UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
VICTORIA DIVISION

SAN ANTONIO BAY ESTUARINE WATERKEEPER and S. DIANE WILSON,	)	
Plaintiffs,	)	
VS.	)	**CIVIL ACTION NO. 6:17-CV-47**
FORMOSA PLASTICS CORP., TEXAS, and FORMOSA PLASTICS CORP., U.S.A.,	)	
Defendants.	)	

PLAINTIFF'S PROPOSED FINDINGS OF FACT

Plaintiffs San Antonio Bay Estuarine Waterkeeper and Diane Wilson submit their Proposed Findings of Fact and Conclusions of Law for the bench trial on Plaintiffs' claims under the Water Pollution Control Act, 33 U.S.C. §1251 et. seq. Plaintiffs reserve the right to request additional or amended findings.

TABLE OF CONTENTS

PLAINTIFFS' PROPOSED FINDINGS OF FACT

After considering all evidence and relevant documents presented by the parties, the Court hereby enters the following findings of fact. If one of the following is more properly characterized as a conclusion of law, it is the Court's intent that it be entered as a conclusion of law.

I. Background on Defendants and Formosa Plastics' Point Comfort Plant

A. Overview of the Plant

1. Since the mid-90s Formosa Plastics Corporation, Texas ("Formosa Texas") has produced plastics pellets and plastics powder in the small town of Point Comfort, Texas, population 725. https://population.us/tx/point-comfort/ ***(Trial Testimony Jurasek*, Ex 64)**
2. These small plastic particles are sold to companies that use the pellets and powder to make plastic products. **(Ex 64, internal pages 5-6; *Trial Testimony, Dr. Jose-Sanchez*)**
3. Formosa Texas' 2,500 acre plant is located on the north side of Lavaca Bay and bounded on the east side by Cox's Creek. State Highway 35 (SH 35) passes along the southern boundary of the production areas of the site on a roughly NE to SW course and continues SW across Lavaca Bay to the town of Lavaca Bay. **(Ex 168)**
4. The plant employed approximately 2,280 persons at the beginning of 2019 **(Ex 86)** and is a major employer in Calhoun County, which has a population of 21,744. https://www.census.gov/quickfacts/calhouncountytexas
5. The plant converts natural gas into a number of intermediate raw hydrocarbon materials, i.e., materials that themselves become feedstock for later manufacturing processes, and final hydrocarbon products and a few byproducts of these conversion processes. Among the products produced are ethylene, propylene, polypropylene, polyethylene (low density,

high density, and linear low density), polyvinyl chloride ("PVC"), and ethylene glycol. **(Ex 64; *Trial Testimony, Dr. Jose-Sanchez*)**

6. Plastic pellets are produced in five units, i.e., production areas, at the Formosa plant. The plant is divided physically and organizationally into production units, the polypropylene unit, (PP unit), polyethylene, (PE unit) and low-density polyethylene (LLDPE). **(Ex 64; *Trial Testimony, Dr. Jose-Sanchez*)** The five pellet producing units are: new units are designated with 2 and the older with a 1; the units are PP1, HDPE, PP1, PE2 and LLDPE. Three of these units were built in 1994: a low-density polyethylene unit, a polypropylene unit and a high-density polyethylene unit. Two more were built in 1998: a second polypropylene unit and a second high-density polyethylene unit. There are two shipping units, one for the 1994 production units and one for the 1998 production units. The pellets produced by these units are basically white in color. **(Ex 64, internal pages 5-6)**
7. The plant includes water and wastewater treatment plants, marine and railroad docks, stormwater management infrastructure. (**Ex 86**)
8. The plant's stormwater system is physically divided by a curb that separates stormwater that discharges into Cox Creek without any treatment in an area called outside battery limits (OSBL) and area where stormwater is routed to the Combined Water Treatment Plant and discharged into Lavaca Bay, designated inside battery limits (ISBL). (***Trial Testimony, Dr. Jose-Sanchez*)**
9. According to a local news report, the plant is undergoing a $5 billion expansion, with new completion in 2019. Kathryn Cargo, *Formosa Expansion to Be Completed By Early 2019*, Victoria Advocate, June 13, 2018 at

https://www.victoriaadvocate.com/news/formosa-expansion-to-be-completed-in-early/article_3d4d44c0-6f58-11e8-8dc8-eb31575b0831.html

B. The Plant is operated by both Defendants

10. Formosa's Point Comfort facility is owned and operated by Formosa Texas.

11. [redacted]

12. [redacted]

13. Formosa USA's Executive Vice President Walter Chen is the supervisor of Formosa Texas' plant manager Rick Crabtree. (**Ex 395,** Crabtree Depo. at 24:1) Mr. Crabtree speaks with Mr. Chen from a few times a week to a few times a quarter. (**Ex 395,** Crabtree Depo. at 24:14-15) Mr. Chen visits Formosa Texas at least once a quarter and maybe a little more than that. **(Ex 395,** Crabtree Depo. at 24:18-19**)**

14. [redacted]

[redacted]

15. In April 2017, Formosa Texas Ken Mounger sought approval from Formosa USA's Walter Chen before sending a letter to customers about the importance of caps on railroad cars. **(Ex 365)** Mr. Mounger's approval form first states, "We have received a NOI [Notice of Intent to sue sent by Plaintiffs] with regards to plastic pellets in the environment." Mr. Mounger next explains, "Operation Clean Sweep requires producers and converters to ensure that railcar caps are installs when railcars are in transit." *Id.* Mr. Mounger asks that Mr. Chen approve sending a letter to Formosa's customers and to approve the attached "strategy." Defendants have not produced the document containing the "strategy" sent to Mr. Chen. Mr. Mounger also sent Mr. Chen the Notice of Intent to Sue. *Id.*

16. Formosa USA must approve contracts of a certain type that commit more than $,2000 before Formosa Texas can enter into those contracts. (**Ex 395,** Crabtree Depo. at 35:13-15) For example, the second contract with Horizon Environmental for the clean up of plastics on Cox Creek and Lavaca Bay required Formosa USA approval. (**Ex 395,** Crabtree Depo. at 35:10-11

17. [redacted]

[redacted]

18. Formosa USA's Mary Bachynsky and John Pastuk are both in the environmental department for Formosa USA. When the Horizon cleanup started in 2017, they received weekly cleanup reports from the Horizon cleanup of Formosa Texas' discharged plastics and monitored those cleanups. (*See, e.g.,* **Ex 189; Ex 190; Ex 191**) John Hyak of Formosa Texas prepared "pellet recovery status" charts for Mary Bachynsky. (**Ex 192**)

19. [redacted]

20. Formosa USA also monitored efforts at individual units to discover the sources of pellets and powder in the stormwater system. **(Ex 195)**

21. [redacted]

22. [redacted]

II. Background on Plaintiffs

A. S. Diane Wilson

23. S. DIANE WILSON has spent much of her life working in the local bays surrounding Calhoun County; these include Lavaca/Matagorda Bays and San Antonio Bays. Ms. Wilson is the fourth generation in her family to fish the bounties of these bays. For forty years, she worked as a commercial fisherman, shrimper, oysterman, and fin fisher, and as a manager at a fish house. She has retired from those professions but continues in the shrimping industry, as a net builder and mender. She has also worked to protect the bays from pollution and degradation. The bays not only support her financially but, also, they are precious to her. **(*Trial Testimony, Wilson*).**

24. From time to time, Ms. Wilson goes out on a skiff into Lavaca and Matagorda Bays. She swims with her children and grandchildren in Matagorda Bay at Magnolia Beach. **(*Trial Testimony, Wilson*).**

25. Ms. Wilson has participated formally at the federal Environmental Protection Agency (EPA) and TCEQ to ask the agencies to require that any industrial discharges into the Lavaca Bay system are as protective of the bays as possible. She has asked that permits contain the most stringent measures and the lowest levels of toxins. She has filed comments on permits and complained formally to government agencies when industries have not complied with permit terms. She has been involved in litigation against those who pollute the bays. She has also sought information from TCEQ and EPA regarding Formosa's history of compliance with its permit provisions. She has never received information regarding a discharge of plastic pellets or powder from Formosa's Point

Comfort facility reported by Formosa to TCEQ. **(*Trial Testimony, Wilson*; *See e.g.* Ex. 1, 96, 97, & 102; *See also* Sec. XI(C)(1) below).**

26. Since at least 2009, Ms. Wilson has complained to EPA and TCEQ about Formosa's illegal discharge of plastics into Lavaca Bay. Since that time, she has been notified that the agencies have informed Formosa that the discharge of pellets violates the Clean Water Act. And she has seen new and continuous discharged plastics, even after investigations and findings of violations by EPA and TCEQ. **(*Trial Testimony, Wilson*; Ex. 56; *See also* Ex. 96, 97, and 102)**

27. Ms. Wilson has often seen Formosa's plastics while on the shores of Lavaca Bay. She has seen them on the shores of Cox Creek, near the Interstate causeway, at 6-mile (in the northwest corner of Lavaca Bay), Black Rock, Magnolia Public Beach, and Port Lavaca boat launch, among other places. She has helped collect samples of the plastic pellets and PVC, SPVC, and other plastic powders from around Lavaca and Matagorda Bays, and Cox Creek. **(*Trial Testimony, Wilson*)**.

28. Ms. Wilson cares deeply about the aesthetic beauty and the environmental health of the bay, wetlands, and shores, and the wildlife dependent on those resources. She detests the littering of Texas beaches and wetlands and is saddened when she sees the plastics and knows that they can cause even more harm to aquatic species. Ms. Wilson knows firsthand about the delicate balance of the ocean's ecosystem. During her lifetime, she has witnessed the decrease in shrimp, oysters and other species in the bays. She understands that harm to one species can cause harm to other species. She has worked with oystermen to help revive oyster reefs in the bay. She worries that fish, oysters, shrimp, turtles, shore birds and other aquatic species in the bay will be harmed by ingesting the plastic pellets and PVC,

SPVC, and other plastic powders. That worry is enhanced, because the toxins can adhere to plastic pellets, meaning that species in the bay could be ingesting additional toxins when they ingest Formosa's plastic pellets. The possibility of toxins adhering to Formosa's plastic pellets is even more daunting to Ms. Wilson because of residual mercury in the middle of Lavaca Bay from a former Alcoa superfund site. (***Trial Testimony, Wilson*).**

29. Ms. Wilson's financial livelihood could be negatively affected by the plastics in the bay and shores. If fewer shrimp populate the bay, due to ingestion of toxic plastic pellets, fewer shrimpers will need work on their nets from her. Less shrimping in the bay would harm her financially. Further, if consumers are concerned about eating fish and shrimp from a bay littered with plastic pellets and PVC, SPVC, and other plastic powders, Ms. Wilson's income could be harmed. (***Trial Testimony, Wilson*)**

30. Based on these concerns, Ms. Wilson's use and enjoyment of the areas near and downstream of the Plant's discharges have been, are being, and will continue to be diminished because of Formosa's Clean Water Act violations. Unless the requested relief is granted, Formosa's Clean Water Act violations will continue to injure Plaintiff.

B. San Antonio Bay Estuarine Waterkeeper

31. San Antonio Bay Estuarine Waterkeeper is an unincorporated association that was started in 2012 as a project of the Calhoun County Research Watch. Calhoun County Research Watch is a 501(c)(3) non-profit organization founded in 1989. Waterkeeper is part of a national network of Waterkeeper organizations, the Waterkeeper Alliance. The board of Waterkeeper meets as needed, and its executive director is Plaintiff S. Diane Wilson. Each Waterkeeper Alliance member has a designated Waterkeeper. Bob Lindsey is that person for the San Antonio Bay Estuarine Waterkeeper. Waterkeeper has sought information from

TCEQ regarding plastic pellet and powder discharges from the Point Comfort Facility and has never received information of any occurring. (**Ex 188, *Trial Testimony, Lindsey, Wilson***)

32. The mission of Waterkeeper is to monitor and proactively protect Lavaca, Matagorda and San Antonio Bays and to educate the public, while reporting relevant findings to the appropriate authorities. Waterkeeper is committed to engaging volunteers, marine biologists, environmental advocates from both Calhoun County Resource Watch and Texas Injured Workers, commercial fishermen, and other members of the community to identify violations of the CWA and promote cleanup and recovery efforts. Waterkeeper also promotes the preservation of local wetlands and waterways for proper commercial and sport fishing and other recreational uses, such as swimming and other watersports to further the appreciation of these beautiful natural resources. ***Trial Testimony, Lindsey;* Ex. 188)**

33. Waterkeeper believes it is important that the public be aware of threats to the Bays. Waterkeeper engages media sources to publicize areas of concern, such as the harmful pollution of waterways by chemical plants and others. Waterkeeper hosts public meetings to educate the community, comments on permit applications at environmental agencies, notifies government agencies when there are problems in the waterways, and files lawsuits when other alternatives are unavailing. (***Trial Testimony, Lindsey)***

34. Members of Waterkeeper have seen Formosa's plastics on the shores of Cox Creek and Lavaca Bay and have reported the plastics to TCEQ and EPA. (***See* Sec. XI(C)(1) below).**

35. In July 2013, Waterkeeper requested an administrative contested case hearing on Formosa Plastics' application for a renewal and amendment to its TPDES permit. In that request,

Waterkeeper described the ongoing, extensive littering of the area with plastics and asked TCEQ to prohibit such discharges. (**Ex.1;** ***See also*** **Ex. 6**)

36. Members of Waterkeeper include sport and commercial fishermen. They are concerned about the effects of plastics on fish, birds, and marine wildlife. Waterkeeper is well aware of the fragile balance of life in Lavaca Bay and that harm to aquatic species can harm not just those species and the ecosystem but, also, the livelihoods of commercial fishermen, shrimpers, oystermen and the passions of those people and of recreational fishers. (***Trial Testimony, Lindsey & Wilson***)

37. Members of Waterkeeper walk the beaches of Lavaca Bay and swim and boat in its waters. They are offended by the littering of the Bay and its shores with plastics. They are concerned about the aesthetic damage to and environmental health of the beaches, wetlands, shores and bays and the wildlife that depend on those resources. (***Trial Testimony , Lindsey & Wilson)***

38. Waterkeeper member, and the official "Waterkeeper," Robert Lindsey has fished in the local water systems since he was a kid, as do many members of his family. The presence of plastic pellets and powder concerns him as he knows that marine life can ingest them. (***Trial Testimony, Lindsey.***

39. Waterkeeper member Ronnie Hamrick has grandchildren who swim in the Bay and play on its beaches. He is concerned about the presence of plastic pellets and powder and their impacts on the Lavaca Bay water system. (***Trial Testimony, Hamrick)***

40. Ronnie Hamrick has taken hundreds of videos since January 2016 reflecting the presence of plastic powder and pellets on Cox's Creek and in Lavaca Bay. Roughly 100 of these are contained in **Ex 139.** (*see also* **Ex. 410,** Hamrick Depo. at 162:8-170:23)

41. Waterkeeper member James David Sumpter regularly takes his dogs for walks at the Bayfront park in Port Lavaca, which is the shoreline of Lavaca Bay. The presence of plastic pellets and powder in the Lavaca Bay system concerns him and lessens the value he derives from spending time on the Bay's shores. (***Trial Testimony, Sumpter)***

42. Waterkeeper member Cheyenne Jurasek describes the mission of Waterkeeper as "just trying to do good;" he does sampling when he can. **(Ex 401,** C. Jurasek Depo. at 10:1, 11**)** Mr. C. Jurasek testified that when he collects samples of pellets, he only gets part of what he sees because "there's too many" to collect. **(Ex 401,** C. Jurasek Depo. at 31:5**)** He's counted maybe 50 pellets in a 6" by 6" area when he's sampled. (**Ex 401,** C. Jurasek Depo. at 32:23 - 33:6) Seeing the pellets in the Bay makes him feel "disgusted" and he "hates to see" the powder there. **(Ex 401,** C. Jurasek Depo. at 31:8, 12) At one point between 2005 and 2008, Mr. C. Jurasek was on the Formosa clubhouse property and went down to the shoreline. He found "handfuls" of pellets. (**Ex 401,** C. Jurasek Depo. at 31:1-6**)** "They [the pellets] were right on the shoreline [of the clubhouse property]. It literally looked like someone took a five gallon bucket and just dumped it." (**Ex 401,** C. Jurasek Depo. at 35:23-25) When asked what it would be like if there were not pellets or powder on the shore of Lavaca Bay, Mr. Jurasek responded, "It would be a better place." **(Ex 401,** C. Jurasek Depo. at 32:9)

43. Waterkeeper is distressed that, after years of complaints to state and federal agencies, Formosa has not taken adequate steps to prevent the illegal discharge of plastics.

44. Waterkeeper's members' use and enjoyment of the areas near and downstream of Formosa's discharges have been, are being, and will continue to be diminished because of

Formosa's Clean Water Act violations. Unless the requested relief is granted, Formosa's Clean Water Act violations will continue to injure Waterkeeper.

C. Plaintiffs' Notice Letter and Lawsuit

45. Plaintiffs sent a 60 day Notice of intent to sue letter to Defendants, EPA, and TCEQ on April 6, 2017. **(Ex 16)**

46. At least 60 days later, but not more than 120 days later, Plaintiffs filed their Complaint on July 31, 2017 in the United States District Court for the Southern District of Texas, Victoria Division. **(Court Doc. No. 1)**

III. Formosa's Water Discharge (TPDES) Permit

A. Background on Formosa's Permit

47. On June 10, 2016, TCEQ issued Formosa Texas a Texas Pollution Discharge Elimination System (TPDES) permit WQ0002436000 for its Point Comfort Facility. The permit expires January 1, 2020. **(Ex 2)**

48. Formosa Texas' TPDES permit grants them permission to treat and discharge wastewater and stormwater into Lavaca Bay and stormwater into Cox Lake (locally called Cox Creek). **(Ex 2)**

49. Formosa Texas was issued its original water discharge permit in 1993. **(Ex 88)**

50. [redacted]

51. The Army Corps of Engineers has likewise found Cox Creek to be navigable waters of the United States under the Clean Water Act. (**Ex 480**)

B. Formosa's Permit prohibits the discharge of floating solids in "other than trace amounts" from all outfalls

52. Formosa has 13 permitted wastewater or stormwater outfalls from the plant (Outfalls 001-013). Outfall 001 discharges treated wastewater and process (or contact) stormwater. Outfalls 002-013 discharges non-process (or non-contact) stormwater. **(Ex 169)**

53. Two of these outfalls (numbered 001 and 011) discharge to conveyances that lead to Lavaca Bay. Six outfalls (numbered 002, 003, 004, 005, 010 and 013) discharge to conveyances that lead to Cox Creek south of SH 35. The remaining five wastewater outfalls (numbered 006, 007, 008, 009, and 012) are to conveyances that lead to Cox Creek north of SH 35. (**Ex 32; Ex 64, Att. B; Ex 169)**

54. Formosa Texas' TPDES permit prohibits the "discharge of floating solids or visible foam in other than trace amounts" from Outfall 001. **(Ex 2 at 71403-000224)** This exact same permit term was in Formosa's original National Pollutant Discharge Elimination System permit issued in 1993. (**Ex 88 at FPC048636)**

55. Formosa Texas' TPDES permit prohibits the "discharge of floating solids or visible foam in other than trace amounts" from Outfalls 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, and 012. **(Ex 2 at 71403-000235-000236)**

56. TCEQ rules prohibit the discharge of "floating debris and suspended solids" into surface waters. 30 Texas Admin. Code 307.4(b)(2). This rule is incorporated by reference into Formosa's TPDES permit. **(Ex 2 at 71403-000242)**

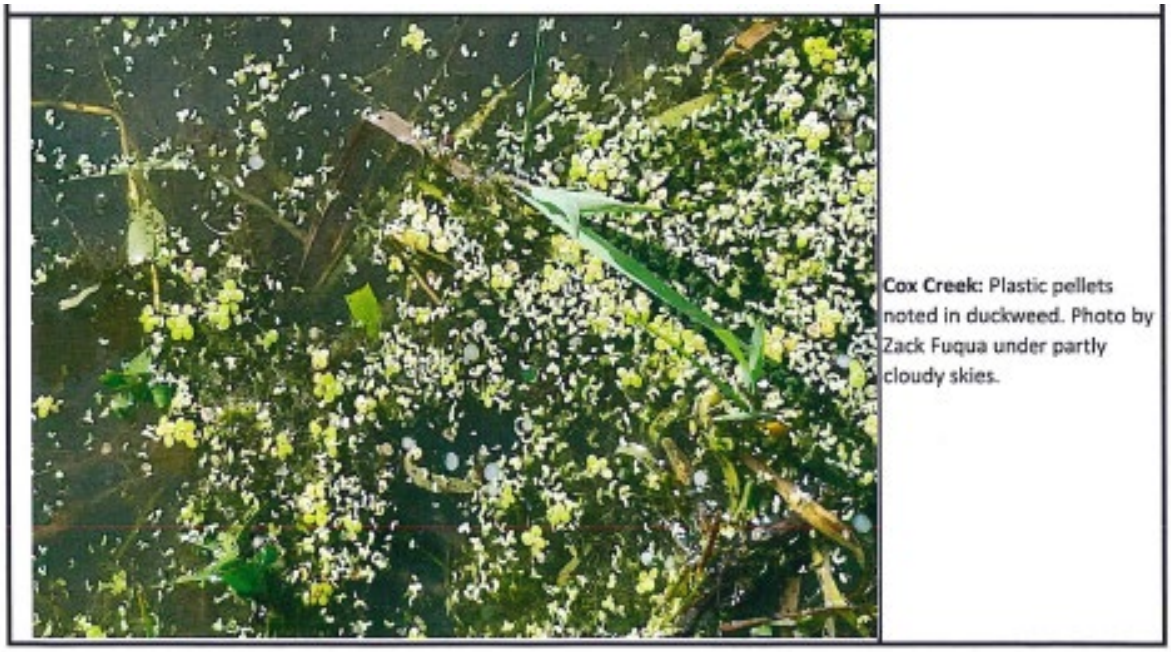
1. **The Definition of "Trace Amounts" is based on TCEQ Documentation & Scientific Definitions**

57. In determining whether floating solids have been discharged in "other than trace amounts," TCEQ inspectors conduct visual inspections of the water bodies which receive the discharges ("receiving waters"). If upon visual inspection, floating solids are readily apparent, the inspectors document this finding, and may take photographic evidence of the floating solids in the receiving waters or on its shores as a record of the violation. (***Trial Testimony, Phillips; See e.g.*** **Ex 12)**

58. In enforcement actions against Formosa Texas, TCEQ has visually determined in photographs the amount of pellets that constitute more than a trace amount, in violation of the permit on March 10 and 14, 2016; September 7, 8, and 13, 2016; April 2018; June 2018; and January 2019. Photographs in the TCEQ investigations establish the visual standard for violation of the permit. The March 2016 photographs are at Cox Creek and the April 2018 photographs show plastics in Lavaca Bay. **(Ex 74 at FPC002716-002718 and Ex 75 at 71403-008239).** January 2019 photos show plastics in Cox Creek and Lavaca Bay. **(Ex 145)**

59. For example, this photo from TCEQ Investigator Karla Trevino from a March 10, 2016 investigation notes "Pellets observed in Cox Creek" (**Ex 74 at FPC002717):**

60. Another example is a photo by TCEQ Investigator Zach Fuqua from a September 7, 2016 investigation at Cox Creek noting "plastic pellets noted in duckweed." (**Ex 9 at 71403-000744)**



61. Finally, a photo by TCEQ Investigator Zach Fuqua from June 26, 2018 in Lavaca Bay, notes "Small, white, floating debris was noted in the vicinity of Outfall 001." (**Ex 75 at 71403-008345**)

Photographic Documentation

Formosa Plastics Corporation, Texas - CN600130017	WQ0002436000	Small, white, floating debris was noted in the vicinity of Outfall 001. Photo by Zack Fuqua under sunny skies.
Formosa Point Comfort Plant - RN100218973	26-Jun-18	
201 FORMOSA DR,POINT COMFORT, TX , 77978	Investigation No. 1484116	
Point Comfort, Texas , 77978	Photograph No. 1: Outfal 001 Discharge	Lavaca Bay

San Antonio Bay
71403-008345

62. Dr. Jeremy Conkle states that to an environmental chemist, the word trace means "not easily found." **(*Trial Testimony, Conkle*; Ex 33 at 21)** Trace contaminant analysis involves hours using various techniques in order to extract the trace contaminant. **(*Trial Testimony, Conkle*; Ex 33 at 21)**

