October 1, 2000 (Rev. C)

Serious Incident Definition

Background

The Department of Transportation's Office of Hazardous Materials Safety (OHMS), within the Research and Special Programs Administration (RSPA), created the definition of serious incident in 1993 to better convey the consequences of hazardous materials transportation – i.e., what has resulted, in terms of harm and inconvenience – as unintended consequences of the necessity to transport hazardous materials. Up until that time, the number of incident reports received was the measure that RSPA most relied upon. However, starting that year, RSPA received a large increase in the number of reports received. The vast majority of the reports originated from a few large companies and, although they met the reporting requirement, were very minor in nature. Thus, RSPA decided to distinguish between those incidents that have the potential to result in significant consequences from the relatively minor incidents.

Initially, a serious incident was defined as one resulting in one or more fatalities or major injuries, closure of a major artery or facility, a vehicle crash or derailment, or an evacuation. Over the years, this definition was refined to better characterize the seriousness of incidents. For instance, an evacuation was counted only if it involved six or more people.

Since 1994, RSPA has defined serious incidents as "incidents that involve: a fatality or major injury due to a hazardous material; closure of a major transportation artery or facility or evacuation of six or more persons due to the presence of a hazardous material; or a vehicle crash or derailment resulting in the release of a hazardous material." Unlike the total number of hazardous materials incidents, the number of serious incidents has been more reliable as a descriptive statistic.

In formulating RSPA's performance plan as required by the Government Performance and Results Act (GPRA), OHMS adopted the current definition of "serious incident" as the primary performance measure for the hazardous materials transportation safety program, a purpose at odds with the initial intent of the measure. It has become clear that this measure is deficient for the purpose of measuring program performance, for a number of reasons.[1]

First, some components of the definition are not objective measures, but are influenced by other factors. For instance, the decision to evacuate a facility may be mandated by other state or Federal regulations, such as OSHA's process safety management standards or EPA's risk management regulations, rather than the imminent danger posed by the presence or release of a hazardous material. RSPA regards this as far less serious than the emergency evacuation of a

[1] Note that other measures, such as the total number of incidents or the number of serious incidents normalized by industrial activity, may be appropriate as subsidiary performance measures or as GPRA measures applicable to specific Operating Administrations.

residential area near a hazardous materials incident. Thus, to measure program performance, only those evacuations threatening the safety of workers or the general public should be included. Due to limitations of our current data collection, we are unable to identify these incidents. To compensate for this, we assign the higher "serious incident" risk to evacuations of six or more. Another example of a serious definition component being influenced by subjective factors would be a road or facility closure that was not caused by a release, but only the perceived threat of a release.

Other elements of the current performance measure do not relate to RSPA's prevention activities. For instance, a goal of the HazMat program is to support the movement of commercial products unimpeded. Thus, counting a road closure caused by a release (implying package failure) as a serious incident is appropriate. However, a road closure resulting from a crash involving only the presence of a HazMat, and not its release, is not appropriate.

These examples illustrate the deficiency of the current definition of serious incident as a measure of program performance. At the same time, they point out that there are significant incident consequences that, while not appropriate for performance measurement purposes, warrant scrutiny in that they may identify the need for new programmatic response.

Our purpose in re-defining "serious incidents" is to:

- identify a subset of all reported incidents that can be used to measure OHMS' performance over time, and

- identify a subset of all reported incidents that require more intense scrutiny and, potentially, programmatic response.

In addressing these concerns, OHMS is establishing two sets of incident consequence measures: "serious" as a performance measure, and "significant" as the analytical basis for program initiatives.

Serious and Significant Incidents

Serious Incidents

Serious incidents, tracked over time, have served as the Department's performance measure on hazardous materials transportation safety. In reformulating serious incidents, we focused on those incidents that result in serious consequences or have a high potential to result in serious consequences. The redefinition of serious incidents retains some components of the current definition, drops some others, and adds several new components.

The new definition of serious incident includes those incidents that involve:
- a fatality or major injury caused by the release of a hazardous material
- the evacuation of 25 or more employees or responders or any number of the general public as a result of release of a hazardous material or exposure to fire

- a release or exposure to fire which results in the closure of a major transportation artery
- the alteration of an aircraft flight plan or operation
- the release of radioactive materials from Type B packaging
- the suspected release of a Risk Group 3 or 4 infectious substance
- the release of over 11.9 gallons or 88.2 pounds of a severe marine pollutant
- the release of a bulk quantity (over 119 gallons or 882 pounds) of a hazardous material.

