complaints

²⁰⁶ *Id.* at Bates No. 315314.

²⁰⁷ *See supra* text accompanying notes 21-40.

²⁰⁸ Transcript of General Causation Trial, R. Doc. 272 at 617, 621, R. Doc. 273 at 867.

²⁰⁹ Transcript of General Causation Trial, R. Doc. 267 at 16.

²¹⁰ No. 18-7889, R. Doc. 242-2 at ¶ 138; No. 19-11133, R. Doc. 273-2 at ¶ 138.

²¹¹ No. 18-7889, R. Doc. 242-2 at ¶ 141; No. 19-11133, R. Doc. 273-2 at ¶ 141.

²¹² Transcript of General Causation Trial, R. Doc. 272 at 624.

²¹³ *Id.*

²¹⁴ *Id.*

through an online form or Facebook posts.²¹⁵ Mr. Buller testified that when CEC came onto the Landfill site in May of 2018, the Parish had begun “receiving some – many of the odor complaints, and there was some indications that there could be some hydrogen sulfide problems.”²¹⁶

As described in the previous section, gases and odors emitted from the Landfill were actually measured by LDEQ and CEC during 2018 and 2019, including hydrogen sulfide and various VOCs.²¹⁷ Issues with leachate and the gas collection system in phase 4A were documented in 2018 and 2019.²¹⁸ The installation of gas collection system in phase 4A did not begin until 2018,²¹⁹ meaning there was little, if any, mitigation of any gases or odors emitted from phase 4A before that time. The largescale measures to fix these issues did not even begin until November 2019 and were not substantially complete until May 2020.²²⁰

For the foregoing reasons, the Court finds the Plaintiffs have proven by a preponderance of the evidence that the odors and emissions from the Landfill occurred during the relevant time period.

III. The Odors and Gases Emitted by the Landfill Were Capable of Producing the Injuries Claimed by Any One or More of the Plaintiffs.

Dr. Susan Schiffman, Plaintiffs’ expert, was found qualified by the Court to testify as an expert on the effect of malodorous emissions on humans.²²¹ Prior to trial, the Court limited Dr. Schiffman’s testimony to the psychological effects of exposure to odor on

²¹⁵ No. 18-7889, R. Doc. 242-2 at ¶ 143; No. 19-11133, R. Doc. 273-2 at ¶ 143.

²¹⁶ Transcript of General Causation Trial, R. Doc. 267 at 23.

²¹⁷ See *supra* text accompanying notes 55-63, 141-201.

²¹⁸ See *supra* text accompanying notes 62-122.

²¹⁹ No. 18-7889, R. Doc. 242-2 at ¶¶ 69-75; No. 19-11133, R. Doc. 273-2 at ¶¶ 69-75.

²²⁰ Exhibit 355 at Bates No. 122; Transcript of General Causation Trial, R. Doc. 267 at 108-09, 111.

²²¹ Transcript of General Causation Trial, R. Doc. 271 at 591-92.

humans, including symptoms such as headaches, nausea, vomiting, loss of appetite, sleep deprivation, dizziness, and fatigue.²²² The Court prevented Dr. Schiffman from testifying as to certain physiological effects, such as irritation to the eyes, nose, or throat; coughing; trouble breathing or asthma; skin irritation; burning lungs; nosebleeds; exacerbation of neurological issues; or exacerbation of COPD.²²³ The Court allowed Dr. Schiffman to testify as to the physiological basis for psychological effects like headaches.²²⁴

Dr. Pamela Dalton, Defendants' expert, was found qualified by the Court to testify as an expert in odor perception; psychology, including psychological impacts from odor perception; and psychogenic symptoms from odor and sensory perception.²²⁵ Dr. John Kind, also Defendants' expert, was found by the Court to be qualified to testify as an expert in toxicology; the fate and transport of compounds; and odor science, including fact and transport of odorous compounds, how they impact people, and how they are measured in the field.²²⁶

As found above, Jefferson Parish residents reported a total of 3,469 odor complaints to Jefferson Parish and LDEQ during 2017, 2018, and 2019, plus additional informal complaints made on Facebook.²²⁷ The residents' complaints received by Jefferson Parish, LDEQ, and the Facebook group reflect that the odor had the smell of hydrogen sulfide. Hydrogen sulfide has a malodorous smell, generally identified as rotten eggs.²²⁸ Some examples of the ways the residents described the odors were "dumpster,"

²²² No. 18-7889, R. Doc. 214 at 3-4; No. 19-11133, R. Doc. 249 at 3-4.

²²³ No. 18-7889, R. Doc. 214 at 4; No. 19-11133, R. Doc. 249 at 4.

²²⁴ Transcript of General Causation Trial, R. Doc. 271 at 598-600, 604-05.

²²⁵ *Id.*, R. Doc. 272 at 757.

²²⁶ *Id.*, R. Doc. 273 at 879.