63. Dr. Conkle explains, "Based on how the word 'trace' is used in relation to environmental contaminants, you should not be able to walk on a shoreline and easily collect a handful of plastic nurdles and powder." **(*Trial Testimony, Conkle*; Ex 33 at 21)**

64. Dr. Jose-Sanchez, a PhD engineer, describes the meaning of trace as follows: "Although the definition of trace amounts is to a certain degree qualitative, the term is typically utilized in analytical chemistry to describe an analyte concentration low enough to cause difficulty in detection. This difficulty may be caused by the sample size or by the matrix (i.e. - the concentration of the analyte of interest relative to the matrix or the sample size causes difficulty for the analyst). In this case, I would define less than trace amounts for plastic or pellets in the effluent, as a quantity of plastics and pellets in the effluents that is difficult to see to the naked eye, as the eye is in this case the equipment utilized for detection." **(*Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 16)**

65. Donna Phillips, a 28-year veteran of TCEQ, explains that "floating pellets or powder that are readily visible are considered in the enforcement community to be in excess of 'trace amounts.'" **(*Trial Testimony, Phillips;* Ex 39 at 3)**

66. Donna Phillips explains, "From my time at the agency [TCEQ], I understand that 'trace amounts' as referenced in the permit, can generally be defined as "*de minimis*" or too insignificant or minor to merit consideration." **(*Trial Testimony, Phillips;* Ex 39 at 6)**

C. Formosa's permit requires Formosa to report within 24 hours to TCEQ any floating solids violations

67. Formosa Texas' TPDES permit requires Formosa Texas to report any permit non-compliance, that may endanger human health, safety, or the environment as required by 30 TAC 305.125(9). **(Ex 2 at 71403-000240)**

68. TCEQ's Executive Director confirmed that reportable discharges that endanger the human health, safety, or the environment includes the discharge of pellets and powder from the Point Comfort facility. **(Ex. 5 at 70403-000167)**

69. Formosa Texas affirmatively agreed during the permitting process that it would be required to report an unlawful discharge of pellets and powder to the Agency. **(Ex 11 at 71403-001829)** Their assertion was made in an attempt to receive their permit and avoid a contested case hearing on the issue of plastic pellet and powder discharges. **(Ex 11 at 71403-001821)**

70. Formosa Texas' TPDES permit requires oral or facsimile notification to TCEQ of non-compliance within twenty-four hours of the event triggering the report. **(Ex 2 at 71403-000240)**

71. Formosa Texas' TPDES permit requires written notification to TCEQ of non-compliance within five days of the event triggering the report. **(Ex 2 at 71403-000240)**

D. Formosa's representations about these permit terms during Formosa's latest Permit Renewal

72. During the public comment period on Formosa Texas' application to renew its TPDES permit, Formosa Texas affirmed that it understood the meaning of the effluent limitation contained in its permit prohibiting the discharge of floating solids "in other than trace amounts" and confirmed it had the same definition as that given by TCEQ's Executive Director. (**(Ex 11 at 71403-001828 - 001829); and Ex 5 at 71403-000165).**

73. TCEQ received Formosa Texas' application to renew its current TPDES permit on February 2, 2010. (**Ex 5 at 71403-000162**)

74. TCEQ published a notice of the application on May 16, 2013. **(Ex 42 at 71403-001281)**

75. TCEQ's notice of Formosa Texas' permit renewal application solicited public comment on the contents of the application. **(Ex 42 at 71403-001278)**

76. On July 16, 2013, Waterkeeper submitted comments to TCEQ on Formosa Texas' permit renewal application. **(Ex 1)** The effluent limitation on discharges of floating solids was one topic covered in the comments: Waterkeeper asked TCEQ to "provide clarification as to the applicability of the permit limits, the State Rules . . . of polyethylene pellets/dust being found in the drainage ditches, the bay, and surrounding areas." **(Ex 1)**

77. On August 17, 2015, TCEQ issued the "Executive Director's Response to Comments" on Formosa's permit renewal application. **(Ex 5 at 71403-000219)** The Response to Comments states: "The draft permit does not authorize Formosa to discharge floating debris and suspended solids via the permitted outfalls," **(Ex 5 at 71403-000165)** and "the draft permit prohibits Formosa from discharging any kind of floating solids." **(Ex 5 at 71403-000166)** Furthermore, the Executive Director "determined that it is not necessary to specify that polyethylene pellets are a solid, or to specify that if Formosa discharges polyethylene pellets it would be a violation of 30 TAC § 307.4(b)(2-4)." **(Ex 5 at 71403-000166)**

78. On December 28, 2015, Formosa Texas submitted a written response to Waterkeeper's request for a contested case hearing. The assertions and agreements made in that written response were with the intention of avoiding a contested case hearing (an administrative trial about issues of fact pertaining to Defendants' permit terms). **(Ex 11)** In that response, Formosa Texas asserted that "none of the asserted reasons for holding a contested case hearing constitute a disputed issue of fact that is relevant and material to the TCEQ's decision on the application." **(Ex 11 at 71403-001823)**

79. One of the asserted issues Formosa Texas stated does not constitute a disputed issue of fact was the "alleged need for more specific permit standards to prevent LLDPE Pellets and PVC dust from being discharged" because, according to Formosa, "the draft permit already prohibits the discharge of floating debris and suspended solids via the permitted outfalls." **(Ex 11 at 71403-001828)** Formosa Texas reiterated, "there is simply no need for the duplicative permit provisions requested" by Waterkeeper. **(Ex 11 at 71403-001829)**

80. In its response to requests for a contested case hearing, Formosa Texas stated that "TCEQ rules at 30 TAC § 307.4(b)(2-4) prohibit the discharge of 'floating debris and suspended solids' into surface waters and this rule is incorporated by reference into the permit." **(Ex 11 at 71403-001828-001829)** Formosa Texas continued: "In the event some polyethylene pellets and PVC dust becomes entrained in stormwater runoff and is discharged into Lavaca Bay via one of the outfalls, then this would indisputably be a permit violation which must be reported to TCEQ within 24 hours." **(Ex 11 at 71403-001828-001829)**

81. In its response to the requested contested case hearing, Formosa Texas asserted "there is no valid reason to hold a contested case hearing on whether the E.D. should have exercised his discretion to include the permit provisions as requested by the Protestants." **(Ex 11 at 71403-001828-001829)**

82. Formosa's TPDES permit was granted "on the basis of the information supplied and representations made by the permittee during action on an application, and relying upon the accuracy and completeness of that information and those representations." **(Ex 44 at 71403-000241)**

IV. Formosa's Combined Storm and Wastewater System Fails to Prevent the Discharge of Plastics in other than trace amounts from Outfall 001

83. The primary function of the wastewater system that discharges from Outfall 001 into Lavaca Bay is to remove or dissolve organic waste. While it has some functions that can remove plastic pellets and powder from the wastewater prior to discharge, these have proved defective for the quantity of plastic pellets and powder that move through the system. The same is true for the recent and hurried remedial measures taken at the outfall. Systemic alterations to the wastewater system are necessary to capture plastic pellets and powder. (***Trial Testimony, Dr. Jose-Sanchez***)

A. Overview of Formosa's wastewater and treated stormwater system

84. Formosa's wastewater treatment plant is referred to as a Combined Wastewater Treatment Plant (CWTP). That plant treats industrial process wastewater and contact stormwater from the physical areas of the plant called "inside battery limits." **(*Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002805)**

85. Wastewater and contact stormwater can be treated in three different ways at the CWTP: receiving, pre-treatment, and biological. Contact stormwater is first pre-treated to remove oil, grease, and floating solids, and adjust the pH. It is then sent to the Stormwater Holding Tank for equalization. Following equalization, both contact stormwater and process wastewater go through a solids, oil, grease, emulsion, and foam removal process. The waters then go through a biological treatment that clarifies and separates the wastewater from the solids. Pellets and powder cannot be reduced or treated through the biological treatment. The wastewater is then sent to a clarifier for further biological treatment. The

presence of pellets and powder cannot be remediated by the biological process at this stage, but may potentially be removed through flocculation. **(*Trial Testimony , Dr. Jose-Sanchez*; Ex 35 at 71403-002812, 002813)**

86. Treated storm and wastewater are discharged directly into Lavaca Bay through a pipe that extends westward from the Plant, called Outfall 001. (**Ex 2 at 71403-000221-000222, 000225)**

B. Deficiencies in current wastewater system for preventing the discharge of plastics in other than trace amounts from 001

87. Engineering deficiencies in Formosa's wastewater treatment system for preventing the discharges of plastics include: (1) inconsistencies in the pretreatment for pellets and powders in both process wastewater and stormwater/washwater flows, (2) the apparent incidental nature of pellet/power removal within the CWTP as opposed to having a dedicated unit to specifically remove gross solids and grit, and (3) potential compromises in CWTP processes due to the lack of initial gross solid and grit removal prior to any other pretreatment or treatment processes due to potential combined effects of abrasion of mechanical equipment, accumulation on basins and channels, and increased energy demands at those processes. **(*Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002837-40)**

88. Formosa's problems with a screen prior to outfall 001 have been identified since at least 2016. At that time they were ordering the 001 outfall screen with one "with smaller holes," with the root cause "poor design selection." (**Ex 439**) In July of 2017, emails discuss placement screens on TZT-01. **(Ex 352)** The email attachment is "pellet screen photo,"

which mae be photos in the next document produced. **(Ex 353)** The Formosa photos show big pipes emptying into a sump. **(Ex 353)** Likely these are the pumps Formosa eventually determined had too high of a flow rate for screens to work. (*See* **Ex 350)**

89. In June 2018, Formosa is trying to have something "in place" by the end of the month, but on June 19, 2018, Formosa Texas' James Porter emails others that "the two methods will are trying to use for filtering the pellets will not work due to the high flow rates encountered." **(Ex 350)** On June 19, 2018, Paul Wei with Formosa Texas responds to James Porter that they will discuss these issues at a meeting "for short term and long term plans." *Id.*

90. Formosa's proposed control specifically designed for controlling plastics discharges at 001 is a mesh "cone filter" in its discharge pipe before it discharges to Lavaca Bay. Formosa installed a cone filter on the main wastewater line on June 20, 2017, but it was removed on April 26, 2018 and "has not been replaced due to two failures resulting from the water pressure in the line overwhelming the cone filter screen." (**Ex 12 at 71403-008277**)

91. [redacted]

92. [redacted]

93. Dr. Robert Hale, Formosa's marine scientist, described the netting on the outflow pipe at Formosa's wastewater system as "wasn't like micron size." (**Ex 397,** Hale Depo. at 144:20) Dr. Hale elaborated, "I would be surprised if it [the screen] would catch powder." (**Ex 397,** Hale Depo. at 144:22)

C. New controls being considered by Formosa in March 2019 for outfall 001 are evidence that problems with discharges at Outfall 001 are ongoing

94. [redacted]

V. Deficiencies in Formosa's OSBL Stormwater System to Prevent the Discharge of Plastics in other than trace amounts from Outfalls to Cox Creek

95. Formosa's "non-contact stormwater" is located in the "outside battery limits" part of the plant and is where stormwater does not come into contact with any chemical processes. Pellets and plastic powder from the five pellets producing units are in this catchment area. Pellets and plastic powder from these five units frequently lines the ditches that eventually discharge through outfalls 002, 004, 005, 006, 007, 008, 009, and 012. The measures in place to catch these plastic pellets and powder before they exit the stormwater external outfalls do not prevent the pellets and powder from exiting the facility and entering Cox Creek. (***Trial Testimony, Dr. Jose-Sanchez***)

A. Overview of Formosa's OSBL Stormwater System

96. Stormwater at the facility includes precipitation that falls on pervious and impervious areas and does not absorb into the subsurface. The excess stormwater generally falls to the surface and then flows through a series of internal concrete and earthen drainage structures ditches. Some are equipped with internal gates, but all eventually discharge through 12 stormwater outfalls numbered 002-0013. **(*Trial Testimony, Dr. Jose-Sanchez*; Ex 35 at 71403-002805)**

97. Water from the surface of the facility that does not come into contact with any chemical processes is called "non-contact stormwater." It comes from areas of the facility known as "outside the battery limits." **(*Trial Testimony, Dr. Jose-Sanchez*; Ex 35 at 71403-002805)**

98. Non-contact stormwater is captured within 12 drainage area, with each area draining to an external outfall. **(*Trial Testimony, Dr. Jose-Sanchez*; Ex 35 at 71403-002808)**

99. The Defendants' TPDES permit does not specify any controls or treatment for stormwater. **(*Trial Testimony, Dr. Jose-Sanchez*; Ex 35 at 71403-002808)**

100. Non-contact stormwater located near manufacturing areas, the water flows through a collection system with an internal gate where Defendants are required to conduct a visual inspection and clean out any pellets or powder observed prior to releasing the water. **(*Trial Testimony, Dr. Jose-Sanchez*; Ex 35 at 71403-002805)**

101. Non-contact stormwater located away from manufacturing areas is not routed through an internal gate and instead flows straight through to one of the 12 external outfalls. **(*Trial Testimony, Dr. Jose-Sanchez*; Ex 35 at 71403-002806**

102. Except for stormwater outfall 013, pellets and powder can travel to and be discharged from the remaining stormwater outfalls via vehicles, pipes, stormwater overflow, and wind. **(*Trial Testimony, Dr. Jose-Sanchez*; Ex 35 at 71403-002810)**

B. Deficiencies in Formosa's stormwater system for preventing the discharge of plastics in other than trace amounts from outfalls into Cox Creek

1. "Non-contact" Stormwater is actually "in contact" with pellets and powder, and is commingled with truly "non-contact" stormwater

103. The term "non-contact stormwater" is misleading, as these stormwater streams generated at Formosa are in contact with pellets and powders, which are a pollutant that must be controlled to comply with permit requirements. Therefore, it appears that from conception, the stormwater management system failed to identify pellets and powders as a significant contaminant. (***Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002816, 17)**

104. Defendants' engineering expert, Mr. Moleux, agrees with Dr. Jose-Sanchez that "any water that comes -- that is produced through rain should not come into contact

with·pellets, and that's done through berming, through other engineering techniques to minimize those pellets from getting out into anything. … you want to keep that water separate from any potential pellets." (**Ex 403, Moleux Depo.** at 172:2-10; *see also* 175:20-176:1)

105. Another design flaw with Formosa's stormwater system for controlling discharges of plastics is that it combines stormwater flows from both pellet/powder producing/management areas (i.e., PVC, SPVC, PP I, PP II, PE I, PE II, LLDPE, and associated laboratory, rail car and transportation facilities) with stormwater from non - pellet/powder producing/management areas (i.e., offices, undeveloped land, other manufacturing areas not producing pellets or plastics), resulting in commingling pellet/powder-free stormwater with that stormwater in contact with pellets/powder. (***Trial Testimony, Dr. Jose-Sanchez;*** **Ex 35 at 71403-002817**)

106. Less than 10% of the area of the Formosa facility is occupied by areas with potential pellet/powder contact. By not controlling or treating effectively the pellets/powder at the source (producing/management areas) and having all stormwater discharged through the same outfalls, virtually the remaining 90% of the stormwater generated at the facility gets also impacted with pellets and powder once they mix in the conveyance system, making it harder to remove the plastics from a much larger volume of water. This results in an increase of the overall volume of stormwater potentially impacted by these contaminants. (***Trial Testimony, Dr. Jose-Sanchez;*** **Ex 35 at 71403-002817, 18**, and **Exhibit 1** to Expert Report).

2. Source control deficiencies

107. Source control means preventing solids from ever touching the ground and thus not ever having the potential to enter the stormwater system. (***Trial Testimony, Dr. Jose-Sanchez*)**

108. Evidence in this section shows that Formosa's pellets and powder regularly and routinely leave the production areas, and get into the stormwater and wastewater system, as Formosa's audits of its facility in 2016 and 2017 documented. More recent emails and plans demonstrate the source control problem has not been fixed.

109. The source controls implemented at Formosa to date continue to be insufficient or ineffective to prevent the release of pellets and powders to the stormwater system. (***Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002827)**

110. Formosa's vacuum truck logs from March 7 and 8, 2018, show that source has been a problem at Formosa -- logs describe that various ditches were "full of powder/some pellets." (***See, e.g.* Ex 95 at FCP023350-51)** Recent vacuum truck logs from 2019 continue to show consistent powder and pellets in the stormwater system and long-clean times. **(*See, e.g.* Ex. 461 at FCP062216)**

111. At the SPVC unit, at least during 2000-2016, "off-spec" product was cleaned as best as possible, but that the remainder of that product was swept into the ground and could end up discharged into Lavaca Bay. **(*Trial Testimony, Van Rozner*; Ex 94 at para. 14; Ex 259)** (The SPVC unit is "inside battery limits" and its stormwater goes to the CWTP.)

112. Mr. Van Rozner was so disturbed by the handling of off-spec product at the SPVC unit that he started taking photos of it; photos from a 2014 incident show vast amounts of powder "like a snow storm" at the SPVC unit. In one incident, the off-spec product was 5'

high. (***Trial Testimony, Van Rozner*; Ex 94 at para. 15-17 and attached photos; Ex 259)**

113. [redacted]

114. [redacted]

115. [redacted]

116. [redacted]

117. Formosa conducted internal audits in 2016 and 2017 to document spillage of pellets at the facility; they produced a 534-page audit. Excerpts depict pellets and powder at the facility and in the stormwater culverts; they also show opportunities for contaminated water that is supposed to be treated at the wastewater facility to be discharged in stormwater. **(Ex 260)**

118. Another document depicts how pellets in a loading area "flow from area in loading area toward drain under steps" and "potential discharge of pellets into the underground drainage." **(Ex 260 at FCP003321-003322)**

119. The audit photographs show a wrack line of pellets and powder on the Formosa's internal stormwater culverts. Three photos from January 2016 near the LLDPE warehouse show a wide swath of powder on the culverts. **(Ex 260 at FCP003317-003319)** Yet another ditch between LLDPE and PE1 also has the big mark of powder. **(Ex 260 at FPC003325)** In fact, stormwater culverts around the facility show the streaky presence of pellets and powder. **(Ex 260 at FPC003332-0033333; FPC003343, FPC003346; FPC003365; FPC003368-003369, FPC003476-003477; FPC003479; FPC003509; FPC003519; FPC003526; FPC003539; FPC003561; FPC003578-003579; FPC003660; FPC003674; FPC003701; FPC003728; FPC003827)**

120. Formosa's internal audit depicts the failure of Formosa to respond to the documentation of problems. For instance, a February 26, 2016 photo of a pile of pellets near a culvert describes "this was also observed on 2.22.2016 audit." **(Ex 260 at FPC003398)** A photo of a spill on railroad lines "was observed in last weeks audit." **(Ex 260 at FPC003422)** A March 24, 2016 culvert crack full of pellets in the HDPE1/PP1 shipping area "was observed last week." **(Ex 260 at FPC003431)** "Pellets are still visible

within the cracks of the pavement [of the stormwater culvert]." **(Ex 260 at FPC003451)** Pellets in a ditch west of the PP-1 unit observed July 1, 2016 stated: "*Note: observation from last weeks* [sic] *audit."* **(Ex 260 at FPC003586)** A July 29, 2016 photo shows pellets are "still visible" at the HDPE1/PP1 railroad loading area. **(Ex 260 at FPC003623)**

121. March 24, 2016 photos show that the inside battery limits boundaries (ISBL) do not always keep pellets within the boundary (and out of the outside battery limits areas). At the PP2 unit a photo shows "pellets are visible just past the containment where a screen used to be in place. Pellets have now left the ISBL area." **(Ex 260 at FPC003439)**

122. On March 18, 2016, the audit describes at the HDPE2 unit, "Pellets can be seen in the drains. Closer inspection reveals that the ditches are full and pellets are floating on the water. Additional photos show pellets floating on the water just under the grating." **(Ex 260 at FPC003423)**

123. An April 7, 2016 photo near the PP2 unit shows "pellets can be seen just below the grating just outside battery limits of the process areas." **(Ex 260 at FPC003472)**

124. Many photos capture problems with torn or missing screens that were meant to stop pellets from entering a stormwater culvert or escaping a building. A May 12, 2016 photo inside the railroad car loading area shows a gap where pellets can escape the building. **(Ex 260 at FPC003515)** A July 15, 2016 photo depicts a torn screen at the PE1/PP1 truck loading area. **(Ex 260 at FPC003604)** An April 15, 2016 photo shows a screen missing at the LLDPE unit. **(Ex 260 at FPC003477)** An April 15, 2016 photo shows a screen missing at the PP1/PE1 railroad car loading unit. **(Ex 260 at FPC003486)** An April 15, 2016 photo near the PP2 unit shows an improperly placed screen in the stormwater system: "pellets are able to make their way into ditch." **(Ex 260 at FPC003493)** An April 7, 2016 photo

shows a screen missing in the PP1/PE1 railroad car loading stormwater system. **(Ex 260 at FPC003470)** That screen or another one is missing on June 9, 2016. **(Ex 260 at FPC003568)** An October 26, 2016 photo shows missing screens at the PP1/PE1 railroad car loading unit. **(Ex 260 at FPC003733)**

125. October 6, 2016 photos captures pellets and and powder floating in a stormwater culvert leaving the "technical" area and at the LLDPE unit. **(Ex 260 at FPC003694; FPC003696)**

126. A November 11, 2016 photo capture pellets in a stormwater ditch: "note that pellets were seen throughout the entire ditch." **(Ex 260 at FPC003742)**

127. A December 13, 2016 photo depicts powder floating in water in a stormwater culvert south of the applications library. **(Ex 260 at FPC003805)** Powder was also visible in a stormwater culvert near the LLDPE unit as well as floating on water in a stormwater culvert east of PE1-PP1 shipping. **(Ex 260 at FPC003806; FCP003822)** Powder was also at the 006 outfall and downstream of a floating boom. **(Ex 260 at FPC003825; FPC003828)**

128. A June 3, 2016 photo captures pellets floating in water in a stormwater culvert leaving the HDPE-1 unit. **(Ex 260 at FPC003560)**

129. The August and October 2017 audits of multiple units show pellets and powder on the ground at loading areas, near drains leading to water culverts, in production units. The photos show gaps in curbs intended to contain "inside battery limits" stormwater so that it is treated instead of escaping to the stormwater system. The photos capture screens that do not completely close. **(Ex 187)**

130. Additional 2017 audits show ongoing problems with pellets in stormwater ditches, in loading areas, and near railroad cars. **(Ex 451)**

131. [redacted]

132. [redacted]

133. Photos from a TCEQ January 17, 2019 investigation show ongoing problems with source control at the plant and plastics in internal waterways. **(Ex 145)**

3. Internal outfalls do not prevent plastics from leaving production areas

134. It has been extensively documented that despite Formosa's stated internal gate opening procedures, Formosa's internal outfall gates have not prevented pellets and powders from reaching further downstream, and towards and beyond the outfalls. **(*Trial Testimony, Dr. Jose Sanchez;* Ex 35 at 71403-002829)**

135. [redacted]

[redacted]

136. [redacted]

137. At times, internal gates have been propped open or were leaking. (***Trial Testimony, Myers***)

138. March 11, 2016 photos show pellets just upstream of outfall 009, past the internal outfall gates. **(Ex 260 at FPC003391)** A September 9, 2016 photo shows pellets that have made their way to the external gate at the 006 outfall, past the internal outfall gates. **(Ex 260 at FPC003691)**

4. Flooding problems and drainage capacity deficiencies lead to overflow, and contribute to plastics discharges

139. According to the drainage studies prepared for Formosa, testimony from Formosa employees, and Formosa's internal emails and documents, the hydraulic capacity of Formosa's system is undersized and this has important implications in the proper control of pellets and powder to ensure compliance with Formosa's permit. **(*Trial Testimony, Dr. Jose Sanchez;* Ex 37 at 71403-010218)**

140. An overflow means that the water will extend beyond the channel's banks bypassing any other controls such as gates and screens along the way, dispersing water and floating materials outside the conveyance system. **(*Trial Testimony, Dr. Jose Sanchez; Ex 35 at 71403-002819*)**

141. The hydraulic capacity of the conveyance system is critical for the proper control of pellets and powders released through stormwater. If capacity is compromised, and pellets and floating powder are in the stormwater, pellets and powders would be discharged beyond the banks of the ditch and/or would likely bypass any screening/boom targeting entrapment of floatables. Alternatively, to prevent overflow, the gates may be opened without proper visual inspection and manual removal, potentially allowing discharge of pellets and powder further downstream. **(*Trial Testimony, Dr. Jose Sanchez;* Ex 37 at 71403-010221)**

142. On August 6, 2012, Mr. Mike Rivet sent a recommendation report to then plant manager Randy Smith. He explained, "**Since original construction,** some ditches at FP TX experience flow restrictions and do not allow for complete drainage of storm water, and therefore water stands in some ditches for long period of time which allows for algae and vegetation growth and debris accumulation, including pellets. Standing water, vegetation growth and debris accumulation has impeded unit's ability to maintain good THM and remove pellets from the ditches. Pellets in the ditches are a concern that was recently noted by EPA and TCEQ as part of their inspections." (emphasis added) (**Ex 107 at FCP0384330**)

143. [redacted]

[redacted]

144. In February 2013, Victor Fredericksen, a Ganem and Kelly engineer, notified Formosa that the boxes for the stormwater system being installed were "way too small for the amount of water the ditch carries." The capacity of the box being installed was 28 cfs, and the runoff from LLDPE was 120 cps for a 2 year storm. Formosa disagrees with this, but Mr. Fredericksen replied, "Every bit of [water] storage space is critical, especially with the gate valves….You should be looking for every way to make ditches and pipes as large as possible." Formosa's Allen Dunwoody, responds, "Polyolefins has a pellet issue NOW that they've asked us to address. Yu-Lin has confirmed that he is aware of no plans for large-scale drainage upgrade...We believe the best answer in relieving the drainage issues is timely sampling and opening the drainage outfall plus internal outfall gates … [ellipses in original] plus possibly additional storage spaces from additional sized retention pond."

