



**ASSOCIATION OF AMERICAN RAILROADS**

**CASUALTY PREVENTION DIVISION**

**BUREAU OF EXPLOSIVES**

**REPORT OF RAILROAD TANK CAR LEAKS  
OF HAZARDOUS MATERIALS  
BY COMMODITY  
BY SOURCE OF LEAK  
FOR THE YEAR  
1993**

*(Non-accident releases)*

**JUNE 30, 1994**

**Report BOE 93-2**

**CMA 110109**

## INTRODUCTION

The Association of American Railroads, Bureau of Explosives has maintained records on railroad accidents and incidents involving explosives and other dangerous goods since its inception in 1907. It has maintained a computerized data base of railroad hazardous materials incidents since 1975. It is from this data base that these statistics are derived.

For those materials, such as Anhydrous Ammonia and Molten Sulfur, which may be shipped under two different hazard classes, (domestic vs. international), we have combined the numbers under the U.S. hazard class.

For the purpose of this report a non-accident release (NAR) is classified as the unintentional release of a hazardous material while in transportation (includes loading, unloading and temporary storage). This release does not usually involve an accident.

In some cases, the number of cars reported as leaking for a particular commodity is less than the total number of all the leak sources for that commodity. This is due to the fact that some cars may have leaked from more than one source, i.e., bottom outlet and stuffing box.

In previous years this report provided comparisons between the current leak rate for a particular commodity and the previous year's leak rate. Because of massive changes in hazard classes, changes in STOC numbers and the ability to reclassify certain Class 3 liquids, we have removed this comparison.

Although hazardous materials are transported by rail in various types of rail cars, i.e., tank cars, covered hoppers, gondolas, box cars, and trailers and/or containers on flat cars (TOFC/COFC), the majority (70%) of hazardous materials moves in tank cars. Because of this fact this report deals with only these containers.

This report is based on information on railroad hazardous materials releases maintained by the AAR's Bureau of Explosives. Railroads are required to report to the Department of Transportation (DOT) any incident involving the unintentional release of a hazardous material or hazardous waste during transportation (including loading, unloading, and temporary storage), even if it is not involved in an FRA reportable train

accident. The vast majority of U.S. railroads voluntarily provide the AAR with copies of the reports filed with DOT. These reports, combined with on-scene reports filed by BOE Field Inspectors, additional Railroad reports, and other incident reports, form the basis for the information contained in this document. We feel that these multiple sources of data provide us the most detailed picture of the sources of Non-Accident Releases.

The data for the number of tank cars originated is derived from AAR's TRAIN II data exchange network. For the year 1992 it is estimated that this system captured 90% of the rail traffic generated in the U.S.

This Report is Part 2 of the Association of American Railroads *Annual Report of Hazardous Materials Transported by Rail*. For additional information on the transportation of hazardous materials by rail please refer to Part 1.

Additional copies of the entire report are available for \$25 each from:

Association of American Railroads  
Bureau of Explosives  
50 F Street, NW  
Washington, DC 20001  
(202) 639-2222

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# **DETAIL FOR DIVISION 2.1 (Flammable Gas)**

|         |                              |   |                                    |
|---------|------------------------------|---|------------------------------------|
| 4905410 | <b>HYDROGEN SULPHIDE</b>     | 1 | liquid line valve loose on base    |
|         | Cars losing lading - 1       |   | or 2.6% of 35 ORIGINATIONS         |
| 4905520 | <b>METHYL MERCAPTAN</b>      | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1       |   | or 50% of 2 ORIGINATIONS           |
| 4905704 | <b>BUTADIENE, INHIBITED</b>  | 1 | thermometer well                   |
| 4905705 |                              | 2 | leak at gauging device             |
|         |                              | 1 | leak at sample line                |
|         |                              | 1 | vapor line valve open, plug loose  |
|         |                              | 1 | liquid line valve open, plug loose |
|         | Cars losing lading - 6       |   | or 0.07% of 9,143 ORIGINATIONS     |
| 4905706 | <b>BUTANE</b>                | 1 | safety valve loose                 |
|         |                              | 2 | leak at gauging device             |
|         |                              | 3 | vapor line valve open, plug loose  |
|         |                              | 3 | liquid line valve open plug loose  |
|         |                              | 1 | leak at thermometer well           |
|         | Cars losing lading - 7       |   | or 0.03% of 20,337 ORIGINATIONS    |
| 4905715 | <b>BUTYLENE</b>              | 1 | leak at gauging device             |
|         | Cars losing lading - 1       |   | or 0.07% of 1,373 ORIGINATIONS     |
| 4905735 | <b>ETHYLENE, REF. LIQUID</b> | 1 | safety valve loose                 |
|         |                              | 1 | safety valve functioned            |
|         |                              | 1 | vapor line valve open, plug loose  |
|         | Cars losing lading - 3       |   | or 0.64% of 472 ORIGINATIONS       |

|         |                           |    |                                    |
|---------|---------------------------|----|------------------------------------|
| 4905747 | ISOBUTANE                 | 1  | vapor line valve open, plug loose  |
| 4905750 | " "                       |    |                                    |
|         | Cars losing lading - 2    |    | or 0.01% of 13,596 ORIGINATIONS    |
| 4905752 | LIQUEFIED PETROLEUM GAS   | 2  | safety valve loose                 |
|         |                           | 1  | leak at manway nozzle, not secured |
|         |                           | 11 | leak at gauging device             |
|         |                           | 10 | liquid line valve open, plug loose |
|         |                           | 1  | liquid line valve open, plug out   |
|         |                           | 1  | liquid line valve loose on base    |
|         |                           | 8  | vapor line valve open, plug loose  |
|         |                           | 2  | leak at sample line                |
|         |                           | 1  | head/shell leak                    |
|         | Cars losing lading - 28   |    | or 0.05% of 55,562 ORIGINATIONS    |
| 4905781 | PROPANE                   | 1  | vapor line valve open, plug loose  |
|         |                           | 1  | leak at gauging device             |
|         |                           | 1  | liquid line valve open, plug loose |
|         |                           | 1  | liquid line valve loose on base    |
|         | Cars losing lading - 4    |    | or 0.02% of 19,921 ORIGINATIONS    |
| 4905782 | PROPYLENE                 | 1  | safety valve loose                 |
|         |                           | 2  | liquid line valve open, plug loose |
|         | Cars losing lading - 3    |    | or 0.02% of 12,232 ORIGINATIONS    |
| 4905792 | VINYL CHLORIDE, INHIBITED | 1  | liquid line valve open, plug loose |
|         |                           | 1  | leak at gauging device             |
|         |                           | 1  | leak at head/shell                 |
|         | Cars losing lading - 3    |    | or 0.01% of 20,414 ORIGINATIONS    |

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**SUMMARY FOR DIVISION 2.1 (Flammable Gas)**

|    |                                    |
|----|------------------------------------|
| 1  | Safety valve functioned            |
| 5  | Safety valve loose                 |
| 3  | Leak at sample line                |
| 1  | Leak at manway nozzle, not secured |
| 1  | Leak at manway nozzle, bad gasket  |
| 3  | Liquid line valve loose on base    |
| 18 | Liquid line valve open, plug loose |
| 1  | Liquid line valve open, plug out   |
| 13 | Vapor line valve open, plug loose  |
| 19 | Leak at gauging device             |
| 2  | Thermometer well leak              |
| 2  | Head/Shell leak                    |

**TOTAL DIVISION 2.1 (Flammable Gas) Tank Cars losing lading - 59**

**or 0.03% of 195,915 DIVISION 2.1 (Flammable Gas) Tank Car Originations**

# **DETAIL FOR DIVISION 2.2 (Nonflammable Gas)**

|         |                   |                                                                                                                                                                                                                                                                                                                                                             |
|---------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4904210 | ANHYDROUS AMMONIA | 19 safety valve loose<br>1 leak at manway nozzle, not secured<br>1 leak at thermometer well<br>20 leak at gauging device<br>20 liquid line valve open, plug loose<br>4 liquid line valve loose on base<br>7 liquid line valve leak at stem<br>2 liquid line valve open, plug out<br>9 vapor line valve open, loose plug<br>1 vapor line valve loose on base |
|---------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                                 |
|-------------------------|---------------------------------|
| Cars losing lading - 80 | or 0.18% of 44,492 ORIGINATIONS |
|-------------------------|---------------------------------|

|         |                     |                                                   |
|---------|---------------------|---------------------------------------------------|
| 4904360 | OXYGEN, REF. LIQUID | 2 safety valve functioned<br>2 safety valve loose |
|---------|---------------------|---------------------------------------------------|

|                        |                              |
|------------------------|------------------------------|
| Cars losing lading - 4 | or 1.61% of 248 ORIGINATIONS |
|------------------------|------------------------------|

|         |                    |                                                                                                                                                                                                      |
|---------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4904503 | ARGON, REF. LIQUID | 2 safety valve loose<br>19 safety valve functioned <sup>1</sup><br>1 liquid line valve open, plug loose<br>1 Leak at manway nozzle, not secured<br>2 leak at gauging device<br>1 leak at sample line |
|---------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                                |
|-------------------------|--------------------------------|
| Cars losing lading - 25 | or 1.89% of 1,322 ORIGINATIONS |
|-------------------------|--------------------------------|

|         |                             |                                                                                                                                                                 |
|---------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4904509 | CARBON DIOXIDE, REF. LIQUID | 16 safety valve functioned <sup>1</sup><br>2 safety valve loose<br>1 liquid line valve loose on base<br>1 leak at manway cover, bad gasket<br>1 head/shell leak |
|---------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                                 |
|-------------------------|---------------------------------|
| Cars losing lading - 21 | or 0.12% of 17,685 ORIGINATIONS |
|-------------------------|---------------------------------|

4904566

NITROGEN, REF. LIQUID

3 Safety valve functioned  
1 liquid line valve open, plug loose

Cars losing lading - 4

or 60% of 5 ORIGINATIONS

<sup>1</sup> The incident reports do not differentiate between the safety valve and the pressure regulator valve. The regulator valves are designed to relieve the pressure and auto-refrigerate the cargo. It is assumed that most of these reported leaks are the pressure regulator functioning.

