Crude Oil and Biofuels Rail Transportation Study

Final Study

April 2016

About the Study

In July 2015, Iowa DOT commissioned a study of crude oil and biofuels railroad transportation incident response preparedness within Iowa, conducted by HDR, Inc. and Witt O' Brien's, LLC. The study was developed to serve as a tool to assist Iowa's state, local, and tribal governments to determine the status of risks and vulnerabilities, prevention methods and programs, and preparedness, response, and recovery capabilities for crude oil and biofuels railroad transportation incidents in Iowa. The geographic, administrative, and operational areas identified in the report were assessed for risks, vulnerabilities, programs and capabilities. Results of the assessments were used to identify challenges and to form recommendations to reduce risk and vulnerability through policy change, planning, training and education, communication, and other actions.

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Executive Summary

Purpose

The Iowa Crude Oil and Biofuels Rail Transportation Study (the Study) was created through an initiative of the Iowa Department of Transportation's (Iowa DOT) Office of Rail Transportation in cooperation with the Iowa Homeland Security and Emergency Management Department (Iowa HSEMD). These agencies sought to define the characteristics, risks, prevention, and emergency response system status and capabilities for crude oil and biofuels rail transportation in the state, and to measure Iowa's preparedness, prevention, response, and recovery capabilities in the event that a crude oil or biofuel rail transportation incident were to occur.

Key items that the Study sought to accomplish were as follows:

- Inform the state about the likely current and near-term future frequency, routes, volumes, and transportation characteristics of crude oil and biofuels by rail within and through Iowa
- Assess the potential risks to public health and safety, and the potential environmental impacts, created by rail transportation of crude oil and biofuels by rail
- Document current private- and public-sector programs and plans related to rail incident prevention and management, including access to emergency equipment and services
- Identify actions to address potential gaps in prevention, preparedness, response, and recovery methods and make public health and safety and environmental protection recommendations for appropriate federal, state, and local agencies, or the private sector
- Establish internal assignments and timelines to quantify successful implementation of findings and recommendations provided in the Study
- Formulate recommendations to close potential gaps in the following areas that would cause a shortfall in Iowa's capabilities for prevention, preparedness, response, and recovery: rail transportation infrastructure, rail transportation practices, rail transportation regulations and regulatory oversight, emergency response resources, organization, training, and response capabilities, communication systems and methods, and other concerns identified through the Study

Crude Oil and Biofuels in Iowa

This Study examined both crude oil and biofuels rail transportation. Both commodities are at present transported by railroads in large volumes in and through Iowa.

Crude Oil

No crude oil shipments originate and terminate in Iowa at present, nor are likely to in the future; however, substantial quantities of crude oil shipments originating in other states pass through Iowa en route to their destination. Current principal sources of crude oil passing through Iowa

include the Williston Basin (Bakken) Field of North Dakota, synthetic and blended oil extracted from oil sands in Alberta and Saskatchewan, Canada. This crude oil is typically sold for markets in the southern and eastern U.S. Other origins of crude oil moving through Iowa include the Niobrara Field of northeast Colorado and the Uinta Basin of northeast Utah. The crude oil consists of various specific gravities and volatility ranging from heavy bitumen to light crude oil.

Biofuels

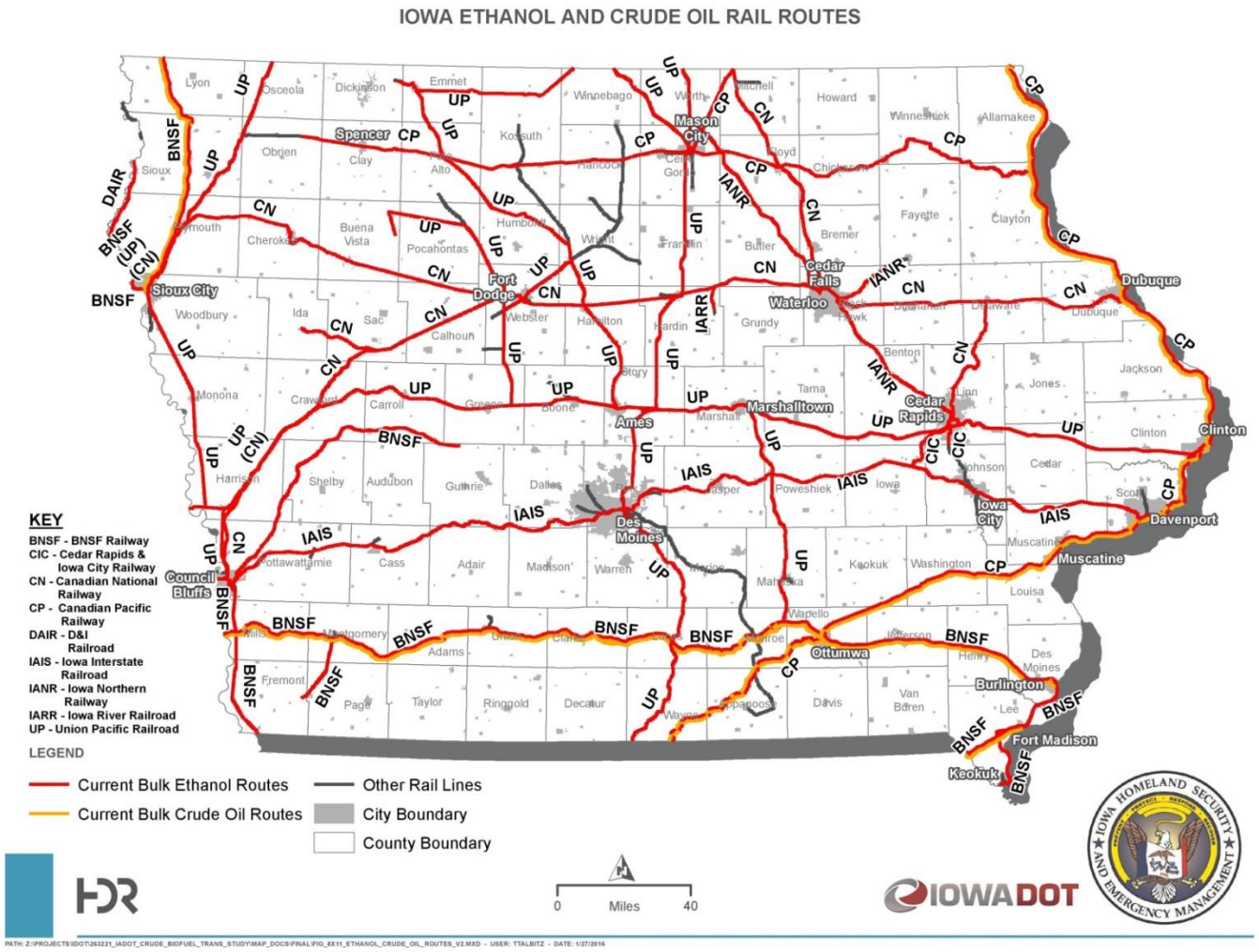
Biofuels transported by rail in and through Iowa consist principally of ethanol and biodiesel. Biodiesel is produced in small quantities relative to ethanol, and is almost exclusively consumed locally to its points of origin, and not moved in large quantities by rail. Ethanol is produced in relatively large quantities. Because ethanol is consumed universally throughout the U.S. but is principally produced only in states with high corn production levels, such as Iowa, and because ethanol is not commercially feasible to be moved by pipeline, ethanol is moved by rail between production and consumption points. The state of Iowa is one of the chief producers of ethanol in the United States. The Iowa Renewable Fuels Association estimated that Iowa produced approximately 26 percent of the nation's ethanol (3.92 billion gallons) in 2015; much of this ethanol moved by rail out of Iowa.[1]

Since only small volumes of biodiesel moves by rail in Iowa, biodiesel transportation practices, risks, and vulnerabilities were not examined in detail in this Study.

Figure ES-A, below, depicts current primary railroad routes of crude oil and ethanol transportation by rail in Iowa.

[1] Renewable Fuels Association, *Where Ethanol is Made*, http://www.ethanolrfa.org/consumers/where-is-ethanol-made/

Figure ES-A. Current Iowa Railroad Routes for Bulk Crude Oil and Ethanol Transportation



Source: HDR, Inc. as of 01/27/2016

Methodology

The Study used desktop research, interviews and surveys, a Stakeholder Steering Committee, and workshops to gather and assess information, develop findings, form recommendations, and design an action plan. Desktop research used public sources to assess current practices, regulations, risks, and vulnerabilities. Interviews and surveys were used to focus on the capabilities, practices, and programs of railroads, ethanol shippers, first responders, and federal, state, and local agencies. The Stakeholder Steering Committee included all Iowa railroads currently engaged in large-scale transportation of crude oil and ethanol by rail, selected Iowa producer/shippers of ethanol, selected Iowa emergency responders, and Iowa DOT and Iowa HSEMD. Workshops were used to present findings, discuss gaps and develop strategies to close gaps, to refine recommendations, and to develop implementable action plans. The Study consultant, HDR, Inc., used mapping to relate rail routes used for crude oil and ethanol to various public and environmental risks and vulnerabilities. The mapping informed a Risk and Vulnerability Analysis (RVA) that quantified risks on a county-by-county basis. Stakeholders participating in interviews and workshops included all Iowa railroads currently engaged in large-scale transportation of crude oil and ethanol by rail, selected Iowa producer/shippers of ethanol, many of Iowa's emergency responders, and the principal federal and state agencies involved in the regulation of crude oil and ethanol transportation safety.

Interviews and surveys were designed to discover information related to railroad and ethanol producer/shipper stakeholders' organization, operating characteristics, transportation routes and volumes, prevention programs, response resources, and recovery plans, with respect to the transportation of crude oil and ethanol by rail. Regulating agencies were interviewed to gain insight into the efficacy of current and possible future regulations and regulatory compliance programs, and to obtain their ideas about how Iowa could improve its Study and reduce its risks and vulnerabilities to crude oil and ethanol rail transportation risks.

The Stakeholder Steering Committee (SSC) was created to guide and inform the Study, and provide opportunities for collaboration and improvement related to findings and recommendations. Two SSC meetings were conducted to review. The first discussed the Study's methodology and initial findings from interviews and research, and the second discussed proposed recommendations and actions.

Risk and Vulnerability Assessment

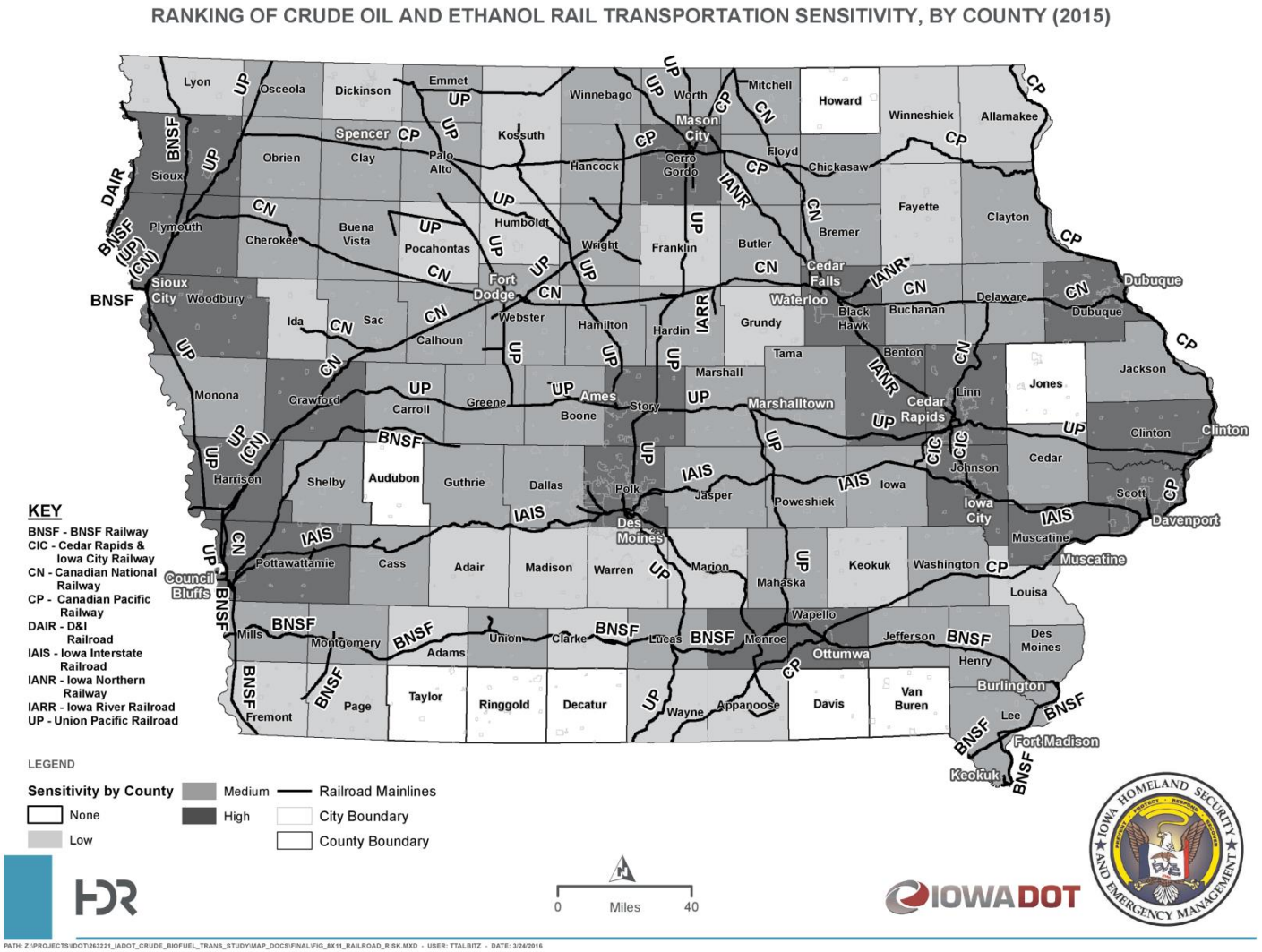
The Risk and Vulnerability Assessment (RVA) considered bulk crude oil and ethanol transportation routes and volumes, recorded previous incidents including main track derailments, spills, and fires, likelihood of future incidents, key public safety and environmental risk factors, and potential impacts from those incidents. These quantities were used to derive an aggregate value for risk.

The RVA was constructed as a building block process on a county-by-county basis, using various factors, such as length of railroad segments carrying crude oil or ethanol within a county, volume of rail traffic, and populations, critical facilities, and environmentally important segments within an identified hazard area. The individual factors were analyzed to determine and overall risk for a given county. The data and information provided for this RVA were the best available data at the time of collection and should be regarded as a snapshot in time, as data changes over time. In addition, all risk assessment results are based on methodology designed specifically for the State of Iowa using Iowa-specific data, statistics, and conditions. Therefore,

the results of the RVA are used to prioritize and develop prevention, protection, mitigation, response, and recovery strategies and resources for Iowa.

Figure ES-B, below, depicts the ranking by Iowa county of bulk crude oil and ethanol rail transportation sensitivity. It is crucial to note that this map does not indicate the likelihood of a rail transportation incident, but aids in reinforcing the intended actions of the RVA.

Figure ES-B. Ranking of Crude Oil and Ethanol Rail Transportation Sensitivity, by County (2015)



Source: HDR, Inc. as of 3/24/2016

Findings, Recommendations, and Improvement Actions

Findings, recommendations, and improvement actions are presented in the following tables: ES-A through ES-D. Recommendations were developed by the Study Team using feedback from stakeholders and Iowa DOT and Iowa HSEMD. Improvement actions were guided by several principles:

1. Cooperation and voluntary action by stakeholders would be the preferred methods, instead of new regulation requiring legislative action at the state or federal level.
2. Proposed improvements would be implementable within the near term, and would be practical and meaningful.
3. Proposed improvements would work within existing commercial, economic, regulatory, and technological parameters.
4. Proposed improvements would be amenable to tracking to enable measurement of improvement and the efficacy of actions.
5. Where feasible, improvements would extend to other hazardous commodities transported by rail in or through Iowa.

Table ES-A. Improvement Implementation Strategy - Prevention

Findings/Challenges	Recommendations	Improvement Actions
Prevention		
1. At-grade crossing collisions, which can lead to derailments and incidents, are a single type of risk that requires coordination among state and local government entities to reduce and eliminate. At-grade grade-crossing signal improvements, separations, or closures can be costly and/or difficult to accomplish.	**1.A:** The state should consider ranking at-grade crossings based on their risk relative to their exposure to crude oil, ethanol, and other high-risk hazardous commodities such as toxic inhalation gases, and the crossing's proximity to the public, and develop an investment program in conjunction with railroads and local and county governments that targets public funds onto higher-risk crossings.	**1.A-1:** Reassess the current at-grade crossing benefit-cost process related to hazardous commodities risk. **1.A-2:** Include hazardous materials as a variable in the crossing consolidation formula. **1.A-3:** Build awareness through education and enforcement via the law enforcement and judiciary communities.
	1.B: The state should consider increasing its funding level for at-grade crossing improvement projects, focusing on high safety benefit-cost ratio improvements such as closure, signage, and signaling.	**1.B-1:** Advocate for state and federal funding for railroad-highway grade crossings.
2. The state has limited knowledge of shipper mechanical and safety inspection practices and execution for ethanol tank cars loaded at ethanol producers in Iowa.	**2.A:** The Iowa DOT should consider hiring an FRA-certified motive power and equipment (MP&E) inspector to visit each Iowa ethanol facility on an annual basis to observe inspection practices and report on training, qualifications, and hand-off of tank cars from the ethanol refinery to the handling railroad. The state should consider coordinating with the FRA to obtain its ethanol refinery inspection reports.	**2.A-1:** Work with the Regional FRA to determine whether a state MP&E inspector is necessary and beneficial. **2.A-2:** If determined necessary, advocate for a new position. **2.A-3:** Discuss with ethanol producers and railroads on how a program could be implemented. **2.A-4:** Increase communication with regional FRA MP&E and hazmat inspectors.
	2.B: The state should evaluate and refine an ethanol refinery tank car mechanical inspection program based on its findings from its first year of inspections and coordination.	**2.B-1:** Collect related information from the FRA and refineries for program evaluation. Include Iowa railroads during implementation process.

Findings/Challenges	Recommendations	Improvement Actions
3. Railroad infrastructure investment programs help reduce risk of derailments. Potential impacts of derailments, from the state's perspective, are different in each area based on the built and physical environment adjacent to the rail line, and the capabilities of the local response system. Railroad infrastructure investment programs would help the state to reduce risk of derailments. Public investments could include track, bridges, signaling and grade crossings improvements, or installation of asset-protection devices such as Wheel Impact Load Detectors, Hot-Box Detectors, or Dragging-Equipment Detectors.	**3.A:** The state should consider an annual discussion with Iowa's railroads regarding their infrastructure investment and improvement needs. This discussion would enable private /public partnerships for Iowa to target public investments in derailment prevention to the areas that the state perceives to have higher physical and natural environment risks and lower response capabilities.	**3.A-1:** Set up a regular channel to discuss infrastructure investment and improvement needs.
	3.B: The state should consider developing a "public investment inventory" to share with the railroads that identifies improvements supported with public funds including past and anticipated decision criteria.	**3.B-1:** Annually track infrastructure improvements that have been made through public investment.
	3.C: The state should consider increasing state funding and seeking federal grants to focus on high safety benefit-cost ratio improvements such as removal of rail joints in bridges, bridge approaches, and crossings; and installation of asset-protection devices.	**3.C-1:** Advocate for additional funding and seek grant opportunities.

Table ES-B. Improvement Implementation Strategy - Preparedness

Findings/Challenges	Recommendations	Improvement Actions
Preparedness		
1. Local emergency preparedness activities, including that for rail incidents involving crude oil or ethanol, is the responsibility of local emergency managers/coordinators. Many local emergency coordinators are not full-time employees and/or have multiple responsibilities/assignments often not related to emergency management.	**1.A:** County officials should consider prioritizing the identification and maintenance of revenue to fund a full-time emergency manager in each county, or consider resource sharing among neighboring counties to create a full-time emergency manager position that serves a larger community or region. This increase in emergency management capacity would better serve the local planning, preparedness, and response needs of the local communities.	**1.A-1:** Conduct outreach to the Iowa Emergency Managers Association, League of Cities, and Iowa State Association of Counties to fully inform them of the importance of the roles the Emergency Manager undertakes, and form a study group to identify areas where regional emergency management coverage would be of benefit.
2. Many counties and municipalities plan along "all-hazards lines" in Iowa and generally do not specifically separate out the risks and vulnerabilities related to crude oil and ethanol transportation by rail	**2.A:** In counties where crude oil and ethanol are transported by rail, local emergency management could profile and analyze rail incident risk and vulnerability to identify and prioritize mitigation measures through their local and regional Incident Management Standard Operating Guidelines/Procedures.	**2.A-1:** Continue to support activities through current and future funding streams. **2.A-2:** Encourage coordination at a systems level for this particular hazard.

Findings/Challenges	Recommendations	Improvement Actions
or related mitigation measures that can reduce risk.		
3. Many local jurisdictions do not have adequate mapping or information gathering capabilities to identify critical infrastructure or vulnerable populations within a 0.5-mile buffer area of railroad main tracks carrying crude oil or ethanol, or within 0.5 miles of major yards.	**3.A:** Counties and municipalities, with support from the state, should consider identifying, mapping, and assessing the vulnerability of the critical infrastructure and vulnerable populations located within 0.5 mile of all railroad main tracks and major yards to determine areas of highest risk, and then prioritize preparedness, response, or mitigation actions for those areas to reduce the risk and improve response.	**3.A-1:** Develop a better understanding of GIS capabilities at the state and local level. Update the status of GIS capabilities by exploring ways to enhance and support locals. **3.A-2:** Iowa HSEMD could advocate for an additional GIS position to help support these activities. **3.A-3:** Iowa DOT/HSEMD can provide critical infrastructure and vulnerable population data created for this study **3.A-4:** Iowa DOT and HSEMD should determine and maintain an appropriate update cycle for this shareable GIS data. **3.A-5:** Quadrenially update risk vulnerability assessment by county.
4. Not all local jurisdictions have written evacuation and shelter plans related to a rail incident involving crude oil or ethanol and other hazardous materials transported by rail.	**4.A:** Iowa HSEMD could assist local emergency managers with the development of local evacuation and sheltering plans tailored for rail incidents where public health and safety is at risk.	**4.A-1:** Iowa HSEMD can provide tailored technical assistance and guidance when evacuation and sheltering plans are updated. **4.A-2:** Create public outreach for instructional media related to evacuation and sheltering activities for people in the hazard areas or buffer zones.
5. Emergency Managers noted that railroads do not typically attend Local Emergency Planning Committee (LEPC) meetings. Some ethanol plants attend, but not all.	**5.A:** LEPCs should consider actively seeking attendance by railroads and shippers, and providing them with a statewide schedule of LEPC meetings and agendas.	**5.A-1:** Disseminate LEPC meeting information and dates, with advanced notice, to all interested stakeholders. **5.A-2:** Encourage Iowa DOT District involvement in LEPCs. **5.A-3:** Advocate rail issues in general emergency management venues.

Findings/Challenges	Recommendations	Improvement Actions
	5.B: Iowa DNR and Iowa HSEMD may consider polling local emergency managers and first responder groups to determine which counties need assistance enhancing LEPC membership, participation, and best practices.	**5.B-1:** Iowa HSEMD can provide an online survey tool to gauge the needs of LEPC management. **5.B-2:** Provide a LEPC best-practices workshop. **5.B-3:** Advocate rail issues in general emergency management venues.
	5.C: Iowa DOT, Iowa DNR, and Iowa HSEMD may consider developing a crude oil and ethanol transportation incident response planning committee to develop guidance and work with LEPCs and emergency management coordinators to develop local incident specific response plans and capabilities.	**5.C-1:** Develop a crude oil and ethanol transportation incident response planning working group from the IERC
6. Federal, state, and industry training and readiness information is often difficult to locate and access.	6.A: Iowa HSEMD, state agencies, and association partners should consider development of a comprehensive, one-stop web portal to provide access and guidance to training opportunities, grants, and other preparedness and response resources.	**6.A-1:** Iowa HSEMD will create a consolidated training calendar on their website. **6.A-2:** Iowa HSEMD can internally try to coordinate grant resources and rail training in a more consolidated form.
7. Federally required crude oil traffic notifications from the railroads to the state have too great a range of traffic volume for effective situational awareness and response planning purposes in some areas. The 25 percent range of change in volume is too broad for some local planners to be comfortable about knowing how much crude oil is being transported through their community.	**7.A:** The state should consider requesting of the FRA that it adjust railroad advance crude oil transportation reporting requirements to notify Iowa HSEMD on behalf of the State Emergency Response Commission (SERC) in advance of scheduled shipments, from a 25 percent change in volume to a smaller range of traffic volume (e.g. no more than a 10 train per week range variance or when a 10 percent or greater change in traffic volume is scheduled to occur).	**7.A-1:** Continue to work with the railroads to find satisfactory reporting regimens that work with both the local responders and the railroads.
8. Federally required Bakken oil train traffic notifications are provided by the railroads to the Iowa HSEMD, on behalf of the SERC, then passed on to the LEPC, local emergency management coordinator, Iowa DOT, and other response entities with a need to know as allowed by state and federal law. Some counties do not have LEPCs that meet regularly to receive and act on new information.	**8.A:** Iowa HSEMD, on behalf of the SERC, should continue to work with local LEPC coordinators and emergency management coordinators to ensure the oil train traffic notifications are shared with emergency response partners who would normally be a member of an active LEPC including the fire chief, police chief, and other response operational groups.	**8.A-1:** Iowa HSEMD will continue to notify Iowa LEPCs and emergency managers on the affected routes. **8.A-2:** Iowa HSEMD will continue to notify relevant state partners. **8.A-3:** Iowa HSEMD will assure all emergency managers understand what to expect from the reporting process.

Findings/Challenges	Recommendations	Improvement Actions
9. Under the standing USDOT Emergency Order, Class I railroads are required to share information on changes to Bakken oil train traffic volume with the SERC. They are not required to share the same information for ethanol trains or other trains that also operate as High-Hazard Flammable Trains (HHFT), and present a similar hazard to railroad communities across Iowa.	**9.A:** The state should consider working with the USDOT to address the information-sharing gap between Bakken oil, and other oil, ethanol, and other commodities when carried in quantity and identified as high-hazard flammable trains by the FRA and PHMSA, and present similar risks to local communities.	**9.A-1:** Local, state, and railroads should continue to work together to find common ground on these issues.
	9.B: Local emergency managers and first responders should consider requesting hazardous commodity flow information from the railroads so that they have a better understanding of all potential hazardous materials that are transported along the tracks through their jurisdiction.	**9.B-1:** Local, state, and railroads should continue to work together to find common ground on these issues.
10. Local and rail industry information sharing related to exemplary practices for preparedness, response capability, and mutual aid, as well as public sector outreach and rail-specific training opportunities are not equal for all communities across the state.	**10.A:** The state should consider developing a web portal that allows for better information sharing, lessons learned, exemplary practices, and railroad incident training opportunities to be accessible to all local first responders and emergency managers in the state	**10.A-1:** Iowa HSEMD can open discussion with the rail industry to determine ways to improve information sharing.
11. Iowa's railroads do not have similar methods for measuring the effectiveness or accomplishments of their preparedness programs.	**11.A:** To maximize public-private coordination efforts, Iowa should recommend that the state, railroads, TRANSCAER, and other railroad-related organizations report annually on the results of their preparedness programs, using simple metrics such as number of local emergency managers and first responder organizations contacted and offered training and exercises; number of coordination meetings attended; and number of first responders trained and number of exercises held. Iowa could facilitate preparedness through tracking and providing the contact information of all local emergency managers and first responder organizations for each of the Iowa railroads, with respect to each railroad's territory.	**11.A-1:** The state is willing to work with the railroads on tracking and reporting of all preparedness, response, and training efforts as part of the public outreach and education program. **11.A-2:** Iowa HSEMD can provide emergency manager and first responder contact information to the railroads. **11.A-3:** Iowa DOT can provide the railroad contact information to Iowa HSEMD for dissemination to appropriate local authorities. **11.A-4:** Iowa HSEMD and Iowa DOT will work with the railroads to encourage exercises when testing planning assumptions.

Table ES-C. Improvement Implementation Strategy - Response

Findings/Challenges	Recommendations	Improvement Actions
Response		
1. Many local emergency operations plans, annexes, incident response plans, and standard operating procedures/guidelines take an all-hazards approach and do not specifically address rail incidents involving crude oil or ethanol or other flammable liquids.	**1.A:** State departments including Iowa DOT, Iowa HSEMD, and Iowa DNR should consider working with local emergency managers to develop local crude oil, ethanol, and other flammable liquids transportation incident response standard operating procedures or guidelines.	**1.A-1:** Iowa HSEMD will work with local emergency managers and LEPCS to provide technical assistance on their plans.
2. Many local first responders are not trained or equipped to appropriately respond to a large rail incident involving crude oil or ethanol on their own. (It is not the goal, however, to have every responder capable of an active response where scene security and notification is the appropriate response).	**2.A:** The Iowa Fire Service Training Bureau, the Iowa Firefighter's Association, Hazmat Task Force, and the crude oil transportation industry and ethanol transportation industry (including shippers and carriers) should work together to identify, fund, and offer specialized hazardous materials response training to all local, state, and tribal first responders. These partners should consider identifying and providing a mobile, local program of training and exercises that meets the appropriate response level criteria for the level of response anticipated by the local first responders. This response level capability should run from active firefighting response (when adequately trained staff are available) to appropriate geographical and situation stabilization activities in tandem with coordination with specialty response teams sent for support. Some responders may only need training on how to evacuate, shelter, and protect lives, while others may need training to support the regional hazardous materials responders (including foam application and hazardous materials decontamination).	**2.A-1:** Encourage the formation of an IERC crude oil transportation incident response planning working group to coordinate these issues.
	2.B: The state, along with the Hazmat Task Force, Iowa Firefighters Association, and railroads operating in Iowa, may consider assembling a focus group to identify ways to improve training, preparedness, and response capabilities for volunteer emergency responders.	**2.B-1:** Encourage the formation of an IERC crude oil transportation incident response planning working group to coordinate these issues.
3. Local firefighting foam resources in rural areas are not sufficient to fight large-scale rail incidents involving crude oil, ethanol, or other flammable liquids.	**3.A:** Iowa HSEMD, the Hazmat Task Force, and the Fire Service Training Bureau of the Department of Public Safety should consider conducting a study to determine how much firefighting foam should be accessible on a regional basis that can be deployed to a rail incident involving crude oil, ethanol, or other flammable liquids.	**3.A-1:** Iowa HSEMD can take the lead in coordinating the group on this issue. **3.A-2:** Coordinate with the railroads on this issue.