Photographs of pellet accumulation around the culvert is attached with the email chain. **(Ex 442)**

145. After the 2013 Ganem and Kelly Studies of the drainage system, Defendants' changed their "Management of Change Procedure" to require an additional project approval from the Civil Engineering Department for projects that would impact drainage. Mike Rivet, the Special Project Director, could not recall any other specific changes made after that study was conducted. **(Ex 407, Rivet Depo. at 14:2-25:22)**

146. In October 24, 2013, there was a big rain event that was a catalyst for meetings about the capacity of the stormwater systems. At the time, "all the ditches were empty", the storm water tank was "low/empty," 1 to 2" of rain fell in an hour, and a road flooded "overflowing to the 006 system." The agreement was that outfall gate management would not fix the problems. In addition, these emails make it clear that the corrective actions put in place previously for this "exact scenario" "were insufficient" and "currently there is no effective solution in drainage improvement." **(Ex 108)**

147. On August 21, 2013, Mike Rivet emailed Tim Chen, asking, "let me know your solution to the storm water flooding problem in LLDPE." Mr. Chen acknowledged that "short term" they had to use a vacuum truck to remove the stormwater and "long term using B-1 to install submerge pipe and piping pump out flood water, this to prevent pellets spill into cox creek complaint." **(Ex 444)**

148. In 2013, Formosa Texas' Brad Chan explained the issue of plant expansion and impervious cover, such that concrete paving would make "nearly 100% or rainwater flow into ditch. **The existing outfalls are overloaded.**" **(Ex 445)**

149. [redacted]

150. In April 2014, Formosa had filled out an "engineering services" request form, seeking a contractor "to study the possibility of solving existing flood conditions in multiple locations/subcatchments associated to Outfall #6." **(Ex 443)** The form indicated that a reservoir that could hold 25-year rainfall would be designed, where the water would be held and then tested before sent to outfall 006.

151. [redacted]

152. **(Ex 418)**(emphasis added): "C/A plants have high/low PH issue, their operators can't open OSBL gates to let rain water out directly. PolyOelfins plants don't have high/low PH issue, **but they have floating pellets issue**. When it rains, their operators open OSBL gates to let rain water out, but the water won't go out (or should I say: go out too slow that back up the trenches and flood the area) due to several problems."

153. Formosa's internal audits also demonstrate extensive overflow problems, leading to "the potential for pellet overflow downstream of a gate in a heavy rain is likely." **(Ex 260 at FPC003311)** One set of photos from the railroad loading area shows concentrations of pellets on the ground and describes, "during rainfall pellets will make their way over the concrete wall." **(Ex 260 at FCP003328):** An August 19, 2016 photo of the HDPE-1 unit shows how pellets are transported in a heavy rain event at the facility. **(Ex 260 at FPC003649)** An October 6, 2016 photo shows a flooded area at the LLDPE warehouse where pellets and powder were floating on the water. **(Ex 260 at FPC003698-003699)** An October 6, 2016 photo captures dense powder floating in stormwater in culverts at the entrance to maintenance as well as a ditch northwest of the cooling tower. **(Ex 260 at FPC003700)** Pellets are also floating in stormwater near the PE1/PP1 loading area on October 6, 2016. **(Ex 260 at FPC003703)** Pellets were also in stormwater downstream of a weir that was supposed to remove them near the PE1/PP1 railroad loading area. **(Ex 260 at FPC003710)** Powder was visible in stormwater ditches. **(Ex 260 at FPC003711)** On October 21, 2016, in water that appears to be standing at the LLDPE bagging and shipping area pellets and powder are visible. **(Ex 260 at FPC003717)** The October 21, 2016 audit shows powder captured by a screen but explains "if in a heavy rain, pellets can travel across the road into grating and then end up in ditch downstream." **(Ex 260 at FPC003718)**

154. [redacted]

[redacted]

155. Formosa Texas' plant manager Rick Crabtree does not disagree with the following statement by the assistant water department manager Chad Lee about outfalls 006, 008, 009 and 012, all of which discharge into Cox Creek: "The Outfalls are not large enough during rainfalls to hold water to effectively skim the pellets." (**Ex 395,** Crabtree Depo. at 70:17-71:4)

5. Deficiencies of controls at external SW outfall gates

156. The controls Formosa has installed at the external outfalls, including floating booms, gabions, mesh screens, wedge screens, and external gates are not adequate to prevent the discharge of floating solids in more than trace amounts from the facility. (***Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002829-002836)**

157. Floating booms are not adequate to control floating plastics because the higher the velocities on the channels where the booms operate, the less effective they are in the containment of floatables. The size of pellets and powders further compromises its effectiveness, with pellets and powders likely easily bypassing the boom by overtopping it, passing under it or migrating through edges or small gaps. (***Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002830-32**). (*See also* **Ex 403,** Moleux Depo. at 201:21-202:1 ("I'd say there's certain limitations at high flow rates" to the effectiveness of booms)).

158. [redacted]

[redacted]

159. Screens installed at Formosa's outfalls do not stop all pellets and powder from being discharged, and can have maintenance problems. For example, if the screen is not regularly cleaned or during large or long lasting rain events, blockage will be so significant that water won't pass through the screen and would start acting more as a solid plate or weir. Water will then start to raise in elevation and pellets and floating powder would float on the surface. Once the water surface reaches the larger opening area or above it, both pellets and powder will bypass the control. (***Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002833**; *see, e.g.* example photographs at **Figures 1-3, 71403-002834, 002835)**

160. In at least March 2016, larger screens "not design (sic) to hold pellet" were in place at the external outfalls. **(Ex 170)**

161. Smaller screens get plugged easily, causing water to overflow or break the screen. On April 11, 2017, Formosa Texas' John Hyak, "what we would like to do is install fine mesh screens on all stormwater Outfalls. Additionally, we can install screens at the boom location. **We know this will probably result in plugged screens and backup of water, but we can worry about that (modify) later.** For now we need to be aggressive and get more done now." (**Ex 466**) (emphasis added). (*See also* **Ex 170** ("John [Hyak] said we cannot use small screen because it will be plugged by grass easily."; **Ex 398,** Hyak Depo. at 39:7-43:1; *See* photos of broken screens in **Ex 12 at 71403-008289 - 008335**)

162. Formosa's John Hyak emails the Formosa Texas maintenance team on June 26, 2018 regarding the need for additional screens at outfall 006, 008 and 009. He explains that the screens get "clogged with pellets and debris" and they need to remove them every three months and have a replacement on hand. **(Ex 350; Ex 351)**

163. Plant Manager Rick Crabtree described a "gap [in the screen system at outfall 006] where they had sewn it together and it wasn't quite tight," where he witnessed one or two pellets escape during a rainfall event in July or August 2018. Mr. Crabtree was there when the gates had already been opened. (**Ex 395,** Crabtree Depo. at 87:19-88:5)

6. Visual Inspection and Outfall Logs do not establish whether floating solids have been discharged from the facility

164. Outfall openings and closings for Formosa's external stormwater outfalls are logged by Formosa's CWTP operators in Formosa's Outfall Status Sheets. (*See* **Exs 13, 14, 17-19, 21-23, 85-86, 417)**

165. Flow rates for each outfall are calculated by Formosa based on the water level in the Outfall Status Sheets. Flow rates vary greatly by outfall and day, for example on January 2, 2019 the flow rate was 0.85 million gallons per day (MGD) at Outfall 007 and 124.2 MGD at Outfall 006. (**Ex 446 at FCP062843;** ***see generally*** **Ex 20; 452; Ex 453; Ex 454**)

166. [redacted]

167. External outfalls gates are usually opened in a rain event. (**Ex 389,** Arguellez Depo. at 15:15).

168. [redacted]

169. Outfall gates can be open for more than 24 hours at a time, which is called "continuous open." (*See e.g.* **Ex 14 at FCP000337).** When this happens, the flows are visually inspected for floating solids only twice a day while the water is flowing, and the water is flowing for sometimes multiple days at a time. (**Ex 398,** Hyak Depo. at 70:15-24; *see e.g.* **Ex 13 at FCP000259)**

170. Formosa's outfall status sheets log do not adequately establish whether floating solids have been discharged from the facility because they are only based on two brief inspections per day and when the outfall gate is open and flowing it is difficult if not impossible to see floating debris because of the large amount of fast moving water. (**Ex 398,** Hyak Depo. at 78:12-79:1; **Ex 389, Arguellez Depo.** at 130:17). Additionally, during certain categories of rain/storm events, it is unlikely Formosa operators will check the outfalls for safety reasons, despite the operational procedures permitting them to. (**Ex 398,** Hyak Depo. at 96:18-99:7) This means that the outfall gates are open and water and any floating debris are flowing but no one is checking for floating debris discharges.

171. Before an external outfall gate can be opened, there must be sampling of the water to determine pH. Wastewater employees would take three jars of the water in the stormwater ditch to the lab. They would do a "visual" inspection to determine if there was oil and grease or floating solids in the water. If the pH met the permit standards, the employee would return to that external outfall and open it. Then the employee would go to the next external outfall gate. It can take up to an hour at each outfall gate before it can be opened during a rainfall. Mr. Arguellez worked as an operator from 2009 until May 2012. (**Ex 389,** Arguellez Depo. at 15:1-16:21; and 10:17-19 and 12:13-14) (**Ex 403,** Moleux Depo at 204:1-205:22 (he understands that it takes "about an hour … or two hours" for the testing and authorization prior to opening an external outfall gate."))

7. Reliance on manual removal of plastics is ineffective and impractical to control the discharge of plastics

172. Formosa's removal method for pellets and powder is reliant on visual observation and consists in the manual operation of the internal gate system and of the gates at the outfalls, and manual removal (fish netting) of the pellets and plastic. Due to the extensive nature of the release of pellets and powders at Formosa's facility, relying on nets and vacuum trucks as a removal method is labor intensive, ineffective, and impractical. This method is also limited in terms of time to respond during rainfall events. For the proposed controls to properly remove as much materials as possible, intense visual inspection and intense manual long term operation and maintenance practices would be required. The life cycle cost of those systems may become prohibitive and, thus, unfeasible to maintain in the long run. (***Trial Testimony, Dr. Jose-Sanchez;*** **Ex 35 at 71403-002820, 002825, 002829**)

173. In particular, removal of plastic pellets from channels and ditches by fish netting is impractical. Powder removal is even more complex as the particles are too small to be captured by the fish netting. Additionally, part of the powder particles would attach to the concrete banks of the channels making it subject to resuspension and migration by future runoff. (***Trial Testimony, Dr. Jose-Sanchez;*** **Ex 35 at 71403-002820, 002829**)

174. [redacted]

175. Formosa's own documents depict the flaws of a system that rely on employees physically to remove pellets from internal ditches. Examples from Formosa's internal audits: A May 6, 2016 photo at the PE1/PP1 rail loading area depicts the difficulty in cleaning pellets off the ground. "Cleaning crews were observed cleaning area prior to picture being taken. There are still pellets visible that need to be removed." **(Ex 260 at**

FPC003501) An August 19, 2016 photo at the PE1/PP1 loading area describes: "Pellets are visible throughout the grass and along with water line. Note that this is the area where cleaning of pellets has been ongoing for several weeks." **(Ex 260 at FPC003546)**

176. [redacted]

177. For instance, vacuum truck notes from March 7 and 8, 2018, describe that various ditches were "full of powder/some pellets." On each day, the employee candidly admits on March 7 "ran out of time" to clean it and on March 8 "didn't have time to clean it." **(Ex 95 at FCP023350-51)** Recent vacuum truck logs show similar difficulties and long-clean times. For example, on on February 27, 2019 the vacuum truck did not have time to inspect the PE1-001 unit. **(Ex. 461 at FCP062216)**

178. These logs show that the operation of stormwater controls which have heavy reliance on visual observation, manual cleaning, and even while utilizing a vacuum truck for cleaning are insufficient to prevent pellets and powders from further migrating downstream. (***Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002821**)

179. Formosa assistant water department manager Chad Lee stated, "When the site gets a good rain, these Outfalls are flowing like rivers and at that time we do not believe much skimming would take place." Plant Manager Crabtree thinks Mr. Lee's assessment is "a fair characterization of skimming by individuals." (**Ex 395,** Crabtree Depo. at 71:5-15)

180. Formosa Texas' plant manager Rick Crabtree admits that he is not sure that the dip nets used at Formosa's external outfalls to remove plastics prior to discharge would remove plastic flakes. (**Ex 395,** Crabtree Depo. at 60:2)

C. Formosa's bonus system discourages the reporting of discharges of plastics

181. The bonus structure for employees and management at the Point Comfort facility disincentivizes reporting spills of plastic pellets or powder, as well as other events that do not comply with environmental regulations, at the production units, particularly among senior employees at the units.

182. On October 7, 2009, Diane Wilson wrote a letter on behalf of Calhoun County Resource Watch to EPA commenting on a 1991 EPA order on Formosa Plastics. **(Ex 56)** In that letter, she reports to EPA that supervisors in the wastewater department "would also tell the operators that releases and work injuries would affect their bonuses if they were reported." **(Ex 56)**

183. [redacted]

184. [redacted]

185. [redacted]

[redacted]

186. [redacted]

187. [redacted]

188. [redacted]

189. [redacted]

190. [redacted]

191. [redacted]

192. [redacted]

193. [redacted]

194. [redacted]

195. Production targets are set for the units. (**Ex 405,** Patek, Gary Depo. at 109:12-16)

196. In a normal day, the manager of a unit will report to upper management regarding changes in production rate. (**Ex 405,** Patek, Gary Depo. at 10:4-11)

197. [redacted]

198. Mr. Crabtree knew of one unit's bonuses that had been lowered when they had a flaring event because there were air emissions in a "reportable quantity." (**Ex 394,** Crabtree Corp. Rep. Depo. at 52:8 and 53:10)

199. Former Formosa employee Van Rozner will testify that he was instructed not to report lab data showing results that did not comply with standards. (**Ex 94 at para. 3;**

***Trial Testimony, Van Rozner*)** In approximately 2015, Mr. Rozner witnessed a spill of about 500 pounds of vinyl chloride at the SPVC unit, but that spill was reported as 2.7 pounds. (**Ex 94 at para. 19)**

200. In 2014, the focus of the speciality PVC unit (SPVC) became even more focused on production rate, instead of environmental or safety compliance. (**Ex 94 at paras. 11-12; *Trial Testimony, Van Rozner*)** Formosa's employees have a financial incentive to produce as much product as possible and get bonuses for high production. (**Ex 94 at para. 23; *Trial Testimony, Van Rozner***

VI. Formosa's ongoing failure to stop illegal plastics discharges from its facility

201. Based on the evidence in this section, Formosa employees and management have known for decades of the systemic problems leading to the discharges of plastic pellets and powder into Cox Creek and Lavaca Bay. A corporate culture of quick-fixes and short-term less costly remedies has prevented correction of the systemic sources of these discharges.

A. Evidence from 1990s-2000 from former Formosa workers

202. In the 1990s, Formosa's equalization pond for the wastewater treatment plant would fill up with PVC powder. **(Ex 80)**

203. Notes of former Formosa Texas employee Dale Jurasek recall flooding incidents in September 1998, where excessive water went to outfall 006. **(Ex 81)**

204. September 11, 1998 notes of Dale Jurasek record pellets in stormwater discharges at outfall 006: "Outfall 006 flowing at about 3000 gpm. Noticed PVC pellets on stairs going down on 006. The screen that normally catches the pellets had been opened in order

to release more rain H2O. Pellets (PVC) were noticed on the discharge side of 006 outfall…" **(Ex 81)**

205. Mr. Jurasek contacted Texas Parks and Wildlife Department by email in 1999 or 2000, stating, "11-11-99 shift instruction stated that we needed to clean out the 006 outfall screen. I cleaned out all the trash and grass and a LARGE quantity of PVC pellets PAST the internal gate. … This proves that PVC pellets are still getting into Cox's Creek near Hwy. 35." **(Ex 81)**

206. On May 16, 2000, Formosa Texas general manager Randy Smith and Darren Estrada were informed by Dale Jurasek about allegations of Formosa's pellets in Lavaca Bay. **(Ex 82, *Trial Testimony, Dale Jurasek*)**

207. On May 16, 2000, Mr. Jurasek informed Mr. Smith and Mr. Estrada that it was "common knowledge among all the fishermen in the are[a] have seen the PVC pellets that have been found in that area." Mr. Jurasek suggested a screen to stop the pellets, but David Tiffin of Formosa Texas responded that there were "other avenues" for the pellets to get into the bay. **(Ex 82, *Trial Testimony, Dale Jurasek*)**

208. Notes of Mr. Jurasek's June 9, 2000, meeting with Formosa Texas' Darren Estrada when Mr. Jurasek spoke with Mr. Estrada about discharged pellets at outfalls 006, 007. At that time, Mr. Jurasek told of his supervisor having him fish out pellets discharged. Mr. Jurasek told Mr. Estrada that the discharged pellets would have a major impact on the local ecology system. Mr. Estrada replied that he would look for himself, and Mr. Jurasek encouraged him to look at the debris line. **(Ex 82, *Trial Testimony, Dale Jurasek*)**

209. Paul Myers worked for Formosa from 2000 until 2013. (***Trial Testimony, Paul Myers***; **Ex 404,** Myers Depo. at 9:13-14) Mr. Myers explained that he thought that the

portion of his unit that was outside battery limits should have been classified as inside battery limits because pellets and plastics would fall to the ground and end up in a ditch going to outfall 009 on Cox Creek. (***Trial Testimony, Paul Myers***; **Ex 404,** Myers Depo. at 36:1, 36:25-37:17). The reason is that pellets and powder fall on the ground, and employees do their best to clean it up, but eventually wash the plastics into covered ditches. (***Trial Testimony, Paul Myers***; **Ex 404,** Myers Depo. at 37:1-17). Mr. Myers explained that **in 2001**, he met with Formosa managers S.E. Chang, Bobby Marquez, David Henderson and one or two engineers to discuss the problem of pellets getting into the ditches. (***Trial Testimony, Paul Myers***; **Ex 404,** Myers Depo. at 33:12-20)

B. Evidence of Lavaca Bay 001 discharges from at least 2004-2010 from Formosa's Bay Monitoring Contractor

210. Marine biologist Lisa Vitale of Freese and Nichols has been working under a contract with Formosa Texas monitoring at the 001 discharge since 1999. (**Ex 411,** Vitale Depo. at 13:16)

211. On July 28, 2010, Ms. Vitale put a net at the 001 outfall, and collected that net on the next day. **(Ex 67)** In her sampling notes, she wrote, "white 'pellets' coming out of diffuser. Same as previous encounter. Will let Formosa know." **(Ex 67)**

212. Ms. Vitale specifically took samples near the 001 outfall for Formosa Texas' John Hyak to look for pellets. (**Ex 411,** Vitale Depo. at 27: 7-12)

213. Ms. Vitale has seen pellets near Formosa's 001 outfall on occasions when she did not take water samples. (**Ex 411,** Vitale Depo. at 29: 16-20)

214. Ms. Vitale estimated taking five to six samples of pellets from near the 001 outfall to Mr. Hyak on five to six occasions. That included samples taken prior to 2010. (**Ex 411,** Vitale Depo. at 27: 17-23)

215. A July 30, 2010 email from Mr. Vitale to Mr. Hyak and Andrew Hennessey of Formosa Texas, discusses seeing pellets at the 001 outfall. **(Ex 66 at FCP04624)** "When we were sampling this week we noticed plastic material floating in the bay again that was coming from the [001] diffuser and moving southwest with the current." **(Ex 66)** Ms. Vitale wrote: "There was quite a bit of it this year, and I just wanted y'all to be aware." **(Ex 66 at FCP04624)**

216. Ms. Vitale's July 2010 email reminds Formosa's Mrrs. Hyak and Hennessey of pellets being found at 001 in 2004 and 2005: "If you remember, **this has happened before, in October 2004 and again in October 2005**, we previously sent y'all a sample to analyze **and y'all discovered it was coming from the plant**…" **(Ex 66 at FCP04624)** (emphasis added)

217. In 2010, Mr. Hyak shared Ms. Vitale's information about the 2004, 2005, and 2010 discharges of plastics from the 001 diffuser with plant manager Randy Nichols and Formosa Texas' Chad Lee. **(Ex 66)**

C. Evidence from at least 2003-2016 from Formosa's records

218. [redacted]

[redacted]

219. An internal B-1 Improvement Proposal and Capital Report for THM Improvement System at PE1/Hopper Car loading from March 15, 2012 (signed by Walter Chen and I.S. Hwang) states: "Also, EHS reported some plastic pellets have been found in Cox Creek. Immediate action is required." **(Ex 167)**

220. [redacted]

221. [redacted]

[redacted]

222. [redacted]

223. On August 6, 2012, Mr. Mike Rivet sent a recommendation report to then plant manager Randy Smith. He explained, "**Since original construction,** some ditches at FP TX experience flow restrictions and do not allow for complete drainage of stormwater, and therefore water stands in some ditches for long period of time which allows for algae and vegetation growth and debris accumulation, including pellets. **Standing water,** vegetation growth and debris accumulation **has impeded unit's ability to** maintain good THM and **remove pellets from the ditches**. **Pellets in the ditches are a concern that was recently noted by EPA and TCEQ as part of their inspections**." (emphasis added) (**Ex 107 at FCP0384330**)

224. [redacted]

225. In July 2013, Paul Heurtevant from Formosa Texas emailed I.S. Hwang, Randy Smith (previous VP and General Manager) and Matt Brogger, "During the FPC-TX Waste Water Permit comment period, a "concerned citizen" made statements that Poly Pellets could be found along the beaches in Calhoun County… EHS personnel yesterday toured the FPC-TX Storm water Outfalls and the Cox Creek bank by Hwy 35. During the inspection, signs of Poly Pellets could be seen." **(Ex 17,** plus attached photos; **Ex 174; Ex 175; Ex 176; Ex 177)**

226. [redacted]

227. [redacted]

[redacted]

D. Evidence from the Environmental Protection Agency (EPA)

228. EPA reported the same problems as Dale Jurasek with the pond overspilling with plastic powder in June 15-17, 2010. **(Ex 7 at 71403-000377)**

229. EPA noted in its 2010 report that Formosa stated that the overflow of the equalization pond was not standard procedure, but 2004 EPA had made "a similar observation" during its February 2-14, 2004 investigation at Formosa Texas. **(Ex 7 at 71403-000377, 000399, and 000400)**

230. In June 15-17, 2010, EPA observed and reported to Formosa that they saw what looked like plastic pellets on the ground outside the LLDPE warehouse and the railcar loading area. **(Ex 7 at 71403-000354)** EPA also saw white powder on the ground as they approached the PVC unit and a broken sack of white and off-white (light orange) powder next to and in the drainage channel. **(Ex 7 at 71403-000359)**

231. In June 15-17, 2010, EPA observed PVC powder on sidewalks, drainage areas, handrails, railcars, on the ground, stormwater channels and inside bagging areas. **(Ex 7 at 71403-000376)**

232. In June 15-17, 2010, EPA reported plastic pellets were observed on the downstream side of the outfall gates at outfalls Nos. 006, 007, 008 and 009. The inspectors also reported plastic pellets of the same size, shape and color at two locations on the shores of Lavaca Bay near Highway 35. **(Ex 7 at 71403-000378)**

233. Photographs of the pellets and powder found by EPA in 2010 were part of the agency's report and were shared with Formosa Texas. **(Ex 7 at 71403-000385**: Photo 6 -

LLDPE pellets on the ground); **(Ex 7 at 71403-000386:** Photo 7 - LLDPE pellets at train loading area); **(Ex 7 at 71403-000387:** Photo 8 - PVC drainage ditch with white powder); **(Ex 7 at 71403-000390:** Photo 11 - PVC dust in parking lot); **(Ex 7 at 71403-000391:** Photo 12 - PVC storm drain culvert with powder); **(Ex 7 at 71403-000392-000395:** Photos 13-16 - PVC storm drainage ditch with powder); **(Ex 7 at 71403-000397-000398:** Photos 18-19, 22 - PVC on ground); **(Ex 7 at 71403-000454:** Photo 75 - downstream outfall 005); **(Ex 7 at 71403-000457-000460:** Photos 78-81 - pellets in water downstream outfall 006); **(Ex 7 at 71403-000469-000471:** Photo 90-92 - pellets downstream outfall 006); **(Ex 7 at 71403-000473:** Photo 94 - pellets downstream outfall 006); **(Ex 7 at 71403-000480-000484:** Photos 101-105 - pellets on concrete apron of outfall 008, showing different colors and sizes of pellets); **(Ex 7 at 71403-000485-000486:** Photos 106-107 - pellets downstream outfall 008, one photo with feral hot prints); **(Ex 7 at 71403-000498-000499:** Photos 119-20 - pellets at outfall 009); **(Ex 7 at 71403-000536-000538:** (Photos 32 (both labeled 32) - PVC resin on ground at PVC bagging area); **(Ex 7 at 71403-000543-000550:** Photos 38-45 - PVC resin on ground at PVC bagging area); and **(Ex 7 at 71403-000574-000576:** Photos 69-71- showing PVC dust on ground at excavated areas).

