4.20 HAZARDOUS SUBSTANCES

SECTION 4.20 HAZARDOUS SUBSTANCES

4.20-1 HAZARD OVERVIEW

Hazardous substances are substances that are considered severely harmful to human health and the environment, as defined by the United States Environmental Protection Agency (U.S. EPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Superfund Law). Many are commonly used substances which are harmless in their normal uses but are quite dangerous if released. The Superfund law designates more than 800 substances as hazardous and identifies many more as potentially hazardous due to their characteristics and the circumstances of their release (USEPA, 2013). Additionally, New Jersey has its own hazardous substance definitions as found in various state legislation.

Hazardous substance includes the following:

- Any element, compound, mixture, solution, or substance designated as hazardous under section 102 of CERCLA.
- Any hazardous substance designated under section 311(b)(2)(a) of the Clean Water Act (CWA), or any toxic pollutant listed under section 307(a) of the CWA. There are over 400 substances designated as either hazardous or toxic under the CWA.
- Any hazardous waste having the characteristics identified or listed under section 3001 of the Resource Conservation and Recovery Act.
- Any hazardous air pollutant listed under section 112 of the Clean Air Act, as amended. There are over 200 substances listed as hazardous air pollutants under the Clean Air Act (CAA).
- Any imminently hazardous chemical substance or mixture which the EPA Administrator has "taken action under" section 7 of the Toxic Substances Control Act (USEPA, 2013).
- Any substance found on the hazardous substance list adopted by the NJDEP pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq.
- Any substance listed as hazardous under New Jersey's Discharges of Petroleum and Other Hazardous Substances Rules, N.J.A.C. 7:1E Appendix A.

If released or misused, hazardous substances can cause death, serious injury, long-lasting health effects, and damage to structures and other properties, as well as the environment.

Transportation of hazardous substances on highways involves tanker trucks or trailers, which are responsible for the greatest number of hazard substance release incidents. New Jersey is composed of over 38,991 miles of highway, many of which are used to transport hazardous substances (NJDOT Public Road Mileage by Area Type, 2020). These roads cross rivers and streams at many points; hazardous substance spills on roads have the potential to pollute watersheds that serve as domestic water supplies for parts of the State. Potential also exists for hazardous substance releases to occur along rail lines as collisions and derailments of train cars can result in large spills.

Pipelines can also transport hazardous liquids and flammable substances such as natural gas and petroleum. Incidents can occur when pipes corrode, when they are damaged during excavation, incorrectly operated, or damaged by other forces. In New Jersey, most of the large pipeline leaks have been caused by marine traffic hitting or the anchors of ships effecting pipelines in the waterways.

In addition, hazardous substances can be transported by aircraft or by watercraft. Crashes, spills of materials, and fires on these vessels can pose a hazard.

4.20-2 LOCATION, EXTENT, AND MAGNITUDE

Location

Hazardous Substances Fixed Site

Many years ago, numerous wastes were dumped on the ground, in rivers, or left out in the open. As a result, thousands of uncontrolled or abandoned contaminated sites were created. These sites included abandoned warehouses, manufacturing facilities, processing plants, and landfills. In response to concerns regarding health and environmental risks, Congress established the Superfund program in 1980 to clean up these sites. The Superfund program is administered by the U.S. EPA in cooperation with individual states. In New Jersey, the Department of Environmental Protection (NJDEP) Contaminated Site Remediation and Redevelopment program coordinates with EPA on the remediation of Superfund Sites in the state (NJDEP, 2013).

Federal regulations, include the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA) required that a National Priorities List (NPL) of sites throughout the United States be maintained and revised at least annually (NJDEP, 2013).

Fixed-site facilities that use, manufacture, or store hazardous substances in New Jersey pose risk and must comply with Title III of the federal SARA. SARA was signed into law on October 17, 1986. It is a federal law that applies nationwide. It must be realized that this law is linked to N.J.S.A. 34:5A, the New Jersey Worker and Community Right to Know Act. SARA requires the governor of each state to establish a State Emergency Response Commission (SERC). New Jersey's SERC was established by Executive Order on February 13, 1987. SARA also requires that the emergency planning districts be established by the SERC. The Act specified that these districts can be existing political subdivisions. The function of the emergency planning district is to facilitate preparation and implementation of emergency plans. In New Jersey, all municipalities and counties have been designated emergency planning districts (total of 585). The Local Emergency Planning Committees (LEPC) is the policy body for the emergency planning district (New Jersey Division of Fire Safety, 2011).

State legislation which establish requirements related to site remediation include:

- The Site Remediation Reform Act (SRRA)- which establishes the Licensed Site Remediation Professional (LSRP) Program. LSRPs oversee the remediation of contaminated sites. SRRA requires that the LSRP comply with all remediation statutes and rules and consider Department developed guidance when making remediation decisions.
- The Industrial Site Recovery Act- which requires notification to the Department within five days of an industrial establishment closing operations or transferring ownership of operations (defined) and the cleanup of the entire industrial establishment.
- The Underground Storage of Hazardous Substances Act - which requires the investigation of the tank to determine the extent and impact of the discharge, and the cleanup of the discharge.

