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.	)	

PLAINTIFFS' SECOND AMENDED PROPOSED FINDINGS OF FACT

Plaintiffs San Antonio Bay Estuarine Waterkeeper and Diane Wilson submit their Second Amended 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.

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PLAINTIFFS' PROPOSED FINDINGS OF FACT

After considering the evidence presented by the parties, the Court hereby finds the following facts to be supported by clear, credible, reliable, often uncontroverted testimony or documents and enters the following findings of fact. Most facts were presented through both documents and testimony. The Court finds the unobjected-to evidence of hundreds of unlawful discharges gathered through samples, videos and photographs by volunteers to be credible, reliable and compelling. 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. Procedural History and Evidentiary Findings

1. Plaintiffs sent a 60-day notice of intent to sue letter to Defendants, EPA, and TCEQ on April 6, 2017 for violations of the Clean Water Act. **(Ex. 16)**
2. 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)**
3. The Court bifurcated this trial. The Court heard the liability phase of the case from March 25 through March 28, 2019, in Victoria, Texas.
4. Plaintiffs' and Defendants' trial exhibits were pre-admitted by the Court. Both parties then filed post-trial amended exhibit lists with the Court on April 5, 2019 (**Court Doc Nos. 126 and 128**) removing any exhibits that were duplicative or

not relevant to this phase of trial. Defendants' objections to Plaintiffs' trial exhibits are represented in the Plaintiffs' Amended Exhibit List. Plaintiffs' objections to Defendants' trial exhibits are to portions of Defendants' deposition designations (Exhibits 264-280), as briefed in Plaintiffs' Motion to Strike Portions of Defendants' Deposition Designations (**Court Doc No. 136)**.

5. Plaintiffs offered testimony of Plaintiff Diane Wilson, and Plaintiff San Antonio Bay Estuarine Waterkeeper ("Waterkeeper") members David Sumpter, Bobby Lindsey, Ronnie Hamrick, Dale Jurasek, and Cheyenne Jurasek (the latter through deposition testimony). These witnesses provided detailed, credible testimony regarding plastics being discharged by Formosa, as well as photographs, videos, and 30 containers containing 2,428 samples of plastics in gallon zip lock bags and plastic bottles of pellets.

6. Mr. Dale Jurasek also provided detailed, credible testimony about conditions at Formosa and also supplied notes recording his informing Formosa in 2000 of plastics being discharged into Lavaca Bay and Cox Creek.

7. Plaintiffs also offered testimony of interested citizens Michael Mang, Myron Spree and Van Rozner. Mr. Mang and Mr. Spree provided detailed, credible testimony regarding plastics being discharged by Formosa, as well as photographs and videos documenting the discharges. Mr. Rozner, a former Formosa employee, testified about problems at Formosa's facility leading to

discharges and produced impressive photographs documenting conditions he witnessed.

8. Plaintiffs offered reports and the testimony of three independent experts, Dr. Aiza Jose-Sanchez (**Exs. 35, 36, 37, 38 and 238**), Dr. Jeremy Conkle (**Exs. 33, 34, and 39)** and Ms. Donna Phillips (**Exs. 39 and 189)**. Defendants made *Daubert* objections to the testimony of Dr. Jose-Sanchez and Dr. Conkle, which are denied. Dr. Jeremy and Dr. Jose-Sanchez used reliable principles and methods to analyze factually relevant scientific and technical information. Defendants cross-examined both experts and had the opportunity to offer expert testimony in response.

9. The expert opinion of Dr. Jeremy Conkle provided compelling and reliable first-hand practical and scientific information about the discharges. Dr. Jeremy Conkle, a Texas A&M scientist, provided thoroughly researched information about the Cox Creek and Lavaca Bay systems, describing why pellets found on the Lavaca Bay shores came from outfall 001, an issue on which both Dr. Hale and Dr. Conkle agree. Dr. Conkle described how Hurricane Harvey flushed Cox Creek, another issue on which the experts agree. He physically viewed discharges at the bays, took scientific samples of the discharges, saw all of Plaintiffs' sampling, and tested pellets in his laboratory. He offered first-hand opinion on whether a trace amount of pellets and powder had been discharged.

He conducted scientifically valid experiments to review how pellets discolor with exposure to biological matter, which Defendants' expert agreed were reasonable methods. He discussed the physical characteristics of plastics. He estimated the amount of pellets cleaned up from Formosa's discharges based on sworn testimony from the clean up company. He reviewed facts and applied his expertise to inform the court. The methodology Dr. Conkle used in this case is reliable and similar to what he uses in his professional capacity. His academic focus on plastics and marine biology applied to the facts of this case made him a potent expert. **(Ex. 33)**

10. Dr. Aiza Jose-Sanchez, an environmental engineer with a Ph.D. in civil engineering from the University of Texas, has 24 years of experience consulting for the public and private sector in stormwater and wastewater engineering. For example, she has developed a stormwater quality program focused on the control of floatables for the City of Fort Worth and has audited wastewater treatment facilities for industrial facilities. (**Trial Tr. vol. 3, 179:12-180:21**) The methodology she used in this case is reliable and similar to what she uses in her professional capacity. She conducted a site visit to Formosa's facility and reviewed extensive information to form her opinions, including but not limited to: the facility's stormwater and wastewater systems, audits and forms completed by Formosa, internal emails and plans for improvements by Formosa, bids from

third parties to Formosa for improvements, cleanup amounts and dates from Formosa's third party contractor from Cox Creek and Lavaca Bay, TCEQ investigation reports, and evidence from Plaintiffs and other local residents about discharges of plastics and powder. ***Id.*** **at 180:25-182:3** Dr. Jose-Sanchez's background and opinions were compelling and credible.

11. Donna Phillips has 28 years of relevant investigation and management experience regulating industrial discharges at TCEQ. (**Ex. 39)** This experience informed her opinions about the definition and enforcement of applicable permit terms. Ms. Phillips also kayaked in Cox Creek and confirmed visually illegal discharges by Formosa. Ms. Phillips' testimony offered relevant and thorough regulatory and technical information that was helpful for analyzing evidence presented in the case; the testimony was thorough and cited supporting facts; Ms. Phillips used reliable underlying evidence, principles and methods; and her testimony applied relevant principles and methods to facts in this case.

12. Defendants offered the testimony of three plant employees and two independent experts. Defendants did not offer live testimony of any stormwater or wastewater engineer to discuss the condition of Formosa's current discharge system. None of Defendants' witnesses had walked, boated or kayaked outside Defendants' outfalls on Cox Creek. None of Defendants' witnesses offered any explanation for why a cleanup crew hired by Formosa had cleaned up 80,199 bags of plastics

discharged from Formosa into Cox Creek and 7,806 bags of plastics discharged into Lavaca Bay. Defendants did not offer credible testimony that plastics had not been discharged by Formosa into Cox Creek and Lavaca Bay in more than trace amounts or that those illegal discharges had stopped.

II. Defendants & the Formosa Plant

A. Formosa, USA

13. Defendant Formosa Plastics Corp., USA ("Formosa USA") is based out of New Jersey. http://www.fpcusa.com/about.html

14. Formosa Plastics Corporation is a publicly-held corporation based in Taiwan that owns 22.61% of the stock of Defendant Formosa USA. (**Ex. 136 at no. 1)**

B. Formosa, Texas

15. Defendant Formosa Plastics Corporation, Texas ("Formosa Texas") is a wholly owned subsidiary of Formosa USA. (**Ex. 136 at no. 1)**

16. Formosa Texas and Formosa USA have the same board members. (**Ex. 136 at Exhibit A)**

C. The Point Comfort Plant

17. Since the mid-1990s, 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 Tr. vol 2, 58:3-19)**

18. These small plastic particles are sold to companies that use the pellets and powder to make plastic products. **(Trial Tr. vol. 4, 8:11-19; Ex. 64, internal pages 5-6)**

19. 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; *see also* Trial Tr. vol. 2, 183-184)**

20. The plant employed approximately 2,280 persons at the beginning of 2019 (**Ex. 86**) and is the largest employer in Calhoun County. (**Trial Tr. vol. 4, 7:20-8:4)** Calhoun County's total population is 21,744. https://www.census.gov/quickfacts/calhouncountytexas

21. Using natural gas, the plant makes plastic pellets and powder. Pellets are produced in five production units: HDPE1 (PE1), HDPE2 (PE2), LLDPE, PP1, and PP2. (**Ex. 64)** There are two shipping units. (**Trial Tr. vol. 2, 185-187)**

22. The pellets produced by these units are basically white in color. **(Ex. 64, internal pages 5-6)**

23. The plant includes water and wastewater treatment plants, marine and railroad docks, stormwater management infrastructure. (**Ex. 86**)

24. 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-becompleted-in-early/article_3d4d44c0-6f58-11e8-8dc8-eb31575b0831.html

D. The Plant is operated by both Defendants

25. The Point Comfort facility is owned and operated by Formosa Texas. Formosa denies that it owns "the entire" plant but admits that it operates the plant and is the permittee on the TPDES permit. Formosa Texas has not disputed ownership of all plastic producing units, and all stormwater and wastewater facilities. (**Doc. No. 60, paragraph 33; Ex. 2)**

26. Based on the evidence below, Formosa USA directs, manages, and controls Formosa, Texas in such a manner as to cause permit compliance (or non-compliance). Formosa USA wholly owns Formosa Texas and thus owns the Point Comfort facility. The Formosa USA website calls Formosa Texas "Our Operations: Point Comfort."

http://www.fpcusa.com/company/operations/point_comfort_tx.html

27. Formosa USA (through its Executive Vice President, who is currently Walter Chen) must approve Formosa Texas' overall annual budget. Additionally, Formosa Texas' budgets for capital improvements, construction and service

contracts, and blanket orders must be approved by Formosa USA. (**Ex. 136, no. 1**)

28. Formosa USA has the authority to allow or disallow projects based on the cost of the project. (**Trial Tr. vol. 4, 86:18-87:25**) Formosa USA must approve contracts of a certain type that commit more than $2,000 before Formosa Texas can enter into those contracts. (**Ex. 136, no. 1 (internal page 5)**; **Ex. 395,** Crabtree Depo. at 35:13-15) If Formosa Texas' budget has inadequate funding for a category of expenditures to allow the purchase of an environmental control system within that category, Formosa Texas must go to Formosa USA to have the funding for that category increased sufficiently to cover the expenditure. **(Ex. 390,** Bachynsky Depo. at 51:18-52:2; 52:3-18)

29. Formosa USA employs and pays the Vice-President and General Manager of Formosa Texas, Rick Crabtree. (**Trial Tr. vol. 4, 6:11-12**; **88:9-23)** Mr. Crabtree must approve budgets for capital projects for costs between $100,000 and $250,000. (**Ex. 136, no. 1**) Mr. Crabtree was the corporate representative of Formosa Texas in this lawsuit. (Ex. 394)

30. Formosa USA's Executive Vice President Walter Chen supervises and manages Mr. Crabtree, and visits Formosa Texas at least once a quarter and more often in the last six months. (**Trial Tr. vol. 4, 85:4-16, 88:1-6**; and **Ex. 395,** Crabtree Depo. at 24:14-19**)** Mr. Chen directs and approves which projects are

implemented at the Point Comfort facility, including any expenditure over $250,000, which includes many pellet recovery and source control projects. (**Ex. 136, no. 1**; **Trial Tr. vol. 4, 83:19-23; Ex. 390,** Bachynsky Depo. at 61:8-21**)**. For example, he has been involved in changes to reduce pellet spillage and discharges at the HDPE1 unit in 2012 (**Ex. 142),** plans for a pellet recovery retention pond from 2014 to present (**Ex. 140; Trial Tr. vol. 4, 84:11-85:6),** and approval of a letter to customers about the importance of caps on railroad cars to reduce pellet spillage in response to Plaintiff's Notice of Intent to Sue letter. **(Ex. 365)**

31. Formosa USA's Vice President of Special Projects, Long Far Pan, is also intimately involved in the design of projects intended to ensure compliance with the Point Comfort facility's TPDES permit. For example, he has been involved in designing retention ponds intended to control the discharge of plastics, including on-site visits to the Point Comfort facility. (**Ex. 154; Ex. 141; Ex. 364)** Formosa Texas' Mike Rivet is working with Mr. Pan on source control projects. (**Ex. 395,** Crabtree Depo. at 41:22-25; **Trial Tr. vol. 2, 203:10-18**)

32. A planning document for the ongoing South Pond project, a project estimated to cost tens of millions of dollars that is intended in part to prevent the discharge of pellets from Formosa's facility, was produced only in Chinese by someone at

Formosa USA. (**Trial Tr. vol. 4, 80:4-81**) An English copy was never provided to the facility's General Manager Rick Crabtree. (**Trial Tr. vol. 4, 80:4-81**)

33. 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**)

34. The purchasing form and approval for the contract for a pellet cleanup contractor were from Formosa USA. **(Ex. 193; Ex. 194; Ex. 395,** Crabtree Depo. at 35:10-11)

35. Bonuses for employees at Formosa are reviewed and approved by Formosa USA. (**Ex. 390,** Bachynsky Depo. at 65:11-16**)**

III. Plaintiffs

A. S. Diane Wilson

36. S. DIANE WILSON is harmed by plastic pollution in Cox Creek and Lavaca Bay. She is further harmed when discharges of plastic pollution are not reported to TCEQ.

37. Ms. Wilson has spent her entire life in Seadrift, Texas; she is 70 years old. **(Trial Tr. vol. 1, 206:15)** Her family has been in the area for 120 years, starting in about

1890 at Black Jack Island, beside San Antonio Bay. **(Trial Tr. vol. 1, 206:24 - 207:2)**

38. She started "decking" on a boat when she was about eight years old. (**Trial Tr. vol. 1, 207:8-9.)** Ms. Wilson is the fourth generation in her family to fish the bounties of these bays. (**Trial Tr. vol. 1, 207:5-7)** She started crabbing when she was 24 and got her own boat and started shrimping when she was 27. (**Trial Tr. vol. 1, 207:10-12)** For forty years, she worked as a commercial fisherman, shrimper, and crabber. She also owned her own net shop and still "can patch up any torn net there is." (**Trial Tr. vol. 1, 207:22 - 208:2)** She has managed fish and shrimp houses. (**Trial Tr. vol. 1, 207:10**) She has retired from those professions but continues in the shrimping industry, as a net builder and mender. (**Trial Tr. vol. 1, 207:22 - 208:16)**

39. "As often as [she] can," Ms. Wilson goes out Lavaca Bay. She goes in a kayak and also in a skiff donated to Waterkeeper after Hurricane Harvey. (**Trial Tr. vol. 1, 208: 8-11)**

40. Ms. Wilson has eight grandchildren and goes to the beach a lot. All her kids like the beach, and they go to Indianola and Magnolia beaches primarily. Her grandchildren go out in the Bay and she wades. (**Trial Tr. vol. 1, 208:18 - 209:1)**

41. In the past ten years, Ms. Wilson has watched the decline of shrimping in Lavaca Bay from maybe 110 to 115 shrimp boats on "opening day" to a state where she

doesn't know of any shrimp houses left. (**Trial Tr. vol. 1, 217:20 - 218:1)** She is "really concerned" about the water in her region, which lead her to form a local Waterkeeper organization. (**Trial Tr. vol. 1, 221:6-19)**

42. In the past thirty years, Ms. Wilson has commented on environmental permits and complained to government agencies about permit non-compliance by a number of companies in her area. (**Trial Tr. vol. 1, 211:24–212:7)** Since at least 2009, Ms. Wilson has complained to EPA and TCEQ about Formosa's illegal discharge of plastics into Lavaca Bay. (**Trial Tr. vol. 1, 214:10-12, 214:8-11; *see also* Exs. 56, 96, 97, and 102)** 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. **(*See e.g.* Ex. 1, 96, 97, & 102; *See also* Sec. XI(C)(1) below)**

43. Ms. Wilson has documented Formosa's plastics on the shores of Lavaca Bay and into Cox Creek from Formosa's outfalls 002, 004, 005, 006, 007, 008, 009 and 012. (**Trial Tr. vol. 1, 234:7-245:14; Ex. 465)**

44. 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

45. San Antonio Bay Estuarine Waterkeeper has standing to sue. It is a membership organization whose members are harmed by the plastic pollution in Lavaca Bay and Cox Creek. The members are also harmed when they are unable to obtain information about the plastics discharges which should be reported to TCEQ.

46. Diane Wilson founded the Waterkeeper organization in 2012, as part of the national Waterkeeper Alliance. The national organization was established by Robert F. Kennedy and now has about 5,000 members, spanning six continents, covering about 2 million square miles of waterways. (**Trial Tr. vol. 2, 106:6-12)** San Antonio Bay Estuarine Waterkeeper is a project of the Calhoun County Resource Watch, a 501(c)(3) organization, that Ms. Wilson organized in 1989. (**Trial Tr. vol. 1, 221:5-25)** Bobby Lindsey serves as the official Waterkeeper for the organization. (**Trial Tr. vol. 2, 105:6-8; Ex. 188)**

47. The mission of Waterkeeper is to "support and promote clean drinking water, clean water for fishing, clean water for swimming." (**Trial Tr. vol. 2, 105:161-7)** Their goal is to meet the people on the water and encourage them "if you see something, say something." (***Id.* at 105:23-106:2)** Waterkeeper is responsible for

monitoring the entire San Antonio Bay Estuarine water system, which has the largest coastline of any estuarine system in Texas. (***Id.* at 110:7-12)**

48. Both Mr. Lindsey and Ms. Wilson have tried to get information about Formosa's discharges of pellets from TCEQ but had not found any. (**Trial Tr. vol. 2, 107:2-5)** Had they found such information, they would have "disseminated it to the public" and also used it for their own research and investigation. *Id.* at 105:5-11.

