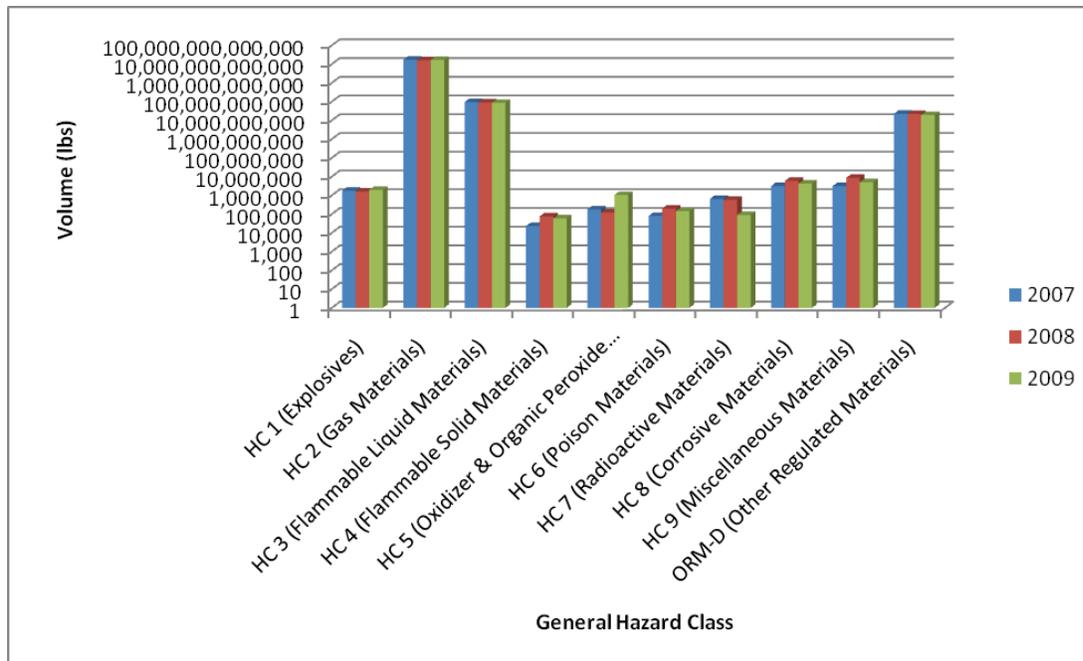


5.9 North Slope

The transportation of hazardous materials through the North Slope Subarea (NS) includes four (4) modes of transportation: air, highway, marine and pipeline. While the commodities shipped spans the spectrum of hazard classes, the largest volume commodities shipped/transported are HC 2.1 (Natural Gas), and HC 3.0 (Petroleum Crude Oil). The breakdown of hazardous materials volumes from year to year by Hazard Class is depicted in Figure 5-41 below.

Figure 5-41. Volumes of Hazardous Materials Shipped into the NS presented on a log scale



In general, HC 2 commodities (Gas Materials), specifically natural gas, HC 3 commodities (Flammable Liquid Materials), specifically crude oil, and ORM-D (Other Regulated Materials), specifically produced water, dominate the volume of hazardous materials shipped within the NS Subarea. This observation is aligned with the facts that there is substantial natural gas and produced water produced as a direct result of the drilling operations on the North Slope, and that the Trans-Alaska Pipeline originates on the North Slope. As these three hazard classes make up 99.3% of the total volume shipped, the breakdown of volumes of hazard class shipments within this subarea (inclusive of all hazard classes) in a percentage of subarea-wide volume does not provide any meaningful insight. However, excluding those three hazard classes provides a general breakdown of the other hazard classes by percentage of the total remaining volume. Figures 5-42, 5-43 and 5-44 depict the breakdown of hazardous material shipments within the NS Subarea by a percentage of total remaining volume shipped. HC 8 (Corrosive Materials), HC 9 (Miscellaneous Materials) and HC 1 (Explosives) consistently dominate the volume of hazardous materials shipped from year to year.

Figure 5-42. NS Hazardous Materials Percentage of Total Volume by Hazard Class for 2007