²²⁷ Transcript of General Causation Trial, R. Doc. 271 at 624; No. 18-7889, R. Doc. 242-2 at ¶ 143; No. 19-11133, R. Doc. 273-2 at ¶ 143.

²²⁸ Transcript of General Causation Trial, R. Doc. 271 at 617, 621, R. Doc. 273 at 867.

“garbage,” “trash,” “rotten food,” “rotten egg,” “sulfur,” and “wet garbage.”²²⁹ These complaints are consistent with exposure to hydrogen sulfide odors.²³⁰ While some descriptors, such as “spoiled milk” or “sewerage,” do not coincide exactly with the common description of a landfill odor, people often have a difficult time labelling a smell other than knowing it is good or bad.²³¹ Odor scientists employ a technique called multidimensional scaling, which categorizes reported odors in a space based on similarities, to evaluate the quality of the odor.²³² When employing multidimensional scaling on the residents’ complaints, all the descriptors were negative.²³³ The citizens uniformly experienced a bad odor, and the odors reported were consistent with hydrogen sulfide emitted by a landfill.²³⁴

Exposure to malodors is capable of causing a psychological response in those exposed. Dr. Schiffman testified that when “it’s an unpleasant odor, . . . biologically, we’re programmed to avoid” it.²³⁵ Specifically, “hydrogen sulfide is a breakdown product that you see with decomposition,” and its malodor “means bacteria, bad, stay away from this.”²³⁶ “[I]f it’s negative, if it’s an aversive odor, [people] can have a reaction to it whether they can identify it or not.”²³⁷ This reaction leads to symptoms “caused by the odor itself, the interaction between the olfactory nerve and the trigeminal nerve.”²³⁸ Effects from malodors occur at levels much lower than the level required to experience effects from toxic chemicals. LDEQ in its January 14, 2019, report concerning the odors at issue in this

²²⁹ Exhibit 453 at 6, 37-38.

²³⁰ *Id.* at 7; Transcript of General Causation Trial, R. Doc. 272 at 705-06.

²³¹ Transcript of General Causation Trial, R. Doc. 272 at 627, 705-08.

²³² *Id.*

²³³ *Id.*

²³⁴ *Id.*

²³⁵ *Id.* at 641.

²³⁶ *Id.*

²³⁷ *Id.* at 730-31.

²³⁸ *Id.* at 730.

case stated that: “Landfill odors are noticeable at low concentrations below the levels that cause toxic effects from the chemical. For example, hydrogen sulfide is smelled at air concentration of 0.5 to 10 ppb, but the first objective signs of eye irritation are experienced at 10,038 ppb, a thousand times higher. . . . The presence of persistent noxious odors themselves may result in discomfort, nausea and headache.”²³⁹

Dr. Dalton also testified that malodors can cause direct effects at low levels of concentration, below toxic levels, and she corroborated Dr. Schiffman’s testimony about the way in which the olfactory nerve and trigeminal nerve generate the perception of odor, although she disputed whether the levels of concentration were sufficient to do so in this case.²⁴⁰ However, Dr. Dalton also opined that malodors can cause a separate psychological response in people, eliciting “somatic symptoms,” which are “responses about our body experiences.”²⁴¹ She explained that

there is a psychological process of appraisal that goes on that causes someone to think about their entire experience and report how they’re feeling under those circumstances.

And that can be the intensity of an odor or how long its experienced, but it can also bring in some of these other factors that we know operate in the real world to cause people to sometimes report feeling unwell.²⁴²

Dr. Dalton testified she found no reason to doubt that the symptoms reported by residents were real, and she found the reports to be credible.²⁴³ But she emphasized that, even with these psychological effects being reported, having levels high enough for people to be able to smell to smell the odor is a prerequisite.²⁴⁴

²³⁹ Exhibit 43 at 19.

²⁴⁰ Transcript of General Causation Trial, R. Doc. 272 at 775-76, R. Doc. 273 at 806, 851-52.

²⁴¹ *Id.* at 777-78, 819-21; Exhibit 449 at 6.

²⁴² Transcript of General Causation Trial, R. Doc. 273 at 821.

²⁴³ *Id.* at 855.

²⁴⁴ *Id.* at 821, 852.

The question, then, is at what level of exposure are people in the general population able to smell hydrogen sulfide, the primary odorous chemical coming from the Landfill, and how long does it take for exposure at such a level to cause a symptom. There is a difference between being able to smell an odor in controlled lab conditions versus in the ambient air.²⁴⁵ The level at which people in a lab are able to detect a difference in the air when exposed to hydrogen sulfide—referred to as the odor detection threshold—has generally been measured to be 0.4, 0.5, or 0.6 ppb.²⁴⁶ In the ambient air, the Court finds the exposure at which people generally are able to smell hydrogen sulfide and which is capable of causing a reaction in those exposed is an average exposure over a thirty-minute period of at least 5 ppb. The scientific literature and Dr. Schiffman’s own studies have shown such a level of exposure “always is a nuisance” to the individuals exposed.²⁴⁷

