H:\HCS\NTHOMAS\RULES\397\REGEVAL9

February 23, 1993

REGULATORY EVALUATION

SAFETY PERMITS

(49 CFR 397)

I. INTRODUCTION

A. Background

The Department of Transportation (DOT) estimates that approximately 4 billion tons of regulated hazardous materials are transported each year and that approximately 500,000 movements of hazardous materials occur each day. Because of the potential risks to life, property, and the environment posed by unintentional releases of hazardous materials and the dangers associated with the release of hazardous materials during their transportation, the Hazardous Materials Transportation Uniform Safety Act (HMTUSA) of 1990 (Pub. L. 101-615, 104 Stat. 3244) was enacted to help reduce the potential risks of these types of occurrences. The HMTUSA of 1990 acknowledges that the movement of hazardous materials in commerce is necessary and desirable to promote economic vitality and meet consumer demands and shall be conducted in a safe and efficient manner.

Section 8 of the HMTUSA of 1990 amended Section 106 of the Hazardous Materials Transportation Act (49 App. U.S.C. 1805; Pub. L. 93-633) and prohibits a motor carrier from transporting by motor vehicle, in commerce (interstate and intrastate), certain designated high risk hazardous materials unless the motor carrier holds a safety permit issued by the Secretary, authorizing such

transportation.

Section 15 of the HMTUSA states that not later than one year after the date of enactment of the HMTUSA “the Secretary shall require by regulation that, before each use of a motor vehicle to transport in commerce any highway route controlled quantity radioactive material, such vehicle shall be inspected and certified to be in compliance with” [emphasis added] the HMTUSA of 1990 and the applicable Federal motor carrier safety laws and regulations. Section 15 further states "[t]he Secretary may [emphasis added] require that inspections be carried out by duly authorized inspectors of the United States or in accordance with appropriate State procedures.” Under Section 15, the Secretary may also permit the shipper or transporter of any highway route controlled quantity (HRCQ) of radioactive materials to inspect the vehicle, as long as "[t]he inspector qualification requirements . . . issued by the Secretary shall apply to individuals conducting inspections . . . ."

The HMTUSA of 1990 also amended the HMTA to require registration of each person who transports or causes to be transported or shipped any of the designated high risk hazardous materials or other hazardous materials transported in a containment system that has a capacity in excess of 3,500 gallons (468 cubic feet) or 5,000 pounds of hazardous materials that require placarding of the vehicle. The registration program is being handled by the Research and Special Programs Administration (RSPA), another Administration within the Department.

B. Purpose of Regulation

As previously stated, Section 8 of the HMTUSA of 1990 amends section 106 of the HMTA to mandate and establish criteria for issuance of Federal safety permits to those motor carriers transporting hazardous materials which present either a high degree of risk during transportation or are of great concern to the public. These materials include quantities of class A and B explosives, materials which have been designated as extremely toxic by inhalation, liquefied natural gas (LNG), and highway route controlled quantity radioactive materials. For purposes of this regulatory evaluation we will refer to these hazardous materials as **designated high risk hazardous materials.** The Secretary has the authority to amend, suspend, or revoke the safety permit of a motor carrier who fails to comply with the requirements of the HMTA.

The Secretary has designated the FHWA as the agency within the Department to promulgate the regulatory requirements for safety permits, since these requirements solely affect highway transportation. The accompanying notice of proposed rulemaking (NPRM) implements the Congressional mandate contained in the HMTUSA requiring issuance of a safety permit for motor carriers transporting the designated high risk hazardous materials.

C. Description of Proposed Changes

The purpose of the proposed safety permit is to enhance the safe transportation of designated high risk hazardous materials in both interstate and intrastate commerce. The FHWA proposes to amend part 397 of Title 49 of the

Code of Federal Regulations. A new Subpart B would be added to the regulations entitled "Motor Carrier Safety Permits." Motor carriers of the designated high risk hazardous materials would be required to obtain a safety permit before engaging in the transportation of these hazardous materials. The conditions required to obtain and retain a safety permit should provide motor carriers with an added incentive to safely operate their commercial motor vehicles. The proposed safety permit requirements would apply to a motor carrier's officers, drivers, agents, representatives, and employees.

As proposed, motor carriers of the designated high risk hazardous materials would be prohibited from transporting those materials in commerce unless they have a FHWA safety permit authorizing such transportation. Motor carriers would be required to submit a motor carrier identification report application, Form MCS-150, and any other required supplemental information, in order to obtain a motor carrier safety permit. The NPRM addresses the proposed processes for application, amendment, suspension, revocation, and renewal of a safety permit.

II. STATEMENT OF THE PROBLEM

On November 10, 1987, the Committee on Government Operations approved and adopted a report entitled "Promoting Safer Highway Routing of Ultrahazardous Cargoes: DOT Oversight" (House Report 100-458). During the hearings which led to the committee report, the Government Activities and Transportation Subcommittee, chaired by Representative Cardiss Collins, received testimony on the highway transport of the so-called non-nuclear ultrahazardous

materials. It was during these hearings that the term “ultrahazardous materials” was coined. Testimony addressed the most toxic types of hazardous materials, such as methyl isocyanate (MIC) and nitrogen tetroxide, gases which are extremely toxic by inhalation. Public and congressional concern about the ultrahazardous materials is due to recent incidents which have involved such materials. For example, in 1984 a release involving methyl isocyanate (MIC) resulted in the deaths of more than 3,000 people in Bhopal, India (see pg. 2, House Report 100-458). Methyl isocyanate can be lethal at 5 parts per million [ppm], however it does not reach its lower flammable limit until there is a 53,000 ppm concentration. Another serious incident also occurred in 1984 in Denver, Colorado, when a tractor-semitrailer transporting a shipment of Department of Defense (DOD) Class A explosive torpedoes overturned on an exit ramp to a major artery in the city of Denver (NTSB/HZM 85/02, 1 O/21/85). Although no deaths occurred during this incident, the artery was closed for more than 8 hours and rush hour traffic was rerouted. The public was stunned that such a hazardous movement could occur within the confines of the city.

In 1985, a tractor-semitrailer loaded with 10 MK-84, 2,000-pound, general purpose bombs of the DOD collided with an automobile near Checotah, Oklahoma (NTSB/SIR-87/01). The automobile’s fuel tank ruptured. Spilled gasoline ignited quickly and engulfed both vehicles in flames. Subsequent explosions from the bombs destroyed the vehicles and left a crater in the roadway 27 feet deep and 35 feet across. Total damages from this incident were estimated at $5 million and 49

persons reported to a hospital emergency room for treatment of injuries.

Although few hazardous materials incidents involving the transportation of liquefied natural gas and highway route controlled quantity radioactive materials have occurred, Congress and the public are clearly concerned about the potential risk associated with transporting hazardous materials. Congress indicated that it may be interested in extending coverage of the permit program to other classes of hazardous materials, as is shown by the report of the Committee on Commerce, Science and Transportation (pg. 16, Senate Report 101-449, 7/10/90), "(t)he committee cannot be certain that the listing of materials for which motor carrier permits are required is sufficiently comprehensive to address all materials presenting either a high degree of risk in transportation or significant concern to the public."

The Federal Highway Administration agrees that consideration should be given to extending the coverage of the permit program to other classes of hazardous materials. But the FHWA believes that the no decision should be made about expanding the safety permit regulations to include all hazardous materials until FHWA has some experience with a program covering the materials listed in section 8, and has had an opportunity to evaluate the effectiveness of that program.

The Research and Special Programs Administration's Hazardous Materials Information System (HMIS) is the principal source of safety data relating to hazardous materials transportation for the Department. Based upon preliminary

data obtained from the HMIS for 1990, the greatest number of hazardous materials incidents, damage and deaths and injuries occur in the highway mode.

Preliminary statistical data obtained from RSPA's HMIS indicate that corrosive materials and flammable liquids are the two leading hazardous materials responsible for reported hazardous materials incidents and property damage. Nevertheless, the HMTUSA of 1990 mandates safety permits for the transportation of certain designated high risk materials, and is silent on corrosive materials and flammable liquids. This demonstrates the sensitivity which exists in Congress to the public's concern when high risk hazardous materials are being transported, even though the probability of a catastrophic event appears low. According to a 1986 Office of Technology Assessment (OTA) report titled ***Transportation of Hazardous Materials,*** "few activities with such statistically low risks arouse such intense public concern..." (page 3).

However, should a catastrophic incident occur, the potential for loss of life, personal injury, and extensive property damage is great, as evidenced by the 1984 Bhopal, India, tragedy and the 1985 Checotah, Oklahoma, incident. This potential for damage is magnified significantly when "ultra-hazardous" materials or "high risk" hazardous materials are transported. For this reason, imposition of additional safety controls on certain designated high risk hazardous materials is warranted.

The FHWA initially considered three different levels of coverage for the proposed permit program. The least stringent level considered was not establishing a permit program at all. Existing Office of Management and Budget

(OMB) guidance on preparing regulatory impact analyses (RIAs) recommends that regulatory evaluations include a no regulation alternative. Because the legislative language and history of HMTUSA clearly mandate the establishment of a permit program, and because it appears that the benefits of establishing such a program outweigh the costs of the program (as set forth below), it has been decided to not consider this alternative further at this time.

The next level of stringency evaluated was establishing a permit program covering only those four high-risk hazardous materials explicitly mentioned in the statute. This is the alternative that the FHWA is proposing, and it is discussed in detail below.

The highest level of stringency considered was to establish a permit program which would cover all highway transportation of hazardous materials. Under this alternative, carriers would be forbidden from carrying any hazardous materials without a permit, which would require a satisfactory safety rating.

A cursory evaluation indicated that immediately adopting such an extensive permitting program would present several difficulties. First, the economic and administrative impact would be dramatic. As was noted above, estimates suggest that up to 500,000 movements of hazardous materials occur each day. The Office of Motor Carrier's (OMC) Motor Carrier Management Information System (MCMIS) records 30,000 active interstate hazardous materials transporters as of January 1993. Subtracting out the 8,000 motor carriers covered by the intermediate option (which will be discussed below) leaves 22,000 additional

interstate carriers which would be required to conform to the new regulations. Assuming that an equal number of intrastate hazardous materials haulers exist (the assumption behind this will be discussed below) yields a total of 44,000 additional motor carriers which would be covered if this alternative were adopted.

The actual expansion would most likely be larger. Farmers, who frequently carry hazardous materials, are exempt from most of the Federal Motor Carrier Safety Regulations (FMCSRs) and therefore not recorded on the MCMIS. It is believed that a large number of farmers would be required to comply with the conditions of this alternative, although the FHWA lacks reliable figures on the number of farmers who transport hazardous materials. Accordingly, the analysis of this alternative did not include an estimate of the costs associated with applying the hazardous materials permitting program to farmers. The FHWA believes that including farmers in this analysis would have increased the estimated cost of this alternative.