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**SUMMARY FOR DIVISION 2.2 (Nonflammable Gas)**

|    |                                    |
|----|------------------------------------|
| 28 | Safety valve functioned            |
| 26 | Safety valve loose                 |
| 6  | Leak at manway nozzle, not secured |
| 3  | Leak at manway nozzle, bad gasket  |
| 13 | Leak at gauging device             |
| 4  | Leak at sample line                |
| 17 | Liquid line valve open, plug loose |
| 6  | Liquid line loose on base          |
| 1  | Liquid line valve open, plug out   |
| 6  | Liquid line leak at stem           |
| 5  | Vapor line valve open, loose plug  |
| 1  | Thermometer well leak              |
| 1  | Blind flange loose                 |

**TOTAL DIVISION 2.2 (Nonflammable Gas) Tank Cars losing lading - 134**

**or 0.2% of 66,185 DIVISION 2.2 (Nonflammable Gas) Tank Car Originations.**

**DETAIL FOR DIVISION 2.3 (Poison Gas)**

|             |                                  |       |                                    |
|-------------|----------------------------------|-------|------------------------------------|
| 4920102     | METHYL MERCAPTAN                 | 1     | vapor line valve open, loose plug  |
|             | Cars losing lading - 1           |       | or 0.19% of 531 ORIGINATIONS       |
| <br>4920508 | <br>SULFUR DIOXIDE               | <br>1 | <br>safety valve loose             |
|             |                                  | 1     | liquid line valve leak at seat     |
|             | Cars losing lading - 2           |       | or 0.06% of 3,437 ORIGINATIONS     |
| <br>4920513 | <br>HYDROGEN SULPHIDE, LIQUEFIED | <br>1 | <br>safety valve loose             |
|             |                                  | 1     | leak at manway nozzle, bad gasket  |
|             | Cars losing lading - 1           |       | or 0.85% of 118 ORIGINATIONS       |
| <br>4920523 | <br>CHLORINE                     | <br>2 | <br>safety valve loose             |
|             |                                  | 2     | liquid line valve open, plug loose |
|             |                                  | 1     | leak at manway nozzle, not secured |
|             |                                  | 1     | liquid line valve loose on base    |
|             |                                  | 1     | unknown                            |
|             | Cars losing lading - 7           |       | or 0.01% of 44,520 ORIGINATIONS    |

\*\*\*\*\* SUMMARY FOR DIVISION 2.3 (Poison Gas)

|   |                                    |
|---|------------------------------------|
| 4 | Safety valve loose                 |
| 1 | Leak at manway nozzle, not secured |
| 1 | Leak at manway nozzle, bad gasket  |
| 2 | Liquid line valve loose on base    |
| 1 | Liquid line valve open, plug loose |
| 1 | Liquid line valve leak at seat     |
| 1 | Vapor line valve open, plug loose  |
| 1 | Unknown                            |

TOTAL DIVISION 2.3 (Poison Gas) Tank Cars losing lading - 12

or 0.02% of 56,556 DIVISION 2.3 (Poison Gas) Tank Car Originations.

# **DETAIL FOR CLASS 3 (Flammable Liquid)**

|         |                                                             |   |                                    |
|---------|-------------------------------------------------------------|---|------------------------------------|
| 4906620 | PROPYLENE OXIDE                                             | 1 | leak at sample line                |
|         | Cars losing lading - 1                                      |   | or 0.02% of 5,107 ORIGINATIONS     |
| 4907210 | ACETALDEHYDE                                                | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1                                      |   | or 0.06% of 1,754 ORIGINATIONS     |
| 4907215 | ETHYL ACRYLATE, INHIBITED                                   | 1 | bottom outlet leak, loose plug     |
|         |                                                             | 6 | leak at manway nozzle, not secured |
|         |                                                             | 4 | leak at manway nozzle, bad gasket  |
|         |                                                             | 2 | liquid line valve open, plug loose |
|         |                                                             | 1 | air inlet leak, plug loose         |
|         |                                                             | 1 | liquid line valve loose on base    |
|         |                                                             | 1 | vacuum relief leak                 |
|         | Cars losing lading - 13                                     |   | or 1.25% of 1,041 ORIGINATIONS     |
| 4907235 | STYRENE MONOMER, INHIBITED                                  | 1 | safety valve loose                 |
|         |                                                             | 1 | leak at manway nozzle, no gasket   |
|         |                                                             | 4 | liquid line valve open, plug loose |
|         |                                                             | 1 | shell/head leak                    |
|         | Cars losing lading - 7                                      |   | or 2.51% of 279 ORIGINATIONS       |
| 4907241 | FLAMMABLE LIQUID, n.o.s.<br>(styrene, ethylbenzene mixture) | 2 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 2                                      |   | or 2.9% of 69 ORIGINATIONS         |
| 4907245 | METHYL ACRYLATE, INHIBITED                                  | 1 | bottom outlet leak, bad gasket     |
|         |                                                             | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 2                                      |   | or 0.57% of 353 ORIGINATIONS       |

|         |                                                                                                  |   |                                    |
|---------|--------------------------------------------------------------------------------------------------|---|------------------------------------|
| 4907250 | METHYL METHACRYLATE MONOMER                                                                      | 3 | leak at manway nozzle, not secured |
|         |                                                                                                  | 1 | leak at manway nozzle, bad gasket  |
|         |                                                                                                  | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 5                                                                           |   | or 0.11% of 4,383 ORIGINATIONS     |
| 4907255 | METHYL METHACRYLATE MONOMER<br>INHIBITED                                                         | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1                                                                           |   | or 0.28% or 361 ORIGINATIONS       |
| 4907265 | STYRENE MONOMER, INHIBITED                                                                       | 1 | safety valve functioned            |
|         |                                                                                                  | 2 | liquid line valve open, plug loose |
|         |                                                                                                  | 1 | vacuum relief leak                 |
|         | Cars losing lading - 4                                                                           |   | or 0.03% of 15,750 ORIGINATIONS    |
| 4907431 | FLAMMABLE LIQUID, POISONOUS,<br>N.O.S. (methanol & xylene &<br>2,4-dimethyl-6-tert butyl phenol) | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1                                                                           |   | or 0.08% of 4,788 ORIGINATIONS     |
| 4907813 | FLAMMABLE LIQUID, CORROSIVE,<br>N.O.S.                                                           | 1 | leak at manway nozzle, not secured |
|         |                                                                                                  | 1 | air inlet leak, loose plug         |
|         | Cars losing lading - 1                                                                           |   | or 0.56% of 177 ORIGINATIONS       |
| 4907835 | ETHYLAMINE                                                                                       | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1                                                                           |   | or 2.1% of 48 ORIGINATIONS         |

|         |                          |                                                                                                             |
|---------|--------------------------|-------------------------------------------------------------------------------------------------------------|
| 4908105 | ACETONE                  | 3 bottom outlet leak, loose cap<br>2 stuffing box loose                                                     |
|         | Cars losing lading - 3   | or 0.11% of 2,700 ORIGINATIONS                                                                              |
| 4908110 | BENZENE                  | 1 vacuum relief leak                                                                                        |
|         | Cars losing lading - 1   | or 0.02% of 4,946 ORIGINATIONS                                                                              |
| 4908134 | FLAMMABLE LIQUID, n.o.s. | 1 leak at manway nozzle, not secured                                                                        |
|         | Cars losing lading - 1   | or 0.41% of 242 ORIGINATIONS                                                                                |
| 4908151 | DIMETHYL SULPHIDE        | 1 leak at manway nozzle, not secured                                                                        |
|         | Cars losing lading - 1   | or 25% of 4 ORIGINATIONS                                                                                    |
| 4908157 | ETHYL ETHER              | 1 liquid line valve leak at seat<br>2 leak at manway nozzle, not secured<br>1 bottom outlet leak, loose cap |
|         | Cars losing lading - 3   | or 50% of 6 ORIGINATIONS                                                                                    |
| 4908160 | PROPANETHIOL             | 1 air line leak, loose plug                                                                                 |
|         | Cars losing lading - 1   | or 3.45% of 29 ORIGINATIONS                                                                                 |
| 4908169 | ETHYL MERCAPTAN          | 1 air inlet leak, loose plug                                                                                |
|         | Cars losing lading - 1   | or 1.02% of 98 ORIGINATIONS                                                                                 |