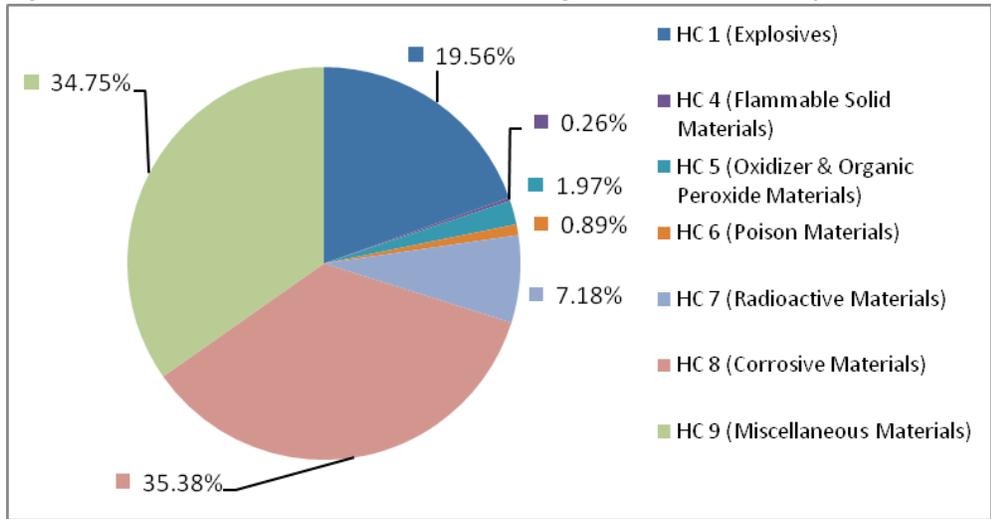


Figure 5-43. NS Hazardous Materials Percentage of Total Volume by Hazard Class for 2008

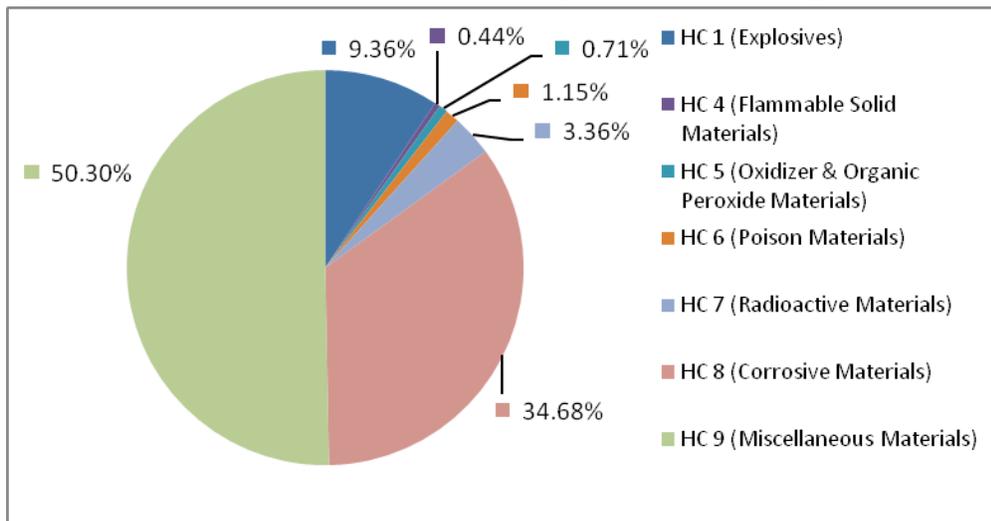


Figure 5-44. NS Hazardous Materials Percentage of Total Volume by Hazard Class for 2009

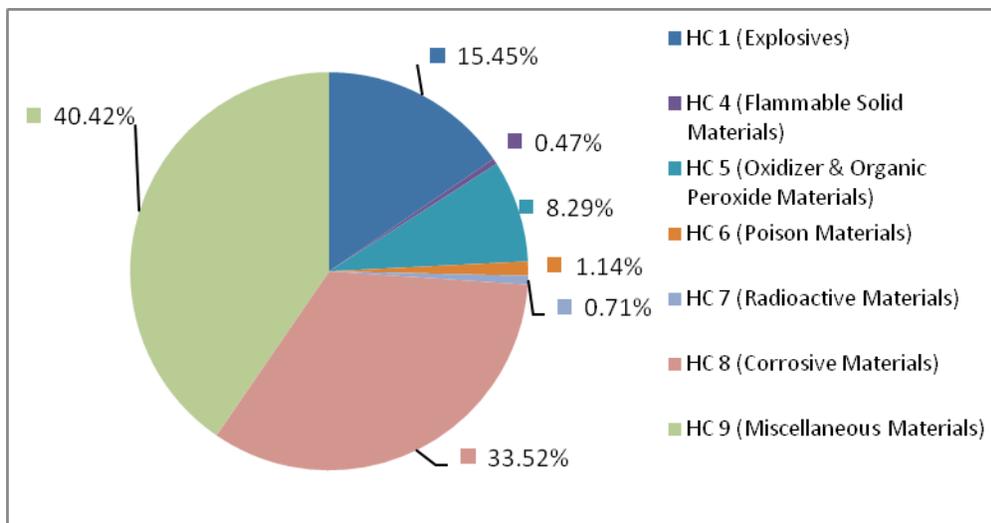


Table 5-63 lists the volume of hazardous materials shipped within the NS Subarea by hazard class for each calendar year evaluated for this study.