This expansive alternative would require Federal and State enforcement officials to locate and rate 44,000 intrastate carriers plus a large number of farmers. Significant administrative hurdles would have to be overcome as well, particularly the need to rate heretofore unrated motor carriers. In fiscal year 1992, 20,000 motor carriers were reviewed and rated. Given that at least 44,000 motor carriers would have to be rated, it appears that the FHWA would be unable to rate all covered motor carriers within two years with current resources.

Focusing on expeditiously rating hazardous materials carriers would also

interfere with other reviews; attempting to rate all hazardous materials carriers immediately would forestall investigators from reviewing and rating other carriers of property or passengers, regardless of the potential harm posed by these other carriers.

The FHWA could work around some of these difficulties through the lagged implementation of a stringent hazardous materials permit system. However, phasing in such a permit system, which would cover a large number of hazardous materials and carriers, would present significant difficulties. For example, what distinctions would be used to determine different compliance dates for more than 2,000 hazardous materials? Would motor carriers be allowed to continue operations prior to obtaining a rating? Clearly this is a significant issue for farmers and others who only infrequently carry hazardous materials, and one with tremendous economic ramifications.

The FHWA believes that the necessity of an all-encompassing permit program has not yet been established. The magnitude of the problem does not appear so great as to require permitting for all hazardous materials. As was mentioned above, the OTA referred to the "statistically low risks" (page 3) of accidents in the transportation of hazardous materials. The FHWA is also uncertain how effective a permit program would be in reducing accidents. The FHWA has little evidence with which to predict the likely safety impacts of a permit program for all hazardous materials. The FHWA does plan to closely monitor and evaluate whatever program is enacted. The information gathered can

then be used to improve the existing program and to assist in future rulemaking actions. However, given the administrative difficulties, the high cost, the relatively low risks of accidents, and the uncertain effectiveness of a large-scale permit program, the FHWA proposes to initially restrict the permit program to the four designated high risk hazardous materials identified by Congress.

The FHWA invites comments on the desirability of establishing a permit program for all classes of hazardous materials. Commenters should specifically address the cost of such a program, the estimated benefits, and the administrative difficulties involved in such a program. Commenters are encouraged to provide any factual and quantitative data they posses.

The remainder of this regulatory evaluation focuses on the second identified alternative, restricting the permit program to the designated high risk hazardous materials.

COSTS AND BENEFITS

Costs

Motor carrier registrants would only be required to submit an updated MCS-150 in order to apply for the initial motor carrier safety permit. Renewal would be required every three years.

The FHWA proposes to limit the initial scope of the safety permit requirements to four specific groups of hazardous materials. A preliminary review of MCMIS revealed that approximately 8,000 interstate motor carriers carry these

materials and therefore would be required to obtain safety permits. Resubmitting an updated MCS-150 would require 20 minutes of preparation time initially, and 20 minutes every 3 years. Using an average wage of $15, this produces an application expense of $40,000 for all interstate motor carriers (8,000 motor carriers x 20 minutes ÷ 60 minutes per hour x $15 an hour wage). Since motor carriers will only have to apply every 3 years, the annualized costs of application are $13,333 ($40,000 ÷ 3 years).

Administrative expenses are assumed to be larger, since motor carriers have to find out about the regulations, understand them, make appropriate adjustments to their operating procedures, and maintain paperwork on their adherence to the new procedures. The FHWA estimates that motor carriers will devote approximately 2 hours to administrative procedures annually, which produces administrative expenses of $240,000 a year (8,000 motor carriers x 2 hours x $15 an hour). Thus the total annual costs of this regulation (application plus administrative) for interstate motor carriers is assumed to be $253,333. The FHWA invites comments on these assumptions and calculations.

The costs to intrastate carriers is impossible to precisely establish. As a preliminary estimate, we assume that 8,000 intrastate motor carriers would require safety permits. This is based on data in the ***1987 Truck Inventory and Use Survey*** (TIUS), a survey of over one hundred thousand truck owners conducted by the Bureau of the Census of the Department of Commerce. Table 12 of the TIUS reports that 14.5 billion miles, transporting hazardous materials, were travelled

that year; 7.1 billion involved trips of less than 200 miles. The FHWA is cognizant of the fact that some of these local and short haul trips could have been carried by interstate carriers. However, the FHWA was unable to discover any more plausible procedure to estimate intrastate carriage of hazardous materials. The FHWA invites comments on this approach and any alternatives. Including the application and registration costs for these 8,000 assumed intrastate motor carriers would double the cost of this program to approximately $507,000 annually.

The cost to the Federal Government is considered to be negligible. From a Federal perspective, there would be no measurable increase in administrative costs. The FHWA would use existing programs to implement and enforce the safety permit requirements. Since the processing costs for the MCS-150 are already included as a program cost in the FHWA's budget, the agency would incur insignificant additional costs when performing this function. Further, the auditing of safety permit applicants has already been included as a normal operating expense under existing FHWA program calculations.

Benefits

While establishing the costs of this proposed regulation is difficult, it is even harder to quantify the benefits of a permit program. The benefits of a permit program consist primarily of the value of the hazardous materials incidents forestalled by the program. Estimating this number requires establishing the number of relevant incidents now occurring, ascertaining the costs of these

incidents, and then determining how many will be avoided because of this regulation. Unfortunately, there are problems with the data on all of these matters, as will be demonstrated below.

Given the paucity of reliable data, a traditional cost benefit analysis would be misleading, and could well be inaccurate by a factor of ten (or more). The uncertainty of each component of the analysis (number of incidents, cost of incidents, safety consequences of the regulation) would, when combined, result in a final estimate of benefits that is inaccurate by more than the sum of the three components errors. The uncertainty is cumulative rather than additive, so extraordinary caution needs to be taken to avoid misinterpreting the results or giving the appearance of precision.

The FHWA, therefore, has decided to perform a modified threshold analysis, whereby we attempt to determine if the benefits exceed a given threshold (the cost of the program) rather than establish the net benefits (or costs) of the program. Given estimated values for some parameters, such as the average cost of an hazardous materials incident, this method allows us to establish how many incidents must be avoided to yield a net benefit. This method also lends itself more readily to sensitivity analysis, so that we can establish what impact varying one or two numbers has on the outcome.

The OTA report on hazardous materials concluded that “Federal accident reports suffer from significant underreporting and do not provide an accurate assessment of the level of safety in the transportation of hazardous materials”

(page 5). The main source of data on hazardous materials accident and incidents is RSPA's HM Incident Report form, #5800.1. These forms are entered into the Hazardous Materials Information System (HMIS). These forms are filled out, and submitted to RSPA, by the carriers involved in the accident or incident. Carriers involved in interstate commerce are required to report hazardous materials incidents. Additionally, intrastate carriers of certain hazardous substances or hazardous wastes are required to report.

From the point of view of the regulation under consideration, there are several shortcomings of the HMIS. First, it is limited primarily to interstate accidents, while this regulation will cover intrastate carriers as well. Second, even the numbers of interstate accidents are suspect. The DOT believes that significant underreporting exists. The OTA study confirms that this is indeed the case. Only 31% of motor carrier accidents found on the Truck Accident File (TAF) were also recorded on the HMIS (page 78). Fifty percent of the most serious accidents reported to the NTSB in 1983 were not in the HMIS (page 79). These results compel us to agree with OTA's conclusion that serious underreporting exists. A third problem with the HMIS is that there is no cross-checking of the data with other sources (such as police or insurance reports) to ensure its validity. The OTA report presents several instances of inaccurate data on the HMIS.

Perhaps most significant for a regulatory evaluation, the reported costs of incidents on the HMIS are totally unreliable. Costs are estimated by the motor carrier, and there is evidence that they are not reporting all their costs. Regardless

of the accuracy of their internal costs, there is no evaluation of the costs to society of HM incidents. A printout of 41 incidents from 1989 to 1991 of the designated high risk hazardous materials indicates that there were two accidents requiring evacuation for which no cost was reported, and three other evacuation-causing accidents for which costs of less than $150 each were reported.

The cost to society of an evacuation is clearly greater than zero. At a minimum, there is a cost in terms of police time, ambulance time, lost wages, and time to people forced to evacuate. Furthermore, an incident involves the unintentional discharge of hazardous materials, so it must cost at least the replacement value of the discharged hazardous materials. Some cleanup cost is also frequently incurred.

Nonetheless, given all these shortcomings, we are forced to rely on the HMIS as the sole national source of hazardous materials incidents. Appropriate adjustments will be made to account for the above enumerated problems. An examination of the HMIS database for the years 1989 through 1991 found no accidents involving highway route controlled radioactive materials, no accidents involving LNG, 8 accidents involving class A and B explosives, and 33 in which poisonous gas was emitted. Twenty four minor injuries were reported, and there were no major injuries or deaths.

Of the 41 reported incidents involving the designated high risk hazardous materials, only 3 were reported as caused by vehicular accidents. The FHWA believes that this latter estimate is too low, and that it results at least partly from

reported incidents which are not properly attributed to vehicular accidents. Furthermore, many of the other possible causes of incidents (improper loading, or defective fittings or valves) could potentially be avoided by the inspection requirements of this proposed regulation and the increased attention to safety we believe a permit program will create. The FHWA assumes that half of the reported incidents, 20 overall, could have been affected by this regulation.

In addition to the problem of faulty reporting, many accidents are not reported at all. Given the widespread agreement (see pages 15-l 6, supra) that accidents are underreported by approximately 50%, the FHWA doubled the 20 relevant accidents to 40. Finally, the HMIS reports primarily interstate incidents, whereas this regulation pertains to intrastate carriage as well. Given the results of the TIUS, which showed that transportation of hazardous materials by trucks in 1987 was almost evenly split between trips of over and under 200 miles, the FHWA assumed that incidents were also equally distributed between intra- and interstate carriage. Therefore, we doubled the 40 incidents to 80 to account for the wider universe of traffic that would be regulated. (This 50-50 split of intra- and interstate carriage may overstate the amount of interstate traffic. Table 9 of the 1992 edition of ***National Transportation Statistics*** indicates that the average length of haul of interstate freight was 571 miles in 1990. Therefore, the 200 mile cut off point used to differentiate types of carriage may be too conservative. However, the FHWA believes that using conservative estimates is preferable when the data are questionable.)