49. 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. (**Trial Tr. vol. 2, 107:2-20)** Ms. Wilson posts photos and videos of pellets and powder discharged by Formosa on Facebook for Waterkeeper. She says "it is the quickest, fastest way to reach the community." The community responds to her posts, and she's "gained quite a few allies" through the Facebook posting. (**Trial Tr. vol. 1, 223:2-8)**

50. Waterkeeper received a small grant, which allowed it to buy a skiff to use for sampling pellets. (**Trial Tr. vol. 1, 108:5-8)**

51. 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).** If the amount of pellets or plastics "just blows me away"

and "is really too much," Ms. Wilson may take photographs or videos and report the discharge to TCEQ. (**Trial Tr. vol. 1, 240:12-15)**

52. 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**)

53. Throughout the years, Waterkeeper has worked with oystermen, shrimpers and workers at plants. Waterkeeper has communicated with biologists in Rockport, Texas. (**Trial Tr. vol. 1, 222:6-10.)**

54. 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. For example:

    a. Waterkeeper member, and the official "Waterkeeper," Robert Lindsey is fourth generation from the Port Lavaca area. He was born and raised there. (**Trial Tr. vol 2, 104:18-21)** Waterkeeper Bobby Lindsey has been at Cox Creek on foot and kayak. ***Id.* at 108:5-6** A December 2, 2018 photo of pellets, **Exhibit 337,** is representative of the pellets he has seen on the creek. Most of the pellets he sees are "bright white." ***Id.* at 108:13-20** Mr. Lindsey reports that when he has been on Lavaca Bay and Cox Creek, the pellets are "extremely visible." ***Id.* at 111:10-11** For Mr. Lindsey, the pellets on the shores are "disheartening" and "disgusting." (**Trial Tr. vol. 2, 110:15-15)**
    b. Mr. Ronnie Hamrick has been a member of Waterkeeper since January 31, 2016. (**Trial Tr. vol. 1, 133:5-6)** Mr. Hamrick has lived at Six Mile on

Lavaca Bay all his life. (**Trial Tr. vol 1, 170:5)** He has children and grandchildren who live in the Port Lavaca and Lavaca Bay area. . He is concerned about the presence of plastic pellets and powder in the water system and the impacts it may have on his family. (**Trial Tr. vol. 1, 134:5-9**) Ronnie Hamrick estimates he has taken a thousand of videos since January 2016 reflecting the presence of plastic powder and pellets on Cox's Creek and in Lavaca Bay. (**Trial Tr. vol. 1, 136:3-4)** Roughly 100 of these videos are contained in **Ex. 139.**

c. 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. (**Trial Tr. vol. 1, 67:13-14.)** He was born in the area and grew up "active in the water." (***Id.* at 90:6-18)**
d. 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) 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)
e. Waterkeeper member Dale Jurasek explained he is concerned for the safety of children who use the waterways and their shores. (**Trial Tr. vol. 2, 84:10-24.)**

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

IV. Formosa's Water Discharge Permit

A. Background

56. 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)**

57. Formosa Texas' TPDES permit grants them permission to treat and discharge wastewater and stormwater into Lavaca Bay and stormwater into Cox Lake. It establishes the limits for contaminants that may be discharged from the Point Comfort Facility, called "effluent limitations." **(Ex. 2)**

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

59. Consultants for Formosa Texas determined that Cox Creek is considered "navigable waters" of the United States. **(Ex. 196)** 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**)

60. 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)**

61. 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; *see also* Trial Tr. vol. 2, 189-190:11)**

B. "Trace Amounts" of Floating Solids

62. 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; *see also* Trial Tr. vol. 2, 192:21-24)**

63. 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)**

64. TCEQ rules prohibit the discharge of "floating debris and suspended solids" into surface waters. 30 Texas Admin. Code 307.4(b)(2). TCEQ rules also require that surface waters be maintained in an aesthetically attractive condition. 30 Texas Admin. Code 307.4(b)(4). TCEQ rules are incorporated by reference into Formosa's TPDES permit as it relates to the discharge of floating solids. **(Ex. 2 at 71403-000242)**

1. Representations during Permitting Process

65. In comments on Formosa's water discharge permit renewal in 2013, Waterkeeper sought clarification regarding "permit limits" for plastic pellets/dust found in drainage ditches and the bay. **(Ex. 1)**

66. In 2015, TCEQ responded to the comment regarding "permit limits" on pellets and powder: "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 [in the permit] 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)**

67. In 2015, Formosa agreed with TCEQ's assessment of the draft permit. Formosa disputed the "alleged need for more specific permit standards to prevent LLDPE Pellets and PVC dust from being discharged." Formosa contended "the draft permit **already prohibits the discharge of floating debris** and suspended solids via the permitted outfalls." **(Ex. 11 at 71403-001828)** (emphasis added) Formosa reiterated, "there is simply no need for the duplicative permit provisions requested" by Waterkeeper. **(Ex. 11 at 71403-001829)**

68. Formosa Texas agreed 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)** "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)**

69. Matt Brogger, the water waste manager at Formosa Texas, testified that it was Formosa Texas' position during this permit renewal process that if a single pellet escaped, it would be a permit violation. He further testified that this was the representation made by Formosa, Texas' attorney on behalf of his client during the administrative process for receiving its new permit. (**Trial Tr. vol. 2, 235:25-236:8)**

70. 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)**

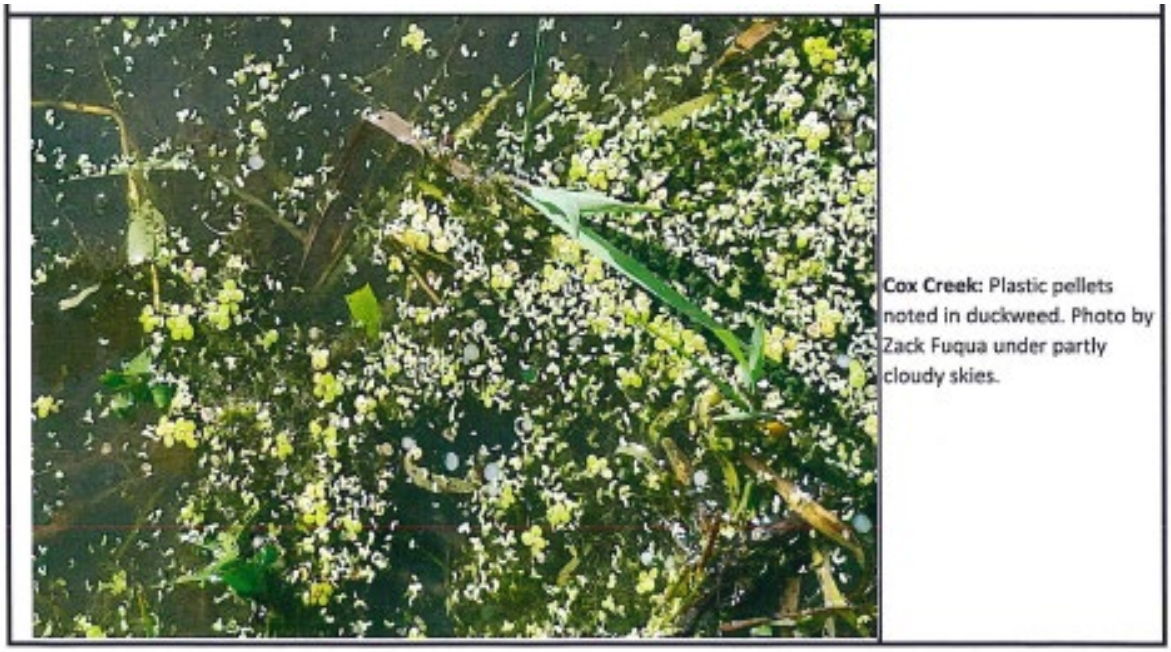
2. TCEQ Enforcement

71. 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 Tr. Vol. 2, 156:22-24, 157:13-25, 158:14-22, 163:16-21*; See e.g.* Ex. 12)**

72. 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)**

73. 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):**

74. 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)**



Cox Creek: Plastic pellets noted in duckweed. Photo by Zack Fuqua under partly cloudy skies.

75. 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
71403-006345

76. 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 Tr. Vol. 2, 157:16-23, 158:14-22; Ex. 39 at 3)** Trace amounts is determined by TCEQ by looking at the receiving water body or ecosystem; seeing the plastic or other floating solid actually leave the facility is not required to establish a discharge of more than trace amounts. **(Trial Tr. vol. 2, 158:14-159:13)** Defendants' expert, Mr. Anderson, agreed that "the point at which the determination that a discharge has occurred is just

downstream… from the outfalls" and adding "it could also be measured much further downstream rather than adjacent to." (**Trial Tr. vol. 3, 250:12-19)**

77. Donna Phillips explains, based on her training and experience at TCEQ and the dictionary, the definition of 'trace amounts' as referenced in the permit is "de minimis or inconsequential." **(Trial Tr. vol. 2, 156:22-24, 157:13-15, 178:12-20*; see also* Ex. 39 at 6)**

78. Trace amounts is not based on the amount of product present or produced at a facility. **(Trial Tr. Vol. 2, 161:18-23; *see id.* at 161:23-162:3 (**"it does not have anything to do with the trace amount as compared to the amount of product, amount of material on site. It has to do with what's going out of -- of the discharge pipe.")**)**

79. Formosa's permit term that prohibits the "discharge of floating solids or visible foam in other than trace amounts" is a standard permit term that is "in most, if not all, discharge permits issued by TCEQ" according to Donna Phillips. **(Trial Tr. vol. 2, 154:11-21).** In her experience at TCEQ, Ms. Phillips and other investigators investigated facilities to determine compliance with this same permit term and she is "totally confident" that this term can be enforced consistently. ***Id.* at 154:22-155:8, 172:25-173:6, 179:8-19.**

80. Trace amounts is a qualitative permit term because it is not a numerical limit. Qualitative permit terms are regularly enforced at TCEQ and are enforced

consistently in Donna Phillips' experience through the uniform training of staff, "stringent documentation" by investigators, and "multi-level of review" for investigations and enforcement within TCEQ. (**Trial Tr. vol. 2, 155:12-156:21**)

81. Defendants' expert Mr. Anderson did not have any criticism of Donna Phillips' explanation of TCEQ's hierarchical system of review for enforcement, and agreed that a field investigator's investigation report relating to trace amounts of a substance would be reviewed and critiqued by other people up the chain at TCEQ. (**Trial Tr. vol. 3, 249:7-13, 247:23-248:22**)

i. Consistent Enforcement

82. The prohibition against the discharges of floating solids has remained the same throughout the existence of Formosa's permit. TCEQ's interpretation has been consistent and is based on the detectability of floating solids in the receiving waters of Formosa's discharge outfalls.

83. For example, the following TCEQ photographs attached to investigation and enforcement reports consistently record what TCEQ determined was a violation of the floating solids permit term:

    a. In a 2016 investigation, TCEQ included this photograph taken south of the SH-35 Bridge on Cox Creek on March 16, 2016, recording the permit violation of more than trace amount of floating solids discharged into the Creek. **(Ex. 74, FCP002716; *see also* FCP002716-2718)**

PHOTO NO. 2
DESCRIPTION:

Pellets observed in Cox Creek.

FCP002716

b. On April 18, 2017, a representative of the Texas General Land Office called TCEQ reporting "a large number of pellets in Cox Creek." **(Ex. 4 at 71403-0022)** That day an investigator recorded the "large number" of floating solids discharged into the Creek. (**Ex. 4, SAB71403-000045;** ***Compare with*** **Ex. 4, SAB71403-000040 – 000045; Ex. 9, 71402-000731, 71402-000744 – 000745; Ex. 74, FCP002716-2718)**

Cox Creek shoreline-Pellets identified on water surface and in surrounding vegetation. Photo by Zack Fuqua under cloudy skies.

84. For Cox Creek, after documenting more than a trace amount of solids downstream of Formosa outfalls 006, 008, and 009, TCEQ finds a violation from all three outfalls. **(Exs. 4, 9, 12 and 74)**

85. In each notice, TCEQ proposes as a "recommended action" that Formosa "ensure there are no discharges of floating solids from the facility." **(Exs 4, 9, 12 and 74)** Formosa describes these recommendations as "inconsistent." **(Defendants' Post-Trial Findings of Fact, Doc. No. 142, at 38, 40, 43, and 59)** However, a recommendation of how to correct a violation is not the same as the standard for identification of a violation that would merit enforcement. The

"recommendation" suggests a way to ensure permit compliance with the trace amounts prohibition. As discussed above, in identification of a violation, the assessment by actors within the agency are consistent.

86. The Agreed Order is consistent with TCEQ's prior enforcement. **See Section VIII below.**

87. Mr. Crabtree admitted that TCEQ had the same definition of trace when the permit was executed as the one it enforces now. **(Trial Tr. vol. 4, 62:19-63:1**)

88. Mr. Crabtree testified that upon receiving a notice of violation from TCEQ in March of 2016, it was apparent that TCEQ and its investigators believed Formosa's discharges exceeded trace amounts of plastic pellets and powder. (**Trial Tr. vol. 4, 64:19-68:8)** He further testified that no one at Formosa questioned whether the term "trace" was ambiguous following receipt of that notice. (**Trial Tr. vol. 4, 74:15-75:4)**

3. Definitions

89. The term "trace" is defined as "*an extremely small amount* of a substance, quality, emotion etc. *that is difficult to see or notice.*" Black's Law Dictionary (10th Ed. 2014) (emphasis added). "Amount" is defined as "the total number or quantity: aggregate." Merriam-Webster Dictionary, https://www.merriam-webster.com/dictionary/amount.

90. One of Dr. Conkle's focuses is studying trace organic contaminants. He testified that "trace" organic contaminants are "not easily identifiable in the environment." He testified further that it is "very difficult to detect" these contaminants and often takes advanced instrumentation to concentrate them for analysis. (**Trial Tr. vol. 2, 36:10-16)**

91. Dr. Conkle explained that in applying the concept of trace from organic chemistry, the materials seen in Cox Creek and Lavaca Bay are not a trace amount because they are "not difficult to find." He stated that the pellets and powder at issue in this case are "very readily available in places where you look, especially Cox Creek" and "the places along the Bay, like next to the Holiday Inn." (**Trial Tr. vol. 2, 36:17-23**)

92. Dr. Jose-Sanchez, a PhD engineer, describes the meaning of trace as follows:

> "Trace amounts, it's a qualitative measurement ...And in my field, I relate it to analytical chemistry, and it's related to the difficulty of the detection of particular constituent of the small size of that constituent compared to the matrix where it's at.
>
> So in this case, when we're talking about pellets, what it means is that it's a small amount, obviously, and it's --it's -- it's hard to detect through the instrument that we're using it to measure. So in this case, it's -- the eye is the instrument.

So below trace levels means, you know, that you cannot easily see with the naked eye." **(Trial Tr. vol. 3, 199:24-200:13; Ex. 35 at 16)**

93. Dr. Jose-Sanchez's testimony confirms that it is "normal methodology" in the engineering profession when you're trying to assess whether there's a problem to "go out there and assess: What is the impact that we're causing downstream? Are they being released, and to what extent? And where are they coming from?" (**Trial Tr. vol. 3, 201:10-21)**

4. Formosa's definition of trace

94. In response to comments about pellet discharges during permitting, neither TCEQ nor Formosa ever suggested that the "trace amounts" limitation be changed to a fixed number of pellets for each outfall.

95. After agreeing to the "trace amount" permit term, Formosa later tried to quantify "trace amounts" based on its permitted mercury discharge limit. (**Ex. 137**) No expert described, explained or sponsored this theory. Formosa admitted that TCEQ did not agree to this quantification.

96. Besides not being offered by an expert, the math in Exhibit 137 is wrong. (**Ex. 137**) Formosa uses its permitted daily average limit of mercury, 0.03 pounds per day, as a basis. Formosa converts 0.03 lbs/day and concludes that equals 0.0003 pounds per minute (three zeros). (**Ex. 137** at FPC000813) The actual number is 0.000**02** lbs/minute, an additional zero and a 2. (0.03/(24x60) or 0.03/1440]

Interestingly on the next page, Formosa states 0.03 pounds per day of mercury equals 0.000**2** lbs per minute, not 0.003, but still the extra zero is missing. (**Ex. 137** at FPC000814) On the next page, Formosa returns to 0.0003. (**Ex. 137** at FPC000815) Converting a daily rate to a per-minute rate should be constant. Formosa constantly got the number *wrong*.

97. Under Formosa's theory, each day Formosa could discharge 9,626 pellets from outfall 006; 7,512 pellets from outfall 008; and 10,922 pellets from outfall 009 (**Ex. 137**) Again, no expert has testified to the basis for these numbers or justified them.

98. In comparison, when Ms. Wilson had to count how many pellets she could gather in a fixed time period the Nurdle Patrol, she had 7,000-9,000 pellets in a minute. **(Trial Tr. vol. 1, 244:16-245:2)**

99. No expert testified that a "daily average" of a contaminant was the same as a "trace amount" of a contaminant.

100. Defendant's expert Mr. Anderson acknowledged that a "trace" of mercury might be 1/1000th of 0.03 pounds per day. **(Trial Tr. vol. 3, 249:15-19, 251:9-19; Ex. 388,** Anderson Depo. at 41:18 - 42:2)

101. Dr. Conkle compared Formosa's questionable mercury-based pellet discharge quantities to the pellets cleaned up. (Ex. 93) 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 the pellets Horizon cleaned from Cox Creek. 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. The range is based on the same number range based to determine to quantity of pellets in each bag. (**Trial Tr. vol. 2, 42:22-44:22)**

102. Dr. Conkle described other flaws in the application of Formosa's mercury-based definition of trace to outfall 001: "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." (**Ex. 93 at 3, 4**)

V. Deficiencies in Formosa's System for controlling plastics discharges

A. Wastewater and "Contact" Stormwater System

1. Overview

103. Formosa's wastewater is normally discharged continuously (24 hours a day, 7 days a week) through Outfall 001 via a pipe into the bottom of Lavaca Bay after

it is treated at the Combined Wastewater Treatment Plant (CWTP). (**Ex. 2 at 71403-000221-000222, 000225; Trial Tr. 44:7-14)**

104. Wastewater is combined with stormwater containing some solid waste (small pellets and fine powders) at the CWTP before the waters are treated. The stormwater comes from a part of the plant called "inside battery limits" (ISBL). **(Ex. 35 at 71403-002805)**

105. Like all wastewater plants, the main design and purpose of Formosa's CWTP is to treat organic waste so it can be discharged at Outfall 001 into Lavaca Bay. (**Ex. 2 at 71403-000221-000222, 000225)**

106. It is not "good practice" to have solids intentionally in a wastewater treatment process. (**Trial Tr. vol. 3, 203:14-15)**

2. Specific Deficiencies

107. The removal of small floating pellets and fine powders in Formosa's wastewater treatment plant is "incidental" to the design and operation of the plant. (**Trial Tr. vol. 3, 203:14-23)**

108. Engineering deficiencies in Formosa's wastewater treatment system for preventing the discharges of plastics include: (1) the lack of dedicated pre-treatment design and operation to remove plastics; (2) inconsistencies in the pretreatment for pellets and powders in both process wastewater and stormwater/washwater flows, 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 Tr. vol. 3, 203:7-23*;* Ex. 35 at 71403-002837-40)**

109. Formosa's proposed control specifically designed for controlling plastics discharges at Outfall 001 is a mesh "cone filter" in its discharge pipe just 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**)

110. Formosa's records indicate the cone filter has been destined to fail yet Formosa has tried repeatedly to redesign the filter. **(Ex. 197** ("noting recurring failure of the cone strainers" and stating the conclusion that "the cone strainer is not designed for what we are using it for and the flows encountered in the system is going to cause the strainer to fail as it has been")**; Ex. 198 (**"The cone strainer was inspected today and was useless after a month in service.")**; Ex. 199, Ex. 200** (email with attached pictures of broken cone filters)**; Ex. 201; Ex. 398**). Mr. Brogger's testimony at trial confirms the cone filter continues to fail. (**Trial Tr. vol. 2, 239:2-23)**

111. Mr. Hyak explained at trial that a cone filter "is not able to stand up to the flow" at the outfall. Formosa has tried "several iterations of the filter, but every time they have checked the new iterations, a piece of the filter has failed." (**Trial Tr. vol. 3, 130:18-131:2)**

112. Dr. Jose-Sanchez testified that from an engineering perspective she "would have not recommended putting an obstruction like [the cone filter] at an effluent point" because "it will plug very quickly." (**Trial Tr. vol. 3, 202:21-203:6)**

113. Even if the filters installed at 001 were successful at capturing pellets, they likely would not have stopped powder releases. 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)

114. A June 21, 2018 email admits the "recurring failure of the cone strainers." The email states that, "The correct fix is to install a filter in the system that has been properly sized for the flows and particulates, however **this is not a quick fix.** So, we have been looking at another design that may buy us more time until we get a permanent filter in place." (**Ex. 197**) Formosa has not yet installed a long-term permanent fix.