Findings/Challenges	Recommendations	Improvement Actions
	3.B: Iowa HSEMD, the Hazmat Task Force, and the Fire Service Training Bureau of the Department of Public Safety should consider establishing a statewide standard for firefighting foam resources for municipal fire department operations at a crude oil, ethanol, or other flammable liquids spill and assist local fire departments and partner resources with designing a path that brings all responders to the same standard.	**3.B-1:** Iowa HSEMD can take the lead in coordinating the group on this issue. **3.B-2:** Coordinate with the railroads on this issue.
	3.C: Iowa HSEMD, the Hazmat Task Force, and the Fire Service Training Bureau of the Department of Public Safety should consider purchasing and strategically placing firefighting foam and application tools around the state for rapid deployment.	**3.C-1:** Iowa HSEMD can take the lead in coordinating the group on this issue. **3.C-2:** Coordinate with the railroads on this issue.
4. Counties across the state rely on Hazmat teams to provide hazardous materials response capabilities, usually at a subscription fee, and with varied degrees of capability and availability to respond due to distance from the hazmat team's home base.	**4.A:** Iowa HSEMD may consider developing and maintaining a capabilities list of all the regional hazmat teams as a database to maintain situational awareness of their varied response capabilities including: equipment caches, location, team training and certification levels, availability, and procedures for activation, deployment, and mobilization.	**4.A-1:** Iowa HSEMD can take the lead in coordinating the group on this issue. **4.A-2:** Coordinate with the railroads on this issue.
5. No individual state department maintains a centralized, comprehensive database of private crude oil, ethanol, or other flammable liquids incident response equipment, qualified spill response contractors, and related resources.	**5.A:** Iowa HSEMD may consider developing and maintaining a response capabilities list of all the railroads as a database to maintain situational awareness of their varied response capabilities including: equipment caches, location, team training and certification levels, and procedures for activation, deployment, and mobilization.	**5.A-1:** Iowa HSEMD and Iowa DNR will work with the railroads, AAR, and ASLRRA to devise an easy and well-maintained process.
	5.B: Iowa HSEMD should consider working with Iowa DNR to update Iowa DNR's list of private contractors operating in Iowa, and to ensure the list of capabilities, their location, certifications, training, and equipment can then be made available to local emergency managers, first responders, and incident responsible parties.	**5.B-1:** Iowa HSEMD and Iowa DNR will work with the railroads, AAR, and ASLRRA to devise an easy and well-maintained process.
6. Local first responders need real-time electronic access to cargo manifest data for rail shipments.	**6.A:** Railroads, state and local authorities should work together to promote and facilitate, statewide, the use of "AskRail" mobile application and work with first responders to obtain the required training and clearances to access the application.	**6.A-1:** Poll stakeholders to determine obstacles to the use of "AskRail," if any. **6.A-2:** Ask the AAR for plain language summaries of appropriate and inappropriate use of the "AskRail" application. **6.A-3:** Promote the clarification of the legal concerns related to the access and use of the "AskRail" application.

Findings/Challenges	Recommendations	Improvement Actions
	6.B: Iowa DOT and Iowa HSEMD should work with the short line railroad association and the AAR to include Class II and Class III railroads in the "AskRail" mobile application.	**6.B-1:** Iowa HSEMD and Iowa DOT should contact AAR and ASLRRA.
7. GIS databases that identify railroad ownership and operators are not completely accurate, particularly in urban areas where trackage is complex. First responders may be delayed in contacting the correct railroad in the event of an incident.	**7.A:** The state should consider updating its railroad GIS databases with accurate information on the railroad responsible for dispatching each line segment, including contact information for that railroad. The state should consider annually furnishing this database to Iowa railroads and request verification of the information.	**7.A-1:** Promote the railroad crossing identifiers (Emergency Notification System signs) that provide the railroad contact information. **7.A-2:** Promote the availability to Iowa DOT's current GIS data. **7.A-3:** Explore the feasibility of adding and improving GIS staffing, capabilities, and data.
8. Railroad notification in the event of an incident is unique to each railroad.	**8.A:** The state should consider meeting with Iowa railroads and discussing methods to simplify and standardize how railroads are contacted and coordinated with during an incident and share that information with local emergency managers.	**8.A-1:** Facilitate an open discussion with railroads on this issue. **8.A-2:** Iowa DOT will continue education and outreach to local responders and dispatch centers on the meaning and use of Emergency Notification System.

Table ES-D. Improvement Implementation Strategy - Recovery

Findings/Challenges	Recommendations	Improvement Actions
Recovery		
1. The railroads methods for recovering from incidents are unique to each railroad. Railroads may have different financial and organizational capability to respond to in incident. The state has low visibility into railroad capabilities.	1.A: The state should consider requesting Iowa railroads to report annually on their recovery program.	**1.A-1:** Work with the railroads to refine the challenge and recommendation, then determine a path forward.

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1.0 Introduction

1.1 Purpose of Study

Crude oil and biofuels are transported by rail within and through the state of Iowa. Several factors including the increased production of crude oil in the Bakken region of North Dakota, its transportation to markets in the Southern and Eastern U.S., and various accidents involving the rail transportation of crude oil and ethanol in the U.S. and Canada have led to additional scrutiny and study of the transportation of hazardous materials by rail and other transportation modes.

The Iowa Department of Transportation's (Iowa DOT) Office of Rail Transportation and the Iowa Homeland Security and Emergency Management Department (Iowa HSEMD) seek to define the characteristics and, risks of crude oil and biofuels transportation in Iowa, the current prevention methods used to reduce risk of incidents, and the capabilities of Iowa's emergency response and recovery system for crude oil and biofuels rail transportation incidents. Outcomes of this Iowa Crude Oil and Biofuels Rail Transportation Study (the Study) will identify gaps and assist in the development of policies, procedures, and actions to further reduce risks and improve emergency response throughout the state. Even though this Study focuses primarily on the rail transportation of crude oil and biofuels, any actions recommended through this Study, which translate readily to other hazardous materials transported by rail, should do so.

The purpose of the Study undertaken by the state of Iowa is identified below:

- Inform the state about the likely current and near-term future frequency, routes, volumes, and transportation characteristics of crude oil and biofuels by rail within and through Iowa
- Assess the potential risks to public health and safety, and the potential environmental impacts, created by rail transportation of crude oil and biofuels by rail
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- Establish internal assignments and timelines to quantify successful implementation of findings and recommendations provided in the Study
- Formulate recommendations to close potential gaps in the following areas that would cause a shortfall in Iowa's capabilities for prevention, preparedness, response, and recovery: rail transportation infrastructure, rail transportation practices, rail transportation regulations and regulatory oversight, emergency response resources, organization, training, and response capabilities, communication systems and methods, and other concerns identified through the Study

The Study identified public and private stakeholders and engaged them for their insights and suggestions through a formal outreach process. Stakeholders included all Iowa railroads involved in the bulk transportation of crude oil and biofuels, selected rail producers/shippers of ethanol; selected local first responders in Iowa; principal state agencies involved in rail transportation, risk assessment, emergency planning, preparedness, response, and recovery including the Iowa DOT, Iowa HSEMD, the Iowa Department of Natural Resources (Iowa DNR), and other state agencies identified through the Study; relevant federal agencies including the Federal Railroad Administration (FRA), Pipeline and Hazardous Materials Safety Administration (PHMSA), the U.S. Department of Homeland Security (USDHS), and others identified through the Study.

Biofuels are liquid fuels used principally by motor vehicles, stationary power plants, and self-propelled machinery such as locomotives, earthmoving machinery, and farm machinery in lieu of refined products of crude oil such as diesel fuel, gasoline, and jet fuel. The principal biofuels produced in the U.S. are ethanol and biodiesel. Large quantities of ethanol are produced in Iowa and transported by rail, whereas very little biodiesel moves by rail within Iowa. Accordingly, throughout this Study, ethanol will be the principal focus for biofuels; however, findings, recommendations, and actions that concern ethanol would be in large part relevant to bulk transportation of biodiesel, should that occur in the future.

1.2 Significant Crude/Ethanol by Rail Transportation Accidents 2013-2015

National attention to crude oil transportation by rail risks occurred after an increase in railroad incidents involving trains carrying crude oil in the U.S. and Canada. This increase in incidents corresponds to an equivalent increase in the quantity of crude oil transported by rail in the U.S. and Canada. (Note: most crude oil and ethanol is moved in "unit" trains. A unit train is a train hauling a single commodity for a single customer or consortium of customers from one origin to one destination, under a single bill of lading. Unit trains are further defined in Section 3.0.) In 2014, 143 reported incidents involving crude oil in a total of 21 states By comparison, in 2010, there were nine incidents affecting only eight states.[2] The following are summaries of major crude by rail incidents from 2013 to present in Canada and the U.S.

- Lac-Mégantic, Quebec (2013, July 5): The engineer of a unit train with 72 tank cars carrying crude oil secured and left the train in Nantes, Quebec, following the completion of his tour of duty. The train was secured, using a combination of hand brakes and the train's air brakes on a main track with an approximate 1.2 percent descending grade. The train later began to move on its own after the air brake system ceased to be effective, and rolled down the descending grade toward the town of Lac-Mégantic. Near the center of town, 63 tank cars derailed, resulting in multiple explosions and a large fire. This resulted in 47 fatalities of residents, evacuation of 2,000 residents, and extensive destruction to the town. Investigations determined that the number of hand brakes applied to the train by its engineer was insufficient to prevent the train from rolling under the influence of gravity if the air brake system failed.[3]

[2] National Geographic, *This Map Shows How U.S. Oil Train Accidents Skyrocketed*, http://news.nationalgeographic.com

[3] Ibid

- Aliceville, Alabama (2013, November 8): A 90-car crude oil unit train from North Dakota to Mobile, Alabama, derailed on a section of track through a wetland near Aliceville, Alabama. Thirty tank cars derailed and approximately a dozen burned for more than 24 hours. No injuries or fatalities resulted.[4]
- Casselton, North Dakota (2013, December 30): An eastbound BNSF Railway (BNSF) crude oil unit train with 106 tank cars struck a westbound unit grain train that derailed onto the eastbound track. Twenty of the rail cars carrying crude oil derailed, resulting in a large explosion. Subsequently, a massive fire started and burned for more than 24 hours. Approximately 1,400 residents were evacuated but no injuries or fatalities were reported.[5]
- Plaster Rock, New Brunswick (2014, January 7): A train hauling crude oil from Manitoba and Alberta to Saint John, New Brunswick, derailed due to a wheel or axle failure. Five of the crude oil tank cars initially caught fire then exploded. Approximately 45 homes in the immediate area of the incident were evacuated. There were no reported injuries or fatalities.[6]
- Philadelphia, Pennsylvania (2014, January 20): Six tank cars carrying crude oil among a 101-car CSX train derailed on a bridge over the Schuylkill River. No injuries or leakage into the river were reported.[7]
- Vandergrift, Pennsylvania (2014, February 13): Twenty-one tank cars of a 120-car train derailed outside Pittsburgh. Nineteen of the derailed cars were carrying crude oil from western Canada, and four of them released crude oil. There was no fire or injuries.[8]
- Lynchburg, Virginia (2014, April 30): A train with 15 tank cars carrying crude oil derailed in the downtown area of Lynchburg. Three cars caught fire, and some cars derailed into a river along the tracks. The immediate area surrounding the derailment was evacuated. No injuries were reported, Approximately 30,000 gallons of oil spilled into the James River.[9]
- Dubuque, Iowa (2015, February 4): Fourteen railcars carrying ethanol in a Canadian Pacific Railway (CP) train derailed along the Mississippi River near Finley's Landing, 10 miles north of Dubuque. Eleven rail cars were involved, and ten were carrying ethanol.[10] At least three cars caught fire and at least three cars

[4] Ibid
[5] Ibid
[6] Ibid
[7] Ibid
[8] Ibid
[9] Ibid
[10] Des Moines Register, *Train cars derail near Dubuque, Plunge into Mississippi River*, http://www.desmoinesregister.com/story/news/2015/02/04/dubuque-train-derail/22873707/ (accessed January 28, 2016)

slipped into the river. An estimated 51,000 gallons of ethanol was released. No injuries or property damages were reported.[11]

- Timmins, Ontario (2015, February 14): Twenty-nine cars of a 100-car Canadian National (CN) Railway unit train carrying diluted bitumen crude oil derailed in a remote area 50 miles south of Timmins, Ontario, spilling oil and catching fire. The train was headed from Alberta to Eastern Canada. No injuries were reported.[12]
- Mount Carbon, West Virginia (2015, February 16): A CSX train derailed during which 19 tank cars caught fire and leaked crude oil into a nearby Kanawha River tributary. The fire lasted for almost a week, and it spread to a nearby house, which was destroyed. Approximately 1,100 residents were evacuated and two injuries were reported.[13]
- Galena, Illinois (2015, March 5): Twenty-one cars of a 105-car unit crude oil BNSF train, derailed three miles south of Galena. Ten of the cars released oil and ignited. No injuries or fatalities were reported. Local officials requested a voluntary evacuation of a one-mile radius around the incident site because of the train's proximity to a propane tank.[14]
- Hornepayne, Ontario (2015, March 5): A CN freight train derailed in a remote area of northern Ontario; the company reported no injuries or fire. The derailed cars were empty tank cars that contained residual quantities of crude oil or gasoline. No leaks or spillages of product were reported.[15]
- Gogama, Ontario (2015, March 7): A CN train carrying crude oil derailed approximately three miles from the Ontario community of Gogama. Multiple tank cars ignited and caught on fire, which resulted in a destroyed bridge and oil leak into the nearby waterway. Five of the tank cars landed into the waterway. CN reported that the tank cars were the newer American Association of Railroads (AAR) CPC-1232-compliant design; these tank cars have been regarded to be better protected against damage than older types.[16]
- Heimdal, North Dakota (2015, May 6): A BNSF train derailed east of the unincorporated community of Heimdal in Wells County. Six CPC-1232 tank cars derailed, of which four caught fire but did not explode. Approximately 25 people were evacuated for several hours. An estimated 60,000 gallons of oil leaked into a

[11] Telegraph Herald, *FRA Report includes details about Dubuque train derailment*, http://www.thonline.com/news/dubuque/article_c80e4ca0-f5c4-11e4-a397-736047563561.html (accessed October 27, 2015)
[12] Global News, *No Injuries After CN Train Derails in Northern Ontario*, March 5, 2015, Print
[13] U.S. Department of Transportation, Federal Railroad Administration Office of Safety Analysis, Accident Detail Report, http://safetydata.fra.dot.gov/officeofsafety/publicsite/Query/incrpt.aspx (accessed June 22, 2015)
[14] Ibid
[15] Huffington Post, Crude Oil Train Derailment in Ontario, Canada Is Third in Less Than a Month, March 7, 2015, Print
[16] U.S. Department of Transportation, Pipeline Hazardous Materials Safety Administration, Hazardous Materials: Rail Petitions and Recommendations to Improve the Safety of Railroad Tank Car Transportation, Federal Register 80, No. 89, May 8, 2015, 26644, http://www.regulations.gov/#!docketDetail;D=Pipeline Hazardous Materials Safety Administration-2012-0082 (accessed June 22, 2015)

nearby waterway that drains into the James River; containment booms were put in place to contain the spilled oil. Additional containment dykes also were built around the derailment site. The derailment did not cause any injuries, fatalities, or structural losses.[17]

- Culbertson, Montana (2015, July 16): A BNSF train derailed east of Culbertson near the North Dakota border, of which at least three CPC-1232 tank cars spilled an estimated 35,000 gallons of crude oil. The incident did not result in any fire, explosion, property damage, injuries, or fatalities. Multiple homes in the area were evacuated and Highway 2, a major roadway in the region was forced to shut down for several hours during incident response.[18]
- Scotland, South Dakota (2015, September 19): Seven cars of a 98-car BNSF unit ethanol train derailed in rural South Dakota. Three cars lost their contents in the derailment and at least one car caught fire. No injuries or property damages were reported.[19]

In the last ten years, there has been only one domestic crude oil or ethanol incident that has resulted in a fatality directly caused by the commodity. This occurred in Cherry Valley, Illinois (near Rockford) on June 19, 2009.[20] A CN unit ethanol train derailed at a highway grade crossing; a total of 19 tank cars derailed. Of these, 13 cars were breached, punctured, and/or lost product and caught fire.[21] Several motorists were parked near the at-grade crossing, but the resulting fire fatally injured one motorist and injured several others.[22] The National Transportation Surface Board (NTSB) concluded that the probable cause of the train derailment was a precipitation-caused washout of the track structure.[23] In addition, the NTSB concluded that CN's emergency management procedures inadequately communicated knowledge of the washout to the train crew in a timely fashion.[24] The NTSB also stated that the inadequate design of the DOT-111 tank cars contributed to the severity of the accident.[25]

1.3 Hazard Profiles: Crude Oil and Ethanol

Both crude oil and ethanol spills, caused by train derailments, are the hazard presented to the Iowa public and environment. First, an understanding of each commodity's hazards is necessary for identifying risk and is needed in order to provide the appropriate level of emergency preparedness and response. Volatility, or the tendency for a material to vaporize, is an important concept. Typically, the more volatile a material is, the more readily it can evaporate and create vapor (gas). Vapor can be easily ignited when an energy source is introduced near the vapor.

[17] Wilz, Greg (North Dakota DES Director), Roehrich, Tammy (Wells County, North Dakota, Emergency Management). Interview. May 13, 2015
[18] CBS News, Rail cars leaking crude after oil train derails in Montana, http://www.cbsnews.com/news/rail-cars-leaking-crude-after-oil-train-derails-in-montana/ (accessed October 26, 2015)
[19] NBC News, Ethanol Tankers Derail in South Dakota, One Catches Fire, http://www.nbcnews.com/news/us-news/ethanol-tankers-derail-south-dakota-one-catches-fire-n430426 (accessed October 27, 2015)
[20] National Transportation Surface Board, *Railroad Accident Report RAR-12-01, http://www.ntsb.gov/investigations/AccidentReports/Pages/RAR1201.aspx*
[21] Ibid.
[22] Ibid.
[23] Ibid
[24] Ibid.
[25] Ibid.

Therefore, a highly volatile substance, with a low flash point, is more prone to igniting than a less volatile substance. Ethanol and crude oil are both volatile compounds, but have other defining characteristics and properties that can dictate their impact to the public and environment.

1.3.1 Industry Descriptions of Crude Oil

The term "crude oil" generally refers to "a mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities."[26] Crude oil composition can vary from thin, lightweight, and volatile, to thick, semi-solid, and heavy. Crude oil also varies in flammability, volatility, toxicity, and American Petroleum Institute (API) gravity.

There are two major variables in crude material characteristics: gravity and sulfur content.

- Gravity ranges from light to heavy, expressed in degrees based on the API scale. The API gravity describes the weight of a petroleum product relative to water (greater than 10° API floats on water and less than 10° API sinks in water).[27]
- The sulfur content of a crude product determines whether the product is considered low, intermediate, or high sulfur crude. It is commonly referred to as "sweet" or "sour" crude oil. Sour crude oil is high in sulfur content, whereas sweet crude is low in sulfur. Sweet crude carries a sulfur content of less than 0.5 percent by weight, while sour crude has sulfur content greater than 1 percent by weight. Intermediate crude oil (neither sweet nor sour) has sulfur content from 0.5 percent to 1 percent.

Crude oils that are light (higher API gravity) and sweet (low sulfur content) are typically more desirable for refiners because they have fewer impurities and are easier (and therefore less expensive) to process. Heavier crudes (those with lower API gravity) and sour crudes (high sulfur content) require more complicated refining processes to make them into retail products such as gasoline.

Figure 1: DOT Hazard Classification Identification Placard for Petroleum Crude Oil Products

Light, sweet crude oil tends to be more volatile than heavier crudes and possesses natural gases that release from the oil when it is heated. These flammable natural gases, such as propane and ethane, can cause additional atmospheric risks for fire spread and inhalation hazards because propane gas is heavier than air and collects near the ground. Light crude oil also floats on water, which will spread quickly in moving waters.[28]

[26] U.S. Energy Information Administration, *Crude Oils Have Different Quality Characteristics*, Today in Energy, http://www.eia.gov/todayinenergy/detail.cfm?id=7110 (accessed June 22, 2015).
[27] National Fire Protection Agency, *704 Frequently Asked Questions on NFPA 704*, http://www.nfpa.org/Assets/files/AboutTheCodes/704/704_FAQs.pdf (accessed June 22, 2015).
[28] U.S. Department of Transportation, Emergency Response Guidebook, Guide 115, Propane. 2012, Print.

1.3.2 Crude Oil Composition Variability Poses Challenges in Transport

The variability in types of crude raises challenges for the transport of crude oil products. Understanding the variability in crude oil composition and related terms helps policymakers, planners, and responders determine likely consequences, should a transportation incident occur, and prepare for an appropriate response. There are multiple classifications of crude oil products and national standards for labeling and identifying each. Proper container labeling can provide insight into the type of product in transit, but labels may not provide enough information for responders to determine the best operational response. Shipping papers, such as manifests, bills of lading, and material safety data sheets, are held by the train operator based on regulatory requirements and industry practices; these can also provide further insight and details about the products in transit, including:

- Proper shipping name of the material
- Hazard class and four-digit identification number
- Total quantity of materials
- Number and type of packages
- Packing group
- Emergency response telephone number
- Shipper (origination)
- Consignee/buyer (destination)

Emergency responders use hazard identifiers to develop and maintain situational awareness of preparedness and response measures to hazardous materials incidents, which include crude oil transportation accidents. Use of the hazard classification and labeling systems, as noted below, improves response tactical considerations that are designed to reduce loss of life and property, and environmental impacts.

1.3.3 USDOT Placards (Crude Oil)

Transportation containers carrying certain types of hazardous materials are required to display a USDOT Hazard Classification Identification Placard. USDOT placards identify all petroleum crude oil products as UN1267, regardless of gravity or sulfur content. They are designated as Class 3 flammable liquids under 49 CFR 173.120. The placard proves useful to first responders, who use it as an initial indicator of what type of hazardous material they are facing.

1.3.4 PHMSA Classifications for Crude Oil

PHMSA regulations further classify hazardous materials in transport according to risk characteristics. The three classifications are:

- Packing Group III (minor danger)
- Packing Group II (medium danger)
- Packing Group I (great danger)

Light sweet crude oil may be classified within Packing Group I, II, or III depending on the specific properties of the batch of oil being transported. Specific properties include vapor pressure, initial boiling points, flashpoints, and dissolved gas content, all of which vary based on the grade of the crude oil (light versus heavy), source of extraction (different well sites), and time of year it is produced (crude may contain a higher concentration of dissolved gases during cold weather).

1.3.5 USEPA Classifications for Crude Oil

The U.S. Environmental Protection Agency (USEPA) has also developed its own classification specifically for crude oil. USEPA classifications describe general toxicity, physical state, and changes that occur with time and weathering. The four classifications are:

- Class A: Light, Volatile Oils: Class A oils are highly fluid, often clear, spread rapidly on solid or water surfaces, have a strong odor, high evaporation rate, and are usually flammable. They penetrate porous surfaces such as dirt and sand, and may be persistent in such a matrix. They do not tend to adhere to surfaces. Flushing with water generally removes them. Class A oils may be highly toxic to humans, fish, and other organisms.[29] Most refined products and many of the highest-quality light crudes are included in this class. Light sweet crude oil fits within this category.
- Class B: Non-Sticky Oils: Class B oils have a waxy or oily feel. Class B oils are less toxic and adhere more firmly to surfaces than Class A oils, although they can be removed from surfaces by vigorous flushing. As temperatures rise, their tendency to penetrate porous substrates increases and they can be persistent. Evaporation of volatiles may lead to a Class C or D residue. Medium to heavy paraffin-based oils fall into this class.
- Class C: Heavy, Sticky Oils: Class C oils are characteristically viscous, sticky or tarry, and brown or black. Flushing with water will not readily remove this material from surfaces, but neither does it readily penetrate porous surfaces. The density of Class C oils may be near that of water, and they often sink. Weathering or evaporation of volatiles may produce solid or tarry Class D oil. Toxicity is low, but wildlife can be smothered or drowned when contaminated. This class includes residual fuel oils and medium to heavy crudes.
- Class D: Non-Fluid Oils: Class D oils are relatively non-toxic, do not penetrate porous substrates, and are usually black or dark brown in color. When heated, Class D oils may melt and coat surfaces, making cleanup very difficult. Residual oils, heavy crude oils, some high paraffin oils, and some weathered oils fall into this class.

1.3.6 Industry Descriptions of Ethanol

Ethanol is a colorless, clear liquid that has a weak, vinous odor. It is also a volatile substance whose flammability is dependent on water content. Most ethanol is created through fermentation

[29] U.S. Department of Transportation, Pipeline Hazardous Materials Safety Administration, https://primis.phmsa.dot.gov/comm/MarkersBrief.htm (accessed June 22, 2015).

of sugar, starches, or feedstocks, with the most common feedstock being corn.[30] Ethanol is an ingredient found in alcoholic beverages and other industrial products, such as solvents, pharmaceuticals, cleaning products, etc. However, the most common use for ethanol is that of fuel for internal combustion engines. In the U.S., ethanol is blended with gasoline to create gasohol. Gasohol blends typically have a 10 percent ethanol (E10) composition, with gasoline blends having ethanol content as high 85 percent (E85). Typically, pure ethanol is transported to tank farms, where the fuel is stored until mixing and customer delivery.

1.3.7 Ethanol Challenges in Transport

Transporting ethanol has been reduced to truck, rail, and barge, since transporting by pipelines is problematic. Pipelines have been an area of concern due to the corrosive nature of ethanol and the fact that ethanol reacts with other products and substances within the pipeline. Corrosion is a major concern as it can affect the structural integrity of the piping material making it possible to release the product. The solvent and miscible properties of ethanol also allows it to mix with other soluble materials, e.g. water, dirt, etc., which in turn creates a product that can no longer meet specification.

Ethanol can be transported in different mixed concentrations and as an additive to different media (e.g. gasohol) and in its pure state. Similar to bulk crude oil, shipping papers, and hazard identifiers are needed to assist emergency responders reacting to hazardous materials incidents involving ethanol.

1.3.8 USDOT Placards (Ethanol)

Transportation containers carrying certain types of hazardous materials are required to display a USDOT Hazard Classification Identification Placard. USDOT placards identify:

- Gasoline, E1 thru E10 as UN 1203
- Ethanol and Gasoline Mixtures, E11 thru E99 as UN 3475
- Alcohol, not otherwise specified (n.o.s.), E95 thru E99 as UN 1987
- Ethanol or Ethyl alcohol, E100 only as UN 1170

All of the above placards categorized ethanol as a Class 3 flammable liquid under 49 CFR 173.120. The placards prove useful to first responders, who use them as an initial indicator of what type of hazardous material they are facing.

1.4 2012 Emergency Response Guidebook (ERG)

1.4.1 Crude Oil and Ethanol

The U.S. Department of Transportation's (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) publishes a guidebook for first responders for use during the initial

[30] USEPA – Section II Ethanol Industry and Process Descriptions: https://www.osha.gov/dts/osta/otm/otm_iv/descriptions.pdf

phase of dangerous good/hazardous material transportation incident. [31] The most recent ERG was published in 2012, and is updated on a four-year cycle. The 2016 edition will be available in early 2016. The ERG allows first responders to look up commodities by either proper shipping name or 4-Digit Number (UN or NA) to determine the appropriate course of action for response, with respect to the commodity and nature of incident. Several other resources are also included in the ERG.

Per the ERG, potential hazards for both ethanol and crude oil are similar since they both are classified as Class 3 flammable liquids. It is important to note that initial evacuation distances are recommended to be 0.5-mile in all directions, in the event of a fire. This fact will be used in the development of the Study's "Risk and Vulnerability Analysis." Also worth noting is the fact that firefighting strategies vary between the two commodities. Ethanol and other alcohol-based solvents require alcohol-resistant foam, whereas regular firefighting foam can be used to extinguish crude oil fires. [32]

[31] USDOT- PHMSA, *2012 Emergency Response Guidebook*, http://phmsa.dot.gov/pv_obj_cache/pv_obj_id_7410989F4294AE44A2EBF6A80ADB640BCA8E4200/filename/ERG2012.pdf

[32] Ibid.

2.0 Stakeholder and Outreach Methodology

The Study relied on the engagement and commitment of stakeholders, at all levels. Railroads, selected shippers, and emergency management representatives were individually interviewed to gain better insight into their various operations and to provide a forum to enable each of the stakeholders to voice concerns about all aspects of Iowa's rail transportation network, risks of crude oil and ethanol incidents, and Iowa's preparedness, planning, response, and recovery capabilities. Information obtained through the interviews was generalized and is not specific to any one stakeholder unless noted.

2.1 Railroads

During the railroad interviews, information guides were provided to facilitate discussions based on these points:

- Frequency, volumes, origin and destination points, and other transportation patterns of crude oil and ethanol within or through Iowa
- Likely future trends that would change current transportation patterns
- Coordination among railroads for transportation practices, planning, and operation
- Each railroad's planning activities and preparedness for emergency management, training and outreach to first responders, and spill and remediation management plans
- Coordination among railroads for emergency management, training of first responders, outreach to first responders, and spill and environmental management
- How each railroad communicates with local first responders and state agencies such as Iowa HSEMD, and Iowa DOT
- Risks to public safety property, and the environmental from transportation of crude and ethanol as perceived by the railroad
- Gaps in emergency preparedness and communication as perceived by the railroad
- Communication protocols between the railroad and state and local agencies, and among railroads
- How railroads communicate needs, risks, threats, and transportation plans with state and local agencies
- How railroads communicate with shippers and receivers of crude oil and ethanol in Iowa about preparedness, safety, training, communication, and risks
- How railroads measure and track current preparedness, risks, improvements, and safety of crude oil and ethanol transportation

The following railroads were interviewed:

- BNSF Railway (BNSF)
- Canadian National Railway (CN)

- Canadian Pacific Railway (CP)
- Cedar Rapids & Iowa City Railroad (CIC)
- D&I Railroad (DAIR)
- Iowa Interstate Railroad (IAIS)
- Iowa Northern Railway (IANR)
- Union Pacific Railroad (UP)

Information obtained in the railroad interviews was summarized in an initial gap analysis of rail practices, communication strategies, preparedness, and planning.