Additionally the State enacted the Toxic Catastrophe Prevention Act (TCPA), N.J.S.A. 13:1K-19 et seq. Currently, implementation of the requirements established under this Act is facilitated by the TCPA Program. Certain industrial facilities using materials considered extraordinarily hazardous must take steps to prevent releases and protect public safety. New Jersey has also mandated that facilities storing large quantities of hazardous substances take preventative measures to reduce the likelihood of a leak or discharge. Established under the New Jersey Spill Compensation and Control Act (N.J.S.A. 58:10-23.11), these requirements include testing and inspection of storage tanks, training of employees, and emergency response planning. e Discharges of Petroleum and other Hazardous Substances (DPHS) program facilitates implementation of these requirements by requiring major facilities to submit Discharge Prevention, Containment, and Countermeasure (DPCC) and Discharge Cleanup and Removal (DCR) plans. Regulations related to reporting of chemical and petroleum discharges are also administered under this by the DPHS program (NJDEP, 2012).

The Community Right to Know (CRTK) program collects, processes, and disseminates the chemical inventory, environmental release and materials accounting data required to be reported under the New Jersey Worker and Community Right to Know Act, N.J.S.A.34:5A and the federal Emergency Planning and Community Right to Know Act of 1986 (EPCRA). EPCRA is also known

as Title III of the SARA. This information is used by the public, emergency planners, and first responders to determine the chemical hazards in the community (NJDEP, 2012).

New Jersey employers, whose businesses are assigned covered North American Industry Classification System (NAICS) codes listed in the New Jersey Worker and Community Right to Know (CRTK) regulations, are required to submit CRTK surveys listing the environmental hazardous substances (EHSs) present at their facilities in quantities that exceed 500 pounds, unless the EHS is on the federal Emergency Planning and Community Right to Know Act (EPCRA) Section 302 list of extremely hazardous substances with a lower reporting threshold. In addition, Section 312 of EPCRA requires owners and operators of federal facilities and private sector facilities that are subject to the United States Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard to report their inventories of any chemical that requires a Materials Safety Data Sheet (MSDS) and is present on site in quantities that exceed 10,000 pounds, unless the chemical is an Extremely Hazardous Substance with a lower reporting threshold (NJDEP, 2011).

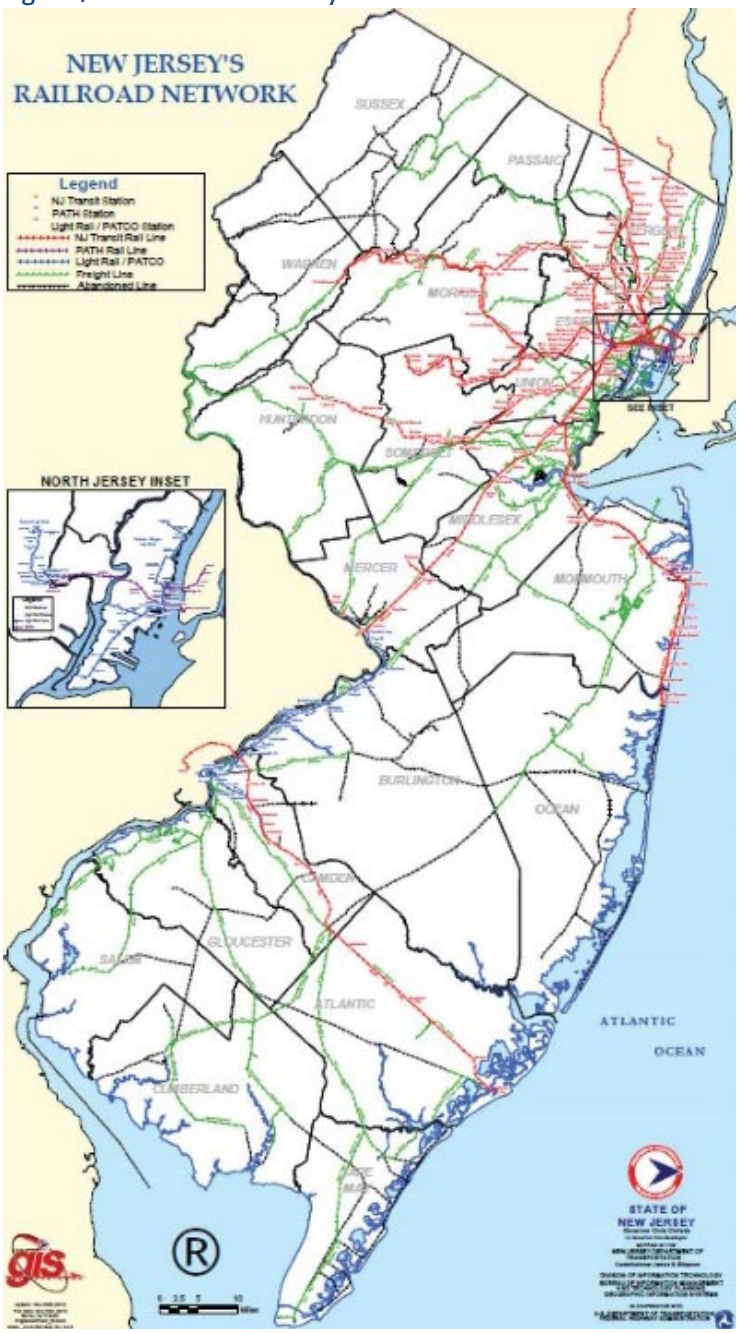
Owners and operators of manufacturing, and select non-manufacturing companies, having the equivalent of 10 or more full-time employees, and manufacturing, importing, processing or otherwise using toxic chemicals listed on the EPCRA Section 313 (TRI) list in quantities that exceed specified thresholds, are required to annually report their releases of these chemicals for the previous year. In New Jersey as of 2021, 321 companies are required to file federal Toxic Chemical Release Inventory (TRI) forms (EPA TRI Explorer, 2023). TRI Form R requires the listing of environmental releases, on-site waste management and off-site transfers while the simplified Form A Certification Statement requires the listing of the chemical only. These companies are also required to submit to NJDEP the Release and Pollution Prevention Report (RPPR) listing the quantities of environmental release, on-site waste management, waste transfer, and chemical throughput information. Most of these facilities are also subject to Pollution Prevention Planning Requirements and, therefore, required to report pollution prevention progress information on the RPPR (NJDEP, 2011).