234. In July 2011, Troy Hill, Acting Associate Director of the Water Quality Protection Division at EPA Region 6, sent a letter to the TCEQ entitled, "Interim Objection to Draft Permit and Request for Additional Information" related to Formosa's TPDES Permit, and included concerns about pellet discharges: "Based on discussions with EPA Region 6 Resource Conservation and Recovery Act (RCRA) enforcement personnel, it is known that ***polyethylene pellets (solids) have been found and continue to be found*** floating

throughout Lavaca Bay as well as along the adjacent shoreline. The suspected source of these pellets being the Formosa Plastics Plant." **(Ex 8 at 71403-000600**) (emphasis added)

E. Formosa's records show current and ongoing discharge problems

235. [redacted]

236. [redacted]

237. [redacted]

238. [redacted]

239. [redacted]

[redacted]

240. [redacted]

VII. Formosa's current controls are inadequate to comply with the Permit requirements, additional controls needed

A. Concepts and proposals evaluated for many years but not fully implemented by Formosa to prevent pellet discharges

241. Based on the evidence presented, Formosa has been aware of the systemic issues causing the discharge of plastic pellets and powder into Cox Creek and Lavaca Bay. Although Formosa has at times evaluated and contemplated preventative and systemic

control measures, they have failed to implement those necessary to cease the discharges in a timely manner after knowing about unlawful discharges.

1. Source Control and Pellet Recovery Projects at the Production Units: "Auger Monsters," a "Lazy River," and Replacing Flanges

242. [redacted]

243. In May 2012, Formosa was aware that it needed a better pellet recovery program at the HDPE and LLDPE units. **(Ex 375)**

244. [redacted]

245. [redacted]

246. [redacted]

247. An email setting up a "Pellet Recovery Equipment Presentation - Lunch and Learn" on July 17, 2017 with a representative from the Newman Regency Group, included the representative's recommendations for options for pellet recovery based on systems installed at DuPont facilities, which had also been proposed the prior year to Formosa: "This is the unit we installed at the DuPont facility in Victoria. This unit uses a perforated

basket… to capture the pellets … **I had proposed this screen to the engineers at Formosa last year…" (Ex 84)** (emphasis added)

248. [redacted]

249. [redacted]

250. [redacted]

251. [redacted]

252. As of November 8, 2018, the pellet recovery concepts evaluated by PP2, PE1, and other units had not become official "projects" and had not been implemented by Formosa (**Ex 407, Rivet Depo.** at 93:6-94:6 (the PE1 unit has gotten proposals on source control projects; PP2 has not gotten bids); **Ex 405,** Patek, Gary Depo. at 93:22-94:23) (**193 dresser couplings project** has not yet gone out for bid as of November 8, 2018); 119:8 (Lazy River project still under evaluation)).

253. In January 2019, the bagging and shipping department was filling out forms to get approval for an "environmental pellet recovery project." **(Ex 373)**

254. [redacted]

[redacted]

255. In February 2019, the office of the general manager of Formosa Texas emailed asking, "Any update on the pellet recovery project we discussed last Friday?" **(Ex 374)**

2. Storm Water & Pellet Recovery Pond, aka the "South Pond"

256. [redacted]

257. On May 14, 2014, the idea of detention ponds "combined with out storm water drainage improvement plans" was "proposed by Walter Chen." (**Ex 140**) As the idea of these ponds evolved, it is clear that Formosa was intending to use the ponds to remove pellets. **(Ex 450)**

258. Walter Chen, Vice President of Formosa USA, has been involved in decisions about stormwater retention ponds at Formosa Texas' plant since at least 2014 (**Ex 140 at FCP040337** (noting on May 14, 2014: "the 3 ponds proposed by Walter Chen will be

combined with our storm water drainage improvement plans.")) Mr. Chen can approve and disapprove projects, even those that have been previously approved.

259. [redacted]

260. [redacted]

261. [redacted]

262. The on and off again nature of this project has caused "confusion" according to John Hyak of Formosa Texas in July 2016, with the "south pond cancelled, south pond not cancelled." (**Ex 215**)

263. [redacted]

264. [redacted]

265. [redacted]

[redacted]

3. New Pellet Producing Units part of Formosa's Expansion

266. The expansion of Formosa's Point Comfort facility includes construction of new pellet producing units. With each of these units comes the potential of pellet and powder spills and discharges into Cox Creek. Defendants are aware of this risk and should be implementing systemic controls designed to prevent such discharges.

267. [redacted]

268. The potential for increased pellet and powder discharges from the proposed expansion have been known by Formosa since at least the Summer of 2016. Special Projects management at Formosa USA believes the new production units needed to be included in an internal study of THM at the facility's units. (**Ex 258**)(July 2016 email to Mike Rivet and Walter Chen suggesting inclusion of PE3 in pellet project study).

269. [redacted]

[redacted]

270. [redacted]

271. [redacted]

B. Improvements Needed for Formosa to Comply with Permit Provisions preventing the discharge of more than trace amounts of floating solids

272. Powder discharges are likely to continue despite the controls implemented to date by Formosa. Additionally, the releases of pellets will continue to be in greater than trace amounts and repetitive, despite the controls Formosa has implemented. Therefore, additional controls should have been implemented previously and continue to be necessary

to correct the structural deficiencies in Formosa's system for preventing the discharge of plastics in more than trace amounts. (***Trial Testimony, Jose-Sanchez***)

273. The additional controls, such as those recommended by Dr. Jose-Sanchez, are needed to improve **the stormwater system** by addressing the major deficiencies identified in Formosa's current stormwater system, include (1) avoiding to the maximum extent possible the commingling effect of pellet/powder impacted stormwater and pellet/powder-free stormwater, (2) decreasing the labor-intensive operation and maintenance of the stormwater controls, and (3) targeting both pellet and powder removal. (***Trial Testimony, Jose-Sanchez;*** **Ex 35 at 71403-002841**)

274. Additional controls, such as those recommended by Dr. Jose-Sanchez, are needed to improve the **wastewater and contact stormwater system** by addressing the pretreatment inconsistencies and would instill conventional coarse solids and grit removal practices into Formosa's CWTP, with the purpose of obtaining an overall more efficient and reliable treatment process. The proposed retrofit consists of adding a pretreatment step for the wastewater and contact stormwater/washwaters to remove pellets and powder. (***Trial Testimony, Jose-Sanchez;*** **Ex 35 at 71403-002847**)

275. **First**, systemic improvements to Formosa's stormwater system are needed based on the historic and existing problems with discharges of plastics from the OSBL stormwater at Formosa. The three stormwater retention ponds designed to isolate the first flush of stormwater and treat the water for pellets and powder by Dr. Jose-Sanchez are necessary and reasonable. To stop unlawful discharges of pellets or powder, the ponds designed by Dr. Jose-Sanchez, or retention ponds designed for a similar purpose, must be

implemented at the Point Comfort facility. (***Trial Testimony, Jose-Sanchez;* Ex 35 at 71403-002841-46**, and *Attachments 5,6, 7*)

276. [redacted]

277. [redacted]

278. In contrast, Defendants' engineering expert, Mr. Moleux, has not reviewed the 2013 Ganem & Kelly studies of drainage capacity issues at Formosa (**Ex 403,** Moleux Depo at 154:22-155:2), and has no opinion on Formosa's stormwater conveyance capacity (**Ex 403,** Moleux Depo at 211:17-212:1).

279. **Third,** additional source control or recovery projects at the production units are necessary for Formosa to comply with its permit and prevent the discharge of floating solids in more than trace amounts. It is reasonable and justified for Dr. Jose-Sanchez to form an independent opinion that additional source controls are needed and then to rely on the testimony and internal documents of Formosa's employees Mike Rivet and Gary Patek who are leading the effort to develop the best methods to limit the loss of plastics from the

pellet production units. Mr. Rivet and the unit personnel know what the needs are at their units. While all production units are different, Mr. Rivet works independently on a regular basis (at least monthly) with representatives from each of them to help develop their own pellet source control projects and share ideas. Because HDPEI is currently the unit showing more progress in terms of understanding of the type of controls that they need and soliciting bids and proposals, Dr. Jose-Sanchez had a reasonable basis for reviewing the bids and proposals obtained by Formosa for pellet recovery projects and source control at HDPEI and determining they were reasonable. (***Trial Testimony, Jose-Sanchez;* Ex 138 at 71403-011019, 21**; **Ex 36 at 71403-008194, 98**)

280. Defendants' engineering expert, Mr. Moleux agrees that "Source reduction is the most important for Formosa to focus on." (**Ex 403,** Moleux Depo at 158:22-24) He does not know anything about pellet recovery projects or bids the HDPE1 unit has requested and been reviewing (*Id.* at 162:2-6), but he agrees that "the units themselves would know best what is happening in terms of the efficacy of existing controls in operations at their unit" and he agrees that "if they saw the need for further improvements… that's ...their right." *Id* at 165:10-20. "If [source recovery and pellet recovery] are implemented, there shouldn't be any pellets in any of those internal gates." If the units are seeing pellets or powder at their internal gates, Mr. Moleux thinks "it [source control] still has to be worked on." *Id.* at 174:9-19; *see also id.* at 175:8-13. Mr. Moleux doesn't know "how efficient [the existing HDPE1] recovery system is." *Id.* at 160:3-8.

281. Mr. Moleux opines that "in those areas where they're collecting a lot of pellets, more source reduction has to be looked at," and agrees that vacuum truck logs would be informative "to determine whether additional source control is needed at those units." (**Ex**

403, Moleux Depo. at 177:4-11) However, Mr. Moleux has not reviewed Formosa's vacuum truck logs in forming his opinion in this case. *Id.* at 176:5-8. Dr. Jose-Sanchez has reviewed excerpts of Formosa's vacuum truck logs, among many other documents such as Formosa's internal audits, to form her opinion about the need for additional source controls (***Trial Testimony, Jose-Sanchez***).

282. **Fourth,** to prevent discharges of plastics from Outfall 001, adding a dedicated pretreatment step for the wastewater and contact stormwater/washwaters to remove pellets and powder using the method recommended by Dr. Jose-Sanchez -- an internally fed rotary screen (such as the Andriz Milliscreen or equivalent) -- is reasonable and justified. (***Trial Testimony, Jose-Sanchez;*** **Ex 35 at 71403-002847, 48, &** ***Attachment 8***)

283. Mr. Moleux hasn't evaluated whether additional changes need to be made to the wastewater treatment process and hasn't discussed how effective it is. (**Ex 403,** Moleux Depo. at 189:5-190:16) Mr. Moleux also can't speak about "how well the wastewater treatment system removes pellets" *Id.* at 190:25-191:2.

284. The reasonable costs for all of these additional necessary improvements for the purposes of calculating economic benefit are included in **Section XI.B.1** ***infra*****.**

VIII. Formosa's Discharges of Plastics in Violation of the Clean Water Act since January 31, 2016

A. Evidence of Past (since January 31, 2016) and Ongoing Plastics Discharges in more than trace amounts from Outfall 001 to Lavaca Bay

1. Evidence from TCEQ Investigations, as recent as January 2019

285. TCEQ conducted April 11, June 12 and June 26, 2018 on-site investigations of the Formosa Texas plant that included examination of Outfall 001. **(Ex 12)**

286. The April 11, 2018 investigation was prompted by citizen complaints of Formosa Texas pellet discharges to either Lavaca Bay via Outfall 001 or to Cox's Creek via one or more of the stormwater outfalls. The TCEQ investigators observed floating white debris and plastic pellets in the Bay near Outfall 001. They observed floating white debris that appeared similar to the debris seen near Outfall 001 in the plant, itself, at the sump that precedes the in-plant inlet to the pipe leading to Outfall 001. Formosa employees acknowledge to the investigators that plastic pellets has been observed during weekly cleaning of a cone filter that had been placed in the outflow path from the sump, just after screens that were also in the outflow path. **(Ex 12)**

287. TCEQ received April 17, May 8, May 18, and June 21, 2018, additional complaints of plastic pellets discharges from Outfall 001. On June 21 and again on June 26, 2018, TCEQ investigators again found floating pellets and white debris near the discharge from Outfall 001. **(Ex 12, photos at Attachment 5, 71403-008345, 008347)**

288. TCEQ investigators on various plant visits collected water samples from the sump and from the sampling spigot down-flow from the sump. They also collected water

samples near the outflow of Outfall 001 and from the north shoreline of Lavaca Bay. Laboratory analyses of the white debris in each sample were consistent with one another, "indicating that is it likely the same material." **(Ex 12)**

289. TCEQ received further complaints on October 8, 2018, of white powder and plastic pellets in Lavaca Bay. The agency investigator on October 9, 2018, documented the fact of white powders and plastic pellets at several places along the shoreline of Lavaca Bay and informed Formosa's Mr. Brogger, who indicated a crew would be dispatched to investigate the area and clean it up. **(Ex 12)**

290. The TCEQ investigators' summary of the April and June inspections was that floating white debris was found on three occasions at the Outfall 001 discharge location. The actual discharge of plastic pellets was not noted, but the potential for discharge of plastic pellets was noted, especially since the cone filter down-flow from the sump screens had been removed. **(Ex 12)**

291. Another TCEQ on-site investigation occured on January 17, 2019. The investigation results were at the time of trial being finalized, but the TCEQ investigator, Zach Fuqua, documented numerous instances of discharged pellets or floating solids at Outfalls 001, 006, 008 and 009. (**Ex 144**; **Ex 145** at **FCP057908-918)**

2. Evidence from Formosa's Lavaca Bay Monitoring Contractor

292. Marine biologist Lisa Vitale of Freese and Nichols has been working for Formosa Texas monitoring at the 001 discharge since 1999. (**Ex. 411,** Vitale Depo. at 13: 16)

293. Biologist Vitale has reported to Formosa Texas discharges of plastics from Formosa's outfall 001 in 2004, 2005, 2010, and at least five or six other times. (**Ex 411,**

Vitale Depo. at 27: 17-23; **Ex 66)** From January 2016 until January 2019, at least twice each year, she noticed plastics near the 001 outfall. (**Ex 411,** Vitale Depo. at 30: 8-19)

294. On December 14, 2016, Ms. Vitale found more plastic particles "than they have noticed in the past" in the 001 on the downside of the diffuser. She sent photos of the particles and a sample to John Hyak. (**Ex 216**)

295. In November 2018, Ms. Vitale found plastic particles at one of the reference stations, the R-2 sampling station maintained to monitor Formosa's discharges from the 001 outfall. (**Ex 411,** Vitale Depo. at 32: 19-24) The reference stations were set up far enough away from the 001 outfall that the thought was they would not be affected by the 001 diffuser. (**Ex 411,** Vitale Depo. at 22: 1-6) She discussed these November 2018 results with Mr. Hyak of Formosa Texas. (**Ex 411,** Vitale Depo. at 32: 19-24)

296. On July 28, 2010, Ms. Vitale put a net at the 001 outfall, and collected that net on the next day. **(Ex 67)** In her sampling notes, she wrote, "white 'pellets' coming out of diffuser. Same as previous encounter. Will let Formosa know." **(Ex 67)**

297. Ms. Vitale specifically took samples near the 001 outfall for Formosa Texas' John Hyak to look for pellets. (**Ex 411,** Vitale Depo. at 27: 7-12)

298. Ms. Vitale has seen pellets near Formosa's 001 outfall on occasions when she did not take water samples. (**Ex 411,** Vitale Depo. at 29: 16-20)

299. Ms. Vitale estimated taking five to six samples of pellets from near the 001 outfall to Mr. Hyak on five to six occasions. That included samples taken prior to 2010. (**Ex 411,** Vitale Depo. at 27: 17-23)

300. A July 30, 2010 email from Mr. Vitale to Mr. Hyak and Andrew Hennessey of Formosa Texas, discusses seeing pellets at the 001 outfall. **(Ex 66 at FCP04624)** "When

we were sampling this week we noticed plastic material floating in the bay again that was coming from the [001] diffuser and moving southwest with the current." **(Ex 66)** Ms. Vitale wrote: "There was quite a bit of it this year, and I just wanted y'all to be aware." **(Ex 66 at FCP04624)**

301. Ms. Vitale's July 2010 email reminds Formosa's Mrrs. Hyak and Hennessey of pellets being found at 001 in 2004 and 2005: "If you remember, this has happened before, in October 2004 and again in October 2005, we previously sent y'all a sample to analyze and y'all discovered it was coming from the plant…" **(Ex 66 at FCP04624)**

302. Formosa has tested samples from its Lavaca Bay Monitoring contractor and concluded it was from Formosa's facility: "This week our Lavaca Bay Monitoring contractor was performing their quarterly monitoring around the wastewater diffuser in the Bay. They found some powder near the diffuser, this was on 04/02/18. **We received a sample from them and had the Lab identify it. The Lab concluded it was polyethylene powder, but could not distinguish from PE-1 or PE-2."** (**Ex 217**) (emphasis added)

3. Evidence from Formosa's cleanup contractors

303. Formosa had a cleanup crew go to the Marina in Lavaca Bay on June 3, 2016 to clean up pellets and plastics that day. Photos taken as part of the clean up document the marina littered with pellets plastics. **(Ex 89)**

304. Horizon Environmental Services entered into a contract with Defendants on April 10, 2017. **(Ex 67 at FCP001493)** One of the objectives of Horizon's contract with Defendants is to "remove stranded pellets from the shore of Lavaca Bay". **(Ex 68 at FCP002045)**. This contract was renewed for another two years of services beginning May 1, 2018. **(Ex 69)**

305. In response to a question from Formosa management in May 2017, Horizon's Eric Barrier responded that the areas with the heaviest amount of pellets on Lavaca Bay were Indianola Beach and Six Mile and that pellets made up 20-40% of the bags. **(Ex 71 at FCP001414)**

306. Over the course of their contracts, Horizon crews have found pellets on the Western, Northern, and most of the Eastern shores of Lavaca Bay. (**Ex 391,** Barrier Dep. 23:14-24:3; **Ex 90; *see* Ex 255 at 71403-012547)**

307. The Lavaca Bay crews for Horizon Environmental Services began cleaning pellets from the shores of Lavaca Bay on April 12, 2017. **(Ex 67 at FCP001493)**

308. Over the course of the contracts, when Horizon crews clean the dock of the Marina on Lavaca Bay they remove all the pellets they see and when they return on later dates more pellets are present. (**Ex 391,** Barrier Dep. 46:2-50:12)

309. During the April 2017 to April 2018 contract, Horizon collected a total of 5,015 bags of debris, including pellets, from the shores of Lavaca Bay. **(Ex 70 at FCP042040-042043)**

310. Horizon collected another 2,791 bags between May 2nd, 2018 and March 14, 2019. **(Ex 72 at FCP063171-063172)**

311. Between April 2017 and February 14, 2019, Horizon has collected between 665,121,996-6,651,219,960 individual pellets, or 30,233-302,328 pounds, or 15 and 151 tons of plastic pellets and powder from the water and shores of Lavaca Bay. (***Trial Testimony, Dr. Conkle*)** (relying on **Ex 391,** Barrier Dep. 156:21-25 (bag size); (**Ex 91**) (bag size - 33 gallons); (**Ex 391,** Barrier Dep. 37:22-38:13) (capacity of bags filled); (**Ex**

71 at FCP001414) (percentage of bags that are pellets/powder). They are still removing bags. (***See*** **Ex. 72 at FCP063171-063172)**

312. Horizon's photos of its cleanup in 2017 shows the extent of the pellets in the Cox Creek system. **(Ex 218)**

313. Even though pellets have been cleaned up, other pellets may have escaped down stream. The higher the volume of pellets cleaned up, the more likely there will be pellets downstream. (**Ex 397,** Hale Depo. at 165:13)

4. Evidence from Local Residents (Mang and Spree), accompanied by Formosa's John Hyak and others

314. Port Lavaca shrimper and fisherman Myron Spree first noticed plastic pellets in Lavaca Bay after Hurricane Harvey. (**Ex 408,** Spree Depo. at 57:4-22) At that time the pellets were "very obvious." (**Ex 408,** Spree Depo. at 57:22)

315. Mr. Spree has told Formosa about the plastics discharges he has seen and provided samples and photos to them. (Spree Trial Testimony; **Ex 358; 356; Ex 357)**

316. Starting in April 2018, Myron Spree took samples of plastic material. The plastic material looks "flaky...like snow." (**Ex 408,** Spree Depo. at 77:14)

317. Mr. Spree has taken 14 samples of pellets and plastic powder at outfall 001 in Lavaca Bay. **(Ex 63 at 58)**

318. Mr. Spree took samples at outfall 001 in April, May, June and July of 2018. **(Ex 63 at 58)** Mr. Spree has also taken photographs and videos of pellets and powder at outfall 001. **(Ex 359; Ex 360)**

319. Mr. Spree says he can "prove" the plastics are from outfall 001. (**Ex 408,** Spree Depo. at 80: 18-20) He explained the plastics are "in the outfall flow" at outfall 001, (**Ex 408,** Spree Depo. at 81:10-13) and that if you go to the edge of the outfall, there is "perfectly clear water," but "you can pick it [plastics] up" in the outfall flow. (**Ex 408,** Spree Depo at 80: 21-25)

320. Formosa's Utility Water Department Manager John Hyak also has seen pellets at Formosa's 001 outfall in Lavaca Bay, when he accompanied Mr. Spree to Formosa's 001 outfall in Lavaca Bay in 2018, likely in April. (**Ex 398,** Hyak Depo. at 182:9 - 184:3)

321. Hydrographic surveyor Michael Mang has also found plastics at Formosa's 001 outfall on June 17, 2018 and March 8, 2019. (**Ex 402,** Mang Depo. at 8:21-25)

322. Before taking his June 2018 sample, Mr. Mang went to the location on two different days and "could see particulate floating in the water." (**Ex 402,** Mang Depo. at 10:1-3)

323. For his June 17, 2018 sampling, Mr. Mang studied the water to determine its flow as well as the wind direction. (**Ex 402,** Mang Depo. at 10:20-25) He set a net in the water to catch a 10 minute sample at Formosa's 001 discharge. (**Ex 402,** Mang Depo. at 10:4-8; **Ex 73 at 71403-009266-009267)**

324. In those 10 minutes his net trapped floating plastics. He lost about half of what he netted because a gust of wind blew the rest away. (**Ex 402,** Mang Depo. at 10:4-8)