|         |                         |   |                                    |
|---------|-------------------------|---|------------------------------------|
| 4908175 | GASOLINE                | 1 | vacuum relief leak                 |
| 4908176 | " "                     | 1 | bottom outlet leak, loose cap      |
|         |                         | 1 | leak at manway nozzle, not secured |
|         |                         | 1 | liquid line valve open, plug loose |
|         | Cars losing lading - 3  |   | or 0.03% of 8,868 ORIGINATIONS     |
| 4908183 | HEXANE                  | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1  |   | or 0.08% of 1,269 ORIGINATIONS     |
| 4908192 | ISOPENTANE              | 1 | liquid line valve open, plug loose |
|         |                         | 1 | bottom outlet leak, loose cap      |
|         |                         | 1 | stuffing box loose                 |
|         | Cars losing lading - 2  |   | or 0.51% of 391 ORIGINATIONS       |
| 4908194 | ISOPROPYLAMINE          | 1 | leak at sample line                |
|         |                         | 1 | air inlet leak, loose flange       |
|         | Cars losing lading - 2  |   | or 1.02% of 196 ORIGINATIONS       |
| 4908224 | METHYL TERT-BUTYL ETHER | 1 | safety valve functioned            |
|         |                         | 1 | bottom outlet leak, loose cap      |
|         |                         | 1 | bottom outlet leak, bad gasket     |
|         |                         | 3 | leak at manway nozzle, not secured |
|         |                         | 1 | air inlet leak, loose plug         |
|         |                         | 1 | liquid line valve loose on base    |
|         |                         | 1 | stuffing box leak                  |
|         |                         | 5 | vacuum relief leak                 |
|         | Cars losing lading - 12 |   | or 0.15% of 8,186 ORIGINATIONS     |
| 4909103 | ALCOHOLS, n.o.s.        | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1  |   | or 0.61% of 164 ORIGINATIONS.      |

|         |                         |    |                                    |
|---------|-------------------------|----|------------------------------------|
| 4909117 | BUTANOLS                | 1  | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1  |    | or 0.04% of 2,339 ORIGINATIONS     |
| 4909123 | ETHYL ALCOHOL           | 1  | safety valve functioned            |
| 4909146 | " "                     | 1  | bottom outlet leak, loose cap      |
|         |                         | 1  | bottom outlet leak, bad gasket     |
|         |                         | 1  | liquid line valve open, loose plug |
|         |                         | 1  | leak at manway nozzle, bad gasket  |
|         |                         | 1  | leak at manway nozzle, not secured |
|         |                         | 1  | vacuum relief leak                 |
|         |                         | 1  | stuffing box loose                 |
|         | Cars losing lading - 7  |    | or 0.31% of 2,254 ORIGINATIONS     |
| 4909128 | BUTYL ACETATE           | 1  | bottom outlet leak, loose cap      |
|         |                         | 1  | stuffing box loose                 |
|         | Cars losing lading - 1  |    | or 0.09% of 1,099 ORIGINATIONS     |
| 4909141 | DENATURED ALCOHOL       | 2  | safety valve loose                 |
| 4909152 | " "                     | 1  | leak at fill hole, not secured     |
|         |                         | 3  | bottom outlet leak, bad gasket     |
|         |                         | 10 | bottom outlet leak, loose cap      |
|         |                         | 3  | leak at manway nozzle, not secured |
|         |                         | 3  | leak at manway nozzle, bad gasket  |
|         |                         | 3  | liquid line valve open, loose plug |
|         |                         | 1  | liquid line valve loose on base    |
|         |                         | 4  | stuffing box loose                 |
|         | Cars losing lading - 24 |    | or 0.2% of 11,787 ORIGINATIONS     |
| 4909150 | DIETHYL KETONE          | 1  | leak at manway nozzle, not secured |
|         | Cars losing lading - 1  |    | or 1.08% of 93 ORIGINATIONS        |

|         |                         |   |                                    |
|---------|-------------------------|---|------------------------------------|
| 4909160 | ETHYL ACETATE           | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1  |   | or 0.07% of 1,446 ORIGINATIONS     |
| 4909166 | ETHYLENE DICHLORIDE     | 1 | safety valve functioned            |
|         | Cars losing lading - 1  |   | or 0.03% of 3,271 ORIGINATIONS     |
| 4909190 | HEPTANE                 | 1 | bottom outlet leak, bad gasket     |
|         | Cars losing lading - 1  |   | or 0.15% of 651 ORIGINATIONS       |
| 4909198 | XYLENES                 | 1 | bottom outlet leak, loose cap      |
|         |                         | 1 | leak at manway nozzle, not secured |
|         |                         | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 3  |   | or 1.88% of 53 ORIGINATIONS        |
| 4909207 | ISOBUTYL ACETATE        | 1 | bottom outlet leak, bad gasket     |
|         | Cars losing lading - 1  |   | or 0.43% of 233 ORIGINATIONS       |
| 4909210 | ISOPROPYL ACETATE       | 1 | leak at manway nozzle, bad gasket  |
|         |                         | 1 | leak at manway nozzle, not secured |
|         |                         | 1 | shell/head leak                    |
|         | Cars losing lading - 3  |   | or 0.89% of 338 ORIGINATIONS       |
| 4909230 | METHYL ALCOHOL          | 1 | safety valve functioned            |
|         |                         | 1 | liquid line valve open, plug loose |
|         |                         | 9 | bottom outlet leak, loose cap      |
|         |                         | 1 | leak at manway nozzle, no gasket   |
|         |                         | 4 | leak at manway nozzle, not secured |
|         |                         | 7 | stuffing box loose                 |
|         |                         | 1 | air inlet leak, loose plug         |
|         |                         | 1 | leak at fill hole, bad gasket      |
|         | Cars losing lading - 19 |   | or 0.07% of 27,428 ORIGINATIONS    |

|         |                                                |                                                                                                                                                   |
|---------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 4909243 | METHYL ETHYL KETONE                            | 1 bottom outlet leak, loose cap<br>1 bottom outlet leak, bad gasket<br>1 leak at manway nozzle, no gasket<br>1 leak at manway nozzle, not secured |
|         | Cars losing lading - 3                         | or 0.22% of 1,382 ORIGINATIONS                                                                                                                    |
| 4909244 | METHYL ISOBUTYL KETONE                         | 1 bottom outlet leak, bad gasket                                                                                                                  |
|         | Cars losing lading - 1                         | or 0.33% of 307 ORIGINATIONS                                                                                                                      |
| 4909268 | N-BUTYL ACETATE                                | 1 liquid line valve open, plug loose                                                                                                              |
|         | Cars losing lading - 1                         | or 0.3% of 335 ORIGINATIONS                                                                                                                       |
| 4909303 | FLAMMABLE LIQUID, n.o.s.<br>(ammonium sulfide) | 1 vacuum relief leak                                                                                                                              |
|         | Cars losing lading - 1                         | of 0.28% of 359 ORIGINATIONS                                                                                                                      |
| 4909305 | TOLUENE                                        | 1 safety valve functioned<br>1 leak at manway nozzle, not secured                                                                                 |
|         | Cars losing lading - 2                         | or 0.06% of 3,139 ORIGINATIONS                                                                                                                    |
| 4909343 | TERPENE HYDROCARBONS, n.o.s.                   | 1 safety valve functioned                                                                                                                         |
|         | Cars losing lading - 1                         | or 5.55% of 18 ORIGINATIONS                                                                                                                       |
| 4909356 | TOLUENE                                        | 2 bottom outlet leak, loose cap<br>1 leak at manway nozzle, not secured<br>1 stuffing box loose                                                   |
|         | Cars losing lading - 3                         | or 5% of 60 ORIGINATIONS                                                                                                                          |

|         |                          |   |                                    |
|---------|--------------------------|---|------------------------------------|
| 4909391 | XYLENE SOLUTION          | 2 | leak at manway nozzle, bad gasket  |
| 4909396 |                          |   |                                    |
|         | Cars losing lading - 2   |   | or 1.46% of 137 ORIGINATIONS       |
| 4910102 | ALCOHOLIC BEVERAGE       | 1 | bottom outlet leak, loose cap      |
|         |                          | 1 | leak at manway nozzle, not secured |
|         |                          | 1 | leak at manway nozzle, bad gasket  |
|         |                          | 1 | stuffing box leak                  |
|         | Cars losing lading - 3   |   | or 0.21% of 1,439 ORIGINATIONS     |
| 4910111 | ALCOHOLS, n.o.s.         | 1 | liquid line valve open, plug out   |
|         | Cars losing lading - 1   |   | or 1.43% of 7 ORIGINATIONS         |
| 4910127 | NAPHTHA                  | 3 | leak at manway nozzle, not secured |
| 4910257 | • •                      | 1 | liquid line valve open, plug loose |
| 4910272 | • •                      | 1 | safety valve functioned            |
|         | Cars losing lading - 5   |   | or 1.38% of 362 ORIGINATIONS       |
| 4910131 | FLAMMABLE LIQUID, n.o.s. | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1   |   | or 0.27% of 365 ORIGINATIONS       |
| 4910135 | COAL TAR DISTILLATE      | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1   |   | or 0.16% of 628 ORIGINATIONS       |
| 4910165 | PETROEUM CRUDE OIL       | 2 | safety valve functioned            |
|         |                          | 2 | bottom outlet leak, loose cap      |
|         |                          | 5 | leak at manway nozzle, not secured |
|         |                          | 2 | leak at manway nozzle, bad gasket  |
|         |                          | 1 | leak at manway nozzle, no gasket   |
|         |                          | 3 | liquid line valve open, plug loose |
|         |                          | 2 | vacuum relief leak                 |
|         |                          | 2 | air inlet leak, loose plug         |
|         |                          | 1 | stuffing box leak                  |
|         | Cars losing lading - 12  |   | or 0.16% of 7,686 ORIGINATIONS     |

|         |                          |                                                                                                                                                                                                                                                                  |
|---------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4910185 | FLAMMABLE LIQUID, n.o.s. | 1 safety valve functioned<br>1 safety valve loose<br>3 leak at manway nozzle, not secured<br>2 leak at manway nozzle, bad gasket<br>2 bottom outlet leak, loose cap<br>2 liquid line valve loose on base<br>3 vacuum relief leak<br>1 air inlet leak, loose plug |
|---------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Cars losing lading - 15

or 0.63% of 2,380 ORIGINATIONS

|         |                                                        |
|---------|--------------------------------------------------------|
| 4910237 | FLAMMABLE LIQUID, n.o.s.<br><i>(naphtha, isoprene)</i> |
|---------|--------------------------------------------------------|

|   |                 |
|---|-----------------|
| 1 | shell/head leak |
|---|-----------------|