The NJDEP maintains a list of Known Contaminated Sites of New Jersey (KCSNJ) which is available online. The "Active Sites" report consists of sites with one or more active cases or remedial action permits where contamination has been confirmed. There are separate reports for pending and closed sites. In 2022, there were over 13,764 KCSNJ sites in New Jersey (NJDEP, 2022).

Hazardous Substances In-Transit

Incidents involving hazardous substances in transit can occur anywhere in the State. New Jersey has several major transportation corridors on which thousands of vehicles transporting hazardous substances travel daily. Major transportation routes include the Garden State Parkway; Atlantic City Expressway; Palisades Interstate Parkway; New Jersey Turnpike; Interstates I-280, I-95, I-295, I-195, I-80, I-78, and I-287; and Routes 1, 33, and 66. New Jersey has 38,991 miles of highways (33,535 miles urban and 5,456 miles rural). Of the total miles of highways, 432 miles are Interstate, 488 miles are other freeways or expressways, 5,896 miles are arterial, 4,437 miles are collector, and 27,738 miles are local (NJDOT Public Road Mileage by Area Type, 2020). Additional information on New Jersey’s transportation network is located in the Section 3.0: State Profile.

Figure 4.20-1 Rails in New Jersey



Source: NJDOT, 2013

Hazardous substances incidents may also occur along railways across the State. NJDOT has a vital interest in preserving and improving the rail freight part of its transportation network. The State has approximately 1,000 miles of rail freight lines and is served by short-line regional and national railroads.

Rail shipments allow cost-effective movement of goods with less stress on the State's highway system. Major commodities shipped by rail entail petrochemicals (including plastic pellets), construction materials, food products, raw materials, and finished goods for manufacturers. One concern for this hazard are rail cars carrying hazardous substances, such as crude oil which is used by both refineries in NJ. Crude oil is one of the most volatile oils and was responsible for killing 42 people in 2013

when the train derailed and exploded in the downtown city of Lac-Mégantic, Quebec, Canada. Therefore, an accident or release could pose a public safety hazard to the community. Figure 4.20-1 shows railways that run throughout New Jersey.

Hazardous substances can also be transported via pipeline across the State. New Jersey has an extensive network of natural gas and petroleum pipelines including one which originates in the Gulf Coast region (the Colonial Pipeline). Figure 4.20-2 shows the extent and locations of pipelines throughout the northeastern United States, with New Jersey highlighted.

Figure 4.20-2 Interstate Natural Gas Pipelines in the Northeast

Source: US Energy Information Administration 2008

Hazardous Substances Offshore

Offshore hazardous substance incidents have the potential to affect New Jersey because of its vast coastline consisting of rivers, bays, and oceans. New Jersey is a vital link in marine transportation in the Northeast. The State has 14 ports, including the Port of New York and New Jersey, which are a critical link for shipping worldwide. The potential for a hazardous substances incident offshore is possible given the volume of shipping traffic around the State.

New Jersey features the Port of New York and New Jersey system, which includes the New Jersey Ports of Port Newark, Elizabeth-Port Authority Marine Terminal, and Port Jersey. More information on the port can be found in Section 3.0: State Profile. The Port ships a variety of goods, many of which are hazardous.

The cities of Linden and Elizabeth, located on New Jersey's highly industrialized northeast coast, are home to Conoco Phillips' Bayway Refinery (formerly owned by Exxon). The northernmost refinery on the east coast of the United States, Bayway processes 238,000 barrels (10 million gallons) of crude oil per day. The crude oil is brought in by tanker ships from the North Sea, Canada, and West Africa. Once processed, 145,000 barrels of gasoline and 110,000 barrels of distillates per day are transported to east coast customers via pipeline transport, barges, railcars, and tank trucks. In addition, a petrochemical plant produces lubricants and additives, and a polypropylene plant produces over 775 million pounds per year of polypropylene (American Littoral Society, 2013).

Figure 4.20-3 Port of New York and New Jersey Facilities

Source: Port Authority of New York and New Jersey, 2023

The Delaware River shoreline is home to six major petroleum refineries that process nearly one million barrels of crude oil per day, as well as other chemicals associated with the refining process, producing 70% of the Northeast's oil and gasoline. Collectively, the Ports of Philadelphia; South Jersey; and Wilmington, Delaware; combined are the largest general cargo port complex in the nation.

In addition to the Port of New York and New Jersey, there are numerous other ports throughout the State. The status of and extent of commercial or private shipping varies greatly across the State. Table 4.20-1 lists the ports of New Jersey.