325. Photographs of what Mr. Mang trapped in his net show plastic pellets and flakes. **(Ex 73)** In Mr. Mang's opinion what he netted were plastics because they floated. (**Ex 402,** Mang Depo. at 15:16-19)

326. Formosa's marine science expert Dr. Robert Hale believes Mr. Mang's method of sampling was reasonable. (**Ex 397,** Hale Depo. at 56:1)

327. On March 8, 2019, Michael Mang took Formosa Texas' John Hyak, Matt Brogger and Steve Morowitz to outfall 001 in a boat. Mr. Mang had contacted Formosa Texas the day before because the powder at 001 was so dense. Mssrs. Hyak, Brogger and Morowitz all witnessed dense powder coming out of outfall 001 on March 8, 2019. The men dipped cups into the water to look at the powder. Mr. Hyak told Mr. Mang that Formosa intended to try a sand filter to stop the powder from being discharged. (***Trial Testimony, Mang***)

[redacted]

5. Evidence from Plaintiffs' Expert, Dr. Conkle

328. On Dr. Conkle's first site visit, December 12, 2017, he went to the Port Lavaca Marina, where he saw plastic pellets on the boat ramp. **(*Trial Testimony, Dr. Conkle;* Ex 33, Figures, at Fig. 3)** The amount Dr. Conkle saw "while not overwhelming, was many times more than what I'd previously seen in the environment." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 5)**

329. During the December 2017 visit to the Port Lavaca Marina, Ronnie Hamrick showed Dr. Conkle plastic powder mixed in with the detritus. Dr. Conkle explains, "The material was difficult to spot at first, but, once identified, appeared to be ubiquitous on the boat ramp from the current water level up to the high water line." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 5)** Dr. Conkle "ha[d] never seen anything like this before." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 5)**

330. Additionally, Dr. Conkle visited the Lavaca Bay shoreline near "the causeway" on his March 16, 2018 visit. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 7 and Figures at Fig. 9)** Dr. Conkle observed that at the causeway, "Both pellets and powder were observed

here, however the amount of plastic powder observed in this location was shocking. Plastic powder was deposited in a line that traced the contours of the shoreline. … It reminded me of the rings seen in dirty bathtubs." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 5 and Figures at Figs. 10 & 11)**

6. Evidence from Waterkeepers' Sampling and Photographic Documentation since January 2016

a) Sampling Overview and Methodology

331. Waterkeeper volunteers began collecting samples of discharged plastics on January 31, 2016. **(Ex 63; *Trial Testimony, Wilson & Hamrick*).**

332. To collect pellet samples, Waterkeeper volunteers normally use the head of a large pool net. If the pellets are far out in the water, they will put an extension on the net. They also have a 5-inch and a 3-inch net like for fish that they use sometimes. Normally, they take a photo before they sample. Once the bag is full, they do the paperwork and take a photo of it. (***Trial Testimony, Sumpter & Hamrick***; **Ex 409,** Sumpter Depo at 29:7-30:2)

333. When Waterkeeper volunteers take a sample, they take note of the wind, time, date and location. (***Trial Testimony, Sumpter & Hamrick***; **Ex 409,** Sumpter Depo at 29:7-9; **Ex 63;** *see, e.g.*, **Ex 133)**

334. When Waterkeeper volunteers sample, they do not take all the plastic they find, just a representation of what they see. (***Trial Testimony, Sumpter & Hamrick***; **Ex 409,** Sumpter Depo at 40:24-41:1)

335. Waterkeeper volunteers save samples in plastic bottles or ziplock bags. **(*Trial Testimony, Sumpter & Hamrick;* *See, e.g.* Ex 133; *Trial Testimony, Dr. Conkle;* Ex 33, Figures 12-14)**

336. Waterkeepers have sampled for plastics at Cox Creek, south of the SH 35 bridge at the boat ramp, south of the SH 35 causeway near Alcoa and near the Holiday Inn, the 002 outfall both north and south, the Bayfront Marina, Black Rock, Harbor of Refugees, and Six Mile Park. (***Trial Testimony, Sumpter & Hamrick;*** **Ex 409,** Sumpter Depo. at 31:21-32:10; **Ex. 255 at 71403-012546** (Map)**; Ex. 468** (Map)**)**

337. From January 31, 2016 until March 12, 2019 (and sampling is ongoing), Waterkeeper volunteers have collected 2,409 total samples of discharged pellets and plastic powder from both Lavaca Bay and Cox Creek. **(Ex 63, Ex 254 (**photos of all samples**),** *see* **Ex 467 (**map of Cox Creek sampling**), 468 (**map of Lavaca Bay sampling**),** *see, e.g.,* **Ex 133** (subset of physical samples)**)**

338. All samples have been given to Diane Wilson, where she stored them in her barn. (***Trial Testimony, Wilson*****)** Dr. Jeremy Conkle viewed the samples and photographed them. **(*Trial Testimony, Dr. Conkle;* Ex 33, Figures 12-14)**

339. Ms. Wilson has kept all of the samples. When Hurricane Harvey hit the coast, water came into the barn, and she lost approximately 10 of the samples. (***Trial Testimony, Wilson;*** **Ex 410**)

340. When a member of Waterkeeper takes a photo or video of pellets or powder in the waters of Lavaca Bay or Cox Creek, they give that record to Ms. Wilson who labels it with the date and location at which it was taken. (***Trial Testimony, Wilson)***

341. The benefit of the Waterkeeper sampling method, according to Dr. Conkle, is that it has taken place over a long period of time, at the same 12 locations on Lavaca Bay and Cox Creek, which means a large dataset has been generated. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 8 and Figure 24; *Trial Testimony, Dr. Conkle*).**

342. Waterkeeperss samples, "demonstrate that plastic and powder were a constant presence at the 12 sites sampled throughout the 1,040-day period." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 8; *Trial Testimony, Dr. Conkle*)** (Dr. Conkle's report was drafted in July 2018; the period of time over which the samples have been collected will have increased to 1,148 as of March 24, 2019.)

b) Evidence from Lavaca Bay

343. Waterkeepers have collected 1,626 samples on 582 distinct days on Lavaca Bay between January 31, 2016 and March 12, 2019. (**Ex 63, Ex 254 (**photos of all samples**),** ***see*** **Ex 468 (**map of Lavaca Bay sampling**),** ***see, e.g.,*** **Ex 133** (subset of physical samples))**.**

344. Plaintiffs' have included as trial exhibits at least 110 videos and 44 photos taken by Waterkeepers from Lavaca Bay from January 2016 through February 2019. (**Exs 263-295 (**folders with photos and videos by month**);** *see also* **Ex 472** (chart with photos/videos listed by date))**.**

B. Evidence of Past (since January 31, 2016) and Ongoing Plastics Discharges in more than trace amounts from Formosa's Stormwater Outfalls into Cox Creek

1. Evidence from TCEQ Investigations & Documentation, as recent as January 2019

345. On March 10 and 14, 2016 TCEQ investigators observed plastic pellets "in Cox Creek, downstream of the [Formosa] facility. The pellets were observed floating on the surface of the water as well as embedded in the creek's sediment." (**Ex 9 at 7143-000731**). Formosa Texas had advanced notice of TCEQ's inspection. **(Ex 240)**

346. On March 15, 2016, TCEQ emailed to Formosa Texas "photographs documenting pellets in Cox Creek downstream of the facility on March 16, 2016." (**Ex 243)** Those photographs document pellets in the creek that violate the permit. Formosa Texas' Mr. Arguellez had requested those photos because "upper management" wanted to see them. **(Ex 244)**

347. As a result of these observations, TCEQ sent an Exit Interview Form on March 21, 2016, citing that Formosa "failed to prevent the discharge of floating solids (plastic pellets) in other than trace amounts." (**Ex 3**) TCEQ's Karla Trevino emailed Porfirio Arguellez of Formosa Texas a copy of the form as well as an email stating, "The Exit Interview Form: Potential Violations and/or Records request is being provided as an attachment to this email to ensure that the issues were communicated clearly during our telephone conversation on March 21, 2016. If there are questions about the information contained in the form, or if a meeting at the TCEQ regional office is requested to discuss the contents of the Exit Interview Form, contact me as soon as possible." The only response to Ms. Trevino was a question about stating that past violations would be included on the form and noted as resolved. There were no questions from Formosa Texas that it did not understand what was meant by discharging more than a trace amount. (**Ex 241)** On April 4, 2016, John Hyak, Formosa signed the Exit Interview form without asking about or objecting to whether it had discharged more than a trace amount of pellets. (**Ex 242)**

348. On May 13, 2016, TCEQ issued a Notice of Violation to Formosa for the same permit violations. (**Ex 9 at 71403-000736**)

349. The TCEQ Investigation report for the March 2016 Investigation notes that "The facility was aware that there is an issue with the discharge of a few plastic pellets through the outfalls." (**Ex 250 at 71403-001215**).

350. The inspection report also documents that after leaving the facility, TCEQ "investigators proceeded to a bridge on State Highway 35 at Cox Creek, just downstream of the facility. The facility's stormwater Outfalls 002-009 discharge into this receiving stream. Plastic pellets were observed floating on the surface of the water, and embedded in the sediment. Photographic documentation was collected and is attached to this report as Attachment No. 5." (**Ex 250 at 71403-001216, 001265, 001267, 001269, 001271, 001273**)

351. On June 10, 2016, Formosa Texas' Rick Crabtree officially responded to the March 2016 investigative finding of illegal discharges of pellets. Formosa Texas characterized the violation as: "FPC-TX failed to prevent the unauthorized discharge of floating solids of floating solids or visible foam in other than trace amounts." (**Ex 219**) Formosa did not dispute the discharge had occurred or ask about what was meant by the permit term "trace amounts." Instead Formosa responded that it had "dispatched a vacuum truck and laborers to remove the pellets." *Id.* Formosa committed, "In the future, Formosa will periodically check Cox Creek; any pellets will be removed….Formosa will continue to investigate potential causes or routes that would allow pellets to enter the creek and take necessary actions or implement improvements to address these items." *Id.*

352. After TCEQ gave a notice of violation, the agency told Formosa to comply with the permit by June 13, 2016. That compliance date was not met because TCEQ determined that the documentation submitted by Formosa was "inadequate to resolve the outstanding violation." TCEQ investigated Formosa's facility and sites along Cox Creek and Lavaca

Bay again on September 7, 8 and 13, 2016 and found "that pellets are still being discharged through the stormwater outfalls and clean-up activities at Cox creek have not been completed." and requested additional documentation about corrective actions. During the September 2016 facility inspection, TCEQ investigators noted "a moderate amount of pellets" at Outfalls 006, 008, and 009. (**Ex 9 at 71403-000731, 000735, 000736, 00073**8)

353. Photographic documentation of the pellet discharges from September 7, 2016 was included in TCEQ's investigation report, showing plastic pellets on the dock of the Port Lavaca Marina, plastic pellets floating on the water in Cox Creek, and plastic pellets floating with other debris at the Port Lavaca Marina. (**Ex 9 at 71403-000743, 000744, 000745**)

354. On September 16, 2016, when TCEQ sent their exit interview form to Formosa Texas, the form cited for "failure to prevent the discharge of floating solids (plastic pellets) in other than trace amounts." TCEQ's Zack Fuqua emailed Porfirio Arguellez of Formosa Texas a copy of the form as well as an email stating, "The Exit Interview Form: Potential Violations and/or Records request is being provided as an attachment to this email to ensure that the issues were communicated clearly during our telephone conversation on September 16, 2016. If there are questions about the information contained in the form, or if a meeting at the TCEQ regional office is requested to discuss the contents of the Exit Interview Form, contact me as soon as possible." **(Ex 245)** On September 16, 2016, Formosa signed the Exit Interview form without asking about or objecting to whether it had discharged more than a trace amount of pellets. **(Ex 246)**

355. On November 8, 2016, Rick Crabtree of Formosa Texas sent another letter to TCEQ regarding the discharges into Cox Creek of floating solids in more than trace amounts.

Again, Formosa did not dispute the permit term trace amounts or contend that less than trace amounts of pellets had been discharged. Instead Formosa states that they are examining "causes and routes where pellets may escape from individual areas of the facility." Formosa states that a "pellet recovery project" was being built at external outfall 006 when TCEQ visited the facility in September 2016, and that the project was completed September 30, 2016 and similar systems were planned for outfalls 004, 007, 008, 009, 012. Attached photos show a floating boom at Outfall 006 (**Ex 4 at 71403-000026-71403-000030**).

356. Additional photographs by TCEQ Investigator Zack Fuqua from April 4 and 18, 2017 show pellets floating on water and embedded in vegetation and on the shore. (**Ex 4 at 71403-000040-71403-000045**)

357. On May 1, 2017, TCEQ sent a notice of enforcement to Formosa, noting that the compliance documentation submitted by Formosa to TCEQ "does not appear to resolve the outstanding violations" because "the clean-up of Cox Creek as well as the planned facility upgrades were not completed within the compliance time frame." **(Ex 4 at 71403-000017, 000022)**

358. On May 9, 2017, Formosa Texas responded to TCEQ about the May 1 letter asking for a deadline to clean up Cox Creek. **(Ex 221)** In all of this correspondence, Formosa never stated that fewer than a "trace amount" of pellets had been discharged or that it did not understand what was meant in its permit. (*See* **Ex 220; Ex 221**; *see also* June 10, 2016 Response in **Ex 3 at 71403-000776**)

359. June 22, 2018, Zach Fuqua of TCEQ investigated Outfalls 006, 007, 008, and 009 for possible pellet or other floating solids' discharges. He determined pellets had been

recently discharged at Outfall 006; a fine screen was in place to prevent those discharges, but the screen was not adequately placed to accomplish this task (**Ex 12** and a photo in Attachment 4, **at 71403-008329**), and the channel leading to the screen had washed out to one side of the outfall gate, creating an unscreened bypass of the outfall gate. (**Ex 12** and photos in Attachment 4, **at 71403-008331 and 008333**). He also determined that pellets and debris were being and had been discharged at Outfalls 008 and 009. Additionally, he observed plastic pellets and floating white debris in Cox's Creek downstream **of the outfalls at SH 35 (Ex12 and photos in Attachment 5,** pp. 71403-008341, 008343).

360. TCEQ conducted an on-site investigation January 17, 2019. The investigation results were at the time of trial being finalized, but the TCEQ investigator, Zach Fuqua, documented (**Ex 145**) numerous instances of discharged pellets or floating solids at Outfalls 001, 006, 008 and 009. (**Ex 144**)

2. Evidence from Defendants' Clean-up Contractors (October 2016 to present)

361. In October of 2016, Palacios Marine Industrial began a 7-day clean-up effort on Cox Creek. (**Ex 406,** Patek, Philip Depo. at 20:20-21) After that, they conducted monthly inspections of the creek until April of 2017. (**Ex 406,** Patek, Philip Depo. at 22:15-24) The purpose of the monthly inspections was to identify locations of pellets and report those to Formosa. (**Ex 406,** Patek, Philip Depo.at 46:7-8) During some of those monthly inspections, PMI would identify the location of pellets and report those to Formosa, but would not remove them from the environment. (**Ex 406,** Patek, Philip Depo.at 60:2-14)

362. For everyday PMI was on the creek they produced "inspection logs." On the logs were asterisks marking where they inspected for pellets and notations describing where pellets were removed from the environment. (**Ex 406,** Patek, Philip Depo.at 43:12-18)

363. On October 5, 2016, PMI Terminal Services began cleaning up Formosa's discharged pellets on Cox Creek. PMI removed "Two (2) 55 bbl drums" at what appears to be outfall 009. (**Ex 222**)

364. On October 6, 2016, PMI removed another two 55 bbl drums of pellets from Cox Creek "PMI moved to the south end of the creek to remove Heavy Pellets from the bridge area. Ran south for any Heavy Pellets that might be running off from bank." (**Ex 223**) Maps showing the cleanup locations are included by PMI.

365. Throughout 2016, PMI continued to map where it found "heavy pellets." On October 7, 2016, PMI found heavy pellets at outfall 009, where PMI had cleaned them just two days earlier on October 5, 2016. PMI also found "heavy pellets" in a bend of Cox Creek south of the SH 35 bridge. *Id.* (**Ex 224** and compare with **Ex 222**) On October 10, 2016, there were "heavy pellets" on the Creek near outfall 006, and four 55-bbl barrels of pellets gathered. (**Ex 225**)

366. On October 12, 2016, PMI went south on Cox Creek toward the dam. This area was covered with heavy pellets almost to the dam on the creek. (**Ex 226**)

367. On October 13, 2016, PMI went even farther south on Cox Creek all the way to the spillway dam where they found pellets. "Most of PMI efforts were concentrated around the boat ramp @ hwy 35 bridge and across on the west side of Cox Creek...most of the efforts going forward will be around the boat ramp." (**Ex 227**)

368. PMI crews found the same average quantity of pellets on the last day of their October clean-up as they did on the first day. (**Ex 406,** Patek, Philip Depo. at 44:23 - 45:18)

369. According to emails in November 2016, Porfirio Arguellez boated on Cox Creek "to get out on the water for a visual inspection." (**Ex 228**)

370. On November 3, 2016, PMI arrived for its monthly inspection. "As noted on the maps a couple of areas around the outfalls had heavy concentration of pellets….Porfirio [Arguellez] arrived at 1:00 p.m. to inspect creek and areas that had heavy concentration of pellets." (**Ex 229)**

371. On January 13, 2017, PMI returned for a monthly inspection and "a heavy concentration found and removed from the outfalls," documenting pellets at 006, 008 and 009 and south of the SH 35 bridge. (**Ex 231)** For the January 2017 cleanup, PMI used a shop vac, as suggested by Mr. Arguellez.

372. On February 3, 2017, PMI returned to Cox Creek for a monthly inspection and finds "pretty much the same, high concentrate at bank area and in duckweed from the bend to the first part of the [SH 35] dock." PMI found "heavy concentrated" at outfall #1 (006), "a good amount of pellets at the bend, "which PMI calls outfall #2 (008) and "same as usual heavy around the cattails" at the outfall PMI calls #3 (009) (**Ex 232)**

373. On March 3, 2017, PMI returned to the same outfalls and south of the SH 35 bridge to find pellets again. PMI also found pellets "along east side of creek in multiple areas." (**Ex 233)**

374. On April 7, 2017, PMI returned to Cox Creek. At the drop off area (southeast bank of the SH 35 bridge) and noted, "still a good amount of pellets along bank and around bridge around the bend. "When we stick our paddle into shall end on bank and stir up dirt

below a high amount of pellets will surface." "[A] good amount of pellets" were at outfall 006, "a good amount of pellets in duckweeds" at outfall 008, and "real spotty around cattails" at outfall 009. **(Ex 253)**

375. In April 12, 2017, PMI recorded, "First outfall [006] was open and flowing, a large quantity of pellets were discovered, on the bank and heavy deposits found in vegetation in surrounding area of outfall. From the outfall back to the creek (3) 55 bbl drums were recovered. Large quantities of pellets were discovered on the bank and heavy deposits found in vegetation in surrounding area of outfall. Notified Porfirio [Arguellez of the wastewater department of Formosa Texas) of findings and waiting for further instructions." **(Ex 234)**

376. Horizon Environmental Services entered into a contract with Defendants on April 10, 2017. **(Ex 67 at FCP001493)** One of the objectives of their contract is to "flush and remove pellets from outfalls in Cox Creek." **(Ex 68 at FCP002045)** This contract was renewed for another two years of services beginning May 1, 2018. **(Ex 69)**

377. The Cox Creek crew for Horizon Environmental Services began flush and removal on the creek on April 19, 2017. **(Ex 67 at FCP001493)**

378. Over the course of their contracts, Horizon crews rotate which outfalls they focus their energy on. These rotations occur on roughly a monthly basis. **(Ex 172 at FCP001233; Ex 391,** Barrier Dep. 69:12 - 69:15).

379. Between April of 2017 and February of 2019, the Horizon Cox Creek crews have flushed and removed plastic pellets and powder from: outfall 009 for 109 days, outfall 008 for 95 days, outfall 006 for 88 days, outfall 005 for 49 days, outfall 007 for 8 days, outfall

004 for 5 days and another 15 days at undisclosed locations on the Creek. **(Ex 172; Ex 70 at 042045-042047)**

380. Over the course of the contracts, when Horizon crews flush and remove pellets from the stormwater outfalls they remove all the pellets they see and when they return on later dates more pellets are present. (**Ex 391,** Barrier Depo. 80:2-84:11)

381. During the April 2017 to April 2018 contract, Horizon collected a total of 44,129 bags of debris, including pellets, from the shores and waters of Cox Creek. **(Ex 70 at FCP042035-042040)**

382. Horizon collected another 36,070 bags between May 2018 and March 14, 2019. **(Ex 72 at FCP063167-063171).**

383. Over the course of the contracts, Horizon has collected between 6,846,355,208-68,463,552,080 individual pellets, or 311,198-3,111,980 pounds, or 156 to 1,556 tons of plastic pellets and powder from the water and shores of Cox Creek. (***Trial Testimony, Dr. Conkle*** (relying on **Ex 391,** Barrier Depo. 156:21-25 (bag size); **Ex 91**) (bag size - 33 gallons); **Ex 391,** Barrier Depo. 37:22-38:13 (capacity of bags filled); **Ex 71 at FCP001414** (percentage of bags that are pellets/powder)).