115. Formosa's problems with a screen prior to outfall 001 have been identified since at least 2016. At that time they were replacing the existing 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 are likely the photos in the next sequential document produced by Defendants in discovery. **(Ex. 353)** The Formosa photos show big pipes emptying into a sump with labels "pellets might come out of this pipe." **(Ex. 353)**

116. Emails on June 19, 2018, show ongoing problems with Formosa's attempts to filter out pellets being discharged from a 24" pipe. Formosa Texas' James Porter emailed others that "the two methods we 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 responded to James Porter that they would discuss these issues at a meeting "for short term and long term plans." *Id.*

B. "Non-Contact" Stormwater System

1. Overview

117. Formosa's stormwater that does not come into contact with "chemical processes" is called "non-contact" stormwater and is discharged through Outfalls 002-013. This area is described as "outside battery limits" (OSBL). The stormwater flows through a series of internal concrete and earthen drainage

ditches and discharge into Cox Creek or Lavaca Bay. **(Trial Tr. vol. 3, 55:10-56:1, 186:11-23; Ex. 35 at 71403-002805)**

2. Specific Deficiencies

118. The measures that Formosa has put in place to catch plastic pellets and powder before they exit the stormwater external outfalls fall into two general categories: source control and pellet or powder recovery. (*See* **Trial Tr. vol. 2, 203:23-204:10)** The following evidence indicates that Formosa's efforts in each of these areas are not enough to be in compliance with their permit. Formosa has not made the systemic changes needed to control pellets and powder from discharging through the stormwater system. (**Trial Tr. vol. 3, 185:10-186:10, 200:14-22)**

i. "Non-contact" stormwater is "in contact" with plastics

119. 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. (**Trial Tr. vol. 3, 186:12-187:2; Trial Tr. vol. 2, 237:17-238:7)** Therefore, it appears that from conception, the stormwater management system failed to identify pellets and powders as a significant contaminant. (**Trial Tr. vol. 3, 187:3-24)**

120. The fact that rainwater can come into contact with plastic pellets and powder indicates deficiencies in the facility's overall design. Defendants' own 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)

121. Another design flaw with Formosa's stormwater system for controlling discharges of plastics is that it combines stormwater flows from both pellet/powder producing or 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 or management areas (i.e., offices, undeveloped land, other manufacturing areas not producing pellets or plastics), resulting in the commingling of pellet/powder-free stormwater with that stormwater that is in contact with pellets/powder. (**Trial Tr. vol. 3, 187:25-189:2; Ex. 35 at 71403-002817**)

122. Less than 10% of the area of the Formosa facility is occupied by areas with likely pellet/powder contact. By not controlling or treating effectively the pellets/powder at the sources located within this 10% of the facility (producing/management areas) and discharging all stormwater through the same outfalls, the remaining 90% of the stormwater generated at the facility is contaminated with pellets and powder once they mix in the conveyance system.

Combining water sources means plastics must be removed from a much larger volume of water, and it is more difficult to remove plastics from a later volume of water. This results in an increase in the overall volume of stormwater potentially impacted by these contaminants. (**Trial Tr. vol. 3, 187:25-189:2*;* Ex. 35 at 71403-002817, 18**, and **Exhibit 1**)

ii. Source control deficiencies

123. 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. How pellets reach the stormwater system is evidenced by the testimony of former employees, and Formosa's audits of its facility in 2016 and 2017. Recent emails and plans as well as continued evidence of discharges demonstrate the source control problems have not been fixed.

124. 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. (**Ex. 35 at 71403-002827)**

125. Source control has long been a known problem at the Formosa facility. Van Rozner, a shift supervisor at the SPVC unit from 2008-2016, photographed the SPVC unit, capturing images of powder in such quantities it looked like a blizzard. (**Trial Tr. vol. 2, 118:25-119:21**) He photographed the SPVC unit for various reasons, including documenting environmental and total housekeeping

compliance. (**Trial Tr. vol. 2, 124:19-125:6**) Some of these photos were shown at trial. (**Ex. 259**) The photos show piles of plastic resin or powder, on the ground of the unit, outside the unit, and plastic mixed with water, what he called a "resin slurry." (**Trial Tr. vol. 2, 125:14-128:20**) One of the photos shows a pile of resin five-inches high. (**Trial Tr. vol. 2, 127:3-12**) Mr. Rozner testified that the SPVC unit often looked like the photos he presented at trial. (**Trial Tr. vol. 2, 126:8-12**)

126. Mr. Rozner testified further that the powder would be cleaned up eventually, but not always immediately. **(Trial Tr. vol. 2, 126:13-17**) The unit was cleaned with hoses, pressure washers, high pressure air, and high-pressure nitrogen. (**Trial Tr. vol. 2, 129:4-7**) The plastic powder would be washed out to the stormwater trenches. **(Trial Tr. vol. 2, 129:12-19**) Mr. Rozner testified that managers and supervisors knew about the plastic powder piling up at the SPVC unit and its presence in the stormwater system. (**Trial Tr. vol. 2 125:7-13; 129:20-130:9**)

127. Mr. Rozner testified that during his employment the CWTP refused to accept water from the SPVC unit causing the unit to flood and powder to be released into Cox Creek. (**Trial Tr. vol. 2, 132:13-134:16**)

128. On May 25, 2016, Chad Lee of Formosa Texas explained in an email to Formosa VPs, Long Far Pan and Rick Crabtree, among others, where the

discharged pellets come from: "[t]he pellets come from the railcar loading area, railcar repair area, bagging/storage/shipping areas, inland traffic (rail in/out) and units where they are made… We agree that the main focus should be at each individual source but we are also studying improvements for the discharge points of each applicable Outfall." **(Ex. 45 at FCP045933**) Following up on the same email chain, on June 29, 2016, Formosa USA's Executive Vice President, Walter Chen, emailed Rick Crabtree and I.S. Hwang, directing them to "Correct the problem from the source control." **(Ex. 45**)

129. An aerial overview of Formosa's facility with locations of different units contains notes about locations where pellets are frequently found in stormwater ditches: "PE2/PP2: Note-internal ditches are covered, ditch is full of pellets" and near PE1/PP1 Bagging: "Concrete ditches around unit, pellets accumulate here." **(Ex. 48)**

130. A THM Observation Summary Chart made by Long Far Pan in July 2016 detailed all of the source control problems encountered by different units throughout the year. For example, during the third week of February 2016 pellets and powder were observed in the northeast corner of the PE1/PP1 bagging and shipping area, a pile of pellets was observed on pavement by a roll off box in the loading area, and downstream of the gates at HDPE 1, pellets were visible on the pavement. (**Ex. 204; Ex. 205**)

131. In a chart about a "Non-contact storm water conservation" project, Formosa's Tim Liu notes that the existing skimmer for pellet removal in their storm water is "not efficient" as of May 2017. **(Ex. 202 at FCP059006**)

132. Formosa conducted internal audits in 2016 and 2017 to document spillage of pellets at the facility. **(See Exs. 187, 260, and 451)** 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, as shown in the following evidence:

a. One audit presentation 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)**
b. 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)**
c. 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)**

d. 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)**
e. 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)**
f. 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)**
g. 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)**
h. A June 3, 2016 photo captures pellets floating in water in a stormwater culvert leaving the HDPE-1 unit. **(Ex. 260 at FPC003560)** 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)** A November 11, 2016 photo capture pellets in a stormwater ditch: "note that pellets were seen throughout the entire ditch." **(Ex. 260 at FPC003742)**

i. 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)**

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

133. Evidence shows that Formosa's implemented controls have not effectively stopped pellets and powder from leaving the production units and reaching entrances to the facility's stormwater system. At trial, Mr. Crabtree testified to a series of source control improvements made at the facility listed in Defendants' Exhibit 44. (**Trial Tr. vol. 4, 10:25-11:9)** Of the 47 source control improvements listed in that document, all but 2 were implemented prior to August of 2017. (**Defendants' Ex. 44**) He also testified to a presentation given to TCEQ in July of 2017 that depicted some of these controls. (**Trial Tr. vol. 4, 17:10-17, 20:15-21; Defendants' Ex. 176**) However, 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 also capture screens that do not completely close. **(Ex. 187)**

134. It is also unclear exactly how many of these source control projects have been fully implemented. Mr. Crabtree testified that Formosa had made the improvements on the dates listed in Defendants' Exhibit 44. (**Trial Tr. vol. 4, 11:5-9**) However, on cross-examination he admitted that at least one of the projects had not yet been completed at the time of trial. (**Trial Tr. vol. 4, 39:13-41:21**)

135. Plant manager Rick Crabtree testified that these source control measures "reduce" pellets and powder from entering the stormwater system. (**Trial Tr. vol. 4, 23:20-24:10**) However, the evidence indicates these measures are not sufficient to stop pellets from reaching the stormwater system in concerning quantities. In January 2018, John Hyak requested that the pellet production units pay for half of the costs for the pellet cleaning crew at the external stormwater outfalls because he stated, "We understand the Polyolefins Units have implemented measures … to minimize pellet spills and enhance clean-up. However, **pellets are still reaching the stormwater Outfalls**." **(Ex. 203**) (emphasis added)

136. Formosa began using vacuum trucks to remove pellets and powder from their stormwater outfalls in April 2017. (**Ex. 64 at Exhibit E, p. 76, 81**) Vacuum truck

logs 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** from March 7 and 8, 2018**)** 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)**

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

138. March 2019 justification forms for a new project at Formosa to install mechanical pellet removal equipment in the stormwater ditches at each production unit state: "Even though PP1 continues its efforts of **pellet source reduction** … pellets continue to collect in the OSBL ditches." **(*See, e.g.*** **Ex. 49)** (emphasis added)

iii. Internal outfalls

139. 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. **(Ex. 35 at 71403-002829)**

140. For example, water overflows around the gates or the gates are opened when it is raining prior to being cleaned. (**Ex. 206 at FCP059023** ("In the event of a

flooding rain, the pellets from the trench are never intercepted before leaving the plant area")); **Ex. 46 at FCP045954; Ex. 366 (**In a Formosa presentation "PPII Pellet Recovery Project" from June 2017 by unit process engineer Daniela Troncoso, a slide titled "Problems at Hand" explains how pellets are released through Formosa's internal and then external stormwater outfalls into the creek: "1. When pellets are spilled or washed into the OSBL storm water trenches, they will usually stay there until a **heavy rain floods the trenches** and washes them down to our outfall gates. In the event of a heavy rain, we are forced to open the outfall gates, **resulting in the release of pellets into the creek**.")).

141. In Formosa documents, the source for pellets at the HDPE1 unit listed in a chart as: "Internal OUTFALL GATE 1 overflowing;" and the source for pellets at the HDPE2 Unit listed in chart as: "Pellet loss though (sic) Internal OSBL storm water Gate." (**Ex. 207 at FCP059038-39)**

142. 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)**

iv. Flooding problems and drainage capacity deficiencies

143. According to the drainage studies prepared for Formosa, trial testimony, and Formosa's internal emails and documents, the hydraulic capacity of Formosa's

stormwater conveyance system is undersized and this has important implications in the proper control of pellets and powder to ensure compliance with Formosa's permit. **(Trial Tr. vol. 3, 197:4-199:22*;* Ex. 37 at 71403-010218)**

144. An overflow of Formosa's stormwater conveyance system means that the water will extend beyond the channel's banks bypassing any controls such as gates and screens along the way, dispersing water and floating materials outside the conveyance system. **(Trial Tr. vol. 3, 198:1-12*;* Ex. 35 at 71403-002819)**

145. 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 outfall gates may be opened without proper visual inspection and manual removal, potentially allowing discharge of pellets and powder further downstream. **(Trial Tr. vol. 3, 198:1-12, 198:22-199:3*;* Ex. 37 at 71403-010221)**

146. Formosa has long known of the capacity restrictions of its stormwater system. 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 [Total Total Housekeeping Maintenance] 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**)

147. Eventually in 2013, Formosa had drainage studies done by a contractor, Ganem and Kelly, which described flooding problems. Key findings include: 1) Drainage facilities are undersized - a large percentage of the ditches and culverts within the plant are too small to handle a 1-year or 2-year storm event. A 1-year storm event has 100% probability of occurrence any given year, and corresponds to 3.5 inches of rain during a 24 hour period in Formosa's location. 2) The studies generally found a series of factors contributing to poor drainage at the Point Comfort facility including: poor maintenance of the existing drainage facilities, gate valves not opening, under-designed drainage facilities, culverts with negative slopes, culverts with "high points in the middle," and limitations to the systems' capacity due to gate valves. 3) Except for conveyance systems feeding Outfalls 004 and 005, conveyance systems for all the other outfalls studied will present flooding under the modeled conditions. 4) Ditches and long sections of

pipe are undersized causing the entire network to back up into the individual plant units. **(See Exs 24-31; Exs. 28-31; and Ex. 37 at 71403-010218)**

148. In February 2013, Formosa was told by Ganem and Kelly "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)**

149. Formosa offered no testimony or evidence to indicate that any other steps recommended by Ganem and Kelly had been taken to alleviate the limited capacity of the facility's drainage system. 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. At his deposition, Mike Rivet, the Special Project Director and Corporate

Representative for Formosa Texas, could not recall any other specific changes made after that study was conducted. **(Ex. 407, Rivet Depo. at 14:2-25:22)**

150. Before an external outfall gate can be opened, there must be sampling of the water to determine pH. Wastewater employees take three jars of the water in the stormwater ditch to the lab. They also 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 returns to that external outfall and opens it. Then the employee goes 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. (**Ex. 389,** Arguellez Depo. at 15:1-16:21, 10:17-19, 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.")) Mr. Hyak confirmed this procedure continues and that Formosa samples "only for pH" at the gate to confirm the water meets standards to open the outfall. (**Trial Tr. vol. 3, 107:17-21)**

151. Mr. Crabtree testified that Formosa has changed its gate opening procedures to allow internal outfalls to release contained water more quickly than before the Ganem Kelly study. (**Trial Tr. vol. 4, 26:8-19.)** However, this testimony was not supported by other evidence or specific information to demonstrate that flooding and capacity issues have been resolved by this change, or when any changes were

made. Furthermore, it conflicts with the testimony of other Formosa employees and internal documents showing the flooding and stormwater capacity problems continue and that infrastructure changes are needed to have more stormwater conveyance capacity in order to prevent flooding problems.

152. 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)**

153. For example, at his deposition on November 2, 2018, Formosa Texas' plant manager Rick Crabtree did 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)

154. 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)**

155. 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. No such reservoir or retention ponds have been built as of trial. **See Section V.C.**

156. Formosa's internal documents discuss flooding problems at the PP1, PP2 and HDPE units. An email on October 21, 2016 explains problems at the PP1 unit: "Significant rain causing flooding in the [PP1] unit. This causes pellets to come out of the dike area into surface drainage.... Fields around unit are holding pellets that come out when it rains."(**Ex. 208 at FCP059037**, presentation attached to October 21, 2016 email, **Ex. 209)**. A Pellet Recovery report produced by Formosa states: "The PP2 area floods very quickly. This is due to the extreme amount of sediment in our storm water trenches." **Ex. 46 at FCP045954; *see also* Ex. 202 at FCP059003**) (discussing "need to build tank to temporarily store storm water to prevent trench overflow."); Formosa's Gary Patek described flooding at the HDPE1 unit. (**Ex. 405,** Patek, Gary Depo. at 77:2-78:25)

157. The stormwater system's capacity problems are exacerbated by obstructions in the water way. "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." **(Ex. 418) (**emphasis added)

158. Formosa's internal audits include evidence of flooding:

a. Photographs of pellets outside a unit note "the potential for pellet overflow downstream of the gate in a heavy rain is likely." **(Ex. 260 at FPC003311)**
b. 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, pellets and powder are visible in water that appears to be standing at the LLDPE bagging and shipping area. **(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)**

159. A May 7, 2018 "Proposal for Stormwater Pretreatment System and Reuse" for Formosa by an outside contractor states in the Project Background section, "**Plastic fines** accumulate in the collection system and **are discharged during heavy rain events causing non-compliance with TCEQ discharge permits**. The facility would like to install collection ponds and a screening system…." **(Ex. 47)** (emphasis added)

160. A January 2, 2019 presentation about the HDPE II Unit explained: "**HDPE II has a history of releasing pellets and other plastic into Cox's creek via the Outfall Gates**, Trench Overflow and Railcar Loading scale pits. These pellets come from the listed sources and are generally released during High-Rain events in which the existing curbing and trenches are overwhelmed. Because of this, pellets that are allowed to enter the trenches are very difficult to remove prior to entering the OSBL outfall gates" (**Ex. 361 at FCP060429**) A January 4, 2019 updated version of the HDPE II presentation changed the wording slightly: "As a result, in the high rain events, at times due to the size Outfall 3 can be overwhelmed and has the possibility to overflow, including flooding of roadways, allowing any pellets that are being held up in the outfall gate to be released to Outfall 9 drainage ditch." (**Ex. 362 at FCP060464**)

161. The capacity problems in the facility's stormwater system will only worsen with the planned expansion. Outfalls 12 and 14 weren't considered in the 2013 Ganem and Kelly study, and they will cover roughly 320 acres (Outfall 14) and 220 acres (Outfall 12) of runoff. **(Ex. 459 at FCP041137**). 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)**

v. End-of-pipe controls

162. End-of-pipe controls "address address the control or removal of pellets and powders in this case at the last point. It's the last line of defense, if you would. It's before they leave the facility." (**Trial Tr. vol. 3, 192:24-193:3)**

163. The controls Formosa has installed at the external outfalls, including floating booms, gabions, mesh screens, wedge screens, and external gates are end-of-pipe controls that are not adequate to prevent the discharge of floating solids in more than trace amounts from the facility. End-of-pipe controls are "not effective" because "[i]f you overload an end-of-pipe system, it will typically fail or would require such an intensive maintenance that may not be feasible in the long run." Additionally, some of these controls act as new impediments to stormwater flow and exacerbate existing flood problems. **(Trial Tr. vol. 3, 192:15-193:9, 195:3-5; Ex. 35 at 71403-002829-002836)**

164. 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 easily bypassing the boom by overtopping it, passing under it, or migrating through edges or small gaps. (**Trial Tr. vol. 3, 193:14-194:19; 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)).