Guidelines issued by the World Health Organization Regional Office for Europe provide that “[i]n order to avoid substantial complaints about odour annoyance among the exposed population, hydrogen sulfide concentrations should not be allowed to exceed 7 µg/m³, with a 30-minute averaging period.”²⁴⁸ Seven µg/m³ is approximately 5 ppb.²⁴⁹ LDEQ stated in its January 14, 2019 report that “hydrogen sulfide is smelled at air concentrations of 0.5 to 10 ppb,” and generally “[t]he human detection limit varies from 5 ppb to 10 ppb.”²⁵⁰ Dr. Schiffman’s report cites a 1983 study by W.H. Bruvold and his colleagues that found hydrogen sulfide “levels from 0.8-7.9 µg/m³ (~0.6-5.7 ppb) led to interference with daily living along with health concerns.”²⁵¹ An exposure level of 5 ppb

²⁴⁵ *Id.*, R. Doc. at 272 at 766, 770-72.

²⁴⁶ *Id.* at 718, 774.

²⁴⁷ *Id.*, R. Doc. 271 at 607-09, R. Doc. 272 at 671.

²⁴⁸ Exhibit 438 at 6.

²⁴⁹ Transcript of General Causation Trial, R. Doc. 271 at 609-610, R. Doc. 273 at 863.

²⁵⁰ Exhibit 43 at 17, 19.

²⁵¹ Exhibit 453 at 15.

being high enough for odor annoyance to occur has been used by people in the field “all over the world,” including Japan and China.²⁵²

The Court rejects Dr. Dalton and Dr. Kind’s opinion that the appropriate exposure at which people generally are able to smell hydrogen sulfide, and which is able to cause a reaction in those exposed, is 10 ppb at 1% of the time or more.²⁵³ As Dr. Dalton explained, “odor intensity increases not linearly with the concentration.”²⁵⁴ Thus, when asked, “So the concentration of 5 to 10 [ppb], the intensities may well be the same,” she admitted, “That’s correct.”²⁵⁵ Because the odor intensity between 5 and 10 ppb is about the same, just about the same number of people would smell hydrogen sulfide at either level. Raising the level of exposure from 5 to 10 ppb would not materially change the legitimate instances of hydrogen sulfide detection in the general population.

In addition, 10 ppb is rejected because it is an overestimate based on assumptions, not data based on scientific experiments. The National Research Council, a nongovernmental research organization, created this estimate through a mathematical method using the Fechner function.²⁵⁶ In doing so, the National Research Council used an assumed Fechner coefficient because of “lack of chemical-specific data.”²⁵⁷ Moreover, after it worked through the Fechner function and came to an initial number, the National Research Council adjusted the number upward by an “empirical field correction factor,” without sufficient explanation.²⁵⁸ Dr. Schiffman explained that, due to these assumptions, the National Research Council’s 10 ppb “is not an experimental number,” meaning not

²⁵² Transcript of General Causation Trial, R. Doc. 272 at 723.

²⁵³ Exhibit 38 at 13; Exhibit 40 at 4.

²⁵⁴ Transcript of General Causation Trial, R. Doc. 272 at 772.

²⁵⁵ Transcript of General Causation Trial, R. Doc. 273 at 861-62.

²⁵⁶ Exhibit 72 at 218.

²⁵⁷ *Id.*

²⁵⁸ *Id.*

based on experimental data.²⁵⁹ The Court finds the 5 ppb recommended by Dr. Schiffman to be more appropriate because it is based on the studies referenced above. Moreover, Dr. Dalton and Dr. Kind's opinion that people must be exposed 1% of the time amounts to approximately 14.4 minutes of exposure out of 24 hours.²⁶⁰ The average 30-minute exposure the Court finds appropriate is more than double the amount of time Dr. Dalton and Dr. Kind opined is needed. This longer period of exposure would account for the experience of symptoms even when there is a lesser concentration. The Court finds exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is sufficient by itself for individuals generally to be able to smell hydrogen sulfide and for the exposure to cause a reaction.

The intermittent and unpredictable nature of the Landfill's odor also factors into residents' ability to smell it. "[T]he intensity of [an odor] is going to be related to how many times you've been exposed" because if people are "exposed over and over and over again, . . . their receptors are being sensitized, not only peripherally, but centrally."²⁶¹ The odor is "going to get stronger and stronger with time."²⁶² It is true smelling an odor on a regular basis may cause people to "lose their sensitivity to it."²⁶³ However, due to the pressurized bursts characteristic of landfill emissions, the odor emitted from a landfill is intermittent and unpredictable.²⁶⁴ This is a "stressor" that "increase[s] the poignancy of that stimulus."²⁶⁵ Dr. Schiffman explained that the intermittent nature of odors is related to

²⁵⁹ Transcript of General Causation Trial, R. Doc. 272 at 725.