384. According to Formosa's marine scientist, Dr. Robert Hale, the higher the volume of pellets cleaned up, the more likely you are to find pellets downstream of the cleanup. (**Ex 397,** Hale Depo. at 165:13)

385. Horizon's supervisor took Formosa Texas' Matt Brogger and Porfirio Arguellez in April 2017 to survey the work and designed a proposal using high pressure hoses to "flush contaminated areas" and to have booms in the water to "prevent any further contamination." (**Ex 235)**

386. Horizon crews began using high pressure hoses to "flush" the shore banks of Cox Creek of pellets. **(Ex 236)** April 2017 photos by Horizon show pellets in Cox Creek and in vegetation. **(Ex 237)** Horizon produced maps of where it found pellets in April 2017. **(Ex 238)**

3. Evidence from Plaintiffs' Experts Observations & Photographs

387. Plaintiffs' Environmental Science Expert, Dr. Jeremy Conkle, has visited Cox Creek seven times since December 2017. (***Trial Testimony, Dr. Conkle;* Ex 33, 34, & 93**) In Dr. Conkle's December 12, 2017 visit to Cox Creek, he described stopping at "the Route 35 bridge that crosses Cox Creek near Formosa Outfall 006, where we were shown nurdles and powder that had accumulated on the creek bank close to the road. There were substantially more nurdles observed in this area. In some spots they covered the ground, looking like a dusting of sleet or hail." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 5 and Figures, Figs. 5 & 6)**

388. On his December 12, 2017 visit to Cox Creek, between outfall 006 and 009, Dr. Conkle saw that "near floating vegetation, pellets were frequently observed at, or near the water surface and entrained in floating vegetation." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 6 and Figures, Fig. 7)** He also saw plastic powder captured by a boom beyond outfall 009. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 6 and Figures, Fig. 8)** He noted, "We also observed some plastic particles floating to the water surface just outside of the booms. This is similar to what would occur if floating plastics became entrained in the water flow, went below booms and escaped capture." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 6)**

389. On June 20, 2018, at the SH-35 boat ramp, just south of Formosa's 006 outfall, Dr. Conkle, "observed plastic powder mixed with pellets covered the surface of the water along

the shoreline." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 7)** At the time he observed the pellets, it was raining. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 7)**

390. On June 22, 2018, water on the creek near the SH-35 boat ramp had receded, but "There were however, a large number of plastic pellets with a much smaller amount of powder still floating at the water's edge." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 7 and Figures, Figs. 20 & 21)** At the time, "there were still a large number pellets in the grass." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 7 and Figures, Fig. 22)**

391. On June 22, 2018, as the water receded, a wrack line was apparent on Cox Creek near the SH-35 boat ramp. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 8)** "The wrack line deposited at the high-water level is mixed with plastic pellets and powder, while the rest was likely swept downstream as water levels rose." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 8)**

392. On February 12, 2019, Dr. Conkle visited the site again. Dr. Conkle described his kayak trip: "This visit to Cox Creek was the first in which I kayaked upstream to observe the presence of plastic pellets and powder on the creek. This allowed me to see the system more thoroughly than from boat or shoreline access points as I had done in previous trips. I observed plastic pellets continuously in the water, among floating vegetation and on the shoreline as we paddled upstream along the southern bank and back downstream on the northern bank." (***Trial Testimony, Dr. Conkle;* Ex 93 at 4, 5**) " I took several videos as well, with one showing that when you press floating vegetation under water with a paddle, it reveals pellets that are hiding among the weeds. Because we were on kayak, I was able to more completely explore the level of plastic pellets found in this system and realize that it is an ongoing problem throughout Cox Creek, despite the massive amounts of pellets

already removed. My personal observations align with the pictures and videos that Diane Wilson and associates have collected in recent months, demonstrating that the level of contamination they've seen is not an anomaly." (***Trial Testimony, Dr. Conkle;*** **Ex 93 at 5**)

393. In July 2018, Dr. Conkle reported that since, "cleanup efforts have removed so much material, but have also been continuous for over a year, this indicates that the release is probably ongoing. The ongoing releases of pellets and powder is also evidenced by the concentrated floating mass of pellets and powder observed on 06/20/2018 in Cox Creek." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 23)** On March 4, 2019, Dr. Conkle reported similar observations: "This was my first trip to Cox Creek since vegetation had been cleared from the boat ramp adjacent to Route 35." (***Trial Testimony, Dr. Conkle;*** **Ex 93 at 5**) However, removing pellets that have become trapped in soils and sediment may be more harmful than leaving them sequestered as they are. This is evidenced by the erosion at the boat ramp, but also large swaths of the Cox Creek shoreline that have been clear-cut with trees and bushes cut to stumps and roots exposed. These areas along Cox Creek are now more susceptible to erosion, which would result in lost acreage and habitat, while causing sedimentation in the creek that could affect navigation and alter water flows. This type of clean-up effort may be more detrimental to the ecosystem than leaving those buried pellets in place." (***Trial Testimony, Dr. Conkle;*** **Ex 93 at 5**)

394. On February 12, 2019, Dr. Conkle also visited Lavaca Bay where plastic powder was more present than pellets. (***Trial Testimony, Dr. Conkle;*** **Ex 93 at 6**) He reported: "At some areas on the shoreline, the plastic powder dominated the debris line, like a ring in a bathtub as described in my previous reports. The level of plastic pellets and powder

observed on this trip on the Lavaca Bay shoreline was similar to previous days." (***Trial Testimony, Dr. Conkle;*** **Ex 93 at 6**)

395. On March 12, 2019, former TCEQ regional director, Donna Phillips visited Cox Creek and Lavaca Bay. At the Port Lavaca Marina, she observed, "A significant number of pellets were observed imbedded in the soil/sand along this western shoreline of Lavaca Bay. A small amount of powder was also observed around the vegetation along the shoreline. Gently dispersing the material observed allowed one to easily discern between the powdery substance and foam from the turbulence of the water." (***Trial Testimony, Phillips;*** **Ex 186)** On Cox Creek, she noted, "Examination of the shoreline on the south side of the road revealed some pellets in the vegetation. Many more pellets were observed, however, by submerging a kayak paddle under the water surface in the vegetation and bringing it to the surface allowing the water to slowly run off. . . Examination of both the shoreline and the vegetation in the part of the creek north of 006 revealed a significant number of pellets, especially when using the paddle to scoop them from the vegetation as was done previously." (***Trial Testimony, Phillips;*** **Ex 186)** Ms. Phillips concluded, "All in all, the number of pellets and the powder observed during this visit in both Cox Creek and at the Lavaca Bay marina exceeded what would be considered a 'trace' amount." (***Trial Testimony, Phillips;*** **Ex 186)**

4. Plaintiffs' complaints to government agencies about plastics discharges

396. In July 2010, Diane Wilson complained to EPA about a pile of pellets on the shore of Formosa Texas' guest house that was about 8 feet from the shore of Cox Creek. **(Ex 84 at 71403-0002003)** Ms. Wilson reported in 2010 that a witness had been on the clubhouse ground and seen pellets so deep "you could stick your hand in them and the pellets would

go over your wrist." **(Ex 84 at 71403-0002003)** The person reported that the witness who saw the pellets reported that "he could use a 5 gallon bucket and get bucket loads of these pellets." **(Ex 84 at 71403-0002003)**

397. On July 16, 2013, Diane Wilson requested a contested case hearing on Formosa's renewal of its TPDES permit. In that request, she stated, " **(Ex 1)** In that request, Ms. Wilson stated, "Effluent Limitations for Outfalls 001 -013 indicate that there shall be no discharge of floating solids in the discharge from any of the referenced outfalls. TCEQ Rule 307.4 (b) (2-4) requires that all discharges to waters of the state must be free of floating debris and suspended solids. According to discussion with EPA Region 6 enforcement personnel, it is known that polyethylene pellets (solids) have been found and continue to be found floating throughout Lavaca Bay as well as along the adjacent shoreline." **(Ex 1)**

398. Ms. Wilson's July 16, 2013, request to EPA summarized discharges of pellet that are similar to those today: "A few years before, a utilities wastewater worker led a group of TCEQ Task Force inspectors from Corpus Christi district office to an island/reef in Lavaca Bay that was covered with PVC pellets where a high tide had deposited the material. On any given day, a visit to the boat launching area at Cox Creek (behind Formosa) or to adjacent shores will unearth PVC pellets." **(Ex 1)** In 2013, she requested TCEQ assistance: "Please provide clarification as to the applicability of the permit limits, the State Rules and the suspect discharge of polyethylene pellets/dust being found in the drainage ditches, the bay and surrounding area." **(Ex 1)**

399. On July 28, 2013, Ms. Wilson requested a contested case hearing on Formosa's request to discharge higher concentrations of contaminants from its 001 outfall. In that

request, she explained to TCEQ, "it is know that polyethylene pellets have been found and continue to be found floating throughout Lavaca Bay as well as around the shoreline." She sites to an skytruth alert. **(Ex 96)**

400. In 2016, Ms. Wilson complained to TCEQ about plastics discharged from Formosa's facility on: (a) February 18, 2016 **(Ex 97)**; (b) February 19, 2016 **(Ex 98)**; and (c) February 29, 2016 **(Ex 100).** n her complaints, she sent TCEQ a list of sampling begun by Waterkeeper members starting December 31, 2016.

401. In November 7, 2016, she complained to U.S. Fish and Wildlife Service (USFWS) and sent them notices of violation from TCEQ. USFWS responded, "The U.S. Fish and Wildlife Service is aware of the problem of plastic pellets in the environment, and their impacts to wildlife. To answer your question, there are juvenile green sea turtles in Texas bays, and a few kemp's ridleys." USFWS tells Ms. Wilson that the National Oceanic and Atmospheric Administration has jurisdiction and forward the complaint to them. **(Ex 101)**

402. In 2017, Ms. Wilson complained to TCEQ about plastics discharged from Formosa's facility: February 24, 2017, **(Ex 102 at 71403-000967 and 000970; Ex 103; Ex 104)** (white substance in Lavaca Bay; TCEQ forwarded to Texas Parks & Wildlife Department)**;** May 18, 2017 **(Ex 105)**; August 15, 2017 **(Ex 106)**; November 13, 2017 **(Ex 109)**; November 16, 2017, **(Ex 110; Ex 111)**; November 21, 2017 **(Ex 112)**; November 30, 2017 **(Ex 113)**; December 19, 2017, **(Ex 114; Ex 115; Ex 116)**

403. In 2018, Ms. Wilson complained to TCEQ about plastics discharged from Formosa's facility: (a) February 12, 2018 **(Ex 117)**; (b) April 4, 2018 **(Ex 118)**; (c) April 10, 2018 **(Ex 119)**; (d) April 15, 2018 **(Ex 120)**; (e) April 19, 2018 **(Ex 121)** (including a video showing the cleanup); (f) April 25, 2019 **(Ex 122)**; (g) May 8, 2018, **(Ex 123; Ex**

124); (h) June 21, 2018 (unattached boom, overflowing outfall 006) **(Ex 125; Ex 126; Ex 127)**; (i) June 22, 2018 **(Ex 128)**; (j) July 9, 2018 **(Ex 129)**; (k) August 31, 2018 **(Ex 130; Ex 131)**; (l) January 14, 2018 **(Ex 132)**.

5. Evidence from Plaintiffs' Sampling & Photos, Videos

404. Waterkeepers have collected 798 samples on 335 distinct days on Cox Creek between January 31, 2016 and March 12, 2019. (**Ex 63, Ex 254 (**photos of all samples**),** ***see*** **Ex 467 (**map of Cox Creek sampling**),** ***see, e.g.,*** **Ex 133** (subset of physical samples)**).**

405. Plaintiffs have included as trial exhibits at least 97 videos and 263 photos taken by Waterkeepers from Cox Creek from February 2016 through February 2019. (**Exs 296-339 (**folders with photos and videos from Cox Creek by month**);** *see also* **Exs 470, 471** (charts with photos/videos from Cox Creek listed by date)**).**

6. Hurricane Harvey scoured out Cox Creek from approximately August 17, 2017 to September 2, 2017, demonstrating that plastics found after this date are new discharges

406. Formosa's engineering expert Peter Moleux opines that Formosa Texas had made appropriate changes by July 31, 2017 to its facility and that, "As a result, since July 31, 2017, FPC-TX has been in compliance with its Permit with regard to the discharge of floating solids." **(Ex 403,** Moleux Depo. at 82:13-21, ***see also*** Agreed Order stating that Formosa's pellet recovery program had been implemented by July 31, 2017, **Ex 77 at 71403-011542).**

407. On August 26, 2017, "Harvey made landfall as a Category 4 Hurricane east of Rockport, Texas on August 26th, 2017, ~50 miles from Port Lavaca." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 25)**

408. "Lavaca Bay was northeast of the hurricane's eye at landfall, and since cyclones rotate in a counterclockwise direction, this area received stronger winds, storm surge and higher rain amounts than areas located south on the coast from the landfall site. The storm surge in Port Lavaca was 6 ft32 and the area received ~12"33 of rain from 8/24 to 8/29/2017 with Hurricane Harvey. Due to these high local and regional rain amount, rivers and tributaries that discharged into Lavaca Bay, flooded. For example, Garcitas Creek's gage height typically fluctuates from 5-7 ft but spiked to almost 25 ft because of Hurricane Harvey." **(*Trial Testimony, Dr. Conkle*; Ex 33 at 25)** (citations omitted)

409. Both Dr. Conkle and Dr. Hale agree that Hurricane Harvey would have produced a "major flushing" of the Cox Creek system. (**Ex 397,** Hale Depo. at 159:2; ***Trial Testimony, Dr. Conkle;* Ex 33 at 25-26)**

410. Dr. Conkle explains that Harvey, "would have redistributed plastic pellets and powder that was already floating, trapped at the sediment surface and to some extent those buried in sediment." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 25)** In Cox Creek, "much of this redistribution [of plastics] would have resulted in plastic transport from Cox Creek downstream to the evaporation lake and potentially into Lavaca and Matagorda Bay. Any floating plastic material that was not transported downstream, would have likely been deposited higher up in the floodplain backwater areas, with decreasing amounts deposited as you move lower in elevation towards the normal water line." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 26)**

411. Formosa's Dr. Hale agrees that Hurricane Harvey may have carried some Cox Creek pellets into the marsh just south of the dam. (**Ex 397,** Hale Depo. at 160:1-7)

412. Dr. Jeremy Conkle reported: "Due to normal downstream flows and the redistribution of pellets and powder described above that would have occurred with Hurricane Harvey, I would not have expected to see the concentrated amounts of plastics observed at the normal creek shoreline if all releases of plastic had ended prior to August 26th, 2017. The storm would have only left a small amount of diffused pellets and powder along the shoreline that would not have been as easy observe as what I witnessed." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 26)**

413. Dr. Conkle contends, " that the pellets or powder observed on 12/12/2017, 03/16/2018, 06/20/2018 and 06/22/2018 were released after waters from Hurricane Harvey receded." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 26)**

414. "In Lavaca Bay and Matagorda Bay, similar patterns of plastic redistribution [to those in Cox Creek] would have occurred," as a result of Hurricane Harvey. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 26)** "Sediment, with the bay's shallow average depth of 5-7 ft,35 would have been heavily disturbed and redistributed by the >100 mph winds and storm surge, followed by flood water inflows from upstream rivers and creeks that also brought with them sediment and debris. Sediment along the bay's shoreline would have also been reworked." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 26)**

415. "This energy intensive storm had the ability to transport plastics and particles already in the water column, those resting on the shoreline and also uncover and redistribute materials buried on the shoreline and in bay sediment. While it is impossible without research to know where these plastic pellets and powder were deposited [from the

Lavaca Bay system], a portion was likely deposited across a range of land elevations on the shoreline ..., some flushed out of the bay and into the Gulf of Mexico as the storm surge receded and upstream flood waters flowed through the system and some may be been deposited in bay sediment and buried." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 26)**

416. After Hurricane Harvey, Horizon Environmental Services resumed clean-up efforts on Cox Creek on September 5, 2017. Between then and March 14, 2019 the clean-up crews have removed 64,320 bags of discharged plastics and debris from the Cox Creek ecosystem. **(Ex. 70 at FCP042037-042020, Ex. 72 at FCP063167-063171)**

417. After Hurricane Harvey, Plaintiffs have taken 646 samples of plastics at Cox Creek and Lavaca Bay. **(Ex 63)**

C. Plastic Powder and Pellets documented in Lavaca Bay and Cox Creek are from Formosa's Facility

1. Lavaca Bay

418. [redacted]

419. [redacted]

420. Likewise, a powerpoint presentation in the summer of 2017, likely for TCEQ, found that 60% of the pellets found in Lavaca Bay were from Formosa. **(Ex 482)**

421. Dr. Conkle concludes that "nearly all the plastic powders and pellets observed in Lavaca Bay was released directly into the Bay, potentially from [Formosa's] Outfall 001." **(Ex 33 at 10; *Trial Testimony , Dr. Conkle*)**

422. Dr. Conkle visited two Lavaca Bay shoreline sites on his March 2018 visit to look for discharged plastics. **(*Trial Testimony, Dr. Conkle;* Ex 33 Figures, at Fig. 2)** He selected those two locations because "if a large amount of material was making its way down and out of Cox Creek, some would accumulate in these areas." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 6)** He looked thoroughly on those locations, even searching behind berms and found no pellets or plastic powders. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 6)**

423. According to Formosa's marine science expert, Dr. Robert Hale, "under normal circumstances" the pellets found in Lavaca Bay have not come from Cox Creek. (**Ex 397,** Hale Depo. at 160:23) Dr. Hale contends that Hurricane Harvey may have carried some Cox Creek pellets into the marsh just south of the dam. (**Ex 397,** Hale Depo. at 160:1-7)

424. Formosa's marine science expert Dr. Robert Hale suggested to Formosa that they do sampling or testing at outfall 001 to determine if pellets are coming out of the outfall. (**Ex 397,** Hale Depo. at 54:13-15)

425. Formosa's marine scientist, Dr. Robert Hale agrees that the Cox Creek system is contained. (**Ex 397,** Hale Depo. at 122:16) "In that for anything to get out of the creek, it's got to go around or traverse that structure [the dam on the creek]." (**Ex 397,** Hale Depo. at 122:11-13)

426. Formosa's corporate representative of Formosa Texas, Matt Brogger, agrees that pellets from Formosa have found their way into Lavaca Bay. (**Ex 392,** Brogger Corp. Rep. Depo. at 18:11) He states the pellets could have come from Cox's Creek, if the water spilled over the dam at the southern end of the creek, from truck spillage or from Formosa's wastewater discharge "going into Lavaca Bay" [outfall 001]. (**Ex 392,** Brogger Depo. at 33:4-22)

2. Cox Creek

427. The plastic pellets and powder found in Cox Creek come from Formosa's stormwater outfalls into the creek. (**Ex 393,** Conkle Depo. at 21:23-22:4; ***Trial Testimony, Dr. Conkle;*** **Ex 33 at 10)**

428. Both marine science experts agree that grasses along the banks of Cox Creek will trap pellets. (**Ex 397,** Hale Depo. at 64:9)

429. The only other entity on Cox Creek that uses pellets is a company Inteplast. (**Ex 393,** Conkle Depo. at 22:11-18) Inteplast is approximately five miles upstream from Formosa. (**Ex 393,** Conkle Depo. at 22:13)

430. Although Formosa's expert Dr. Robert Hale states that pellets in Cox Creek could have been discharged by Inteplast, a company five miles upstream of Formosa Texas, he has no physical evidence that any of the pellets in Cox Creek come from Inteplast. (**Ex 397,** Hale Depo. at 65:5-18)

431. Dr. Hale also agrees that it is more likely that the pellets south of the SH-35 bridge come from Formosa than Inteplast. (**Ex 397,** Hale Depo. at 68:6)

432. Formosa's internal emails and sampling demonstrate that the pellets in Cox Creek and Lavaca Bay are from Formosa. In an email from Matt Brogger to Rick Crabtree, on March 23, 2016: "Matt Brittain ran the **pellet samples we collected from Cox Creek. Looks like there are pellets from every unit there**." (emphasis added) From Rick Crabtree, March 23, 2016: "Although we have no certainty on how the pellets got into the creek (outfall, upstream, storm, "planted" by others, etc.…), Matt is working with the lab to see if they can give a rough idea of the age of the pellets from the creek. Since the pellets are made in each of our PO units (see "ditch sample" attachment), **it is unlikely most occurred during one event** (unless planted there by others)." **(Ex 163**)

433. [redacted]

434. Formosa USA believes some recovered pellets are from other producers, but the company has no suggestion of what the other producers might be. **(Ex 390,** Bachynsky Depo. at 12:16-25)

435. Formosa USA is aware of no studies that have been undertaken to determine how pellets happen to have made their ways to Cox's Creek or to Lavaca Bay. **(Ex 390,** Bachynsky Depo. at 26:6-20)

436. Formosa Texas agrees that pellets from Formosa have found their way into Cox Creek. **(Ex 392,** Brogger Depo. at 18:8; *id.* at 23:18-20 ("if you are going to talk specifically about Cox's Creek, it [pellets] could get out from the stormwater outfalls.")

437. Formosa's engineering expert, Mr. Moleux, has no opinion about whether pellets found just downstream of Formosa's external stormwater outfall 006 are likely to be

coming from any other source other than Formosa, and he hasn't looked into and has no specific knowledge about potential other source of pellets near Cox Creek or Lavaca Bay. (**Ex 403,** Moleux Depo. at 75:8-76:7).

D. Formosa's discharges of plastics from January 31, 2016 and ongoing are in greater than "trace amounts"

438. Plaintiffs samples, photographs, and videos of plastics in both Cox Creek and Lavaca Bay document plastics of more than trace amounts, in similar or more quantities than TCEQ's documentation included in investigation reports. (***Trial Testimony, Phillips*; *see* Exs 73, 139, 174-177, 195, 254, 263-339, 356-57, 360, & 455-58)**

439. Dr. Jeremy Conkle concludes, "The large amount of plastic materials removed is proof that Formosa has released much more than "trace" amounts of plastic into the environment." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 23)** The plastics Dr. Conkle has seen on the shores of or in the waters of Cox Creek and Lavaca Bay have consistently been more than trace amounts in the seven site visits he has made, starting December 12, 2017, with the most recent visit February 12, 2019. **(*Trial Testimony, Dr. Conkle*)**

440. Photographs in Dr. Conkle's report show that more than trace amounts of plastics have been discharged on Cox Creek and Lavaca Bay from December 2017 through February 2019. **(*Trial Testimony, Dr. Conkle;* Ex 33, Figures 3-7, 10-11, 16-17, 20-23, 26) and Ex 34, Figure 1)**

441. Dr. Conkle also cites the quantities of pellets and powder collected by Horizon Environmental, the cleanup crew hired by Formosa, as evidence that more than trace amounts of plastics have been discharged. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 22-23)**

442. Dr. Conkle's expert opinions are based on reliable evidence and are credible.

443. Engineer Dr. Aiza Jose-Sanchez concludes, "it is my professional opinion that, during the Pre-Controls Phase (prior to July 2017), Formosa's design and operation of its stormwater management system has allowed the discharge of stormwater contaminated with pellets and powders above trace amounts, and that these releases have been extensive, historical and repetitive." **(*Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002813, 14)** Dr. Jose-Sanchez, having reviewed Table 1, which lists Defendants stormwater and source control concludes, "It is my professional opinion that powders discharges are likely to continue despite the controls provided to date by Formosa. Additionally, the proposed controls will like decrease but not eliminate the discharges of pellets below trace amounts and the releases will continue to be repetitive. The later opinion is based on the dependency of such controls on intense manual and visual operation as explained below and the potential inadequate conveyance capacity of Formosa's stormwater network." **(*Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002825)**

444. Dr. Jose-Sanchez also concludes that for Formosa's treated wastewater system, "it is my opinion that there have been and are still pellets and/or plastic materials discharges above trace amounts through Outfall 001." **(*Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at 71403-002836-37**).

445. Dr. Jose-Sanchez's expert opinions are based on reliable evidence and are credible.

446. Having reviewed photographs of plastics found in Cox Creek and Lavaca Bay, Plaintiffs' Regulatory expert, Ms. Phillips concluded, "a confident determination that these deposits were not the result of a trace amounts of pellets discharged." **(*Trial Testimony, Phillips;* Ex 39 at 7)**

447. Ms. Phillips' expert opinions are based on reliable evidence and are credible.

448. When shown a video taken by Plaintiff Diane Wilson of pellets in Cox Creek on December 2, 2018, Defendants' marine biologist Dr. Robert Hale admitted, "I would say that is more than a trace amount," assuming that if the definition of trace amounts is what is in the receiving water. (**Ex 397,** Hale Depo. at 216:5)

E. Formosa's experts and corporate representatives' opinions that Formosa has *never* discharged plastics in more than trace amounts are not credible

1. Peter Moleux, Formosa's Engineering Expert

449. Formosa's engineering expert Peter Moleux's expertise is "due diligence involving equipment, chemistry and operations." (**Ex 403,** Moleux Depo. at 27:17-18)

450. Mr. Moleux is not qualified to give opinions about Formosa's stormwater system, and it is not within the scope of his testimony. He did not offer an opinion regarding whether Formosa is using "best management practices for stormwater because, I have no opinion on stormwater, the conveyance system or anything else. I didn't address it. … I don't have expertise in designing stormwater collection systems." (**Ex 403,** Moleux Depo at 157:21-25) He went on later to say that he has not been asked to give opinions about the stormwater system, but will opine about "[j]just the removal and recovery of pellets through best management," and when asked if that relates to the stormwater outfalls, he responded, "No." (**Ex 403,** Moleux Depo. at 156:17-18; and 156:21)

451. Mr. Moleux's opinion is that if Formosa complies with "best management practices" then they will be in compliance with their permit. **(Ex 403,** Moleux Depo. at 41:7-23; 89:4-7). He defined best management practices as "common sense initiatives to try to keep pellets in their proper location" and based on the TCEQ definition of the phrase

in its Multi-Sector General Stormwater Permit. *Id.* at 63:16-64:7. When asked if the permit at issue in this case for Formosa's stormwater and wastewater and discharges of plastics was from the TPDES Multi-Sector General Stormwater Permit, he said "yes." *Id.* 62:22-63:15. (This is incorrect - in fact, the permit at issue in this case is an *individual* TPDES permit, which includes permit terms prohibiting the discharge of floating solids in other than trace amounts, and does not rely on the term "best management practices" **(*See* Ex 2)**).

452. Mr. Moleux believes Formosa is in compliance with its permit related to the discharge of floating solids, but he gave inconsistent answers as to the basis for this opinion, and then agreed that in his opinion "**There is no scenario under which Formosa can be out of compliance with their permit term for the discharge of floating solids.**" **(Ex 403,** Moleux Depo. at 88:19-89:3.) (emphasis added) He at one point stated that the basis for his opinion is "whether TCEQ has identified violations or not" from Formosa's facility. *Id.* at 83:16-19. Another time he agreed his opinion is "based on the operations and the changes they've made to their operations, not based on any analysis of the number or amount of pellets or plastics that have left the facility" because as he explained, "there are no analysis of the number of pellets that I have been informed about. So there is no analysis to compare it to." *Id.* at 85:16-22.