The new definition differs from the current definition in several ways.

The new definition of serious incidents includes incidents resulting in the evacuation of 25 or more employees or responders or any number of the general public when there has been a hazardous material release or exposure to fire. The old definition set the threshold at six or more persons. The new 5800.1 form will identify the types of people evacuated and will enable such a definition.

All incidents involving a major transportation artery closure were included in the old, pre-FY2001 definition of "serious incident." The new, post-FY2001 definition only includes those incidents when the material is released or there is exposure to fire. All transportation artery closures are included in the significant incident definition.

Vehicle crashes or derailments resulting in the release of a hazardous material are excluded from the new definition (unless other criteria, such as a bulk release, are met) of a serious incident. (However, they are included in the definition of significant incidents, discussed below.)

Incidents on board or affecting aircraft are particularly serious, due to the potential for loss of many lives and extremely large economic costs, including aircraft replacement costs. Radioactive materials shipped in Type B packaging are not expected to ever release their contents, even under accident scenarios, so any such release is of extreme gravity. Transported infectious substances include a wide range of hazards, from medical waste, such as "sharps," to highly contagious airborne viruses. Restricting serious the definition of serious incident to the more serious Risk Group 3 and 4 materials is more appropriate than including all of these materials. (All suspected releases of infectious substances will be included in the significant category.) They will be included in the serious category if a Risk Group 3 or Group 4 infectious substance is identified on the incident reporting form.[2]

The release of more than a bulk quantity of a material (defined as 119 gallons or 882 pounds) is also added to the "serious incident" definition, due to the potential for serious consequences. This criterion captures spills from bulk packaging and also includes spills from more than one non-bulk packaging. Even if no other serious consequences such as fatalities, injuries, or large evacuations actually occur when a bulk quantity is released, slight changes in incident scenarios

[2] Internal OHMS review will be necessary to determine whether any specific infectious material incident involved a Risk Group 3 or 4 material, since current regulations do not require shippers to classify infectious substances by Risk Group.

could easily lead to such consequences.

The rationale for including severe marine pollutants with a quantity release greater than or equal to 11.9 gallons or 88.2 pounds in the serious incident category relates to the criteria for classification of mixtures of materials as marine pollutants. For a solution or mixture to be classified as a marine pollutant, it must be 10 percent or more by weight of a material identified as a marine pollutant in the Appendix B to 49 CFR § 171.101. The percentage falls to 1 percent or more in the case of a severe marine pollutant. A marine pollutant released in bulk quantity (119 gallons or 882 pounds) would be in the serious incident category. Maintaining the same ten-to-one ratio based on hazard, a release of 11.9 gallons or 88.2 pounds of a severe marine pollutant is appropriate for inclusion in the serious incident category.

As with the current definition, all incidents with fatalities and major injuries are considered serious.

Significant Incidents

The second measure, named significant incidents, includes all serious incidents in addition to those incidents that *could have become serious*. Significant incidents can be studied more intensely by OHMS to identify important trends and to develop safety-related initiatives.[3]

Significant incidents include all serious incidents and, in addition, those that involve:

- evacuations of 25 employees or responders or any number of the general public, regardless of whether a release or exposure to fire occurred,
- major transportation artery closure, regardless of whether a release or exposure to fire occurred,
- bulk packaging in an accident if damage was sustained to the hazardous materials container or if a crash or derailment was involved even if no release has occurred,
- a radioactive material shipped in a Type B packaging when damage is sustained to the packaging even if no release has occurred,
- an infectious substance,
- a severe marine pollutant,
- a poisonous by inhalation (PIH) material, except those shipped as an NOS (not otherwise specified) material that does not explicitly identify the material as an inhalation hazard, and
- a vehicle crash or derailment resulting in the release of a hazardous material.