²⁶⁰ *Id.*, R. Doc. 273 at 866-67.

²⁶¹ *Id.*, R. Doc. 271 at 617 (Dr. Susan Schiffman's Testimony).

²⁶² *Id.*

²⁶³ *Id.*, R. Doc. 273 at 835 (Dr. Pamela Dalton's Testimony).

²⁶⁴ *Id.*, R. Doc. 272 at 638-40 (Dr. Susan Schiffman's Testimony).

²⁶⁵ *Id.*

issues of sensitivity, and “[e]ach time you’re able to detect it at a lower level.”²⁶⁶ Dr. Dalton later agreed, admitting that “when you give someone an odor-threshold test over and over, they get better able to do it, and that also can decrease their threshold” for detecting the odor, resulting in their being “better able to recognize the quality of that odor from the background of other odors.”²⁶⁷

The odor from the Landfill also lingered due to hydrogen sulfide’s ability to accumulate in homes. Dr. Schiffman’s studies, in which she “put monitors outside and inside homes of somebody who is doing a lot of complaining” about odors, showed that the “hydrogen sulfide levels went up inside the home” to detectable levels.²⁶⁸ She explained in her report that hydrogen sulfide is “heavier than air and accumulates in enclosed and low-lying areas within the home.”²⁶⁹ Hydrogen sulfide can also get into air conditioning systems, extending the duration of the exposure.²⁷⁰

Although not necessary to the Court’s opinion, the Court also finds that other compounds present in the Landfill’s emissions enhanced the intensity of the bad odor. In July 2018, LDEQ collected and measured samples of volatile organic compounds during odor events in River Ridge and Waggaman.²⁷¹ As mentioned previously, a VOC is a compound containing carbon and one that is easily able to evaporate in normal temperatures.²⁷² Most VOCs have odors.²⁷³ Dr. Schiffman explained that, while hydrogen sulfide is a surrogate for the odor emitted from the Landfill due to limitations in modeling,

²⁶⁶ *Id.*, R. Doc. 268 at 271-72.

²⁶⁷ *Id.*, R. Doc. 273 at 836.

²⁶⁸ *Id.*, R. Doc. 272 at 697-98.

²⁶⁹ Exhibit 453 at 14.

²⁷⁰ Transcript of General Causation Trial, R. Doc. 272 at 644-45.

²⁷¹ Exhibit 27 at 9-10.

²⁷² Transcript of General Causation Trial, R. Doc. 272 at 652, 681-82.

²⁷³ *Id.* at 681.

other compounds accompanied the hydrogen sulfide to form the odor cloud.²⁷⁴ Dr. Schiffman found that 33 VOCs detected in the Landfill also were detected by LDEQ in River Ridge and Waggaman.²⁷⁵ She explained that the literature and her studies have found that combinations of VOCs, even when individually below odor detection thresholds, can have an additive, sub-additive, or synergistic effect to enhance the bad odor.²⁷⁶

Dr. Dalton and Dr. Kind opined that VOCs do not necessarily produce stronger odors, and in fact some individual VOC odors can be suppressed when combined with others.²⁷⁷ The Court rejects their opinions and finds more credible the results of Dr. Schiffman's experiments using a subset of the 33 VOCs detected in this case combined with hydrogen sulfide.²⁷⁸ Dr. Schiffman found this subset, when combined with hydrogen sulfide, is sub-additive or additive, enhancing the intensity of the bad odor.²⁷⁹

Having established the exposure at which people can smell hydrogen sulfide and experience a reaction is an average exposure of 5 ppb over a thirty-minute period, the Court will address whether such reaction can cause the individual injuries claimed by the Plaintiffs.

A. Headaches

Exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing headaches in the general population. Dr Schiffman testified hydrogen sulfide can activate both the olfactory and trigeminal nerves.²⁸⁰ When the olfactory nerve is

²⁷⁴ *Id.* at 686-87.

²⁷⁵ *Id.* at 684-696.

²⁷⁶ *Id.* at 655-657; Exhibit 453 at 19-20.

²⁷⁷ Transcript of General Causation Trial, R. Doc. 273 at 832-33, 882-883.

²⁷⁸ *Id.*, R. Doc. 272 at 693-95.