The HMIS printout, as was mentioned above, covered 3 years of data. The FHWA, therefore, assumed that the annual number of incidents of the designated high risk hazardous materials was 27 (1/3 of 80). A separate printout listed the 20 most costly incidents. The three lowest reported figures ($15, $5, and $1) were thrown out as being obviously too low. The mean value of the 17 remaining accidents was $13,495. Multiplying this value by the 27 annual incidents results in a $364,000 annual costs of incidents. However, as was noted above, carriers only report the costs that they bear, and probably not even all of those costs. We assumed that the social costs of hazardous materials incidents are equal to the reported costs, $13,495 per incident. The total cost per incident is therefore $27,000, and the annual cost of incidents equals $729,000.

At an annual cost of $729,000, this regulation would have to reduce hazardous materials incidents by 70% to pass the threshold cost of $507,000. It seems unfikely that the permit program would have that dramatic an impact. At a 50% reduction, the total savings would be approximately $365,000, over $140,000 short of the cost of the program.

From this vantage point, the costs of the regulation appear to exceed the benefits. When we consider the likelihood of injuries or fatalities, the picture looks somewhat different. Preliminary evaluation shows that the net present value (NPV) of the costs of this regulation over 5 years is $1,71 7,000. Current DOT guidance in the conduct of economic evaluations recommends that a threshold value of $2.5 million per avoided death be used. Therefore, this proposal would

have to prevent one fatality every five years in order for the benefits to exceed the costs (not counting any other benefits). [A death averted in year 5 would have a net present value (using a 7% discount rate) of $1.78 million, higher than the NPV of the costs for those five years. The value of a death averted in years 1 through 4 would, of course, be higher].

The same DOT guidance recommends that prevention of a critical injury be valued'at .7625 times the value of a death averted, which would equal $1.9 million in 1993. Using this value, this proposal would pass the threshold test (that is, exceed the discounted 5 year cost of the program) if it averted only one critical injury in either of the first two years of the program. Severe injuries are counted as .1875 times the value of a death averted, or approximately $470,000. Therefore, the proposal does not quite cross the threshold if it results in a reduction of one severe injury a year. Nevertheless, it would only take one or two incidents with no injuries in conjunction with a severe injury reduction to push the benefits over the threshold.

The data are not adequate to state with certainty that the benefits are likely to exceed the costs. Deaths and critical injuries from hazardous materials accidents and incidents are apparently uncommon. It is difficult to statistically account for low probability events, since one or two serious accidents can skew the data. These kinds of data tend to be highly variable, with one or two incidents driving the data for a given year. This difficulty is compounded by the shortcomings in the basic data reported above.

However, given the low costs, the program would not have to reduce accidents greatly to be cost beneficial. While no ultimate cost benefit ratio is presented, the FHWA believes that the permit program is likely to have a net positive impact.

It is also worth noting that this program may have benefits in addition to reducing accidents involving the designated high risk hazardous materials. As was suggested above, the need for motor carriers to comply with the requirements of this regulation (particularly the need for pre-trip inspections) could enhance their overall safety, reducing the number of incidents that are not directly attributable to transportation of the designated high risk hazardous materials. For example, safety inspections could detect problems in the packaging of hazardous materials that would otherwise have been undetected, thereby preventing an incident that is not directly transportation related. Furthermore, it is possible that some of the safety procedures proposed by this regulation for the four categories of hazardous materials would also be implemented by motor carriers when transporting other classes of hazardous materials, or other categories of freight. This program will serve as an additional incentive for these motor carriers to be in full compliance with the FMCSRs. Because the safety posture of these carriers will be enhanced, the chances for being involved in the type of catastrophic accidents described above will be greatly reduced. In addition, the Federal Government would benefit from the additional enforcement tool provided by this proposed program. The FHWA will have the authorization to deny or revoke safety permits applied for by

or issued to carriers that fail to meet the motor carrier fitness standard of 49 CFR 385.5. While the FHWA believes these spinoff benefits are likely, we have no basis for estimating their value.

In addition, this program would probably increase the amount and reliability of data on transportation of hazardous materials. The value of this should not be understated. As the OTA suggested several years ago in the report ***Transportation of Hazardous Materials,*** "DOT needs the information such a program could provide to help set priorities for rulemaking, research, and enforcement actions" (page 24). The need for these data has not diminished in the interim.

It is estimated that if the FHWA were to establish a policy for the collection of user fees for motor carrier safety permits, the agency would be required to develop a management information system (MIS) to account for the receipt, processing and collection of such fees. The estimated costs would include, but not be limited to:

(1) payment processing procedures;

(2) payment acknowledgement procedures;

(3) renewal notification procedures;

(4) associated data processing procedures;

(5) personnel expenses;

(6) administrative expenses;

(7) field implementation expenses; and

(8) fee collection procedures.

It is estimated that the start-up costs to the FHWA of implementing a fee-based program would be $500,000, based on the costs of existing DOT fee-based programs. Thereafter, the expense of continuing program management would be approximately $50 for each safety permit application processed. These estimates do not include regional personnel costs, bank processing costs, nor the expense that would be incurred by internal management audits. Accordingly, it is recommended that the FHWA not assess fees initially. Rather, we believe the FHWA should review the possibility of implementing a fee-based program if this regulation is fully implemented and expanded to include other motor carriers of hazardous materials.

(2) 103

SUPPLEMENTAL INFORMATION
DOCKET MC-92-4

COMMERCIAL VEHICLE SAFETY ALLIANCE

Recommended National Procedures for the Enhanced Safety Inspection of Commercial Highway Vehicles Transporting Transuranics, Spent Fuel, and High-Level Radioactive Waste

FEBRUARY 15, 1993

Summary of U.S. Department of Transportation Radiation Limits

Measuring Point	Rate Limit
EXCLUSIVE USE VEHICLES	
Two meters (6.6') from sides-enclosed trailer	10 mrem/hr
Two meters (6.6') from vertical plane of trailer edge (flatbed)	10 mrem/hr
At contact on surface of sides and top-enclosed trailer	200 mrem/hr
At contact on any surface of load (flatbed trailer)	200 mrem/hr
On vertical plane of trailer edge (flatbed)	200 mrem/hr
Surface of bottom of trailer	200 mrem/hr
Package surface (enclosed trailer only)	1000 mrem/hr
Occupied area of vehicle	2 mrem/hr
NON-EXCLUSIVE USE VEHICLES	
One meter (3.3') from any surface of package	10 mrem/hr
Package surface	200 mrem/hr

Includes Minimum Standards and
Out-of-Service Criteria

Prepared for

The United States Department of Energy
Under Cooperative Agreement No. DE-FC02-86CH10305

Table of Contents

NOTE: If a heading is shaded, the entire section is enhanced. If heading is not shaded, only those enhanced items will be shaded.

1.0 GENERAL

CAUTION: Radiation cannot be detected by the five senses. It is important to have access to radiation survey instruments. Radiation surveys should be conducted by a person trained in radiation detection techniques. All commodities subject to inspection under these guidelines are HRCQ (Highway Route Contolled Quantity) or assumed to be HRCQ.

Approach all vehicles transporting transuranic waste, spent fuel, or high-level radioactive waste shipments with caution as controlled levels of radiation are present.

Perform radiation level inspections and safety inspections quickly and in a professional manner so as not to delay the shipment or to expose enforcement personnel to unnecessary radiation.

If emergency situations develop during the inspection:

- Initiate IMMEDIATE action to control the situation.

- Isolate the vehicle if possible and evacuate all personnel to areas not affected by radiation emitted by the shipment. If there is a fire, be sure to evacuate personnel to areas clearly outside of any plume.
- Notify the emergency response system that is responsible for handling radioactive material situations within your state. The Department of Energy and Nuclear Regulatory Commission will provide radiological advice and assistance upon request.

If no problems are apparent, the inspection procedures outlined in this guide should be followed.

DO NOT RELEASE VEHICLES INSPECTED AT POINT OF ORIGIN UNTIL THEY ARE DEFECT FREE.

PERFORM EN-ROUTE INSPECTIONS AS SPECIFIED IN THIS DOCUMENT.

2.0 PRELIMINARY ACTIVITIES

2.1 It is recommended that two inspectors perform the inspection. The use of two inspectors ensures inspector safety, accuracy of data compiled, expediency, and continuity.

2.2 Ensure that you have the equipment listed in Table 1.

Table 1. Equipment Checklist

- chock blocks
- inspection record form
- radiation monitoring equipment

2.3 Ensure that your radiation monitoring equipment meets minimum standards:

- Use instruments that read dose rates in the range of 0.1 mrem/hr to 2 rem/hr (1 microsievert/hr to 0.02 sievert/hr). To ensure the instrument does not default to zero when saturated, at least one radiation survey instrument shall not read zero in radiation fields with an exposure rate of 100 rem/hour (1 sievert/hr).

- Ensure that all radiation survey instruments have been calibrated within the past year in accordance with ANSI N323-1978 and meet the durability standards on ANSI N13.4-1971.

2.4 Turn on radiation survey instruments to warm them up.

2.5 Operationally check your radiation survey instruments as recommended by the manufacturer. Refer to the operators' manual if necessary.

2.6 Record background reading on inspection form. NOTE: Subtract the background reading from subsequent readings to get true value. Enter the true values on inspection form.

3.0 BEGINNING THE INSPECTION

GENERAL SAFETY PRACTICES
• Always inform the driver when you are going underneath the vehicle. • Never go underneath a vehicle with the engine running. • Always enter and exit vehicle on the driver's side in full view of the driver. • Do not get into dangerous positions (e.g., between tandem axles) when checking tires, inside wheels, and suspension components. • Do not get into dangerous positions when checking steering components (e.g., between front fender well and front tire). • Look for loose or protruding parts of the vehicle throughout the inspection.

3.1 Begin the radiation portion of the inspection at the driver's side of the power unit.

3.2 With the instrument turned on, approach the rear wheels of the power unit.

3.3 Stop when you are 2 meters (6.6 feet) from the unit and take a reading.

CAUTION: Step 3.4 applies throughout the inspection.

3.4 EMERGENCY PROCEDURES: If, at any time the survey readings exceed those stated in Table 2 f exclusive use vehicles or non-exclusive-use vehicles, then immediately perform the following action

- **STOP!!** Do not continue this procedure.
- Establish a hot line at the 2 mrem/hr level.
- Have the driver come to you.
- Survey the driver for contamination.
- Notify appropriate radiation health agency.
- Notify shipper.
- Place vehicle out-of-service.