453. Mr. Moleux's basis for his opinion that Formosa's "source reduction and pellet recovery" efforts are working is that "there haven't been massive amounts of pellets lately that have been discharged." But when asked how he knows… he admits he has not reviewed vacuum truck logs. (*Id.* at 176:5-8) On his visit to Formosa, Mr. Moleux did not go to Lavaca Bay or Cox Creek nor did he review any of Plaintiffs' or Defendants'

photographic evidence of plastics found in the receiving waters or documents related to the cleanup of plastics on Cox Creek (**Ex 403,** Moleux Depo. at 54:21; 55:1-2; 59:13-16; 190:17-20), and thus he cannot evaluate whether Formosa's controls to prevent the discharge of plastics are working. Agrees Dr. Jose has "reviewed more information about plastics that have been found in Cox Creek and Lavaca Bay" than he has and "Basically, I don't know about what has been released and from where." *Id. at* 192:23-193:24 Ultimately he agrees, he's "really just giving an opinion about source control in this case" *Id.* at 191:3-6.

454. Dr. Moleux's opinions don't apply to prior to July 2018 because he "didn't study anything about the pre-controls phase. So I don't know really what happened then" (**Ex 403,** Moleux Depo at 195:12-16) (pre-controls is defined in Dr. Jose-Sanchez' report as prior to July 2017, *see* **Ex 35 at 71403-002813**).

455. Dr. Moleux met with John Hyak and outfall gate operators on his site visit but didn't discuss with them whether they had seen pellets or powder in the stormwater ditches because he was focused on the "written procedures." (**Ex 403,** Moleux Depo at 205:23-206:18)

456. Based on the findings above, Mr. Moleux's testimony that Formosa is in compliance with its permit term for the discharge of floating solids and that it is using best management practices is not credible.

2. Formosa's compliance with its plastic discharge limits cannot be credibly evaluated without viewing the receiving waters near Formosa's facility

457. Formosa's Water Utility Manager John Hyak has not been outside any of the Formosa's stormwater outfalls on the Cox Creek side, except to look for pellets at the SH 35 boat ramp. (**Ex 398,** Hyak Depo. at 197:19, 23)

458. On his visit to Formosa, Formosa's marine scientist expert Dr. Robert Hale was driven on a boat tour but was not taken to see Cox Creek or the shoreline near Formosa's Cox Creek outfalls. (**Ex 397; Ex 469**)

459. Formosa offered the testimony of Mr. Ricky Anderson, a past TCEQ employee with a work history similar to Ms. Phillips's history (except, her geographic area had more large petrochemical facilities). (**Ex 388,** Anderson Depo. at 12:18-13:1)

460. Mr. Anderson did not know, at the time of his Formosa site visit, that Cox's Creek had been cleaned by Formosa's contractor each of the preceding four days. (**Ex 388,** Anderson Depo. at 30: 6-14)

461. Mr. Anderson visited only one area of the creek, the area on the southwest of the creek at the SH 35 crossing. (**Ex 388,** Anderson Depo. at 34:5-7, 37:10-19)

3. Formosa's definition of trace is baseless and unworkable

462. Formosa Texas Corporate representative Matt Brogger stated Formosa's definition of trace amounts uses mercury concentration levels in Formosa's TPDES permit to extrapolate to the definition of trace. (**Ex 137**) Under Formosa' theory, each day Formosa could discharge 9,626 pellets from outfall 006; 7,512 pellets from outfall 008; 10,922 pellets from outfall 009 (**Ex 137**)

463. Using Formosa's definition, Formosa Texas' plant manager Rick Crabtree argues that more than 10,000 pellets at an external outfall, about half a sandwich bag of pellets, is more than a trace amount. (**Ex 395,** Crabtree Depo. at 101:6-23) He admitted that he would not know what 10,000 pellets looks like in an uncontained surface. (**Ex 395,** Crabtree Depo. at 102:13-14) He admits that you should be able to see the pellets "to some degree" in a rain. (**Ex 395,** Crabtree Depo. at 104:13-15) He "doesn't know" if anyone is actually counting pellets during a rainfall event, but says that the head of the water department John Hyak says his workers are "estimating and counting" the pellets. (**Ex 395,** Crabtree Depo. at 106:1-10) Mr. Crabtree doesn't know if any document estimate pellet possibly counted at outfalls. (**Ex 395,** Crabtree Depo. at 106:14)

464. Formosa Texas' corporate position is that no more than trace amounts of pellets have been discharged from its stormwater outfalls because the status sheets kept by employees at the outfalls do not state that more than trace amounts of pellets were at the outfall gates. (**Ex 392,** Brogger Depo. at 135:4-13)

465. Formosa Texas' plant manager Rick Crabtree contends that Formosa's discharges are less than trace "because we have capture and recovery systems in place that reduce the -- or limit the release of … Reduce the floating debris to less than trace amount." (**Ex 395,** Crabtree Depo. at 63:9-15)

466. Mr. Hyak, the head of Formosa's water department, states to the contrary. Mr. Hyak admitted that you would not be able to count pellets in the discharge flow using the flow rate of 93,750 gallons per minute (gmp). (**Ex 398,** Hyak Depo. at 78:24) The flow rate of 93,750 gallons per minute as a flow rate (based on a report of outfall 008 having a flow rate of 135 million gallons per day) (**Ex 398,** Hyak Depo. at 76:88-78:13) is an

example found in one of the Formosa Texas' DMR reports, where Formosa estimates the daily average and daily maximum flow rate of water (**Ex 398,** Hyak Depo. at 67:8-11)

467. Mr. Hyak admitted that someone could not count pellets in the discharge flowing using half the flow rate of 46,875 gpm (half the flow rate of 93,750 gpm). (**Ex 398,** Hyak Depo. at 79:1)

468. Mr. Hyak has not trained his operators to count pellets as the water is being discharged. (**Ex 398,** Hyak Depo. at 79: 9-11)

469. Regarding pellets and plastics discharged at outfall 001, Mr. Crabtree states, "I don't know if there is a good method to county them if they passed all the controls." (**Ex 395,** Crabtree Depo. at 108:15-16)

470. Formosa's own retained engineering expert, Mr. Moleux, does not agree with Formosa Texas's Corporate Representative's position on quantifying the definition of trace amounts of floating plastics based on the permit limit for mercury, because the permit term can't be quantified and it is impractical to count pellets. (**Ex 403,** Moleux Depo. at 76:23-77:25, 78:22-80:10, 80:15-81:5 ("Who's going to sit there and count the pellets?"))

471. Dr. Conkle reviewed Formosa's proposed proposed definition of what would be a trace amount of pellets per outfall, which was an extrapolation of their limits of mercury per volume. **(Ex 137**) Dr. Conkle then determined how many days it would have taken Formosa discharging at that self-proposed "trace" rate to discharge the amount of pellets cleaned up by Horizon Environmental. For Cox Creek, Formosa would have had to discharge pellets *every day* for 251-2507 *years* at Formosa's self-defined trace rate to discharge just the amount of pellets Horizon has cleaned from Cox Creek. (***Trial Testimony, Dr. Conkle;* Ex 93 at 3**) (The number of years varies so dramatically

depending on the percentage of pellets in a bag, as explained in Dr. Conkle's report.) For Lavaca Bay, Formosa would have had to discharge pellets every day for 2,761 or 27,610 *years* at Formosa's self-defined trace rate to discharge just the amount of pellets Horizon has cleaned from Lavaca Bay. (***Trial Testimony, Dr. Conkle;* Ex 93 at 3**)

472. Dr. Conkle additionally explains how Formosa's proposed definition of trace would apply to outfall 001: "I would also note that even if mercury limits were used as the comparison for pellet discharge, there is also a single grab measurement of 0.01 mg L^{-1} for mercury in Formosa's permit. Based on the mass of a single pellet based on Formosa's statement that there 22,000 pellets lb^{-1}, 0.01 mg L^{-1} would equate to 0.0005 pellets or 5 ten thousandths of a pellet, meaning that if any grab sample were taken that contained even a tiny fraction of a pellet, it would exceed their self-proposed value based on mercury in their permit." (***Trial Testimony, Dr. Conkle;* Ex 93 at 3, 4**)

473. Mr. Anderson acknowledged that a "trace" of mercury might be 1/1000th of 0.03 mg/L. **(Ex 388,** Anderson Depo. at p. 41, l:18 through p. 42, l:2)

474. Mr. Anderson had reviewed some of the pellet photos collected by the Plaintiffs, but he had no opinion as to whether they show more or less than a "trace" of pellets. **Ex 388**, Anderson Depo. at p.45, l: 4-17)

475. Formosa USA has considered a theory that, if it retains 99.99999% or 9.999999% of all pellets it produces, only a "trace amount" of pellets escape. However, Formosa USA has no data that any particular percentage of its produced pellets are accounted for. **(Ex 390,** Bachynsky Depo. at 36:1-15)

F. Total Number of Discharge Violations since January 31, 2016

1. Lavaca Bay

476. **Option 1**: Based on the evidence above, Plaintiffs have demonstrated that Formosa has been in violation of its TPDES permit provision "no discharge of floating solids in other than trace amounts" for Outfall 001 daily (continuously) since January 31, 2016 to present. As of March 24, 2019 (the day before trial in this case), that equals **1,149 days of violations for discharges to Lavaca Bay through Outfall 001.**

477. **Option 2**: Alternatively, Plaintiffs have demonstrated that Formosa has been in violation of its TPDES permit provision "no discharge of floating solids in other than trace amounts" for Outfall 001 each day since January 31, 2016 that Plaintiffs have presented as evidence either a sample, photo, video, and/or cleanup document showing plastics in other than trace amounts in Lavaca Bay, which equals **736 days of violations as of March 14, 2019**. Plaintiffs have produced a chart compiling all of this evidence by date, marked as **Plaintiffs' Exhibit 472**, which reliably shows the dates of each of these 736 days of violations. **(See Ex 63, 254, 263-295, & 472)**

2. Cox Creek

478. **Option 1**: Based on the evidence above, Plaintiffs have demonstrated that Formosa has been in violation of its TPDES permit provision "no discharge of floating solids in other than trace amounts" for is stormwater outfalls discharging to Cox Creek daily (continuously) since January 31, 2016 to present. As of March 24, 2019 (the day before trial in this case), that equals **1,149 days of violations for discharges to Cox Creek through Outfalls 003, 004, 005, 006, 007, 008, 009, 012.**

479. **Option 2**: Alternatively, Plaintiffs have demonstrated that Formosa has been in violation of its TPDES permit provision "no discharge of floating solids in other than trace amounts" for its stormwater outfalls to Cox Creek each day since January 31, 2016 that Plaintiffs have presented as evidence either a sample, photo, video, and/or cleanup document showing plastics in other than trace amounts in Cox Creek, which equals **613 days of violations as of March 10, 2019**. Plaintiffs have produced a chart compiling all of this evidence by date, marked as **Plaintiffs' Exhibit 470**, which reliably shows the dates of each of these 613 days of violations. **(See Ex 63, 254, 296-339, 470 & 471)**

480. **Option 3**: Alternatively, Plaintiffs have demonstrated that Formosa has been in violation of its TPDES permit provision "no discharge of floating solids in other than trace amounts" for its stormwater outfalls to Cox Creek each day since January 31, 2016 that Plaintiffs have presented as evidence that Formosa had at least one external outfall gate open followed by either a sample, photo, or video showing plastics in other than trace amounts in Cox Creek, which equals **316 days of violations as of March 10, 2019**. Plaintiffs have produced a chart compiling all of this evidence by date, marked as **Plaintiffs' Exhibit 471**, which reliably shows the dates of each of these 316 days of violations. **(See Ex 13, 14, 17-19, 21-23, 63, 85, 86, 254, 296-339, 417, 470, & 471)**

IX. Formosa's Failure to Report Violations of the Clean Water Act since January 2016

A. Importance of Reporting Violations & Formosa's duty to report

481. Donna Phillips worked with others at TCEQ developing the agency policy on reporting problems with a system. **(*Trial Testimony, Phillips;* Ex 39 at 3)**

482. Ms. Phillips explains, "Noncompliance reporting by regulated entities is an important element of the regulatory process." **(*Trial Testimony, Phillips;* Ex 39 at 9)** According to Ms. Phillips, "self-reporting of violations indicates that the entity is diligent about compliance." **(*Trial Testimony, Phillips;* Ex 39 at 9)**

483. Ms. Phillips details the reasons that entities are required to report noncompliant discharges. Reporting of noncompliance allows regulatory entities to take "any steps needed to address potential impact." **(*Trial Testimony, Phillips;* Ex 39 at 9)** Reporting of violations also allows downstream entities to be informed. **(*Trial Testimony, Phillips;* Ex 39 at 9)** Finally, citizens have an interest in entities reporting their violations so they can make informed decisions about their activities. **(*Trial Testimony, Phillips;* Ex 39 at 10)**

484. The failure to report a noncompliant discharge is a separate violation than the noncompliant discharge itself. **(*Trial Testimony, Phillips;* Ex 39 at 10)**

485. TCEQ frequently cites permittees for failure to report a noncompliant discharge and cited Formosa for failure to report such a discharge in 2015. **(*Trial Testimony, Phillips;* Ex 39 at 10)**

486. This duty to report was emphasized during the permitting process for Formosa's TPDES permit, when one comment was made about Formosa's duty to report. **(*Trial Testimony, Phillips;* Ex 39 at 11)** TCEQ responded: "Formosa must notify the TCEQ within 24 hours of any noncompliance, including the discharge of polyethylene pellets." **(Ex 5 at 71403-000167)**

487. During the permitting process, Formosa Texas acknowledged its duty to report: "[i]n the event some polyethelyne pellets and PVC dust becomes entrained in storm water

runoff and is discharged into Lavaca Bay via one of the outfalls, then this would indisputably be a permit violation which must be reported to TCEQ within 24 hours." **(Ex 11 at 71403-001829)**

B. Number of Failure to Report Violations since January 31, 2016

488. Formosa has not reported any discharges of pellets to TCEQ as required by its permit. Formosa Texas admits, "that no such reports have been made to TCEQ or EPA because there have been no illegal discharges. More specifically, based on visual inspections of the water prior to gate opening, there has been no indication of floating debris." **(Ex 424, Interrogatory No. 20**)

489. Despite knowledge of continued discharges of pellets and powder into Lavaca Bay and Cox Creek (**See Sec. VI**), Formosa has never reported a single discharge of floating solids to TCEQ. **(Defendants' Original Answer to Plaintiffs' First Amended Complaint, Doc. No. 60 at 10, ¶60).**

490. The number of days of violations for failure to report are based on the dates of violations for discharges, ***see*** **Section XI.G. "Maximum Penalties"** ***infra***.

X. The Agreed Order with TCEQ did not resolve Formosa's violations, and was limited to six violations that Plaintiffs' case does not cover

491. On January 17, 2019, TCEQ signed an Agreed Order adjudicating violations of Formosa's permit. **(Ex 77 at 6)** The Order concludes that Formosa "failed to prevent the

discharge of solids in other than trace amounts" at three of its stormwater outfalls. **(Ex 77 at 2)**

492. The Agreed Order stated that pellets were discharged from outfall 006, 008 and 009 and "were observed floating in Cox Creek and embedded in the creek's sediment." **(Ex 77 at 2a)**

493. The TCEQ penalty calculation worksheet establishes the violations adjudicated by the Agreed Order, assessing a penalty for six violation events between April 4, 2017 to May 17, 2017. **(Ex 78 at 71403-011905; *Trial Testimony, Phillips*)** These six events are comprised of two events at each of three outfalls – 006, 008, and 009. **(Ex 78 at 71403-011905)**

494. Formosa Plastics Texas was fined $121,875 total, for both the violations of floating solids and a separate sampling violation, of which $112,500 was for the plastic pellet discharge violations. **(Ex 78 at 71403-011903-011905; *Trial Testimony, Phillips*)**

495. The Agreed Order recognized that Formosa implemented a "pellet recovery system" by July 31, 2017, including installing a cone filter, floating booms, wedge and gate screens, and gabions. **(Ex 77 at 3b)** The Agreed Order did not include a finding, however, that violations have ceased as a result of this pellet recovery system.

496. In fact, Formosa tried to get TCEQ to make a finding that the "pellet recovery system" implemented by Formosa minimized future discharges of solids, including pellets, "to only trace amounts in accordance with the TDPES permit." **(Ex 247)**

497. TCEQ ordered Formosa "on a semi-annual basis" to conduct a "comprehensive evaluation at the Facility, Cox Creek, and Lavaca Bay and remove and properly dispose of any discharged pellets found during the evaluation of Cox Creek or Lavaca Bay and any

pellet loss during the evaluation of the facility." (**Ex 77 at 3c)** Prior to the signing of the final order, however, Formosa had sought to be ordered to clean up pellets only "to the extent practicable" in Cox Creek, Lavaca Bay and its outfalls. **(Ex. 247)**

498. The only prospective corrective measures required are "evaluations" of the facility, Cox Creek, and Lavaca Bay 60 days after execution of the Order and on a semi-annual basis after. Formosa is then required to "remove and properly dispose of any discharged solids" and document their evaluations and clean-up**. (Ex 77 at 3)**

499. Additionally, the Order resolves "only the matters set forth by [the] Order. The Commission shall not be constrained in any way from requiring corrective actions or penalties for violations that are not raised here." **(Ex 77 at 2-3)**

500. Discharges from Outfalls 001, 002, 004, 005, 007, and 012 are not covered by the Agreed Order **(Ex 77 at 1; *Trial Testimony, Phillips*)**

501. Failure to report violations are also not covered by the Agreed Order. **(Ex 77 at 1-2; *Trial Testimony, Phillips*)**

XI. The Clean Water Act penalty factors support large penalties against Formosa

A. First Penalty Factor: Formosa's violations are serious and cause harm

1. Past and ongoing harm caused by discharged pellets & plastic powder

502. According to Dr. Jeremy Conkle, "The release of plastic pellets and powder from Formosa Plastic Texas (Formosa) into the Lavaca and Matagorda Bay system is likely to harm the ecosystem." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 9)**

503. Dr. Conkle explains, "If not physically removed most of these plastic pellets and powder will be retained with in the Lavaca/Matagorda Bay system due to its 237-day retention time. This material will accumulate on shorelines, beaches and in sediment, where due to plastics resistance to degradation,1 it will persist indefinitely (100s to 1000s of years) unless disturbed by humans, hurricanes or flooding." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 10)**

504. Dr. Conkle continues, "The plastic released into Cox Creek and Lavaca Bay is not just a physical nuisance, it is also problematic for biota. A portion of this plastic will be consumed by organisms within the bay, including fish, turtles, shrimp, oysters, crabs and birds during their various life stages." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 10)**

505. Dr. Robert Hale describes Lavaca Bay as "stressed" with mercury, turbidity, erosion, wastewater, and plastic debris. (**Ex 397,** Hale Depo. at 76:8-21)

506. One article by Dr. Hale explains, "Microplastics have been reported in over 100 species of wildlife across all trophic levels including in shellfish and fish sold for human consumption." (**Ex 397**, Hale Depo. at 80:20-81:1) Formosa's pellets are a microplastic. (**Ex 397,** Hale Depo. at 24:3) Dr. Hale continued, "the inertia of plastic production is so large that we have to express concern about what might be affecting organisms." (**Ex 397,** Hale Depo. at 75:14-16)

507. Dr. Hale agrees that there is no reason to not believe that pellets could be accumulating in species in Cox Creek and Lavaca Bay. (**Ex 397,** Hale Depo. at 81:13-14) He is "concerned" about species both in the creek and the bay eating microplastics. (**Ex 397,** Hale Depo. at 105:17)

508. Dr. Hale states, "Historically we've been concerned about filter feeders with very small plastics that fall into the lower range of that definition of microplastics." (**Ex 397,** Hale Depo. at 85:1-3) The local "filter feeders" "would be things like shellfish, oysters, things along that line," (**Ex 397,** Hale Depo. at 85:16-17), which might consume a plastic powder they came in contact with. (**Ex 397,** Hale Depo. at 85:22-23)

509. Dr. Hale has also written, "Both microplastics and chemicals in them can bioaccumulate in animals." (**Ex 397,** Hale Depo. at 86:3-5) Dr. Hale explained that bioaccumulate means "buildup above what we'd call ambient levels in the tissue of an organism." (**Ex 397,** Hale Depo. at 86:8-10)

510. Microplastics can also biomagnify in species, according to Dr. Hale, "where you've got one species eating another organism, that's where you can get more rapid accumulation." (**Ex 397,** Hale Depo. at 95:14-96:9)

511. When asked about pellets at the playground on Lavaca Bay, Dr. Hale responded, "I don't think it's necessarily a good ideas to have, you know, plastics of unknown origins, shall we say, in public beaches or in playgrounds." (**Ex 397,** Hale Depo. at 104:19-22)

512. According to Dr. Hale, some studies indicate microplastics could affect the immune systems of some species. (**Ex 397,** Hale Depo. at 118:22-23)

513. Dr. Hale agrees that academic studies of potential effects of microplastics are a good basis to discuss potential harm to species. (**Ex 397,** Hale Depo. at 121:23)

514. According to an article by Dr. Hale, "Microplastics pose greater risks due to their potential for ingestion by a wider suite of organisms." (**Ex 397,** Hale Depo. at 126:4-10) Dr. Hale explained the reason: "The smaller it [the plastic] is, the more organisms it will

basically fit into. So if you've got a large, you know, trunk of plastic, it's not going to to into a copepod." (**Ex 397,** Hale Depo. at 126:8-10)

515. Formosa's Porfirio Arguellez acknowledged, "the negative impact" of the discharged pellets at both Lavaca Bay and Cox Creek. He admitted that as for the pellets in the creek,it "doesn't look good." (**Ex 389**, Depo. Arguellez at 130:25-9)

516. Fisherman and shrimper Myron Spree has seen and videotaped a seagull plunging into water at outfall 001. He explained, "There was a lot of plastic material, a lot of stuff floating, at it was the break of day, it was still break of twilight, and a seagull come through there and picked up -- possibly picked up something in the water, but they don't dive unless they are going to pick up something, knowing the seagulls." (**Ex 408,** Spree Depo. at 87:17-23) Mr. Spree explained that there was "nothing else there in the water ... to attract them [the seagull]." (**Ex 408,** Spree Depo. at 86:25-87:1)

517. In another instance, just a few weeks before his November 27, 2018 deposition, Mr. Spree witnessed pelicans diving into the outflow stream of the 001 outfall, and at the time "there was all kinds of powder on the water." (**Ex 408,** Spree Depo. at 88:2-10)

518. Port Lavaca resident Richard Haight goes fishing "once in a while when he gets bored" because he likes to eat fish. (**Ex 396,** Haight Depo. at 21:12-15)

519. In July 2018. Mr. Haight was fishing at Magnolia Beach on Lavaca Bay. On that day he caught a 22" redfish (**Ex 396,** Haight Depo. at 33:6-15) and a 21" trout. (**Ex 396,** Haight Depo. at 35:23-25) The trout was "real poor." (**Ex 396,** Haight Depo. at 36:6)

520. Mr. Haight usually cleans his fish at the beach. (**Ex 396,** Haight Depo. at 36:15-18) That day he was running out of bait, so he opened up the guts of the fish. (**Ex 396,** Haight Depo. at 36:25-37:1) In the guts of the trout were little green pellets smaller than a

pencil eraser and white "sawdust like stuff." (**Ex 396,** Haight Depo. at 37:1-14) He took a water bottle to try to wash it to see what it was "and it was plastic." (**Ex 396,** Haight Depo. at 37:16-20) He found four of five pellets and dropped a couple on the ground. (**Ex 396,** Haight Depo. at 64:16-19) The "sawdust stuff was plastic too. It was a bunch of that. I guess they're eating it…," Mr. Haight explained. (**Ex 396,** Haight Depo. at 38:5-7)

521. Mr. Haight threw the trout with pellets and plastic flakes in its gut away. "I didn't want it because it was poor." (**Ex 396,** Haight Depo. at 38:10-11)

522. Dr. Conkle also reports reviewing an affidavit of a fisherman Mike Miller, who reported seeing pellets in the stomach of redfish he caught on two different occasions. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 27)**

2. Both experts agree that pellets & plastic powder will transport other contaminants, including mercury

523. Mercury can sorb onto the surface of pellets, and that sorbed mercury "would be fairly highly bioavailable" to a species that consumes the pellet. (**Ex 397,** Hale Depo. at 92:23 and 93:4-5)

524. Pellets are a supplemental mechanism by which mercury in Lavaca Bay can be transported in the bay. (**Ex 397,** Hale Depo. at 96:19-97:6) Mercury can also sorb to plastic powders. (**Ex 397,** Hale Depo. at 97:12)

525. In October 2018, Dr. Conkle took samples of plastics from Lavaca Bay and Cox Creek to work with Dr. Jessica Dutton of Texas State University to test whether mercury was present on the plastics and powder sampled. **(*Trial Testimony, Dr. Conkle;* Ex 34 at 3 and Fig. 2)** All plastics tested positive for mercury, with a yellowed pellets found south

of the causeway being an order of magnitude higher in concentration of mercury concentration. **(*Trial Testimony, Dr. Conkle;* Ex 34 at 3-4 and Table 2)** The mercury concentrations ranged from 0.0027 mg/kg at Cox Creek adjacent to outfall 006) to 0.133 mg/kg at the RV park just south of the causeway. **(*Trial Testimony, Dr. Conkle;* Ex 34 at Table 2)**

526. Dr. Conkle compared the concentrations of mercury he found with 7.5 mg/ke concentration allowed for mercury in children's toys by the European Commission. **(*Trial Testimony, Dr. Conkle;* Ex 34 at 4)**

527. Of the chemicals in Formosa's wastewater, the following can sorb onto Formosa's pellets or plastic powder: chromium, copper, lead, mercury, oil and grease, zinc, benzene, hexavalent chromium, and 2-, 3-, 7-, 8- dioxin. (**Ex 397,** Hale Depo. at 109:19-111:22)

528. Defendants' marine scientist expert Dr. Robert Hale has explained how mercury or other contaminant on the pellets can bioaccumulate in aquatic organisms and can also biomagnify (the concentration increases more rapidly in a species that eats another species with the contaminant). (**Ex 397,** Hale Depo. at 86:3-5, 8-10; 95:14-96:9)

529. [redacted]

B. Second Penalty Factor: Formosa gained an economic benefit by failing to make systemic improvements sufficient to prevent its violations

1. Without making necessary changes Formosa unfairly profited in comparison with competitors who complied with the CWA

530. [redacted]

531. [redacted]

532. There is a problem at the Formosa plant with plastic pellets and powders passing through the central wastewater treatment plant; this problem could be rectified by adding a pretreatment stage, like a rotating Andritz milliscreen, for flows to the wastewater treatment plant. The cost of such a pretreatment stage would be roughly **$216,000** (2019). (***Trial Testimony, Dr. Jose-Sanchez;* Ex 35 at p.71403-002848**)

533. [redacted]

2. ***Formosa should have made systemic changes in at least 2000, but never designed a facility or operated its plant to prevent plastic discharges***

534. Since at least 2000, Formosa should have knows about its problems with the discharge of pellets and powder from its outfalls into Lavaca Bay and Cox Creek. Its own internal emails mention long term problems with pellets. ***See*** **Section IV(A) above.**

535. Formosa's former employee Dale Jurasek notified management of discharged pellets into Lavaca Bay and Cox Creek in May and June of 2000. (**Ex 83,** ***Trial Testimony, D. Jurasek*****)** Formosa' former employee Paul Mayers met with Formosa managers S.E. Chang, Bobby Marquez, David Henderson and one or two engineers to discuss the problem of pellets getting into the ditches in 2001. (***Trial Testimony, Myers***; **Ex 404,** Myers Depo. at 33:12-20.)