Evacuations, transportation artery closures, Type B shipments, infectious substances, and severe marine pollutants are all extensions of serious incident criteria. The presence of any PIH material

[3] In other cases, such as air transportation incidents where the number of incidents is relatively low and the potential consequence is large, all incidents or different sets of incidents may be examined in some depth by the relevant Operating Administration.

in an incident warrants further attention, so these incidents are considered significant. Since some generic proper shipping names (PSNs) include both PIH and non-PIH materials, only those generic PSNs that indicate that all included materials are inhalation hazards will be considered in this category.

All crash and derailment incidents are included in the set of *significant* incidents when *bulk* packagings are involved. They are of special importance since they allow the examination of packaging integrity issues under greater stresses than are typically involved in most loading or unloading incidents. Bulk packaging involved in an accident (other than a crash or derailment) if damage was sustained to the hazardous materials container with or without release is also included as significant for similar reasons. The new 5800.1 reporting requirements or current rail reporting requirements will capture these incidents. (Note that counts for significant incidents due to derailment or damage to bulk packagings involving the rail mode would be dependent on ties to the Rail Equipment Accident Report.)

The differences between the old definition of serious incidents and the new definitions for significant and serious incidents are highlighted in Table 1. Table 1 also relates the criteria for telephonic reporting (which considers public and political interest in addition to other factors) to the definitions of significant and serious incidents. Table 2 shows the number of incidents per year over the past decade using each definition. Figure 1 graphically compares trends between the old and new definition of serious incidents for the period over which it applies as a basic program performance measure.

The new definition for serious incidents maintains a trend comparable to the current serious definition at a slightly higher level (11% on the average) over the period for which it applies as a basic program performance measure. The new definition appears to be subject to less random variation, over the period of interest. This is partly the result of more limited definitions for evacuations and closure of a major transportation artery that more closely gauge results of factors under the control of the hazardous material transportation safety program, and exclude actions affected by other factors.

Program performance results will be tracked using both the old and new definitions for serious incidents for a transitional period.

Table 1. Definitions for Serious and Significant Incidents

	Old	New (FY2001)		
Criteria	**Serious Incidents**	**Significant Incidents**	**Serious Incidents**	**Telephonic Notification**
Fatalities*	yes	yes	yes	yes
Major Injuries*	yes	yes	yes	yes
Evacuations*	yes, if 6 or more people	yes, if 25 or more employees or responders or any number of the general public	yes, if 25 or more employees or responders or any number of the general public with release or exposure to fire	yes, if any number of the general public lasting one hour or more.
Major Transportation Artery Closure*	yes	yes	yes, with release or exposure to fire	yes, if closed or shut down for one hour or more
Vehicle Crash or Derailment with Release	yes	yes	no	no
HM in Bulk Packaging in Accident Without Release.	no	yes, if structural damage is sustained to the HM container or if in a crash or derailment	no	no
Aircraft Flight Plan or Operation Altered*	no	yes	yes	yes
Radioactive Materials in Type B Packaging	no	yes, if damage is sustained to packaging	yes, with release	yes, if fire, breakage, or suspected contamination occurs (note: all RAM)
Infectious Substances	no	yes, if Risk Group 2, 3, or 4	yes, if Risk Group 3 or 4	yes, if fire, breakage, or suspected contamination occurs
Severe Marine Pollutant	no	yes	yes, if over 11.9 gal. or 88.2 lbs. released	no
Bulk Quantity Released (over 119 gal. or 882 lbs.)	no	yes	yes	yes, if bulk release is of a marine pollutant
Poisonous by Inhalation Materials (except non-IH NOS materials)	no	yes	no	no

* Due to the presence of hazardous materials.

Effective: October 1, 2000

Table 2. Number of incidents per year meeting the definitions for serious and significant incidents.*

Year	Old Serious Incidents	New Significant Incidents	New Serious Incidents
1990	402	777	525
1991	405	738	460
1992	376	711	456
1993	358	707	428
1994	427	745	437
1995	408	714	420
1996	466	797	503
1997	423	773	486
1998	432	770	456
1999	370	898	440
Total	4,067	7,630	4,611

* Data current as of June 26, 2000. Data does not include hazardous material in bulk packaging in an accident with no release that would be included in the significant category if damage was sustained to the hazardous materials container or if a crash or derailment was involved.

Figure 1. Comparison of Old and New Definitions of "Serious Incidents"