Table 5-63. Volumes of Hazard Class Transported within NS Subarea by Calendar Year

Hazard Class	2007 (Total Volume in lbs)	2008 (Total Volume in lbs)	2009 (Total Volume in lbs)
HC 1 (Explosives)	1,759,291	1,602,057	1,950,164
HC 2 (Gas Materials)	17,106,447,039,097	16,105,633,218,281	16,665,444,532,526
HC 3 (Flammable Liquid Materials)	94,766,767,413	90,086,966,893	86,100,701,273
HC 4 (Flammable Solid Materials)	23,014	75,459	59,190
HC 5 (Oxidizer & Organic Peroxide Materials)	177,328	121,495	1,046,318
HC 6 (Poison Materials)	79,978	196,886	144,335
HC 7 (Radioactive Materials)	646,090	575,102	90,087
HC 8 (Corrosive Materials)	3,181,873	5,937,317	4,230,449
HC 9 (Miscellaneous Materials)	3,124,836	8,611,967	5,101,611
ORM-D (Other Regulated Materials)	22,464,000,000	22,113,000,000	19,305,000,000

A more detailed evaluation of each hazard class is provided below. A shipment volume threshold of 100,000 lbs was established for the North Slope Subarea due to the number and volume of hazardous materials commodity shipments.

HC 1 Explosives: The primary explosives that were transported through the North Slope Subarea were HC 1.0, 1.1, 1.4 and 1.5. HC 1.5 represented the highest volume transported from year to year, and increased by 15% in 2008 and another 25% in 2009. HCs 1.0 and 1.1 remained fairly consistent, while HC 1.4 decreased by 32% between 2007 and 2008 and another 48% between 2008 and 2009. Table 5-64 lists the primary HC 1 commodities shipped within the North Slope Subarea. There were no shipments of HC 1.2 or 1.3 that exceeded 100,000 lbs.

Table 5-64. Primary Hazard Class 1 Commodities Shipped within the NS Subarea

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
1.0	Ammunition	0006
1.1	Boosters	0042
1.4	Detonator Assemblies, Non-Electric	0361
	Articles, Explosives, N.O.S.	0349
1.5	Explosive, Blasting, Type B or Agent Blasting, Type B	0331
	Ammonium Nitrate-Fuel Oil Mixture	0331
	Explosive, Blasting, Type E	0332

HC 2 Gas Materials: HC 2.1, 2.2 and 2.3 were transported in the North Slope Subarea. The largest volume was represented by HC 2.1, Natural Gas, which was transported via

the pipeline infrastructure on the North Slope. Table 5-65 lists the primary HC 2 commodities shipped within the North Slope Subarea.

Table 5-65. Primary Hazard Class 2 Commodities Shipped within the NS Subarea

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
2.1	Natural Gas	1971
	Propane Cylinders	1978
	Compressed Gas, Flammable, N.O.S.	1954
	Acetylene, Dissolved	1001
	Petroleum Gases, Liquefied or Liquefied Petroleum Gas	1075
	Lighters or Lighter Refills	1057
2.2	Compressed Gas, N.O.S.	1956
	Fire Extinguishers	1044
	Carbon Dioxide	1013
	Oxygen, Compressed	1072
	Nitrogen, Compressed	1066
	Argon, Compressed	1006
	Air, Compressed	1002
	Bromotrifluoromethane	1009

HC 3 Flammable Liquid Materials: The North Slope Subarea has the second highest volume of HC 3.0 transported within the State. The primary commodity is crude oil that is shipped via the Trans-Alaska Pipeline, and associated piping on the North Slope, from the North Slope to Valdez. Table 5-66 lists the primary HC 3 commodities shipped within the North Slope Subarea.

Table 5-66. Primary Hazard Class 3 Commodities Shipped within the NS Subarea

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
3.0	Crude Oil	1267
	Flammable Liquids, Toxic, N.O.S.	1992
	Paint	1263
	Petroleum Distillates, N.O.S. or Petroleum Products, N.O.S.	1268
	Tetrahydrofuran	2056
	Gasoline	1203
	Combustible Liquid, N.O.S.	1993
	Flammable Liquids, Corrosive, N.O.S.	2924

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
	Alcohols, N.O.S.	1987
	Toluene	1294
	Methanol	1230
	Diesel Fuel; Fuel Oil; Gas Oil; or Heating Oil Light	1202
	Adhesives	1133

HC 4 Flammable Solid Materials: HC varied between 4.1, 4.2 and 4.3 from year to year for this grouping of commodities. Volumes also varied and displayed no visible trend other than potentially industrial demands. There were no HC 4.0 commodities shipped in a volume that exceeded 100,000 lbs.