2.2 Producers/Shippers

With the assistance of Iowa DOT, two Iowa ethanol producers/shippers were selected and interviewed. Both are large shippers that regularly load unit trains of ethanol. It was found that Iowa has no shippers or receivers of crude oil, so only ethanol producers/shippers were considered. A "Shipper Interview Guide" helped to facilitate discuss and uncover information related to:

- Regional trends for ethanol within or through Iowa
- Likely future trends that would change current transportation patterns
- Coordination with railroads for transportation patterns
- Each shipper's planning activities and preparedness for emergency management, training and outreach to first responders, and spill and environmental management
- Coordination among shippers for emergency management, training and outreach to first responders, and spill and environmental management
- How each shipper communicates with local first responders and state agencies such as Iowa HSEMD and Iowa DOT
- Risks to public safety, preparedness, and critical environmental areas as perceived by the shipper
- Communication protocols between the shipper and state and local agencies, and among railroads
- How the shipper communicates needs, risks, threats, and transportation plans with state and local agencies, and with railroads
- How the shipper inspects tank cars used to ship ethanol, how it qualifies its inspectors, and how it assures that cars are inspected in accordance with regulatory practices
- How the shipper measures and tracks its current preparedness, risks, improvements, and safety of ethanol rail transportation

The following shippers were interviewed:

- POET Ethanol Products

- Siouxland Energy Coop

Information obtained in the shipper interviews has been summarized in an initial gap analysis of rail practices, communication strategies, preparedness, and planning.

2.3 Emergency Management

For the last stakeholder component, Iowa state and local emergency management agencies and local first responders were interviewed. These interviews were conducted to collect the following information:

- Knowledge of current rail transportation of crude oil and ethanol within and through Iowa
- Coordination with railroads for training and emergency preparedness
- Coordination with railroads for emergency and environmental response to an incident
- State of training, equipment, and planning
- Hurdles that hinder or limit access to or delivery of training
- How each agency or first responder entity coordinates with each other
- Risks to public safety, public and private infrastructure and development, and critical environmental areas associated with the rail transportation of crude oil and ethanol, as perceived by the agency
- Communication protocols between the shipper and state and local agencies, and among railroads
- Communication protocols for on-going transportation, (i.e. notification of rail movements)
- How each agency measures and tracks its current preparedness, risks, improvements, and safety of crude oil and ethanol transportation.

A strategy was developed to effectively and efficiently interview the largest stakeholder group. Synergy was found by taking advantage of Iowa HSEMD meetings and other sponsored activities. The meetings hit on the breadth and depth of Iowa's emergency response community, and focused on:

- Local emergency managers from Iowa HSEMD Regions 3, 4, 5 and 6 at Iowa HSEMD's annual conference on October 20-21, 2015
- Iowa HSEMD, Iowa DOT, and Iowa Department of Natural Resources (Iowa DNR), and Iowa Department of Public Safety (Iowa DPS)
- Additional local stakeholder groups, consisting of emergency managers, fire officials, police, public health, and emergency medical services, that were identified by Iowa DOT and Iowa HSEMD

Online surveys were also distributed to additional local stakeholders through Iowa HSEMD, Iowa Fire Training Division, and the Iowa Hazmat Taskforce Association networks. Results

from these surveys were used to refine the "Risk Vulnerability Assessment," as well as identify additional gaps and best practices.

2.4 Stakeholder Steering Committee

A Stakeholder Steering Committee (SSC) was created to guide and inform the Study, and provide opportunities for collaboration and critique related to findings and recommendations related to the initial gap analysis. Stakeholder representation includes:

- Key agencies such as Iowa DNR, Iowa HSEMD, and Iowa DOT
- Key local first responders, including both large urban areas and rural counties
- Railroads with substantial crude oil and ethanol volumes: BNSF, CIC, CN, CP, DAIR, IAIS, IANR, and UP
- Ethanol producers/shippers such as POET Ethanol Products and ADM

The first SSC meeting was held on November 4, 2015, to review study findings and query stakeholder thoughts regarding the study methodology. The second SSC meeting was held on January 28, 2016, to review initial recommendations and actions.

2.4.1 Results of SSC Meetings

SSC Meeting 1

Upon hearing the overall Study's goals and findings at the first SSC meeting, the Study team facilitated a breakout session that asked these questions of the stakeholders:

- What the Study should not do?
- What the Study should do?
- What questions have we not asked of you that we should ask?
- What have we not done that we should do?
- What have you been successful with?
- What are the roadblocks that you face?

Figure 2: First SSC Meeting

Source: Iowa DOT

During this stage of the meeting, the stakeholders were able to voice their concerns about the Study's methodology and strategy. As a group, the Study's stakeholders collectively answered the facilitation questions, with responses such as:

What should the Study not do?

The Study should not:

- Mandate legislation or draft legislation.
- Recommend strategies that are at odds with existing or pending state or federal legislation.
- Increase standard of care.
- Tax private industry, with intent.
- Create a static document.
- Put stakeholders at odds.
- Imply there is an unaddressed crisis.
- Imply that stakeholders are not already meeting or going beyond requirements.
- Recommend strategies beyond the capabilities of stakeholder organizations.
- Include language or images that could be used against stakeholders.
- Avoid tank car discussion.

What should the Study do?

- Provide funding for first responders to go to training events (in addition to railroad funding).
- Inform emergency management about local training.
- Clarify/reinforce responsibilities and roles of stakeholders in emergency management.
- Create recommendations with a clear understanding of:
    - The actual risk of an incident (as compared to other risks faced by organizations).
    - The reality of the capabilities and resources available to stakeholders.
    - The reality of capabilities and resources needed in case of an incident.
- Build collaboration between public and private sectors to leverage existing resources.
- Increase public buy-in instead of compliance.
- Understand different stakeholders have need of different information (seasonal statistics vs. yearly, for example).
- Educate public and elected officials:
    - About existing regulation.

- Speak to them on their level.
- To take some responsibility for their own safety (update Driver's License Manual about railroad safety, etc.).
    - Identify capabilities and processes of stakeholders.
    - Tell a collective story without identifying individual stakeholders.
    - Thoughtfully consider the audience in the report content and format.

What questions should we have asked, but didn't?

- Who are your partners and what have they done?
- What are you going to do after the report comes out?
- How will you sustain a relationship with other stakeholders and partners?
- Did we contact the right person at your organization?
- What resources do you have available?
- How do we better provide/aggregate resources?

What can we do better?

- Contact industry organizations, like the American Petroleum Institute (API) and Association of American Railroads (AAR)
- Define what a common carrier does and explain it
- Crafting the message and objectives
- Use social media

SSC Meeting 2

The second SSC meeting reviewed the Study Team's findings, proposed recommendations, and intended actions prior to the public release of the Study. The focus of the Study is not to create new legislation, but rather to work in cooperation with the appropriate stakeholders and agencies to identify and improve gaps in current operating practices, with respect to emergency prevention, preparedness, response, and recovery, while also working to enhance stakeholder communication. Therefore, refining improvement actions helped Iowa DOT and Iowa HSEMD establish performance measures and internal timelines to quantify the potential implementation of findings and recommendations developed in the Study.

2.4.2 Incorporating Stakeholder Feedback into the Study

Early on, the Study Team anticipated and addressed several of the stakeholder concerns through the careful planning of the Study's approach and methodology. As the Study progressed, the Study Team has captured and incorporated more of the stakeholder concerns within the Study's recommendations and improvement actions.

3.0 Rail Haulage of Crude and Ethanol – Practices

3.1 Overview of Railroad Transportation

This section provides a general overview of the components of rail haulage of crude oil and ethanol in Iowa.

At present, ethanol transported by rail is loaded and unloaded at rail served facilities in Iowa and crude oil shipments by rail travel through Iowa between producers in Canada and the Bakken oil region of North Dakota and markets in the Southern and Eastern U.S. The loading and unloading of railcars in Iowa containing ethanol typically occurs at a privately owned, or shipper-owned, location and not on the property of or via the use of railroad-owned facilities. Railcars containing crude oil are not presently loaded or unloaded in Iowa.

Crude oil and ethanol are loaded into railroad tank cars. Each commodity is generally transported from a producer at a point of origin to a receiver at a point of destination in a homogeneous unit train pulled by locomotives and carrying 50 or more cars. An empty buffer car, not used to transport crude oil or ethanol, is placed between the lead car of the unit train and the locomotives pulling the train. Trains carrying crude oil and ethanol are typically operated by a two-person train crew consisting of a conductor and engineer that will often operate a train for between 100 and 150 miles (a crew district) before being relieved by another train crew. Railroad operations are conducted in compliance with federal regulations, which address railroad operations; maintenance of track, bridges, signals, locomotives, and equipment; safety; and labor.

Rail lines in Iowa hosting crude oil shipments include main lines with medium to heavy rail traffic density. Rail lines in Iowa hosting ethanol shipments include branch lines with light rail traffic density and main lines with medium to heavy rail traffic density. Railroad main lines in Iowa have either one main track with sidings to accommodate meet-pass events between trains or have two main tracks. Many lines in Iowa over which crude oil and ethanol are transported have a wayside signal system to increase operating efficiency, velocity, and safety and to prevent the likelihood of collisions between trains and other accidents. A Positive Train Control (PTC) system that further minimizes the likelihood of train collisions and overspeed accidents, and mandated by federal law, is under development on many lines in the Iowa railroad network. Trains carrying crude oil and ethanol in Iowa travel at speeds consistent with the method of operation, track geometry, geographical constraints, challenges of operations in urban and rail terminal areas, and other considerations on a given rail line segment. Maximum authorized speed for trains carrying crude oil and ethanol may range between 10 and 60 miles per hour (mph).

The general ownership and maintenance of railroads in Iowa is described further in Section 9.1 below.

3.2 Organization of the Rail Transportation Network

This section generally describes the organization of the Iowa railroad network as applicable to the railroads that potentially host crude oil and ethanol transportation in Iowa.

In Iowa, most railroads own and maintain the networks over which they operate or directly provide railroad transportation. Ownership and maintenance generally includes all fixed railroad infrastructure including bridges and other structures, track, wayside signal and communication systems, and administrative and maintenance facilities. Railroad equipment, including

locomotives, railcars, vehicles, and other heavy equipment, may be owned and/or leased by the railroad. Maintenance can be provided by a railroad and/or an outside entity, as appropriate.

There are instances in which a railroad may not own railroad line segments over which it operates in Iowa, as described below.

- Trackage rights are an arrangement whereby one railroad (tenant) has the authority to operate over a segment of railroad owned by another (host). For example: Union Pacific Railroad (UP) has trackage rights over the Canadian Pacific Railway (CP) between Emmetsburg and Hartley, Iowa, to access a shipper served by UP and CP at Hartley. Also, Amtrak does not own any trackage in Iowa, but its passenger trains serving Iowa operate over two lines owned by BNSF Railway (BNSF).
- Haulage rights are an arrangement whereby one railroad markets service over a route owned by another, but does not operate its own trains over the railroad. For example: Union Pacific Railroad (UP) has haulage rights over the Iowa Northern Railway (IANR) between Cedar Rapids and Waterloo, Iowa, to access isolated UP customers in the Waterloo area.
- Public ownership of a railroad line over which a railroad provides transportation exists on a limited basis in Iowa. For example, D&I Railroad (DAIR) operates over a line in Iowa and South Dakota that is owned by the State of South Dakota. The State of Iowa does not own any railroads in the state at present.
- In other cases, a railroad segment may be owned by one or more railroads and involve some level of public ownership. For example: the Fourth Street Rail Corridor in downtown Cedar Rapids, Iowa, hosts railroad operations of the Cedar Rapids & Iowa City Railway (CIC), Canadian National Railway (CN), Iowa Northern Railway (IANR), and Union Pacific Railroad (UP) over right-of-way owned by the City of Cedar Rapids, and on track owned by two of the railroads – CIC and UP.

Section 9.0, of this study, identifies and describes additional details related to the organization and the physical characteristics of each Iowa railroad segment that is potentially used for transporting crude by rail and ethanol.

4.0 Regulations for Transportation of Crude Oil and Ethanol by Rail

4.1 Regulations for Transportation of Crude Oil and Ethanol by Rail

The U.S. Department of Transportation (USDOT), through the Federal Railroad Administration (FRA) and Pipeline and Hazardous Materials Safety Administration (PHMSA), regulate crude oil and ethanol movements by rail. Other independent agencies also play a role in the regulation of crude oil and ethanol by rail. The National Transportation Safety Board (NTSB) investigates accidents involving rail transportation, whereas the U.S. Surface Transportation Board (STB regulates economic aspects of rail transportation. The Department of Homeland Security's Transportation Security Administration (TSA) regulates security aspects of rail transportation. Although all of these agencies have a hand in the safe transportation of crude oil and ethanol by rail, the primary agencies for safety regulation are the FRA and PHMSA.

The FRA specializes in supporting and enforcing rail regulations, while performing research and development to improve rail safety and policy. PHMSA serves to establish national policy, set and enforce standards, educate, and conduct research to prevent accidents related to hazardous materials transportation. For practical purposes, the FRA can be thought of as the agency regulating the operation of railroads and the maintenance and safety of railroad track, bridges, signals, and rolling stock; while PHMSA regulates construction and maintenance aspects of tank cars transporting crude oil and ethanol that pertain to their integrity and their resilience to impact, penetration, fire, heat, and explosion in case of a derailment or collision.[33] Synergistically, these two organizations combine to create regulation affecting the transportation of crude oil and ethanol by rail. It is important to note that the U.S. Congress and Senate are currently considering new regulations that would pertain to the safety of crude oil and ethanol transportation by rail. Provided below is a description concerning rail elements that have been or are being considered for regulation. A summary of regulation for the transportation of crude oil and ethanol by rail is found in Section 4.2.

4.1.1 Train Braking System

Freight trains utilize a braking technology originally developed in the 1930s, which has been continuously improved and is reliable and effective when operated and maintained correctly. The system is composed of a brake cylinder, brake shoes, dual air reservoir and control valve mounted on each car in the train, an air line traveling the length of the train, an air compressor and reservoir on the locomotive(s), and an engineer's control valve on the lead locomotive. The air line traveling the length of the train has a dual-purpose serving as both a supply line (to recharge the reservoirs on each car after a brake application and release cycle) and as a signaling line. As a signaling line, a drop in pressure signals the control valve on each car to apply the brakes on that car, and an increase in pressure signals the control valve on each car to release the brakes. This provides a fail-safe design; any drop in brake pressure will cause a brake application on each car (provided that the air reservoirs on each car have adequate reserve air pressure).

In addition to air brakes, many trains can also utilize dynamic braking, provided the locomotive(s) on the train is so equipped. Dynamic braking consists of using the electric traction

[33] USDOT: PHMSA, *Mission and Goals*, http://www.phmsa.dot.gov/about/mission

motors mounted on the locomotive axles that normally provide rotational force to the locomotive's axles to act instead as generators. By acting as generators, the traction motors resist turning and provide a braking force to the locomotive(s) and train.

All U.S. railroads utilize, operate, and maintain air brake systems under FRA regulations. Most locomotives utilized for over-the-road train service are equipped with dynamic brakes; however, dynamic braking is not necessarily required to be serviceable so long as the operating rules of the railroad account for inoperative dynamic brakes, and the engineer of the train is aware of the inoperable condition before departing the train's initial station. All Iowa railroads included in this study have operating rules governing use of air brakes and dynamic brakes that are similar, and maintenance practices that are similar.

A new type of air brakes, Electronically Controlled Pneumatic (ECP) braking, has been developed but has not been widely deployed on U.S. railroads. The principal feature of ECP braking is it uses an electronic signal to each car in a train to instruct it to apply or release brakes, rather than using the train line as the signaling system. ECP braking thus offers simultaneous application or release of all the brakes in the train, as opposed to the delay inherent in conventional air brakes as the air pressure signal travels on the train line. The FRA has mandated that all trains of 70 or more tank cars loaded with Class 3 flammable liquids (flammable or combustible liquids, including crude oil and ethanol) with at least one car carrying Packing Group 1 flammable liquids, must be operated with ECP braking by January 1, 2021. This requirement will effectively require all crude oil and ethanol trains operated in or through Iowa to be equipped with ECP braking.

4.1.2 Trackside Safety Technology

Trackside safety technologies, known also as wayside asset protection devices, are systems designed to remotely monitor and alert train operating crews or train dispatchers to changes in train activity and conditions that are unsafe in the field. These devices include:

- Dragging Equipment Detector (DED): This system detects derailed cars or axles, brake rigging that is dragging on the track, or any other dragging component of the train.
- Hot Box Detector (HBD): This system detects wheel bearings and wheels that have elevated temperature, typically due to failed or failing wheel bearings or brakes that have failed to release. Wheel bearings that have failed can cause derailments; hot wheels can fracture, stuck brakes can cause rapid flange wear or wheel shelling that can cause derailments.
- Wheel Impact Load Detector (WILD): This system detects excessive wheel impacts, which may be due to wheels that have flat spots or are broken, which can lead to derailments.
- Wheel Crack and Flange Integrity Detectors: This system detects wheel cracks or broken flanges, which can cause derailments.
- High-Water Detectors and Slide Detectors: These systems detect high water under or through a bridge or culvert, which can lead to failure of the railway embankment or bridge, and landslides of the track structure or of slopes above the track.

- High-Wide Detectors: These systems detect rail cars or ladings that protrude beyond the vertical and horizontal clearance gauge of a rail line. They are typically placed on the approaches to through truss bridges or tunnels.

These systems improve train and railroad safety by detecting and reporting defects or failures that may cause train derailments. Typically, these systems are installed at intervals reflecting a cost-benefit approach to derailment prevention. Because WILD and wheel-crack and flange-integrity detectors are costly, and because these conditions tend to be slow developing, their spacing is very wide, as infrequent as one every 1,000 miles. HBD and DED detectors, conversely, are often spaced more closely. Spacing of detectors is influenced by train density, local geography, the potential for risks, and other considerations. For example, because of the greater vulnerability of concrete crossties to damage caused by any derailment, such as a single axle of a car, compared to timber crossties, DEDs are often closely spaced on rail lines that are laid with concrete ties.

4.1.3 Grade Crossing Safety

Grade-crossing safety is an issue recognized by most local and state officials as well as railroad operators. A grade crossing collision occurs approximately once every three hours in the U.S. Although most grade crossings are equipped with warning signs to alert motorists that they are approaching a rail crossing, not all grade crossings have passive or active warning devices. Passive warning devices include signs, pavement markings, and crossbucks. Active warning devices typically include automatic crossing gates, flashing lights, and bells, which are maintained by the owner of the tracks. These are more effective in preventing collisions than the passive devices, which typically consist of crossbucks and/or stop signs.

Rail companies and local public safety officials work with programs like Operation Lifesaver, which is a non-profit organization providing public education programs in Iowa and all other states. Operation Lifesaver's programs work to ensure the public is aware of the rules of the road and to practice caution when using unmarked private crossings and active or passive marked crossings on public roads.

On June 29, 2015, the FRA announced a partnership with Google that integrates FRA's geographic information system data, providing the location of public and private railroad crossings into Google's navigation and mapping products.[34] This partnership provides navigational warnings to drivers and passengers when approaching a grade crossing.

4.1.4 Train Speeds

Operating at lower train speeds is a procedural safety measure, which is ultimately the responsibility of the train operator. PHMSA recently issued the final ruling, Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains (HHFT), which implements speed reduction rules in certain defined urban areas.[35] These

[34] U.S. Department of Transportation, *Google, FRA team up for safety; will add rail crossing data to maps*, June 29, 2015, http://www.transportation.gov/fastlane/fra-google-team-to-incorporate-rail-data-in-maps (accessed June 30, 2015).

[35] U.S. Department of Transportation, Pipeline Hazardous Materials Safety Administration, *Docket No. Pipeline Hazardous Materials Safety Administration-2012-0082 (HM-251), Hazardous Materials: Enhanced Tank Car Standards and Operational Controls of High Hazard Flammable Trains*,

rules limit the speed of crude oil unit trains to 40 mph in high-population areas (100,000 population or more) unless all tank cars meet or exceed the performance standards for the DOT-117 tank car. Train operators must be cognizant of their geographic locations, in relation to a high-population area, to operate the train through these areas, in a proper and safe manner. It is important to note that Class I railroad company, BNSF, is taking steps to assign even slower speeds in high-risk areas by initiating voluntary speed restrictions in high threat urban areas (HTUAs).[36]

4.1.5 Train Loads and Securement

Railroads are expected to address proper distribution of loaded and unloaded railcars in a train consist, which have varying weights, to help prevent derailments and other accidents. For example, if an empty car is placed before loaded cars in a train and the brakes are applied in an emergency application, buff forces in the train may cause the empty car to derail. The position of loaded and unloaded cars in a train consist is critical in challenging railroad operating territories, as in mountainous areas for example, which may include alignments with severe upgrades and downgrades and curvature.

Directly related to train loads is proper train securement. This involves actions for securing an unattended train containing hazardous materials, generally including the setting of an appropriate number of handbrakes on the railcars in the consist to prevent the train from rolling away, locking the locomotive cab(s) to prevent entry and train operation by unauthorized individuals, and comprehensive coordination with a train dispatcher in which a train crew member identifies the location, tonnage, and length of the train, the grade and weather conditions at the location where the train is staged, and the number and location in the train of handbrakes that are applied. One factor of the 2013 accident at Lac Mégantic, Quebec, (described earlier in this Study) was related to the improper securement of the locomotives and other train cars. Understanding that train securement was a factor that contributed to the Lac Mégantic accident, U.S. regulatory agencies examined current railroad operating practices, and issued a final rule for the securement of unattended rail equipment. While past securement regulations have thwarted risk associated with unattended movement of unattended equipment, this rule provided additional securement requirements for unattended equipment, primary trains transporting poisonous by inhalation hazardous materials or large volumes of Class 2.1 (flammable gases), Class 3 (flammable or combustible liquids, including crude oil and ethanol), and Class 1.1 or 1.2 (explosive) hazardous material. This final rule finalizes requirements set forth in FRA Emergency Order 28, Establishing Additional Requirements for Attendance and Securement of Certain Freight Trains and Vehicles on Mainline Track or Mainline Siding Outside of a Yard or Terminal.[37]

4.2 Rules and Regulations for Rail Haulage of Crude Oil and Ethanol

A summary of recently adopted rules and regulations for the rail haulage of crude oil and ethanol can be found in Appendix A.

http://www.transportation.gov/sites/dot.gov/files/docs/final-rule-flammable-liquids-by-rail_0.pdf (accessed June 22, 2015).

[36] Ibid.

[37] FRA, *Final Rule: Securement of Unattended Equipment*, https://www.fra.dot.gov/eLib/Details/L16849

4.3 Railroad Tank Car Regulations

The section identifies current and impending regulations that affect tank car design, construction, resilience, use, and employment in crude oil and ethanol rail transportation. The most commonly used tank cars have an approximate capacity of 28,000 to 32,000 U.S. gallons, and are generally arranged in unit trains of 75 to 120 cars in length. Ethanol also commonly moves in smaller lots of between one and 50 cars in mixed freight trains. See Section 5 and Section 9.1.1 for more information regarding operating and tank car regulations.

4.3.1 Recent Rail System Improvements

A spike in crude oil transportation by rail has resulted in several significant incidents, as well as an increase in the reports of oil leaks and other releases from the tank cars. Incidents increased from 12 in 2008 to 186 in 2014, according to USDOT data. Note that an "incident" can include any event from a leak due to an improperly maintained or closed drain valve on a tank car, to a major derailment and subsequent fire. Significant incidents, such as fires and explosions after a derailment, have caused increased concern in crude oil transport by rail. In the past few years, there has been effort by the U.S. government and the railroad industry to improve the safety of transportation of crude oil by rail. According to the Railway Supply Institute, approximately $7 billion has been spent to put 57,000 of the upgraded, CPC-1232 compliant USDOT Class 111 tank cars in service. These upgraded tank cars included safety upgrades that were voluntarily adopted by the tank car industry in 2011.

4.4 Tank Car Standards

Recent changes in rail car standards are expected to decrease the risk of fire and explosion for upgraded tank cars. The new standard for cars carrying crude oil will start with cars constructed after October 1, 2015. All existing cars transporting crude oil with the Packing Group I designation will have to be retrofitted to meet the new standards. Under a new USDOT rule, railways have three years to retrofit or retire existing cars if they are to be used to haul crude oil.

The new USDOT 117 tank car, which replaces the CPC-1232 tank car, has a thicker steel shell (9/16" vs. 1/2" for CPC-1232) and a full-height 1/2" end shield, intended to increase strength and prevent puncture during a derailment or crash. It includes a thermal jacket to withstand heat and reduce the risk of tank failure by fire impingement, and it has an enhanced bottom outlet valve designed to withstand impact from a crash or derailment, reducing the risk of leaks and spills.

5.0 Federal Regulation Impacts

A summary of recent federal regulation impacts that are directly related to the rail haulage of crude oil and ethanol and chronology of PHMSA and FRA safe transportation of energy products regulations can be found in Appendix A.

Additionally, bills of the 114th U.S. Congress that have relevance to the safe transportation of energy products can also be found in Appendix A. It is important to note that many bills have been introduced to change crude oil regulations or requirements, but to date, very few pass with significant action.

6.0 Past State Studies of Crude Oil and Ethanol Transportation Risks, Prevention, and Response

Seven studies from six different states and two federal reports—all covering crude oil and ethanol rail transportation risks, prevention, response, and recovery—were analyzed. Information about each can be found in Appendix B.

7.0 Crude Oil and Ethanol Transportation and Trends

7.1 Economic and Geographic History and Trends for Rail Transportation of Oil and Ethanol

7.1.1 Crude Oil Rail Transportation

U.S. crude oil production numbers continue to climb with the advent of the Shale Revolution, which has been attributed to technological advances that has made it easier [and more economically feasible] to extract oil and natural gas from permeable shale rock. With the new geologic discoveries, pipelines infrastructure is not present in these locations. New pipeline construction lags behind the crude oil production, so existing railroad systems are being used to move the commodity. According to Association of American Railroads (AAR), U.S. Class I railroads originated 9,500 carloads of crude oil, in 2008.[38] In 2014, they originated 493,146 carloads, an increase of nearly 5,100 percent over a six-year period.

7.1.2 Economic Benefits from Crude by Rail Transportation

Growth in domestic crude oil production is important in the U.S. goal to become more energy independent [from traditional oil-supplying countries]. Crude oil needs to be refined in order to increase its value. It is worth noting that existing pipeline networks are not able to handle the added volume from the Shale Revolution, combined with the fact that most refineries exist in traditional crude oil areas [the South and the coasts]; the railroad network makes it possible to transport the raw material efficiently and effectively.

According to AAR, some economic benefits associated with continued growth in domestic crude oil production are:[39]

- Reductions in the U.S. trade deficit of tens of billions of dollars every year
- New and better employment and economic development opportunities for communities all over the country
- Billions of dollars in new tax revenues
- Reduced reliance on oil from sources in the world that are not secure and whose interests do not necessarily correspond well to those of the United States
- Reduced vulnerability to oil shocks that in the past have caused immense harm to the U.S. economy

By using an underlying infrastructure, transporting crude by rail enables producers to use a carrier who can move their product to any refinery terminal, while also being responsive to changing economic conditions [growth and decline of crude oil demand]. These competitive advantages [for producers and railroads] make it easy to see why crude oil rail transportation is so widespread in the U.S.

[38] Association of American Railroads, *US Rail Crude Oil Traffic*, https://www.aar.org/BackgroundPapers/US%20Rail%20Crude%20Oil%20Traffic.pdf
[39] Ibid.

7.1.3 Ethanol Rail Transportation

Since 2000, U.S. ethanol production has grown sharply from 1.6 billion gallons (2000) to 14.3 billion gallons (2014), a 780 percent increase. Ethanol production is concentrated in the Midwest and Great Plains, where a majority of the raw material, needed for production, is grown. With railroad networks all over the U.S., freight railroads play a major part in the movement of ethanol. According to AAR, all Class I railroads transport ethanol. It is estimated that 15 percent to 20 percent of ethanol movements occur via Class II and Class III railroads.[40]

Due to ethanol's corrosive and miscible properties, piping ethanol over long distances is somewhat risky. Instead, rail transportation of ethanol is safer, more flexible, and is more efficient. As a suitable transportation alternative, ethanol by rail movements account for around 70 percent of total ethanol transport.

7.1.4 Economic Benefits from Ethanol Transportation

Ethanol is being produced all across the U.S., with the highest concentrations for production centralized in the Midwest and Great Plains. Harvested plants are one of the major ingredients in ethanol; this raw material is abundant and within close proximity to grain elevators and railroad networks, which allows it to be easily transported to biorefineries for processing.

The prevalent method for producing ethanol is wet milling, where the grain [mostly corn] is soaked in water and strong acid. This method separates the grain into many useable components, such as starch, gluten, fiber, and germ. All of these components are further processed to create [corn] oil, gluten meal, starches, [corn] syrup, and through an added process of fermentation – ethanol. The sheer act of creating ethanol spins off many other industries, not to mention the waste product from ethanol production is often used as cattle feed.

Ethanol has changed the energy landscape, and is used in over 97 percent of U.S. gasoline and makes up over 10 percent of the gasoline supply.[41] This commodity is helping to drive energy independence from oil producing countries, as well as supporting American jobs. Per AAR, ethanol accounted for 1.0 percent of total rail carloads and 1.5 percent of rail tonnage, in 2012 - the highest volume chemical commodity.