Table 2. **Summary of U.S. Department of Transportation Radiation Limits**

Measuring Point	Rate Limit
EXCLUSIVE USE VEHICLES	
Two meters (6.6') from sides-enclosed trailer	10 mrem/hr
Two meters (6.6') from vertical plane of trailer edge (flatbed)	10 mrem/hr
At contact on surface of sides and top-enclosed trailer	200 mrem/hr
At contact on any surface of load (flatbed trailer)	200 mrem/hr
On vertical plane of trailer edge (flatbed)	200 mrem/hr
Surface of bottom of trailer	200 mrem/hr
Package surface (enclosed trailer only)	1000 mrem/hr
Occupied area of vehicle	2 mrem/hr
NON-EXCLUSIVE USE VEHICLES	
One meter (3.3') from any surface of package	10 mrem/hr
Package surface	200 mrem/hr

3.5 If the radiation survey instrument readings are less than 10 mrem/hr at 2 meters (6.6 feet), then

- Contact the driver.

- Identifyyourself and tellthedriver what you are doing.
- Place chock blocks in front of and behind the rear wheels of the power unit.
- Have the driver exit the vehicle and provide the following documents:
  - Operator's License
  - Medical Certificate
  - Vehicle Registration
  - Log Book(s)
  - Permits
  - Shipping Paper(s)
  - Route Plan
  - Training Certificate
  - Vehicle Inspection Report

4.0 RADIATION SURVEY

See the inside of the back cover.

5.0 DRIVER INSPECTION STANDARDS

Inspection Item	Out-Of-Service Condition
5.1 Driver's Age	
Is not at least 21 years of age. {391.11 (b) (1)}	Less than 21 years of age; remove driver.
5.2 Commercial Driver License	
Is not licensed to operate the type of vehicle being operated. Out-of-service action to be initiated only upon home state license verification. {391.11 (b) (7)}	No valid license; remove driver.
5.3 Medical Examiner's Certificate	
Does not possess current Medical Examiner's Certificate. {391.43}	Medical Examiner's Certificate absent or not current; remove driver.

5.4 Waiver of Physical Disqualification

No waiver of physical disqualification in possession when required. { 39 1.49)	No waiver when required; remove driver.

5.5 Certificate of Training

Driver must have in possession a current certificate of training that provides the following information: • Driver's name and operator's license number. • Date of training, name and address of person providing training. • Statement of person providing training that certificate information is correct. • Driver has been trained in the hazards and characteristics of HRCQ.	Certificate of training absent; remove driver.

Inspection Item	Out-Of-Service Condition
5.6 Sickness or Fatigue	
When so impaired that the driver should not continue the trip. {392.3}	Driver out-of-service until no longer impaired by sickness or fatigue.
5.7 Driver Disqualification	
Driver disqualification under the provisions of 391.15.	Driver out-of-service until requalification is established.
5.8 Drugs and Other Substances	
Is in possession. {392.4}	Driver to be placed out-of-service for 24 hours.
Is under the influence, with probable cause. {392.4}	Driver to be placed out-of-service for 24 hours.
5.9 Intoxicating Beverages	
Is in possession. {392.4}	Driver to be placed out-of-service for 24 hours.

Has consumed within the last four hours before going on duty. { 392.5)	Driver to be placed out-of-service for 24 hours.
Is under the influence. {392.5}	Driver to be placed out-of-service for 24 hours.

5.10 Driver's Record of Duty Status

Driving more than ten hours following eight consecutive hours off duty. { 395.3 (a)}	Driver to be placed out-of-service for eight consecutive hours.
Driving for any period after having been on duty 15 hours following eight consecutive hours off duty. {395.3 (a)]	Driver to be placed out-of-service for eight consecutive hours.
Driving after being on duty more than 60 hours in seven consecutive days or 70 hours in eight consecutive days. {395.3 (b)}	Driver to be placed out-of-service until eligibility to drive is reestablished.
No record of duty status in possession when one is required.	Driver to be placed out-of-service for eight consecutive hours.
Failing to have in possession a record of duty status for the previous seven consecutive days. See Exception 395.13 (b) (3).	Driver to be placed out-of-service for eight consecutive hours.

Inspection Item	Out-Of-Service Condition
A record of duty status does not accurately reflect the driver's actual activities and duty status (including time and location of each duty status change and the time spent in each duty status) in an apparent attempt to conceal a violation of an hours-of-service limitation. {395.8 (e)}	Driver to be placed out-of-service for eight consecutive hours.

5.11 Vehicle Inspection Report

Driver must have in possession a legible copy of the last vehicle inspection report and all enroute inspection documents.	

6.0 SHIPPING PAPER AND ROUTE PLAN STANDARDS

Inspection Item	Out-Of-Service Condition
6.1 Route Plan	
Driver must have in possession a written route plan, and be on the route designated by the plan. {177.825}	Proper route plan is not present. Not on designated route.
6.2 Shipping Papers	
Drivers must have in possession documents that indicate the hazardous material being transported. {177.817} The papers must be: • Readily visible to a person entering the driver's compartment, or in a holder on the driver's door; and • in immediate reach of the driver when restrained by seat belt.	No hazardous material shipping papers in possession when required.

Inspection Item	Out-Of-Service Condition
The entries must: • Appear as the first entry on the shipping paper, or • Be designated by an "X" in the hazardous material column ("RQ" must be used in the case of a hazardous substance), or • Be highlighted or entered in a contrasting color that clearly distinguishes the entry from other shipping descriptions. • Be legible and printed in English. • Contain only authorized abbreviations.	

The shipping paper must include:

- Proper shipping name — As prescribed by the tables in 172.101 or 172.102; for example:
  - Radioactive Fissile Material N.O.S.
  - Radioactive Material N.O.S.
- Proper hazard class — 7 (Radioactive Material).
- Identification number — Appropriate UN ID Number.
- Total quantity and unit of measurement — Entry of the total quantity and unit of measurement (e.g., one cask 36,000 lbs. or three packages 60,000 lbs.).

Inspection Item	Out-Of-Service Condition
• Radionuclides — Entry of name of each radionuclide in the radioactive material. • Physical and chemical form — Description of physical and chemical form or material if not in special form. • Activity — Entry of activity in curies, millicuries, microcuries, or becquerels, with abbreviations allowed.	
• "Highway route controlled quantity"	
• Label type — Category of label applied to each package (e.g., Radioactive Yellow III).	
• Transport index — Index assigned to each package labeled as Radioactive Yellow III.	
• Fissile class — Entry of Fissile class if appropriate.	
• An entry of warning statement for Fissile Class III, if applicable.	

- Additional notation — Entry of warning statement for Fissile Class III, if applicable.

- Package identification — Entry of NRC or DOT certificate identification marking (e.g., "U.S.A./9001/B( ) F").

- Instructions for exclusive use vehicles only — Specific instructions for maintenance of exclusive use shipment controls must be issued in writing and included with the shipping paper information.

- Shipper's Certification — "This is to certify that the above-named material are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

7.0 EXTERNAL HAZARDOUS MATERIAL IDENTIFICATION STANDARDS

Inspection Item	Out-Of-Service Condition
7.1 Placarding	
Each motor vehicle must be properly placarded on each side and each end. {177.823}	No placards.
	When any of the required placards for a hazard class are missing or any placards misrepresent the hazardous material being transported.
Each placard must be readily visible from each direction it faces. Placarding is permitted on the front of a motor vehicle instead of the front of the cargo body.	
Each placard must be securely attached or affixed.	
Each placard must be located clear of appurtenances, ladders, etc.	

Each placard must be located away from other markings that may reduce the placard's effectiveness.

Highway route controlled quantity radioactive material must have the required "RADIOACTIVE" warning placards placed on a square white background having a black border.

Words must be printed horizontally reading from left to right.

Each placard must be legible and visible.

Inspection Item	Out-Of-Service Condition

7.2 Labeling

Each package shall be properly labeled.

Type of label — Proper label shall be the highest category required for any of the determining conditions for the package as set forth in 172.403 (c).

Number of labels displayed — The package is required ts have two labels, affixed on opposite sides.

Marking of labels — The labels are to be legibly marked with contents/radionuclides, activity, and transport index.

Compare to shipping paper to ensure matching entries.

Contents/radionuclides — The name or symbol of the radionuclide shall be listed on the label.

Activities — Units shall be expressed in appropriate curie units. For fissile material, the weight in grams or kilograms of the fissile radioisotopes may be listed.

7.3 Package Marking

Gross weight — Packages of over 110 pounds (50kg.) shall have the gross weight marked on the outside of the package.

"Type B" requirements — "Type B" shall be marked on the outside of the package.

Package identification marking — Outside package shall be marked with identification markings indicating package certificate number (e.g., U.S.A./9001/B( ) F) or DOT specification number (e.g., "DOT 6M").

Proper shipping name and UN number.

Name and address of consignee/consignor.

Security seal on package.

8.0 IN-CAB PARTS AND ACCESSORIES INSPECTION STANDARDS

Inspection Item	Out-Of-Service Condition
8.1 Seat Belts	
As prescribed by 393.93:	
• Webbing must not be frayed, split, or torn.	
• Attachment fittings must not be loose, badly corroded, or missing.	
• Anchor bolts must be present and securely fastened to the floor.	
8.2 Horn	
As prescribed by 393.81:	
• Each power unit must be equipped with an operative horn.	

8.3 Windshield Glazing/Wipers

All glazing used in the motor vehicle must be approved safety glass. The windshield must be "AS 1" and all other glass must be "AS2."

Any crack over 1/4-inch wide, intersecting cracks, discoloration not applied in manufacture, or other vision-distorting matter in the sweep of the wiper on the driver's side.

Inspection Item	Out-Of-Service Condition
As prescribed by 393.60, in the area wiped by the full length of the blade(s), the windshield: • Must not have scratches or abrasions that are more than $^1/_2$-inch wide and more than 6 inches in length. • Must not have holes or intersecting cracks. • Must not have nicks or chips larger than 1-$^1/_2$ inches. • Must not have a crack whose edge can be felt on the wiper side of the windshield. • Must not have discoloration extending more than 3 inches up from the right or left side, more than 1 inch in from the right or left side, or more than 1 inch down from the top. The windshield must not have signs, posters, stickers, or other non-transparent material extending more than 4-$^1/_2$ inches from the bottom.	

The power unit must have operable windshield wipers. NOTE: If a motor vehicle was originally equipped (manufactured) with only one wiper, only one wiper is required. If originally equipped (manufactured) with two or more wipers, all wipers are required. { 393.78 }

Any power unit that has an inoperative wiper or missing or damaged parts that render it ineffective.

The windshield wipers must operate for a full stroke and must return to the proper "park" position out of the driver's view when shut off.

The windshield wiper blades or arm parts must not be missing or damaged.

The windshield wiper controls must operate properly and must be located within the driver's reach while at the controls.