Table 4.20-1 Ports in New Jersey

Type of Facility	Port Name	Owner	County
Marine Port	Elizabeth – Port Authority Marine Terminal	Port Authority of New York and New Jersey	Union
Marine Port	Port of Camden - Balzano Terminal	South Jersey Port Corporation	Camden
Marine Port	Port of Camden – Broadway Terminal	South Jersey Port Corporation	Camden
Marine Port	Gloucester Marine Terminals	Holt Logistics/Gloucester Terminals, LLC	Gloucester
Marine Port	Port Newark	Port Authority of New York and New Jersey	Essex
Marine Port	Bayonne Terminals	CMA CGM	Hudson
Marine Port	SJPC Paulsboro Marine Terminal	Holt Logistics, LLC	Gloucester
Marine Port	Port Jersey-Port Authority Marine Terminal	Port Authority of New York and New Jersey	Hudson
Marine Port	Port of Salem	South Jersey Port Corporation	Salem
Airport	Newark Liberty International Airport	Port Authority of New York and New Jersey	Essex
Airport	Atlantic City International Airport	South Jersey Transportation Authority	Atlantic
Airport	Teterboro Airport	Port Authority of New York and New Jersey	Bergen
Airport	Maguire Air Force Base	United States Air Force	Burlington
Airport	Morristown Municipal Airport	Town of Morristown	Morris
Petroleum Product Terminal	Buckeye Terminals LLC - Pennsauken	Buckeye Terminals LLC	Camden
Petroleum Product Terminal	Sunoco Logistics - Newark	Sunoco Logistics	Essex
Petroleum Product Terminal	Petroleum Fuel & Terminal Co	Petroleum Fuel & Terminal Co	Essex
Petroleum Product Terminal	Shell Oil Products U.S. - Newark	Shell Oil Products U.S	Essex
Petroleum Product Terminal	Buckeye Terminals LLC - Newark Delancey	Buckeye Terminals LLC	Essex
Petroleum Product Terminal	BKEP Materials LLC	BKEP Materials LLC	Gloucester
Petroleum Product Terminal	Sunoco Logistics - Westville	Sunoco Logistics	Gloucester
Petroleum Product Terminal	Gulf Oil LP - Woodbury	Gulf Oil LP	Gloucester
Petroleum Product Terminal	CPI Operations LLC	CPI Operations LLC	Gloucester
Petroleum Product Terminal	PBF Logistics Products Terminals LLC	PBF Logistics Products Terminals LLC	Gloucester
Petroleum Product Terminal	Sunoco Logistics - Paulsboro	Sunoco Logistics	Gloucester
Petroleum Product Terminal	Nustar Energy LP - Paulsboro	Nustar Energy LP	Gloucester
Petroleum Product Terminal	Exxon Mobil - Paulsboro	Exxon Mobil	Gloucester
Petroleum Product Terminal	Repauno Port and Rail Terminal	Delaware River Partners LLC	Gloucester
Petroleum Product Terminal	Owens Corning	Owens Corning	Hudson
Petroleum Product Terminal	Buckeye Terminals LLC - Bayonne	Buckeye Terminals LLC	Hudson
Petroleum Product Terminal	IMTT - Bayonne	IMTT	Hudson
Petroleum Product Terminal	Gordon Terminal Service Co.	Gordon Terminal Service Co.	Hudson
Petroleum Product Terminal	Consumers Oil Corp	Consumers Oil Corp	Mercer
Petroleum Product Terminal	Kinder Morgan - Carteret	Kinder Morgan	Middlesex
Petroleum Product Terminal	Buckeye Terminals LLC - Port Reading	Buckeye Terminals LLC	Middlesex
Petroleum Product Terminal	Sewaren Blending Terminal	Shell Oil Products U.S. Terminal	Middlesex
Petroleum Product Terminal	Buckeye Terminals LLC - Perth Amboy	Buckeye Terminals LLC	Middlesex
Petroleum Product Terminal	Kinder Morgan – Perth Amboy	Kinder Morgan	Middlesex
Petroleum Product Terminal	Buckeye Terminals - Raritan Bay	Buckeye Terminals	Middlesex
Petroleum Product Terminal	Phillips 66 Company - Linden	Phillips 66 Company	Union

Source: New Jersey Statewide Freight Plan, June 2023

Aside from ports, New Jersey features several maritime-based transportation routes that also have the potential to cause a hazardous substances incident at sea. America's Marine Highways consist of over 29,000 nautical miles of navigable waterways including rivers, bays, channels, the Great Lakes, and Saint Lawrence Seaway System and coastal routes. The Marine Highway system is a robust and efficient means of moving freight in terms of cost per ton-mile—and yet, it is the most underutilized of our transportation modes. These all-water routes consist of 11 corridors, four connectors, and three crossings that serve as extensions of the surface transportation system.

Figure 4.20-4 America's Marine Highway Corridors

Source: United States Department of Transportation (USDOT)

Port authorities that participate in the project can apply for grants and incentives to build capacity at Ports. The Port of New York and New Jersey would become a key player in this system. Two major routes, the M-95 and M-87 routes would have a direct effect on New Jersey. Figure 4.20-4 illustrates the proposed maritime highway corridors, with New Jersey circled.

Extent and Magnitude

The extent of risk due to a hazardous substance release will depend on whether it is from a fixed or mobile source, the size of impact, the toxicity and properties of the substance, duration of the release, and the environmental conditions (for example, wind and precipitation, terrain, etc.).

4.20-3 PREVIOUS OCCURRENCES AND LOSSES

This section presents the previous occurrences of hazardous substances incidents in New Jersey and is divided by the different forms of hazardous substance release (fixed site, in-transit, and offshore). If applicable, each section begins with a discussion of significant incidents followed by a table outlining other notable incidences that occurred and affected New Jersey. The previous occurrence section is based on best known and available data, as well as from anecdotal information from the planning team.

Hazardous Substances Fixed Site

Motiva Oil Spill – 2012

A tank of diesel fuel failed due to being hit by the storm surge from Superstorm Sandy at a storage facility owned by Motiva Enterprises LLC in Woodbridge Township. Approximately 349,000 gallons of diesel fuel spilled mostly into the Arthur Kill (a narrow waterway that separates New Jersey and Staten Island) and Smith's Creek.

