State of New Jersey

Richard J. Codey
Acting Governor

Department of Environmental Protection

Bradley M. Campbell
Commissioner

IN THE MATTER OF THE SIX-MILE STRETCH OF THE LOWER PASSAIC RIVER AND OCCIDENTAL CHEMICAL CORPORATION; MAXUS ENERGY CORPORATION; AND TIERRA SOLUTIONS, INC. Respondents	:	**DIRECTIVE TO PAY THE STATE FOR THE 2,3,7,8-TETRACHLORODIBENZO-p-DIOXIN SOURCE CONTROL DREDGE PLAN IN THE SIX-MILE STRETCH OF THE LOWER PASSAIC RIVER**

The State of New Jersey issues this Directive and Notice to Insurers (hereinafter "Directive") to Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "the Department") by N.J.S.A. 13:1D-1 et seq., the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq. and Executive Order No. 40, issued by the Governor of the State of New Jersey. The Directive is issued in order to notify the above-captioned Respondents that, pursuant to this authority, the Department has determined that it is necessary for the State to develop a Source Control Dredge Plan to address 2,3,7,8-tetrachlorodibenzo-p-dioxin contaminated sediments in the six-mile stretch of the Lower Passaic River to protect the State's citizens and natural resources, and to notify the Respondents of their responsibility in connection with the discharge of hazardous substances.

BACKGROUND

For more than two decades, Occidental Chemical Corporation and its predecessors-in-interest Diamond Shamrock Chemical Company and others (hereinafter "OCC") intentionally discharged 2,3,7,8-tetrachlorodibenzo-p-dioxin (hereinafter "TCDD"), DDT and various other pesticides and chemicals from their manufacturing plant into the Passaic River. EPA and other Agencies have determined that TCDD, in particular, is one of the most toxic chemicals ever developed by man, is extremely harmful to human health and the environment, and can cause adverse health effects (including cancer and reproductive damage) at very low concentrations. TCDD contamination associated with OCC's operations have been found in the sediment of the Six-Mile stretch of the Lower Passaic River at concentrations of up to 5,300,000 parts per trillion and its continued migration has created one of the largest and most toxic contaminant discharges in the world.

The New Jersey Superior Court, Appellate Division has reviewed OCC's plant operations, finding that OCC's actions in discharging TCDD and other hazardous substances into the Passaic River "constituted intentional conduct with the corresponding intentional injury

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inextricably intertwined."[1] The Court found that OCC knew "the nature of the chemicals it was handling," and then that "they were being continuously discharged into the environment."[2] Former plant workers testified under oath that OCC's waste policy amounted to "dumping everything" into the Passaic River and that employees were directed to wade surreptitiously into the Passaic River at low tide and "chop up" the mountains of chemicals in the River so they would not be seen by passing boats.[3] Based upon its examination of the record, the Court believed that OCC "intentionally and knowingly discharged hazardous pollutants with full awareness of their inevitable migration to and devastating impact upon the environment."[4] Today, extremely high concentrations of TCDD remain in the sediments of the Passaic River, are migrating into Newark Bay, and continue to be a threat to human health and the environment.

Dioxin concentrations in the Passaic River fish and crabs are among the highest reported in any known scientific literature and are considered unsafe for human consumption. Because of the TCDD discharged from OCC's chemical plant, the State has been forced to impose and enforce fishing and crabbing bans in the Passaic River for more than 20 years. Despite the State's efforts, however, the fish and crabs are known to be harvested and consumed by a segment of the population of New Jersey. In addition to the imminent and substantial danger that TCDD poses to human and animal populations, the presence of TCDD in the sediment continues to impact commerce, industry, navigation, and dredging and has significantly damaged the ecosystem and natural resources of the Passaic River and the State of New Jersey.

The Department has determined that it is necessary for the State to develop a Source Control Dredge Plan to address TCDD-contaminated sediments in the Six-Mile Stretch of the Lower Passaic River in order to protect the State's citizens, the environment and New Jersey's natural resources. As one of many steps necessary to protect the citizens and environment of New Jersey, the Department issues this Directive to Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. to require them to pay for the State's costs in connection with the development of a Source Control Dredge Plan for the Six-Mile Stretch of the Lower Passaic River.