HC 5 Oxidizer and Organic Peroxide Materials: HC 5.1 and 5.2 were transported within the North Slope Subarea. 2009 displayed the highest volume of both commodity groups (significantly higher than 2007 and 2008. Volumes between 2007 and 2008 decreased or increased, but no apparent trend was noted. Table 5-67 lists the primary HC 5 commodities shipped within the North Slope Subarea.

Table 5-67. Primary Hazard Class 5 Commodities Shipped within the NS Subarea

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
5.1	Calcium Hypochlorite, Hydrated or Calcium Hypochlorite, Hydrated Mixtures	2880
	Oxidizing Solid, N.O.S.	1479
5.2	Organic Peroxide Type F, Liquid	3109

HC 6 Poisons: HC 6.1 and 6.2 were transported within the North Slope Subarea. HC 6.1 increased significantly (more than doubling) between 2007 and 2008 and then decreased by approximately 25% between 2008 and 2009. HC 6.2 commodities were primarily regulated medical waste products and did not exceed a volume shipped of 100,000 lbs. Table 5-68 lists the primary HC 6 commodity shipped within the North Slope Subarea.

Table 5-68. Primary Hazard Class 6 Commodities Shipped within the NS Subarea

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
6.1	Toxic Liquid, Organic, N.O.S.	2810

HC 7 Radioactive Materials: HC 7.0 shipped within the North Slope Subarea decreased from year to year. While only a 10% decrease between 2007 and 2008, the volume of

shipments decreased by 85% between 2008 and 2009. Table 5-69 lists the primary HC 7 commodity shipped within the North Slope Subarea.

Table 5-69. Primary Hazard Class 7 Commodities Shipped within the NS Subarea

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
7.0	Radioactive Material, Surface Contaminated Object or Radioactive Material	2913

HC 8 Corrosive Materials: The volume of HC 8.0 shipped within the North Slope Subarea increased by almost 50% between 2007 and 2008, and then decreased by approximately 30% between 2008 and 2009. Table 5-70 lists the primary HC 8 commodities shipped within the North Slope Subarea.

Table 5-70. Primary Hazard Class 8 Commodities Shipped within the NS Subarea

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
8.0	Hypochlorite Solutions	1791
	Corrosive Liquid, Basic, Inorganic, N.O.S.	3266
	Corrosive Cleaning Supplies	1760
	Bisulfites, Aqueous Solutions, N.O.S.	2693
	Batteries, Wet, Filled with Acid	2794
	Corrosive Liquid, Acidic, Inorganic, N.O.S.	3264
	Batteries, Wet, Non-Spillable	2800
	Amines, Liquid, Corrosive, N.O.S. or Polyamines, Liquid, Corrosive, N.O.S.	2735

HC 9 Miscellaneous Materials: The volume of HC 9.0 commodities shipped within the North Slope Subarea saw a dramatic increase between 2007 and 2008 and then dropped but remained higher than 2007 levels in 2009. The sharp increase in 2008 could be attributable to the increase in the Alaska Permanent Fund Dividend checks during this timeframe. Table 5-71 lists the primary HC 9 commodities shipped within the North Slope Subarea.

Table 5-71. Primary Hazard Class 9 Commodities Shipped within the NS Subarea

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
9.0	Lithium Batteries	3090
	Environmentally Hazardous Substances, Solid, N.O.S.	3077
	Asbestos	2212
	Hazardous Waste, Liquid, N.O.S.	3082
	Lithium Batteries, Contained in Equipment	3091
	Engines / Vehicles	3166

ORM-D Materials: Produced water, transported via the North Slope Pipeline piping infrastructure is the only ORM-D commodity identified as being transported within the state. Table 5-72 lists the primary ORM-D commodity shipped within the North Slope Subarea.³⁶

Table 5-72. Primary Hazard Class ORM-D Commodities Shipped within the NS Subarea

Hazard Class	Hazardous Material Description (Greater than 100,000 lbs Shipped)	UN ID Number
ORM-D	Produced Water	None

Figure 5-45 depicts the volume of hazardous materials shipped each year within the North Slope Subarea by Hazardous Material Name for volumes exceeding 100,000 pounds.

³⁶ Water production totals for 2007, 2008 and 2009 were extracted from the Alaska Risk Assessment Total Produced Water Production 1995-2009 statistics.

Figure 5-45. Hazardous Material Commodities by Hazardous Material Name (Greater than 100,000 lbs) for the North Slope Subarea, for 2007 through 2009, presented on a log scale.