Hazardous substances incidents occurring onsite occur frequently across the State, and are typically small, localized events. EPA maintains records of the reported amount of chemicals disposed of or otherwise released at facilities each year. Table 4.20-2 presents the total number of pounds of chemicals released from facilities per county between 2017 and 2021 according to the EPA TRI Explorer's National Analysis data set (updated May 2023, released to the public in May 2023).

Table 4.20-2 Pounds of Chemicals Released On-Site 2017-2021

County	2017	2018	2019	2020	2021	2017 to 2021 Total	Annual Average
Atlantic	21,569.00	18,704.60	16,520.11	25,343.60	40,029.50	122,166.81	24,433.36
Bergen	44,148.43	49,162.75	35,726.35	26,989.42	28,210.50	184,237.45	36,847.49
Burlington	193,227.20	204,974.52	196,407.50	118,058.20	180,418.72	893,086.14	178,617.23
Camden	9,130.36	8,242.42	7,149.20	6,010.54	5,987.80	36,520.32	7,304.06
Cape May	555.303	1.003	--	--	--	556.31	278.15
Cumberland	50,884.48	110,199.45	172,005.40	63,656.64	65,038.99	461,784.96	92,356.99
Essex	26,356.52	36,675.05	33,706.32	31,899.21	32,189.82	160,826.92	32,165.38
Gloucester	1,275,780.47	1,322,191.46	1,693,416.58	836,546.09	297,071.48	5,425,006.08	1,085,001.22
Hudson	15,662.30	71,423.77	44,814.44	24,019.39	41,065.81	196,985.71	39,397.14
Hunterdon	2,162.48	2,091.04	915.97487	1,030.41	1,396.17	7,596.07	1,519.21
Mercer	6,584.85	5,959.45	12,224.48	9,989.86	10,172.00	44,930.64	8,986.13
Middlesex	173,062.32	179,942.13	186,144.87	205,360.35	190,868.98	935,378.65	187,075.73
Monmouth	4,347.57	4,155.70	3,328.57	635.9341	169.7951	12,637.57	2,527.51
Morris	53,154.24	44,023.84	26,233.18	28,733.54	29,476.51	181,621.32	36,324.26
Ocean	27,987.79	27,334.69	23,687.48	15,362.47	5,270.25	99,642.68	19,928.54
Passaic	24,986.10	25,664.01	27,949.74	21,213.65	23,328.77	123,142.26	24,628.45
Salem	766,097.81	619,396.17	626,163.89	652,681.66	563,051.67	3,227,391.20	645,478.24
Somerset	35,894.62	34,962.82	45,030.72	43,460.20	30,864.77	190,213.13	38,042.63
Sussex	8,852.81	6,154.81	261.109	284.1094	94.8305	15,647.68	3,129.54
Union	2,693,295.76	2,962,113.54	3,313,531.35	3,024,287.51	3,819,434.72	15,812,662.89	3,162,532.58
Warren	148,466.30	155,113.86	154,002.40	153,083.92	130,842.70	741,509.17	148,301.83
Total	5,582,206.70	5,888,487.07	6,619,219.68	5,288,646.70	5,494,983.79	28,873,543.94	5,774,708.79

Source: EPA TRI Explorer, 2023

Hazardous Substances In-Transit

The following section outlines past occurrences of hazardous substances incidents occurring in transit. It begins with a discussion of significant past occurrences as well as hazardous substances releases reported to the EPA.

Arthur Kill Pipeline Leak – 1990

In 1990, a leaking pipeline resulted in a release of 0.5 million gallons of oil into the environment. The leak occurred at an Exxon facility and had a devastating impact on the environment. This incident affected hundreds of birds in the Kill waters and hundreds of marine organisms in the mud and wetlands of the Arthur Kill tributaries and had indirect impacts on organisms across the region. The incident prompted improvements in leak detection, enforcement, and existing laws (Kane, 1990).

Paulsboro Train Derailment – 2012

On November 30, 2012, a train carrying hazardous substances plunged into the Mantua Creek in Paulsboro Gloucester County. Three cars fell into the creek. One of the tank cars released approximately 23,000 gallons of vinyl chloride into the air as vapor. The incident occurred approximately 1.5 miles from its confluence with the Delaware River, and very close to the Philadelphia International Airport (EPA, 2012).

Figure 4.20-5 Paulsboro Train Derailment

Source: National Transportation Safety Board (NTSB) 2013

Vinyl chloride, a colorless gas industrial chemical with a sweet odor, is known to be highly toxic, flammable, and carcinogenic. It is primarily used in the production of polyvinyl chloride (PVC) plastic. Short-term exposure to high levels of vinyl chloride in the air can cause dizziness, drowsiness, and headaches. Exposure to very high levels can result in death (EPA, 2012). The incident forced approximately 200 homes in the area to be evacuated until the release was contained (Forand, 2013). Figure 4.20-5 shows the rail cars involved in this incident.

In addition to these large incidents, hazardous substances releases occur regularly in smaller quantities. Table 4.20-3 outlines the annual amount of pounds of chemicals released per county reported to EPA from 2017 to 2021 according to the EPA TRI Explorer's National Analysis data set (updated May 2023, released to the public in May 2023).