FINDINGS

I. The Six-Mile Stretch of the Lower Passaic River

1. The scope of this Directive is the six miles of the Lower Passaic River, from mean high water line of each bank, that encompass those reaches of the Passaic River from the abandoned ConRail railroad bridge at the downriver boundary of the area located at the U.S. Army Corps of Engineers ("USACE") station designation of 40+00 (i.e., a transect running

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[1] Diamond Shamrock Chemicals Company v. Aetna Casualty & Surety Company, 258 N.J. Super. 167 (App. Div. 1992).

[2] Id.

[3] Id.

[4] Id.

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perpendicular to the USACE Federal Project Limit for dredging 4000 feet upstream from the red channel junction marker at the confluence of the Hackensack and Passaic Rivers) to a transect six miles (31,680 feet) upriver located at the USACE station designation of 356+80 (hereinafter "the Six-Mile Stretch" or "the Six-Mile Stretch of the Lower Passaic River"). The Six-Mile Stretch is located within the following counties and municipalities: in Essex County, the municipality of Newark, and in Hudson County, the municipalities of Harrison, East Newark, and Kearny.

2. The Diamond Alkali Site consists of the former pesticide manufacturing facility at 80 Lister Avenue, Newark, Essex County, New Jersey and the adjacent property at 120 Lister Avenue, Newark, Essex County, New Jersey (hereinafter, "Lister Site"). The Lister Site is located directly on the banks of the Passaic River.

II. Responsible Parties

Occidental Chemical Company and Maxus Energy Corporation

3. In 1940, Kolker Chemical Works, Inc. acquired the Lister Agricultural Chemical Company.[5]

4. In March 1951, Diamond Alkali Company acquired Kolker Chemical Works, Inc., and later merged into Diamond Alkali Company.[6]

5. On September 21, 1967, Diamond Alkali Company, as a result of a merger with Shamrock Oil and Gas Company, changed its name to Diamond Shamrock Corporation.[7]

6. In 1983, New Diamond Corporation was incorporated to be a holding company and parent of Diamond Shamrock Corporation. After the creation of New Diamond Corporation, Diamond Shamrock Corporation changed its name to Diamond Chemicals Company. Thereafter, New Diamond Corporation changed its name to Diamond Shamrock Corporation. On or about October 26, 1983, Diamond Chemicals Company changed its name to Diamond Shamrock Chemicals Company.

7. On or about September 4, 1986, all of the outstanding stock in Diamond Shamrock Chemicals Company was acquired by Oxy-Diamond Alkali Corporation, an affiliate of Occidental Petroleum Corporation. Thereafter, Diamond Shamrock Chemicals Company merged with Oxy-Diamond Alkali Corporation and was renamed Occidental Electrochemicals Corporation.[8]

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[5] Id.

[6] Id.

[7] Letter from W.E. Notestine, Vice President and General Counsel, Maxus Energy Corporation, to Thomas McKee, Responsible Party Cleanup Element, Division of Hazardous Waste Management, New Jersey Department of Environmental Protection, December 13, 1988.

[8] Letter from Carol Dinkins, Vinson & Elkins, attorney for Occidental Chemical Corporation, to John Sacco, Natural and

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8. On April 30, 1987, Diamond Shamrock Corporation changed its name to Maxus Energy Corporation.[9]

9. Maxus Energy Corporation is a Delaware corporation with a principal office located at 1330 Lake Robbins Drive, Suite 400, The Woodlands, Texas.

10. On November 30, 1987, Occidental Electrochemicals Corporation merged into Occidental Chemical Corporation.[10]

11. Occidental Chemical Corporation is a New York corporation with a principal office located at 5005 LBJ Freeway, Dallas, Texas.

Tierra Solutions, Inc.

12. On December 4, 1987, Diamond Shamrock Chemical Land Holdings, Inc. changed its name to Chemical Land Holdings, Inc.[11]

13. Subsequently, Chemical Land Holdings, Inc. changed its name to Tierra Solutions, Inc.[12]

14. Tierra Solutions, Inc. is a Delaware Corporation with a principal office located at 2 Tower Center Boulevard, Floor 10, East Brunswick, New Jersey.