Inspection Item	Out-Of-Service Condition
8.4 Defroster	
The power unit must have a properly functioning device for removing condensation from the inside of the windshield and ice, snow, or frost from the outside of the windshield. {393.79}	Inoperative or fails to function properly.
8.5 Rear Vision Mirrors	
As prescribed under 393.80, mirrors must:	
• Be present.	Not present.
• Not obstruct forward vision of the driver.	Obstructs forward vision of driver.
• Not be cracked, pitted, broken, discolored, or clouded to the extent that rear vision is obscured.	Rear vision obscured.
• Hold adjustment so as to provide a clear view of the area the mirrors were designed to reflect.	Does not hold adjustment.
• Not have objects or material hung from or blocking mirrors.	Objects or material hanging from or blocking mirrors.
• Be securely mounted on a stable support.	Not securely mounted.

• Reflect to the driver a view of the highway to the rear of such motor vehicle.	View of highway to the rear not reflected to driver.

8.6 Air Pressure

Have driver start the engine, build reservoir pressure between 90 and 100 psi, and, with engine at idle, make a full treadle valve brake application and hold it for one full minute. NOTE: There will be an initial drop in air pressure registered by the dash gauge. {396.3 (a) (1)}	If an air leak is discovered and the reservoir pressure is not maintained when governor is cut in, reservoir pressure is between 80 and 90 psi, engine is at idle, and service brakes are fully applied.

8.7 Low Air Warning Device

The vehicle must be equipped with a low air warning device, visual and/or audible as required. {393.51}	Missing, inoperative, or does not operate at 55 psi and below or $^1/_2$ the governor cut-out pressure, whichever is less.

Inspection Item	Out-Of-Service Condition

8.8 Steering Lash

Ask the driver to rock the steering wheel to check for steering wheel free play. Also, check the steering column for proper securement.

When any of these values — inch movement or degrees — are met or exceeded, vehicle shah be placed out-of-service. {393.209(b)] (For power steering systems, engine must be running.)

Steering Wheel	Manual System Movement 30 Degrees or:	Power System* 45 Degrees or:
16" (41cm)	4-1/2" (11.5 cm) (or more)	6-3/4" (17 cm) (or more)
18" (46 cm)	4-3/4" (12 cm) (or more)	7-1/8" (18 cm) (or more)
19" (48 cm)	5" (13 cm) (or more)	7 1/2" (19 cm) (or more)
20" (51 cm)	5-1/4" (13 cm) (or more)	7-7/8" (20 cm) (or more)
21" (53 cm)	5-1/2" (14 cm) (or more)	8-1/4" (21 cm) (or more)
22" (56 cm)	5-3/4" (15 cm) (or more)	8-5/8" (22 cm) (or more)

*For power systems, if steering wheel movement exceeds 45 degrees before steering axle tires move, rock the steering wheel left to right between points of power steering valve resistance. If that motion exceeds 30 degrees (or the inch movement values shown for manual steering), vehicle shall be placed out-of-service.

Inspection Item	Out-Of-Service Condition
8.9 Floor, Firewall, and Internal Wiring	
The floor and the firewall of the driver's compartment must not contain holes that would permit exhaust gases to enter the compartment.	Vehicle to be placed out-of-service.
Wiring shall be grouped together and protected to withstand abrasion.	
Wiring shall not be located so as likely to be charred, overheated, or enmeshed in moving parts.	
Wiring shall not be adjacent to any part of the fuel system.	
The edges of all holes through which wiring passes, unless the wiring is metal covered, shall be rolled or bushed with a grommet of rubber or other suitable material.	
The presence of bare, loose, dangling, chafing, or poorly connected wires is prohibited.	Presence of bare, loose, dangling, chafing, or poorly connected wires.

8.10 Headlight Beam Indicator

The beam indicator in the driver's compartment must operate when the headlamps are on high beam setting.

8.11 Sleeper Berth

Sleeper berths must meet the requirements of 393.76.

8.12 Emergency Equipment

Fire extinguisher and warning devices for stopped vehicles.

- A commercial motor vehicle used to transport hazardous material/transuranic waste must be equipped with a fire extinguisher having an Underwriter's Laboratories rating of 10 B:C or more, securely fastened on the power unit.
- Each commercial motor vehicle must be equipped with three bidirectional emergency reflective triangles, except as provided by 393.95 (f).

9.0 EXTERNAL PARTS AND ACCESSORIES INSPECTION STANDARDS — POWER UNIT

Inspection Item	Out-Of-Service Condition

9.1 General

Start at the front of the vehicle and proceed counterclockwise around the vehicle. Check the power unit for identification of:

- Motor carrier name, city, and state.
- ICC/MC number or U.S. DOT number as appropriate.
- State license plate/number.

The vehicle must not have metal, glass, or other loose or dislocated parts protruding from the surface of the vehicle so as to cause a safety hazard.

The vehicle's front bumper must not be missing, loosely attached, or protruding so as to create a safety hazard.

The vehicle must not be missing fenders that were present as original equipment.

The passenger compartment must not have doors or door parts missing, broken, or sagging so that the door cannot be properly operated.

9.2 Front of Vehicle (Power Unit)

Move to a position near or underneath the front of the power unit and examine the steering components while the driver is rocking the steering wheel:

• Examine the front axle beam and all steering components for cracks, looseness, and welded repair. {393.209} and {393.209 (d)}	Any crack. Any welded repair.
• Examine the steering gearbox for cracks or loose or missing mounting bolts. (393.209 (c)}	Any absence of or loose mounting bolts or positioning parts.
• Examine the pitman arm on the steering gear output shaft. {393.209 (d)}	Any looseness or welding of the pitrnan arm on the output shaft.

Inspection Item	Out-Of-Service Condition
• Check the steering column universal joints for proper condition, operation, and repair. {393.209 (d)}	Worn, faulty, or obviously welded repairs.
• Check the steering wheel for proper securement and condition. {393.209 (c)}	Steering wheel not properly secured.
• Check the ball and socket joints on the pitman arm, drag link, steering arms, and tie rod ends. {393.209 (d)}	Any movement of a stud nut under steering load. Any motion, other than rotational, between any linkage member and its attachment point of more than $^1/_8$ inch (3 mm) **measured with hand pressure only.**
• Check the tie rods and drag links for loose clamps or looseness in any threaded joint. {393.209 (d)}	Loose clamp(s) or clamp bolt(s) on tie rods or drag links. Any looseness in any threaded joint.
• Check for any modification to the steering system or any condition that interferes with free movement of any steering component. {393.209 (d)}	Any modification or other condition that interferes with free movement of any steering component.

9.3 Power Steering

Check the auxiliary power assist cylinder for leaks or looseness. {393.209 (e)}

- Hoses, tubes, or connectors must not show evidence of being rubbed by moving parts.

Auxiliary power assist cylinder loose.

9.4 Hood Securement and Hinges

Check the hood latches for securement. Cab-over units must be securely fastened at the rear of the cab.

Latch does not securely hold the hood of cab in fully closed position (e.g., broken, missing).

Inspection Item	Out-Of-Service Condition
9.5 Engine Compartment	
Check air compressor, pulley, belts, bolts, and securement. {396.3 (a) (1)}	Compressor drive belts in condition of impending or probable failure. Loose compressor mounting bolts. Broken, missing, or loose mounting bolts, brackets, braces or adaptors. Cracked, broken, or loose pulley.
9.6 Steering Axle Suspension and Related Components	
Inspect suspension hangers or other axle positioning parts for alignment, looseness, and condition. {393.207 (a)}	U-bolt(s), spring hanger(s), or other axle positioning part(s) cracked, broken, loose, or missing.
Inspect leaf spring assemblies for alignment and condition. {393.207 (c)}	Any leaf in a spring leaf assembly broken or missing.

A coil spring must not be cracked or broken. { 393.207 (d)]	Coil spring broken.
The leaves in any leaf spring assembly must not shift or be displaced in a manner that could result in contact with the tire, rim, brake drum, or frame. { 393.207 (c)}	One or more leaves displaced in a manner that could result in contact with a tire, rim, brake drum, or frame.

9.7 Steering Axle Brake Components

Check for operative brakes:

• Each commercial motor vehicle must have operative brakes on each axle. { 393.48 (a)}	Absence of effective braking action on any steering axle of any vehicle.
• The braking system shall not have missing, broken, loose, or inoperative components including shoes, springs, anchor pins, spiders, cam rollers, push rods, cam shaft brackets, and air chamber mounting bolts. (393.48 (a))	Missing, broken, loose, or inoperative components, including shoes, springs, anchor pins, spiders, cam rollers, push rods, cam shaft brackets, and air chamber mounting bolts.
• The service brake system must fully release when the brake pedal is in the released position.	
• Check for a mismatch of air chamber sizes and slack adjuster length. { 393.48 (a)}	Mismatch across any power unit steering axle of air chamber sizes or slack adjuster length.

Inspection Item	Out-Of-Service Condition
• Inspect the lining or pads for securement, thickness, and functionability. {393.47}	Drum Brakes: Lining with a thickness less than $^{3}/_{16}$" for a shoe with a continuous strip of lining or $^{1}/_{4}$" for a shoe with two pads or to wear indicator if lining is so marked. Air Disc Brakes: Lining with a thickness less than $^{1}/_{8}$".
• Lining must be firmly attached to the shoe and not saturated with oil, grease, or brake fluid. {393.47}	Lining or pad not firmly attached to the shoe. Lining or pad is saturated with oil, grease, or brake fluid.

9.8 Brake Adjustment

Check brake chambers and mark each push rod. Brake adjustment measurements shall be taken when brake chamber air pressure is between 90 and 100 psi.

Shall not meet or exceed those specifications in the table below. (Dimensions in inches.)

Any brake that meets or exceeds the specifications in the table below.

CLAMP TYPE BRAKE CHAMBER DATA
(Dimensions in inches)

Type	Outside Diameter	Maximum Stroke at Which Brakes Must be Readjusted
6	4-1/2	1-1/4
9	5-1/4	1-3/8
12	5-11/16	1-3/8
16	6-3/8	1-3/4
20	6-25/32	1-3/4
24	7-7/32	1-3/4*
30	8-3/32	2
36	9	2-1/4

*Two inches for long-stroke design

BOLT TYPE BRAKE CHAMBER DATA
(Dimensions in inches)

A	6-15/16	1-3/8
B	9-3/16	1-3/4
C	8-1/16	1-3/4
D	5-1/4	1-1/4
E	6-3/16	1-3/8
F	11	2-1/4
G	9-7/8	2

ROTOCHAMBER DATA
(Dimensions in inches)

9	$4\text{-}9/32$	$1\text{-}1/2$
12	$4\text{-}13/16$	$1\text{-}1/2$
16	$5\text{-}13/32$	2
20	$5\text{-}15/16$	2
24	$6\text{-}13/32$	2
30	$7\text{-}1/16$	$2\text{-}1/4$
36	$7\text{-}5/8$	$2\text{-}3/4$
50	$8\text{-}7/8$	3

WEDGE BRAKE DATA
(Dimensions in inches)

Movement of the scribe mark on the lining shall not exceed $1/16$".