7.2 Current Locations of Ethanol and Crude Oil Producing Points and Destination Points

The majority of crude oil being produced is coming from formations in Canada, the Upper Plains, the Rocky Mountains, and Southwest. Generally, crude-by-rail is moving toward oil refineries near the Gulf, Atlantic, and Pacific Coasts. See Figure 3, Crude-by-Rail Movements for general crude oil trends.

This section summarizes the key issues affecting the rail transportation of crude oil and ethanol in Iowa. Included are the location of Iowa's biorefineries and rail networks carrying crude oil and ethanol, federal rules and regulations for rail equipment used to transport hazardous

[40] Association of American Railroads, *Railroads and Ethanol*,https://www.aar.org/_layouts/15/download.aspx?SourceUrl=/BackgroundPapers/Railroads%20and%20Ethanol.pdf

[41] Renewable Fuels Association, *Why is Ethanol Important*, http://www.ethanolrfa.org/consumers/why-is-ethanol-important/

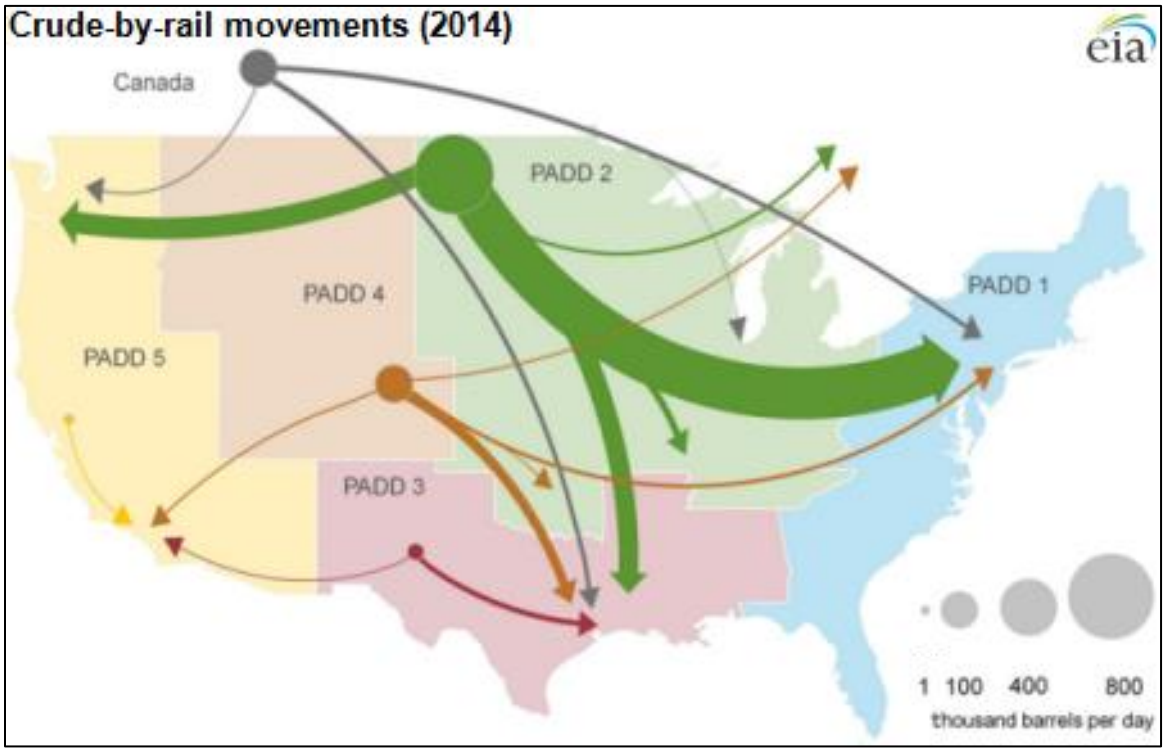
materials and for rail haulage of crude oil and ethanol, and results of coordination with federal and state agencies conducted during the Study. Railroad safety technologies are briefly described as they affect the analysis in this memorandum.

7.3 Potential Current and Likely Future Crude Oil Rail Routes and Ethanol Rail Networks in Iowa

To understand how Iowa's rail network is utilized in transporting crude oil and ethanol by rail, a holistic view of the commodities must be examined. First, the majority of North American crude oil production that is moved by rail or has the potential to move by rail is occurring at formations located in Western Canada, the Upper Great Plains, the Rocky Mountains, and west Texas, with the Upper Great Plains (principally western North Dakota) recently becoming a major new source for oil production. Growth in the Upper Great Plains has exceeded pipeline capacity, requiring shipment by rail.[42] As of September 2015, 49 percent of North Dakota Oil Production was shipped by rail, a total of 17.1 million barrels or approximately 220 trainloads.[43]

These crude-by-rail movements trend towards existing oil refineries located on or near the Gulf, Atlantic, and Pacific Coasts, the location of most refining capacity in the U.S. See below for Figure 3, Crude-by-Rail Movements for general crude oil transportation trends from producing locations to refining locations.

Figure 3. Crude-by-Rail Movements



Source: U.S. Department of Energy/Energy Information Administration (2014)

[42] U.S. Energy Information Administration, *Rail Deliveries of U.S. Oil Continue to Increase in 2014*, https://www.eia.gov/todayinenergy/detail.cfm?id=17751

[43] North Dakota Pipeline Administration, *Monthly Update – September 2015 Oil Production and Transportation*, https://ndpipelines.files.wordpress.com/2012/04/ndpa-monthly-update-november-13-20151.pdf

"The Petroleum Administration for Defense Districts (PADDs) are geographic aggregations of the 50 States and the District of Columbia into five districts"; Iowa falls into PADD 2 corresponding to the Midwest.[44] The PADDs help users of EIA's petroleum data assess regional petroleum product supplies and analyze patterns of crude oil and petroleum product movements moving throughout the country.[45]

Oil refineries convert the crude oil to usable forms, such as varying types of fuels (e.g., diesel, gasoline, jet fuel, etc.) and components for other petrochemical products. Refineries then distribute the final products to different markets. It is important to note that Iowa does not have any crude oil shipping or receiving facilities for crude oil unit trains, nor any refineries, so all of the rail traffic for this commodity moves through the state.

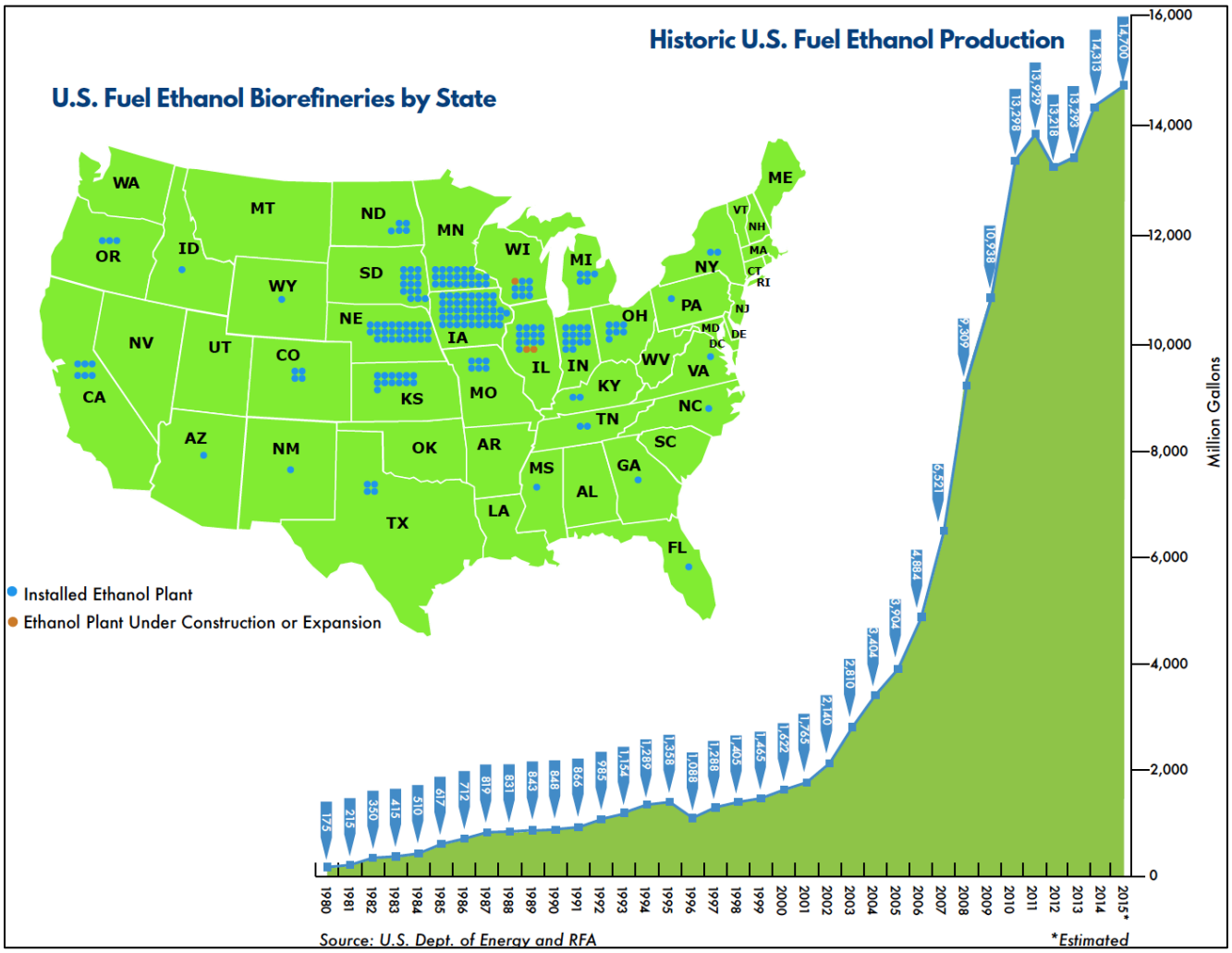
With its location centered in the middle of the U.S. "Corn Belt," the State of Iowa has more ethanol biorefineries than any other state in the country, and is the leader in ethanol production. Overall, 44 ethanol biorefineries are located within the state, leading Iowa to produce billion gallons of ethanol each year (Iowa accounts for approximately 26 percent of all annual U.S. ethanol production, in 2015).[46] See Figure 4, U.S. Ethanol Biorefineries by State and Historic U.S. Fuel Ethanol Production for ethanol production volumes and relative locations.

[44] U.S. Energy Information Administration, *PADD Regions Enable Regional Analysis of Petroleum Product Supply and Movements*, https://www.eia.gov/todayinenergy/detail.cfm?id=4890

[45] Ibid.

[46] Renewable Fuels Association, *Where Ethanol is Made*, http://www.ethanolrfa.org/consumers/where-is-ethanol-made/

Figure 4. U.S. Ethanol Biorefineries by State and Historic U.S. Fuel Ethanol Production (2015)



Source: U.S. Department of Energy/ Energy Information Administration and Renewable Fuels Association (2015)

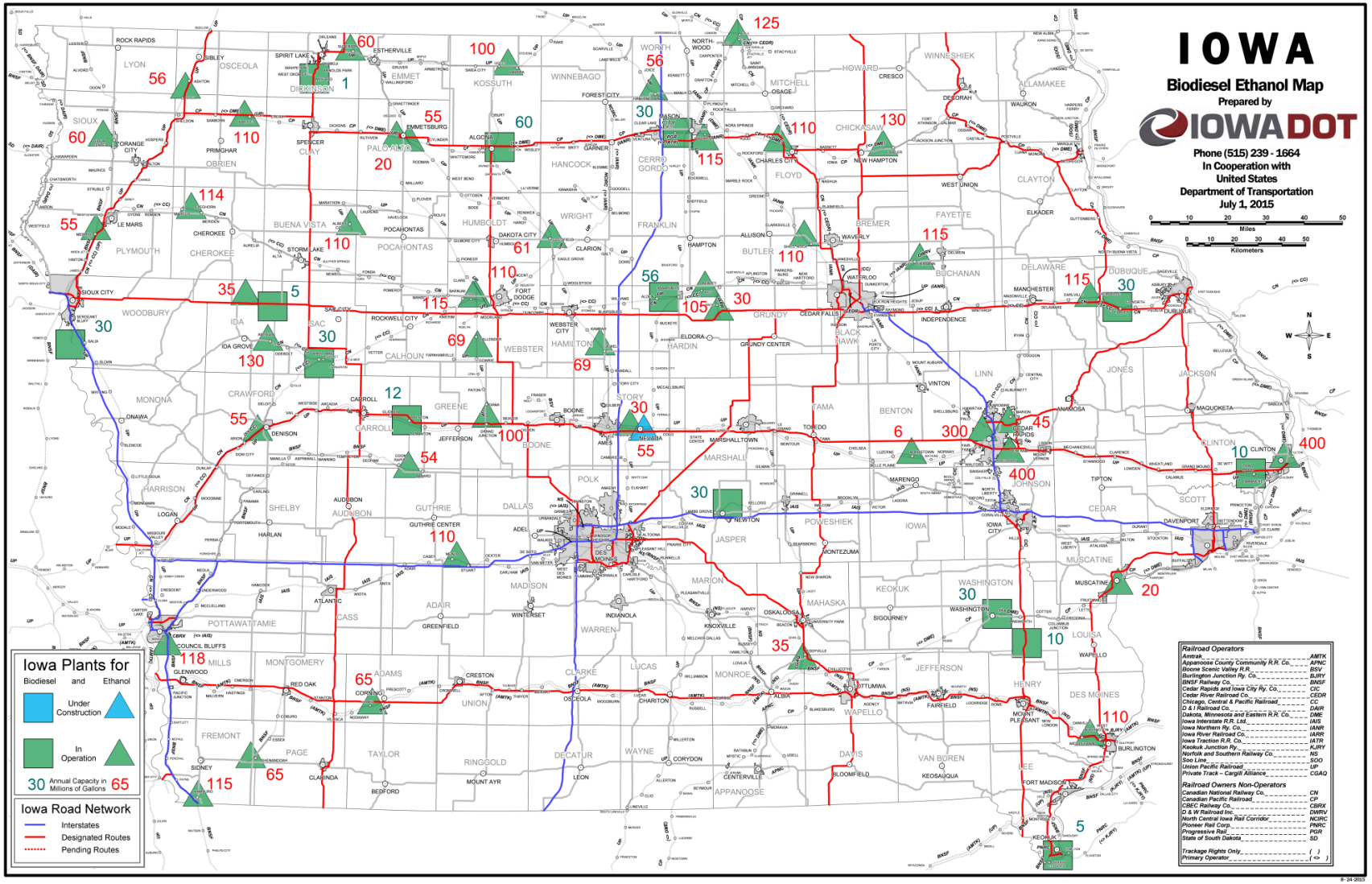
Similar to most other commodities, market forces determine ethanol consumption locations, transportation routes, and transportation volumes. Ethanol produced in Iowa that is consumed in local markets is typically trucked to blending terminals that serve consumption markets. Because surrounding states of Minnesota, South Dakota, and Illinois are also significant ethanol producers, ethanol produced in Iowa typically flows west, south, or east, as markets to the north of Iowa are supplied by ethanol producers closer to those markets. A substantial percentage of Iowa ethanol production is shipped by rail to blending terminals and oil refineries throughout the U.S. (with the exception to a large degree of ethanol producing states adjacent to Iowa). These blending terminals or refineries blend the ethanol with gasoline to meet air emissions regulations, and regional, market, and climate requirements.[47]

Since Iowa produces a surplus of ethanol, it must be exported to other states. Iowa's ethanol refinery locations are shown in Figure 5, Iowa Biodiesel Ethanol Map. Iowa's railroads typically

[47] Cummings, A. Trains. "*Ethanol: rail boom or bust.*" August 2007. Pages 30-37.

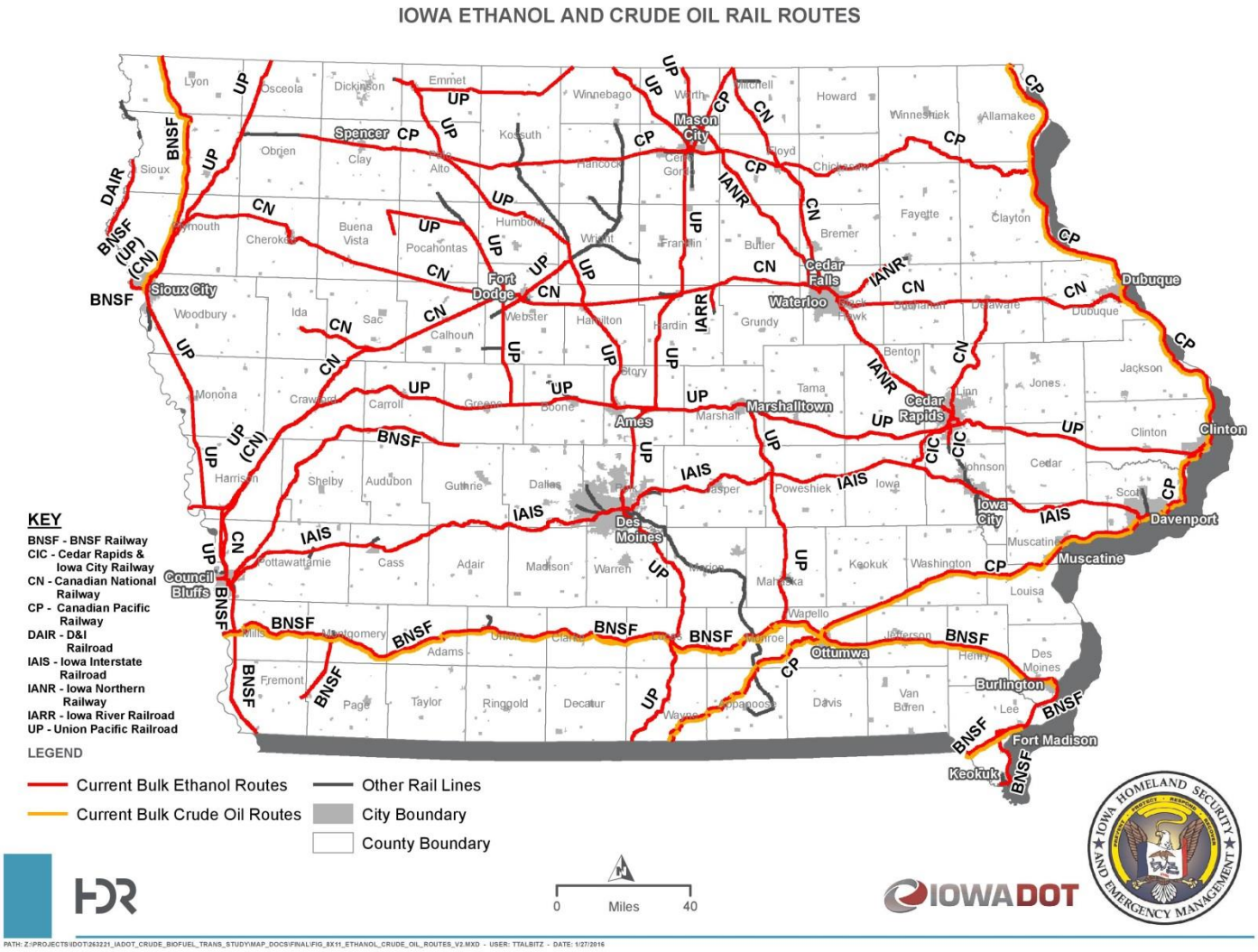
directly serve these refineries; however, some refineries use truck to haul ethanol short distances to loading terminals on railroads, in particular to gain access to more than one railroad in order to obtain competition for transportation. The Study Team overlaid the locations of Iowa's ethanol refineries on Iowa's rail routes to develop a map showing the current and likely potential routes for ethanol by rail, as shown in Figure 6, Current Iowa Railroad Routes for Crude Oil and Ethanol. Section 9.0 of this Study details each railroad route currently used for the transportation of crude oil and ethanol.

Figure 5. Iowa Biodiesel Ethanol Map



Source: Iowa DOT (2015)

Figure 6. Current Iowa Railroad Routes for Bulk Crude Oil and Ethanol Transportation



Source: HDR, as of 1/27/2016

7.4 Long-Term Potential Energy Market Trends Impacting Rail Transportation of Crude Oil and Ethanol in Iowa

7.4.1 Crude Oil Trends

According to the U.S. Department of Energy – Energy Information Administration (EIA), short-term crude oil production trends are expected to go down from current levels (9.4 million barrels per day [or b/d] in the first half of 2015) to 8.7 million b/d by August 2016.[48] From there, production begins rising in late 2016, returning to an average of 9.0 million b/d in the fourth quarter. With this being said, crude-by-rail routes will likely use the same pattern for the next several years. The outlook beyond 2016 deals with uncertain global economic conditions that could affect domestic crude oil supply and demand, as well as regulatory changes that could affect the transportation of crude by rail. Regulatory changes that could restrict rail transportation of crude oil and ethanol, either outright routing restrictions or economic impacts that render rail transportation uneconomic, rail could shift the current crude oil carried by rail to pipeline or strand inland oil supplies from reaching coastal refineries.[49] Additionally, imposing a "uniform national speed limit" for crude oil unit trains could degrade the nation's railroad network fluidity and efficiency, and it could result in network congestion.

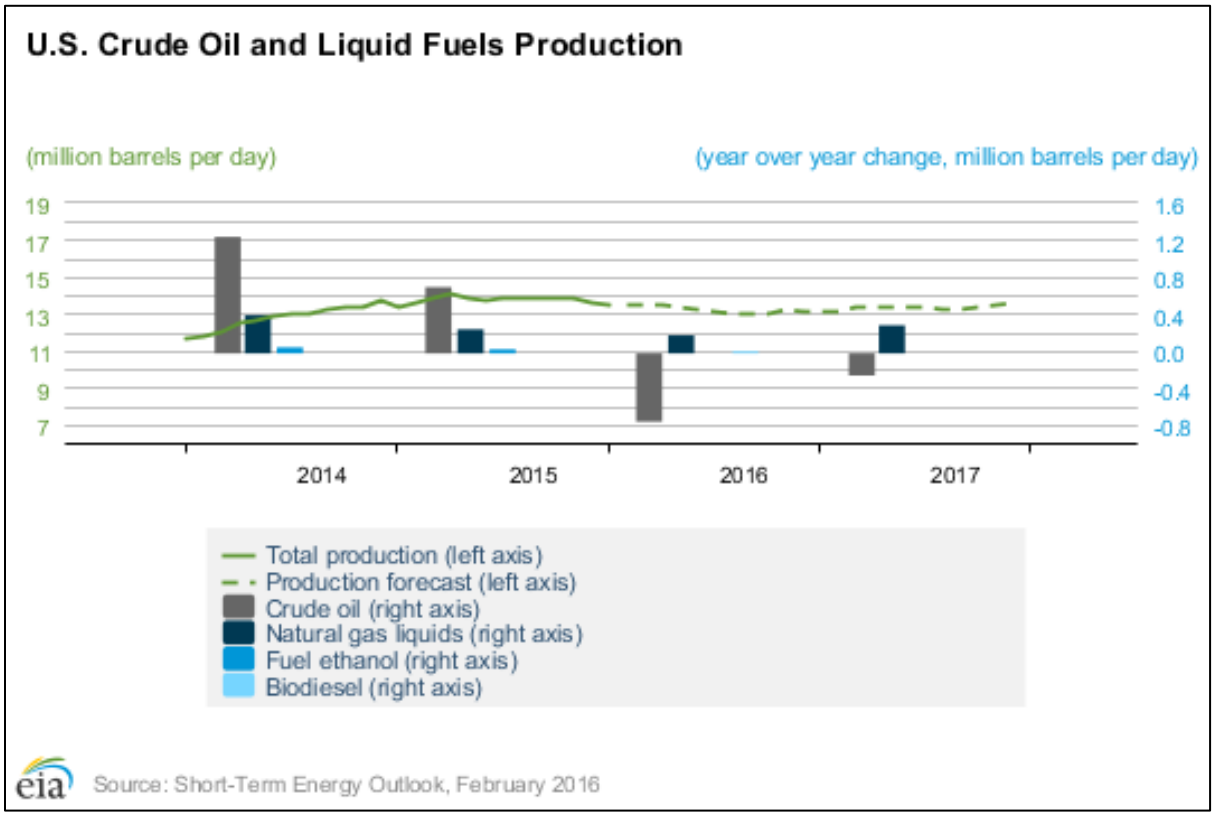
In the short term, rail transportation of crude oil in the U.S. can be expected to slowly decline from its current levels. In the long term in the U.S., it is unlikely that pipeline construction will completely render rail transportation uneconomic, as pipelines are fixed, costly investments that require lengthy contractual volume commitments to fund construction, whereas rail transportation can react immediately to market conditions and absorb production fluctuation from producing regions for which pipeline capacity would be uneconomic. From an Iowa perspective, crude oil volumes by rail can be expected to decline somewhat in the short term, but not reach zero.

See Figure 7 for U.S. Crude Oil and Liquid Fuels Production Projections.

[48] U.S. Department of Energy – Energy Information Administration, *Forecasts*, http://www.eia.gov/forecasts/steo/report/us_oil.cfm

[49] Progressive Railroading, http://www.progressiverailroading.com/rail_industry_trends/article/Rail-Outlook-2015-Freight-and-passenger-railroad-leaders-discuss-the-year-ahead--42853

Figure 7. U.S. Crude Oil and Liquid Fuels Production



Source: U.S. Energy Information Administration (February 2016)

7.4.2 Ethanol Trends

The Study's producer/shipper interviews indicated that Iowa's current distribution pattern for ethanol is unlikely to change. The interviewed producer/shippers stated they anticipated an increase in ethanol demand in coastal and high-population areas, requiring that more unit train shipments of ethanol will be moving toward these areas. (Unlike crude oil, ethanol is not economically feasible for pipeline transportation for long distances.) One producer/shipper noted that the volume of ethanol moving in mixed train (also known as manifest train) shipments to the West Coast is expected to increase. Total future ethanol-volume trends are expected to have small growth, absent regulatory requirements to increase use of renewable fuels or reduce air emissions further. However, the potential regulatory and policy changes, mentioned in the crude oil section above, could have similar impacts to ethanol-by-rail transportation.

In the short term, rail transportation of ethanol in the U.S. can be expected to increase slowly from its current levels. In the long term in the U.S., there is potential for a substantial increase in ethanol train volumes. From an Iowa perspective, ethanol volumes by rail can be expected to gradually increase in the short term, with potential for significant long-term increase should federal air emissions or renewable fuel policy require a higher ethanol blend into gasoline.

8.0 Interviews

8.1 Summary of Railroad Interviews

As part of this Study, interviews were held with eight railroads that operate in Iowa. Participants included four Class I railroads, which operate the majority of the rail mileage in Iowa; one Class II (or regional) railroad that handles significant volumes of ethanol; and two Class III (or short line) railroads that operate branch lines in Iowa and serve customers that load ethanol transported in railroad tank cars. Interviews were limited to railroads that transport crude oil and ethanol in unit-train volumes only. In total, the networks of the railroads interviewed taken in the aggregate account for approximately 95 percent of railroad route miles in Iowa.

8.1.1 Preventative Measures

As discussed in Sections 4.0, 5.0 and Appendix A, railroad transportation of crude oil and ethanol is subject to numerous government regulations, standards, and operating protocols. Information learned in the interviews indicates that each railroad has developed derailment prevention and response programs that go beyond Federal Railroad Administration regulations [as set forth in the Code of Federal Regulations (CFR)]. However, each one of the individual railroad programs is unique.

The large Class I railroads perform regular assessments of their networks that include identification of routes carrying crude oil, ethanol, and other hazardous materials. These assessments have been the catalyst for investments in asset protection devices such as a Hot Box Detector (HBD) and a Wheel Impact Load Detector (WILD) on routes with significant volumes of hazardous materials traffic. Aiding in derailment prevention, these devices monitor train movements and help to detect mechanical defects on locomotives and railcars prior to an incident occurring. Railroad personnel are notified when a potential defect is detected, providing the train crew time to remediate possible defects.

The four Class II and Class III railroads interviewed indicated they had made investments in their track infrastructure to support the safe operation of ethanol transportation. Those investments included replacing jointed rail with continuous welded rail or heavier jointed rail, replacing worn crossties, installing radio-controlled turnouts that can be operated by train crews, replacing bridges to handle the heaviest industry-standard loaded car weights, and eliminating speed restrictions. One Class I railroad and one Class III railroad indicated that they each operate unit trains of hazardous materials at speeds below the federally required limit and below what the track condition would safely be able to accommodate.

Federal regulations govern railroad operating, maintenance, and rolling stock practices. In addition, railroads design and execute internal prevention, preparedness, and response programs. The interviews queried each railroad about its practices for the safe transportation of crude oil and ethanol, as applicable. All railroads stated they have practices that go above and beyond federal regulations. Two railroads provided detailed descriptions of their derailment prevention programs.

8.1.2 Coordination with State and Local Agencies

The railroads interviewed are in communication with state, county, and local fire departments, emergency response agencies, and other entities. Seven railroads interviewed have held on-site training activities and safety presentations for local fire departments, first responders, and other local emergency management groups located along its networks. Four railroads arranged mock training exercises to familiarize local agencies in procedures and equipment used to respond to a railroad hazardous material spill; two railroads donated the tank car used in the spill exercise to a local college to be used for hazmat training. Three railroads interviewed have also sponsored local first responders to attend Safety and Emergency Response Training Center (SERTC) programs at the Transportation Technology Center, Inc. (TTCI) in Pueblo, Colorado. All of the Class I railroads and one Class II railroad provide information to the Association of American Railroads (AAR) for its "AskRail", a mobile-phone application which uses a crossing database to provide railroad emergency contact information to first response agencies. Seven of the railroads interviewed indicated that the success of their local training efforts has been mixed; response could be stronger in big cities, with full-time fire and emergency departments, provided money is available to pay for the overtime salaries of the employees being trained. Participation in railroad-sponsored training can be low in rural locations where fire and emergency services are provided by volunteers who may not be available to take off from work to attend training sessions.