III. Lister Site Ownership and Operations

15. In the early 1900s, the Lister Agricultural Chemical Company owned and developed 80 Lister Avenue.[13]

16. In 1940, Kolker Chemical Works, Inc. acquired 80 Lister Avenue.[14]

Historic Resources, Office of Natural Resource Restoration, New Jersey Department of Environmental Protection, November 7, 2003.

[9] Letter from W.E. Notestine, Vice President and General Counsel, Maxus Energy Corporation, to Thomas McKee, Responsible Party Cleanup Element, Division of Hazardous Waste Management, New Jersey Department of Environmental Protection, December 13, 1988.

[10] Letter from Carol Dinkins, Vinson & Elkins, attorney for Occidental Chemical Corporation, to John Sacco, Natural and Historic Resources, Office of Natural Resource Restoration, New Jersey Department of Environmental Protection, November 7, 2003.

[11] Id.

[12] Id.

[13] Diamond Shamrock Chemicals Company v. Aetna Casualty & Surety Company, 258 N.J. Super. 167, 181 (App. Div. 1992).

[14] Id.

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17. In the mid-1940s, Kolker Chemical Works, Inc. began agricultural chemical manufacturing at 80 Lister Avenue.

18. From March 1951 to August 1969, the Diamond Alkali Company owned and operated a facility at 80 Lister Avenue.[15]

19. In August 1969, the Diamond Alkali Company ceased production activities at 80 Lister Avenue.

20. In March 1971, the Diamond Alkali Company sold 80 Lister Avenue but reacquired it again in 1986.[16]

21. On April 19, 1984, Diamond Shamrock Chemicals Company acquired 120 Lister Avenue.[17]

22. Between January 27, 1986 and September 4, 1986, Diamond Shamrock Chemicals Company transferred titles of the Lister Site to a sister company, Diamond Shamrock Chemical Land Holdings, Inc., now known as Tierra Solutions, Inc.[18]

23. Tierra Solutions, Inc. is the current owner of the Lister Site.

IV. TCDD Contamination at and emanating from the Lister Site

24. One of the chemicals manufactured at the Lister Site was 2,4,5-trichlorophenoxyacetic acid ("2,4,5-T").[19] TCDD was formed as a by-product of the 2,4,5-T process and is a particularly toxic form of dioxin.[20] Up to 15 percent of the total national output of 2,4,5-T was produced at the Lister Site, with an average of approximately 800 tons per year.[21]

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[15] Administrative Consent Order, In the Matter of Diamond Shamrock Chemicals Company and Marisol, Inc., March 13, 1984.

[16] Id.

[17] United States of America, The State of New Jersey v. Occidental Chemical Corporation, Chemical Land Holdings, Inc., Consent Decree, DACD: 07:14:89.

[18] Letter from Carol Dinkins, Vinson & Elkins, attorney for Occidental Chemical Corporation, to John Sacco, Natural and Historic Resources, Office of Natural Resource Restoration, New Jersey Department of Environmental Protection, November 7, 2003.

[19] Richard F. Bopp, Michael L. Gross, Huayi Tong, H. James Simpson, Stephen J. Monson, Bruce L. Deck, and Fredrika C. Moser, "A Major Incident of Dioxin Contamination: Sediments of New Jersey Estuaries," *Environmental Science and Technology*, Vol. 25, No. 5, 1991.

[20] U.S. Environmental Protection Agency, *Dioxins*, 1980.