9.9 Brake Drums

Must not be cracked on friction surface extending to an open edge. { 396.3 (a) (1)}

Drums with an external crack.

Must not have any portion missing or external cracks. (NOTE: Do not confuse short hairline heat check cracks with flexural cracks.) { 396.3 (a) (1)}

Any portion of the drum or rotor (discs) missing or in danger of falling away.

9.10 Brake Hose/Tubing

Check brake hoses for securement against chafing, kinking, or damage. { 396.3 (a) (1))

Hose with any damage extending through the outer reinforcement ply. (Rubber-impregnated fabric cover is not a reinforcement ply. Thermoplastic nylon may have braid reinforcement or color difference between cover and inner-tube. Exposure of second color is out-of-service.)

Inspection Item	Out-Of-Service Condition
Check for any bulging or swelling when air pressure is applied. {396.3 (a) (1)}	Bulge or swelling when air pressure is applied.
Check for leaks. {396.3 (a) (1)}	Hose or connection with audible leak.
Check for improper splices (e.g., sliding the hose ends over a piece of tubing and clamping). {393.46}	Two hoses improperly joined such as a splice made by sliding the hose ends over a piece of tubing and clamping the hose to the tube.
Check hoses for cracks or any area that restricts air. {393.45 (a) (4)}	Air hose cracked, broken, or crimped in such a manner as to restrict air flow.

9.11 Frame and Frame Assemblies

Check frame and cross members for cracks, alignment, looseness, or sagging parts. { 393.201 (a)} and (396.3 (a) (1)}

- Tire and wheel clearance: Under no circumstances shall the body or frame be capable of coming in contact with a tire or any part of the wheel assemblies.

Any cracked, loose, sagging, or broken frame member.

Any cracked, loose, or broken frame member adversely affecting support of functional components such as steering gear, fifth wheel, engine, transmission, body parts and suspension.

Any crack in the frame web that is directed toward bottom flange.

Any crack in the frame web around the radius and into the bottom flange.

Any crack in the bottom flange.

Inspection Item	Out-Of-Service Condition
Check to ensure that the cab or the body of the vehicle is securely fastened/attached to the frame.	Cab or body not securely fastened/attached to the frame.

9.12 Lighting Devices

All lights and reflectors required by 393 must be present and capable of being operated at all times as follows:

• Any exterior bulb or sealed beam must light properly. {393.24 (b)}	Headlamps — The single vehicle or towing vehicle does not have both head lamps operative on low beam.

- Turn signal lamps must properly indicate right or left when so switched. {393.19}

Does not have operative turn signal on each side of the front of the power unit. (Unless manufactured otherwise, truck tractor turn signals must be double faced and located so as to be visible to passing drivers. There must be two turn signals on the rear of the cab, one at each side.)

Check lamps and reflectors for proper color permitted. {393.25 (b)}

Lamps on truck — Does not have at least one steady burning red lamp on each side of the rear, visible from 500 feet.

Inspect condition of lamps and reflectors for cleanliness, visibility, and securement. {393.25 (f)}

Stop lamp — Does not have at least one operative stop lamp on the rear of the vehicle.

9.13 Steering Axle Wheels, Rims, and Fasteners

Inspection Item	Out-Of-Service Condition
Inspect the rim for imperfections, cracks, bends, etc. {393.205 (a)}	Rim cracks — Any circumferential crack except a manufactured crack at the valve stem hole.
Inspect steel disk and aluminum cast wheels thoroughly for warpage, alignment, and cracks.	Any disc or cast wheel cracks.
Inspect stud or bolt holes on the wheel for elongation (e.g., worn out of round). {393.205 (b)}	Any elongated stud holes.
Inspect wheels both in the spoke and web areas for cracks. {393.205 (a)}	Any spoke wheel crack.
Check for cracks in the tubeless demountable adapter.	Any crack at a spoke in the tubeless demountable adapter.
Inspect wheel lug nuts and bolts for securement, proper thread engagement, or failure to function as designed by the manufacturer. {393.205 (c)}	Any loose, missing, broken, cracked, or stripped (both spoke and disc wheels) fasteners.

Inspect steering axle wheels for welded repair. {396.3 (a)(1)}	Any welded repair other than disc to rim attachment on steel disc wheel(s) mounted on the steering axle.
Inspect all welds in any wheel. {393.205 (a)} and {396.3 (a)(1)}	Any cracks in welds attaching disc wheel to rim. Any cracks in welds attaching tubeless demountable rim to adapter. Any welded repair on aluminum wheel(s) on a steering axle.

9.14 Tires on Steering Axle

Inspect steering axle tires for minimum tread depth. • Must not have less than $^4/_{32}$-inch tread when measured in any major tread groove. {393.75 (b))	**Less than $^4/_{32}$-inch tread measured in any major tread groove at any location on the tire.**

Inspection Item	Out-Of-Service Condition
Inspect the tread area of each tire around the circumference. {393.75 (a)}	When any part of the breaker strip or casing ply is showing in the tread.
Inspect the sidewall of each tire for damage or defects. {393.75 (a)}	When sidewall is cut, worn, or damaged to the extent the ply cord is exposed.
Inspect the tire markings to ensure that the tires are suitable for highway use. {396.3 (a) (1)}	Labeled "Not For Highway Use" or carrying other markings that would exclude use on steering axle.
Inspect the radial tube stem for proper markings. {396.3 (a) (1)}	A tube-type radial tire without tube stem markings. These include a red band around the tube stem, the word "radial" embossed in metal stems, or the word "radial" molded in rubber.
Ensure that bias ply and radial construction tires are not on the same axle. {396.3 (a) (1)}	Mixing bias and radial tires on the same axle.
Steering axle tires should not be regrooved. {393.75 (e)}	Any regrooved tire.

Inspect each tire for observable bumps, bulges, or knots. {396.3 (a) (1)}	Any tire with observable bumps, bulges, or knots.
Inspect each tire for ply repair. {396.3 (a) (1))	Boot, patch, or other ply repair.
Check the tire load/limit to ensure the tires are not overloaded per the manufacturer's specifications. { 393.75 (f)}	Weight carried exceeds tire load limit. This includes overloaded tire resulting from low air pressure.
Check for flat or leaking tires. {393.75 (a) (3))	Tire is flat or has a noticeable leak (e.g., can be heard or felt).
Ensure that tires are mounted or inflated in such a manner that they do not come in contact with any part of the vehicle. (393.75)	Any tire so mounted or inflated that it comes in contact with any part of the vehicle.

9.15 Fuel Tanks and Their Mounting

Inspect the vehicle's fuel system for integrity. { 393.67)	A fuel system with a visible leak at any point.

Inspection Item	Out-Of-Service Condition
Each fuel tank must be properly closed with a cap designed for that tank. {393.67}	Fuel tank filler cap missing.
Inspect the mounting bolts or brackets securing the fuel tank to the motor vehicle. NOTE: Some fuel tanks use springs or rubber bushings to permit movement. {393.65}	A fuel tank not securely attached to the motor vehicle by reason of loose, broken, or missing mounting bolts or brackets. (NOTE: Some fuel tanks use springs or rubber bushings to permit movement. 393.65)

9.16 Headerboard

Vehicle shah be equipped with a headerboard or similar device of sufficient strength to prevent load shifting, penetrating, or crushing the driver's compartment. (393.106)

Any vehicle without a front-end structure or equivalent device as required.

9.17 Battery

Every storage battery shall be covered by a fixed part of the motor vehicle or protected by a removable cover or enclosure. (393.30)

Exposed battery.

9.18 Exhaust Systems

Inspect the exhaust system for integrity and leaks.

Exhaust system determined to be leaking at a point forward of or directly below the driver/sleeper compartment.

Inspection Item	Out-Of-Service Condition
9.19 Coupling Device	
Inspect the coupling device of the tractor and trailer for cracks, defects, or looseness of parts. Check the attachment of the fifth wheel to the trailer and examine the coupling plate attachment to the trailer for cracks or defects. {393.70}	Locking jaws do not lock around kingpin properly.
If equipped with an adjustable fifth wheel assembly, inspect the locking pins for security. {393.70}	Locking mechanism parts missing, broken, or not engaged.
Check the fifth wheel play lengthwise of the vehicle between the upper and lower fifth wheel halves. (393.70}	Horizontal movement between the upper and lower fifth wheel halves exceeds $^1/_2$ inch.

9.20 Fifth Wheel Mounting to Frame

Inspect fifth wheel mounting to frame.

Any fasteners missing or ineffective.

Any movement between mounting components.

Any mounting angle iron cracked or broken.

9.21 Mounting Plates and Pivot Brackets

Inspect mounting plates and pivot brackets.

Any fasteners missing or ineffective.

Inspection Item	Out-Of-Service Condition
	Any welds or parent metal cracked. (SPECIAL NOTE: Any repair weld cracking, well defined (especially open) cracks in stress or load-bearing areas, cracks through 20 percent or more original welds or parent metal. 393.70)
	More than $^1/_4$-inch horizontal movement between pin and bracket.
	Pivot bracket pin missing or not secured.
9.22 Sliders	
Inspect slider component integrity.	Any latching fasteners ineffective.
	Any fore or aft stop missing or not securely attached.

Movement of more than 3/8 inch between slider bracket and slider base.

Any slider component cracked in parent metal or weld.

9.23 Lower Coupler

Inspect lower coupler securement and integrity.

Operating handle not in closed or locked position.

Separation between upper and lower coupler allowing light to show through from side to side.

Cracks in fifth wheel plate.

SPECIAL NOTE: Any repair weld cracking, well-defined (especially open) cracks in stress or load-bearing areas.

Inspection Item	Out-Of-Service Condition
	EXCEPTIONS: (1) Cracks in fifth wheel approach ramps and (2) casting shrinkage cracks in the ribs of the body of a cast fifth wheel. Locking mechanism parts missing, broken, or deformed to the extent that the kingpin is not securely held.
9.24 Safety Devices	
Check the safety chain, cable, or other device for proper attachment. {393.70 (c)}	Missing. Unattached or incapable of secure attachment. Chains and hooks worn to the extent of a measurable reduction in link cross section.

	Improper repairs to chains and hooks, including welding, wire, small bolts, rope, and tape.
	Kinked or broken wire rope strands.
	Improper clamps or clamping on wire rope.