165. Formosa staff agree and have witnessed pellets getting around the floating boom. **(Ex. 367)** (Arturo Bazan email August 25, 2016: "At the last rain event the water was flowing around the top of the floating boom.") (**Ex. 210**) (John Hyak email Dec 20, 2016: "We have been requested by 'management' to monitor Outfall 006 during rainfall events. **Our goal is to determine how pellets are getting by the floating boom**;" follow up email by Richard Chavez, December 23, 2016: "On Dec 23rd we opened 006 and noticed that the water was very turbulent and was going under the boom and coming up on the other side bubbling with water and debris that contained pellets. So in my opinion the pellets are going under the boom…") (emphasis added).

166. Screens installed at Formosa's outfalls do not stop all pellets and powder from being discharged, and can have maintenance problems from plugging which will

also block the flow of water. Keeping screens of the size Formosa is using clean is going to be "extremely difficult, if not impossible." 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 Tr. vol. 3, 194:20-196:9; Ex. 35 at 71403-002833**; *see, e.g.* example photographs at **Figures 1-3, 71403-002834, 002835)**

167. Despite Formosa's knowledge that smaller screens get plugged easily and can overflow, and the stormwater system's capacity issues, Formosa chose to install fine mesh screens at its outfalls. 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; Ex. 398,** Hyak Depo. at 39:7-43:1 ("John [Hyak] said we cannot use small screen because it will be plugged by grass easily.") The result is that the screens became plugged and the

pressure of the water build up broke through the screens. (*See* photos of broken screens in **Ex. 12 at 71403-008289 - 008335**)

168. Formosa's John Hyak emailed 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." **(Ex. 350; Ex. 351)**

169. 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)

170. Gabions are at best a temporary control -- the main purpose for using gabions is for "erosion control or for entrapment of sediments" and they will not prevent the discharge of pellets and powder in the long run. (**Trial Tr. vol. 3, 196:10-24)**

vi. Outfall Status Sheets

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

172. 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**)

173. Formosa has calculated the average daily flow for several stormwater outfalls using data from July 2016-April 2017 (based only on days when the external gate is open): Outfall 006 has an average of 119.56 MGD; Outfall 008 has an average of 93.3 MGD, and Outfall 009 has an average of 135.65 MGD. (**Ex. 137**)

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

175. Outfall gates can also be open **on days with very little rain.** (**Trial Tr. vol. 3, 201:22-202:12;** *see, e.g.* **Ex. 460** at FCP046794 (rainfalls of 0.28, T ("trace"), 0.02, 0.01 inches respectively on 5/22/18-5/25/18) and **Ex. 23** at FCP032463 (outfall status sheets showing outfalls 006, 008, and 009 open at least once each on 5/22/18-5/25/18))

176. Outfall gates can also be open **on days without any rain.** (*See, e.g.* **Ex. 460 at FCP046794** (rainfall of 0.00 inches on 5/14/18-5/19/18) and **Ex. 23 at FCP032465** (outfall status sheets showing outfall 009 open every day 5/14/18-5/19/18)). Mr. Hyak, Formosa's wastewater manager, agrees that Formosa's outfall gates are opened when it's not raining, and that Formosa's stormwater

conveyance system includes sources of water other than stormwater, such as wash water. (**Trial Tr. vol. 3, 149:11-18**)

177. Once opened, outfall gates can remain 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 continuously often at high flow rates, and the water is flowing for sometimes multiple days at a time. (**Ex. 398, Trial Tr. vol. 3, 149:19-150:5;** *see e.g.* **Ex. 13 at FCP000259)**

178. 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 hard to see the pellets, and "difficult to count the pellets." (**Trial Tr. vol. 3, 149:24-150:1; 150:22**; **Trial Tr. vol. 3, 200:23-201:9; 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. (**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.

vii. Reliance on manual removal

179. Formosa's removal method for pellets and powder from its stormwater system relies on visual observation and consists in the manual operation of the internal gate system and of the gates at the outfalls, manual removal (fish netting) of the pellets and plastic, and vacuum trucks. 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 or when the gates are open and flowing. 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 Tr. vol. 3, 190:23-191:14, 192:5-8*;* Ex. 35 at 71403-002820, 002825, 002829**)

180. 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 Tr. vol. 3, 192:5-8*;* Ex. 35 at 71403-002820, 002829**)

181. Evidence from Formosa confirms the difficulties in removing pellets and powder from the stormwater system with a net. 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)

182. At trial Mr. Crabtree testified that the skimming nets were fine enough to catch powder. (**Trial Tr. vol. 4, 27:15-23**) However, this is inconsistent with statements made during his deposition that he was 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)

183. Former employee Van Rozner testified that although the members of the SPVC unit were supposed to remove plastic powder from stormwater ditches before opening gates, that did not always happen. (**Trial Tr. vol. 2, 130:9-21**) They opened these gates without cleaning out the SPVC powder in order to prevent further back-up of water into the SPVC unit and did so occasionally with the permission of supervisors. (**Trial Tr. vol. 2, 130:22-131:12**)

184. Formosa's recent documents demonstrate that its reliance on manual removal (THM) to clean up pellets and powder is inefficient and ineffective, and a

"permanent automatic solution" is needed. In recent approval forms from February 2019 for a new pellet recovery project in all pellet production units that has not been implemented, Formosa states "Even though PP1 continues its efforts of pellet source reduction and pellet recovery (THM), pellets continue to collect in the OSBL ditches. PP1 has installed screens all around the unit to prevent pellets from entering the OSBL ditches, has hired 2 full time THM professionals to help manually clean up pellets and has had vacuum trucks vacuum the PP1 internal and designated permitted outfalls on a routine basis… PP1 proposes to install a permanent automatic solution at each of the PP1 internal gates in order to ensure that pellets do not leave the OSBL ditches through the internal gates and to reduce the cost of the routine THM efforts described above." **(Ex. 49)**. The remaining units are also experiencing the same limitations with pellet source reduction and recovery. **(*See* Ex. 50, Ex. 51, Ex. 52, Ex. 53, Ex. 54)**

185. Formosa's own documents depict the flaws of a system that rely on employees physically removing pellets from internal ditches. Examples from Formosa's internal audits include: 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)**

186. In April 2017, Formosa had decided to send vacuum trucks to its outfalls "dedicated to the removal of pellets and powder." (**Ex. 478**) Every day, the trucks were to vacuum 006, 008 and 009 and then go to the internal outfalls. At the time it was not clear that the trucks could reach all the outfalls in one day. Additionally, the trucks only operated 8 hours days, while the plant runs 24/7. (**Ex. 478**)

187. 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)**

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

C. Plastics Controls discussed by Formosa but not yet implemented

189. 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 discussed systemic control measures, they have failed to implement those necessary to cease the discharges in a timely manner.

1. Sand filter at Outfall 001

190. On March 7, 2019, Walter Chen approved Formosa's three-month "trial with sand filters to try to filter pellets." The "explanation" for the "trial" filter was the presence of "floating white debris" at outfall 001 and on the shores of Lavaca Bay. The "explanation" states "similar white debris has been found during this cleaning" of screens by Formosa Texas and that the lab has analyzed the "white debris" and determined it to be "polyethylene powder/flake … with some other inorganic material." **(Ex. 372)** "If the trial is a success," Formosa Texas will rent the filters "until a B-1 is approved to purchase and install new sand filters…" The form states: "We anticipate this [**the trial period**] could take **up to 18 months**." **(Ex. 372)**

191. At the time of trial on liability, this filter was not yet installed. (**Trial Tr. vol. 4, 46:6-11)**

192. Mr. Mang testified that when he took several Formosa employees out on his boat to Formosa's 001 discharge point in Lavaca Bay, John Hyak told him they were going to build a sand filter to address the plastics coming out of 001. Mr. Mang responded that "as much material as you're putting out here… it looks like it's going to clog up," and then he recalled that one of the other Formosa employees, Chad Lee, stated "We'll just have to do a lot of backflushing to, you know, keep it flushed out." (**Trial Tr. vol. 1, 115:3-15**)

193. Dr. Jose-Sanchez does not think the sand filter is going to work "for the very same reasons that the cone filter is not working. It's going to be overloaded very quickly because, from what we're seeing at the outfall, the effluent has plastics, has pellets and powders in it. So it's going to overload the system, and it's going to need a whole lot of backflushing to regenerate that sand and work." (**Trial Tr. vol. 3, 204:9-19)**

194. Dr. Jose-Sanchez recommends removing the pellets and powder *before* they enter the CWTP. (**Trial Tr. vol. 3, 203:9-23)**

2. Source Control and Pellet Recovery Projects

195. Formosa has studied, pondered, but not implemented much of what its has learned from what its competitors do to prevent pellet discharges, as shown in the following evidence:

a. A 2012 email identifying design deficiencies in Formosa's loading leading to pellets being spilled discusses Formosa employees touring European plants. (**Ex. 368**)
b. In at least 2012, Formosa was looking at a system used by Dow in California for skimmers for PE powder or "fines." (**Ex. 248**)
c. A March 16, 2012 email discusses a "design deficiency … via blowing pellets out [of rail cars] causing pellets spill problem." The email discusses Formosa employees touring European plants, impliedly to get ideas for better design, and notes that since "important visitors schedule and audit" coming, efforts would be focused on the short term goal of cleaning up pellets. The email attached a chart documenting the pellet problem: "2/3/12 Pellets were found in the storm water ditch on the southeast corner of the LLDPE bagging area...2/3/12 Pellets were found in the storm water ditch west of the PO1 bagging area...Pellets were found on the ground next to the rail car loading area which is adjacent to storm water ditch." **(Ex. 368)**
d. On September 6, 2012, Formosa USA forwarded an email from RSA, Inc., to Formosa Texas staff. RSA shared a video about its system that "removes PE fines from water surfaces." The email stated that Dow was using this equipment overseas. **(Ex. 378)**
e. In 2016, and 2017, Formosa looked at how Dow and DuPont captured pellets that had been discharged, and came up with recommendations for its facility, such as the lazy river concept. **(***See, e.g.*, **Ex. 60 at FCP045944-045945**; **Ex. 61; Ex. 206 at FCP059023; Ex. 211** (HDPE II Pellet Recovery presentation by Eric Lee, attached to email from April 2017: "With the 'Lazy River' you can control when you flush the pellets down the trenches… Controlling when the trenches are flushed allows the cleaning of the trenches and outfalls to be a preemptive, <u>not reactive</u> activity") (emphasis in original))
f. Rick Crabtree was informed on May 12, 2016 that Matt Brogger "met with DOW yesterday to discuss how they handle/manage pellets at their Seadrift facility. The attached Word document summarizes our meeting." **(Ex. 421)**
g. On February 23, 2016, John Hyak emailed Jesse Chang of Formosa LLDPE unit, "I have been working with Rick Crabtree regarding pellets being discharged in our outfalls. He indicated to me that you had visited a

plant and had ideas of how to minimize this issue." **(Ex. 376)** On February 29, 2016, Mr. Chang responded that he worked at Westlake Polymers plant in Lake Charles, Louisiana, at a plant designed by Fluor Engineering, where they had "an underground system where they collected all water with potential powder and pellet. Any spill of pellet in extruder building and loading area, operator just use water to wash it to this underground system and collected into a pound [sic]. In this pound, pellet was removed by rotating skimmer. When water over a certain level, water pump will pump it out through a filter before going to outlet ditch." **(Ex. 376)** Mr. Chang went on to describe the flaws with the Formosa design: "PO already set up a holding dike and skimmer in the ditch between HDPE1 and IEM plant with similar functions. The difference are between FPCUSA using open ditch and WLK using underground ditch. PO bulk loading is at south of IEM plant. When pellet dropped to ground bulk truck loading, pellet will wash out to wastewater plant during big shower and flood period without any processing."**(Ex. 376)** Mr. Chang offers to discuss with Mr. Hyak whether adding a holding tank will prevent pellet flow to the wastewater plant.

h. 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)

196. Formosa has discussed many source control or pellet recovery projects (sometimes called "B1" projects based on the approval form) such as the "lazy river" concept, floor sweeps, replacing couplings, or auger monsters, that have not been implemented at all or not systematically throughout the facility, as shown by the following evidence:

a. In May 2012, Formosa employee Tim Chen asked for an update on a better pellet recovery program at the HDPE and LLDPE units, including a "floor sweep system." **(Ex. 375)**
b. In a chart from November 2017 with "action items" for HDPE II Unit to address source control: "Pellets build up in concrete covered non-contact storm trenches;" "This will be rolled into the Lazy River B1 project;" "This is intended as a **temporary fix until the Lazy River project is implemented;**" "B1 for Lazy River project will replace the need for PM cycle for cleaning underground trenches." **(Ex. 369 at FCP060375; Ex. 370**) (emphasis added)
c. The PP2 unit has evaluated pellet recovery and source control projects, such as the use of a "**lazy river**" and **auger monsters** "to collect any pellets that may end up in the OSBL storm water trenches." **(Ex. 62 at FCP045953-045972**). On June 23, 2017, Rick Crabtree, Formosa Texas General Manager, told Daniela Troncoso, the process engineer who created a presentation and concepts for pellet recovery at the PP2 unit, to present her concepts to the other units. **(Ex. 63**; *see also* **Ex. 62**) HDPE-II has also listed the lazy river as one of its "plans taking shape" in 2017 to "help remedy the current pellet/powder environmental situation" (**Ex. 212; Ex. 206 at FCP059023**)
d. 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))
e. A coupling is put where two pipes joint to hold them together. When a coupling fails, pellets or powder will fall to the ground. One coupling failure caused a 170,000 pound spill of pellets onto the ground. (**Ex. 473)** Mr. Crabtree admitted that 700-800 pounds of pellets can fall to the ground when a coupling fails. (**Trial Tr. vol. 4, 40:19-23)** In a January 13, 2017 B-1 request for funds for better flanged coupling, the justification explains, "Pipe joints that have dresser couplings that cause pellet spills will be eliminated [sic] and reduce pellets getting into Cox's creek." (**Ex. 473)**

"We have had many spills resulting in pellets getting into our storm water system that reaches Cox's creek that has hurt the environmental record of Formosa plastics." *Id.*

f. At least 193 couplings at the HDPE1 unit had not been replaced as of trial. In November 2018, Formosa was requesting bids to replace these couplings. (**Ex. 406,** Patek, Gary Depo. at 93:22-94:23). At trial, Mr. Crabtree acknowledged that couplings still need to be replaced at the PE-1 unit. (**Trial Tr. vol. 4, 41:16-21**)

197. Formosa plans to install pellet removing Parkson Aquaguard units at each pellet production units, but similar concepts had been evaluated several years prior. These units were not in place across the facility as of trial:

a. Formosa's records show recent approval forms from February 2019 for new pellet recovery projects totalling $4,035,283.12 to install Parkson Aquaguard units at each pellet production unit. (**Ex. 55)** These projects have not yet been installed, and the approval forms list the project duration ranging from 9 to 14 to 30 months from March 2019 depending on the unit. **(*See* Ex. 49, Ex. 50, Ex. 51, Ex. 52, Ex. 53, Ex. 54)** ("Even though PP2 continues its efforts of pellet source reduction and pellet recovery (THM), pellets continue to collect in the OSBL ditches.") (same language for rest of units except PE-2).

b. Similar concepts to the Parkson Aquaguards were evaluated in at least October 2016, Formosa received bids and evaluated several models/brands **(Ex. 146; Ex. 147; 149**), demonstrating that Formosa has not acted quickly to install source control and may not implement the current project if not required by an external entity.

c. Dr. Jose-Sanchez agrees that the Parkson Aquaguards would remove pellets, but states that the challenge for Formosa's stormwater system with installing these units "is going to be related to the already compromised capacity of the ditches in these areas because having those Aqua Guard systems is going to be another additional barrier in your system… it's

going to back up the water. So that's going to exacerbate the flooding problem." (**Trial Tr. vol. 3, 205:14-206:10**)

3. Pellet Control Retention Ponds

198. Formosa has been evaluating at very high levels a retention pond project to prevent pellets from being discharged through the stormwater system, called at various times "small reservoirs" along Cox's Creek, the South Pond, the "South Pond Pellet Control & Water Reuse System" or "Pellet Collection South Ponds," since at least 2014, but as not constructed any ponds as of trial. (See **Ex. 140**; **Ex. 149; Ex. 150; Ex. 151**)

199. On May 14, 2014, the idea of retention ponds "combined with our 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)**

200. 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.