[21] Richard F. Bopp, Michael L. Gross, Huayi Tong, H. James Simpson, Stephen J. Monson, Bruce L. Deck, and Fredrika C. Moser, "A Major Incident of Dioxin Contamination: Sediments of New Jersey Estuaries," *Environmental Science and*

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25. "Dioxins" are a group of chemical compounds that share certain chemical structures and biological characteristics. Dioxins are comprised of two benzene rings linked by a pair of oxygen atoms, forming tricyclic aromatic compounds. The polychlorinated dibenzo-p-dioxins, of which there are 75 isomers, have been the focus of worldwide public health research due to the extremely toxic nature of one of these isomers, referred to as 2,3,7,8 tetrachlorodibenzo-p-dioxin or TCDD. TCDD is considered the most toxic synthetic organic compound known to exist.[22]

26. Occidental Chemical Company, through its predecessor Diamond Shamrock Chemical Company (hereinafter "Diamond") discharged hazardous substances, including TCDD, from its facility at the Lister Site into the Passaic River.[23]

27. The soil and ground water at the Lister Site are contaminated with Dioxins, including TCDD, pesticides, and other hazardous substances.[24]

28. Former Diamond employees have testified under oath in court that Diamond's waste disposal policy at its facility on the Lister Site essentially amounted to "dumping everything" into the Passaic River, despite knowledge of the high toxicity of the Dioxins produced at the facility.[25]

29. In an April 6, 1992 decision, the Appellate Division of the Superior Court of New Jersey (hereinafter "the Appellate Division") found that "[o]verwhelming evidence was presented that Diamond knew about the release of dioxins from its plant and the migration of these substances to surrounding areas."[26]

30. The Appellate Division found that "the continuous release of dioxins from the [Diamond] plant was not 'unforeseen,' and the resulting damage was not 'unexpected.'"[27]

Technology, Vol. 25, No. 5, 1991.

[22] U.S. Environmental Protection Agency, *Dioxins*, 1980, "Health Assessment Document for Chlorinated Dibenzo-p-dioxins," Office of Research and Development, Sept. 1985; New Jersey Department of Environmental Protection, "A Study of Dioxin (2,3,7,8-Tetrachlorodibenzeno-p-Dioxin) Contamination in Select Finfish, Crustaceans and Sediments of New Jersey Waterways," Office of Science and Research, October 30, 1985, http://www.state.nj.us/dep/dsr/dioxin/Study%20of%20Dioxin.pdf.

[23] Diamond Shamrock Chemicals Company v. Aetna Casualty & Surety Company, 258 N.J. Super. 167, 182-183 (App. Div. 1992).

[24] U.S. Environmental Protection Agency Region 2, Diamond Alkali Co. Superfund Site Description New Jersey, undated, http://www.epa.gov/region02/superfund/npl/0200613c.pdf.

[25] Diamond Shamrock Chemicals Company v. Aetna Casualty & Surety Company, 258 N.J. Super. 167, 182-183 (App. Div. 1992).

[26] Id.

[27] Id.

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31. The Appellate Division found that "Diamond intentionally and knowingly discharged hazardous pollutants with full awareness of their inevitable migration to and devastating impact upon the environment."[28]

32. The Appellate Division found that "Diamond knew 'the nature of the chemicals it was handling,' knew that 'they were being continuously discharged into the environment,' and knew that 'they were doing at least some harm [to the environment].'"[29]

33. The Appellate Division found that "Diamond knew it was dealing with a toxic substance. Perhaps it was not aware of the exact extent of the dangerous consequences emanating from its polluting activity. However, we cannot ignore reality by accepting the blithe assurance of Diamond that it did not intend to injure others. The evidence abounds the other way."[30]

34. The Appellate Division found that "[a]lmost from the day production of the phenoxy herbicides commenced, Diamond's workers experienced a skin disease called chloracne" and "the record reveals that at a relatively early date, Diamond became aware of the high toxicity of dioxins and chose to disregard methods designed to diminish their production."[31]

35. The Appellate Division found that "Diamond's management was wholly indifferent to the consequences flowing from its decision. Profits came first."[32]

36. The Appellate Division found that Diamond Shamrock had shown a "heedless indifference to the environmental damage which resulted from its manufacturing operations."[33]

V. TCDD Contamination in the Six-Mile Stretch of the Lower Passaic River

37. Sediments in the Six-Mile Stretch of the Lower Passaic River and Newark Bay are contaminated with Dioxins, including TCDD.[34]

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[28] Id. at 197.

[29] Id. at 211.

[30] Id. at 215.

[31] Id.

[32] Id. at 213.

[33] Id. at 184.