536. Formosa's water quality monitoring expert Lisa Vitale took samples of pellets at the 001 outfall in 2004, 2005, 2010 and at least five or six other times, which Formosa

tested in 2004 and 2005 and each time determined to be their pellets. (**Ex 411,** Vitale Depo. at 27: 17-23) **(Ex 66 at FCP04624)**

537. In 2010, EPA took extensive photos of pellets and powder at Formosa's facility and discharged from the plant. **(Ex 7 at 71403-000354)** The 2010 report noted that in 2004 EPA had made "a similar observation" during its February 2-14, 2004 investigation at Formosa Texas. **(Ex 7 at 71403-000377, 000399, and 000400)**

538. Formosa's Mike Rivet noted in 2012: "Pellets in the ditches are a concern that was recently noted by EPA and TCEQ as part of their inspections." (**Ex 107 at FCP0384330**)

3. Compared to competitors who complied with the CWA, Formosa benefitted by $43.9 million by not designing a system to prevent the discharge of pellets.

539. When a company delays or avoids undertaking measures that would prevent noncompliance with environmental-protection requirements, the company may realize an economic benefit. Expenditures may be avoided, altogether, and, if expenditures are merely delayed, the company gains the time value of money (i.e., money not spent on environmental compliance is available immediately and without borrowing costs for other financially productive activities) and may gain from reduced costs of compliance as time moves on. Business opportunities that have been interrupted to come into compliance are not interrupted during the delay or avoidance period. (***Trial Testimony, Shefftz;*** **Ex 40 at 71403-008206 and 008207).**

540. The economic benefit to the company that delays undertaking measures that would prevent noncompliance with environmental-protection requirements, so, the economic benefit to the violator, should be an element of calculating civil penalties assessed against

the violator. Further, the economic benefit figure should represent the amount of money that would make the violator indifferent between compliance vs. noncompliance. To do this, the contribution to the civil penalty that derives from the economic benefit to the violator should be adjusted to account for the probability of detection and prosecution of the violation, i.e., as the probability of detection and prosecution declines, the economic benefit contribution to the calculation of the civil penalty for a detected and prosecuted violation should rise. Otherwise, incomplete detection and prosecution lead the violator to under-cost the risk of a violation. (***Trial Testimony, Sheffz;*** **Ex 40 at 71403-008206 and 008207)**.

541. If one assumes, contrary to fact, a 100% probability of detection and prosecution of all violations, then, standard financial cash flow and net present value analysis techniques of the types used to compare alternative investment opportunities should be used to determine the economic benefit realized (or not) by the violator because of the violator's delayed undertaking of measures to meet its environmental-protection duties. This is basically what E.P.A.'s BEN model does, for example. One calculates the "on-time" costs (the costs as they would have been, had they been incurred at the earlier time they should have been incurred) and the "delay" costs (the costs as they actually were or will be incurred) and compares the two, after adjusting them for the time value of money (itself, a function of the weighted average cost to a particular company of capital), inflation and differences in available tax deductions. (***Trial Testimony, Sheffz;*** **Ex 40 at 71403-008209 and 008210).**

542. For this case, the economists for the Plaintiffs and Defendants are largely in agreement on the methodology and variables, save for three variables, used to derive the

economic benefit from delayed compliance, if one posits 100% probability of detection and prosecution of all violations. The three variables as to which there is disagreement are (1) on-time compliance date, (2) delayed compliance date and (3) cost of compliance. (**Ex. 384 paras. 11 and 12 and Ex. 385 paras. 11 and 12)**

543. If, as in the Formosa case, there comes a time when the violator undertakes to reverse the environmental damage caused by the violation, the violator will incur costs, e.g., cleanup costs, that would not have been incurred, but for the violations. When this happens, the economic benefit of the violations is whittled way by the costs that would have been forgone, had the violations not occurred. These forgone costs can be reduced to net present value, as were the benefits, and subtracted from the benefits. (***Trial Testimony, Shefftz;* Ex 40 at p. 71403-008218**)

544. The evidence in this case supports a finding that Formosa was apprised of the need upgrade its stormwater conveyance and treatment systems at least as early as June of 2010 and of the need to upgrade its wastewater treatment plant and institute source reduction efforts at least as early as January of 2004. Had Formosa acted in a timely fashion on this information, the economic benefit it realized, prior to incurring forgone costs for cleanup, from non-compliance would have been $17,607,572. (***Trial Testimony, Shefftz;* Ex. 179 at p. 71403-012354)** After reducing this benefit by the present value of cleanup costs, i.e., $2,834,234, the net benefit to Formosa would have been $14,773,293. (***Trial Testimony, Shefftz;* Ex. 179 at p. 71403-012354**)

545. The evidence also supports a second scenario in which Formosa was apprised of the need upgrade its stormwater conveyance and treatment systems and to upgrade its wastewater treatment plant and institute source reduction efforts at least as early as January

of 2000. In that scenario, the economic benefit realized by Formosa because of its non-compliance, again before considering cleanup costs, would be $46,764,001. With the reduction for cleanup costs, the net benefit to Formosa would have been $43,929,767. (***Trial Testimony, Shefftz;*** **Ex. 179 at p. 71403-012354)**

546. Additional costs of compliance, if any, identified after the date of Mr. Shefftz's latest expert report supplement, i.e., after February 2019, would add roughly $993,842/$1 million of cost to the net economic benefit realize by Formosa because of its violations, under the scenario in which the need to act on some improvements became clear in 2004 and on others became clear in 2010. (***Trial Testimony, Shefftz;*** **Ex. 179 at p. 71403-012346**)

547. Additional costs of compliance, if any, identified after the date of Mr. Shefftz's latest expert report supplement, i.e., after February 2019, would add roughly $1,871,010/$1 million of cost to the net economic benefit realize by Formosa because of its violations, under the scenario in which the need to act on all improvements became clear in 2000. (***Trial Testimony, Jonathan Shefftz;*** **Ex. 179 at p. 71403-012351**)

C. Third Penalty Factor: Formosa's history of Clean Water Act violations

548. On July 20, 2011, TCEQ entered an agreed Clean Water Act enforcement order against Formosa Texas for (1) excessive phenol discharge to Lavaca Bay from Outfall 001, (2) excessive phenol discharge from internal Outfall 101, and (3) discharge to Cox's Creek of untreated process wastewater via Outfalls 006 and 007. An administrative penalty of $68,600 was assessed, though parts of this were forgiven in exchange for Formposa's compliance with the enforcement order and completion an environmentally-beneficial project for National Audubon Society. **(Ex 343)**

549. Additionally, the Agreed Order adjudicating violations of Formosa's permitconcludes that Formosa "failed to prevent the discharge of solids in other than trace amounts" at three of its stormwater outfalls. **(Ex 77 at 2)**

D. Fourth Penalty Factor: Formosa has not made good faith efforts to comply with this long-standing problem

1. Formosa's disregard and almost contempt for addressing violations, until the eve of trial

550. The disregard of Formosa Texas for the discharge of plastics issue is evident by an absence of meaningful action to fix the problem. Since Formosa was informed of plastics being discharged into Lavaca Bay in 2000, it has never reported the issue to TCEQ. (***See* Section IX above**)

551. Until Waterkeepers began sampling in 2016, Formosa largely ignored its discharge problem. In 2016, Formosa began internal audits to determine the extent of pellets falling to the ground. Yet the changes that Formosa has made have not been systemic enough to stop the discharges from occurring. (**See, e.g., Ex 260; and Testimony Jose-Sanchez)**

552. For this lawsuit, Formosa Texas gathered pellets in an unrepresentative way to determine if the pellets on the shores of Lavaca Bay belonged to the company. Formosa's own scientist admits those tests are not conclusive. (**Ex 481,** Lee Depo. at 32:16)

553. Regardless, in in the summer of 2017, Formosa concluded that l 60% of the pellets found in Lavaca Bay were from Formosa. **(Ex 482)**

554. In Formosa Texas' 2004 and 2005 studies (not produced to Plaintiffs but mentioned in emails by Formosa's contractor Lisa Vitale) Formosa tested pellets brought to it by Ms. Vitale and determined the pellets came from its plant. (**Ex 65**) [redacted]

555. During the public comment period and in response to a requested case hearing, Formosa affirmatively asserted it understood the meaning of its permit terms. Formosa has not contested findings of violation by TCEQ, but continues to assert in this litigation they have never discharged plastic pellets in powder in other than trace amounts. Moreover, only during this litigation have they asserted their permit term is ambiguous and should have any meaning other than its plain meaning. It further asserted it knew it needed to report any discharges of floating solids, including plastic pellets and powder. Yet on the few times its agents have looked outside the facility property lines, they have failed to report the pellets and powder in excess of trace amounts at the facility. **(*See e.g.* Section VIII(C)(4) above; *See also* Sections (III)(C)-(D), VI(E), VII(D)(1) above)**

556. Formosa's Agreed Order entered into with TCEQ was a cynical effort to try to moot out Plaintiffs' litigation instead of an attempt to stop the discharge of pellets. As it was negotiating an order with TCEQ (including a "pellet recovery system" purportedly implemented as of July 31, 2017 that included a cone filter, floating booms, wedge and gate screens, and gabions, (**Ex 77 at 71403-011542**), internally engineers and water quality specialists were emailing about the flaws of the existing system and the need for more expansive controls, such as more source control the holding pond like is used in the South Pond project. **(See Section VII(A)(2) above)**

E. Fifth Penalty Factor: Large penalties are needed to have an economic impact on Formosa

557. According to the 2016-2017 consolidated financial statement for Formosa Plastics Corp (Taiwan), the after-tax net income of Formosa Plastics USA, in 2017 was roughly $936 million. (*See* https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKEwi0k9vugIfhAhUEbK0KHf3KBxYQFjABegQICBAC&url=http%3A%2F%2Fwww.fpc.com.tw%2Ffpcwuploads%2Ffiles%2F2017%2520Financial%2520Statement-Consolidated-EN.pdf&usg=AOvVaw3opsk8JbFA1ds-NT4p5NPe (visited March 16, 2019). The December 31, 2017, exchange rate for NTDs was 29.6460 to 1.0 USD. (https://www.fiscal.treasury.gov/files/reports-statements/treasury-reporting-rates-exchange/itin-12-31-17.pdf.)

558. [redacted]

559. [redacted]

560. In 2009, the United States sued in the Southern District of Texas Formosa Texas and two of its sister companies (one, adjoining the Formosa Texas facility, and one, in Louisiana) for violations of federal hazardous waste, clean air, clean water, and right-to-know laws. **(Ex. 183)** This action was resolved by consent decree in February 2010; that decree imposed various operational requirements on the defendants and assessed a collective civil penalty of $2.8 million (2010 dollars). **(Ex 184)**

561. The 2010 consent decree provided, among other stipulated penalties, stipulated penalties of $100/violation and $175/violation, depending the nature of the violation, for certain violations occurring in two post-consent-decree periods. The Texas defendants failed to comply in material respects with the terms of the consent decree, and the United States in March 2012 demanded an additional $1,447,925 civil penalty, which penalty the court imposed by consent decree amendment March 13, 2013. **(Ex 185, particularly, Exhibit H).**

562. Mr. Anderson acknowledged that TCEQ, in assessing administrative penalties against a permit violator, does not consider the economic impact of the penalty on the violator. (**Ex 388,** Anderson Depo. at 66:14-25)

563. [redacted]

F. Sixth Penalty Factor: "Other matters as justice may require"

564. Plaintiffs contend that Formosa's long-time failure to make system changes to halt its illegal discharge must be considered.

565. Formosa's bonus structure which incentivizes not reporting environmental issues should be a factor in the consideration of penalties.

566. Formosa's posture in the community, which provokes fear in community members in testifying against the company, should be considered. Instead of openly listening to community concerns, Formosa makes them fear that their testimony will lead to the firing of their relatives or friends. (***Trial Testimony Meyers, Rozner, Wilson, Hamrick***)

G. Maximum Penalties and Penalties awarded

567. Each of the following figures have had six violations removed from their total to account for the six violation events already covered in TCEQ's January 2019 Agreed Order.

568. Option 1: Option 1: for three continuous violations per day (one discharge violation to Cox Creek, one discharge violation to Lavaca Bay, and one violation for failure to report) the Court may award a maximum penalty of: (1,149 total violations - (6 violations from the Agreed Order x $53,484 per violation) = $184,246,848.

569. Option 2: Option 2: for a violation for each day Plaintiffs have a photo, sample, video or cleanup documentation showing an unlawful quantity of plastics in either Cox Creek or Lavaca Bay, and one violation for each date of any unreported violation(s): (2,085 total violations - (6 violations from the Agreed Order x $53,484 per violation) = $111,193,236.

570. Option 3: for a violation for each day Plaintiffs have a photo, sample, or video recording an unlawful quantity of plastics in either Lavaca Bay, or on Cox Creek following a stormwater outfall opening, and one violation for each date of any unreported violation(s): (1,788 total violations - (6 violations from the Agreed Order x $53,484 $53,484 per violation= $$95,308,488.

XII. Injunctive Relief Remedies

A. Need for ongoing, environmentally managed cleanup

571. No biological surveys have been done of Cox Creek according to Matt Brogger, Formosa's wastewater manager. **(Ex 392,** Brogger Depo. at 121:11)

572. In Dr. Conkle's July 2018 report he described "recently clear-cut vegetation from the banks of Cox Creek adjacent to Route 35." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 19)** Dr. Conkle described that the cleared area had been covered with mulch. **(*Trial Testimony, Dr. Conkle;* Ex 33 at 19)**

573. Dr. Conkle explained that the clearing method he observed, "does have implications for the stability of the bank and the fate and transport of plastic pellets and powder. First, diverse and abundant vegetation in riparian zones is vital to ecosystem health. While there are many benefits to healthy riparian zones, the two most relevant in this case are bank stabilization and water filtration." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 19 and Figures at Fig. 15a)**

574. Dr. Conkle explained the importance of diverse banks of Cox Creek: "Riparian zones are dynamic ecosystems that can change rapidly with pulses in streamflow. These changes are due to erosion that destabilizes the bank, potentially resulting in land

loss and sediment accumulation in the downstream water body. Healthy riparian zones mitigate these effects with vegetation. A diverse mixture of grasses and trees stabilizes soil and helps to keep it in place during these pulses. In this case, the loss of vegetation in this area could result in increased erosion and bank destabilization if the area is not properly colonized by vegetation before a significant pulse event. Additionally, with this clear-cut area being next to Route 35, its loss of vegetation, without sufficient soil stabilization efforts, could affect the stability of soil that supports the road and bridge." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 19-20)**

575. Dr. Conkle detailed the benefit of a vegetated banks of Cox Creek: "The second benefit of a vegetated riparian zone is water filtration, with particulate matter being the most relevant in this case. While vegetation removal will lead to soil and sediment loss, healthy vegetation will trap sediment and increase elevation. Vegetation prevents erosion because its physical structure is an impediment to free-flowing water. Therefore, creek banks covered in a mixture of soft-stemmed vegetation and trees will slow the movement of water." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 20)**

576. The consequences of clearing the land are significant in this case, according to Dr. Conkle: "The removal of vegetation on Cox Creek adjacent to Route 35 has several implications for the fate and transport of plastic pellets and powder. The existing plastic contamination on the creek bank, if not physically cleaned-up prior to these actions, would now be more likely to wash off of the bank and downstream due to the lack of vegetation. For future discharges of plastic contaminants in this area, proportionally less would be trapped along this section of Cox Creek. The reduced capacity of this area to trap plastic contamination would result in its transport and greater dispersal to downstream areas of

the Creek and evaporation lake. . . Additionally, for any plastic contamination that is currently trapped and buried in this creek bank, it would be more likely to be exposed and transported downstream if erosion occurs. " **(*Trial Testimony, Dr. Conkle;* Ex 33 at 20)**

577. On his February 12, 2019 visit, Dr. Conkle kayaked up Cox Creek, which "allowed [him] to see the system more thoroughly than from boat or shoreline access points as [he] had done in previous trips." **(Ex 93** at 4**)**

578. On his February 2019 trip, Dr. Conkle "observed plastic pellets continuously in the water, among floating vegetation and on the shoreline as we paddled upstream along the southern bank and back downstream on the northern bank (**Ex 93 at 4-5**)

579. In his July report, Dr. Conkle noted a clear cut area next to Cox Creek. He explained the importance of "a vegetated riparian zone" that filtrates the water as well as prevents erosion. "These clear-cutting efforts, with their potential environmental damage, are an example of why any efforts to cleanup plastic that has been released by Formosa should be supervised and carried out by a group independent of Formosa." **(*Trial Testimony, Dr. Conkle;* Ex 33 at 20)**

580. Dr. Conkle recommends that future clean up be supervised by someone who assesses the entire ecosystem: "Any future efforts, particularly for buried pellets, should be independently and carefully considered by someone with the qualifications to assess the entire effect on the ecosystem by weighing the costs and benefits of those proposed measures." (***Trial Testimony, Dr. Conkle;* Ex 93 at 5**)

581. On January 25, 2019, four crew members and a supervisor of Empire Field Services worked four hours "mowing/weed eating along the shoreline at the boat and also at the location just north of hwy 35." **(Ex 92 at FPC047396)** Empire Field Services indicated

that for this work they used "tools, weedeater, chainsaw, etc." **(Ex 92 at FPC047397)** As admitted by Mr. Brogger, no environmental surveys were done for this work.

582. The "mowing/weed eating" with "tools, weedeater, chainsaw" has harmed the boat ramp at the SH 35 bridge and limited the ability to use the ramp. **(*Trial Testimony Conkle, Wilson*)**

583. Plaintiffs sought documents from Formosa showing they had gotten permission or consulted with the Texas Department of Transportation before they undertook "mowing/weed eating" with "tools, weedeater, chainsaw" at the TxDOT boat ramp. No documents exist.**(Ex 92**)

584. Dr. Hale testified that if asked about how to do a proper cleanup, he would advise about how to limit erosion and habitat destruction. (**Ex 397,** Hale Depo. at 179:6)

585. Dr. Hale testified that he believes Formosa has a "social responsibility" to clean up any pellets or plastics they have discharged. (**Ex 397,** Hale Depo. at 172:8)

586. Likewise, Formosa's Porfirio Arguellez when asked if he would like to see the pellets cleaned up responded forthrightly, "I would like to be part of that, would like to clean up and make sure everything is cleaned up." (**Ex 389,** Arguellez Depo. at 130:18-22)

B. Changes needed at the facility to comply with permit terms

587. In order for Defendants to comply with their permit terms the following changes must be made at their facility:

a. capacity improvements to the stormwater system such that flooding does not occur in rainfall events that are at a minimum less than a 2-year event;

b. direction of all outside battery limits stormwater to a holding pond system with engineered controls to remove pellets and plastics and, if necessary, treatment of the stormwater before it is discharged into waters of the State of Texas;

c. improvements to the wastewater system, i.e., to the system that historically has discharged to Lavaca Bay via Outfall 001, that ensure that no more than a trace amount of pellets are discharged;

d. completion of source reduction initiatives along the lines of those being developed by Mr. Rivet and Mr. Patek at the pellet-production units;

588. Additionally, there needs to be ongoing cleanup of discharged plastics on Cox Creek and Lavaca Bay until such time that only a trace amount of plastics can be found discharged over a two-month period of time, as instructed by environmental consultants. The methods of this clean-up must be reviewed by an environmental consultant within one month of this order to determine best cleanup methods, with the goal being a cleanup that best protects the entire ecosystem (if the removal methods will cause long-term damage, or short-term significant damage, they should not be used.

589. Defendants must report to TCEQ every day that more than trace amounts of plastics are in Cox Creek or Lavaca Bay, unless Defendants can prove the plastics have come from another source, Defendants report the discharge to TCEQ.

XIII. Any other relief

590. If Plaintiffs prevail, they will request reimbursement of their costs and reasonable attorneys' fees. The parties have agreed this briefing will only be necessary if Plaintiffs prevail.

Respectfully submitted,

/s/ Amy Johnson

Amy Johnson
LAW OFFICES OF AMY R. JOHNSON
State Bar No. 10679550
5836 SE Madison St.
Portland, OR 97215
503-939-2996 Telephone
210-229-9328 Fax
amy@savagejohnson.com

Erin Gaines
State Bar No. 24093462
TEXAS RIOGRANDE LEGAL AID
4920 N-I35
Austin, TX 78751
512-374-2739 Telephone
512-447-3940 Fax
egaines@trla.org

Enrique Valdivia
State Bar No. 20429100
TEXAS RIOGRANDE LEGAL AID
1111 N Main Avenue
San Antonio, TX 78212
210-212-3700 Telephone
210-229-9328 Fax
Attorneys for Plaintiff S. Diane Wilson

David Frederick
State Bar No. 07412300
FREDERICK, PERALES, ALLMON & ROCKWELL, PC
1206 San Antonio
Austin, TX 78701
(512) 469-6000 Telephone
dof@lf-lawfirm.com

David T. Bright

State Bar No. 02991490
Federal Bar No. 8628
SICO HOELSCHER HARRIS, LLP
802 N. Carancahua, Suite 900
Corpus Christi, Texas 78401
(361) 653-3300 Telephone
(361) 653-3333 Fax
Attorneys for Plaintiff S. Diane Wilson and San Antonio Bay Estuarine Waterkeeper

CERTIFICATE OF SERVICE

I do hereby certify that a true and correct copy of the above and foregoing document has been forwarded to the following counsel of record, on this the 18th day of March, 2019.

J. Stephen Ravel SENT VIA EMAIL
Diane L. Nichols
Kelly Hart & Hallman, LLP
303 Colorado, Suite 2000
Austin, Texas 78701

_/s/ Amy Johnson_____
Amy Johnson