Table 4.20-3 Pounds of Chemicals Released Off-site 2017-2021

County	2017	2018	2019	2020	2021	2017 to 2021 Total	Annual Average
Atlantic	12,678	2,773	20,322	42,192	34,490	112,455	22,491
Bergen	136,483	405,344	225,743	194,894	71,884	1,034,348	206,870
Burlington	87,819	46,778	79,382	41,382	34,244	289,604	57,921

County	2017	2018	2019	2020	2021	2017 to 2021 Total	Annual Average
Camden	8,300	15,006	14,863	9,484	7,884	55,537	11,107
Cape May	100	95	--	--	--	195	98
Cumberland	35,871	7,749	9,453	8,361	746	62,181	12,436
Essex	317,543	206,632	240,881	323,483	319,308	1,407,848	281,570
Gloucester	501,543	274,721	266,534	282,428	157,555	1,482,781	296,556
Hudson	2,053,083	1,514,728	1,214,781	1,680,388	1,281,704	7,744,684	1,548,937
Hunterdon	569,020	525,120	385,712	384,509	222,254	2,086,615	417,323
Mercer	95	111	111	96	1,860	2,274	455
Middlesex	2,684,718	2,935,572	2,320,544	2,223,704	3,082,794	13,247,331	2,649,466
Monmouth	6,654	22,257	3,761	99	2	32,774	6,555
Morris	23,178	75,316	189,072	176,611	161,808	625,985	125,197
Ocean	34,540	40,602	44,705	17,178	599	137,625	27,525
Passaic	5,472	6,629	61,971	36,438	55,959	166,468	33,294
Salem	84,725	55,113	46,387	29,704	18,864	234,793	46,959
Somerset	29,504	73,658	41,358	42,582	43,630	230,732	46,146
Sussex	--	--	--	--	--	--	--
Union	267,054	432,154	424,672	354,385	283,162	1,761,427	352,285
Warren	268,687	313,901	822,326	685,031	871,751	2,961,697	592,339
Total	**7,127,068**	**6,954,259**	**6,412,578**	**6,532,951**	**6,650,499**	**33,677,354**	**6,735,471**

Source: EPA TRI Explorer, 2023

Hazardous Substances Offshore

Several petroleum-based incidents have occurred in and around New Jersey's coastline. Although there is no offshore drilling off the coast of New Jersey, the State's system of ports is vulnerable to hazardous substances incidents because of the cargo shipped throughout the region. The following section discusses past occurrences of hazardous substances incidents in New Jersey.

Motor Tanker (M/T) ATHOS I Oil Spill – 2004

On November 26, 2004, the M/T ATHOS I (Athos) struck a large, submerged anchor while preparing to dock at a refinery in Paulsboro, New Jersey. The anchor punctured the vessel's bottom, resulting in the discharge of nearly 265,000 gallons of crude oil into the Delaware River and nearby tributaries (NOAA, 2006).

The Athos departed Venezuela for the Citgo Asphalt Refinery in Paulsboro, New Jersey on November 20, 2004, carrying approximately 13 million gallons of crude oil. At approximately 9:30 pm on 26 November 2004, tug operators assisting the Athos with docking at the refinery notified the United States Coast Guard (USCG) that the tanker was leaking oil. The vessel had struck several submerged objects while maneuvering through Anchorage #9 to its berth. Within minutes, the ship lost power and listed approximately eight degrees to the vessel's port side (NOAA, 2006).

Surveys of the river bottom following the incident found several submerged objects in the area, including an 18,000-pound anchor, large concrete block, and pump casing. The USCG's investigation of the incident determined that the anchor punctured the vessel's number seven center cargo and port ballast tanks (USCG, 2006). The bulkhead between the cargo and ballast tanks was also damaged, allowing product to migrate into the ballast tank and then into the river (USCG, 2005).

Hazardous Substances Incidents in New Jersey

The following table outlines the history of hazardous substances incidents in New Jersey.

Table 4.20-4 Major Hazardous Substances Incidents in New Jersey

Date(s) of Event	Event Type	Counties Impacted	Description
1/1/1990	Hazmat - offshore	Hudson and Union	An Exxon underwater pipeline ruptured and released 567,000 gallons of No. 2 fuel oil into the Arthur Kill. The leak occurred from a 5-foot gash in the 12-inch pipeline that connects the Bayway Refinery at Linden, New Jersey, to the Bayonne Plant in Bayonne, New Jersey. The spill occurred near the New Jersey coast, but tides and winds moved the oil to the three islands in the Kill and the Staten Island coastline.
3/1/1990	Hazmat - offshore	Hudson	Approximately 240,000 gallons of oil spilled from a barge into the Kill van Kull between Bayonne, closing the waterway and blocking ships from Port Newark.
6/8/1990	Hazmat - offshore	Hudson	260,000 gallons of oil spilled from a ruptured tanker docking in Bayonneinto New York Harbor
5/10/1996	Hazmat – offshore	Cape May	The T/V Anitra released 42,000 gallons of oil into Big Stone Anchorage, Delaware Bay. Over 50 miles of beaches were oiled over a 2-week period.
11/26/2004	Hazmat - offshore	Gloucester	The M/T ATHOS I (Athos) struck a large, submerged anchor while preparing to dock at a refinery in Paulsboro, New Jersey. The anchor punctured the vessel's bottom, resulting in the discharge of nearly 265,000 gallons of crude oil into the Delaware River and nearby tributaries.
1/13/2012	Hazmat – fixed site	Gloucester	A malfunctioning fuel pump gasket for a New Jersey Transit facility spilled 26,000 gallons of diesel fuel into Grenloch Lake and surrounding waterways including Big Timber Creek and the Delaware River.
11/30/2012	Hazmat – in transit	Gloucester	A freight train derailment in Paulsboro caused a spill of vinyl chloride. The freight train consisted of two locomotives and 82 cars; seven cars derailed while traveling over a moveable bridge spanning Mantua Creek. Four tanks cars, three containing vinyl chloride and one containing ethanol, were dumped into the Creek. One of the cars released approximately 20,000 gallons of vinyl chloride into the Creek and surrounding area. Over 40 people were treated at the hospital. Estimated equipment damage was multi-millions of dollars.
9/10/2013	Hazmat – in transit	Passaic	A freight Train derailment in Clifton caused a spill of Polychlorinated Biphenyls Solid. The lid of container box MHFU2220 was dislodged and caused the release of about 8000 pounds of material.
5/19/2014	Hazmat – in transit	Essex	On 5/19/14 driver was loaded with 7500 gallons of lysergic acid diethylamide and end route to delivery destination in Flemington NJ. While in approach to the traffic circle at Mine ST & Route 12 driver tried to avoid a vehicle that entered his path which resulted in the truck and trailer overturning. Clean up crews started pumping the product in the roadway into a small oil truck (1,650 gallons) and into large storage totes and barrels (950 gallons). 3,901 gallons was salvage and pumped from the trailer into a hired tanker and was delivered to original delivery destination.
11/21/2015	Hazmat – in transit	Union	According to the information obtained the following occurred. During offload a loose pipe fitting resulted in the loss of 1 000 gallons of gasoline. The free product released to asphalt lot adjacent roadway and nearby storm/drain. The storm drain leads to a small stream which eventually leads to dismal swamp.