²⁷⁹ *Id.*

²⁸⁰ *Id.*, R. Doc. 271 at 598, 602-03.

stimulated, it provides the rotten egg quality to the odor.²⁸¹ When the trigeminal nerve is stimulated, which can occur from exposure to hydrogen sulfide, the nerve releases compounds called CGRP and substance P.²⁸² These compounds cause the blood vessels to dilate, resulting in a release of inflammatory mediators, resulting in a neuro-inflammatory response that causes headaches, including migraines.²⁸³ Dr. Schiffman in her report cited studies documenting this phenomenon, as well as headaches resulting from exposure to malodors more generally.²⁸⁴ Dr. Schiffman also opined in her report that frequent, unpredictable, and uncontrollable exposure to a malodor may effect stress and mood, which can trigger and exacerbate headaches, and otherwise impact quality of life.²⁸⁵ Headaches also are related to sleep disturbance.²⁸⁶

Dr. Dalton testified that headache is a type of somatic symptom associated with exposure to malodors.²⁸⁷ A publication by Dr. Dalton cites studies supporting this opinion.²⁸⁸ Dr. Dalton also testified “a very strong odor over a long period of time [may] produce, you know, the experience of a headache due to stress.”²⁸⁹ LDEQ also stated in its January 14, 2019, report concerning the odors at issue in this case that “[t]he presence of persistent noxious odors themselves may result in . . . headache.”²⁹⁰

B. Nausea

Exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing nausea in the general population. Dr. Schiffman testified that the same

²⁸¹ *Id.* at 602.

²⁸² *Id.* at 603.

²⁸³ *Id.*; Exhibit 453 at 21-22.

²⁸⁴ Exhibit 453 at 21-22.

²⁸⁵ *Id.* at 22.

²⁸⁶ *Id.*

²⁸⁷ *Id.* at 820, 849.

²⁸⁸ Exhibit 449 at 6.

²⁸⁹ Transcript of General Causation Trial, R. Doc. 273 at 869.

²⁹⁰ Exhibit 43 at 19.

mechanism described above that stimulates the olfactory and trigeminal nerves causing headaches may also cause nausea.²⁹¹ In fact, Nausea is often a secondary effect subsequent to headaches.²⁹² Additionally, the olfactory nerve connects to the amygdala, which connects to the brain stem and the vomit centers in the medulla.²⁹³ Dr. Schiffman in her report cited studies documenting nausea as a response to malodors. In her report, she opined that humans have a natural aversion to the rotten egg smell of hydrogen sulfide as a reflexive nausea response to the smell of rotten food.²⁹⁴

Dr. Dalton testified that nausea is a type of somatic symptom associated with exposure to malodors.²⁹⁵ A publication by Dr. Dalton states the same, citing studies supporting this opinion.²⁹⁶ LDEQ also stated in its January 14, 2019, report concerning the odors at issue in this case that “[t]he presence of persistent noxious odors themselves may result in . . . nausea.”²⁹⁷

C. Vomiting

Exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing vomiting. Dr. Schiffman testified that the same mechanisms described above that cause nausea may lead to vomiting.²⁹⁸ A publication by Dr. Dalton supports her opinion that vomiting is a type of somatic symptom associated with exposure to malodors, citing studies supporting this opinion.²⁹⁹

²⁹¹ Transcript of General Causation Trial, R. Doc. 271 at 603, 605.

²⁹² Exhibit 453 at 22.

²⁹³ Transcript of General Causation Trial, R. Doc. 271 at 605.

²⁹⁴ Exhibit 453 at 22.

²⁹⁵ Transcript of General Causation Trial, R. Doc. 273 at 820, 856.

²⁹⁶ Exhibit 449 at 6.

²⁹⁷ Exhibit 43 at 19.

²⁹⁸ Transcript of General Causation Trial, R. Doc. 271 at 605.

²⁹⁹ Exhibit 449 at 6.

D. Loss of Appetite

Exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing a loss of appetite in the general population. Dr Schiffman testified that odors have an effect on flavor and appetite, and she has personally verified the effect of odor on appetite.³⁰⁰ Additionally, nausea and vomiting also may cause a loss of appetite.³⁰¹ A publication authored by Dr. Dalton supports her opinion that loss of appetite is a type of somatic symptom associated with exposure to malodors, citing studies supporting this opinion.³⁰²

E. Sleep Disruption

Exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing sleep disruption in the general population. Dr. Schiffman testified that “if you don’t feel well, . . . you’re not going to sleep well. If you have a headache, you’re not going to sleep well.”³⁰³ Her report cites studies that document sleep deprivation is a response to malodors.³⁰⁴ A publication by Dr. Dalton includes her opinion that sleep disorders are a type of somatic symptom associated with exposure to malodors, citing studies supporting this opinion.³⁰⁵

F. Dizziness

Exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing dizziness in the general population. Dr Schiffman testified “when you smell something bad you hold your breath And, therefore, you can sometimes . . . lower

³⁰⁰ Transcript of General Causation Trial, R. Doc. 272 at 626.

³⁰¹ *Id.*, R. Doc. 271 at 605

³⁰² Exhibit 449 at 6.

³⁰³ Transcript of General Causation Trial, R. Doc. 271 at 606.

³⁰⁴ Exhibit 453 at 25.