201. Formosa had developed project approval forms for an earlier version of the South Pond in 2015 **(Ex. 152**), but it was "put on hold" by Formosa USA's Walter Chen in December 2015. (**Ex. 141; Trial Tr. vol. 4; 84:19-86:6**)

202. In an Aug 2016 Pellet THM implement project/Suggestion summary Chart with all the units and notes, including GMO suggestions such as "Pellet capture before Cox Creek a. Storm Water Gates 06, 08, and 09" and "To consider a local rain water storage device for preventing rain water built up and making sated down pellets to floating up and flow with flooding water to public ditch." Admits that "Pellets are in Lavaca bay is an environmental issue." **(Ex. 371**)

203. Walter Chen as well as Long Far Pan, Formosa USA's Vice President for Special Projects have been involved in designing and planning for the South Pond. **(Ex. 141; Ex. 154; Ex. 213; Ex. 214)** The approval for the South Pond project comes from the President of Formosa USA who lives in Taiwan. **(Ex. 155)** ("Attached please find the preliminary south pond system investment report to Taiwan. … This report is in Chinese due to the approval will be from Taiwan")

204. 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**)

205. Formosa solicited bid proposals for the front end engineering and design, detail design and engineering, and construction of the South Pond, and received

bids from three companies in February and May 2018. **(Ex. 156 at FCP040529 (Ex. 157; Ex. 158** GHD bids for [redacted] (FEED), [redacted] (EPC) **(Ex. 159** PEI, Power Engineering Inc. bid [redacted] (FEED), [redacted] EPC, [redacted] DDE)) **(Ex. 160)** (Burns McDonnell bid [redacted] (FEED))

206. The South Pond will "serve two purposes which will be a method to collect potential plastic pellets from discharging into neighboring waters as well as a means to recycle the rainwater." **(Ex. 153**)

207. The most recent plans with cost estimates for the South Pond are in Chinese. (***See, e.g.,*** **Ex. 161**) The translated version of this plan states: "Due to the four expansions of the sewage treatment plant of Texas plant, the existing equipment and capacity of the rainwater drainage system can no longer meet the requirements of the environmental protection commitment. During the rainy season, there are often illegal overflow drainages, which are now accused by fishermen and warned by environmental authorities, for which rectification actions have been ordered to be taken." The current plan "proposes to build a new 30-acre southern pond and corresponding gravity flow ditch and pumping station piping system to collect the temporary rainwater in heavy rain; the pumping station piping system will send the rainwater to the raw water tank for reuse, while avoiding illegal overflow drainage and meeting the requirements of

environmental protection commitment." The projected timeline for the project from the translated report is: "The whole new construction project is expected to be put into commissioning in the first quarter of 2021 and **put into operation in the second quarter of 2021**." (emphasis added) The total costs from this report for the South Pond are **$28,555,097.** The document compares the cost of this project to those of another project titled the "Last One" which are listed as $39,827,206. **(Ex. 162 at 71403-011038**; document translated into English) **(**these plans are from on or after July 2018, *see* July 9, 2018 email; **Ex. 155)**

208. Dr. Jose-Sanchez agrees that retention ponds would be helpful to prevent pellet and powder discharges from the facility, and she has also proposed a series of ponds as a solution for Formosa's facility. (**Trial Tr. vol. 3, 206:11-207:1**)

209. At the time of trial, the South Pond was not constructed or operational. **(Trial Tr. vol. 4, 36:12-37:2**)

4. New Pellet Producing Units in Formosa's Expansion

210. 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.

211. Formosa's expansion at the Point Comfort facility includes new pellet producing units that will present new opportunities for releases of pellets and powder through inadequate source control. **(*See* Ex. 252 at 060664; *see also* Ex. 257**) (a presentation for Walter Chen).

212. The potential for increased pellet and powder discharges from the proposed expansion have been known by Formosa since at least the Summer of 2016 when 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).

213. The expansion includes a new stormwater outfall, number 14. (**Ex. 414**) However, some of the new units will have stormwater that discharges through existing outfalls. A January 2, 2019 email attaching October 16, 2018 plans for the new PE-3 unit shows discharge of stormwater to existing outfall 012. (**Ex. 412**; **Ex. 413 at FCP060707, 060710**,)

214. At least at outfall 12, Formosa has currently planned on utilizing the same inadequate measures to prevent discharges of plastic pellets and powder. **Ex. 413.** At the internal gates, operators will use dip nets for fine powder and pellets, skimming screens are planned "for areas of high source of pellet & powder," and booms are used as a control technology. (**Ex. 413**) The plan proposed suggests

that "in case of a 'big rain' storm water will be pumped to the Storm water pit for cleaning and then sent to the Storm Water Tank." **(Ex. 413)**

215. The new PE-3 unit is being modeled off the LLDPE unit for design of stormwater and controls. In August 11, 2016, Walter Chen emailed Rick Crabtree in discussing storm water system and pellets recovery review for new units, "Source control is our conclusion." (**Ex. 416**)

D. Formosa's bonus system discourages reporting

216. 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.

217. 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)**

218. Formosa has a bonus policy called its Performance Reward Program. The program awards bonuses based on specific factors: production, quality control, environmental performance, safety performance and some costs. (**Ex. 394,** Crabtree Corp. Rep. Depo. at 34:10-18) **(Ex. 57**)

219. The bonus policy was developed by Formosa USA. (**Ex. 395,** Crabtree Depo. at 14:24-15:3) The current bonus procedures have been in place since 1999. **(Ex. 58 at FPC037142**)

220. Formosa's bonus policy rewards hourly and maintenance employees on a quarterly basis. (**Ex. 394,** Crabtree Corp. Rep. Dep. at 34:5-18) In one year, the bonuses received by an hourly employee will range from zero to one month's worth salary. **(Ex. 395,** Crabtree Depo. at 8:20-24)

221. Formosa USA determines the bonuses for hourly and maintenance employees. (**Ex. 394,** Crabtree Corp. Rep. Depo. at 37:2-4)

222. Bonuses are awarded to management on an annual basis. (**Ex. 394,** Crabtree Corp. Rep. Dep. at 34:19-23) The formulas for awarding bonuses are different for hourly, mid-management and upper management. (**Ex. 394,** Crabtree Corp. Rep. Dep. at 41:1-7)

223. Middle management can get bonuses worth up to 3-½ months of their annual salary. (**Ex. 395,** Crabtree Depo. at 9:17-19) Bonuses for middle management can range from $100,00 to $150,000. (**Ex. 395,** Crabtree Depo. at 10:8-9)

224. Upper management and executives can get a bonus worth 6 months of their annual salary. (**Ex. 395,** Crabtree Depo. at 9:20-21) Bonuses for upper management and executives can range from $140,000 to $180,000. (**Ex. 395,** Crabtree Depo. at 10:12-13)

225. The bonuses of salaried employees are more affected by environmental noncompliance in comparison with hourly employees. (**Ex. 394,** Crabtree Corp. Rep. Dep. at 90:11-23)

226. According to Mr. Crabtree, environmental noncompliance with the water quality permit does not affect bonuses. (**Ex. 395,** Crabtree Depo. at 8:2-8**; Trial Tr. vol. 4, 107:6-10**) Thus, if Formosa discharged more than trace amounts of pellets, no employees' bonuses would be affected. (**Ex. 395,** Crabtree Depo. at 16:9**; Trial Tr. vol. 4, 107:11-22**)

227. The purpose of the Environmental bonus is to "incentivize" the discovery of root causes of discharges and "implement preventative measures". (**Trial Tr. vol. 4, 28:15-25**.) This incentive is thus not offered to prevent pollution of the local water bodies.

228. The Formosa Performance Reward policy for *hourly* employees defines "environmental non-compliance" as "Any reportable discharge and any violation of parameters set forth in the permit conditions or applicable regulations identified by a regulatory agency or third party audit." **(Ex. 58 at FPC037142**)

229. The Formosa Performance Reward policy for *salaried* employees defines "environmental non-compliance" as "Any reportable discharge. Any violation of parameters set forth in the permit conditions or applicable regulations identified by a regulatory agency or third party audit." **(Ex. 57 at FPC037153**)

230. No hourly employees' bonuses have been affected by the allegation of illegal pellet discharges. (**Ex. 394,** Crabtree Corp. Rep. Depo. at 51:12-16)

231. 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)

VI. Formosa's plastics discharges in violation of the Clean Water Act

A. Pre-Liability Phase (prior to 2016) Evidence of Discharges

232. 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 cheaper short-term remedies has prevented correction of the systemic sources of these discharges. This historical evidence supports the evidence during the liability phase that unlawful discharges of plastic pellets and powder are ongoing and that the problems at Formosa's facility are systemic.

1. Evidence from former Formosa employees

233. Dale Jurasek worked at Formosa from 1981 until 2001. (**Trial Tr. vol. 2, 58:3-15)** In 1998, he became "a whistleblower" for the EPA and FBI regarding "safety hazards and environmental hazards" at Formosa. *Id.* at 66:21-25. The

circumstance was so concerning for Mr. Jurasek that he wore a "wire" and recorded conversations for EPA and the FBI. (**Trial Tr. vol. 2, 81)**

234. In 1998 notes he took for the federal agencies, he described the water flowing at 3000 gpm at outfall 006, with the screen opened and pellets "on the discharge side of outfall 006." **(Ex. 81)**

235. In 1999 or 2000 Mr. Jurasek emailed Texas Parks and Wildlife Department about pellets past Formosa's internal gate: "This proves that PVC pellets are still getting into Cox's Creek near Hwy. 35." **(Ex. 81)**

236. On May 16, 2000, Mr. Jurasek met with the two top officials at Formosa Texas: Randy Smith and Darren Estrada. He told them, it was "common knowledge among all the fishermen in the are[a] have seen the PVC pellets that have been found" at outfall 001. **Ex. 82.** He testified, "Everybody knew it." **(Trial Tr. vol. 2, 74:6-13; and Ex. 82)** Mr. Jurasek suggested to Formosa that he be hired to sample at the 001. **(Ex. 82, Trial Tr. vol. 2, 71:16-73:12)** Formosa already had a private contractor doing that work.

237. On June 9, 2000, Mr. Jurasek met with Mr. Estrada about discharged pellets at outfalls 006, 007. Mr. Jurasek described fishing out discharged pellets and said he was concerned about a major impact on the local environment. Mr. Estrada replied that he would look for himself. Mr. Jurasek suggested he look at the debris line. **(Ex. 82)** As the pellets floated in the treatment plant, they would change

colors as they came in contact with the chemicals from white or milky looking to rust. (**Trial Tr. vol. 2, 76:12-18)**

238. Mr. Jurasek explained that, Formosa knew it was "illegal" for pellets to leave the plant. The pellets were "plugging up the 24-hour sampling systems." (**Trial Tr. vol. 2, 80:16-20)**

239. Paul Myers worked for Formosa from 2000 until 2013. (**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. (**Ex. 404,** Myers Depo. at 36:1, 36:25-37:17) When pellets and powder fell on the ground, employees tried to clean it up but would eventually wash the plastics into covered ditches. (**Ex. 404,** Myers Depo. at 37:1-17) Mr. Myers explained that in 2001, he met with Formosa managers and engineers to discuss the problem of pellets getting into the ditches. (**Ex. 404,** Myers Depo. at 33:12-20)

2. Evidence from Formosa's Bay Monitoring Contractor

240. 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)

241. On July 28, 2010, Ms. Vitale put a net at the 001 outfall. The next day, she collected the net. **(Ex. 67)** She recorded: "white 'pellets' coming out of [001] diffuser. Same as previous encounter. Will let Formosa know." **(Ex. 67)** Two days later, she emailed Mr. Hyak of Formosa Texas: "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)** She wrote: "There was quite a bit of it this year, and I just wanted y'all to be aware." **(Ex. 66 at FCP04624)** She reminded him: "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)

242. Ms. Vitale sampled for pellets five or six times near the 001 outfall for Mr. Hyak. (**Ex. 411,** Vitale Depo. at 27: 7-23) There were also times when she saw pellets near the outfall but did not take samples. (**Ex. 411,** Vitale Depo. at 29: 16-20)

243. 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)**

244. Ms. Vitale has continued to find pellets at 001, more frequently in 2016-18. (**Ex. 411,** Vitale Depo. at 30:8-24) This evidence demonstrates Formosa's

liability during the liability period for this case (January 2016 to present) and is discussed below in **Section VI.B.**

3. Evidence from Formosa's internal documents

245. In 2003, Formosa had problems with its storm water tank constantly overflowing and with "fines/Powder/pellets in the Storm water tank that is very difficult to remove." Formosa admitted that "If this material is not removed, it will cause problems at HDPE and CWTP." **(Ex. 474**) In 2017, the problem had not been fixed: "The storm/wash down water from PP-1 extrusion is collected in the extrusion sumps. There is *always* fines/Powder/pellets in the Storm water tank that is very difficult to remove. If this material is not removed, it will cause problems at HDPE and CWTP." **(Ex. 475)** (emphasis added)

246. On January 10, 2012, Paul Spinks of Formosa Texas sends an email to supervisors, imploring, "we need immediate action and continued effort (cleaning every shift) until ALL the pellets and debris are cleaned from: outfall 008 (and 009); upstream of the railroad car loading building …; pellet transfer area; extrusion area; inside our internal outfall…" On January 11, 2012, Eric Tsai responded, "the pellet/powder (with grass) in ditch will be a big issue for PO operation working area...please consider to set up some ways that will help us keep THM to meet what EPA/OSHA require…" **(Ex. 377)**

247. A March 15, 2012 justification to Formosa USA for a THM improvement system at the PE1 unit a stated: "**some plastic pellets have been found in Cox Creek. Immediate action is required**." **(Ex. 167)** (emphasis added)

248. In a March 6, 2012 email, Tim Chen noted the "design deficiency" at the pellet loading station for the HDPE and LLDPE units: "The original design of loading station structure [built in 1989], building do [sic] has design deficiency which be hard to maintain good THM per daily 12-16 rail cars blowing and cleaning pellets spill everywhere the station building, around the corners, tracks, spots.--" **(Ex. 379)**

249. In July 2013, Paul Heurtevant from Formosa Texas emailed Randy Smith (General Manager at that time) 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)**

250. A December 16, 2015 email from Matt Brogger of Formosa Texas, during the renewal process for Formosa's TPDES permit, states: "One of the public comments we received on our wastewater permit renewal was concerning pellets in Cox Creek/Lavaca Bay. I drove from Gate 2 to outfall 006 yesterday and **it**

was as bad as I have seen it in a long time. There are pellets scattered on the road, in the ditches and in the loading areas from LLDPE Bagging to Outfall 006. … **Conditions like this won't help us in our defense if we ever get the permit in front of the Commissioners**." Formosa Texas' Rick Crabtree responds, "Even though we may not be able to practically eliminate these type spills, the only way we will dispel public concerns is to timely manage all spills of this nature." **(Ex. 178**) (emphasis added)

251. In a June 28, 2016, email from Formosa's Vice President for Special Projects, Long Far Pan, to Rick Crabtree, Mr. Pan states "I want to say thanks to the persons who continue to track Outfall pellets overflow cases. I thought **it is existing for a long time** and now is a right time to stop it happen in new expansion and implement in old plants through a help from outside plant's [Dow's] THM of pellets.…I suggest to add a water retention space… to save outfall overflow gate to minimum" **(Ex. 45 at FCP045931-045932**) (emphasis added)

4. Evidence from EPA Investigation

252. In 2010, EPA conducted an unannounced inspection at Formosa. In the 2010 report from the inspection, EPA recorded that pellets were found downstream of outfalls 006,007, 008 and 009. EPA included numerous photographs of pellets in Cox Creek. Remarkably, the EPA photographs are similar to the TCEQ

documentations of violations from 2016 on, and also look like the photos taken by Plaintiffs. This specific evidence is discussed in the following findings:

253. EPA reported an equalization pond overflowing with powder, based on a June 15-17, 2010 surprise inspection. This was the identical problem mentioned by Dale Jurasek . **(Ex. 7 at 71403-000377)**

254. In the 2010 report, EPA noted that during its February 2-14, 2004 investigation at Formosa, it made a "similar observation" about powder overflowing the equalization pond. Formosa replied that overflow was not standard procedure. **(Ex. 7 at 71403-000377, 000399, and 000400)**

255. In June 2010, EPA observed and reported to Formosa 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 at 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)** EPA also observed powder on sidewalks, drainage areas, handrails, railcars, and the ground, and in bagging and drainage areas and stormwater channels. **(Ex. 7 at 71403-000376)**

256. In 2010, EPA also reported pellets downstream of the outfall gates 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)**

257. 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).

258. 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)

B. Liability Phase (January 2016 – present) Evidence of Discharges

1. Samples and Evidence Collected by Plaintiffs

259. It is undisputed that local residents and members of Plaintiff organization have collected over 2,400 samples and hundreds of photographs and videos of pellets and powder from Lavaca Bay and Cox Creek. (**Trial Tr. vol. 4, 50:18-24**)

i. Sampling Overview and Methodology

260. Waterkeepers began collecting samples of discharged plastics on January 31, 2016. **(Ex. 63; Trial Tr. vol 1, 137:2-10; Trial Tr. vol. 1, 233:11-20)** From January 31, 2016 until March 12, 2019, Waterkeepers have collected 2,428 samples of discharged pellets and plastic powder from both Lavaca Bay and Cox

Creek. **(Exs. 63**, and **254 (**photos of all samples), *see, e.g.,* **Ex 133** (subset of physical samples)**)** Sampling has continued despite the close of evidence.