9.25 Drive Axle Tires

Check the tire load limit to ensure that the tires are not overloaded per the manufacturer's specifications. (393.75 (f)}	Weight carried exceeds tire load limit. This includes overloaded tire resulting from low air pressure.
Check for leaking or flat tires. {393.75 (a) (3))	Tire is **flat** or **has** noticeable leak (e.g., can be heard or felt).

Inspection Item	Out-Of-Service Condition
Inspect the sidewall of each tire for damage or defects. {393.75 (a)}	Bias ply tire — When any ply is exposed in the tread area or sidewall. Radial ply tire — When any ply is exposed in the tread area or damaged cords are evident in the sidewall.
Inspect the tire markings to ensure that the tires are suitable for highway use. {396.3 (a) (1)}	Is marked "Not For Highway Use" or otherwise marked and having like meaning.
Ensure that tires are mounted or inflated in such a manner that they do not come in contact with any part of the vehicle. {396.3 (a) (1)}}	So mounted or inflated that it comes in contact with any part of the vehicle. (This includes any tire contacting its mate in a dual set.)
Inspect each tire for observable bumps, bulges, or knots. {396.3 (a) (1)}	Any tire with observable bumps, bulges, or knots.

Inspect each tire for minimum tread depth. Must have at least $^2/_{32}$-inch tread when measured in a major tread groove. {393.75 (c)}	So worn that less than $^2/_{32}$-inch tread remains when measured in any major tread groove at any location on the tire.
Inspect tires for size to ensure that the sizes are the same across a single axle.	**75%** or more of the tread width missing in excess of 12 inches (30 cm) in circumference. (393.75(c)).
Ensure that bias ply and radial construction tires are not on the same axle.	

9.26 Drive Axle Wheels, Rims, and Fasteners

Inspect the rim for imperfections, cracks, bends, etc. {393.205 (a)}	Rim cracks — Any circumferential rim crack except an intentional manufactured crack at the valve stem hole
Inspect steel disc and aluminum cast wheels thoroughly for war-page, alignment, and cracks.	Any disc or cast wheel cracks.

Inspection Item	Out-Of-Service Condition
Inspect stud or bolt holes on the wheel for elongation (e.g., worn out of round). {393.205 (b)}	Any elongated stud holes.
Inspect wheels both in the spoke and web areas for cracks. {393.205 (a)}	Any spoke wheel crack.
Check for cracks in the tubeless demountable adapter.	Any crack at a spoke in the tubeless demountable adapter.
Inspect wheel lug nuts and bolts for securement, proper thread engagement, or failure to function as designed by the manufacturer. {393.205 (c)}	Any loose, missing, broken, cracked, or stripped (both spoke and disc wheels) fasteners.
Inspect axle wheels for welded repair. {396.3 (a) (1)}	Any welded repair other than disc to rim attachment on steel disc wheel(s) mounted on the axle.

Inspect all welds in any wheel. { 393.205 (a)] and {396.3 (a) (1)}	Any cracks in welds attaching disc wheel to rim. Any cracks in welds attaching tubeless demountable rim to adapter. Any welded repair on aluminum wheel(s).

9.27 Drive Axle Brake Components

Check for operative brakes:

• Each commercial motor vehicle must have operative brakes on each axle. { 393.48 (a)}	Absence of effective braking action on any brake on any drive axle of any vehicle.

Inspection Item	Out-Of-Service Condition
• The braking system shall not have missing, broken, loose, or inoperative components, including shoes, springs, anchor pins, spiders, cam rollers, push rods, cam shaft brackets, and air chamber mounting bolts. {393.48 (a)}	Missing, broken, loose, or inoperative components, including shoes, springs, anchor pins, spiders, cam rollers, push rods, cam shaft brackets, and air chamber mounting bolts.
	Audible air leak at brake chamber (e.g., ruptured diaphragm, loose chamber clamp).
• The service brake system must fully release when the brake pedal is in the released position.	
• Check for a mismatch of air chamber sizes and slack adjuster length. {393.48 (a)}	Mismatch across any drive axle of air chamber sizes or slack adjuster length.

• Inspect the lining or pads for securement, thickness, and functionability. (393.47)	Drum Brakes: Lining with a thickness less than $^3/_{16}$" for a shoe with a continuous strip of lining or $^1/_4$" for a shoe with two pads or to wear indicator if lining is so marked. Air Disc Brakes: Lining with a thickness less than $^1/_8$".
• Lining must be firmly attached to the shoe and not saturated with oil, grease, or brake fluid. {393.473	Lining or pad not firmly attached to the shoe. Saturated with oil, grease, or brake fluid.

9.28 Parking Brake

Have the driver apply parking brake. Ensure that the brake applies at both ends of the axle. {393.41}	Any parking brake on the vehicle or combination not applied upon actuation of the parking brake.

Inspection Item	Out-Of-Service Condition
	Inoperable breakaway braking system on trailer(s). (Note: No trailer brake application upon actuation of the parking brake control indicates an inopable breakaway braking system.)

9.29 Brake Adjustment

Check brake chambers and mark each push rod. Brake adjustment measurements shall be taken when brake chamber air pressure is between 90 and 100 psi.

Any brake that meets or exceeds the specifications in the following table.

Brake adjustment shall not meet or exceed those specifications in the following table. (Dimensions in inches.)

CLAMP TYPE BRAKE CHAMBER DATA
(Dimensions in inches)

Type	Outside Diameter	Maximum Stroke at Which Brakes Must be Readjusted
6	4-1/2	1-1/4
9	5-1/4	1-3/8
12	5-11/16	1-3/8
16	6-3/8	1-3/4
20	6-25/32	1-3/4
24	7-7/32	1-3/4*
30	8-3/32	2
36	9	2-1/4

*Two inches for long-stroke design

BOLT TYPE BRAKE CHAMBER DATA
(Dimensions in inches)

A	6-15/16	1-3/8
B	9-3/16	1-3/4
C	8-1/16	1-3/4
D	5-1/4	1-1/4
E	6-3/16	1-3/8
F	11	2-1/4
G	9-7/8	2

ROTOCHAMBER DATA
(Dimensions in inches)

9	4-9/32	1-1/2
12	4-13/16	1-1/2
16	5-13/32	2
20	5-15/16	2
24	6-13/32	2
30	7-1/16	2-1/4
36	7-5/8	2-3/4
50	8-7/8	3

WEDGE BRAKE DATA
(Dimensions in inches)

Movement of the scribe mark on the lining shall not exceed 1/16".

Inspection Item	Out-Of-Service Condition
9.30 Drive Axle(s) Suspension and Spring Assembly	
Inspect suspension U-bolt(s), spring leaf(s), spring hanger(s), or other axle positioning part(s) for alignment, looseness, and condition. {393.207 (a)}	U-bolt(s), spring hanger(s), or other axle positioning part(s) cracked, broken, loose, or missing.
Inspect leaf spring assemblies for alignment and condition. {393.207 (c)}	Any leaf in a spring leaf assembly broken or missing.
A coil spring must not be cracked or broken. {393.207 (d)}	Coil spring broken.
A rubber spring must not be missing. {393.207 (a)}	Rubber spring missing.
The leaves in any leaf spring assembly must not shift or be displaced in a manner that could result in contact with the tire, rim, brake drum, or frame. {393.207 (c)}	One or more leaves displaced in a manner that could result in contact with a tire, brake drum, rim, or frame.
A torsion bar spring in the torsion bar suspension must not be cracked or broken. {393.207 (e)}	Broken torsion bar spring in the torsion bar suspension.

9.31 Torque, Radius, or Tracking Components

Any part of a torque, radius, or tracking component assembly, or any part used for attaching the same to the vehicle frame or axle, must not be cracked, loose, broken, or missing. (This does not apply to loose bushings in torque or track rods.)

Any part of a torque, radius, or tracking component assembly, or any part used for attaching the same to the vehicle frame or axle, that is cracked, loose, broken, or missing (including missing bushings, but not loose bushings in torque or track rods).

10.0 EXTERNAL PARTS AND ACCESSORIES INSPECTION STANDARDS — TRAILER

Inspection Item	Out-Of-Service Condition
10.1 Trailer Frame and Frame Assemblies	
Check frame and cross members for cracks, alignment, looseness, or sagging parts. {393.201 (a)} and {396.3 (a) (1)}	Any cracked, loose, sagging, or broken frame member.
• Tire and wheel clearance: Under no circumstances shall the body or frame be capable of coming in contact with a tire or any part of the wheel assemblies.	Any crack in the frame web which is directed toward bottom flange.
	Any crack in the frame web around the radius and into the bottom flange.
	Any crack in the bottom flange.

10.2 Trailer Lighting Devices

All lights and reflectors required by 393 must be present and capable of being operated at all times as follows:

- Any exterior bulb or sealed beam must light properly.
  - Turn signal lamps must properly indicate right or left when so switched. {393.19)

Does not have an operative turn signal on each side of the rear most vehicle.

- Check lamps and reflectors for proper color. {393.25 (b)}

Lamps on trailer — Not having at least one steady burning red lamp on each side of the rear, visible from 500 feet.

- Inspect condition of lamps and reflectors for cleanliness, visibility, and securement. {393.25 (f)}

Stop lamp — Does not have an operative stop lamp on each side of the rear most vehicle.

Inspection Item	Out-Of-Service Condition
10.3 Suspension Assembly and Other Axle Positioning Parts	
Inspect suspension U-bolt(s), spring leaf(s), spring hanger(s), or other axle positioning part(s) for alignment, looseness, and condition. {393.207 (a)}	U-bolt(s), spring hanger(s), or other axle positioning part(s) cracked, broken, loose, or missing.
Inspect leaf spring assemblies for alignment and condition. {393.207 (c)}	Any leaf in a spring leaf assembly broken or missing.
A coil spring must not be cracked or broken. {393.207 (d)}	Coil spring broken.
A rubber spring must not be missing. {393.207 (a)}	Rubber spring missing.
The leaves in any leaf spring assembly must not shift or be displaced in a manner that could result in contact with the tire, rim, brake drum, or frame. {393.207 (c)}	One or more leaves displaced in a manner that could result in contact with a tire, brake drum, rim, or frame.
A torsion bar spring in the torsion bar suspension must not be cracked or broken. {393.207 (e)}	Broken torsion bar spring in the torsion bar suspension.

10.4 Sliding Axle Positioning Component

Check adjustable axle assemblies for locking pin engagement. { 393.207 (b))

Adjustable axle assembly (sliding sub frame) with any locking pins missing or not engaged.

- All axles on the motor vehicle must be in proper alignment with the longitudinal axis of the vehicle.

Locking bar not closed or not in the locked position.

10.5 Fifth Wheel Kingpin

Check kingpin assembly.