³⁰⁵ Exhibit 449 at 6.

your oxygen saturation from doing that.”³⁰⁶ Dr. Schiffman’s report cites studies that document dizziness as a response to malodors.³⁰⁷ Dr. Dalton testified that dizziness is a type of somatic symptom associated with exposure to malodors.³⁰⁸ A publication authored by Dr. Dalton also includes his opinion that dizziness is a type of somatic symptom associated with exposure to malodors, citing studies supporting this opinion.³⁰⁹

G. Fatigue

Exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing fatigue in the general population. Dr. Schiffman testified “[l]ack of sleep will lead to fatigue.”³¹⁰ Her report cites studies documenting that fatigue is a response to malodors.³¹¹ Dr. Dalton also testified that fatigue is a type of somatic symptom associated with exposure to malodors.³¹²

H. Anxiety and Worry

Exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing anxiety or worry in the general population. Dr. Schiffman testified that because hydrogen sulfide “is an aversive odor, it activates the amygdala, which is the part of the brain that deals with emotions.”³¹³ Because hydrogen sulfide is “an unpleasant odor, which, biologically, we’re programmed to avoid” people may become worried about what the odor is and whether it will affect the health of them and their families.³¹⁴ Additionally, people hold their breath due to a malodor, and “when you alter that calm breathing

³⁰⁶ Transcript of General Causation Trial, R. Doc. 271 at 606.

³⁰⁷ Exhibit 453 at 25.

³⁰⁸ Transcript of General Causation Trial, R. Doc. 273 at 820.

³⁰⁹ Exhibit 449 at 6.

³¹⁰ Transcript of General Causation Trial, R. Doc. 271 at 606.

³¹¹ Exhibit 453 at 25.

³¹² Transcript of General Causation Trial, R. Doc. 273 at 820.

³¹³ *Id.*, R. Doc. 272 at 640-41.

³¹⁴ *Id.* at 641.

pattern, you start getting anxiety.”³¹⁵ Dr. Schiffman’s report includes his opinion that repeated and unpredictable exposures also lead to stress that produces anxiety.³¹⁶ LDEQ also stated in its January 14, 2019, report concerning the odors at issue in this case that “[l]ong term exposure to noxious odors may affect mood, anxiety and stress levels.”³¹⁷

I. Decrease in Quality of Life

Exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing a decrease in quality of life, including a loss of use and enjoyment of property, in the general population.³¹⁸ Dr. Schiffman in her report explains that “[f]our ‘FIDO’ characteristics of malodorous emissions (frequency, intensity, duration, and offensiveness) are used by scientists to assess the effects of odors on health, well-being, and quality of life.”³¹⁹ For the reasons explained above, an odor emitted from the Landfill of a least 5 ppb of hydrogen sulfide over thirty minutes is significant and is capable of causing the above symptoms. The intermittent and unpredictable nature of the odor acts as a stressor, and is capable of accumulating and lingering in the home. The odors from the Landfill occurred intermittently over a three-year period. Dr. Schiffman in her report opined that all of these elements resulted in a frequent, intense, and offensive odor that lasted for a long period, ultimately causing a decrease in quality of life.³²⁰ She also testified that repeated exposures to malodors affect a person’s mood, and in her report describes in detail several studies, some involving hydrogen sulfide and landfills, that have shown

³¹⁵ *Id.*, R. Doc. 271 at 606-07.

³¹⁶ Exhibit 453 at 15.

³¹⁷ Exhibit 43 at 19.

³¹⁸ Plaintiffs waived any claims they may have for physical property damage, such as corroded gutters, peeling paint, and damage to automobiles. The Court determined this waiver includes odor-related damages to physical property such as furniture, drapes, and carpet. R. Doc. 138. The procedure for handling claims of diminution of property values will be discussed at the next status conference held by the Court.

³¹⁹ Exhibit 453 at 9.

³²⁰ *Id.* at 9-10.

these effects.³²¹ In her report she explains that “[n]oxious odors associated with biodegradable waste have consistently been shown to trigger stress and negative mood.”³²² Exposure to malodors may also “increase feelings of discomfort and the desire to escape an environment” as well as make people more likely to feel “stressed or annoyed and nervous or anxious.”³²³

A publication authored by Dr. Dalton also includes the statement that “[s]everal studies have reported the negative effect of malodors on mood,” and “[m]alodors may cause individuals to feel a lack of control over their environment, adversely affecting stress levels.”³²⁴ She goes on to state that “[s]ocial relations are also threatened by indoor malodors,” and “[i]ndoor malodors can also reduce social interactions by causing inhabitants to experience shame or embarrassment about the malodor, even when they are external in origin.”³²⁵ LDEQ also stated in its January 14, 2019, report concerning the odors at issue in this case that “[l]ong term exposure to odor may effect mood, anxiety, and stress levels,” and “it is well established that malodorous odors have a negative impact on quality of life.”³²⁶

The odor complaints by residents are consistent with these findings and show an interference with daily life and loss of use and enjoyment of their property. Examples of how residents altered their daily life include not wanting to go outside; being unable to enjoy outdoor activities like walking the dog, watching sports at the playground, and yard work; feeling trapped in their homes; avoiding inviting people over due to

³²¹ Transcript of General Causation Trial, R. Doc. 272 at 640; Exhibit 453 at 7-9.