Cars losing lading - 1

or 50% of 2 ORIGINATIONS

|         |               |
|---------|---------------|
| 4910245 | PETROLEUM OIL |
|---------|---------------|

|   |                                    |
|---|------------------------------------|
| 1 | leak at manway nozzle, not secured |
| 1 | liquid line valve open, plug loose |

Cars losing lading - 1

or 0.1% of 964 ORIGINATIONS

|         |                         |
|---------|-------------------------|
| 4910253 | METHYL TERT BUTYL ETHER |
|---------|-------------------------|

|   |                                    |
|---|------------------------------------|
| 2 | leak at manway nozzle, not secured |
| 1 | leak at manway nozzle, bad gasket  |
| 1 | liquid line valve open, plug loose |
| 1 | stuffing box loose                 |

Cars losing lading - 5

or 0.38% of 1,302 ORIGINATIONS

|         |                       |
|---------|-----------------------|
| 4910256 | PETROLEUM DISTILLATES |
|---------|-----------------------|

|   |                                |
|---|--------------------------------|
| 1 | safety valve functioned        |
| 1 | bottom outlet leak loose cap   |
| 1 | bottom outlet leak, bad gasket |

Cars losing lading - 3

or 1.61% of 186 ORIGINATIONS

|         |                                               |   |                                    |
|---------|-----------------------------------------------|---|------------------------------------|
| 4910259 | PETROLEUM NAPHTHA                             | 2 | bottom outlet leak, loose cap      |
|         |                                               | 1 | bottom outlet leak, bad gasket     |
|         |                                               | 1 | leak at manway nozzle, bad gasket  |
|         |                                               | 1 | air inlet leak, loose flange       |
|         |                                               | 1 | liquid line valve open, plug loose |
|         | Cars losing lading - 6                        |   | or 0.22% of 2,714 ORIGINATIONS     |
| 4910280 | RESIN SOLUTION                                | 1 | bottom outlet leak, bad gasket     |
|         | Cars losing lading - 1                        |   | or 0.23% of 429 ORIGINATIONS       |
| 4910290 | DENATURED ALCOHOL                             | 1 | bottom outlet leak, loose cap      |
|         |                                               | 1 | liquid line valve open, plug loose |
|         | Cars losing lading - 2                        |   | or 10% of 20 ORIGINATIONS          |
| 4910306 | FLAMMABLE LIQUID, n.o.s.<br>(xylene, toluene) | 1 | safety valve functioned            |
|         | Cars losing lading - 1                        |   | or 3.7% of 27 ORIGINATIONS         |
| 4910313 | TURPENTINE                                    | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1                        |   | or 1.66% OF 60 ORIGINATIONS        |
| 4910314 | FLAMMABLE LIQUID, n.o.s.<br>(decane, decane)  | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1                        |   | or 1.04% of 96 ORIGINATIONS        |
| 4910318 | TURPENTINE RESIDUE                            | 1 | safety valve loose                 |
|         |                                               | 1 | leak at manway nozzle, bad gasket  |
|         |                                               | 1 | stuffing box loose                 |
|         | Cars losing lading - 2                        |   | or 10% of 20 ORIGINATIONS          |

|         |                                                                         |                                                                                                                                                                     |
|---------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4910320 | PULP MILL LIQUID                                                        | 1 bottom outlet leak, loose cap<br>2 leak at manway nozzle, no gasket<br>1 leak at manway nozzle, not secured<br>1 leak at gauging device                           |
|         | Cars losing lading - 5                                                  | or 0.52% of 955 ORIGINATIONS                                                                                                                                        |
| 4910401 | ALCOHOLS, n.o.s.                                                        | 1 liquid line valve leak, loose plug                                                                                                                                |
|         | Cars losing lading - 1                                                  | or 0.67% of 149 ORIGINATIONS                                                                                                                                        |
| 4910467 | FLAMMABLE LIQUID, n.o.s.<br>(propylene glycol monomethyl ether acetate) | 1 leak at manway nozzle, not secured                                                                                                                                |
|         | Cars losing lading - 1                                                  | or 1.13% of 88 ORIGINATIONS                                                                                                                                         |
| 4910560 | CHEMICAL PLANT WASTE                                                    | 1 leak at manway nozzle, bad gasket                                                                                                                                 |
|         | Cars losing lading - 1                                                  | or 2.56% of 39 ORIGINATIONS                                                                                                                                         |
| 4912215 | BUTYL ACRYLATE                                                          | 1 safety valve functioned<br>1 bottom outlet leak, loose cap<br>1 leak at manway nozzle, bad gasket<br>1 liquid line valve open, plug loose<br>1 vacuum relief leak |
|         | Cars losing lading - 5                                                  | or 0.17% of 2,918 ORIGINATIONS                                                                                                                                      |
| 4912356 | PETROLEUM DISTILLATE, n.o.s.                                            | 1 leak at manway nozzle, not secured<br>1 leak at manway nozzle, bad gasket                                                                                         |
|         | Cars losing lading - 2                                                  | or 14.29% of 14 ORIGINATIONS                                                                                                                                        |

**\*\*\*\*\* SUMMARY FOR CLASS 3 (Flammable Liquids)**

|    |                                    |
|----|------------------------------------|
| 14 | Safety valve functioned            |
| 5  | Safety valve loose                 |
| 43 | Bottom outlet leak, loose cap      |
| 11 | Bottom outlet leak, bad gasket     |
| 1  | Bottom outlet leak, loose plug     |
| 55 | Leak at manway nozzle, not secured |
| 29 | Leak at manway nozzle, bad gasket  |
| 4  | Leak at manway nozzle, no gasket   |
| 1  | Liquid line valve open, plug out   |
| 26 | Liquid line valve open, loose plug |
| 5  | Liquid line valve loose on base    |
| 1  | Liquid line valve leak at seat     |
| 1  | Vapor line valve open, loose plug  |
| 7  | Air inlet leak, loose plug         |
| 2  | Air inlet leak, loose flange       |
| 1  | Leak at fill hole, not secured     |
| 1  | Leak at fill hole, bad gasket      |
| 22 | Stuffing box loose                 |
| 17 | Vacuum relief leak                 |
| 2  | Leak at sample line                |
| 1  | Leak at gauging device             |
| 3  | Shell/head leaks                   |

**TOTAL CLASS 3 (Flammable Liquid) Tank Cars losing lading - 228**

**or 0.11% of 209,304 CLASS 3 (Flammable Liquid) Tank Car Originations**

# DETAIL FOR COMBUSTIBLE LIQUIDS

|         |                                                              |                                              |
|---------|--------------------------------------------------------------|----------------------------------------------|
| 4913122 | ALCOHOLS, n.o.s.<br>( <i>isoheptyl alcohol</i> )             | 1 leak at manway nozzle, not secured         |
|         | Cars losing lading - 1                                       | or 12.5% of 8 ORIGINATIONS                   |
| 4913128 | ALCOHOLS, n.o.s.                                             | 1 safety valve loose<br>1 vacuum relief leak |
|         | Cars losing lading - 2                                       | or 1.18% of 169 ORIGINATIONS                 |
| 4913150 | COMBUSTIBLE LIQUID, n.o.s.<br>( <i>methyl acetoacetate</i> ) | 1 leak at manway nozzle, not secured         |
|         | Cars losing lading - 1                                       | or 1.49% of 67 ORIGINATIONS                  |
| 4913179 | ALLYL GLYCIDYL ETHER                                         | 1 vacuum relief leak                         |
|         | Cars losing lading - 1                                       | or 0.18% of 544 ORIGINATIONS                 |
| 4914164 | FUEL OIL                                                     | 1 leak at manway nozzle, not secured         |
|         | Cars losing lading - 1                                       | or 25% of 4 ORIGINATIONS                     |
| 4914216 | BUTYL ACRYLATE                                               | 1 leak at manway nozzle, bad gasket          |
|         | Cars losing lading - 1                                       | or 100% of 1 ORIGINATIONS                    |
| 4914247 | PETROLEUM DISTILLATES, n.o.s.                                | 1 leak at manway nozzle, bad gasket          |
|         | Cars losing lading - 1                                       | or 3.45% of 29 ORIGINATIONS                  |