261. Waterkeepers have sampled for plastics downstream of all outfalls that discharge into Cox Creek. (**Exs. 63** and **467)** Waterkeepers have sampled at multiple locations in Lavaca Bay, including the SH 35 causeway near Alcoa; the SH causeway and near the Holiday Inn, the Bayfront Marina, Lighthouse Beach, Black Rock, Harbor of Refuge, and Six Mile Park. **(Exs. 63, 468** and **255** at **71403-012546**)

262. Each sample is a representation or "snapshot" of all the pellets or powder that Waterkeepers have seen that day. (**Trial Tr. vol. 1, 150:22-23, 92:23-25; and Trial Tr. vol. 2, 115:7-116:4)**

263. Mr. Sumpter and Mr. Hamrick sample about four to seven times per week and have sampled at all the spots on the shore of Lavaca Bay and near outfalls 006, and 002, 004 and 005 on Cox Creek. (**Trial Tr. vol. 1, 70:3, 73:2-15)**

264. Ms. Wilson tries to kayak up Cox Creek once a week and take samples. (**Trial Tr. vol. 1, 241:16-20)** To kayak from 006 to 012 takes her about three and a half hours**. (Trial Tr. vol. 1, 241:17-24)**

265. To collect pellet samples, Waterkeepers use a three or five inch pool net. Sometimes, they use a pole extension to sample pellets far from shore. (**Trial Tr. vol. 1, 149:5-9)** The samples are put into a plastic bag or a plastic bottle. Usually

powder samples are put in a plastic bottle. The powder floats and a ring of powder is visible in the water captured by the bottle. **(Trial Tr. vol. 1, 149:11-150:10, 78:1-12*; see, e.g.* Ex 33, Figures 12-14)** In Lavaca Bay, Waterkeepers mostly find powder, but there are places on the bay where there are usually lots of pellets. **(Trial Tr. vol. 1, 88:25-89:6)**

266. When Waterkeepers take a sample, they also take a photograph or video and record the wind, time, date and location for the sample. **(Trial Tr. vol. 1, 79:6-9; 79:25-80:5; 81:9-11; and 148:1-14; *see* Ex. 63** (list of all samples); **Ex. 33, Figures 12-14)** After Mr. Hamrick and Mr. Sumpter sample, they text the details to Ms. Wilson. **(Trial Tr. vol. 1, 138:11-21; and 83:4-8)**

267. All samples are given to Diane Wilson, who stores them in her barn. **(Trial Tr. vol. 1, 224:1-18; 147:20-25; 148:18-24)** After Ms. Wilson has been give the samples, she and Mr. Lindsey work together to log the details of each sample. He reads her the written information on each sample, and she records it into the computer. **(Trial Tr. vol. 2, 109:5-11)**

268. Mr. Sumpter has seen pellets being discharged from outfall 006 two of the three times he has been at the outfall. **(Trial Tr. vol. 1, 73:20; and 99:6-12)** He has also seen booms outside Formosa's outfalls lined with powder. **(Trial Tr. vol. 1, 94:14-21)**

269. Ms. Wilson has been inside outfall 006 and seen pellets being discharged from the outfall "lots of times." (**Trial Tr. vol. 1, 261:24-262:19)**

270. Dr. Conkle has viewed the samples in Ms. Wilson's barn and photographed them. **(Trial Tr. vol. 2, 39:17-24; Ex 33, Figures 12-14; Ex 410**) 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 locations on Lavaca Bay and Cox Creek. These samples create a "long-term record" that shows where these materials "consistently accumulate." **(Trial Tr. vol. 2, 16-23; *see also* Ex. 33 at 8 and Figure 24)**

271. In her 28 years of experience with investigations and enforcement at TCEQ, Ms. Phillips has never seen a comparable amount of evidence to the samples, photographs, and videos collected by Plaintiffs in this case. (**Trial Tr. Vol. 2, 170:6-9)**

272. Ms. Wilson has participated in the Nurdle Patrol started by the Mission-Aransas National Estuarine Research Reserve. The project entailed collecting pellets for ten minutes and then counting the amount gathered. She took her first sample for the Nurdle Patrol on the east bank of Cox Creek south of SH 35 in November 2018. At the time, there were so many pellets, she did not think she could keep gathering them for ten minutes, so she collected for one minute and then multiplied by ten. She took the pellets home and dried them and then

measured how many were in a tablespoon, which was 240 pellets. The first time Nurdle Patrol sampling she did, she gathered 3000 pellets in one minute. For Nurdle Patrol reporting, they recorded 30,000 pellets in 10 minutes. (**Trial Tr. vol. 1, 240:6-249:5)** The next time she sampled with a fish net between 006 and 007; she thought she got from 7,000-9,000 pellets in a minute. **(Trial Tr. vol. 1, 244:16-245:2)** She has collected the most nurdles of any of the Nurdle Patrol samplers along the Gulf Coast, as far as Florida. (**Trial Tr. vol. 1, 250:3-8; and 251:14-22)**

ii. Sampling and Documentation from Lavaca Bay

273. 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**),** and **Ex. 133** (subset of physical samples)**)**

274. 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)**)**

iii. Sampling and Documentation from Cox Creek

275. 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)**)**

276. Plaintiffs have included as trial exhibits 195 videos and 410 photos taken by or for Waterkeepers from Cox Creek from February 2016 through February 2019. (**Exs 296-339 (**folders with photos and videos from Cox Creek by month with 97 videos and 263 photos) (**Exs. 139** (98 videos)**, 455-58** (147 photos)**;** *see also* **Exs 470, 471** (charts with photos/videos from Cox Creek listed by date)**)**

2. Other Evidence Supporting Violations in Lavaca Bay

i. Evidence from TCEQ Investigations

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

278. 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 have 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)**

279. TCEQ received additional complaints of plastic pellets discharges from Outfall 001 on April 17, May 8, May 18, and June 21, 2018. On June 21 and again on June 26, 2018, TCEQ investigators found floating pellets and white debris near the discharge from Outfall 001, as well as more pellets in Cox Creek. **(Ex. 12, photos at Attachment 5, 71403-008341- 008347)**

280. During various plant visits TCEQ investigators 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)**

281. 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)**

282. 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, especially since the cone filter down-flow from the sump screens had been removed. **(Ex. 12)**

283. TCEQ's citing of "floating white debris" on several occasions eventually led to Formosa's March 2019 decision to try sand filters. **(Ex. 372**) During the time between the sightings and the request, outfall 001 continued to pump water into Lavaca Bay. (**Trial Tr. vol. 4, 46:6-9**)

284. 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)**

ii. Evidence from Formosa's Lavaca Bay Monitoring Contractor

285. As discussed above in **Section VI.A.**, Lisa Vitale has sampled for Formosa near outfall 001 and sent samples to Formosa in 2004, 2005 and 2010. Formosa confirmed that these samples were from their facility.

286. From January 2016 until January 2019, Ms. Vitale has noticed plastics near the 001 outfall at least twice a year. (**Ex. 411,** Vitale Depo. at 30: 8-19)

287. 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**)

288. On April 2, 2018, Ms. Vitale took a sample of white debris near the diffuser. Formosa has tested samples 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)

289. In November 2018, Ms. Vitale found plastic particles at a sampling station used to monitor Formosa's discharges from the 001 outfall. (**Ex. 411,** Vitale Depo. at 32: 19-24) These particles were found despite the fact that the reference stations were set up far enough away from the 001 outfall that it was believed they would not be affected by the 001 diffuser. (**Ex. 411,** Vitale Depo. at 22: 1-6) Ms. Vitale discussed these November 2018 results with Mr. Hyak of Formosa Texas. (**Ex. 411,** Vitale Depo. at 32: 19-24)

iii. Evidence from Formosa's cleanup contractors

290. 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)**

291. 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 content in bags used to collect waste. (**Ex. 71 at FCP001414)**

292. 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)**

293. 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)**

294. 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)

295. 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)**

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

297. Based on the number of bags and information provided by Eric Barrier, Dr. Conkle prepared an estimate for the quantity of pellets and powder collected during the course of Horizon's contracts. (**Trial Tr. vol. 2, 37:3-7)** Matt Brogger, wastewater manager for Formosa Texas testified that Eric Barrier was a "competent, functioning person" and that he would not doubt Eric Barrier's testimony that 20-40% of a clean-up bag's contents was plastic pellets and powder. (**Trial Tr. vol. 2, 227:5-15)**

298. Dr. Conkle calculated a range between which the quantity of plastic pellets and powder cleaned-up from Lavaca Bay falls. The range is defined by the percentage of plastic pellets and powder in each bag. Although Mr. Barrier testified that 20-40% of the contents of a bag are plastic pellets and powder, Dr. Conkle set the lowest level of the range to reflect a percentage of a bag's contents as only 5% plastic pellets and powder. (**Trial Tr. vol. 2, 37:14-38:3)**

299. Dr. Conkle estimates that 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. (**Ex. 93 at 71403-012383-012385**; (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)) Horizon is still removing bags of

plastic pellets and powder, and debris. (***See* Ex. 72 at FCP063171-063172)** Dr. Conkle testified he believes these are conservative estimates given that he used to the pellet type with the lowest mass to make the calculations. **(Trial Tr. vol. 2, 18-23)**

300. Defendants criticized Dr. Conkles figures as being too broad. However, Defendants' expert Dr. Hale acknowledged that Dr. Conkle was given a wide-range of figures to work from by Defendants' contractor. He further testified that Dr. Conkle's calculations were accurate and that he did not believe it was unreasonable for Dr. Conkle to rely on sworn testimony in designing his calculations. (**Trial Tr. vol. 3, 47:14-49:19**)

301. Defendants also suggested the figures in the calculation were inaccurate, however they offered nothing more than conclusory statements to suggest this. Mr. Brogger testified that he and Mr. Barrier's estimates as to the amount of pellets in a bag would be different, but never offered any evidence as to what his estimate might be. (**Trial Tr. vol. 2, 227:15-17**) Mr. Crabtree testified that although every bag of debris that was collected by Horizon workers was left at the Point Comfort facility, Formosa never tried to determine a different estimate than that offered by Eric Barrier. (**Trial Tr. vol. 4, 32:5-33:11**)

302. Dr. Conkle testified that these figures alone do not indicate that discharges are continuing. However, the presence of pellets and powder in the quantities

observed during his visit to the site in February of 2019 even after the extent of this clean-up does indicate that discharges are continuing. (**Trial Tr. vol. 2, 39:6-16).** Donna Phillips agrees that seeing "a lot of pellets or a lot of the powder" not long after the crew has been cleaning up an area "leads you to believe that there must be ongoing discharges." (**Trial Tr. vol. 2, 170:10-23)**

303. 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)

iv. Evidence from Local Residents

304. Port Lavaca shrimper and fisherman Myron Spree started shrimping in 1978 in Lavaca Bay and eventually sold his boat in 1995. (**Trial Tr. vol. 1, 179:24; 181:6; and 189:12)**

305. Mr. Spree first noticed plastics in Lavaca Bay after Hurricane Harvey. (***see* Ex. 408**) He first met with Formosa Plastics' Rick Crabtree to discuss plastics in Lavaca Bay in September 2017. (**Trial Tr. vol. 1, 190:6-8)**

306. When Mr. Spree complained to TCEQ about plastics at the 001 outfall on March 29, 2018, "it looked like shreds." (**Trial Tr. vol. 1, 190:22-24; and 192:14)**

307. Formosa employees went with Mr. Spree to the 001 outfall within the next couple of days to take a sample. Mr. Marwitz of Formosa later told Mr. Spree

that the sampling results showed they had found "old plastic pellets" that had been discharged. **(Trial Tr. vol. 1, 193:1-19)**

308. In June 2018, Mr. Spree took an approximately one minute sample at outfall 001 with a small net and captured a lot of old and new pellets. He took a photo of the sample and sent it to TCEQ. **(Trial Tr. vol. 1, 194:6-195:18;andEx. 358)**

309. Mr. Spree has taken samples at 001 and has given some of the samples to Formosa and others to Diane Wilson. **(Trial Tr. vol. 1, 196:7-9; and *see* Exs. 358, 356, and 357)** He took the first samples in February 2018; those samples looked like "plastic particles" **(Trial Tr. vol. 1, 197:5-8)** He also shared his samples with a reporter for the *Victoria Advocate*. ***Id.* at 198:12-13.**

310. Mr. Spree was at outfall 001 with Michael Mang on March 22, 2019, where he saw "quite a bit" of plastic powder. **(Trial Tr. vol. 1, 200:11-12)**

311. Mr. Spree has taken 14 samples of pellets and plastic powder at outfall 001 in Lavaca Bay 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)**

312. Formosa's Utility Water Department Manager John Hyak agreed that pellets have been discharged from Formosa's 001 outfall and saw pellets in April 2018 at the discharge point. **(Ex. 398,** Hyak Depo. at 182:9 - 184:3) In March 2019

Mr. Hyak accompanied Mr. Spree to Formosa's 001 outfall in Lavaca Bay and saw discharged powder. (**Trial Tr. vol 3, 165:14-16)**

313. Mr. Spree is not a member of Waterkeeper and monitors voluntarily because "the bay is deteriorating" and he thought "that's going to continue until somebody does something about it, corrects the situation somehow or another." (**Trial Tr. vol 1, 180:22-24, 201:21-25, 202:19-25)** Mr. Spree's testimony was credible and reliable.

314. Michael Mang has lived 56 years in Point Comfort Texas. He lives a mile from Formosa's facility. (**Trial Tr. vol. 1, 104:8-24)** He also owns property on Lavaca Bay. ***Id. at* 105:12-13.** Mr. Mang served 12 years on the city council of Point Comfort, including 10 years as mayor pro tempore. ***Id. at* 106:5-6.** For 20 years Mr. Mang was a commercial fisherman, but now he works as a hydrographic surveyor locating underground pipelines. ***Id. at* 105:19-25.** When Formosa's outfall 001 was initially installed in Lavaca Bay, Mr. Mang was hired to put the buoy in the bay showing the location of the pipe and discharge. ***Id. at* 107:2-5**.

315. During the summer of 2018, Mr. Mang first heard from Myron Spree about the discharge of plastics from outfall 001 into Lavaca Bay. (**Trial Tr. vol 1, 108:9-10.** Mr. Mang initially "shrugged it off," but after Mr. Spree persisted in showing him photos and videos and asking him if he'd looked, Mr. Mang "made

it a point" too look at 001 "on a slick calm day." ***Id. at* 108:20-25.** "I was really shocked at what I saw," Mr. Mang testified, "It really surprised me. I didn't expect to see that amount." ***Id.* at 109:3-5.** Mr. Mang saw white "particulate" that "would, basically, stay put, and you could see it on top of the water." ***Id.* at 109:11-17.**

316. On June 27, 2018, Mr. Mang went to the 001 diffuser and saw "quite a bit of particulate on the surface" so he "devised a little 10-foot catch net." **(Trial Tr. vol 1, 110:11-13)** He ran a 10-minute sample with the net and caught "plastic particulate and small pellets." ***Id.* at 110:15 - 111:15; Ex. 402**. 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) Photographs of what Mr. Mang trapped in his net show plastic pellets and flakes. **(Ex. 73)** Formosa's marine science expert Dr. Robert Hale believes Mr. Mang's method of sampling was reasonable. (**Ex. 397,** Hale Depo. at 56:1)

317. Mr. Mang has been to the 001 outfall "a conservative estimate of 15 times during peak weather times" and he has "seen the same stuff almost every time." He explained, "The pellets are harder to see… They're there, you'll see occasionally, but the powder is always there. (**Trial Tr. vol 1, 111:19-24**) He explained that "on clear days… you can actually take your hand and make a little swish, and you can see it come to the top." ***Id.* at 113:1-3.**

318. On March 8, 2019, it was a foggy day, and Mr. Mang went out early to 001 and "observed a lot of powder residue on the surface of the water as well as suspended below it. And I watched it for an hour or two, and on that day, it was the day I notified Formosa" of what he saw. Mr. Mang notified Formosa because, "I figured it was time that I said something." He explained, "'I'd been looking at this for most of the summer, trying to get a grip on exactly the extent of it, and I just wanted them to be aware that it's there." Id. at 113:20-23.

319. Formosa sent four Formosa employees to go with Mr. Mang to the 001 outfall, including John Hyak and Matt Brogger, whom he considers his friend, as well as Chad Lee. Rick Crabtree had also been notified. (**Trial Tr. vol 1, 113:12-17, 114:13-20**) Matt Brogger testified that on that day there was material floating on the surface downstream from the diffuser and it was readily apparent. (**Trial Tr. vol. 2, 243:7-23**)

320. Mr. Mang told the Formosa representatives that this was a "serious issue" and something had to be done about the discharge. Mr. Hyak agreed and said Formosa had applied for a permit to use a sand filter. (**Trial Tr. vol. 1, 115:3-18)**

321. On March 22, 2019, Mr. Mang also saw "more floating residue on the surface. … it's basically the same thing anytime you go on a slick day." (**Trial Tr. vol. 1, 123:25-124:2**)

322. Mr. Mang is not a member of Waterkeeper and is a volunteer monitoring the discharges because he's "concerned with the bay system. It's the cumulative effect that's got me bothered more than anything. . . . just the little amount I took in ten minutes, if, you know, you figure that over the magnitude of the flow and what's coming out of there, you know, it comes to a lot. (**Trial Tr. vol. 1, 117:1-24)** Mr. Mang's testimony was credible and reliable.

v. Evidence from Plaintiffs' Experts

323. Dr. Conkle first site visit was in December 2017. (**Trial Tr. vol. 2, 12:23-25)** He went to the Port Lavaca Marina, where he saw plastic pellets on the boat ramp. **(Trial Tr. vol. 2, 17:8-15; Ex. 33, Figures, at Fig. 3)** Dr. Conkle testified that although the pellets and powder were not as highly concentrated at Lavaca Bay as they were in Cox Creek, they could still be seen. **(Trial Tr. vol. 2, 17:12-16; Ex. 33 at 5)** Dr. Conkle testified that on his first trip to Lavaca Bay and Cox Creek, the quantity of plastic pellets and powder was "astonishing". **(Trial Tr. 15:19-21; Ex. 33 at 5)**

324. Additionally, Dr. Conkle visited the Lavaca Bay shoreline on his March 16, 2018 visit. **(Trial Tr. vol. 2, 26:15-22; *See also* Ex. 33 at 7 and Figures at Fig. 9)** Dr. Conkle testified he observed powder on the Lavaca Bay shore near the causeway. He testified the powder was like a ring of scum that wrapped around the shoreline and was half-an-inch to an inch deep, and about an inch wide. (**Trial**

Tr. vol. 2, 32:10-22) Photos taken that day by Dr. Conkle of the shoreline of the bay near the causeway show large quantities of powder deposited along the shoreline. **(Ex. 33 at 5 and at Figs. 10 & 11)**

325. 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." **(Ex. 186)**

3. Other Evidence Supporting Violations in Cox Creek

i. Evidence from Formosa documents

326. High-ranking officials at Formosa USA are well aware of the continued discharges from the Point Comfort facility. On May 24, 2016, Chad Lee of Formosa Texas explained in an email to Formosa USA Vice President for Special Projects, Long Far Pan, "Outfalls 006, 008 and 009 all have pellet issues… and Outfall 012 will be impacted from Phase IV expansion when activated." **(Ex. 45 at FCP045934)** After receiving this answer to his question about which outfalls have pellet overflow issues historically, Long Far Pan of Formosa USA asks Chad Lee in an email on July 18, 2016, who is "in charge to issue the water

pollution citations to responsible plant which included outfall pellets overflow and Po. Plants overflow to public ditch in TX site?" The response by Chad Lee is that they have a designated person who does Pellet/Powder audits every week, but Mr. Lee does not respond that any Formosa production unit has received a "citation." **(Ex. 249**).