Source: New York Times 1990; Anitra Oil Spill Natural Resource Trustees 2004; RT.com 2012; National Transportation Safety Board (NTSB) 2012; NTSB 2009; USDOT 2018

FEMA Disaster Declarations

The Federal Emergency Management Agency (FEMA) has not issued any disaster declarations resulting from hazardous substances incidents in New Jersey.

4.20-4 PROBABILITY OF FUTURE OCCURRENCES

Hazardous Substances Fixed Site

Hazardous substances incidents at on-site facilities occur occasionally, typically without significant negative consequence. As indicated in the Previous Occurrence section, on-site chemical releases occur rather frequently. Small spills will occur on site

throughout the course of the year. Thus, the probability for future events is high. However, the risk of a major on-site hazardous substances incident in a given year is rather low.

Hazardous Substances In-Transit

As demonstrated by the Past Occurrences section, incidents involving hazardous substances in transit occur rather frequently. The 5-year annual average is approximately 350 incidents per year in all counties. The size and scope of these incidents vary from very small to large amounts of chemicals being spilled. However, as indicated by the Paulsboro train derailment incident, transportation incidents involving hazardous substances can be rather severe. Given the vast road and rail networks throughout the State, and the quantity of hazardous substances transported regularly through the State, the probability for future events in a given year is high.

Hazardous Substances Offshore

Significant hazardous substances occurring offshore are rather rare in New Jersey. As discussed in the Previous Occurrences section, several incidents have occurred over the past couple decades. While these incidents have been rather rare, New Jersey's port systems and waterways are vast and the possibility for an incident does exist. Given the factors noted, past occurrences, and the State's water network, the probability for future incidents in a given year is low.

Potential Effects of Climate Change

Although hazardous substance events are considered human-caused hazards, they can directly result from the effects of other hazards such as tropical storms. For example, there were numerous discharges directly caused by Superstorm Sandy and Hurricane Ida such as knocked over storage tanks and drums and ruptured utility lines. Climate change is expected to affect the probability and severity of coastal storms in the state of New Jersey as sea level rises and the ocean warms. This increased intensity of hurricanes and tropical storms could lead to additional risk of hazardous substance discharges in the state in the future.

4.20-5 VULNERABILITY ASSESSMENT

This section addresses New Jersey's vulnerability, in a qualitative nature, to the hazardous substances hazard. A consequence analysis for this hazard was also conducted and presented in Section 10. Impacts on the public, responders, continuity of operations, and delivery of services; property, facilities, and infrastructure; and the environment, economic condition of the State, and the public confidence in the State's governance is discussed in Section 10 in accordance with Emergency Management Accreditation Program (EMAP) standards. This section addresses assessing vulnerability and estimating potential losses by jurisdiction and to State facilities.

Built Environment

Because of the number of facilities storing hazardous substances throughout the State, all State and critical facilities are exposed to hazardous substances incidents. Potential losses to State facilities and critical facilities caused by a hazardous substance incident are difficult to quantify. Potential losses may include inaccessibility, loss of service, contamination and/or potential structural and content losses if an explosion occurs.

Population and Economy

All counties in New Jersey have at least one facility that stores hazardous substances, according to USEPA SARA Title III facilities data. Depending on the type and quantity of chemicals released and the weather conditions, an incident can affect larger areas that cross jurisdictional boundaries.

When hazardous substances are released in the air, water or on land they may contaminate the environment and pose greater danger to human health. The general population may be exposed to a hazardous substances release through inhalation, ingestion or dermal exposure. Exposure may be either acute or chronic, depending upon the nature of the substance and extent of release and contamination. The majority of the New Jersey population is vulnerable to the effects of hazardous substances incidents. Populations located along major transportation routes (such as I-95 and I-295) and rail transportation

(NJ Transit/Amtrak) are more vulnerable because of the quantities of chemicals transported on these major thoroughfares. Further, populations residing along New Jersey's coast are vulnerable to offshore hazardous substances incidents.

The closure of waterways, railroads, airports and highways as a result of a hazardous substance incident has the potential to impact the ability to deliver goods and services efficiently. Potential impacts may be local, regional, or statewide depending on the magnitude of the event and level of service disruptions. If a significant hazardous substances incident occurred, not only would life, safety and the built environment be at risk, but the economy of New Jersey would be affected as well. A significant incident in an urban area could force businesses to close for an extended period of time because of contamination or direct damage caused by an explosion, if one occurred. The exact impact of hazardous substances incidents on-site and the State's vulnerability to such an incident is difficult to determine, given the uncertain nature of the size and scope of incidents.