|         |                        |   |                                    |
|---------|------------------------|---|------------------------------------|
| 4915101 | ALCOHOLS, n.o.s.       | 1 | stuffing box loose                 |
|         | Cars losing lading - 1 |   | or 0.06% of 1,668 ORIGINATIONS     |
| 4915110 | FUEL OIL               | 1 | leak at manway nozzle, not secured |
|         |                        | 1 | shell/head leak                    |
|         | Cars losing lading - 2 |   | or 0.03% of 7,963 ORIGINATIONS     |
| 4915112 | FUEL OIL               | 1 | bottom outlet leak, loose cap      |
|         |                        | 1 | stuffing box loose                 |
|         | Cars losing lading - 1 |   | or 0.03% of 6,112 ORIGINATIONS     |
| 4915117 | FUEL OIL #2            | 2 | bottom outlet leak, loose cap      |
|         |                        | 3 | leak at manway nozzle, bad gasket  |
|         |                        | 2 | stuffing box loose                 |
|         | Cars losing lading - 5 |   | or 0.06% of 8,257 ORIGINATIONS     |
| 4915118 | FUEL OIL #4            | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1 |   | or 5.26% of 19 ORIGINATIONS        |
| 4915127 | CYMENES                | 1 | leak at manway nozzle, bad gasket  |
|         |                        | 1 | vacuum relief leak                 |
|         | Cars losing lading - 1 |   | or 5.55% of 22 ORIGINATIONS        |
| 4915133 | COAL TAR DISTILLATE    | 1 | liquid line valve loose on base    |
|         | Cars losing lading - 1 |   | or 0.6% of 167 ORIGINATIONS        |

|         |                            |   |                                    |
|---------|----------------------------|---|------------------------------------|
| 4915165 | PETROLEUM CRUDE OIL        | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1     |   | or 0.79% of 127 ORIGINATIONS       |
| 4915168 | PAINT                      | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1     |   | or 0.01% of 10,772 ORIGINATIONS    |
| 4915170 | PINE OIL                   | 1 | leak at manway nozzle, not secured |
|         |                            | 1 | stuffing box loose                 |
|         | Cars losing lading - 2     |   | or 0.97% of 103 ORIGINATIONS       |
| 4915171 | KEROSENE                   | 2 | heater coil leak                   |
|         | Cars losing lading - 2     |   | or 0.3% of 663 ORIGINATIONS        |
| 4915185 | COMBUSTIBLE LIQUID, n.o.s. | 1 | safety valve loose                 |
|         |                            | 1 | safety valve functioned            |
|         |                            | 3 | bottom outlet leak, loose cap      |
|         |                            | 1 | leak at manway nozzle, bad gasket  |
|         |                            | 2 | leak at manway nozzle, not secured |
|         |                            | 1 | liquid line valve loose on base    |
|         |                            | 1 | air inlet leak, no plug            |
|         |                            | 3 | stuffing box loose                 |
|         |                            | 1 | leak at gauging device             |
|         |                            | 1 | shell/head leak                    |
|         | Cars losing lading - 11    |   | or 0.39% of 2,853 ORIGINATIONS     |
| 4915188 | GAS DRIPS, HYDROCARBON     | 1 | safety valve functioned            |
|         | Cars losing lading - 1     |   | or 100% of 1 ORIGINATIONS          |

|         |                               |   |                                    |
|---------|-------------------------------|---|------------------------------------|
| 4915195 | XYLENES                       | 1 | safety valve loose                 |
|         |                               | 1 | liquid line valve loose on base    |
|         | Cars losing lading - 2        |   | or 0.55% of 366 ORIGINATIONS       |
| 4915235 | FUEL OIL                      | 1 | heater coil leak                   |
|         |                               | 1 | bottom outlet leak, loose cap      |
|         |                               | 1 | leak at manway nozzle, bad gasket  |
|         |                               | 1 | liquid line valve open, plug loose |
|         | Cars losing lading - 4        |   | or 50% of 8 ORIGINATIONS           |
| 4915247 | PETROLEUM OIL                 | 1 | liquid line valve open, plug out   |
|         |                               | 1 | air inlet leak, no plug            |
|         | Cars losing lading - 1        |   | or 0.32% of 313 ORIGINATIONS       |
| 4915256 | PETROLEUM DISTILLATES, n.o.s. | 1 | leak at manway nozzle, bad gasket  |
|         |                               | 1 | liquid line valve open, plug loose |
|         | Cars losing lading - 2        |   | or 0.71% of 251 ORIGINATIONS       |
| 4915258 | PETROLEUM NAPHTHA             | 3 | bottom outlet leak, loose cap      |
| 4915259 | " "                           | 1 | bottom outlet leak, bad gasket     |
|         |                               | 1 | air inlet leak, loose plug         |
|         |                               | 5 | leak at manway nozzle, not secured |
|         |                               | 1 | leak at manway nozzle, bad gasket  |
|         |                               | 4 | liquid line valve open, plug loose |
|         |                               | 1 | liquid line valve open, plug out   |
|         |                               | 1 | stuffing box loose                 |
|         |                               | 2 | vacuum relief leak                 |
|         | Cars losing lading - 17       |   | or 0.38% of 4,532 ORIGINATIONS     |
| 4915294 | PETROLEUM OIL                 | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1        |   | or 0.22% of 450 ORIGINATIONS       |

|         |                                                                 |   |                                    |
|---------|-----------------------------------------------------------------|---|------------------------------------|
| 4915350 | COMBUSTIBLE LIQUID, n.o.s.<br>(pulp mill liquid)                | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1                                          |   | or 100% of 1 ORIGINATIONS          |
| 4915362 | HEXANOLS                                                        | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1                                          |   | or 25% of 4 ORIGINATION            |
| 4915399 | COMBUSTIBLE LIQUID, n.o.s.                                      | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1                                          |   | or 0.18% of 567 ORIGINATIONS       |
| 4915401 | ALCOHOLS, n.o.s.                                                | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1                                          |   | or 0.24% of 425 ORIGINATIONS       |
| 4915459 | COMBUSTIBLE LIQUID, n.o.s.<br>(butanol distillation heavy ends) | 1 | leak at gauging device             |
|         | Cars losing lading - 1                                          |   | or 100% of 1 ORIGINATIONS          |
| 4915473 | COMBUSTIBLE LIQUID, n.o.s.<br>(n-methyl pyrrolidinone)          | 1 | liquid line valve open, plug loose |
|         | Cars losing lading - 1                                          |   | or 8.33% of 12 ORIGINATION         |
| 4915507 | ALCOHOLS, n.o.s.<br>(octanol & decanol)                         | 1 | vacuum relief leak                 |
|         | Cars losing lading - 1                                          |   | or 1.96% of 51 ORIGINATIONS        |

|         |                                                              |   |                               |
|---------|--------------------------------------------------------------|---|-------------------------------|
| 4915546 | ALCOHOLS, n.o.s.                                             | 1 | safety vent loose             |
|         | Cars losing lading - 1                                       |   | or 0.7% of 143 ORIGINATIONS   |
| 4915578 | COMBUSTIBLE LIQUID, n.o.s.<br>(contains hydrocarbon solvent) | 1 | bottom outlet leak, loose cap |
|         | Cars losing lading - 1                                       |   | or 100% of 1 ORIGINATIONS     |

**\*\*\*\*\* SUMMARY FOR COMBUSTIBLE LIQUIDS**

|    |                                    |
|----|------------------------------------|
| 3  | Safety valve loose                 |
| 1  | Safety vent loose                  |
| 2  | Safety valve functioned            |
| 13 | Bottom outlet leak, loose cap      |
| 1  | Bottom outlet leak, bad gasket     |
| 15 | Leak at manway nozzle, not secured |
| 13 | Leak at manway nozzle, bad gasket  |
| 9  | Stuffing box loose                 |
| 2  | Liquid line valve open, plug out   |
| 3  | Liquid line valve loose on base    |
| 5  | Liquid line valve leak, plug loose |
| 1  | Air inlet leak, loose plug         |
| 2  | Air inlet leak, no plug            |
| 6  | Vacuum relief device leak          |
| 2  | Shell/head leak                    |
| 2  | Leak at gauging device             |
| 3  | Heater coil leaks                  |

**TOTAL COMBUSTIBLE LIQUID Tank Cars losing lading - 74**

**or 0.09% of 81,595 COMBUSTIBLE LIQUID Tank Car Originations**

**DETAIL FOR DIVISION 4.3 (Dangerous When Wet)**

|         |                        |   |                              |
|---------|------------------------|---|------------------------------|
| 4916456 | SODIUM, METAL          | 1 | shell/head leak              |
|         | Cars losing lading - 1 |   | or 0.23% of 426 ORIGINATIONS |

**\*\*\*\*\* SUMMARY FOR DIVISION 4.3 (Dangerous When Wet)**

**1 Shell/head leak**

**TOTAL DIVISION 4.3 (Dangerous When Wet) Tank Cars losing lading - 1**  
**or 0.15% OF 662 DIVISION 5.1 (Oxidizer) Tank Car Originations**