[34] U.S. Department of Commerce, National Oceanographic and Atmospheric Administration, "Assessing TCDD-TEQ Risk in a New Jersey Urban Industrialized Waterway," June 2004.; Richard F. Bopp, Michael L. Gross, Huayi Tong, H. James Simpson, Stephen J. Monson, Bruce L. Deck, and Fredrika C. Moser, "A Major Incident of Dioxin Contamination: Sediments of New Jersey Estuaries," *Environmental Science and Technology*, Vol. 25, No. 5, 1991.

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38. In March 1986, Diamond Shamrock Chemical Company submitted the "Passaic River Sediment Study," which indicated that the sediments of the Lower Passaic River were contaminated with TCDD.[35]

39. Subsequent studies confirmed that sediments of the Lower Passaic River are contaminated with Dioxins, including TCDD, and further demonstrated that Dioxins, including TCDD, have migrated beyond the Six-Mile Stretch.[36]

40. TCDD is present in the sediment of the Six-Mile Stretch of the Lower Passaic River directly adjacent to the Lister Site at concentrations of up to 5,300,000 parts per trillion.[37]

41. TCDD is present in the sediment of the Six-Mile Stretch of the Lower Passaic River at other locations at concentrations of up to 6,900 parts per trillion.[38]

42. TCDD in the sediments of the Lower Passaic River and Newark Bay are among the highest concentrations and the greatest extent of documented TCDD discharges in the world.[39]

VI. TCDD Presents Unacceptable Risks to Ecological Health

43. The Department has determined that TCDD in sediments show strong resistance to biodegradation and is transported with sediment movement. TCDD bioaccumulates in biota tissues and biomagnifies in the food web.[40]

44. The Department has determined that the fauna within the entire tidal section of the

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[35] "Passaic River Sediment Study," March 1986, prepared by I.T. Corporation.

[36] U.S. Department of Commerce, National Oceanographic and Atmospheric Administration, "Assessing TCDD-TEQ Risk in a New Jersey Urban Industrialized Waterway," June 2004.; Richard F. Bopp, Michael L. Gross, Huayi Tong, H. James Simpson, Stephen J. Monson, Bruce L. Deck, and Fredrika C. Moser, "A Major Incident of Dioxin Contamination: Sediments of New Jersey Estuaries," *Environmental Science and Technology*, Vol. 25, No. 5, 1991.

[37] E.g., U.S. Department of Commerce, National Oceanographic and Atmospheric Administration, "Assessing TCDD-TEQ Risk in a New Jersey Urban Industrialized Waterway," June 2004.

[38] New Jersey Department of Environmental Protection, "A Study of Dioxin (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) Contamination in Select Finfish, Crustaceans and Sediments of New Jersey Waterways," Office of Science and Research, October 30, 1985, http://www.state.nj.us/dep/dsr/dioxin/Study%20of%20Dioxin.pdf.

[39] Richard F. Bopp, Michael L. Gross, Huayi Tong, H. James Simpson, Stephen J. Monson, Bruce L. Deck, and Fredrika C. Moser, "A Major Incident of Dioxin Contamination: Sediments of New Jersey Estuaries," *Environmental Science and Technology*, Vol. 25, No. 5, 1991.

[40] D.J. Hoffman, C.P. Rice, T.J. Kubiak, "PCBs and Dioxins in Birds," Environmental Contaminants in Wildlife: Interpreting Tissue Concentrations, 1996; C.P. Rice, P. O'Keefe, T.J. Kubiak, "Sources, pathways and effects of PCBs, dioxins, dibenzofurans," Handbook of Ecotoxicology, 2nd Edition, 2003.