³²² Exhibit 453 at 8.

³²³ *Id.*

³²⁴ Exhibit 449 at 5.

³²⁵ *Id.* at 6.

³²⁶ Exhibit 43 at 19.

embarrassment; fearing for the health of themselves and their families; having to leave their homes and sleep elsewhere due to the odor; and moving to escape the odor.³²⁷ Dr. Schiffman testified that these complaints are consistent with malodor exposure and are capable of being caused by the emissions from the Landfill.³²⁸

J. Irritation to the Eyes, Nose, or Throat; Coughing; Trouble Breathing; Asthma; Skin Irritation; Burning Lungs; Nose Bleeds; Neurological Issues; and COPD

The Court prohibited Dr. Schiffman from testifying as to irritation to the eyes, nose, or throat; coughing; trouble breathing; asthma; skin irritation; burning lungs; nose bleeds; neurological issues; and COPD.³²⁹ The Plaintiffs did not provide the expert testimony necessary to meet their burden of proving by a preponderance of the evidence that hydrogen sulfide emissions present in this case are capable of causing these physiological symptoms. Plaintiffs have not shown that exposure to an average of 5 ppb of hydrogen sulfide over thirty minutes is capable of causing irritation to the eyes, nose, or throat; coughing; trouble breathing; asthma; skin irritation; burning lungs; nose bleeds; neurological issues; and COPD.

CONCLUSIONS OF LAW

The separation of causation into general and specific causation is characteristic of toxic tort cases.³³⁰ “General causation asks whether exposure to a substance causes harm to anyone,” and “[s]pecific causation asks whether exposure to a substance caused a particular plaintiff’s injury.”³³¹ Courts have employed this bifurcated approach to

³²⁷ Exhibit 453 at 13-14.

³²⁸ Transcript of General Causation Trial, R. Doc. 271 at 625-26, R. Doc. 272 at 644, 646-47, 652-53.

³²⁹ No. 18-7889, R. Doc. 214 at 4; No. 19-11133, R. Doc. 249 at 4.

³³⁰ 3 David L. Faigman, et al., *Modern Scientific Evidence: The Law and Science of Expert Testimony* § 21:2 (2021-2022 ed.), Westlaw (database updated Dec. 2021).

³³¹ *Id.*

causation in the toxic tort context because, while “the general causation issue is often obvious in nontoxic cases,” it is more difficult to determine whether, and at what levels of exposure, a chemical may cause certain injuries.³³² Thus, especially in mass tort actions like this one in which there are complex issues of fact, parties often address general causation at the outset to establish whether “the drug or other product in question is capable of causing the type of injury which is being claimed by all of the plaintiffs.”³³³

As explained above, the Case Management Order defines the determination of general causation to be 1) whether odors and gases were being emitted by the Landfill, 2) during the relevant time period, and 3) whether any such odors and gases were capable of producing the injuries claimed by any one or more of the Plaintiffs.³³⁴ This definition in the Case Management Order is consistent with how Louisiana courts have defined general causation. For example, in *Guidry v. Dow Chemical Co.*, the Louisiana Fourth Circuit Court of Appeals explained,

General causation refers to proving exposure in a dose sufficient to cause health effects—that exposure to mold can cause disease. Specific causation refers to proving a sufficient causative link between the alleged health problems and the specific type of mold. . . . “[O]ne is the problem of establishing that the chemical involved is capable of causing the type of harm from which the plaintiff suffers. . . . The other problem relating to proof of causation is that of establishing, given that the toxic substance in question can cause harm of the type suffered by the plaintiff, that the plaintiff’s harm did in fact result from such exposure.”³³⁵

In *Marshall v. Air Liquide-Big Three, Inc.*, the Louisiana Fourth Circuit Court of Appeal noted the question of general causation was whether “exposure to carbide lime dust could

³³² *Id.* § 21:2 & n.1.

³³³ Paul D. Rheingold, *Litigating Mass Tort Cases* § 6:13, Westlaw (database updated May 2021).

³³⁴ R. Doc. 162 is the Seventh Case Management Order. This definition has not changed in the various versions of the Case Management Order.