# DETAIL FOR DIVISION 5.1 (Oxidizers)

|         |                                    |    |                                   |
|---------|------------------------------------|----|-----------------------------------|
| 4918335 | HYDROGEN PEROXIDE SOLUTION         | 16 | disk ruptured                     |
|         |                                    | 1  | leak at manway nozzle, bad gasket |
|         |                                    | 2  | shell/head leak                   |
|         | Cars losing lading - 19            |    | or 0.62% of 3,070 ORIGINATIONS    |
| 4918714 | CALCIUM CHLORITE                   | 1  | bottom outlet leak, loose cap     |
|         | Cars losing lading - 1             |    | or 100% of 1 ORIGINATIONS         |
| 4918723 | SODIUM CHLORATE                    | 2  | disk ruptured                     |
|         |                                    | 1  | leak at manway, not secured       |
|         | Cars losing lading - 2             |    | or 0.78% of 254 ORIGINATIONS      |
| 4918733 | OXIDIZING SUBSTANCE LIQUID, n.o.s. | 1  | shell/head leak                   |
|         | Cars losing lading - 1             |    | or 2.27% of 44 ORIGINATIONS       |
| 4918774 | AMMONIUM NITRATE SOLUTION          | 1  | shell/head leak                   |
|         | Cars losing lading - 1             |    | or 0.05% of 1,882 ORIGINATIONS.   |

\*\*\*\*\*

**SUMMARY FOR DIVISION 5.1 (Oxidizers)**

|    |                                    |
|----|------------------------------------|
| 19 | Disk ruptured                      |
| 1  | Bottom outlet leak, loose cap      |
| 1  | Leak at manway nozzle, not secured |
| 1  | Leak at manway nozzle, bad gasket  |
| 4  | Shell/head leak                    |

**TOTAL DIVISION 5.1 (Oxidizer) Tank Cars losing lading - 24**

**or 0.27% OF 9,039 DIVISION 5.1 (Oxidizer) Tank Car Originations**

# DETAIL FOR DIVISION 6.1 (Poison B)

|         |                                   |   |                                    |
|---------|-----------------------------------|---|------------------------------------|
| 4921220 | PHENOL                            | 3 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 3            |   | or 0.05% of 5,916 ORIGINATIONS     |
| 4921455 | NITROBENZENE, LIQUID              | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1            |   | or 0.038% of 264 ORIGINATIONS      |
| 4921475 | POISONOUS LIQUID, n.o.s.          | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1            |   | or 0.13% of 794 ORIGINATIONS       |
| 4921613 | DIPHENYLMETHANE -4,4-DIISOCYANATE | 1 | leak at manway nozzle, bad gasket  |
|         | Cars losing lading - 1            |   | or 0.05% of 2,068 ORIGINATIONS     |
| 4921805 | BUTYL PHENOLS, LIQUID             | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1            |   | or 16.66% of 6 ORIGINATIONS        |
| 4923106 | ARSENIC ACID, LIQUID              | 1 | head/shell leak                    |
|         | Cars losing lading -1             |   | or 1.04% of 96 ORIGINATIONS        |

**\*\*\*\*\* SUMMARY FOR DIVISION 6.1 (Poison B)**

|   |                                    |
|---|------------------------------------|
| 1 | Leak at manway nozzle, not secured |
| 4 | Leak at manway nozzle, bad gasket  |
| 1 | Bottom outlet leak, loose cap      |
| 1 | Shell/head leak                    |

**TOTAL DIVISION 6.1 (Poison B) Tank Cars losing lading - 8**

**or 0.03% of 25,997 DIVISION 6.1 (Poison B) Tank Car Originations**

# DETAIL FOR CLASS 8 (CORROSIVE) MATERIAL

|         |                          |     |                                    |
|---------|--------------------------|-----|------------------------------------|
| 4930010 | FLUOROSULFONIC ACID      | 1   | disk ruptured                      |
|         | Cars losing lading - 1   |     | or 1.23% of 81 ORIGINATIONS        |
| 4930022 | HYDROFLUORIC ACID        | 1   | disk ruptured                      |
|         | Cars losing lading - 1   |     | or 2.32% of 43 ORIGINATIONS        |
| 4930026 | HYDROFLUOROSILICIC ACID  | 1   | disk ruptured                      |
|         |                          | 1   | leak at manway nozzle, bad gasket  |
|         |                          | 1   | leak at manway nozzle, not secured |
|         |                          | 5   | shell/head leak                    |
|         | Cars losing lading - 7   |     | or 0.69% of 1,020 ORIGINATIONS     |
| 4930030 | OLEUM                    | 9   | disk ruptured                      |
|         |                          | 1   | liquid line valve leak at seat     |
|         | Cars losing lading - 10  |     | or 0.44% of 2,282 ORIGINATIONS     |
| 4930040 | SULFURIC ACID            | 1   | rupture disk missing               |
|         |                          | 124 | disk ruptured                      |
|         |                          | 3   | bottom outlet leak, loose cap      |
|         |                          | 2   | leak at washout                    |
|         |                          | 4   | liquid line valve open, loose plug |
|         |                          | 7   | leak at manway nozzle, bad gasket  |
|         |                          | 3   | leak at manway nozzle, no gasket   |
|         |                          | 4   | leak at manway nozzle, not secured |
|         |                          | 2   | liquid line valve leak at stem     |
|         |                          | 1   | liquid line valve leak at seat     |
|         |                          | 1   | air inlet leak, loose plug         |
|         |                          | 4   | leak at fill hole, bad gasket      |
|         |                          | 3   | leak at fill hole, not secured     |
|         |                          | 2   | shell/head leak                    |
|         | Cars losing lading - 159 |     | or 0.25% of 64,867 ORIGINATIONS    |

|         |                                                         |    |                                    |
|---------|---------------------------------------------------------|----|------------------------------------|
| 4930042 | SULFURIC ACID, SPENT                                    | 9  | disk ruptured                      |
|         |                                                         | 1  | leak at manway nozzle, bad gasket  |
|         |                                                         | 2  | leak at fill hole, bad gasket      |
|         |                                                         | 2  | leak at fill hole, not secured     |
|         |                                                         | 1  | liquid line valve open, plug loose |
|         |                                                         | 1  | air inlet leak, loose plug         |
|         | Cars losing lading - 15                                 |    | or 0.27% of 5,623 ORIGINATIONS     |
| 4930208 | CORROSIVE LIQUID, n.o.s.<br>(phosphoric, sulfuric acid) | 3  | disk ruptured                      |
|         |                                                         | 2  | bottom outlet leak, loose cap      |
|         |                                                         | 2  | stuffing box loose                 |
|         | Cars losing lading - 6                                  |    | or 0.37% of 1,626 ORIGINATIONS     |
| 4930223 | NITRIC ACID                                             | 1  | safety valve loose                 |
|         |                                                         | 1  | safety valve functioned            |
|         |                                                         | 1  | air inlet leak, loose plug         |
|         | Cars losing lading - 3                                  |    | or 0.61% of 492 ORIGINATIONS       |
| 4030228 | HYDROCHLORIC ACID                                       | 2  | safety valve functioned            |
|         |                                                         | 4  | safety vent loose                  |
|         |                                                         | 44 | disk ruptured                      |
|         |                                                         | 1  | leak at washout                    |
|         |                                                         | 5  | leak at manway nozzle, not secured |
|         |                                                         | 1  | leak at manway nozzle, bad gasket  |
|         |                                                         | 1  | leak at fill hole, not secured     |
|         |                                                         | 1  | leak at fill hole, bad gasket      |
|         |                                                         | 1  | liquid line valve open, plug loose |
|         |                                                         | 1  | liquid line loose on base          |
|         |                                                         | 3  | air inlet leak, loose plug         |
|         |                                                         | 6  | shell/head leak                    |
|         | Cars losing lading - 68                                 |    | or 0.46% of 14,746 ORIGINATIONS    |
| 4930229 | HYDROCHLORIC ACID MIXTURE                               | 1  | disk ruptured                      |
|         | Cars losing lading - 1                                  |    | or 2.7% of 37 ORIGINATIONS         |

|         |                                                       |    |                                    |
|---------|-------------------------------------------------------|----|------------------------------------|
| 4930231 | HYDROCHLORIC ACID                                     | 1  | disk ruptured                      |
|         | Cars losing lading - 1                                |    | or 0.67% of 143 ORIGINATIONS       |
| 4930245 | NITRATING ACID MIXTURE<br>(less than 50% nitric acid) | 1  | blind flange loose                 |
|         |                                                       | 1  | liquid line valve open, plug loose |
|         |                                                       | 4  | leak at manway nozzle, bad gasket  |
|         |                                                       | 1  | leak at fill hole, not secure      |
|         | Cars losing lading - 7                                |    | or 35% of 20 ORIGINATIONS          |
| 4930247 | PHOSPHORIC ACID                                       | 1  | safety valve loose                 |
| 4930248 | " " "                                                 | 80 | disk ruptured                      |
|         |                                                       | 2  | leak at manway nozzle, not secured |
|         |                                                       | 12 | leak at manway nozzle, bad gasket  |
|         |                                                       | 1  | leak at manway nozzle, no gasket   |
|         |                                                       | 1  | bottom outlet leak, loose cap      |
|         |                                                       | 1  | bottom outlet leak, bad gasket     |
|         |                                                       | 1  | bottom outlet leak at flange       |
|         |                                                       | 2  | liquid line valve loose on base    |
|         |                                                       | 1  | blind flange loose                 |
|         |                                                       | 2  | stuffing box loose                 |
|         |                                                       | 2  | vacuum relief leak                 |
|         |                                                       | 4  | shell/head leak                    |
|         |                                                       | 1  | air inlet leak, loose flange       |
|         |                                                       | 1  | unknown                            |
|         | Cars losing lading - 110                              |    | or 0.43% of 25,444 ORIGINATIONS    |
| 4931303 | ACETIC ACID, GLACIAL                                  | 1  | safety valve loose                 |
|         |                                                       | 1  | bottom outlet leak, bad gasket     |
|         |                                                       | 1  | liquid line valve open, plug loose |
|         |                                                       | 1  | vacuum relief leak                 |
|         |                                                       | 1  | shell/head leak                    |
|         | Cars losing lading - 4                                |    | or 0.1% of 4,057 ORIGINATIONS      |
| 4931304 | ACETIC ANHYDRIDE                                      | 1  | disk ruptured                      |
|         |                                                       | 1  | bottom outlet leak, loose cap      |
|         |                                                       | 1  | leak at sample line                |
|         |                                                       | 2  | shell/head leak                    |
|         | Cars losing lading - 5                                |    | or 0.19% of 2,142 ORIGINATIONS     |