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Passaic River are heavily contaminated with TCDD.[41]

45. The U.S. Environmental Protection Agency determined that TCDD research in aquatic organisms and wildlife has revealed adverse reproductive impacts and immunotoxicity effects.[42]

46. The U.S. Environmental Protection Agency has determined that aquatic organisms, particularly early life stages of certain fish species, are extremely sensitive to low concentrations of TCDD, with high mortality rates observed.[43]

VII. TCDD Presents Unacceptable Risks to Human Health

47. In 1983, the New Jersey Department of Health and the U.S. Environmental Protection Agency announced that the results of their cooperative investigation into dioxin contamination of fish caught in the estuarine portion of the Passaic River indicated widespread dioxin contamination. Tissue samples collected across this region exhibited concentrations of TCDD in excess of the Federal Drug Administration "Levels of Concern" which recommend no consumption at that level.[44]

48. The U.S. Environmental Protection Agency has determined that TCDD bio-accumulate in fish and renders the fish unfit for human consumption.[45]

49. The Department has determined that due to the elevated TCDD concentrations in Passaic River sediment, TCDD has accumulated to concentrations unsafe for human consumption in many commercially significant aquatic species in and near this waterway.[46]

50. The Department has determined that due to the presence of TCDD found in the tissue of the blue crab, and due to the propensity for exposure, that the consumption and sale of

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[41] New Jersey Department of Environmental Protection, "A Study of Dioxin (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) Contamination in Select Finfish, Crustaceans and Sediments of New Jersey Waterways," Office of Science and Research, October 30, 1985, http://www.state.nj.us/dep/dsr/dioxin/Study%20of%20Dioxin.pdf.

[42] U.S. Environmental Protection Agency, "Interim Report on Data and Methods for Assessment of 2,3,7,8-Tetrachlorodibenzo-p-dioxin Risks to Aquatic Life and Associated Wildlife," Office of Research and Development, March 1993.

[43] Id.

[44] New Jersey Department of Environmental Protection, "A Study of Dioxin (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) Contamination in Select Finfish, Crustaceans and Sediments of New Jersey Waterways," Office of Science and Research, October 30, 1985, http://www.state.nj.us/dep/dsr/dioxin/Study%20of%20Dioxin.pdf.

[45] Administrative Consent Order, In the Matter of the Diamond Alkali Superfund Site (Passaic River Study Area), and Occidental Chemical Company, April 1994.

[46] New Jersey Department of Environmental Protection, "A Study of Dioxin (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) Contamination in Select Finfish, Crustaceans and Sediments of New Jersey Waterways," Office of Science and Research, October 30, 1985, http://www.state.nj.us/dep/dsr/dioxin/Study%20of%20Dioxin.pdf.

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this species from the Passaic River should be prohibited.[47]

51. In June of 1983, upon discovery of TCDD at the Lister Site, Governor Thomas H. Kean declared a state of emergency and authorized and directed the Department to take emergency measures necessary to "fully and adequately protect the health, safety and welfare of the citizens of this State from any actual or potential threat or danger which may exist as a result of the possible contamination of the premises located at 80 Lister Avenue in the City of Newark."[48]

52. Executive Order EO-40-17 in 1983 and Executive Order EO-40-19 in 1984 prohibited the sale and consumption of all fish, shellfish, and crustaceans from the Passaic River and Newark Bay, and remain in effect today.[49]

53. The Department has determined that the most immediate public health threat of Dioxins is from the consumption of blue crabs taken throughout the tidal Newark Bay complex, which includes the Six-Mile Stretch of the Lower Passaic River.

54. An angler study conducted in 1995 revealed that of 300 anglers surveyed, 124 anglers reported consuming blue claw crab, and 15% of those anglers that consumed the blue claw crab ate the hepatopancreas.[50]

55. The Department has determined that individuals who consume either the hepatopancreas or the contaminated muscle tissue (i.e., cross contaminated during processing) of the blue crab may be exposed to TCDD.[51]

56. The U.S. Environmental Protection Agency has determined that TCDD can be identified as a human carcinogen based on the weight of the human and animal evidence.[52]

57. The U.S. Environmental Protection Agency has determined that "even the slightest trace of TCDD in the environment may have adverse effects on the health of both

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[47] Id.

[48] Governor Thomas H. Kean, " Executive Order No. 40," June 2, 1983.

[49] Administrative Order on Consent for Remedial Investigation and Feasibility Study, Conformed Copy as Amended, February 17, 2004.

[50] New Jersey Department of Environmental Protection, "Estimate of Cancer Risk to Consumers of Crabs Caught in the Area of the Diamond Alkali Site and Other Areas of the Newark Bay Complex From 2,3,7,8-TCDD and 2,3,7,8-TCDD Equivalents," Division of Science, Research and Technology, April 25, 2002.