8.1.3 Emergency Response Plans

The four Class I railroads interviewed have hazmat departments with support staff containing hazardous materials managers, hazmat special agents, and trained hazmat responders who are available to respond to an incident. In addition, each Class I railroad and one Class III has emergency response contractors that can be summoned to a location where a hazardous material spill or incident has occurred. The railroads have stringent training programs for contractors and conduct audits, which the contractors must pass. All of the Class I railroads and one Class III railroad indicated that they have equipment such as fire trailers and or foam staged across their networks that can be accessed if an incident requires; one Class I and two Class III railroads said they work with local response groups that can quickly dispatch equipment to the scene of an incident. All of the railroads stated they had an informal mutual-aid agreement with one or more of their neighboring Iowa railroads. Two of the railroads have a formal mutual aid agreement that covers response equipment only. One railroad also noted that their mutual aid is open to anyone asking for assistance, such as their neighboring railroads, industrial customers, and the public. The railroads interviewed said that they prefer to handle post-hazmat incident cleanup themselves.

8.1.4 Railroad Concerns

When the railroads were asked what their concerns were about transporting hazardous materials and what a state entity might do to be proactive, the following common themes emerged:

- Funding should be made available to local fire departments and emergency responders for hazardous material training and for the purchase of hazmat response equipment such as foam and pumps

- The level of knowledge when responding to incidents varies among local responders
- Producers/Shippers are not equally responsive when it comes to inspecting or maintaining tank cars, and few inspection or operating regulations exist to ensure the safe loading and unloading of rail equipment at shipper facilities, or the safe maintenance of privately owned railroad cars
- Grade crossing safety, and the lack of rail safety awareness among motorists, is an ongoing source of concern
- Producers/Shippers should be invited to state-sponsored hazardous material symposiums
- Funding should be made available to regional railroads and short lines handling hazardous materials to purchase asset protection devices such as detectors, or safety devices such as switch point indicators on non-signaled track
- Railroads are not sanctioned fire departments, so traditional mutual aid agreements have posed challenges.

8.2 Producers/Shippers Interviews

The Study Team interviewed two producers/shippers of ethanol, focusing on each ethanol producers' involvement in ethanol tank car receiving/loading, methods, ethanol transportation trends, training/qualification of plant employees, and emergency response. See Section 2.2 for more information about the producer/shipper interview process.

Producer/shipper training was stated as being corporate-based with a combination of hazardous materials and railroad training, with the railroads providing specific training material. Additionally, USDOT hazardous materials training must be renewed every three years. Some joint training is conducted with the railroads and local fire departments. Both producers/shippers participate in TRANSCAER, and donate resources to local first responders.

Derailment prevention strategies, within the facilities, consist of track and railcars inspections and by operating trains at slow speeds. Substandard track or tank cars are either repaired or bad ordered before being utilized in loading or release. Typically, repairs that cannot be performed by staff are contracted out. Operations staff, utilizing checklists, conducts inspections of tank cars prior to loading and release to the rail carrier. Management does often audit operations staff on the quality of tank car inspections.

8.3 Agency Interviews

8.3.1 Federal Railroad Administration

FRA (Washington, D.C.)

As part of the Study, the Study team sought input from the FRA regarding crude oil and ethanol rail transportation in Iowa. The FRA noted that Iowa was the first state to reach out to it during the development of a study that analyzed the rail transportation of these two commodities. Throughout the interview, the FRA cited its various programs to assist railroads in assessing

their infrastructure and to identify potential risks and vulnerabilities. Additionally, the FRA also spoke about its involvement in security and routing audits and continued involvement in reviewing railroads' oil-spill response plans.

The FRA stated it has recently been focusing more on producers/shippers and auditing their procedures at loading racks at shipping and production facilities. FRA stated that its regulations for loading, unloading, and securing tank cars have at times been confusing to producers/shippers. At times, this confusion may make it difficult for producers/shippers to comply with regulations and for the FRA to enforce its regulations. Due to this awareness, the FRA is seeking to develop additional regulations within these areas, while tightening up existing regulations during 2016-2017.

When asked about specific areas the FRA felt Iowa should investigate, the FRA asked if the Study would identify the types and spacing requirements of rail equipment asset-protection devices (defect detectors) on the Iowa railroad network. In addition, the FRA felt it would be beneficial to define fouled ballast, as this kind of track defect has the potential to harm track surface over time and potentially increase the risk of derailments. (During the interviews with Iowa's railroads, no trends for defect detector types and their spacing, nor fouled ballast thresholds were identified.) Standards or recommended practices for detector spacing by type or risk, and for elimination or management of fouled ballast, could be developed through Iowa's Rail Advisory Committee (RAC), or through consultation with the FRA's Rail Safety Advisory Committee (RSAC). The Association of American Railroads (AAR), as an industry-level entity, could also assist in establishing guidelines, standards, or recommended practices, as well.

Additionally, the FRA stated its interest in improved mapping and logging of emergency response resources, while also determining the level and frequency of information that first responders need from railroads to be more effective in terms of emergency response. The FRA stated that it would assist Iowa in analyses of derailment data and their causes, and comparing Iowa data to national averages to learn about contributing factors to those rates in Iowa.

FRA Region 6 – Kansas City, Missouri

The territory of FRA Region 6, based out of Kansas City, Missouri, is Iowa, Colorado, Kansas, Missouri, Nebraska, southeast Wyoming, and southern Illinois. Its areas of interest include grade crossing and trespasser safety and accident prevention, rail equipment and facility inspections, and inspections in the areas of hazardous materials transportation, track, mechanical systems, and operating practices. Since this entity has jurisdiction in Iowa, the Study Team arranged a meeting with FRA Region 6 to seek its input for the Study.

As the local governing body for freight and passenger rail, representatives of FRA Region 6 noted that it places special emphasis on crude-by-rail routes for track inspections. An on-going evaluation continually prioritizes these routes; inspections typically occur more frequently on line segments on which defects were noted in past inspections. Strengthening the safe transportation of crude oil and ethanol by rail in Iowa, Region 6 stated that it conducts National Safety Plan audits on all Class Is handling hazardous materials to check compliance with initial inspection requirements, compliant transportation paperwork, and so on. The National Inspection Plan gives Region 6 the ability to identify risk factors and allocate time to railroads based on risk. Region 6 stated it does not have the resources to make inspections or visits to every short line in Iowa annually. Due to the large territory over which it has jurisdiction, it relies heavily on

Iowa's two state rail track inspectors for inspection and response support. Iowa DOT's track inspection program is described later in this report.

The FRA stated it supports eliminating or mitigating risks; additional safety inspectors are needed to cover hazmat facilities, estimating that it inspects up to 20 percent of the ethanol and small co-op facilities in Iowa annually. FRA said it is also engaged in safety audits, investigating complaints from the public, and assuring rules compliance. It also noted that there is a need to address inspection of the short line railroads on a more regular basis. In 2016, FRA said it would continue its focus on tank car shops and producer/shipper loading practices and facilities.

8.3.2 PHMSA

The Study Team sought input from PHMSA, to gain insight into crude oil and ethanol by rail operations, in Iowa, and areas that may potentially require additional consideration in the Study. PHMSA noted that Iowa was the first state to reach out to PHMSA regarding any kind of state-funded study about crude oil and ethanol transportation by rail. PHMSA mentioned that it has influence on assignment of training grants to U.S. states for use in training and commodity flow studies. Grant amounts are based on relative population, and Iowa funnels its share through the State of Iowa's Homeland Security Emergency Management Department (HSEMD), who then disburses funding down to the county level.

PHMSA recommended that Iowa continue to utilize grant money to train its first responders. Ultimately, one of the goals of this study is to identify higher-risk areas and ensure those areas are receiving the right tools, with respect to emergency preparedness and response. PHMSA also mentioned that they would be releasing a new edition of the "Emergency Response Guidebook (ERG)," in 2016. The ERG helps first responders and emergency management personnel to appropriately assessing the hazards they are presented during response.

8.3.3 Iowa DOT Track Inspectors

The State of Iowa currently has two rail track inspectors, sponsored by Iowa DOT. These track inspectors perform inspections independently of FRA Region 6 track inspectors and all private railroads. In addition, this group communicates with FRA Region 6 on joint-interests and other priorities, on an as-needed basis. The Iowa DOT track inspectors are also required to complete inspections on all rail projects funded by Iowa's Railroad Revolving Loan and Grant (RRLG) program. The DOT track inspectors also examine complaint calls regarding current railroad issues within the state.

At the core of the track inspectors' duties is the annual inspection of all main tracks in Iowa's general rail system. The track inspectors prioritize inspections based on history of derailments and other incidents, past history of defects, existing tonnage, passenger route status, and hazmat route status. A goal for the inspectors is to inspect crude-by-rail routes bi-annually. An increase to crude oil and ethanol traffic has changed Iowa DOT's past rail inspection activities. Currently, rail inspection activities are prioritized through an organizational risk-framework, focusing on higher-risk areas.

The Iowa DOT track inspectors noted that Iowa railroads are investing in capital programs, especially in areas that are seeing increases in crude oil traffic. The track inspectors noted Iowa railroads' effort regarding capital program work, and reinforced the continued need for derailment prevention programs and track maintenance.

8.4 Other Interviews

The emergency management agencies and first responder interviews are further discussed within Section 11.0 of the Study.

9.0 Current Rail Practices in Iowa for Crude by Rail and Ethanol Transportation by Rail

This section describes in general the practice of transporting bulk crude oil by rail and the characteristics of the rail routes over which bulk ethanol is currently or potentially transported in Iowa. Information presented in this section was provided by the state's railroads during interviews conducted for this Study or compiled from public sources such as the Iowa State Rail Plan.

9.1 Crude by Rail Transportation in Iowa

This section describes in general the practice of transporting bulk crude by rail and the characteristics of the rail networks over which crude oil is currently transported in unit-train quantities in Iowa. Information presented in this section was provided by the state's railroads during interviews conducted for this Study or compiled from public sources such as the Iowa State Rail Plan.

9.1.1 Equipment and Transportation

Crude by rail transportation requires the use of a railroad tank car. Rail equipment used for the transportation of crude oil is typically owned by the producer/shipper or by a railcar leasing company, and not the railroad that is providing the transportation service. The typical characteristics of railcars used for crude oil transportation and applicable tank car construction and maintenance and railroad operations regulations are also described within Section 4.0, Section 5.0, and Appendix A.

Crude by rail can be transported as loaded single cars, blocks of cars, or as a unit train. Railroads will often collect single cars or blocks of cars from the facility of one or more crude oil producers and stage them in a railroad yard for assembly into a unit train. General operating practice is for railroads to transport crude oil separately in bulk shipments via unit trains. At present, crude oil unit trains are not assembled or switched in Iowa, and no crude oil is destined for receivers in Iowa. Crude oil is transported through Iowa only. Additional information about the rail haulage of crude oil by rail can be found within Section 3.0 and Appendix A.

In order to detect potential safety and operational hazards of transporting crude oil by rail, the mechanical components of railroad tank cars used for shipping crude oil are inspected at several intervals during the typical transportation cycle, as generally described below:

- Empty tank cars are inspected by the producer/shipper after delivery to a production facility by the railroad and before cars are loaded with crude oil. Potential mechanical issues or loading/unloading device defects are noted, and repaired as required.
- The producer/shipper formally releases loaded tank cars for movement by the railroad, and railroad train crews inspect the tank cars before pulling them from a producer/shipper's facility. Any potential mechanical defects or other issues, including leaky valves, cracked wheel, safety appliance defects, or improperly or insufficiently displayed hazardous materials placards, are immediately reported to the producer/shipper for response, repair, or reconciliation, as appropriate.

- Railroad mechanical forces inspect loaded tank cars received in interchange and accepted from other railroads. In some instances, a tank car may be inspected later and at a point other than where it was received in interchange from another railroad. Any potential mechanical defects are reported to the delivering and receiving railroads- the producer/shipper, and the owner of the tank car. One of these parties will be responsible for payment for repairing the car, depending upon the nature of the defect, agreements between the parties, and other considerations. However, repairs, if they are safety-related, are made before the tank car departs the yard where the defect was discovered.
- Depending upon the length of the rail route between the producer/shipper (origin) and the receiver (destination) and the number of railroads involved in providing the transportation, tank cars are required to be additionally inspected at routine intervals en route. Inspections may occur where train crews change, when a certain mileage between inspections has occurred, or in cases when locomotives and/or other railcars are added to or switched out of the train carrying the crude oil. These inspections may occur on the Iowa railroad network.
- The receiver inspects the loaded tank cars upon delivery from the railroad.
- The receiver empties the tank cars and releases them to the railroad for pick up.
- Railroad train crews or mechanical forces inspect empty tank cars before a train pulls them from a receiver's facility.
- Empty tank cars are assembled and reverse routed to a crude oil producer (shipper) for reloading.

9.2 Crude by Rail Routes in Iowa

The Iowa rail network supports transportation of crude oil by rail that is produced in North Dakota and other states and is transported through Iowa. At present, two of the six Class I railroads that serve Iowa transport crude oil, BNSF and CP. [50] The characteristics of each are described below.

9.2.1 Class I Railroads

BNSF Railway (BNSF)

BNSF Railway (BNSF) is a Fort Worth, Texas-based Class I railroad with a network of approximately 32,500 miles in the U.S. and Canada, of which approximately 700 miles are in Iowa. BNSF serves the U.S. Midwest, West, and South; Gulf Coast and West Coast ports; and Canada.

The BNSF network hosts crude by rail shipments from several fields. While the principal field shipping oil on BNSF is the Bakken of North Dakota, other fields that have loaded trains on BNSF that may travel through Iowa include the Niobrara (northeast Colorado), Uinta (northeast Utah), and Canadian oil sands. Trains may be originated by BNSF or interchanged to BNSF

[50] The six Class I railroads serving Iowa are BNSF Railway, Canadian National Railway, Canadian Pacific Railway, Kansas City Southern Railway (haulage rights only), Norfolk Southern Railway, and Union Pacific Railroad.

from other carriers, and in order to reach markets and receivers in the southern and eastern U.S. located both on and off the BNSF network, may travel through Iowa. For receivers located off its network, BNSF interchanges crude by rail trains at various gateways such as Chicago, St. Louis, and Kansas City.

At present, much of the crude by rail on the BNSF network that passes through Iowa originates in the Bakken Field of North Dakota, and flows generally on the following two north-south routes:

- South from Fargo, North Dakota, to Willmar, Minnesota; Sioux City, Iowa; Ashland and Lincoln, Nebraska; Kansas City, Missouri; and points in the southern U.S. This route travels through northwestern Iowa between Lester and Sioux City, Iowa.
- South from Fargo, North Dakota, to Minneapolis, Minnesota; La Crosse, Wisconsin; Savanna and Galesburg, Illinois; and points south including St. Louis, Missouri, and the southern U.S. and points east including Chicago, Illinois. This route is not located in Iowa, but it is immediately opposite and generally within 1-3 miles of Iowa's eastern border with Wisconsin or Illinois, between New Albin and Sabula, Iowa.

BNSF also carries crude by rail over two east-west routes that are used to provide additional capacity and connectivity between the two north-south routes identified above. These east-west routes are described below:

- East from Ashland, Nebraska, to Creston, Ottumwa, and Burlington, Iowa; Galesburg, Illinois; and points south including St. Louis, Missouri and the southern U.S. and points east including Chicago, Illinois. This route travels through southern Iowa between Pacific Junction and Burlington, Iowa.
- West from Galesburg, Illinois, to Fort Madison, Iowa; Kansas City, Missouri; and points in the southern U.S. This route travels through southeastern Iowa between Fort Madison and Argyle, Iowa.

The characteristics of BNSF's potential crude by rail routes in Iowa are identified later in this section.

The general operating practice is for BNSF to transport bulk crude by rail in unit trains, but it can also be transported as blocks of cars in manifest trains. Crude by rail unit trains in the U.S. are typically at least 75 cars in length and up to 120 cars in length. The frequency of crude by rail shipments on BNSF through Iowa ranges from 0 to 2 trains daily on each route.

Canadian Pacific Railway (CP)

Canadian Pacific Railway (CP) is a Calgary, Alberta (Canada) based Class I railroad with a network of approximately 13,700 miles in the U.S. and Canada, of which approximately 650 miles are in Iowa. CP serves the U.S. Midwest and East Coast, West Coast and East Coast ports, and Canada. CP operates in Iowa through its subsidiary Dakota, Minnesota & Eastern Railroad.

The CP network hosts bulk crude by rail shipments, with originating points from the oil fields of North Dakota and Alberta and Saskatchewan in Canada, and traveling to markets in the southern and eastern U.S. CP projected that in 2015 it transported approximately 12,000 crude oil

carloads, some of which traveled over the Iowa rail network. No crude oil shipments originate or terminate on CP in Iowa, but shipments from Canadian oil fields to markets in Texas presently travel through Iowa. CP has one north/south crude by rail route in Iowa, as described below:

- South from Canada to Minot, North Dakota; Minneapolis, St. Paul, and Winona, Minnesota; New Albin, Lansing, Marquette, Dubuque, Clinton, Davenport, Muscatine, Washington, Ottumwa, and Moravia, Iowa; and Kansas City, Missouri, for forwarding to destinations in the southern U.S. (including Texas) not located on the CP network.

The characteristics of CP's crude by rail route in Iowa are identified and described later in this section.

The general operating practice is for CP to transport bulk crude by rail in unit trains. In 2015, approximately 95 percent of bulk crude oil on CP was moved in this manner. Some crude oil is transported as blocks of cars in CP manifest trains, depending upon customer and service requirements. In 2015, approximately 5 percent of bulk crude oil on CP was moved in this manner. CP crude by rail unit trains in the U.S. are typically at least 75 cars in length and up to 120 cars in length, and many unit trains traveling through Iowa presently average 115 cars. Loaded unit trains from oil fields in Canada operate south from Minneapolis to Kansas City via Iowa and empty unit trains returning to the Canadian oil fields to be reloaded travel north from Kansas City to Minneapolis via Iowa. Frequency of crude by rail shipments on CP in Iowa ranges from 0 to 2 trains daily.

9.2.2 Other Railroads

Other railroads in Iowa may potentially handle empty railcars used in crude oil transportation that are returning to an oil field for reloading, traveling to or from storage, traveling to or from a car repair facility, or repositioning between oil fields. Empty tank cars may contain a small amount of residue or crude oil.

9.2.3 Detailed Characteristics of Rail Routes Currently Carrying Bulk Crude in Iowa

This section describes the physical and operating characteristics of each current railroad route and railroad operating subdivision over which crude oil is transported in Iowa. The following physical characteristics are accounted for in the inventory, as described below:

- Railroad and Operating Subdivision within Iowa – identifies the owner and operator of the railroad and limits of each operating subdivision in Iowa carrying crude by rail. Segments on which the identified railroad has trackage rights over a segment owned by another railroad are described.
- Segment in Iowa and Approximate Mileage – identifies the segment of the operating subdivision that is within Iowa and the approximate length of the segment in miles.
- Track Configuration – identifies the number of main tracks and the presence of sidings used for meet-pass events between trains.

- Method of Operation – identifies generally the railroad operating system or practice employed on each segment, to the extent known, including the presence of:

  - Centralized Traffic Control (CTC) – A train control system whereby a train dispatcher provides operational authority to trains remotely via a wayside signal system and radio communication.
  - Automatic Block Signals (ABS) – A wayside signal system that indicates block occupancy and minimizes the likelihood of collisions between trains. ABS is not controlled by a train dispatcher, but a train's entry to into a segment of ABS may be controlled by a train dispatcher. Typically requires that operational authority be provided as an overlay through a track warrant or track authority issued by a train dispatcher via radio communication.
  - Track Warrant Control (TWC) or Track Authority (TA) – System of operational authority issued to trains remotely by a train dispatcher via radio communication.
  - Restricted Limits (RL) or Restricted Speed (RS) and Yard Limits (YL) – Slow speed operations (not greater than 20 mph) within and at the approach to railroad yards and on industrial leads and other trackage that does not require operational authority from a train dispatcher. Trains operating within these limits typically coordinate operations with the train dispatcher and other trains operating within the limits via radio communication.

- FRA Track Class – identifies the applicable Federal Railroad Administration (FRA) Class of Track designation on the main track(s) for each line segment. Note that a railroad may maintain a line segment one level higher than the assigned FRA Track Class and what is shown in this inventory.
- Maximum Authorized Speed for Freight Trains – identifies the maximum speed freight trains can travel over each segment; note that speeds may be further restricted owing to track geometry, bridge restrictions, limited sight distances, challenges of rail operations in urban and rail terminal areas, and other safety and operating considerations.
- Maximum Authorized Speed for Passenger Trains – identifies the maximum speed passenger trains can travel over each segment; note that speeds may be further restricted owing to track geometry, limited sight distances, challenges of rail operations in urban and rail terminal areas, and other safety and operating considerations. Speeds are identified only for railroad subdivisions presently hosting Amtrak intercity and long-distance passenger trains in Iowa.
- Maximum Allowable Gross Weight per Car – identifies the heaviest railcar gross weight that can be accommodated over the main tracks of the segment.
- Existing Wayside Asset Protection Devices and Spacing – identifies the locations of existing wayside asset protection devices, which is infrastructure that identifies mechanical defects and failures and shifted loads on railcars, and other potentially hazardous conditions that could affect the safety of railroad operations. These include Hot Box Detectors (HBD), Dragging Equipment Detectors (DED),

High/Wide/ Shifted Load Detectors (SLD), Hot Wheel Detectors (HWD), Wheel Impact Load Detectors (WILD), and other devices.

- Proposed Wayside Asset Protection Devices – identifies proposed wayside asset protection devices, as described by Iowa's freight railroads during railroad coordination conducted during the Study.
- Likely Average Number of Crude Oil Trains Daily by Segment – identifies the likely average number of trains daily by segment over each railroad operating subdivision potentially carrying crude oil in Iowa. The average number of crude oil trains and crude oil volumes transported by segment may change, based upon market changes, available railroad capacity, and other considerations. In general, the aggregate frequency of crude oil unit trains per day, combined all railroads, at any location in Iowa, typically does not exceed three (3).

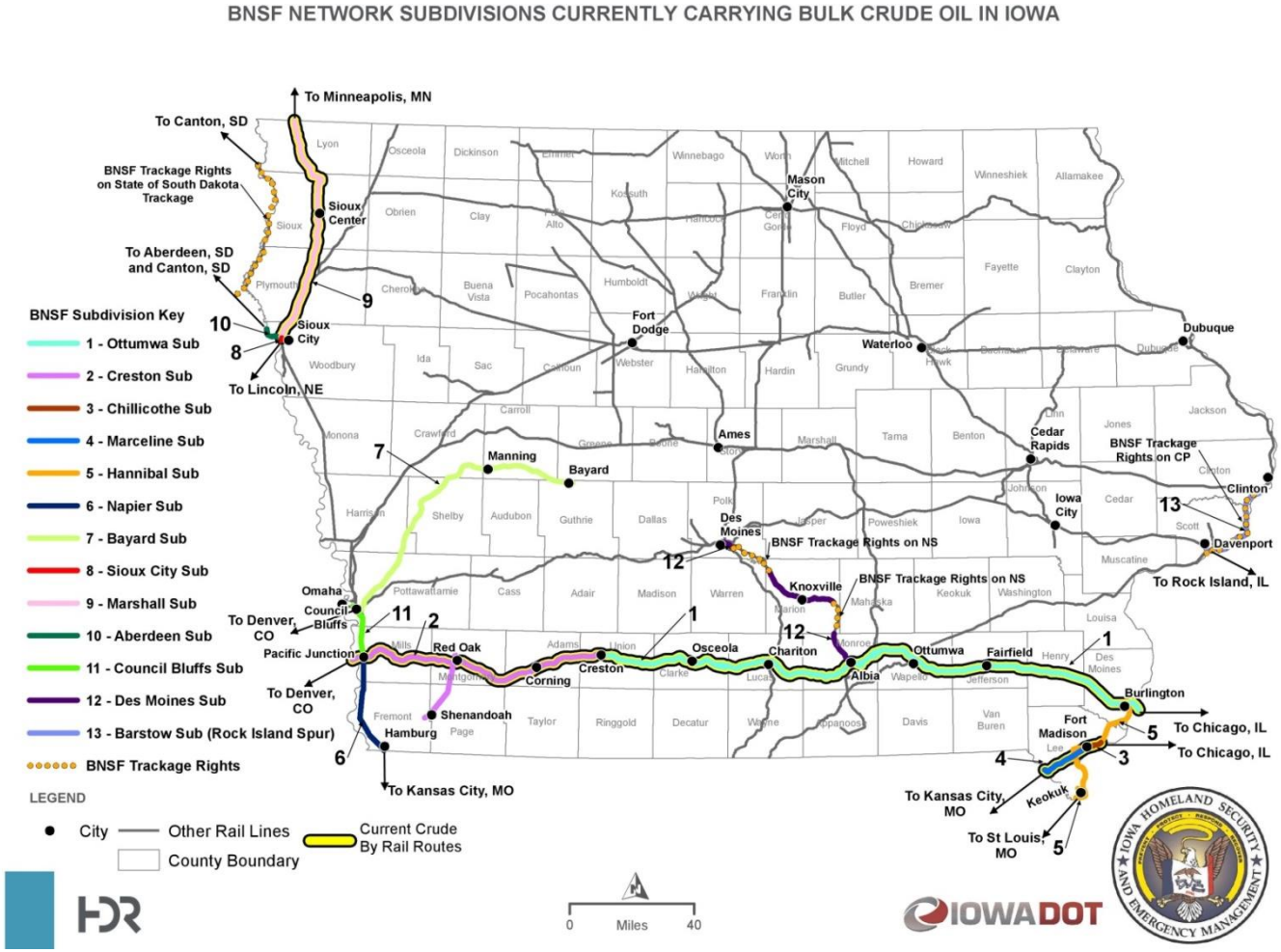
The Study recognizes that there are many active and passive warning devices at road/rail at-grade crossings on segments of the Iowa rail network over which crude oil is potentially transported. Specific inventories for the number and types of grade crossing warning devices by rail segment are not included in this Study due to the level of detail and field investigation that would be required. Section 9.5.3 includes summary information about the total number of and types of all grade crossings on the Iowa rail network. Note that a relatively small percentage of the Iowa rail network currently hosts movements of crude oil unit trains.

During interviews conducted for this Study, the state's railroads identified some routes and operating subdivisions hosting bulk crude oil transportation by rail in Iowa. These subdivisions and others that are likely to host crude by rail transportation are included in the descriptions below.

BNSF Railway (BNSF)

The characteristics of BNSF railroad operating subdivisions currently carrying unit trains of crude oil in Iowa, to the extent known, are identified in Appendix C. Railroad operating subdivisions of BNSF currently carrying bulk crude oil in Iowa are identified in Figure 8 below.

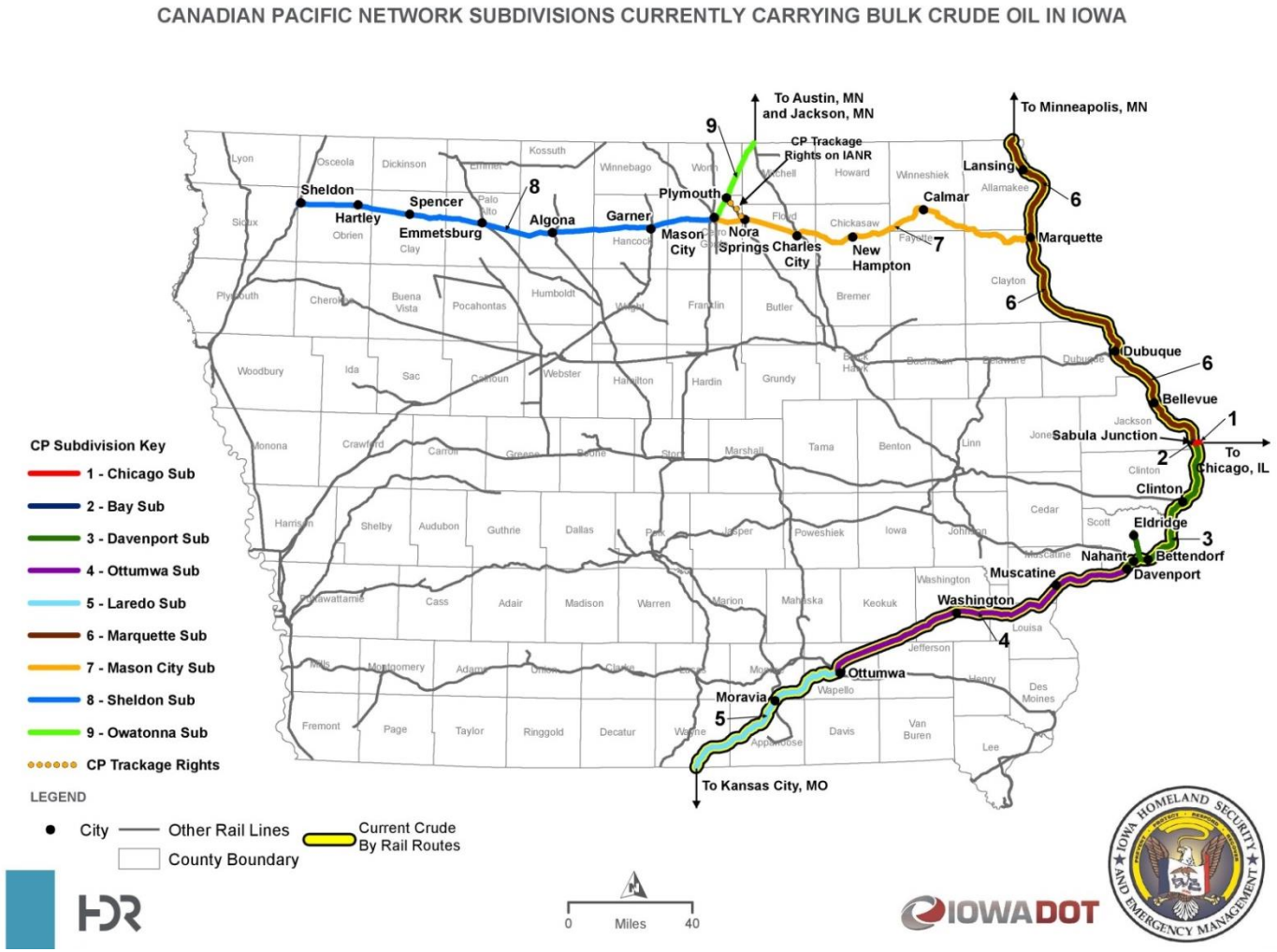
Figure 8. BNSF Network Subdivisions Currently Carrying Bulk Crude Oil in Iowa



Canadian Pacific Railway (CP)

The characteristics of CP railroad operating subdivisions currently carrying crude unit trains of crude oil in Iowa, to the extent known, are identified in Appendix C. Railroad operating subdivisions of CP currently carrying bulk crude oil in Iowa are identified in Figure 9 below.