|         |                                                       |                                                                             |
|---------|-------------------------------------------------------|-----------------------------------------------------------------------------|
| 4931405 | ACRYLIC ACID                                          | 1 leak at manway nozzle, not secured<br>1 leak at manway nozzle, bad gasket |
|         | Cars losing lading - 2                                | or 0.1% of 2,010 ORIGINATIONS                                               |
| 4931414 | BUTYRIC ACID                                          | 1 vacuum relief leak                                                        |
|         | Cars losing lading - 1                                | or 1.54% of 65 ORIGINATIONS                                                 |
| 4931417 | CRESOL                                                | 1 bottom outlet leak, loose cap                                             |
|         | Cars losing lading - 1                                | or 0.5% of 201 ORIGINATIONS                                                 |
| 4931421 | ALKYLAMINES, n.o.s.<br>(fatty tertiary amines)        | 1 bottom outlet leak, loose cap                                             |
|         | Cars losing lading - 1                                | or 2.7% of 37 ORIGINATIONS                                                  |
| 4931447 | PROPIONIC ACID SOLUTION                               | 1 blind flange loose<br>1 bottom outlet leak, loose cap                     |
|         | Cars losing lading - 2                                | or 0.43% of 466 ORIGINATIONS                                                |
| 4932315 | CORROSIVE LIQUID, n.o.s.<br>(ferric sulfate solution) | 1 disk ruptured                                                             |
|         | Cars losing lading - 1                                | or 0.85% of 118 ORIGINATION                                                 |
| 4932329 | FERROUS CHLORIDE SOLUTION                             | 2 leak at manway nozzle, not secured<br>1 leak at fill hole, no gasket      |
|         | Cars losing lading - 3                                | or 0.31% of 964 ORIGINATIONS                                                |

|         |                                                                           |                                                                                                                        |
|---------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 4932343 | FERRIC CHLORIDE SOLUTION                                                  | 1 disk ruptured<br>1 shell/head leak                                                                                   |
|         | Cars losing lading - 2                                                    | or 0.3% of 662 ORIGINATIONS                                                                                            |
| 4932359 | PHOSPHORUS TRICHLORIDE                                                    | 1 safety valve functioned<br>1 leak at manway nozzle, not secured                                                      |
|         | Cars losing lading - 2                                                    | or 2.12% of 94 ORIGINATIONS                                                                                            |
| 4932384 | ZINC CHLORIDE SOLUTION                                                    | 1 disk ruptured                                                                                                        |
|         | Cars losing lading - 1                                                    | or 3.33% of 30 ORIGINATIONS                                                                                            |
| 4932385 | TITANIUM TETRACHLORIDE                                                    | 1 leak at manway nozzle, not secured                                                                                   |
|         | Cars losing lading - 1                                                    | or 0.38% of 259 ORIGINATIONS                                                                                           |
| 4932393 | ZINC CHLORIDE SOLUTION                                                    | 2 disk ruptured<br>1 leak at manway nozzle, not secured                                                                |
|         | Cars losing lading - 3                                                    | or 5.08% of 59 ORIGINATIONS                                                                                            |
| 4935206 | SODIUM HYDROXIDE,<br>LIQUID or SOLUTION                                   | 1 disk ruptured<br>1 leak at manway nozzle, not secured<br>1 leak at manway nozzle, bad gasket<br>1 stuffing box loose |
|         | Cars losing lading - 4                                                    | or 4% of 100 ORIGINATIONS                                                                                              |
| 4935202 | CAUSTIC ALKALI LIQUID, n.o.s.<br>(sodium hydroxide & potassium hydroxide) | 1 leak at manway nozzle, bad gasket                                                                                    |
|         | Cars losing lading - 1                                                    | or 6.25% of 16 ORIGINATIONS                                                                                            |

|                    |                                                              |                                                                                                                                                                                                                                                                                      |
|--------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4935220            | ALKALINE CORROSIVE LIQUID                                    | 2 heater coil leaks<br>2 leak at manway nozzle, not secured<br>1 stuffing box loose                                                                                                                                                                                                  |
|                    | Cars losing lading - 4                                       | or 0.88% of 453 ORIGINATIONS                                                                                                                                                                                                                                                         |
| 4935221            | CAUSTIC ALKALI LIQUID, n.o.s.<br>(contains sodium hydroxide) | 1 leak at manway nozzle, no gasket                                                                                                                                                                                                                                                   |
|                    | Cars losing lading - 1                                       | or 0.74% of 135 ORIGINATIONS                                                                                                                                                                                                                                                         |
| 4935230            | POTASSIUM HYDROXIDE<br>LIQUID or SOLUTION                    | 1 disk loose<br>7 disk ruptured<br>1 leak at manway nozzle, bad gasket<br>1 bottom outlet leak, loose cap<br>1 stuffing box loose                                                                                                                                                    |
|                    | Cars losing lading - 11                                      | or 0.29% of 4,261 ORIGINATIONS                                                                                                                                                                                                                                                       |
| 4935240<br>4935245 | SODIUM HYDROXIDE,<br>LIQUID or SOLUTION                      | 1 disk not standard<br>19 disk ruptured<br>2 safety valve function<br>7 leak at manway nozzle, not secured<br>3 leak at manway nozzle, bad gasket<br>3 bottom outlet leak, loose cap<br>1 liquid line valve open, plug loose<br>2 stuffing box loose<br>3 air inlet leak, loose plug |
|                    | Cars losing lading - 38                                      | or 0.05% of 82,805 ORIGINATIONS                                                                                                                                                                                                                                                      |
| 4935251            | SODIUM HYDROXIDE, SOLUTION                                   | 1 disk ruptured<br>1 leak at manway nozzle, not secure<br>1 vacuum relief leak                                                                                                                                                                                                       |
|                    | Cars losing lading - 3                                       | or 20% of 15 ORIGINATIONS                                                                                                                                                                                                                                                            |

|         |                                                                  |                                |                                    |
|---------|------------------------------------------------------------------|--------------------------------|------------------------------------|
| 4935257 | CORROSIVE LIQUID, n.o.s.<br>(cupric chloride & sodium hydroxide) | 1                              | shell/head leak                    |
|         | Cars losing lading - 1                                           | or 10% of 10 ORIGINATIONS      |                                    |
| 4935260 | SODIUM ALUMINATE SOLUTION                                        | 2                              | disk ruptured                      |
|         | Cars losing lading - 2                                           | or 0.28% of 695 ORIGINATIONS   |                                    |
| 4935268 | SODIUM HYDROSULFIDE                                              | 1                              | disk ruptured                      |
|         |                                                                  | 1                              | leak at manway nozzle, not secured |
|         |                                                                  | 1                              | liquid line valve open plug loose  |
|         | Cars losing lading - 3                                           | or 0.22% or 1,347 ORIGINATIONS |                                    |
| 4935280 | AMMONIUM HYDROSULFIDE                                            | 1                              | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1                                           | or 10% of 100 ORIGINATIONS     |                                    |
| 4935604 | ALKYLAMINES, n.o.s.<br>(polyalkylamines)                         | 1                              | leak at manway nozzle, not secured |
|         | Cars losing lading - 1                                           | or 16.66% of 6 ORIGINATIONS    |                                    |
| 4935645 | HEXAMETHYLENE DIAMINE                                            | 1                              | blind flange loose                 |
|         |                                                                  | 2                              | liquid line valve open, plug loose |
|         |                                                                  | 1                              | liquid line valve loose on base    |
|         |                                                                  | 1                              | leak at manway nozzle, not secured |
|         | Cars losing lading - 5                                           | or 0.09% of 5,711 ORIGINATIONS |                                    |
| 4935647 | SODIUM HYDROSULFIDE SOLUTION                                     | 4                              | disk ruptured                      |
|         | Cars losing lading - 4                                           | or 0.95% of 42 ORIGINATIONS    |                                    |

|                   |                                                                   |                                                                      |
|-------------------|-------------------------------------------------------------------|----------------------------------------------------------------------|
| 4935665           | MONOETHANOLAMINE                                                  | 1 disk ruptured<br>1 leak at manway nozzle, no gasket                |
|                   | Cars losing lading - 2                                            | or 0.83% of 598 ORIGINATIONS                                         |
| 4936343           | AMMONIUM SULPHIDE SOLUTION                                        | 2 leak at manway nozzle, bad gasket                                  |
|                   | Cars losing lading - 2                                            | or 4.87% of 41 ORIGINATIONS                                          |
| 4936344           | COPPER CHLORIDE                                                   | 1 disk ruptured<br>1 shell/head leak                                 |
|                   | Cars losing lading - 2                                            | or 100% of 1 ORIGINATIONS                                            |
| 4936381<br>GASKET | ALKYLAMINES, n.o.s.<br><i>(1,3-propanediamine, n,n-dimethyl)</i>  | 1 leak at manway nozzle, BAD                                         |
|                   | Cars losing lading - 1                                            | or 4.76% of 21 ORIGINATIONS                                          |
| 4936539           | PETROLEUM REFINERY SULFIDE<br>WASTE (CORROSIVE LIQUID,<br>N.O.S.) | 1 leak at manway nozzle, not secured                                 |
|                   | Cars losing lading - 1                                            | or 0.22% of 452 ORIGINATIONS                                         |
| 4936540           | GLYCERINE CRUDE OR SPENT<br>LYE                                   | 1 disk ruptured<br>1 disk missing<br>3 bottom outlet leak, loose cap |
|                   | Cars losing lading - 5                                            | or 0.32% of 1,571 ORIGINATIONS                                       |