Horizontal movement between the upper and lower fifth wheel halves exceeds 1/2 inch. (393.70)

Inspection Item	Out-Of-Service Condition
	Kingpin can be moved by hand in any direction. Note: This item is to be used when uncoupled semitrailers are encountered, such as at a terminal inspection, and it is impossible to check item (1) above. Kingpins in coupled vehicles are to be inspected using items (1) above and (3) and (4) below. Vehicles are not to be uncoupled. (393.70)
	Kingpin not properly engaged. (393.70)
	Sepatation between upper and lower coupler allowing light to show through from side to side. (393.70)

Any semitrailer with a bolted upper coupler having fewer bolts than shown in the following table:

Minimum Total Quantity of Bolts (Total minimum quantity of bolts must be equally divided with 1/2 on each side of the coupler.)

Bolt Size	
1/2"	5/8" and larger
14 (7 ea. side)	10 (5 ea. side)

Inspection Item	Out-Of-Service Condition
10.6 Trailer Axle Wheels, Rims, and Fasteners	
Inspect the rims for imperfections, cracks, bends, etc. {393.205 (a)}	Rim cracks — Any circumferential crack except a manufactured crack at the valve stem hole.
Inspect steel disc and aluminum cast wheels thoroughly for warpage, alignment, and cracks.	Any disc or cast wheel cracks.
Inspect stud or bolt holes on the wheel for elongation (e.g., worn out of round). {393.205 (b)}	Any elongated stud holes.
Inspect wheels both in the spoke and web areas for cracks. {393.205 (a)}	Any spoke wheel crack.
Check for cracks in the tubeless demountable adapter.	Any crack at a spoke in the tubeless demountable adapter.
Inspect wheel lug nuts and bolts for securement, proper thread engagement, or failure to function as designed by the manufacturer. {393.205 (c)}	Any loose, missing, broken, cracked, or stripped (both spoke and disc wheels) fasteners.

Inspect axle wheels for welded repair. {396.3 (a) (1))	Any welded repair other than disc to rim attachment on steel disc wheel(s) mounted on the trailer axle.
Inspect all welds in any wheel. {393.205 (a)} and {396.3 (a) (1)}	Any cracks in welds attaching wheel disc to rim. Any cracks in welds attaching tubeless demountable rim to adapter. Any welded repair on aluminum wheel(s).

Inspection Item	Out-Of-Service Condition
10.7 Trailer Tires	
Check the tire load limit to ensure that the tires are not overloaded per the manufacturer's specifications. {393.75 (f)}	Weight carried exceeds tire load limit. This includes overloaded tire resulting from low air pressure.
Check for leaking or flat tires. {393.75 (a) (3)}	Tire is flat or has noticeable leak (e.g., can be heard or felt).
Inspect the sidewall of each tire for damage or defects. {393.75 (a)}	Bias ply tire — When any ply is exposed in the tread area or sidewall. Radial ply tire — When any plies are exposed in the tread area or damaged cords are evident in the sidewall.
Inspect the tire markings to ensure that the tires are suitable for highway use. {396.3 (a) (1)}	Is marked "Not For Highway Use" or otherwise marked and having like meaning.

Ensure that tires are mounted or inflated in such a manner that they do not come in contact with any part of the vehicle. {396.3 (a) (1)} }	So mounted or inflated that it comes in contact with any part of the vehicle. (This includes any tire contacting its mate in a dual set.)
Inspect each tire for observable bumps, bulges, or knots. {396.3 (a) (1)}	Any tire with observable bumps, bulges, or knots.
Inspect each tire for minimum tread depth. Must have at least $^2/_{32}$-inch tread when measured in a major tread groove. { 393.75 (c))	So worn that less than $^2/_{32}$-inch tread remains when measured in any major tread groove at any location on the tire.
Inspect tires for size to ensure that the sizes are the same across a single axle.	75% or more of the tread width missing in excess of 12 inches (30 cm) in circumference. (393.75(c))
Ensure that bias ply and radial construction tires are not on the same axle.	

Inspection Item	Out-Of-Service Condition

10.8 Trailer Axle Brake Components

Check for operative brakes:

- Each commercial motor vehicle must have operative brakes on each axle. {393.48 (a)}

  Absence of effective braking action on any brake on any trailer axle.

- The braking system shall not have missing, broken, loose, or inoperative components, including shoes, springs, anchor pins, spiders, cam rollers, push rods, cam shaft brackets, and air chamber mounting bolts. {393.48 (a)}

  Missing, broken, loose, or inoperative components, including shoes, springs, anchor pins, spiders, cam rollers, push rods, cam shaft brackets, and air chamber mounting bolts.

  Audible air leak at brake chamber (e.g., ruptured diaphragm, loose chamber clamp).

- The service brake system must fully release when the brake pedal is in the released position.

• Check for a mismatch of air chamber sizes and slack adjuster length. {393.48 (a)}	Mismatch across any steering axle of air chamber sizes or slack adjuster length.
• Inspect the lining or pads for securement, thickness, and functionability. { 393.47)	Drum Brakes: Lining with a thickness less than $^{3}/_{16}$" for a shoe with a continuous strip of lining or $^{1}/_{4}$" for a shoe with two pads or to wear indicator if lining is so marked. Air Disc Brakes: Lining with a thickness less than $^{1}/_{8}$".
• Lining must be firmly attached to the shoe and not saturated with oil, grease, or brake fluid. {393.47}	Lining or pad not firmly attached to the shoe. Saturated with oil, grease, or brake fluid.

Inspection Item	Out-Of-Service Condition
10.9 Trailer Brake Drums	
Must not be cracked on friction surface extending to an open edge. {396.3 (a) (1)}	Drums with an external crack.
Must not have any portion missing or external cracks. (NOTE: Do not confuse short hairline heat check cracks with flexural cracks.) {396.3 (a) (1)}	Any portion of the drum or rotor (discs) missing or in danger of falling away.
10.10 Trailer Brake Hose/Tubing	
Check brake hoses for securement against chafing, kinking, or other damaged. {396.3 (a) (1)}	Hose with any damage extending through the outer reinforcement ply. (Rubber-impregnated fabric cover is not a reinforcement ply. Thermoplastic nylon may have braid reinforcement or color difference between cover and innertube. Exposure of second color is out-of-service.)

Check for any bulging or swelling when ***air*** pressure is applied. { 396.3 (a) (1)}	Bulge or swelling when air pressure is applied.
Check for leaks. { 396.3 (a) (1)}	Hose and/or connection with audible leak.
Check for improper splices (e.g., sliding the hose ends over a piece of tubing and clamping). { 393.46)	Two hoses improperly joined, such as a splice made by sliding the hose ends over a piece of tubing and clamping the hose to the tube.
Check hoses for cracks or any area that restricts air. { 393.45 (a) (4)}	Air hose cracked, broken, or crimped in such a manner as to restrict air flow.

10.11 Brake Adjustment

Check brake chambers and mark each push rod. Brake adjustment measurements shah be taken when brake chamber air pressure is between 90 and 100 psi.	Any brake that meets or exceeds the specifications in the following table.

Inspection Item	Out-Of-Service Condition
Brake adjustment shall not meet or exceed those specifications in the following table. (Dimension in inches.)	

CLAMP TYPE BRAKE CHAMBER DATA
(Dimensions in inches)

Type	Outside Diameter	Maximum Stroke at Which Brakes Must be Readjusted
6	4-1/2	1-1/4
9	5-1/4	1-3/8
12	5-11/16	1-3/8
16	6-3/8	1-3/4
20	6-25/32	1-3/4
24	7-7/32	1-3/4*
30	8-3/32	2
36	9	2-1/4

*Two inches for long-stroke design

BOLT TYPE BRAKE CHAMBER DATA
(Dimensions in inches)

A	6-15/16	1-3/8
B	9-3/16	1-3/4
C	8-1/16	1-3/4
D	5-1/4	1-1/4
E	6-3/16	1-3/8
F	11	2-1/4
G	9-7/8	2

ROTOCHAMBER DATA
(Dimensions in inches)

9	4-9/32	1-1/2
12	4-13/16	1-1/2
16	5-13/32	2
20	5-15/16	2
24	6-13/32	2
30	7-1/16	2-1/4
36	7-5/8	2-3/4
50	8-7/8	3

WEDGE BRAKE DATA
(Dimensions in inches)

Movement of the scribe mark on the lining shall not exceed 1/16".

Inspection Item	Out-Of-Service Condition
10.12 Rear-End Protection	
Each motor vehicle must be equipped with a rear-end protection device meeting the requirements of 393.86.	
10.13 Spare Tire Securement	
Spare tire(s), wheel(s), and other equipment must be securely fastened to the motor vehicle. {392.9}	Part(s) of a vehicle or a condition of loading such that the spare tire or any part of the load or dunnage can fall onto the roadway.
10.14 Load Securement	
Check all tie down or cargo securement devices for looseness, damage, wear, etc.	When any accessible cargo securement device is defective.

11.0 COMPLETING THE INSPECTION

11.1 Place vehicle and/or driver out-of-service, if necessary.

- Do not allow a vehicle displaying an out-of-service sticker to be driven. If necessary to escort out-of-service vehicles to another location, DO NOT affix sticker until vehicle is parked at that location.

11.2 Show the driver all defects listed on inspection form and instruct the driver on the disposition of driver-vehicle inspection form and in the correction of out-of-service defects or violations.

11.3 Conclude the driver-vehicle examination by recording the time completed and the inspector's signature.

11.4 Request driver to sign the form and give driver a copy.

11.5 Place out-of-service vehicle(s) in suitable location.

- On an out-of-service power unit, place the out-of-service sticker on the outside of the windshield (driver's side) in the driver's line of vision.
- On an out-of-service trailer, place the out-of-service sticker on the left front of the trailer at about eye level where the sticker would be easily observed by someone coupling or uncoupling the vehicle combination.

Inspection Item	Out-Of-Service Condition

11.6 Apply a CVSA pilot study (radioactive) decal to each vehicle.

Location:

- Power Unit - Passengers windshield adjacent to the CVSA decal.
- Trailing Unit - Right side near the front adjacent to the CVSA decal.

11.7 Have driver set the parking brake, then remove wheel chocks.

RADIATION SURVEY

Inspection Item	Out-Of-Service Condition
4.1 In-Cab Survey	
Measure radiation level in the driver position and in the sleeper berth of the cab. { 173.441)	When measurement exceeds 2 **mrem/hr** in a space normally occupied by a person(s).
4.2 External Vehicle Survey	
Measure external radiation level(s)	
• Measured at 2 meters (6.6') from surface. { 173.441)	When measurement exceeds 10 **mrem/hr** at 2 meters **from** surface of vehicle.
· Measured at surface of vehicle. { 173.441)	When measurement exceeds 200 **mrem/hr** at accessible surface **of** vehicle.