[51] New Jersey Department of Environmental Protection, "A Study of Dioxin (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) Contamination in Select Finfish, Crustaceans and Sediments of New Jersey Waterways," Office of Science and Research, October 30, 1985, http://www.state.nj.us/dep/dsr/dioxin/Study%20of%20Dioxin.pdf.

[52] U.S. Environmental Protection Agency, "Dioxins: Summary of the Dioxin Reassessment Science, Information Sheet 1," October 15, 2004, http://www.epa.gov/NCEA/pdfs/dioxin/factsheets/dioxin_short.pdf.

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human and animal populations."[53]

58. The U.S. Environmental Protection Agency, in conjunction with the U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, has determined that human health effects from dioxin may include, "adverse effects upon reproduction and development; suppression of the immune system; chloracne (a severe acne-like condition that sometimes persists for many years); and cancer."[54] The Agency for Toxic Substances and Disease Registry concluded that other human health effects of dioxin exposure may include: liver dysfunction, neurological, and genotoxic effects.[55]

59. The U.S. Environmental Protection Agency has determined that in animals, dioxin has been shown to be teratogenic, embryotoxic, carcinogenic and cocarcinogenic.[56] Exposure to dioxins has been found to produce a variety of toxic effects including death, immunological, cardiovascular, gastrointestinal, hematological, hepatic, renal, endocrine, dermal effects and body weight loss (known as wasting syndrome).[57]

60. The U.S. Food and Drug Administration has reported that, based on animal studies, there is evidence that exposure to low concentrations of dioxin over long periods (or high concentrations during sensitive life stages) might result in detrimental reproductive and/or developmental effects.[58]

VIII. Impact of Source Removal

61. The Department has determined that the removal of contaminated sediments within the Passaic River would result in the significant reduction of chemical exposure to humans and ecological receptors in the Passaic and potentially in many other areas of the NY/NJ Estuary. Contaminants found in sediments targeted for removal would no longer be transported to Newark Bay.[59]

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[53] U.S. Environmental Protection Agency, *Dioxins*, 1980.

[54] U.S. Environmental Protection Agency, "Dioxins: Summary of the Dioxin Reassessment Science, Information Sheet 1," October 15, 2004, http://www.epa.gov/NCEA/pdfs/dioxin/factsheets/dioxin_short.pdf; see also U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, "Toxicological Profile for Chlorinated Dibenzo-p-dioxins (CDDs)," December 1998, http://www.atsdr.cdc.gov/toxprofiles/tp104.html.

[55] U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, "Toxicological Profile for Chlorinated Dibenzo-p-dioxins (CDDs)," December 1998, http://www.atsdr.cdc.gov/toxprofiles/tp104.html.

[56] U.S. Environmental Protection Agency, *Dioxins*, 1980.

[57] U.S. Environmental Protection Agency, *Dioxins*, 1980.; see also U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, "Toxicological Profile for Chlorinated Dibenzo-p-dioxins (CDDs)," December 1998, http://www.atsdr.cdc.gov/toxprofiles/tp104.html.

[58] Food and Drug Administration, "Questions and Answers about Dioxins," October 2004. http://www.cfsan.fda.gov/~lrd/dioxinqa.html.

[59] New Jersey Department of Transportation, Maritime Resources, "Restoration of the Passaic River Conceptual Proposal," p. 2, March 17, 2000.

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IX. Spill Compensation and Control Act

62. Dioxins, including TCDD are hazardous substances pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11b.k.

63. Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. are responsible for the TCDD and other hazardous substances that have been discharged at the Lister Site and into the Six-Mile Stretch of the Lower Passaic River.

64. Pursuant to N.J.S.A. 58:10-23.11g.c, Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. are strictly liable, jointly and severally, without regard to fault, for all cleanup and removal costs associated with TCDD in the sediment of the Six-Mile Stretch of the Lower Passaic River.

65. Pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11f, whenever any hazardous substance is discharged, the Department may, in its discretion, act to clean up and remove or arrange for the cleanup and removal of the discharge, or may direct any person in any way responsible for the hazardous substances to clean up and remove, or arrange for the cleanup and removal of discharge hazardous substances.

66. In order to mitigate the impact to ecological and human health due to the presence of TCDD in the Lower Passaic River, the Department has determined that a Department-approved source control project is necessary to protect human health and the environment from TCDD discharged from the Lister Site into the Six-Mile Stretch of the Lower Passaic River.

DIRECTIVE

67. The Department hereby directs Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. to cleanup up and remove the discharged TCDD by arranging for the source control of TCDD-contaminated sediment in the Six-Mile Stretch of the Lower Passaic River by paying the State's costs for the development of a Source Control Dredge Plan. This Plan shall achieve stabilization and/or removal of TCDD concentrations above 17 parts per trillion or to a level that permanently removes the main source of uncontrolled TCDD sediment contamination in the Passaic River, and thereby prevent ongoing TCDD loadings to other parts of the estuary, decrease the amounts of TCDD-impacted sediments suspended in the water column, decrease the availability of TCDD-laden sediment to biota and other receptors, and accelerate the reduction of TCDD concentrations in fish/shellfish tissue to levels considered safe for both human consumption and ecosystem health. The Plan will take into consideration DDT and other contaminants in close proximity to the TCDD, the risks posed from the DDT and other contaminants for purposes of post-dredging exposure and disposal, and the opportunities to remediate that contamination along with the TCDD in order to gain efficiencies and effectiveness

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of the source control efforts. The Plan will also take into account all future uses of the Passaic River.

68. The Department hereby directs Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. to pay the Department **$2,298,106.00** within thirty (30) calendar days after receipt of this Directive and Notice to Insurers. The payment must be delivered to:

Bureau of Revenue
Department of Environmental Protection
P.O. Box 417
Trenton, New Jersey 08625-0417

NOTICE

69. If Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. fail to pay the Department the amount set forth above, the Department may commence suit against Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. seeking reimbursement for all costs incurred.

70. Further, failure to comply with this Directive and Notice to Insurers will increase the potential liability of Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. to the Department in an amount equal to three (3) times the cost of arranging for the cleanup and removal of the discharge by paying the State's costs pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11f., including a first priority lien on the property subject of the discharge.

71. Pursuant to N.J.S.A. 58:10-23.11u., the Department may issue an order to require compliance with the Spill Compensation and Control Act. Failure by the Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. to comply with this Directive may result in the issuance of an order by the Department, which will subject each Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. to penalties of up to $50,000 per day and each day of violation constitutes an additional, separate and distinct violation of the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq.

RESERVATION OF RIGHTS

72. In the event that the costs of completing the activities described in this Directive and Notice to Insurers exceed the current estimates, the Department reserves the right to direct Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. to pay such costs and to seek full reimbursement and damages for all such costs. In the event that the costs of completing the activities described in the Directive and Notice to Insurers are less than the estimate specified above, the Department will rebate the unexpended funds to those parties that complied with the Directive and Notice to Insurers on a proportional basis.

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73. The Department reserves the right to direct the Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. to take or arrange for the taking of any and all additional remediation which the Department determines to be necessary to protect the public health and safety or the environment and to seek full reimbursement and treble damages for all costs incurred in taking such additional remediation.

74. Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. are advised that the discharges referenced in this Directive and Notice to Insurers may also constitute violations of the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and that Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. may, therefore, be subject to the penalties prescribed for violations of these Acts. The Department reserves all rights and remedies under those Acts as well as any other rights and remedies under any applicable law.

NOTICE TO INSURERS

75. BE ON NOTICE THAT, pursuant to N.J.S.A. 58:10-23.11s., any claims for costs of cleanup or civil penalties by the State and any claim for damages by any injured person, may be brought directly against the bond, insurer or any other person providing evidence of financial responsibility. Occidental Chemical Corporation, Maxus Energy Corporation and Tierra Solutions, Inc. are therefore urged to contact such insurers and notify them of the issuance of this Directive and Notice to Insurers.

Date: 12/14/05

Ronald T. Corcory, Assistant Director
Oversight Resources Allocation Element

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