**\*\*\*\*\* SUMMARY FOR CLASS 8 (Corrosive Material)**

|     |                                    |
|-----|------------------------------------|
| 5   | Safety valve functioned            |
| 3   | Safety valve loose                 |
| 4   | Safety vent loose                  |
| 1   | Rupture disk loose                 |
| 1   | Rupture disk not standard          |
| 321 | Disk ruptured                      |
| 2   | Disk missing                       |
| 19  | Bottom outlet leak, loose cap      |
| 1   | Bottom outlet leak, bad gasket     |
| 1   | Bottom outlet leak at flange       |
| 36  | Leak at manway nozzle, bad gasket  |
| 32  | Leak at manway nozzle, not secured |
| 5   | Leak at manway nozzle, no gasket   |
| 12  | Liquid line valve open, loose plug |
| 2   | Liquid line valve leak at seat     |
| 4   | Liquid line blind flange loose     |
| 3   | Liquid line valve loose on base    |
| 1   | Liquid line valve leak at stem     |
| 1   | Leak at sample line                |
| 9   | Air inlet leak, loose plug         |
| 1   | Air inlet leak, loose flange       |
| 7   | Leak at fill hole, bad gasket      |
| 7   | Leak at fill hole, not secured     |
| 2   | Leak at fill hole, no gasket       |
| 6   | Vacuum relief leaks                |
| 2   | Leak at washout                    |
| 23  | Shell/head leaks                   |
| 2   | Heater coil leak                   |
| 10  | Stuffing box loose                 |
| 1   | Unknown                            |

**TOTAL CLASS 8 (Corrosive Material) Tank Cars losing lading - 511**

**or 0.021% of 242,446 CLASS 8 (Corrosive Material) Tank Car Originations**

**DETAIL FOR CLASS 9**  
**(Hazardous Waste only)**

|         |                                                               |        |                                                                       |
|---------|---------------------------------------------------------------|--------|-----------------------------------------------------------------------|
| 4809190 | WASTE FLAMMABLE LIQUID n.o.s.<br>(toluene/xylene)             | 1      | leak at manway nozzle, not secured                                    |
|         | Cars losing lading - 1                                        |        | or 0.55% of 180 ORIGINATIONS                                          |
| 4809230 | WASTE METHYL ALCOHOL                                          | 1      | safety valve loose                                                    |
|         | Cars losing lading - 1                                        |        | or 3.03% of 33 ORIGINATIONS                                           |
| 4809243 | WASTE METHYL ETHYL KETONE                                     | 1      | stuffing box loose                                                    |
|         | Cars losing lading - 1                                        |        | or 100% of 1 ORIGINATIONS                                             |
| 4815170 | WASTE COMBUSTIBLE LIQUID, n.o.s.                              | 2      | leak at manway nozzle, bad gasket                                     |
|         | Cars losing lading - 2                                        |        | or 9.09% of 22 ORIGINATIONS                                           |
| 4835220 | WASTE ALKALINE LIQUID, n.o.s.                                 | 1      | shell/head leak                                                       |
|         | Cars losing lading - 1                                        |        | or 2.27% of 44 ORIGINATIONS                                           |
| 4836538 | WASTE CORROSIVE LIQUID, n.o.s.<br>(contains sodium hydroxide) | 1<br>1 | leak at manway nozzle, no gasket<br>leak at manway nozzle, bad gasket |
|         | Cars losing lading - 2                                        |        | or 18.18% of 11 ORIGINATIONS                                          |
| 4871201 | WASTE COMBUSTIBLE LIQUID, n.o.s.<br>(F003)                    | 1      | safety valve loose                                                    |
|         | Cars losing lading - 1                                        |        | or 0.92% of 105 ORIGINATIONS                                          |

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\*\*\*\*\* SUBTOTAL FOR ALL HAZARDOUS WASTES only

|   |                                    |
|---|------------------------------------|
| 2 | Safety valve loose                 |
| 3 | Leak at manway nozzle, bad gasket  |
| 1 | Leak at manway nozzle, no gasket   |
| 1 | Leak at manway nozzle, not secured |
| 1 | Stuffing box loose                 |
| 1 | Shell/head leak                    |

TOTAL HAZARDOUS WASTE Tank Cars losing lading - 9

or 0.21% of 4,283 Hazardous Waste Tank Car Originations

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**Balance of CLASS 9 materials**

|         |                                                                                                  |   |                                    |
|---------|--------------------------------------------------------------------------------------------------|---|------------------------------------|
| 4940364 | <b>FORMALDEHYDE SOLUTION</b>                                                                     | 1 | vacuum relief leak                 |
|         | Cars losing lading - 1                                                                           |   | or 0.1% of 982 ORIGINATIONS        |
| <br>    |                                                                                                  |   |                                    |
| 4941132 | <b>DICHLOROMETHANE</b>                                                                           | 1 | safety valve functioned            |
|         |                                                                                                  | 1 | stuffing box loose                 |
|         | Cars losing lading - 2                                                                           |   | or 0.7% of 285 ORIGINATIONS        |
| <br>    |                                                                                                  |   |                                    |
| 4941204 | <b>OTHER REGULATED SUBSTANCES,<br/>n.o.s. (contains creosote)</b>                                | 1 | shell/head leak                    |
|         | Cars losing lading - 1                                                                           |   | or 1.05% of 95 ORIGINATIONS        |
| <br>    |                                                                                                  |   |                                    |
| 4945770 | <b>MOLTEN SULFUR</b>                                                                             | 4 | disk ruptured                      |
|         |                                                                                                  | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 5                                                                           |   | or 0.01% of 61,281 ORIGINATIONS    |
| <br>    |                                                                                                  |   |                                    |
| 4960131 | <b>ENVIRONMENTALLY HAZARDOUS</b>                                                                 | 1 | safety valve functioned            |
| 4960132 | <b>SUBSTANCE, LIQUID n.o.s.</b>                                                                  | 1 | shell/head leak                    |
|         |                                                                                                  | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 2                                                                           |   | or 0.06% of 3,531 ORIGINATIONS     |
| <br>    |                                                                                                  |   |                                    |
| 4961161 | <b>ENVIRONMENTALLY HAZARDOUS<br/>SUBSTANCE, LIQUID n.o.s.<br/>(bis(2-ethyl hexyl) phthalate)</b> | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1                                                                           |   | or 0.37% of 270 ORIGINATIONS       |

|         |                                                                                                                     |   |                                    |
|---------|---------------------------------------------------------------------------------------------------------------------|---|------------------------------------|
| 4961387 | ENVIRONMENTALLY HAZARDOUS<br>SUBSTANCE, LIQUID n.o.s.<br>( <i>alcohol C<sup>13</sup>-15 poly (1-6) ethoxylate</i> ) | 1 | vacuum relief leak                 |
|         | Cars losing lading - 1                                                                                              |   | or 0.1% of 953 ORIGINATIONS        |
| 4963301 | ENVIRONMENTALLY HAZARDOUS<br>SUBSTANCE, LIQUID n.o.s.<br>( <i>contains acenaphthene</i> )                           | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1                                                                                              |   | or 8.33% of 12 ORIGINATIONS        |
| 4963330 | ENVIRONMENTALLY HAZARDOUS<br>SUBSTANCE, LIQUID n.o.s.<br>( <i>contains creosote</i> )                               | 1 | bottom outlet leak, loose cap      |
|         | Cars losing lading - 1                                                                                              |   | or 0.07% of 1,368 ORIGINATIONS     |
| 4963361 | BENZO-A-PYRENE                                                                                                      | 1 | liquid line blind flange loose     |
|         | Cars losing lading - 1                                                                                              |   | or 0.45% of 224 ORIGINATIONS       |
| 4966150 | PHTHALIC ANHYDRIDE, LIQUID                                                                                          | 1 | leak at manway nozzle, not secured |
|         | Cars losing lading - 1                                                                                              |   | or 0.08% of 1,301 ORIGINATIONS     |

**\*\*\*\*\* SUMMARY FOR ALL CLASS 9 (ORM's and Hazardous Wastes)**

|   |                                    |
|---|------------------------------------|
| 2 | Safety vent loose                  |
| 4 | Disk ruptured                      |
| 4 | Leak at manway nozzle, not secured |
| 2 | Bottom outlet leak, loose cap      |
| 1 | Stuffing box loose                 |
| 2 | Vacuum relief leak                 |
| 2 | Liquid line blind flange loose     |
| 2 | Shell/head leak                    |

**TOTAL CLASS 9 (ORM's and Hazardous Waste) Tank Cars losing loading - 25**

**or 0.16% of 16,087 CLASS 9 (ORM's and Hazardous Waste) Tank Car Originations**