Figure 9. CP Network Subdivisions Currently Carrying Bulk Crude Oil in Iowa



9.3 Ethanol by Rail Transportation in Iowa

This section describes in general the practice of transporting ethanol by rail and the characteristics of the rail networks over which ethanol is currently or potentially transported in Iowa. Information presented in this section was provided by the state's railroads during interviews conducted for this Study or compiled from public sources such as the Iowa State Rail Plan.

9.3.1 Equipment and Transportation

Ethanol transportation by rail requires the use of a railroad tank car. Rail equipment used for the transportation of crude oil typically owned by the producer/shipper or by a railcar leasing company, and not the railroad that is providing the transportation service. The typical characteristics of railcars used for ethanol transportation and applicable tank car construction and maintenance and railroad operations regulations are described later in this report.

Ethanol can be transported as loaded single cars, blocks of cars, or as a unit train. Railroads will often collect single cars or blocks of cars from the facility of one or more ethanol producers and stage them in a railroad yard for assembly into a unit train of typically 75 or more cars. Because ethanol is often shipped from refineries that do not have large-scale storage, and often is shipped to receivers that may not require large quantities, ethanol unit trains have a greater variability of length than crude oil unit trains. While crude oil unit trains are typically 110-120 cars long, ethanol unit trains often vary from as few as 60 cars to as many as 120 cars. Additional information about the rail haulage of ethanol by rail can be found later in this report.

In order to detect potential safety and operational hazards of transporting ethanol by rail, the mechanical components of railroad tank cars used for shipping ethanol are inspected at several intervals during the typical transportation cycle, as generally described below:

- Empty tank cars are inspected by the producer/shipper after delivery to a production facility by the railroad and before cars are loaded with ethanol. Potential mechanical issues or loading/unloading device defects are noted, and repaired as required.
- The producer/shipper formally releases loaded tank cars for movement by the railroad, and railroad train crews and/or mechanical forces inspect the tank cars before pulling them from a producer/shipper's facility. Any potential mechanical defects or other issues, including leaky bottom outlet valves, cracked wheel, safety appliance defects, or improperly or insufficiently displayed hazardous materials placards, are immediately reported to the producer/shipper for response, repair, or reconciliation, as appropriate.
- Railroad mechanical forces inspect loaded tank cars received in interchange and accepted from other railroads. In some instances, a tank car may be inspected later and at a point other than where it was received in interchange from another railroad. Any potential mechanical defects are reported to the delivering and receiving railroads- the producer/shipper, and the owner of the tank car. One of these parties will be responsible for payment for repairing the car, depending upon the nature of the defect, agreements between the parties, and other

considerations. However, repairs, if they are safety-related, are made before the tank car departs the yard where the defect was discovered.

- Depending upon the length of the rail route between the producer/shipper (origin) and the receiver (destination) and the number of railroads involved in providing the transportation, tank cars are required to be inspected at routine intervals en route. Inspections may occur where train crews change, when a certain mileage between inspections has occurred, or in cases when locomotives and/or other railcars are added to or switched out of the train carrying the ethanol.
- The receiver inspects the loaded ethanol tank cars upon delivery from the railroad.
- The receiver empties the tank cars and releases them to the railroad for pick up.
- Railroad train crews and/or mechanical forces inspect empty tank cars before a train pulls them from a receiver's facility.
- Empty tank cars are assembled and reverse routed to an ethanol producer (shipper) for reloading.

9.4 Ethanol Rail Networks in Iowa

The Iowa rail network supports transportation of ethanol that is produced in Iowa and ethanol that is produced in neighboring states and is transported through Iowa. The networks of nine Iowa railroads – including four Class I railroads and five Class II and Class III railroads (regional and short line railroads) – transport ethanol in Iowa and are identified in this section. The characteristics of each are described below.

9.4.1 Class I Railroads

BNSF Railway (BNSF)

BNSF Railway (BNSF) is a Fort Worth, Texas-based Class I railroad with a network of approximately 32,500 miles in the U.S. and Canada, of which approximately 700 miles are in Iowa. BNSF serves the U.S. Midwest, West, and South; Gulf Coast and West Coast ports; and Canada. Ethanol plants are located on the BNSF network in Iowa, in which BNSF also receives ethanol through interchange with other railroads in Iowa and in adjacent states and from producers in other states. Frequency of ethanol shipments on BNSF in Iowa is typically daily, and it can be transported as single cars, blocks of cars, or as a unit train.

Canadian National Railway (CN)

Canadian National Railway (CN) is a Montreal, Quebec (Canada) based Class I railroad with a network of approximately 20,600 miles in the U.S. and Canada, of which approximately 600 miles are in Iowa. CN serves the U.S. Midwest and South; Gulf, West Coast, and East Coast ports; and Canada. CN operates in Iowa through its subsidiaries Chicago Central and Pacific Railroad and Cedar River Railroad. Ethanol plants are located on the CN network in Iowa and CN can also receive ethanol through interchange with its connections in the state. Frequency of ethanol shipments on CN in Iowa is typically daily, and it can be transported as single cars, blocks of cars, or as a unit train.

Canadian Pacific Railway (CP)

Canadian Pacific Railway (CP) is a Calgary, Alberta (Canada) based Class I railroad with a network of approximately 13,700 miles in the U.S. and Canada, of which approximately 650 miles are in Iowa. CP serves the U.S. Midwest and East Coast, Canada, and West Coast and East Coast ports. CP operates in Iowa through its subsidiary Dakota, Minnesota & Eastern Railroad. Ethanol plants are located on the CP network in northern and eastern Iowa and CP can also receive ethanol through interchange with other railroads in Iowa and adjacent states and from producers in other states. Frequency of ethanol shipments on CP in Iowa is typically daily, and it can be transported as single cars, blocks of cars, or as a unit train.

Union Pacific Railroad (UP)

Union Pacific Railroad (UP) is an Omaha, Nebraska-based Class I railroad with a network of approximately 32,000 miles in the U.S., of which approximately 1,300 miles are located in Iowa. UP serves the U.S. Midwest, West, and South; Gulf and West Coast ports; and maintains direct connections within the rail network of Mexico. Ethanol plants are located on the UP network throughout Iowa and UP can also receive ethanol through interchange with other railroads in Iowa and adjacent states and from producers in other states. Frequency of ethanol shipments on UP in Iowa is typically daily, and it can be transported as single cars, blocks of cars, or as a unit train.

9.4.2 Class II and Class III Railroads

Cedar Rapids & Iowa City Railway (CIC)

The Cedar Rapids & Iowa City Railway (CIC) is a Class III railroad owned by Alliant Energy and based in Cedar Rapids, Iowa. CIC operates a network consisting of approximately 57 miles of lines in the Cedar Rapids and Iowa City area. Large volumes of ethanol originate at the ADM and Ingredion plants on the CIC at Cedar Rapids, Iowa. Iowa Northern Railway (IANR) also delivers ethanol in unit and manifest trains to CIC at Cedar Rapids, Iowa. Frequency of ethanol shipments on CIC in Iowa is typically daily, and it can be transported as single cars, blocks of cars, or as a unit train.

D&I Railroad (DAIR)

The D&I Railroad (DAIR) is a Class III railroad owned by aggregate producer L.G. Everist and is based in Sioux Falls, South Dakota. Its network includes a principal line from Dell Rapids and Sioux Falls, South Dakota, to Sioux City, Iowa. DAIR operates in Iowa entirely on trackage owned by the State of South Dakota between Canton and Elk Point, South Dakota, via Hawarden, Iowa, and over trackage rights on the BNSF Aberdeen Subdivision between Elk Point, South Dakota, and Sioux City, Iowa, for approximately 42 rail miles within Iowa. DAIR transports ethanol through Iowa from the Siouxland Energy Transload and POET Biorefining on the State of South Dakota-owned line at Hudson, South Dakota, south to Sioux City, Iowa. Frequency of ethanol shipments on DAIR is typically several times weekly. Ethanol can be transported as single cars, blocks of cars, or as a unit train.

Iowa Interstate Railroad (IAIS)

Iowa Interstate Railroad (IAIS) is a Class II railroad based in Cedar Rapids, Iowa, and operates a regional network of approximately 550 miles, reaching from Chicago and Peoria, Illinois, to Davenport, Iowa City, Des Moines, and Council Bluffs, Iowa. IAIS also operates over a line of the CIC from Yocum Connection (South Amana), Iowa, to Cedar Rapids, Iowa.

IAIS is a conduit for a large volume of ethanol rail traffic that originates in Cedar Rapids and northern Iowa, which flows to markets in the U.S. Midwest, East, and South via the rail gateways of Chicago, the Quad Cities, and Peoria, Illinois. IAIS ethanol traffic traveling through Iowa originates at the ADM and Ingredion plant in Cedar Rapids on the CIC, from unit and manifest ethanol trains from northern Iowa that are transported by the Iowa Northern Railway (IANR) to Cedar Rapids for interchange to CIC, and via an ethanol plant located on the IAIS network at Menlo, Iowa. Frequency of ethanol shipments on IAIS in Iowa is typically daily, and it can be transported as single cars, blocks of cars, or as a unit train.

Iowa Northern Railway (IANR)

Iowa Northern Railway (IANR) is a Class III railroad based in Cedar Rapids, Iowa, and operates a regional network consisting of approximately 165 miles of railroad that it owns or operates under agreement. IANR's principal route reaches from Manly to Waterloo and Cedar Rapids, Iowa. IANR has trackage rights over CP and UP in Iowa to access isolated IANR lines between Belmond and Forest City, Iowa, and between Dewar (Waterloo) and Oelwein, Iowa, respectively. As part of a trackage rights agreement with UP to access UP's North Yard in Cedar Rapids and an interchange agreement with CIC, IANR also operates over the CIC in Cedar Rapids to interchange traffic with the CIC at its 950 Yard in southwest Cedar Rapids.

IANR ethanol traffic originates at plants on its network at Shell Rock and Fairbank, Iowa. Blocks of ethanol from each plant are typically combined into a unit train at Waterloo, Iowa, which is interchanged to CIC and bridged to IAIS in Cedar Rapids. Frequency of ethanol shipments on IANR in Iowa is at least once weekly, and it can be transported as single cars, blocks of cars, or as a unit train.

Iowa River Railroad (IARR)

Iowa River Railroad (IARR) is a Class III railroad based in Steamboat Rock, Iowa, and operates a single line from an ethanol plant near Steamboat Rock, Iowa, approximately 9 miles to the interchange with CN at Ackley, Iowa. Frequency of ethanol shipments and method of shipment on IARR is not confirmed.

9.4.3 Characteristics of Rail Networks Potentially Carrying Bulk Ethanol in Iowa

Ethanol has many origins and many destinations with both short-term and long-term contracts for its movement by rail. This results in a high variability of routing as different consumers of ethanol source from many different ethanol refineries, and as large producers of ethanol with multiple refineries may choose to fulfill a contract with shipments from multiple refineries. This section describes the physical and operating characteristics of each potential railroad network or railroad operating subdivision over which bulk ethanol is transported in Iowa. The following physical characteristics are accounted for in the inventory, as described below:

- Railroad and Operating Subdivision within Iowa – identifies the owner and operator of the railroad and limits of each operating subdivision in Iowa carrying ethanol. Segments on which the identified railroad has trackage rights over a segment owned by another railroad are described.
- Segment in Iowa and Approximate Mileage – identifies the segment of the operating subdivision that is within Iowa and the approximate length of the segment in miles.
- Track Configuration – identifies the number of main tracks and the presence of sidings used for meet-pass events between trains.
- Method of Operation – identifies generally the railroad operating system or practice employed on each segment, to the extent known, including the presence of:

  - Centralized Traffic Control (CTC) – A train control system whereby a train dispatcher provides operational authority to trains remotely via a wayside signal system and radio communication.
  - Automatic Block Signals (ABS) – A wayside signal system that indicates block occupancy and minimizes the likelihood of collisions between trains. ABS is not controlled by a train dispatcher, but a train's entry to into a segment of ABS may be controlled by a train dispatcher. Typically requires that operational authority be provided as an overlay through a track warrant or track authority issued by a train dispatcher via radio communication.
  - Track Warrant Control (TWC) or Track Authority (TA) – System of operational authority issued to trains remotely by a train dispatcher via radio communication.
  - Restricted Limits (RL) or Restricted Speed (RS) and Yard Limits (YL) – Typically slow speed operations within and at the approach to railroad yards, on industrial leads, and other trackage that does not require operational authority from a train dispatcher. Trains operating within these limits typically coordinate operations with the train dispatcher and other trains operating within the limits via radio communication.

- FRA Track Class – identifies the applicable Federal Railroad Administration (FRA) Class of Track designation on the main track(s) for each line segment. Note that a railroad may maintain a line segment one level higher than the assigned FRA Track Class and what is shown in this inventory.
- Maximum Authorized Speed for Freight Trains – identifies the maximum speed freight trains can travel over each segment; note that speeds may be further restricted owing to track geometry, bridge restrictions, limited sight distances, challenges of rail operations in urban and rail terminal areas, and other safety and operating considerations.
- Maximum Authorized Speed for Passenger Trains – identifies the maximum speed passenger trains can travel over each segment; note that speeds may be further restricted owing to track geometry, limited sight distances, challenges of rail operations in urban and rail terminal areas, and other safety and operating

considerations. Speeds are identified only for railroad subdivisions presently hosting Amtrak intercity and long-distance passenger trains in Iowa.

- Maximum Allowable Gross Weight per Car – identifies the heaviest railcar gross weight that can be accommodated over the main tracks of the segment.
- Existing Wayside Asset Protection Devices and Spacing – identifies the locations of existing wayside asset protection devices, which is infrastructure that identifies mechanical defects and failures and shifted loads on railcars, and other potentially hazardous conditions that could affect the safety of railroad operations. These include Hot Box Detectors (HBD), Dragging Equipment Detectors (DED), High/Wide/ Shifted Load Detectors (SLD), Hot Wheel Detectors (HWD), Wheel Impact Load Detectors (WILD), and other devices.
- Proposed Wayside Asset Protection Devices – identifies proposed wayside asset protection devices, as described by Iowa's freight railroads during railroad coordination conducted during the Study.
- Likely Average Number of Ethanol Trains Daily by Segment – identifies the likely average number of trains daily by segment over each railroad operating subdivision potentially carrying ethanol in Iowa. The average number of ethanol trains and ethanol volumes transported by segment may change, based upon market changes, available railroad capacity, and other considerations. In general, the aggregate frequency of ethanol unit trains per day, combined all railroads, at any location in Iowa, typically do not exceed three (3).

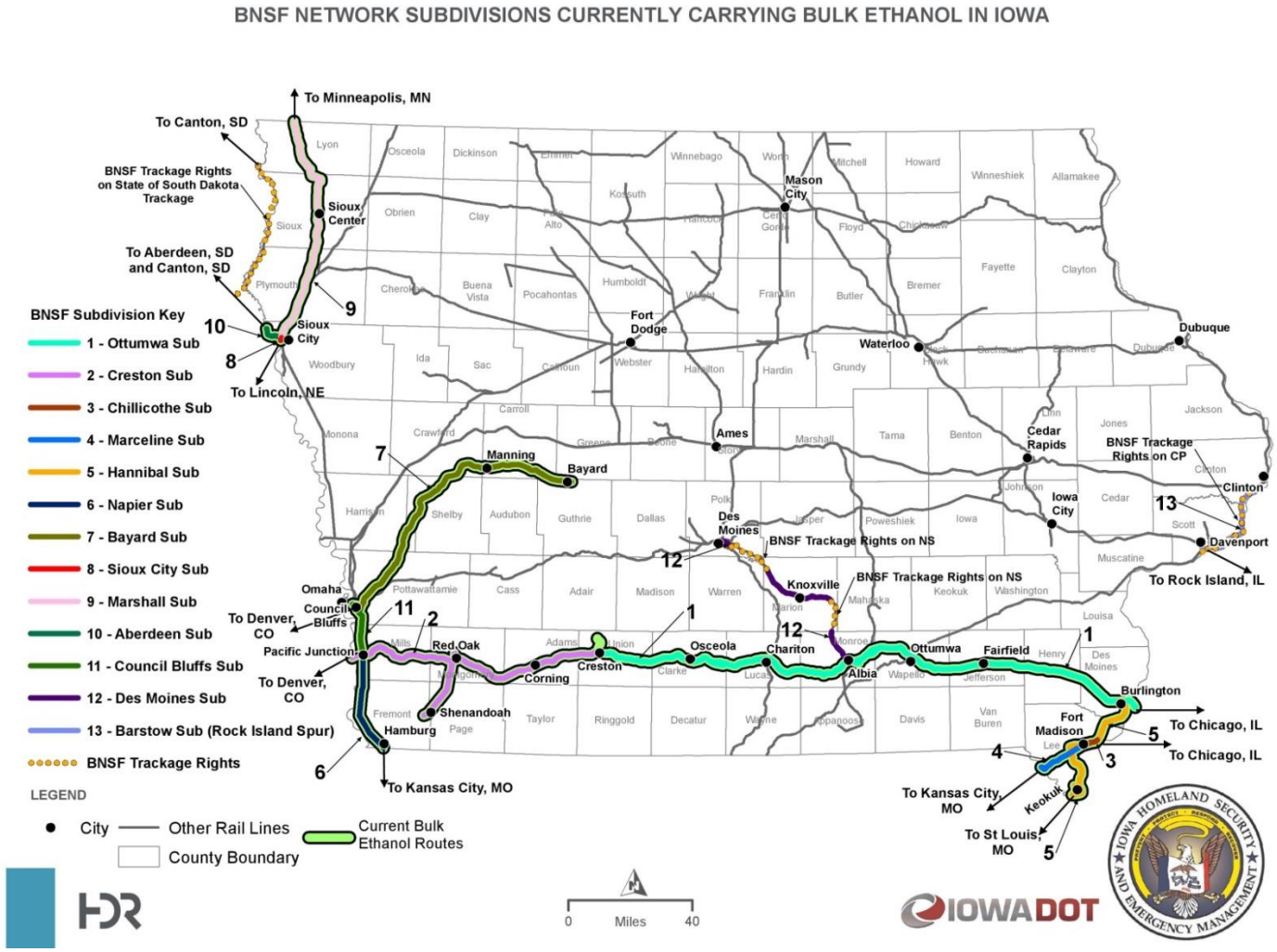
The Study recognizes that there are many active and passive warning devices at road/rail at-grade crossings on segments of the Iowa rail network over which ethanol is potentially transported. Specific inventories for the number and types of grade crossing warning devices by rail segment are not included in this Study due to the level of detail and field investigation that would be required. Section 9.5.3 includes summary information about the total number of and types of all grade crossings on the Iowa rail network. Note that most of the Iowa rail network currently hosts regular ethanol shipments in quantities varying from individual carloads to unit trains, but only routes known to currently handle bulk shipments are detailed below.

During interviews conducted for this Study, the state's railroads identified some routes and operating subdivisions hosting bulk ethanol transportation by rail. These subdivisions and others that are likely to host ethanol transportation are included in the descriptions below.

BNSF Railway (BNSF)

The characteristics of the BNSF rail network currently carrying bulk ethanol in Iowa, to the extent known, are identified in Appendix D. Railroad operating subdivisions of BNSF currently carrying ethanol in Iowa are identified in Figure 10 below.

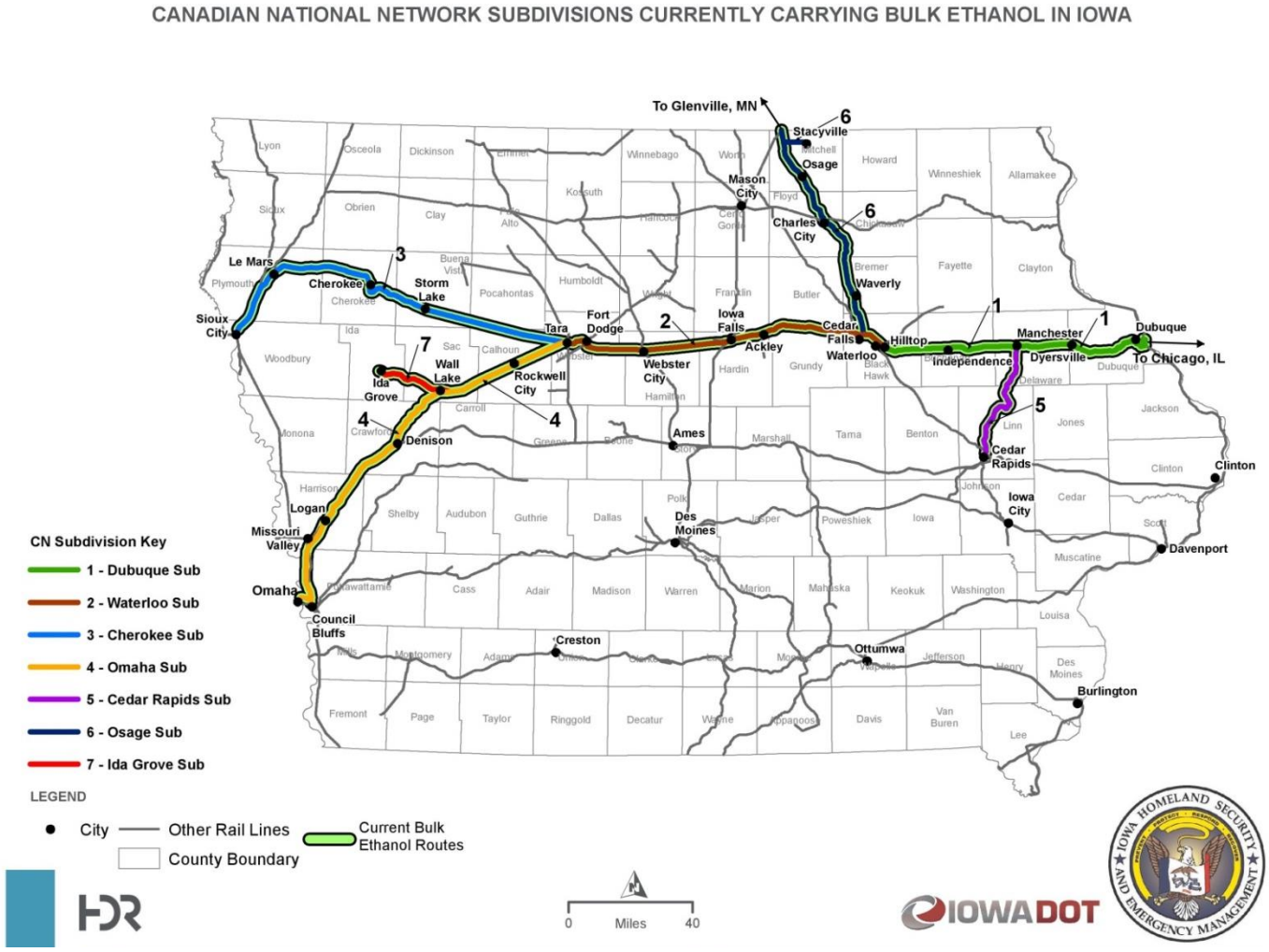
Figure 10. BNSF Railroad Network Subdivisions Currently Carrying Bulk Ethanol in Iowa



Canadian National Railway (CN)

The characteristics of the CN rail network currently carrying bulk ethanol in Iowa, to the extent known, are identified in Appendix D. Railroad operating subdivisions of CN currently carrying bulk ethanol in Iowa are identified in Figure 11 below.

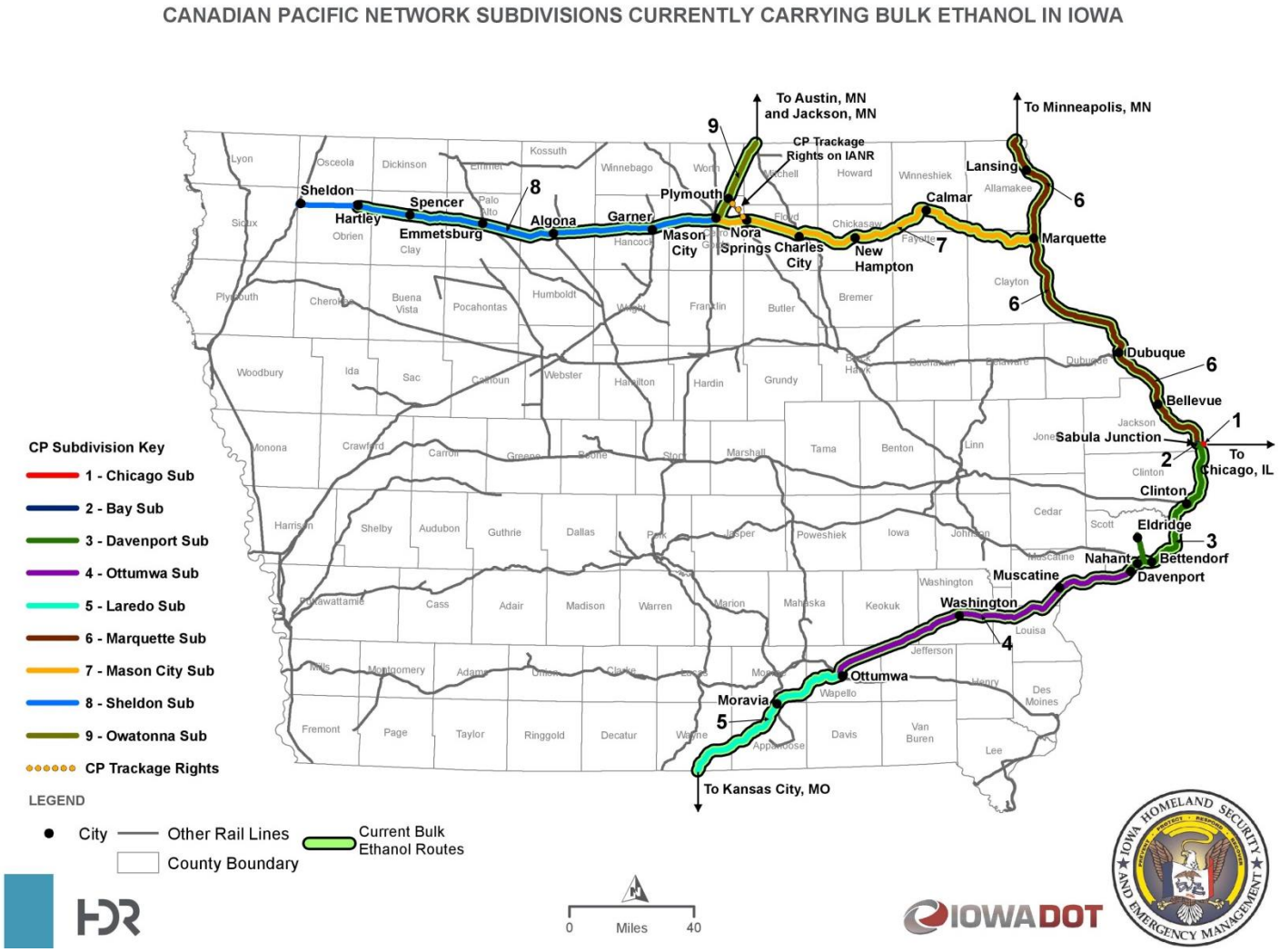
Figure 11. CN Network Subdivisions Currently Carrying Bulk Ethanol in Iowa



Canadian Pacific Railway (CP)

The characteristics of the CP rail network currently carrying bulk ethanol in Iowa, to the extent known, are identified in Appendix D. Railroad operating subdivisions of CP currently carrying bulk ethanol in Iowa are identified in Figure 12 below.