327. The Vice President of Formosa USA has also long known of the discharges from the Point Comfort facility. (*See* July 15, 2016 Email from Long Far Pan: "Mr. Walter very concerned the pellets flow to creek again." (**Ex. 415**))

328. Photos taken by Formosa Texas in April 2017 show discharged pellets at the boat ramp on Cox Creek south of SH-35. (**Ex. 239**)

329. The investment plans for a proposed South Pond at Formosa states that "the existing equipment and capacity of the rainwater drainage system can no longer meet the requirements of the environmental protection commitment. … During the rainy season there are often illegal overflow drainages." **(Ex. 162 at FCP037646) (**these plans are from on or after July 2018, *see* July 9, 2018 email; **Ex. 155)**

ii. Evidence from TCEQ Investigations

330. 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)**

331. On March 15, 2016, TCEQ emailed to Formosa Texas "photographs documenting pellets in Cox Creek downstream of the facility on March 10, 2016." (**Ex. 243)** Those photographs document pellets in the creek in a quantity that violates Defendants' permit. Formosa Texas' Mr. Arguellez had requested those photos because "upper management" wanted to see them. **(Ex. 244)**

332. 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 including statements of past violations found during an unrelated investigation on the form and noting them as resolved. There were no questions or statements 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)**

333. On May 13, 2016, TCEQ issued a Notice of Violation to Formosa for the same permit violations. (**Ex. 250**) The TCEQ Investigation Report for the March 2016 investigation was included in the May 13, 2016 Notice of Violation. That report 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**). 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**)

334. 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.*

335. 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)

336. 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**)

337. 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)**

338. 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**)

339. 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**)

340. On May 1, 2017, a year after the initial Notice of Violation, 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)**

341. 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**)

342. The May 1, 2019 Notice of Enforcement led to an Agreed Order in January 2019, which is discussed in **Section VIII** below**.**

343. 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)

344. 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**)

iii. Evidence from Defendants' Cleanup Contractors

345. In October of 2016, Palacios Marine Industrial ("PMI") was hired by Formosa to 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)

346. For every day 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)

347. 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**) 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.

348. 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. (**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**)

349. 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**)

350. 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**)

351. 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)

352. 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; *see also* Ex. 228** (Porfirio Arguellez boated on Cox Creek "to get out on the water for a visual inspection.")

353. On January 13, 2017, PMI returned for a monthly inspection and their report states "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.

354. 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)**

355. 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)**

356. 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 shallow 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)**

357. 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)**

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

359. 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). 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)

360. 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)**

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

362. 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)**

363. 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)**

364. At times, Ms. Wilson has seen as many as 13 Horizon employees with four boats and three pumps cleaning up an area. (**Tr. Trans. vol. 1, at 436:14-18)**

365. Based on the number of bags and information provided by Eric Barrier, the corporate representative for Horizon, Dr. Conkle prepared an estimate for the quantity of pellets and powder collected during the course of Horizon's contracts. (**Trial Tr. vol. 2, 37:3-7)** Matt Brogger, wastewater manager for Formosa Texas testified that Eric Barrier was a "competent, functioning person" and that he would not doubt Eric Barrier's testimony that 20-40% of a clean-up bag's contents was plastic pellets and powder. (**Trial Tr. vol. 2, 227:5-15)**

366. Dr. Conkle calculated a range for the quantity of plastic pellets and powder cleaned-up from Cox Creek falls. The range is defined by the percentage of plastic pellets and powder in each bag. Although Mr. Barrier testified that 20-40% of the contents of a bag are plastic pellets and powder, Dr. Conkle set the lowest level of the range to reflect a percentage of a bag's contents as only 5% plastic pellets and powder. (**Trial Tr. vol. 2, 37:14-38:3)**

367. Over the course of the contracts, Dr. Conkle estimates that Horizon has collected anywhere 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. (**Ex. 93 at 71403-012383-012385;** 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)) Dr. Conkle testified he believes these are conservative estimates given that he used the pellet type with the lowest mass to make the calculations. (**Trial Tr. vol. 2, 18-23)**

368. Defendants criticized Dr. Conkle's figures as being too broad. However, Defendants' expert Dr. Hale acknowledged that Dr. Conkle was given a wide-range of figures to work from by Defendants' contractor. He further testified that Dr. Conkle's calculations were accurate and that he did not believe it was unreasonable for Dr. Conkle to rely on sworn testimony in designing his calculations. (**Trial Tr. vol. 3, 47:14-49:19**)

369. Defendants also suggested the figures in the calculation were inaccurate, however they offered nothing more than conclusory statements to suggest this. Mr. Brogger testified that he and Mr. Barrier's estimates as to the amount of pellets in a bag would be different, but never offered any evidence as to what his estimate might be. (**Trial Tr. vol. 2, 227:15-17**). Mr. Crabtree testified that although every bag of debris that was collected by Horizon workers was left at the Point Comfort facility, Formosa never tried to determine a different estimate than that offered by Eric Barrier. (**Trial Tr. vol. 4, 32:5-33:11**)

370. Dr. Conkle testified that these figures alone do not indicate that discharges are continuing. However, the presence of pellets and powder in the quantities

observed during his visit to the site in February of 2019 even after the extent of this clean-up does indicate that discharges are continuing. (**Trial Tr. vol. 2. 39:6-16)** Donna Phillips agrees that seeing "a lot of pellets or a lot of the powder" not long after the crew has been cleaning up an area "leads you to believe that there must be ongoing discharges." (**Trial Tr. vol. 2, 170:10-23)**

371. 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)

iv. Evidence from Plaintiffs' Experts and local Residents

372. Plaintiffs' Environmental Science Expert, Dr. Jeremy Conkle, has visited Cox Creek and Lavaca Bay eight times since December 2017. (**Trial Tr. vol. 2, 12:4-5; Ex. 33, 34, & 93**) In discussing the first site trip he made in December 2017, Dr. Conkle describes the quantity of plastic pellets and powder at Cox Creek as "astonishing." He further testified that the quantity of pellets and powder was "shocking" because he had never seen them in a similar quantity before. (**Trial Tr. vol. 2, 15:19-16:14)**

373. Photos taken by Dr. Conkle during that December 12, 2017 visit to Cox Creek, show plastic pellets and powder accumulated on the creek bank close to the road. In one photos, the pellets look like a dusting of sleet or hail on the ground. **(*See* Ex. 33 at 5 and Figures, Figs. 5 & 6)** Photos from the same visit taken between

outfall 006 and 009 show pellets on the water surface near or entrained in floating vegetation. **(*See* Ex. 33 at 6 and Figures, Fig. 7)** Photos also show plastic powder captured by a boom in the waters downstream of outfall 009. **(*See* Ex. 33 at 6 and Figures, Fig. 8)**

374. On June 20, 2018, at the SH-35 boat ramp on Cox Creek, just south of Formosa's 006 outfall, Dr. Conkle, found "a lot" of plastic pellets and powder. (**Trial Tr. vol. 2, 26:24-27:6)** Dr. Conkle returned to the boat ramp two days later on the June 22nd. During the interim period of the two visits, there was a large rain event and the area received between six and ten inches of rain. (**Trial Tr. vol. 2, 26:25-27:3)** When Dr. Conkle stopped on June 22, 2018, water on the creek near the SH-35 boat ramp had receded, all the powder was gone but he observed pellets that had been deposited on the boat ramp as the water receded. (**Trial Tr. vol. 2, 27; *see also* Ex. 33 at 7 and Figures, Figs. 20, 21, & 22)**

375. On February 12, 2019, Dr. Conkle visited the site again. Photos taken during this site visit show plastic pellets in the water and shorelines of the Cox Creek. (**Ex. 93 at Figures, Fig. 1-7.)** During his February 2019 trip, Dr. Conkle traveled up Cox Creek in kayak. He testified this allowed him to see the problem in finder detail, including the pellets trapped in the shoreline and floating amongst the vegetation. He testified that the pellets are all the way up the Creek, and on both banks. (**Trial Tr. vol. 2, 31:4-24.)**

376. In his report Dr. Conkle asserts that he "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 71403-012371**) He further states that his "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." (**Ex. 93 at 71403-012372**)

377. Photos taken by Dr. Conkle during the February 2019 site visit also show plastic pellets and powder on the shores of Lavaca Bay in levels similar to those from photos of earlier site visits. **(Ex. 93 at Figures, Fig. 8 & 9)**

378. On March 12, 2019, former TCEQ regional director, Donna Phillips visited Cox Creek and Lavaca Bay. On Cox Creek, she saw "many pellets" around outfall 006 by kayak and "a number of pellets along the shoreline and in the vegetation" at the boat ramp south of Highway 35, and noted that "all you had to do was… dip your paddle in and just kind of pull up some of the vegetation, and many would rise, and they would fall again. But, yeah, we saw a lot." (**Trial Tr. Vol. 2, 159:23-160:16, 161:5-10; Ex. 186)** Ms. Phillips took photographs during her site visit, and included them in her supplemental report. (**Trial Tr. Vol. 2, 160:17-25; Ex. 186)** Ms. Phillips concluded that the pellets and powder she saw

during her site visit was not even close to what she would consider "trace amounts." (**Trial Tr. Vol. 2, 161:12-17*;* Ex. 186)**

379. During the summer of 2018, Mr. Mang has been to Cox Creek about three or four times and has "seen lots of pellets." He stated, "the pellets are obvious. They've been there for years and years, and you see them on the [SH 35) boat ramp every time you go in and out of there." (**Trial Tr. vol. 1, 116:21-117:7**)

v. Evidence from Plaintiffs' correspondence to government agencies

380. On July 16, 2013, Diane Wilson requested a contested case hearing on Formosa's renewal of its TPDES permit. 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)**

381. 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)**

382. 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)**

383. 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).** In her complaints, she sent TCEQ a list of sampling begun by Waterkeeper members starting December 31, 2016.

384. 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 forwards the complaint to them. **(Ex. 101)**

385. In 2017, Ms. Wilson complained to TCEQ about plastics discharged from Formosa's facility on: February 24, 2017, **(Ex. 102 at 71403-000967 and 000970; Ex. 103; Ex. 104)** (white substance in Lavaca Bay)**;** 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)**; and December 19, 2017, **(Ex. 114; Ex. 115; Ex. 116).**

386. In 2018, Ms. Wilson complained to TCEQ about plastics discharged from Formosa's facility on: (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)**.

C. Discharges are Violations of Formosa's Permit

1. Plastic pellets and powder are "floating solids"

387. During trial, Formosa continuously attempted to conflate their permit terms for "total suspended solids" and "floating solids" despite numerous TCEQ and

Formosa statements that plastic pellets and powder are floating solids. (***See, e.g.* Trial Tr. vol. 4, 45:7-8, 45:22-46:1, 46:14-48:16**) Additionally, testimony and physical evidence shows that the plastic pellets and powder observed in Cox Creek and Lavaca Bay float, and are floating solids.

388. Dr. Conkle testified that he has seen plastic pellets and powder in Lavaca Bay and Cox Creek. He further testified that he conducted an analysis of those pellets and that powder with Fourier Transform Infrared Spectrometry (FTIR). The results of that analysis showed the pellets were polyethylene and polypropylene, and that the powder was only polyethylene. (**Trial Tr. vol. 2, 19:17-20:25**) Dr. Conkle testified that polyethylene and polypropylene both have a density lighter than water and would float. **(Trial Tr. vol. 2, 20:11-18**)

389. Defendants' marine expert Dr. Robert Hale agreed that polyethylene and polypropylene pellets and powder would float. (**Trial Tr. vol. 3, 27:10-16**) Dr. Hale stated that PVC powder will also float. (**Trial Tr. vol. 3, 28:21-29:8**)

390. Former SPVC supervisor Van Rozner testified that not all PVC resin (which looks like powder) sinks and he has seen PVC resin that floats. (**Trial Tr. vol. 2, 120:23-121:15**)

391. Rick Crabtree testified that the pellets and powder produced at the Formosa facility float. (**Trial Tr. vol. 4, 47:14-20**) Mr. Crabtree conceded that floating white debris in Lavaca Bay would have to come out of a pipe underwater and

float to the surface. (**Trial Tr. vol. 4, 48:19-49:10**) He also conceded that references to "floating white debris" in Lavaca Bay in emails sent by Lisa Vitale referred to plastics. **(Trial Tr. vol. 4, 47:22-25**)

392. The pipeline for Formosa's outfall 001 is underground, and it rises up to a diffuser that is about 3-½ feet underwater. The diffuser creates a bit of turbulence on the water. (**Trial Tr. vol. 4, 107:19-108:6)**. This means the discharge occurs underwater, so that floating solids are initially in the water column and eventually will float.

2. Discharged plastics are from Formosa's facility

393. Mr. Crabtree conceded that plastic pellets and powder had made their way from the Formosa facility into the local water bodies. (**Trial Tr. vol. 4, 41:23-42:1**)

i. Lavaca Bay

394. In December 2016, after a "third party" brought a powder sample discharged from outfall 001, Formosa tested the sample. **(Ex. 380)** Formosa tested the sample and determined "with 90% confidence" that the sample was HDPE. **(Ex. 381)** Titanium and chromium were also on the sample. **(Ex. 381)** This sorption of metals is consistent with testimony of Dr. Hale. (**Trial Tr. vol. 3, 42:21-44:13**) Rick Crabtree was made aware of the results of the sampling. **(Ex. 382)** Formosa could not discern whether the sample was from HDPE1 or HDPE2 and asked if

the "exact additives and plasticizer" could be identified to make the determination. **(Ex. 383)**

395. Formosa's sampling of pellets from the Lavaca Bay Marina in June 2016 found that 95% of the pellets sampled were from Formosa's PP1 unit; upon getting the result, Rick Crabtree responded, "may indicate where most efforts need to be focused to address now (PP1)." (**Ex. 165)** Mr. Brogger testified that he trusts the conclusions of Formosa's lab as to the origins of the pellets tested from Lavaca Bay. (**Trial Tr. vol. 2, 225:7-22)**

396. 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)**

397. 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**

398. Dr. Conkle visited two Lavaca Bay shoreline sites on his March 2018 visit to look for discharged plastics. **(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." **(Ex. 33 at 6)** He looked thoroughly on those locations, even searching behind berms and found no pellets or plastic powders. **(Ex. 33 at 6)**

399. 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)

400. 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) He was not shown any Formosa documents that indicate the plastic pellets and powder seen in Lavaca Bay are Formosa's. (**Trial Tr. vol. 3, 41:7-13**)

401. 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)

402. 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)

ii. Cox Creek

403. Dr. Conkle concludes the plastic pellets and powder found in Cox Creek come from Formosa's stormwater outfalls into the creek. (**Ex. 33 at 10)**

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

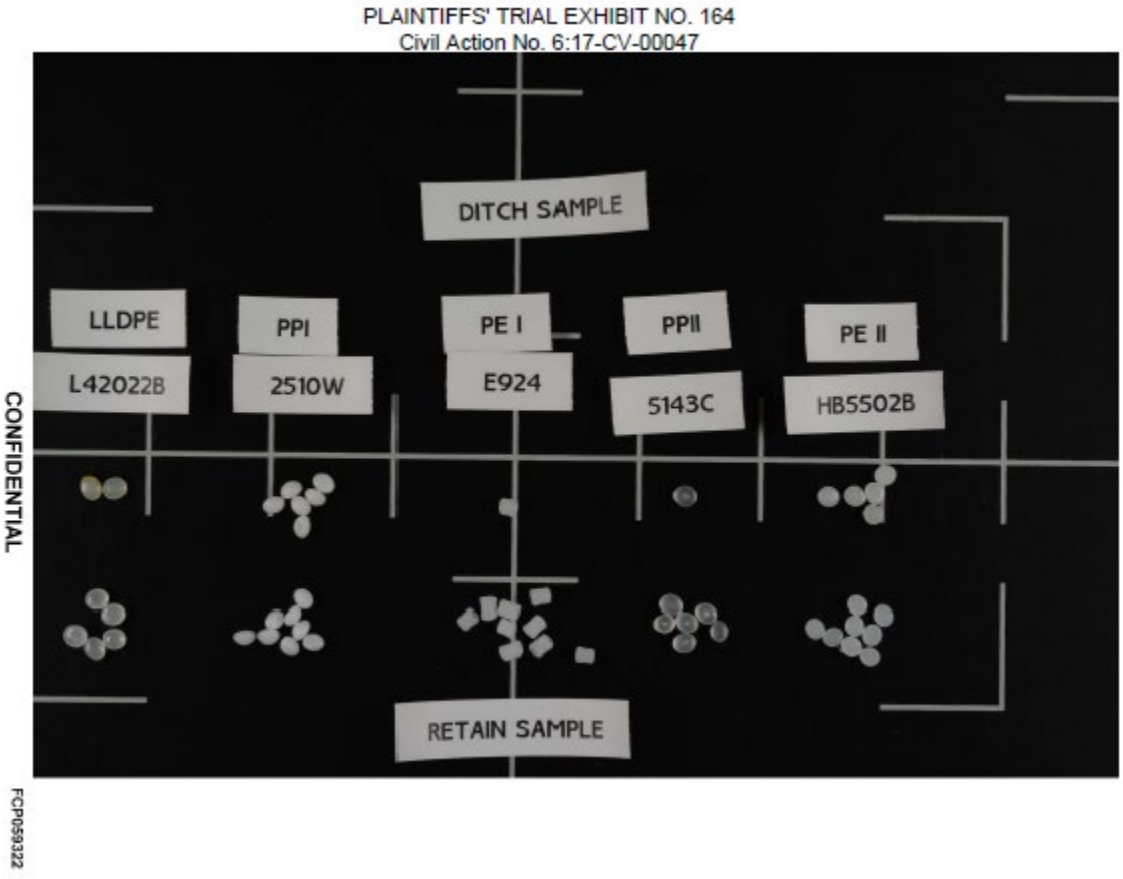
405. Although Formosa's expert Dr. Robert Hale states that pellets in Cox Creek could have been discharged by Inteplast, a company five miles upstream of Formosa Texas, he has no physical evidence that any of the pellets in Cox Creek come from Inteplast. (**Ex. 397,** Hale Depo. at 65:5-18)

406. 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)

407. Formosa's internal emails and sampling demonstrate that the pellets in Cox Creek 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**)

408. Formosa's sampling analysis involved both separating pellets by shape and color, and then running a Fourier-transform infrared (FTIR) spectroscopy on the pellets to determine their FTIR signature or fingerprint. This sampling allowed Formosa to conclude that there were pellets from all of its production units in Cox Creek in 2016, as shown in the picture below. **(Ex. 164 "Ditch Sample"; Ex. 165; Ex. 166)**



409. 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)

410. 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)

411. Formosa Texas agrees that pellets from Formosa have found their way into Cox Creek. (**Ex. 392,** Brogger Depo. at 18:8) and that pellets from Formosa have made their way to Lavaca Bay. ***Id.*** **at 23:1-4.**

412. During trial, Matt Brogger confirmed that analysis on pellets sampled at Cox Creek determined there were pellets from all of Formosa's plastics producing units. (**Trial Tr. vol. 2, 2456-23)**

3. Discharges are in greater than "trace amounts"

413. 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 finding violations of the permit term. (**Trial Tr. Vol. 2, 171:4-23; *see* Exs 73, 139, 174-177, 195, 254, 263-339, 356-57, 360, & 455-58)**

414. Ronnie Hamrick testified that when he goes out to sample, the plastic pellets and powder are not difficult to find. (**Trial Tr. 147:14-16)** He testified that the

pellets are readily visible and that it would be impossible to count them. (**Trial Tr. 173:17-22)** This fact is corroborated by the photographic, videographic, and physical samples taken by Waterkeepers.