³³⁵ *Guidry v. Dow Chem. Co.*, 2016-0757, p. 9 n.7 (La. App. 4 Cir. 3/1/17), 214 So. 3d 78, 84 n.7 (third alteration in original) (citations omitted) (quoting *Watters v. Dep’t of Soc. Servs.*, 08-0977, p. 17, n. 18 (La. App. 4 Cir. 6/17/09), 15 So.3d 1128, 1143 n.18).

cause the class representatives' symptoms," while the question of specific causation was "linking those health effects [the class representatives experienced] to their exposure to carbide lime."³³⁶ In *Bradford v. CITGO Petroleum Corp.*, the Louisiana Third Circuit Court of Appeals explained, "'General causation' refers to whether a substance is capable of causing a particular injury or condition in the general population, while 'specific causation' refers to whether a substance caused a particular individual's injury."³³⁷

The Plaintiffs may meet their burden of proving general causation if they show 1) odors and gases were being emitted by the Landfill, 2) during the relevant time period, and 3) any such odors and gases were capable of producing the injuries claimed by any one or more of the Plaintiffs. As laid out above, the Court has found as a factual matter that at times during the relevant time period odors and gases, including hydrogen sulfide, were being emitted by the Jefferson Parish Landfill in levels of at least 5 ppb of hydrogen sulfide over thirty minutes. The Court also has found an average exposure to 5 ppb of hydrogen sulfide over thirty minutes is capable of producing headaches, nausea, vomiting, loss of appetite, sleep disruption, dizziness, fatigue, anxiety and worry, a decrease in quality of life, and loss of enjoyment or use of property. Accordingly, as a matter of law Plaintiffs have met their burden of establishing general causation with respect to those Plaintiffs who have complained during the relevant time period of headaches, nausea, vomiting, loss of appetite, sleep disruption, dizziness, fatigue, anxiety and worry, a decrease in quality of life, and loss of enjoyment or use of property.

³³⁶ *Marshall v. Air Liquide-Big Three, Inc.*, 2011-0990, p. 30 (La. App. 4 Cir. 9/7/12), 107 So. 3d 13, 34.

³³⁷ *Bradford v. CITGO Petroleum Corp.*, 2017-296, p 6 (La. App. 3 Cir. 1/10/18), 237 So. 3d 648, 659 (citing *Knight v. Kirby Inland Marine, Inc.*, 482 F.3d 347, 351 (5th Cir. 2007)).

Defendants argue general causation also requires the Court to determine the geographic extent to which odors from the Landfill could have caused an injury.³³⁸ Defendants argue the Court must draw geographic boundaries on a map showing where the odors reached the necessary concentration for a sufficient period of time to cause the alleged injuries.³³⁹ However, that finding goes beyond the definition of general causation. As explained, general causation concerns whether a substance is capable of producing the injuries alleged by the Plaintiffs. Drawing boundaries is more appropriate when determining specific causation, which concerns whether the substance caused the alleged injuries to a specific plaintiff.³⁴⁰

Defendants cite only one case, *Molden v. Georgia Gulf Corp.*, for support of their argument that the Court should draw geographic boundaries at this time, but *Molden* did not address general causation.³⁴¹ *Molden* concerned a motion for summary judgment on the causation of physical injuries by a one-time chemical dispersal.³⁴² General causation is never mentioned, and the parties assumed the opinions of the plaintiff's expert, who himself admitted the levels of exposure were below levels capable of causing physical injury, were accurate.³⁴³ The court found those who were outside the dispersal cloud were not exposed and could not claim physical injury, and those within the cloud were exposed below thresholds capable of causing injury, based on the plaintiffs' expert testimony.³⁴⁴ On the other hand, the court in *Molden* was not faced with the issue of general causation—

³³⁸ No. 18-7889, R. Doc. 265 at 7; No. 19-11133, R. Doc. 292 at 7.

³³⁹ No. 18-7889, R. Doc. 265 at 11-12; No. 19-11133, R. Doc. 292 at 11-12.

³⁴⁰ *See, e.g., In re Hanford Nuclear Rsrv. Litig.*, 292 F.3d 1124, 1138-39 (9th Cir. 2002) (holding the issue of general causation is “whether the evidence showed the defendants' alleged emissions were capable of causing the illnesses from which plaintiffs' suffered” and not “individualized exposure to specific threshold doses”).

³⁴¹ *See Molden v. Georgia Gulf Corp.*, 465 F. Supp. 2d 606 (M.D. La. 2006).

³⁴² *Id.* at 608.

³⁴³ *Id.* at 611 & n.27.

³⁴⁴ *Id.* at 610.

whether and at what levels a chemical is even capable of causing the plaintiffs' alleged injuries. The court was easily able to determine on summary judgment whether exposure to the agreed upon limit occurred in the one-time plume. It is clear the court in *Molden* went beyond determining general causation. The Defendants have not cited—and the Court has not found—any authority which requires the Court to draw geographic boundaries at the general causation stage.

CONCLUSION

For the foregoing reasons, the Plaintiffs have proven by a preponderance of the evidence that odors and gases emitted by the Jefferson Parish Landfill during the relevant time period were capable of causing headaches, nausea, vomiting, loss of appetite, sleep disruption, dizziness, fatigue, anxiety and worry, a decrease in quality of life, and loss of enjoyment or use of property in the general population.

Plaintiffs have established general causation for the damage claims made in this action.³⁴⁵

New Orleans, Louisiana, this 29th day of November, 2022.



SUSIE MORGAN
UNITED STATES DISTRICT JUDGE

³⁴⁵ General causation for damage claims relating to diminution of property values will be determined at a later date.