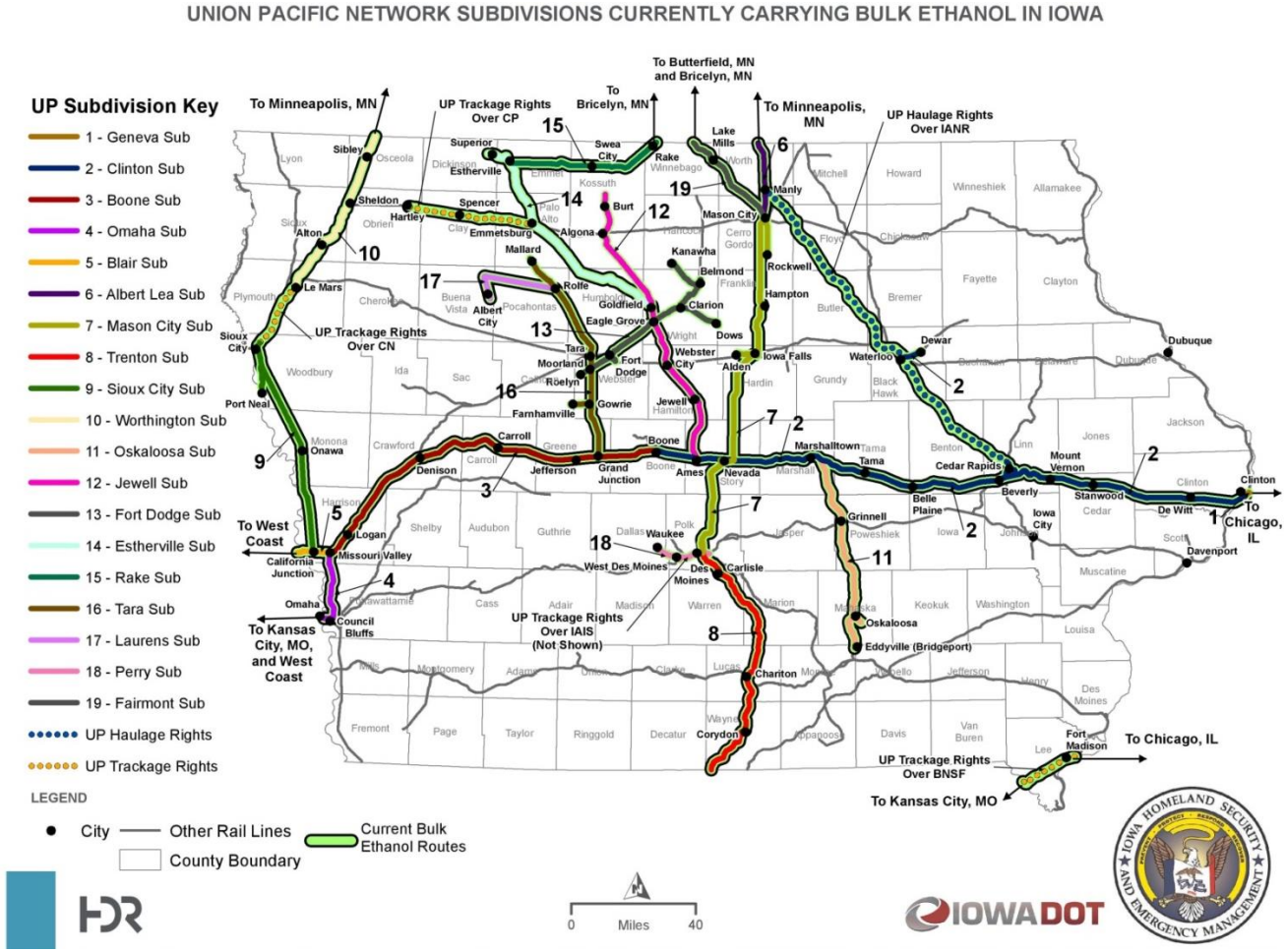
Figure 12. CP Network Subdivisions Currently Carrying Bulk Ethanol in Iowa



Union Pacific Railroad (UP)

The characteristics of the UP rail network currently carrying bulk ethanol in Iowa, to the extent known, are identified in Appendix D. Railroad operating subdivisions of UP currently carrying bulk ethanol in Iowa are identified in Figure 13 below.

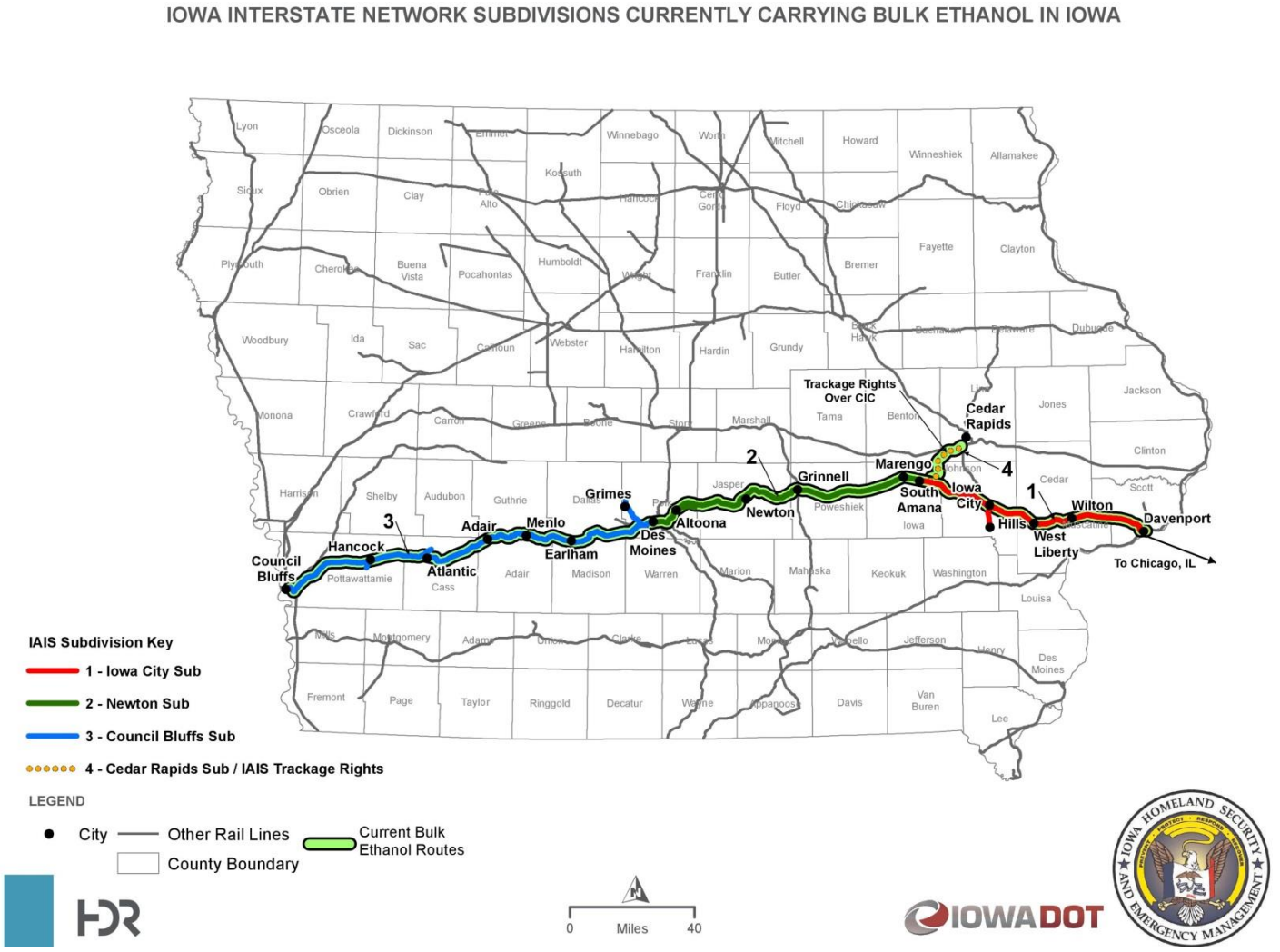
Figure 13. UP Network Subdivisions Currently Carrying Bulk Ethanol in Iowa



Iowa Interstate Railroad (IAIS)

The characteristics of the IAIS rail network currently carrying bulk ethanol in Iowa, to the extent known, are identified in Appendix D. Railroad operating subdivisions of IAIS currently carrying bulk ethanol in Iowa are identified in Figure 14 below.

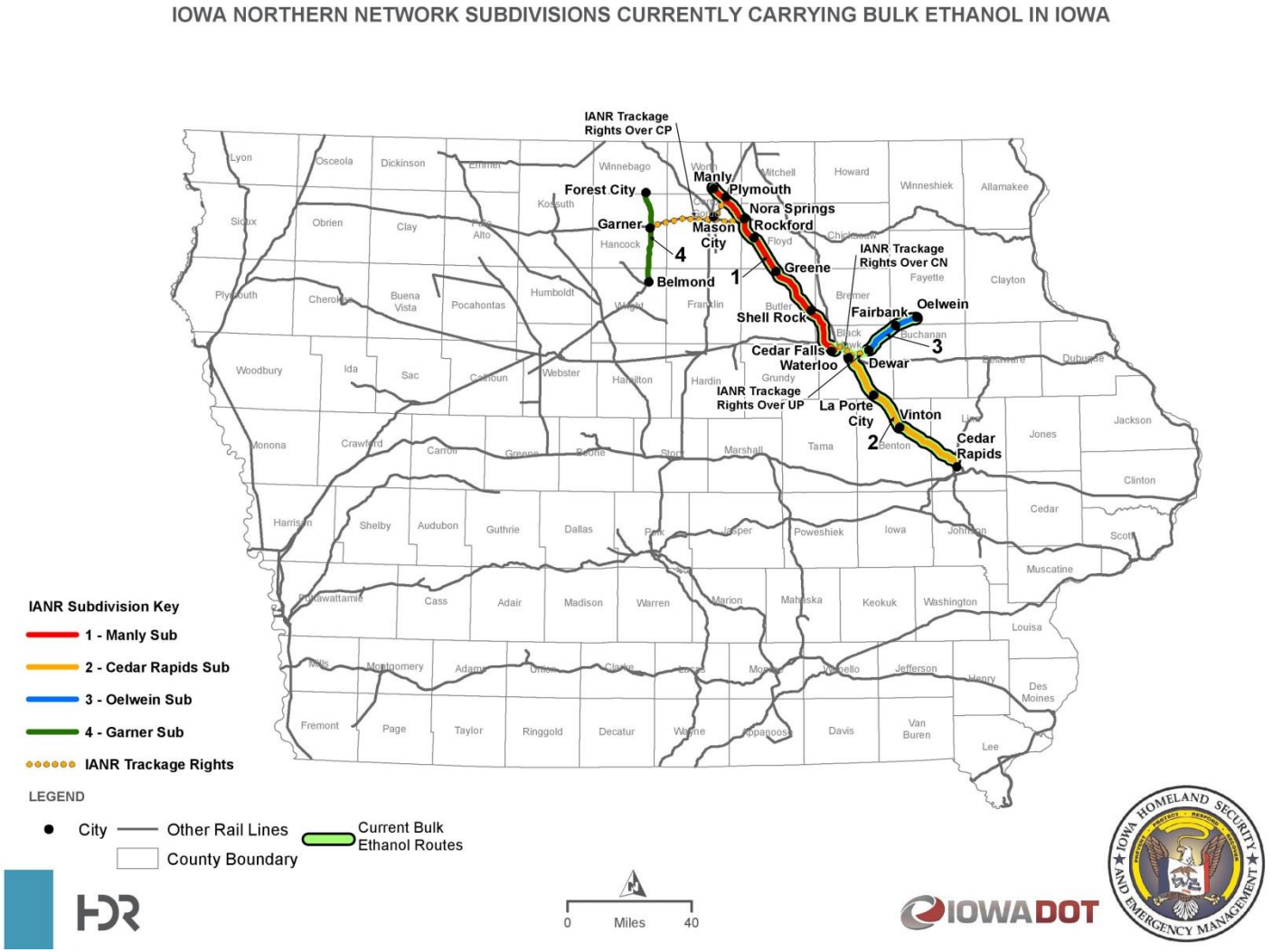
Figure 14. IAIS Network Subdivisions Currently Carrying Bulk Ethanol in Iowa



Iowa Northern Railway (IANR)

The characteristics of the IANR rail network currently carrying bulk ethanol in Iowa, to the extent known, are identified in Appendix D. Railroad operating subdivisions of IANR currently carrying bulk ethanol in Iowa are identified in Figure 15 below.

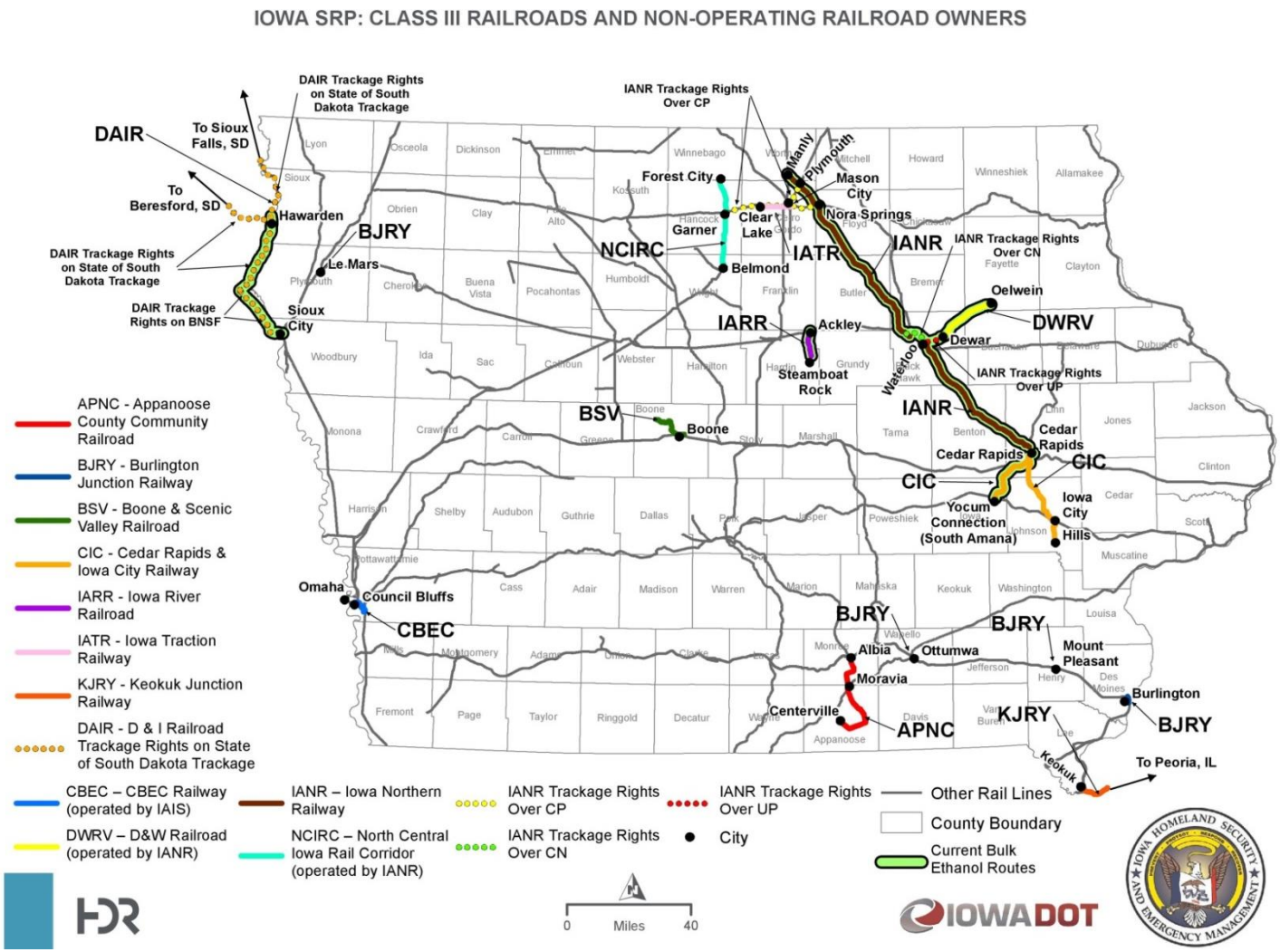
Figure 15. IANR Network Subdivisions Currently Carrying Bulk Ethanol in Iowa



Other Short Line Railroads

The characteristics of the rail network of other short line railroads currently carrying ethanol in Iowa, to the extent known, are identified in Appendix D. Other short line railroads currently carrying ethanol in Iowa are identified in Figure 16 below.

Figure 16. Other Short Line Railroads Currently Carrying Ethanol by Rail in Iowa



9.5 Risk Reduction Programs Identified by Iowa Railroads

Iowa's railroads utilize programs and practices to identify and improve safety, operations, and other risks on their networks in the state. During interviews conducted for this Study, the state's railroads identified some of these routine risk reduction programs and practices. These and others that are likely to be utilized by the state's railroads transporting crude oil and ethanol by rail are included in the descriptions below.

9.5.1 Derailment Prevention via Track Inspection and Improvements

Iowa's railroads routinely inspect infrastructure for defects that could potentially cause a train derailment or other incidents.

Routine track inspections, as mandated by federal regulations enumerated in 49 CFR 213.233, are conducted by a designated track inspector and are used to identify potential defects to track structure and the best means of correction. A track inspector is designated by the Federal Railroad Administration (FRA) as one who "inspects and monitors functions of railroad track and structures to assure compliance with Federal safety and health regulations among railroads, railroad employees, and contractors to railroads within an assigned geographical territory[51]." Iowa railroads have one or more designated track inspectors that inspect main tracks and sidings on a schedule and at an interval associated with the designated FRA Class of Track on each rail line segment in Iowa, as generally described in Table 1 below. Some of Iowa's railroads interviewed for the Study indicated that additional track inspections might be performed in the case of inclement weather, flooding, or a train derailment, or immediately preceding a unit train carrying ethanol.

Table 1. Main Track Inspection Requirements by FRA Class of Track

FRA Class of Track	Maximum Authorized Train Speeds	Number of Times Track Inspected per Week and Inspection Intervals
1	10 mph freight / 15 mph passenger	Weekly with at least three calendar days interval between inspections, or before use, if the track is used less than once a week, or twice weekly with at least one calendar day interval between inspections, if the track carries passenger trains or more than 10 million gross tons of traffic during the preceding calendar year.
2	25 mph freight / 30 mph passenger	Weekly with at least three calendar days interval between inspections, or before use, if the track is used less than once a week, or twice weekly with at least one calendar day interval between inspections, if the track carries passenger trains or more than 10 million gross tons of

[51] USDOT – FRA, *Track Inspector*, https://www.fra.dot.gov/Page/P0374

FRA Class of Track	Maximum Authorized Train Speeds	Number of Times Track Inspected per Week and Inspection Intervals
		traffic during the preceding calendar year.
3	40 mph freight / 60 mph passenger	Weekly with at least three calendar days interval between inspections, or before use, if the track is used less than once a week, or twice weekly with at least one calendar day interval between inspections, if the track carries passenger trains or more than 10 million gross tons of traffic during the preceding calendar year.
4	60 mph freight / 80 mph passenger	Twice weekly with at least one calendar day interval between inspections.
5	80 mph freight / 90 mph passenger	Twice weekly with at least one calendar day interval between inspections.

In addition to the designated track inspectors of the railroads, the FRA has track inspectors, as described earlier in this report. Generally, FRA inspects segments of the Iowa railroad network at regular intervals. The track inspections and evaluations are prioritized based on tonnage traveling over a segment and whether or not a segment carries hazardous materials. A special emphasis for FRA track inspections is given to routes carrying crude oil and to routes that have had the most defects in past inspections. FRA Region 6 has jurisdiction over Iowa's railroad network. Region 6 is based in Kansas City, Missouri, and has additional offices in Council Bluffs, Iowa, and St. Louis, Missouri. Region 6 has approximately 55 inspectors that cover a multi-state area that includes Iowa. FRA track inspectors regularly coordinate with Iowa's railroads and Iowa DOT, as described below.

In addition to the railroads and the FRA, Iowa DOT has two track inspectors that inspect the Iowa railroad network, independently and in coordination with the state's railroads and the FRA. Iowa Code requires that Iowa DOT track inspectors inspect all main tracks in the state's general rail system once annually. During an interview conducted for the Study, Iowa DOT track inspectors indicated that DOT prioritizes track inspections based upon past history of derailments and other incidents, past history of defects, existing freight railroad tonnage over a given segment, and whether or not a route hosts passenger trains. Iowa DOT track inspectors indicated that they inspect the BNSF Creston and Ottumwa subdivisions – over which Amtrak operates a pair of passenger trains daily – twice a year, and that the goal was to inspect routes carrying crude by rail twice a year.

The routine track inspections made by designated railroad and state track inspectors described above are visual, and may not reveal the existence of potential issues concerning internal track defects and a number of track geometry considerations. Many of Iowa's railroads interviewed during the Study employ rail detection vehicles at longer intervals to identify these rail defects and failures. Federal law "requires that internal rail inspections on Class 4 and 5 track, and Class 3 track hosting regularly scheduled passenger trains or that is a hazardous materials route, not exceed a time interval of 370 days between inspections or a tonnage interval of 30 million gross

tons, whichever is shorter[52].” Some of Iowa’s railroads, at their discretion, may use a rail detection and track geometry vehicle more frequently than required by federal law, as part of a risk management, track maintenance, or general safety program.

Some of Iowa’s railroads interviewed for the Study own their own rail detection vehicles, while others use vehicles owned by other railroads or use the services of a contractor with a vehicle. The FRA also has a rail detection and track geometry vehicle that operates over the national rail network, including segments in Iowa, year-round to identify potential rail defects and failures. The Iowa DOT has coordinated with Iowa’s railroads and the FRA on past track inspection programs for the state’s rail network, including a two-week program (CORTEx, Crude Oil Route Track Examination) in spring 2015, in which FRA and DOT inspected routes in Iowa that carry crude by rail and other high energy commodities.

Iowa railroads interviewed during the Study identified the following general track improvements that have been made, or could potentially be made in the future, to reduce the risk of train derailments and other safety and operating risks on routes carrying crude by rail and ethanol:

- Replacement of lighter rail sections (i.e. 75-100 lbs. / yd.) with heavier rail sections (i.e. 110-136 lbs. / yd.) on main tracks and sidings
- Replacement of jointed rail sections on main tracks and sidings – which are typically 39 feet in length, connected by bolted joint bars at the end of each rail section, and prone to cracking and other rail flaws and defects at the ends – with continuous welded rail that is free of joints. Continuous welded rail is either new rail or secondhand rail that was checked for internal rail flaws and defects before installation
- Cascade main track rail into yard tracks during replacement programs
- Replacement of rail in road/rail grade crossing surfaces, which can be prone to corrosion and breaks caused by road salt used to melt ice and snow on roadways in winter
- Elimination of bridge joints, which are rail joints typically within 500 feet of a bridge approach, or on the bridge itself, which can fail under stress created by non-uniform loading on an approach to a bridge or on the bridge itself
- Replacement of ties in main tracks and sidings, including hardwood ties on main tracks, sidings, and yard tracks, and some application of steel ties in railroad yards
- General improvements to track surface
- Replacement of main track turnouts
- Installation of switch point protectors on main track turnouts
- Installation of switch point indicators on select main track turnouts on lines that do not have a wayside signal system
- Installation of a fixed derail device on industry trackage at a location with a turnout to a railroad main track or siding to avoid the unnecessary movement of

[52] 49 CFR Part 213 (Final Rule); January 24, 2014

standing cars from an industry track and onto a main track or siding used for trains to meet and pass

- Installation of additional wayside asset protection devices to mitigate against potential rail equipment defects and failures and associated rail damage, including Wheel Impact Load Detectors (WILD)
- Upgrade of active warning devices at public grade crossings to include flashing light signals and gates, closure of public grade crossings, or grade separation of public grade crossings

9.5.2 Derailment Prevention via Bridge and Structures Inspection and Improvements

Iowa's railroads typically make a general visual inspection of railroad bridges and other structures during the routine track inspections made by a designated track inspector as noted in earlier in this section. Additional bridge inspections may be conducted in the case of inclement weather, flooding, or a train derailment. Iowa railroads must also adhere to federal law concerning railroad bridge safety and assurance, qualifications and designation of responsible bridge engineers and inspectors, capacity of bridges, bridge inspections, repair and modification of bridges, and bridge management programs as outlined in 49 CFR Part 237. More comprehensive inspections of bridges and other structures are facilitated at longer intervals and typically include an emphasis on structural condition, identification of short- and long-term maintenance needs, and bridge ratings. Iowa railroads interviewed during the Study conduct the comprehensive inspection of bridges independently and/or through a qualified contract railroad bridge inspector.

Iowa railroads interviewed during the Study identified the following general bridge and structures improvements that have been made, or may be made in the future, to reduce the risk of train derailments and other safety and operating risks on routes carrying crude by rail and ethanol:

- Acquire updated load rating data for bridges and other structures
- Upgrade bridges and other structures to accommodate railcars with heavier maximum allowable gross weights of 286,000 lbs., which has become an industry standard capacity for railroad equipment (268,000 lbs. was the previous industry standard capacity; Iowa's railroads have been in the process of upgrading bridges to handle 286,000 lb. gross weight cars since the 1990s).
- Convert open deck bridges to ballast deck bridges to improve train ride quality and general track geometry.
- Replace wooden-pile bridge structures with corrugated metal pipes, pre-stressed concrete structures, and steel bridges.

9.5.3 Grade Crossing Inventory, Risks and Incident Trends, and Programs

Inventory

According to the FRA's inventory of at-grade crossings, there are a total of 4,331 public at-grade road/rail crossings and an additional 745 public crossings that are grade separated in Iowa. The number of private at-grade road/rail crossings in Iowa is not confirmed. The type of warning devices at Iowa's public at-grade crossings is identified in Table 2 below.

Table 2. Types of Warning Devices at Iowa Public At-Grade Crossings

Warning Device Type	Gates	Flashing Lights	Bells	Special Warning	Stop Signs	Crossbucks	Other	None
Number of Crossings	1,010	794	19	19	423	2,042	2	20

Source: FRA Office of Safety Analysis

The Table 2 above shows that slightly less than half of all public at-grade crossings in Iowa have active warning devices such as gates, flashing lights, and bells, while more than half of crossings have passive warning devices such as crossbucks and/or stop signs or no warning systems. An inventory of the specific number and classification of grade crossings over railroads lines potentially carrying crude by rail and ethanol in Iowa was not assembled for this Study.

Risks and Incident Trends

Iowa's at-grade crossings provide an intersection between active railroad operations and vehicular and pedestrian traffic on roadways. The most common risk at grade crossings is a collision between a moving train and a vehicle. Depending upon a train's length and tonnage, the speed at which it is operating, and other considerations including sight distances and weather conditions, it may take a train a mile or more to come to a complete stop to avoid a potential collision with a vehicle. Collisions can result in an incident (including a derailment and release of a hazardous material such as crude oil or ethanol), and fatalities and injuries to railroad employees, motorists, and pedestrians.

Table 3 below shows the number of road/rail grade crossing incidents, fatalities, and injuries, which have occurred at public at-grade crossings in Iowa over the last decade (2005-2014). These figures represent the entire Iowa railroad network and not just routes potentially carrying crude oil and networks carrying ethanol in Iowa. Incidents that involve trains carrying ethanol and crude oil have not been separately reported.

Table 3. Road/Rail Incidents in Iowa (2005-2014)

Road/Rail Incidents	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total Incidents	77	69	82	72	52	52	41	43	49	51
Deaths	6	6	7	5	4	4	2	5	5	7
Injuries	32	20	27	25	19	20	24	16	25	17

Source: FRA Office of Safety Analysis

These figures show that a significant decrease in the average number of total incidents and injuries, comparing the initial and latter five-year segments, with the average number of total incidents decreasing 42 percent and the number of injuries decreasing 33 percent. Over the successive five-year periods, the number of deaths decreased by an average of one per year.

Programs

General improvements to public road/rail grade crossings in Iowa are typically made with assistance from federal, state, and local funding sources.

Iowa DOT administers several loan and grant programs and state-sponsored rail investment programs to railroads in Iowa, as identified below:

- Railroad Revolving Loan and Grant Program: Provides, among other things, assistance for the restoration, conservation, improvement, and construction of railroad main lines, branch lines, switching yards, sidings, rail connections, intermodal yards, highway grade separations, and other rail-related improvements.
- Highway-Railroad Grade Crossing Safety Program: This federally funded program provides financial assistance to states for improvement of rail crossings over roadways.
- Highway-Railroad Grade Crossing Surface Repair Program: This state-funded program is similar to the federally funded crossing safety fund.
- Primary Road Highway-Railroad Grade Crossing Repair Program: This state-funded program is designed to assist with surface improvements at road/rail crossings on the primary road system.

Iowa railroads interviewed during the Study identified the following general programs and improvements that have been made, or may be made in the future, to reduce the risk of train derailments and other safety and operating risks at grade crossings on routes carrying crude by rail and ethanol:

- Continue to identify strategies and local, state, and federal sources to assist with the funding necessary to upgrade signage, active warning devices, and crossing surfaces and roadway approaches at grade crossings, and to potentially grade separate or close high-risk or high-traffic road/rail grade crossings. Emphasis was made on taking advantage of the funding programs administered by Iowa DOT that are described earlier in this section.
- Continue to maintain railroad emergency contact information signage and a federal DOT grade crossing number for unique identification at each grade crossing in Iowa.
- Continue to promote public safety and grade crossing awareness in the communities served by the railroads, which may involve coordination with Operation Lifesaver in Iowa.

9.5.4 Mechanical Defects

Iowa's railroads inspect railroad tank cars used in the transportation of crude oil and ethanol at regular intervals as prescribed by federal regulations, railroad operating rules, and other practices used by railroads to identify potential mechanical defects and/or loading/unloading device defects. Iowa's ethanol producers and receivers provide additional inspections before loading or unloading a railcar. While there are no crude oil shippers or receivers in Iowa at present, crude oil shippers and receivers outside of the state would provide inspections similar to those performed by ethanol shippers and receivers in Iowa.

Mechanical defects on a railcar used to transport crude oil or ethanol by rail are typically identified by a railroad or a shipper. This may include a cracked wheel, safety appliance defects (such as bent handholds used by train crews to ride on cars during switching events), structural defects (such as damaged rail car frame), loading and unloading device defects (such as leaky valves), and insufficiently or improperly displayed hazardous materials placards.

Additional mechanical inspections may be conducted in the case of a railroad incident or accident (such as a train derailment) or when there is suspicion of a potential defect at any other time in the transportation cycle not outlined above.

Iowa railroads interviewed during the Study identified the following general improvements that have been made, or could potentially be made in the future, to reduce the risk of train derailments and other safety and operating risks due to mechanical defects on railcars traveling over routes carrying crude oil and ethanol in Iowa:

- Continued use of a Qualified Mechanical Inspector (QMI) to assist train crews with a Class I brake test and initial terminal inspection of railcars loaded with ethanol, as identified by FRA Emergency Order 30 and FRA Safety Advisory 2015-01.
- Development of strategies for assuring that ethanol producers/shippers are equally responsive to maintenance issues related to railroad tank cars.
- Increased monitoring of potential leaks on bottom outlet valves on railroad tank cars used in ethanol transportation. Defective bottom outlet valves can develop leaks about 24 hours after the railcar has been loaded with ethanol, and after the railroad has received the car from the producer.
- Increased monitoring of potential cracking in side bearing cages on railroad tank cars.
- Continued focus on identification and repair of empty tank cars with condemnable wheels.
- Assure that producers/shippers and railroads are sufficiently or properly displaying hazardous materials placards on railroad tank cars carrying ethanol.
- Greater vigilance in identifying potential mechanical defects and human factor issues as a means of minimizing train derailments and other accidents.
- Continued maintenance of detailed railcar inspection documentation.