If an incident occurred that would require one of the State's major highways to close, the impact on the economy could be significant. Given the scope and importance of New Jersey's transportation routes to the greater northeastern United States, the vulnerability of New Jersey's economy is significant.

New Jersey's economy is particularly vulnerable to hazardous substances incidents that may occur offshore. Such an event would impact shipping and access to New Jersey's ports as well as the tourism industry, which relies on summer beach network as a significant portion of the State's economy.

A significant portion of the New Jersey economy relies on the State's waterways and shoreline; thus the economy is vulnerable to the impacts of hazardous substances occurring offshore. Tourism associated with the Jersey Shore is critical to the overall economy. If an incident occurred similar to the 2010 Deepwater Horizon spill in the Gulf of Mexico, the impact on the economy would be disastrous. Additionally, if a hazardous substances incident forced the closure of shipping lanes or one of New Jersey's ports, the State would lose millions of dollars in revenue. New Jersey's commercial fishing industry would suffer tremendous losses from a major spill or other hazardous substances incident. Given the importance of New Jersey's waterways to the State's economy, it is clear that the State is vulnerable to hazardous substances incidents occurring offshore.

Ecosystems and Natural Assets

A hazardous substance release, whether on site, in transit, or offshore, can negatively impact the environment. Depending on the nature and amount of the substance, the release may contaminate the air, water, or soil potentially causing concern for direct human and animal exposure (whether through inhalation, ingestion, or dermal exposure), recreational usage, crop irrigation, and fish and wildlife consumption (USEPA, 2011).

Impact Analysis

Severity and Warning Time

Hazardous substance releases can contaminate air, water, and soils, possibly resulting in death and/or injuries. Dispersion can take place rapidly when the hazardous substance is transported by water and wind. While often accidental, releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events. Hazardous substances can include toxic chemicals, radioactive substances, infectious substances, and hazardous wastes. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas.

With a hazardous substance release, whether accidental or intentional, several potentially exacerbating or mitigating circumstances will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. For example, primary and secondary containment or shielding by sheltering-in-place measures protects people and property from the harmful effects of a hazardous substance release.

Characteristics that can enhance or magnify the effects of a hazardous substance release include:

- Weather conditions- which affect how the hazard occurs and develops,
- Effects of buildings and terrain- which alter dispersion of hazardous substances,

- Non-compliance with applicable codes (such as building or fire codes),
- Maintenance failures (such as fire protection and containment features)- which can substantially increase the damage to the facility itself and to surrounding buildings.

As discussed earlier, the severity of the incident is dependent not only on the circumstances described above, but also with the type of substance released and the distance and related response time for emergency response teams. The areas with the closest proximity to the releases are generally at greatest risk; however, depending on the agent, a release can travel great distances or remain present in the environment for a long period of time (e.g. centuries to millennia).

The severity of offshore hazardous substances incidents will vary based on the amount of hazardous substance spilled, the location of the spill, and the prevailing currents. The effects of an accident can have a devastating impact on the environment. An example of the worst-case scenario was the Deepwater Horizon oil spill in 2010, which affected the gulf and the coastline from Texas to Florida and was one of the worst environmental disasters in the United States.

Hazardous Substances Fixed Site

The warning time for an incident occurring at an on-site or fixed facility will vary. Incidents may be sudden without any warning such as an explosion or may be slowly developing such as a leaking container. Facilities that store extremely hazardous substances are required to notify local officials when an incident occurs. Local emergency responders and emergency management officials would determine the need to evacuate the public or to advise to shelter in place.

Hazardous Substances In-Transit

Similarly to on-site hazardous substances incidents, the amount of warning time for incidents associated with hazardous substances in transit varies based on the nature and scope of the incident. If an explosion did not occur immediately following an accident, there may be time for warning of adjacent neighborhoods and enough time to facilitate appropriate protective actions.

Hazardous Substances Offshore

Offshore hazardous substances incidents will generally have enough warning time and will not be an immediate threat to health and life. In most cases the environmental impacts of hazardous substances incidents will develop slowly as the full extent of the accident may occur over the course of several weeks or months. As was the case with the 2010 Deepwater Horizon incident in the Gulf of Mexico, the immediate impact was limited to the crews stationed on the oil rig, and the greater environmental impact occurred days to weeks into the incident.

Hazardous Substances Fixed Site for Secondary Hazards

The secondary impacts associated with on-site hazardous substances releases include those impacting the health of the community and environment. If spilled, hazardous substances can contaminate wells, kill wildlife, and impact the ecosystem. Hazardous substance incidents also can cause acute and chronic health issues and have an impact on long-term public health. The secondary impacts have the potential to occur regardless of the mode (fixed site, in transit, or offshore) or the source of release.

Hazardous Substances In-Transit for Secondary Hazards

In addition to the secondary impacts noted for the fixed-site hazard, other impacts include damage to the infrastructure such as roadbeds or bridges may occur.

Hazardous Substances Offshore for Secondary Hazards

Aside from the general impacts noted with the fixed-site hazard, offshore incidents present unique challenges and secondary impacts. The secondary impacts associated with offshore incidents were witnessed in 2010 during the Deepwater Horizon spill occurring in the Gulf of Mexico. The incident had tremendous impacts on the environment, wildlife, and the economy. A significant incident would have a devastating impact on all of these sectors. A significant portion New Jersey's economy is reliant on tourism, as well as near-shore and off- shore fisheries, thus an impact to the shore would be devastating.