415. 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. He testified that everytime he has visited Lavaca Bay and Cox Creek plastic pellets and powder were "easy and quick to find." (**Trial Tr. vol. 2, 28:11-14)**

416. Photographs in Dr. Conkle's reports show that more than trace amounts of plastics have been discharged on Cox Creek and Lavaca Bay from December 2017 through February 2019. **(Ex. 33, Figures 3-7, 10-11, 16-17, 20-23, 26; Ex. 34, Figure 1; Ex. 93, Figures 1-8)**

417. 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. **(Ex. 33 at 22-23)**

418. 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." **(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 … and the potential inadequate conveyance capacity of Formosa's stormwater network." **(Ex. 35 at 71403-002825)**

419. 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." **(Ex. 35 at 71403-002836-37**)

420. 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 the quantity of pellets observed in the video was more than a trace amount. (**Ex. 487; Trial Tr. vol. 3, 37:19-21**) In his deposition testimony, Dr. Hale made this same statement assuming that the definition of trace amounts is what is in the receiving water. (**Ex. 397,** Hale Depo. at 216:5)

4. Discharges are frequent and recurring

421. Dr. Conkle testified that new pellets produced by Formosa are generally clear or a little cloudy in color and that they look new. (**Trial Tr. vol. 2, 22:10-11**) Pellets produced by the Formosa facility from every production unit in response to discovery in this case are clear or cloudy in color. **(Ex. 134 & 135**) Dr. Conkle testified that plastics can yellow "over long periods of exposure in the environment." (**Trial Tr. vol. 2, 22:15-18**) Dr. Conkle testified that it was his opinion that pellets embedded in sediment or in water for a long period of time would not be white in color because the organic matter would stain them over time. (**Trial Tr. vol. 2, 23:13-18**)

422. Dr. Conkle's opinion is based on reliable scientific methodology. He conducted an experiment where he placed pellets produced by Formosa in black and green teas for a period of three months. What resulted was light staining to the pellet that matched the color of the tea. According to Dr. Conkle, this shows what could happen to a pellet produced by Formosa after it has been exposed to the environment regardless of if it was trapped in water or sediment. (**Trial Tr. vol. 2, 24-25:14**) The discoloration of the pellets following Dr. Conkle's experiment is apparent. (**Ex. 94, Figures 3&4**) On cross-examination Dr. Conkle confirmed that the plastic produced by Formosa becomes discolored when soaked or steeped in organic matter and that the organic materials found in tea

were similar to the organic compounds found in Lavaca Bay, Cox Creek, or any other natural waters. **(Trial Tr. vol. 2, 50:23-51:7)**

423. Defendant's expert Dr. Hale explained that biofouling is a process by which organisms and organic matter can build up on plastic surfaces. He testified that the process of biofouling results in the discoloration of pellets over time. (**Trial Tr. vol. 3, 27:17-28:2**) Dr. Hale agreed that using tea as organic matter for this test would act as a surrogate. (**Trial Tr. vol. 3, 33:9-12**) Dr. Hale offered no evidence that the plastics pellets and powder produced by Formosa would not discolor when exposed to the environment. (**Trial Tr. vol. 3, 38:9-39:8**)

424. Dr. Conkle's opinion that it is possible that the plastics produced by Formosa would be discolored by organic material is corroborated by the experiences of Waterkeepers. Mr. Hamrick testified that pellets entrained in vegetation will turn a greenish color, and that those exposed to the sun will turn more tan. Comparatively, the newer pellets in the system are bright white. **(Trial Tr. vol. 1, 164:18-165:12**)

425. Mr. Hamrick also testified that although some pellets are entrained in the root system of the vegetation in Cox Creek, there are also pellets on the surface of the water in the vegetation. He testified that he can drag his net across the surface of the water, over the vegetation, and collect pellets of all colors, including bright white pellets. (**Trial Tr. vol. 1, 164:18-167:12-168:11**) The majority of the

samples taken by Mr. Hamrick in the vegetation of Cox Creek are collected from the surface water. (**Trial Tr. vol. 1, 164:18-168:14-22**)

426. The extensive cleanup operations by Formosa's contractors where crews "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) as discussed more extensively in **Sections VI(B)(2) and (3)** above, demonstrate that Formosa's discharges are ongoing and not just "legacy discharges."

427. Ms. Wilson explained, "I have been up that creek [Cox Creek] a lot, and sometimes there would be nothing there, and then suddenly there would be -- the next time I went, there would be a lot of them there, and they all looked really fresh." ***Id.*** **at 254:21-24.**

428. Waterkeeper Dale Jurasek testified that he was at Cox Creek on Saturday, March 23, 2019 where he saw "many, many, many pellets." (**Trial Tr. vol. 2, 100:2)**

i. Hurricane Harvey

429. Testimony discussed below about Hurricane Harvey further supports that new discharges have occurred regularly since August 2017. Hurricane Harvey scoured out Cox Creek from approximately August 17, 2017 to September 2, 2017, demonstrating that plastics found in Cox Creek after this date are new discharges.

430. On August 26, 2017, Hurricane Harvey made landfall as a Category 4 Hurricane east of Rockport, Texas on August 26th, 2017 about 50 miles from Port Lavaca." **(Ex. 33 at 25)**

431. Dr. Conkle's report states that "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." **(Ex. 33 at 25)** (citations omitted)

432. Both Dr. Conkle and Dr. Hale agree that Hurricane Harvey would have produced a "major flushing" of the Cox Creek system. (**Trial Tr. vol. 2, 30:5-10; Trial Tr. vol. 3, 39:21-40:6)**

433. Dr. Conkle explains that Hurricane 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. In Cox Creek, the storm 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 Tr. vol. 2, 29:4-30:2)**

434. 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)

435. Dr. Jeremy Conkle testified that Hurricane Harvey would have wiped clean the creek and removed most of the plastic pellets and powder that was there. He testified that following Hurricane Harvey, plastic pellets and powder should not have been as readily apparent as pellets and powder shown in photos of Plaintiffs' exhibits. (**Trial Tr. vol. 2. 30:5-10)**

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

437. Dr. Conkle contends that 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. **(Ex. 33 at 26)** "Sediment, with the bay's shallow average depth of 5-7 ft, 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." **(Ex. 33 at 26)** "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." **(Ex. 33 at 26)**

438. 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)**

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

5. Formosa's witnesses rely on very limited information and are not convincing

440. Formosa's Water Utility Manager John Hyak has not taken a boat up Cox Creek to look for the discharges of pellets and powder in the creek. (**Trial Tr. vol. 3, 172:15-17)**

441. Mr. Brogger does not check Cox Creek on a daily, or even weekly basis, to determine whether the controls put in place by Formosa are working. He testified he visited Cox Creek maybe 15 times in 2018, but that was a "wild guess." (**Trial Tr. vol. 2, 233:23-234:10)**

442. Mr. Crabtree, the facility's General Manager, testified that at the facility they generally attempt to evaluate whether systems function properly before scaling them up. (**Trial Tr. vol. 4, 104:3-11**) However, he has never boated up Cox Creek or walked past the 006 outfall to evaluate the efficacy of the newly implemented controls. **(Trial Tr. vol. 4, 105:20-106:1**) He testified that his opinion as to the quantity of pellets and powder exiting the facility was not at all based on what he has seen in the waterways outside the plant. (**Trial Tr. vol. 4, 106:12-16**)

443. 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**) Dr. Hale only visited the

boat ramp at Cox Creek, but was never shown any of the pellets in the system. **(Trial Tr. vol. 3, 30:25-31:17**)

444. 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. **(Trial Tr. vol. 3, 241:14-242:3**) On his site visit to Formosa, Mr. Anderson only went to one area off of Formosa's property downstream of the stormwater outfalls on Cox Creek, where state highway 35 crosses the creek, and he did not take any photographs. (***Id.* at 245:13-246:9, 246:15-18**) 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 and he did not ask for or review any information about the amount of plastics had been cleaned up by Formosa's contractors. (***Id.* at 235:13-18, 246:10-18; Ex. 388,** Anderson Depo. at 30:6-14**)**

445. Mr. Anderson's opinions about the definition and applicability of "trace amounts" are unreliable and not credible because of his contradictory statements and the limited information he has reviewed. In his deposition, Mr. Anderson stated he had reviewed some of the pellet photos collected by the Plaintiffs, but he had no opinion as to whether they showed more or less than a "trace" of pellets because he "wasn't there to see the accumulation over time." (**Ex. 388**, Anderson Depo. at 45:4-17) Then at trial, Mr. Anderson testified that he could not say that

several of Plaintiffs' pictures showed floating solids in more than trace amounts because he hadn't "had it defined yet for me," he didn't "have a standard," and "some are out enough, but I don't know that I would call it greater than trace." (**Trial Tr. vol. 3, 236:12-24, 247:11-16)**

446. Defendants' retained engineering expert Mr. Moleux, who did not testify at trial, based his opinion that Formosa's "source reduction and pellet recovery" efforts are working on the assumption "there haven't been massive amounts of pellets lately that have been discharged." But he also admitted that he had not seen "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." (**Ex. 403** at 85:16-22; 176:5-8) Furthermore, Mr. Moleux's opinions are limited because on his visit to Formosa, he 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; 190:17-20). Thus, Mr. Moleux cannot reliably evaluate whether Formosa's controls to prevent the discharge of plastics are working. Mr. Moleux's testimony that Formosa is in compliance with its permit term for the discharge of floating solids is not credible.

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

1. Lavaca Bay

447. **Option 1**: Based on the evidence above and consistent with Clean Water Act case law, 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.**

448. **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)**

449. Based on her regulatory experience and the evidence she has reviewed in this case, Donna Phillips believes Plaintiffs' Option 2 is reasonable for determining

the number of days of violations for Lavaca Bay. **(Trial Tr. vol. 2, 170:24-171:13)**

450. The evidence in **Sections VI(B)(2) and VI(C) above**, particularly the testimony by Mr. Mang and Mr. Spree as well as documents and testimony by Lisa Vitale, demonstrate that more than trace amounts of plastics are being discharged continuously, or at least on a daily basis, through 001 into Lavaca bay. This supports Plaintiffs' Options 1 & 2.

2. Cox Creek

451. **Option 1**: Based on the evidence above and consistent with Clean Water Act case law, 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.**

452. **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)**

453. Based on her regulatory experience and the evidence she has reviewed in this case, Donna Phillips believes Plaintiffs' Option 2 is reasonable for determining the number of days of violations for Cox Creek. **(Trial Tr. vol. 2, 171:14-23)**

454. **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)**

455. Alternatively, based on her regulatory experience and the evidence she has reviewed in this case, Donna Phillips believes Plaintiffs' Option 3 is reasonable

for determining the number of days of violations for Cox Creek. **(Trial Tr. vol. 2, 171:24-172:6)**

456. All of these options are supported by Plaintiffs' extensive and credible evidence of plastic pellets and powder in the environment outside Formosa's Point Comfort facility in quantities of such magnitude they are easily seen in videos, photographs, and physical samples. Based on the following substantial and credible evidence, it is highly likely that these plastic pellets and powder are regularly and frequently discharged from the facility in more than trace amounts. The following factors lead to this conclusion:

a. Source control measures implemented at the facility intended to prevent pellets and powder from ever reaching the ground are incomplete; others have have been ineffective. (**Sec. V(B)(2)(ii) above**) Plastic pellets and powder end up being swept, blown, or washed (either with water or rain) into Formosa's stormwater system, and ultimately discharged into Cox Creek. (**Sec. V(B)(2)(i) above**) Formosa did not produce any evidence to rebut this fact.
b. Pellet recovery measures implemented in the facility's stormwater system are temporary and insufficient to remove plastic pellets and powder from the flow before the water is discharged into the creek. (**Sec. V(B)(2)(iii)-(v) above**) Formosa did not produce any evidence to rebut this fact.
c. Formosa's stormwater design makes the removal of pellets inherently more difficult. "Noncontact" stormwater is in fact "in contact" with pellets and powder. Stormwater with pellets and powder is from 10% of the facility. Formosa mixes that 10% stormwater with the other 90% of the facility. Removing pellets and powder from the larger volume is more difficult. (**Sec. V(B) above**)
d. The flushing of Cox Creek from Hurricane Harvey and the ongoing, extensive cleanup operation for the past two years, combined with

hundreds of videos and photographs, labeled by date and location, capture plastic pellets and powder in highly visible and astonishing quantities, demonstrate that releases are ongoing and regular (**Sec. VI(B)(2) and (3)(iii) above**) This is confirmed by expert testimony.

e. In the photos and videos of Cox Creek, a majority of plastic pellets and powder are bright white, indicating they have not been in the environment for long. (**Sec. VI(C)(4) above**)

457. Thus, the accumulation of evidence presented at trial establishes that it is highly likely the pellets and powder are discharged in greater than trace amounts each time an outfall is opened to discharge stormwater from the Point Comfort Facility into Cox Creek, which supports Plaintiffs' Option 3.

VII. Formosa's reporting violations of the Clean Water Act

A. Formosa's Reporting Requirement

458. 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)**

459. 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: "Formosa must notify the TCEQ within 24 hours of any noncompliance, including the discharge of polyethylene pellets." **(Ex. 5 at 70403-000167; *see also* Trial Tr. vol. 2, 152:9-12; Ex. 39 at 11)**

460. 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, stating: "[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** Formosa's 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)**

461. 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)** 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**

462. Therefore, Formosa is required to report any violation of its permit requirement to not discharge in greater than trace amounts of floating solids within 24 hours to TCEQ. **(Trial Tr. vol. 2, 169:23-6)**

463. The failure to report a noncompliant discharge is a separate violation than the noncompliant discharge itself. **(Trial Tr. vol. 2, 169:21-25, 172:19-22; Ex. 39 at 10)**

464. TCEQ frequently cites permittees for failure to report a noncompliant discharge and cited Formosa for failure to report such a discharge in 2015. **(Ex. 39 at 10)**

B. Importance of Self-Reporting

465. According to Donna Phillips, "a healthy self-reporting program is just indicative of good stewardship, good compliance" and demonstrates that compliance is "very important to that entity." **(Trial Tr. vol. 2, 169:14-17*;* Ex. 39 at 9)**

466. Ms. Phillips details the reasons that entities are required to report noncompliant discharges: first, TCEQ is "extremely resource limited" and self-reporting "provides the information that … investigators need to make good assessments of where their... resources are best used" (**Trial Tr. vol. 2, 169:7-13);** second, reporting of violations allows downstream entities to be informed **(Trial Tr. vol. 2, 169:17-20*;* Ex. 39 at 9);** and third citizens have an interest in entities reporting their violations so they can make informed decisions about their activities. **(Ex. 39 at 10; *see also* Trial Tr. vol. 2, 106:24-107:11; 112:22-25)** **(**Testimony by Mr. Lindsey relating the importance to Waterkeeper of accurate self-reporting by Formosa**).**

C. Total Number of Reporting Violations since January 31, 2016

467. 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**)

468. 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)**

469. 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***.

VIII. TCEQ's Enforcement does not preclude this suit

470. 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)**

471. The Agreed Order adjudicates violations from April 4, 2017 through May 17, 2017 and finds six violations. **(Ex. 77; *see* Ex. 256 at 71403-003699**; **Ex. 4*)*** Formosa did not deny the violations in the Agreed Order. (**Trial Tr. vol. 2, 166:3-**

6) By admitting to the violations and agreeing to pay a penalty through this Agreed Order, Formosa "agree[d] to waive all notice and procedural rights," including "the right to an evidentiary hearing, and a right to appeal" TCEQ's findings of violations. **(Ex. 77 at 1)**

472. 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)**

473. 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 Tr. vol. 2, 166:12-167:25)** These six events are comprised of two events at each of three outfalls – 006, 008, and 009. **(Ex. 78 at 71403-011905)**

474. 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)**

475. 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)**

476. Formosa's "pellet recovery system" controls listed in the Agreed Order are not adequate to stop the discharge of floating solids from Formosa's facility in

more than trace amounts because they are end-of-pipe controls that require heavy maintenance. (**Trial Tr. vol. 3, 192:9-196:24**)

477. The Order did not find that the pellet recovery program would stop all discharges of solids. Nor did the Order find that the program would lead to compliance with the trace amounts standard. 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 TPDES permit." **(Ex. 247)** TCEQ chose not to include that language. (**Trial Tr. vol. 2, 240:17-241:19)**

478. Despite Formosa's contention that the executed Agreed Order creates ambiguity in TCEQ's enforcement standards, it did not challenge the TCEQ findings or definition of trace, which it had a right to do as part of the enforcement process. Instead, it signed the order and paid the fine, because that was cheaper and more time efficient. (**Trial Tr. vol. 4, 77:6-78:14; Trial Tr. vol. 2, 242:9-22; *see* Ex. 77**)

479. 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)**

480. 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)**

481. 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)**

482. Discharges from Outfalls 001, 002, 004, 005, 007, and 012 are not covered by the Agreed Order. **(Ex. 77 at 1; Trial Tr. vol. 2, 166:24-167:10)**

483. Failure to report violations are also not covered by the Agreed Order. **(Ex. 77 at 1-2)**

Respectfully submitted,

*/s/ Amy Johnson*_____
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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 through the Court's electronic filing system, on this the 8th day of December 2021.

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