Iowa ethanol producers/shippers interviewed during the Study identified the following general improvements that have been made, or could potentially be made in the future, to reduce the risk of train derailments and other safety and operating risks due to mechanical defects on railcars traveling over routes carrying ethanol in Iowa:

- Increased monitoring of potential mechanical issues or loading/unloading device defects.
- Greater vigilance in identifying potential mechanical defects and human factor issues as a means of minimizing train derailments and other accidents.
- Continued maintenance of detailed railcar inspection documentation. Many rail producers/shippers in Iowa use an inspection checklist as the basis for inspection of empty railcars before loading. Inspection checklists typically vary from shipper to shipper.
- Reduce the number of bad order empty cars that are received from a railroad for use in loading at an ethanol producing facility.

9.6 Other Risk Reduction Programs

This section identifies other regulations and practices to improve safety, operations, and other risks on railroads in the state. During interviews conducted for this Study, the Federal Railroad Administration (FRA) and other agencies identified some of these routine risk reduction regulations and practices. Those that are likely to be utilized by the state's railroads transporting crude oil and ethanol by rail are included in the descriptions below.

9.6.1 Positive Train Control

Positive Train Control (PTC) refers to technologies designed to automatically stop or slow a train before certain accidents can occur. PTC is designed to prevent collisions between trains, derailments caused by excessive speed, trains operating beyond their limits of authority, incursions by trains on tracks under repair, and by trains moving over switches left in the wrong position. PTC systems are designed to determine the location and speed of trains, warn train operators of potential problems, and take action if operators do not respond to a warning.

The Rail Safety Improvement Act of 2008 required railroads to place PTC systems in service by December 31, 2015, under the following circumstances:

- On all rail main lines over which regularly-scheduled commuter or intercity passenger trains operate; and
- On all Class I railroad main lines with over 5 million gross ton-miles per mile annually over which any amount of toxic/poison-by-inhalation hazardous materials is handled.

The mandate for PTC excludes all Class II (regional) and III (short line) railroads regardless of tonnage or number of toxic/poison cars handled as long as no passenger trains travel over the lines. Under these conditions, all rail operators over the Amtrak corridors within Iowa as well as any Class I railroad main line routes would likely need to be equipped with PTC for operation over the lines.

Class I railroads are currently developing PTC systems for their networks, which would include implementation of the technology on principal lines in Iowa. As an example, a route that hosts bulk crude oil and ethanol shipments in Iowa was targeted for the first implementation of a PTC system on the CP network. CP selected its Ottumwa Subdivision for a pilot program and anticipated that it would receive FRA approval to begin revenue service test runs of the system before the end of 2015. CP anticipates that it will next implement a PTC system on its connecting Davenport and Laredo subdivisions in Iowa.

Congress has considered several bills that would extend the 2015 deadline of the Act. In October 2015, Congress passed H.R.38 19 - Surface Transportation Extension Act of 2015, providing a three-year extension of the original PTC deadline. Under the new law, U.S. freight railroads will have until December 31, 2018, to fully implement PTC. [53]

[53] Association of American Railroads- Positive Train Control: https://www.aar.org/policy/positive-train-control

10.0 Railroad Hazardous Materials Safety and Response Programs

10.1 General Background

Railroad organization and staffing is still being collected and analyzed through railroad interviews, however, preliminary findings show that the Class I railroads maintain full time hazardous materials response managers and key staff that manage response needs during derailments. Hazmat Managers also work with local first responders to provide on-site training, coordinate specialized training through SERTC, TEEX, and other training venues. The Class I railroads also maintain contracts with environmental cleanup and oil spill response organizations who provide and support remediation activities during spill response and recovery.

Class I railroads maintain caches of spill response equipment including firefighting trailers equipped with portable water dump tanks, pumps, hoses, monitors, and foam. Incident response systems include staff trained in NIMS and ICS as well as specialized hazardous materials and firefighting operations. More data is being collected and reviewed regarding these capabilities for all classes of railroads operating in Iowa.

The Class I railroads support community outreach and training programs through two different approaches. Most railroads offer on-site training to first responders through their hazmat management programs. This type of training is provided, on request, to local fire and hazardous materials responders and may be provided directly to an individual department, or as a regional delivery to multiple first responder departments in a given area. The railroads also offer specialized training through partnered programs. These programs include TRANSCAER and TTCI/SERTC offering individual and group training. TRANSCAER is a portable rail training program that travels the country and provides free hands-on training to first responders. TTCI/SERTC training provides live fire drills and hazardous materials response training in Pueblo, Colorado. The cost of this training is covered by sponsoring Class I railroads. Community Outreach programs are usually provided through railroad whistle stop tours, such as Operation Lifesaver, that provide training, education, and safety awareness to first responders and the general public. Operation Lifesaver also provides specialized training programs for firefighters and police officers.

Initial research shows that neither the railroads nor the first responders fully understand each other's capabilities. The railroads generally understand that they may need to provide the specialized equipment required to gain control of spills, fires, and hazardous materials releases created during railroad accidents. While they may not know the specific capabilities of each department, they do know that the capabilities vary along the rail routes.

11.0 Local Emergency Management and First Response Roles and Responsibilities

Iowa's county and municipal emergency management coordinators and first responders have the primary responsibility of planning, preparing, and managing emergency response operations related to crude oil and ethanol rail transportation incidents occurring within their jurisdictional boundaries. Initial response will be managed by local emergency responders, including emergency managers, fire departments, law enforcement, public works, and emergency medical services. If local capabilities are or are anticipated to be overwhelmed, local mutual aid and/or state resources will work with local responders to support and augment required services.

Many of Iowa's local responder agencies are increasingly challenged to maintain response capabilities for routine, everyday incidents. Therefore, their ability to undertake new and additional planning and preparedness efforts is limited. At the same time, due to the dramatic increase in crude oil and ethanol rail transportation across the state, more preparedness activity falls on them. Most emergency managers interviewed during this Study reported that their time is often spent addressing day-to-day operational issues. They are aware that the likelihood of crude oil or ethanol rail incident, happening in their jurisdiction, is small. While such an incident is a concern to emergency managers that were interviewed, planning and preparing for crude oil and ethanol rail accidents is not a top priority. The local ability to focus on updating and maintaining plans, mutual aid agreements, and preparedness measures, to address this hazard, often taxes current staffing capabilities and limits the ability to address new issues.

Many local emergency managers' positions are part-time in their respective local governments. Emergency Managers also often hold other job responsibilities, such as public information, city administration, 9-1-1 coordination, or serve as local first responders. These additional responsibilities require emergency managers to divide their time among all their responsibilities, and may not allow them sufficient time to focus on emergency management – mitigation, protection, preparedness, response, and recovery activities.

Of the 731-registered fire departments in Iowa, 90.3 percent are all volunteer and 3.3 percent are all career. The remaining 6.4 percent are a combination of career and volunteer firefighters. Specific to crude oil and ethanol rail incident response, only 26.54 percent of all fire departments provide technical/specialized rescue capabilities, and 11.90 percent provide hazardous materials response capabilities.[54]

Most of Iowa's rural and volunteer fire departments have limited capabilities and resources to manage large crude oil or ethanol transportation incidents. Locals often rely on local mutual aid, regional, and state support to provide operational staff, technical support, and specialized teams to conduct operations outside of their normal operational capabilities. Urban fire departments, in larger cities, have hazardous materials response capabilities and provide regional hazardous materials response capabilities to neighboring jurisdictions.

[54] US Fire Administration, *National Fire Department Census Quick Facts, January 2015*, https://apps.usfa.fema.gov/census/summary. Accessed December 09, 2015.

11.1 Local Emergency Management Fund

Under Iowa Code 29C.17, the state requires that a local emergency management fund be created in the office of the county treasurer. Any unencumbered balance in the fund during the fiscal year may not revert to county general revenues. Additionally, any reimbursement, matching funds, moneys received from sale of property, or monies obtained from any source in connection with the local emergency management program must be deposited in the local emergency management fund. The local emergency management agency's approved budget shall be funded by one or any combination of the following options, as determined by the commission:

1. A countywide special levy pursuant to Section 331.424, Subsection 1.
2. Per capita allocation funded from city and county general funds or by a combination of city and county special levies, which may be apportioned among the member jurisdictions.
3. An allocation computed as each jurisdiction's relative share of the total assessed valuation within the county.
4. A voluntary share allocation.
5. Other funding sources allowed by law.

A political subdivision may appropriate additional funds for the purpose of supporting commission expenses relating to special or unique matters extending beyond the resources of the agency.

Joint emergency response communications services under Section 29C.9, Subsection 6, shall be funded as provided for in the agreement entered into pursuant to Chapter 28E.

Expenditures from the local emergency management fund shall be made on warrants drawn by the county auditor, supported by claims and vouchers signed by the emergency management coordinator or chairperson of the commission.

Subject to Chapter 24, the commission shall adopt, certify, and provide a budget, on or before February 28th of each year, to the funding entities determined pursuant to Subsection 2.

The form of the budget shall be as prescribed by the department of management. Any portion of a tax levied by a county or city to support the local emergency management agency shall be identified separately on tax statements issued by the county treasurer.[55]

11.2 Local Emergency Planning Committees

Local Emergency Planning Committees (LEPC) are required under federal law to develop and maintain emergency hazardous materials response plans, reviewing the plans at least annually, and provide information about hazardous chemicals in the local community to citizens and responders requesting the information under the Emergency Planning and Community Right-to-Know Act (EPCRA).[56]

Local emergency response plans must include the following elements:

[55] Iowa Code, Chapter 29C, *Emergency Management Security*. Print.

[56] US Environmental Protection Agency, *Local Emergency Planning Committees*. http://www.epa.gov/epcra/local-emergency-planning-committees. Retrieved on December 8, 2015.

- Identification of facilities and transportation routes of extremely hazardous substances
- Description of emergency response procedures, on and off site
- Designation of a community coordinator and facility emergency coordinator(s) to implement the plan
- Outline of emergency notification procedures
- Description of how to determine the probable affected area and population by releases
- Description of local emergency equipment and facilities and the persons responsible for them
- Outline of evacuation plans
- A training program for emergency responders (including schedules)
- Methods and schedules for exercising emergency response plans[57]

As a minimum, each LEPC should be comprised of a representative from each of the following groups or organizations:

- Elected state and local officials,
- Law enforcement personnel,
- Civil defense personnel,
- Firefighting personnel,
- First-aid personnel,
- Health personnel,
- Local environmental personnel,
- Hospital personnel,
- Transportation personnel,
- Broadcast and print media,
- Community groups, and
- Owners and operators of facilities subject to the requirements of EPCRA.

A person may represent one or more of the disciplines listed, provided they are duly appointed by each group or organization to be represented.[58]

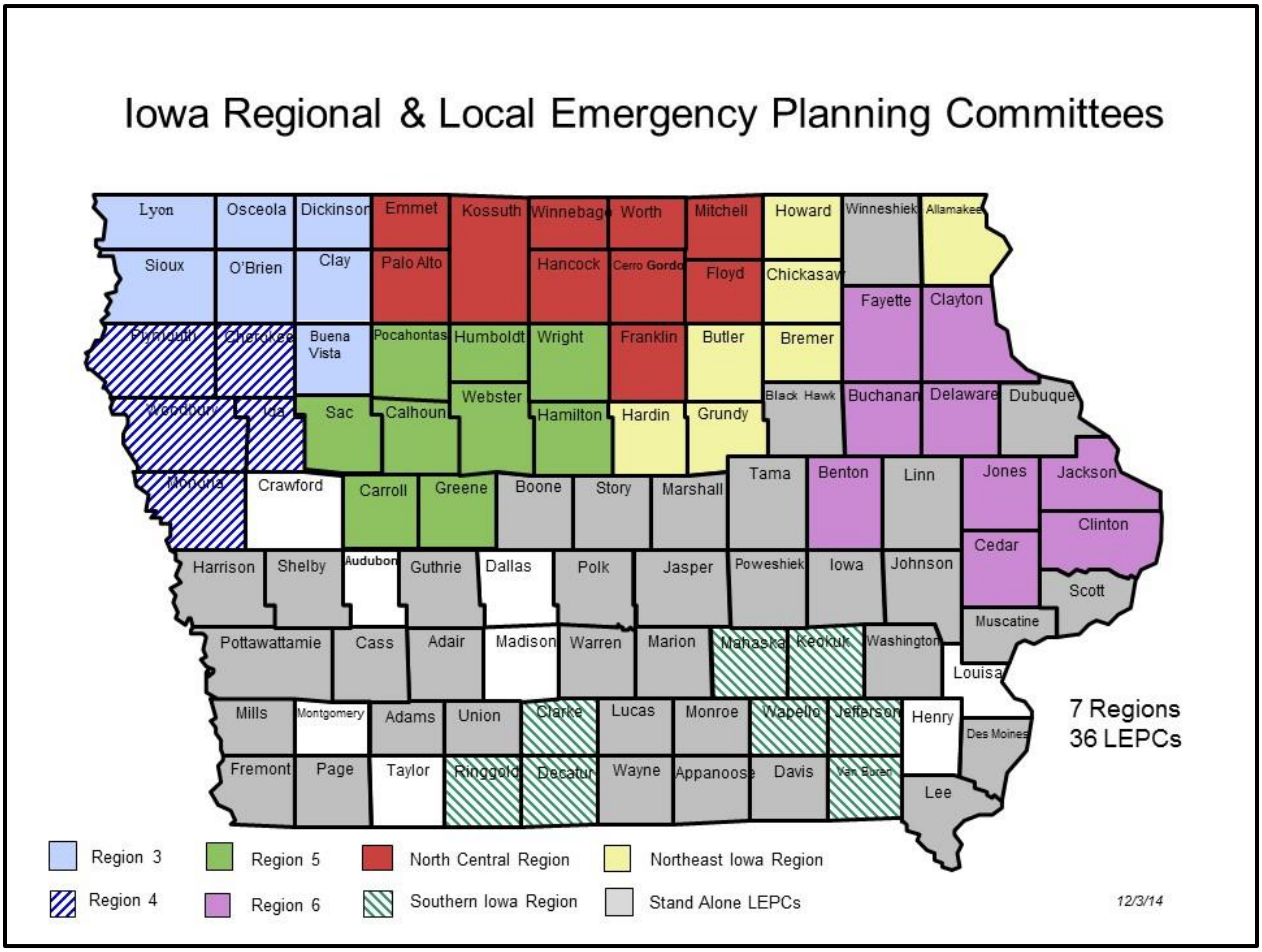
[57] Ibid.
[58] Iowa LEPC Handbook. November 6, 2013. Print.

11.3 Local Mutual Aid Agreements and Statewide Mutual Aid Compact

The Local Emergency Management Commissions, in collaboration with other public and private entities within this state, are required to develop mutual aid arrangements for reciprocal emergency services and recovery aid and assistance in case of disaster as needed. The chairperson of a commission, subject to the approval of the Governor, may enter into mutual aid arrangements with emergency management agencies or organizations in other states for reciprocal emergency services and recovery aid and assistance in case of disaster too great to be dealt with unassisted.[59]

There are currently 36 Local and seven Regional LEPCs in Iowa as depicted in the map below:

Figure 17. Iowa Regional and Local Emergency Planning Committees



11.4 Regional Hazardous Materials Response Teams

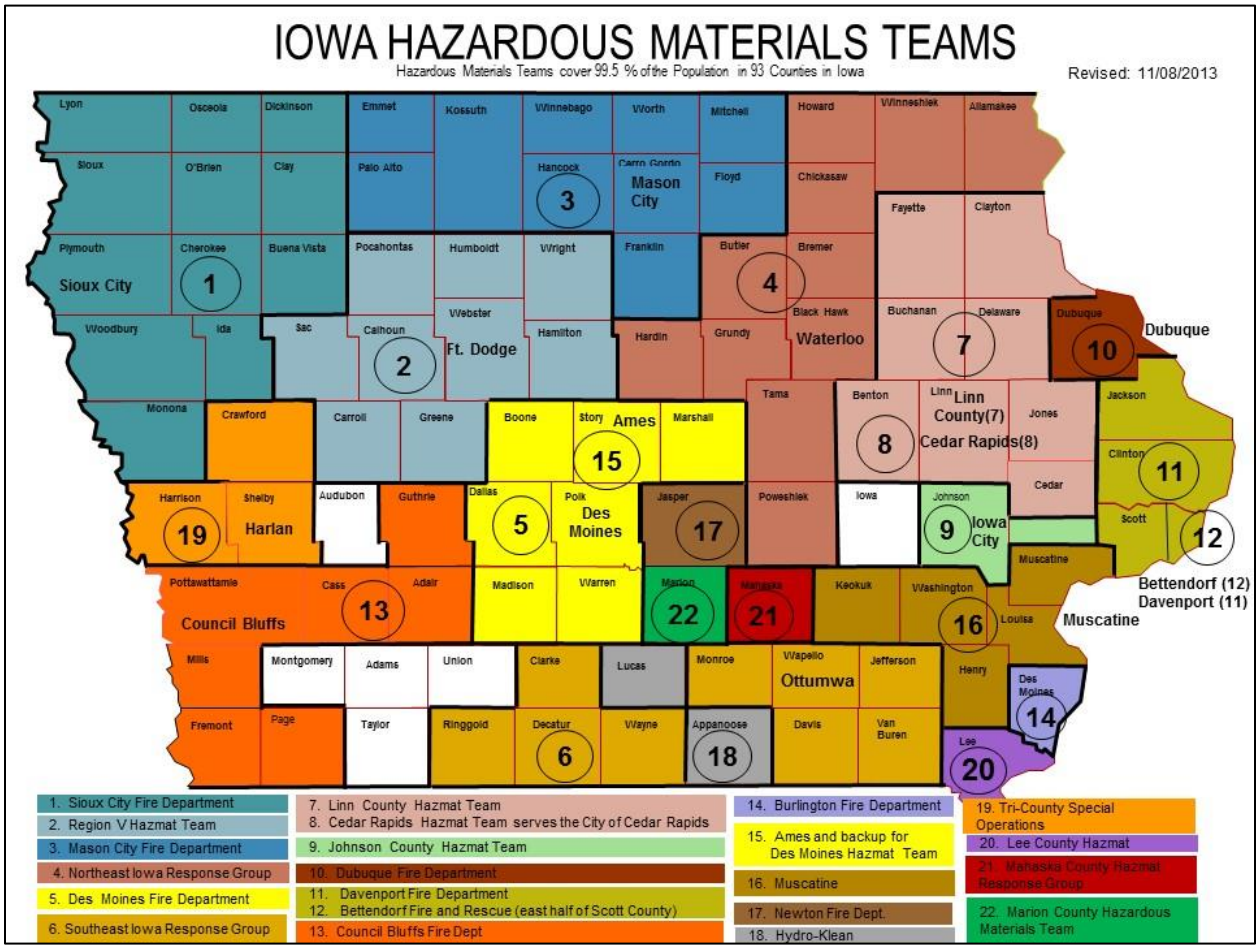
Iowa HSEMD does not operate, but supports regional hazardous materials response teams that are developed, managed, and maintained by local career fire departments in Iowa's larger cities. These regional response teams provide subscription services, to surrounding counties, to support

[59] Iowa Code, Chapter 29C, *Emergency Management Security*. Print.

and augment hazardous materials response needs in those communities that do not have sufficient capabilities to manage an incident on their own.

There are currently 22 regional response teams that cover and provide services to 95 of the state's 99 counties. The teams provide hazardous materials response capabilities and training to local fire departments in their service areas. The regional teams respond to the areas found in Figure 18: *Iowa Hazardous Material Teams.*

Figure 18. Iowa Hazardous Materials Teams



Note: Iowa County recently joined to receive hazmat response team services from the Linn County team.

At the state level, Iowa HSEMD also supports Weapons of Mass Destruction/HazMat teams. Iowa's Weapons of Mass Destruction (WMD)/HazMat team was established to enhance the capabilities of existing fire department hazmat teams to provide statewide coverage for on-site testing and identifying, assessment and support for render-safe operations involving increasingly sophisticated improvised explosive devices and those that may contain chemical, biological, radioactive, nuclear or explosive (CBRNE) materials.

Fire department hazmat personnel from established departments in Council Bluffs, Davenport, and Des Moines make up the state's WMD HazMat team. These departments were chosen based on their existing hazmat capabilities.

11.5 Local Response Preparedness

The Study Team examined local preparedness via qualitative interviews and an online survey tool, which were used to gather information from Iowa's local emergency managers and responders. The survey explored local risk perception, capabilities, and response preparedness. Emergency management coordinators and fire officials provided their insight through the interviews and surveys. The online survey was distributed through HSEMD to all local emergency management coordinators in the state, and 34 first responders and emergency managers responded by providing feedback; representing a reasonable sampling for survey results. Responses are summarized in Table 4 below. Complete individual responses can be found in Appendix H.

Table 4. General Preparedness and Response Capabilities

General Survey Question	Yes	No	I don't know
Risk			
Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	89.3%	3.6%	7.1%
Incident History			
Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	14.3%	78.6%	7.1%
Interaction with Railroads			
Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	96.4%	3.4%	0%
Have any railroads contacted you to offer training, planning, or exercises?	40.7%	55.6%	3.7%
Resource Support			
Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	17.8%	78.6%	3.6%
Do you have mutual aid agreements?	88.9%	3.7%	7.4%
Are the mutual aid agreements written agreements?	81.5%	7.4%	11.1%
Response Capabilities			
Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	78.6%	14.3%	7.1%
Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	25.0%	75.0%	0%
Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	21.5%	71.4%	7.1%
Do you conduct public education/outreach efforts related to general preparedness?	75.0%	25.0%	0.0%
Do you conduct public education/outreach efforts related to hazardous materials incidents?	53.6%	42.9%	3.5%
Do you conduct public education/outreach efforts related to crude oil/ethanol by rail transportation incidents?	3.6%	89.3%	7.1%
Do you have any identified emergency shelter facilities in your jurisdiction?	81.5%	11.1%	7.4%
Do you have the capability to manage a mass-casualty incident?	77.8%	7.4%	14.8%

Regarding communications with railroads in the state, the respondents provided the following information:

Table 5. Communication with Railroads

How would you characterize your familiarity with railroads in your jurisdiction?	
Regular contact	14.8%
We've talked in the past but I don't remember who I've talked to.	25.9%
I would have to look up my contacts	51.9%
My contact list may need to be updated	18.5%
I don't have any contacts with the railroads	7.4%

Note: Some respondents provided multiple responses to this question.

While most respondents stated that they have incident (and hazard) specific plans, many acknowledged through the interview process that their plans have not been updated to reflect changes in risk, vulnerability, and response operations related to crude oil and ethanol rail transportation. Twenty-five percent or less of the respondents are equipped with the specialized training, exercise, or actual incident response experience to manage a crude oil or ethanol by rail incident.

When asked about their capability to manage mass casualty incidents and thresholds for designating an incident, 20 percent stated that four or more patients would require a mass casualty response, while 40 percent would initiate a mass casualty incident with five patients and 45 percent would initiate a mass casualty incident with six or more patients. Note that the numbers equal 105 percent due to some individuals providing multiple responses to this question.

Almost all emergency responders interviewed stated that they have limited response capabilities or staffing for large-scale responses. In areas where volunteers serve as the primary response force, concerns were expressed about the availability of first responders due to paid work obligations.

Local firefighting foam capabilities were reported to be inadequate for large-scale spills in most rural areas. To augment foam supplies, many local first responders stated they rely on mutual aid, regional hazmat teams, nearby airports, and military installations. However, there are many types of foam, each serving a slightly different purpose, and each has a slightly different application procedure or tool. Municipal fire departments may not use the same types of foam as local airports and military installations, and may not have the training, tools, and skill sets to apply them all to properly extinguish fires or prevent ignition of released flammable liquids.

11.6 Training and Exercise

The Iowa Fire Service Training Bureau and HSEMD provide administrative and grant funding support for multiple hazardous materials training programs and courses including:

- Railroad-provided crude oil and ethanol by rail incident training programs like Transportation Community Awareness and Emergency Response (TRANSCAER) or other regional and on-site training programs;
- Local and regional training to first responders through the regional hazardous materials teams; and

- Specialized training programs at industry-specific training facilities across the country including the Security and Emergency Response Training Center (SERTC) in Pueblo, Colorado and Texas A&M Extension Service (TEEX).

Interviews with local first responders revealed that while some local responders have received the specialized incident training for crude oil transportation through the rail companies, through SERTC, or through TEEX, others have received training through regional hazardous materials response teams, TRANSCAER, or other railroad-supplied training. The interviews also revealed that many first responders have had no specialized training and remain inadequately prepared to manage or mitigate a large incident. Training limitations were often attributed to local training availability, refresher training limitations, and limited in-state opportunities for hands-on training with flammable liquids.

12.0 Private Sector, Federal, and State Roles and Responsibilities

12.1 Private Sector

Under the Oil Pollution Act of 1990 (OPA 90), the responsible party (RP) is the facility owner or operator involved in the incident. OPA-90 includes any motor vehicle, rolling stock or pipeline in their definition of facility.[60] RPs must directly provide hazardous materials response resources, environmental monitoring and protection, as well as remediation capabilities to remove the spilled product and return environment to pre-incident conditions. The RP may also be responsible for cost recovery of utilized public resources including equipment, labor, and materials costs.

The regulatory structure for crude oil and ethanol transportation by rail assigns the practical and legal responsibility for the safety of shipments to the private-sector shipping company. Industry safety standards set by the railroad companies themselves for rail transportation are sometimes more stringent than U.S. federal regulations.

In general, railroads are responsible for their equipment, tanks, tracks, lines, vehicles, personnel, and training, as well as inspection for compliance with hazardous material packaging and placarding.[61] Regarding incident response, 49 CFR 130 (Oil Spill Prevention and Response Plans) states that railroads must maintain either a basic response plan or a comprehensive response plan, if each of the tank cars used holds more than 1,000 barrels of liquid petroleum or non-petroleum oil. Comprehensive plans are subject to FRA approval, must comply with the National Contingency Plan and relevant Area Contingency Plans (ACPs), and provide for training and exercise to address a worst-case spill or release. Basic plans require only identification of the manner of response, response personnel, and equipment that will be available, and contact information. The most frequently used tanks cars are DOT-111s and CPC-1232s (compliant) and each carry about 700 barrels apiece; therefore, they do not require a comprehensive plan.[62]

Railroads frequently use unit trains to ship crude oil and ethanol by rail. Unit trains have consists of similar cars that are used to transport a single commodity (e.g. crude oil or ethanol), and are capable of transporting 70,000 barrels (or 2.94 million gallons) or more, per train. Given the broad use of unit trains, the NTSB has recommended lowering the volume threshold for comprehensive plans and covering more crude oil and ethanol unit-train shipments.

OPA-90 establishes that the owner or operator of a facility/vessel, from which oil is spilled, is liable for the cost associated with the containment and cleanup of the spill- including any damages that may have occurred. Even though the railroads do not own the cars, they maintain responsibility as operators while the rail cars are in transit. OPA-90 also requires that private companies test their plans and maintain the equipment necessary to respond to a spill. During a

[60] OPA-90. Retrieved from http://uscode.house.gov/view.xhtml?path=/prelim@title33/chapter40&edition=prelim. January 11. 2016.

[61] American Association of Railroads, *United States Hazardous Materials Instructions for Rail*. January 4. 2011. Print.

[62] Fritelli, John, Andrews, Anthony, Parfomak, Paul, Pirog, Robert, Ramseur, Jonathon, and Ratner, Michael, US Library of Congress, Congressional Research Service, US Rail Transportation of Crude Oil: Background and Issues for Congress, R43390, 2014, https://www.fas.org/sgp/crs/misc/R43390.pdf (accessed June 22, 2015).

three-year cycle, a facility must test its plan annually against the 15 preparedness components that are listed in the National Preparedness for Response Exercise Program, which was developed to meet the intent of Section 4202(a) of OPA-90.[63] Railroads may have contracts or agreements with private companies for the purpose of hazardous materials response, incident mitigation, and cleanup. These provisions must be detailed in their plans.

Railroad companies will be guided by their emergency response plans in an incident involving the transportation of crude oil and other hazardous materials, including ethanol. Emergency response plans should take into account the chemical properties of crude oil and ethanol, and the potential effects of accidental releases during transportation. The content of these plans will be familiar to agencies that have regulatory authority, at the federal and state levels; however, these plans are not always shared with local response and emergency management organizations. Lack of communication and coordination of respective response roles and capabilities across sectors creates gaps in response that may negatively impact safety of responders and the public.

To assist local first responders in response, the AAR has developed an "AskRail" smartphone application that allows trained hazardous materials first responders to query railcar contents at railroad accidents. The mobile application requires railroad-industry approved training before access is granted. Once approved, users will have real-time access to railcar consists on all North American Class I railroads. "AskRail" provides a simple way to determine whether a railcar is carrying hazardous material, while also providing essential information regarding the stability, volatility, or reactivity of products involved in a railroad accident.

As a courtesy to the RP, the Iowa DNR provides a listing of contractors, to help expedite spill response. The listed contractors have indicated to Iowa DNR that they are in compliance with OSHA regulations for emergency response personnel. Once hired by the RP, contractors are urged to communicate with Iowa DNR to ensure they are aware of site conditions, response timelines, and expectations for remediation. The contractor list provides the name, location, contact information, service area, response level, and general service limitations. Response levels are listed as:

- Level A – Requiring the greatest level of skin, respiratory, and eye protection.
- Level B – Requiring the highest respiratory protection but a lesser level of skin protection.
- Level C – Requiring lesser levels of respiratory and skin protection.
- Level D – Requiring little or no respiratory and skin protection.

12.2 Federal-State Government Relationship

Federal powers to promulgate and enforce crude oil transportation and security regulations are derived primarily from the Commerce Clause (Article 1, Section 8) of the U.S. Constitution. The Commerce Clause gives Congress the power to regulate commerce among the states, with tribes and with foreign nations. Federal regulations that address transportation, found in Title 49 of the CFR, are illustrations of this power. The Commerce Clause prohibits states from passing legislation that discriminates against or excessively burdens interstate commerce.

[63] Oil Pollution Act of 1990 33 US Code §1321; §4202 and §1321.

The Supremacy Clause (Article 6, Section 2) of the U.S. Constitution dictates that the laws of the United States are the supreme law of the land. This means that federal law takes precedence over state laws, and that federal law preempts, or invalidates, any state law that conflicts with the exercise of federal power. In many instances, Congress empowers federal regulatory agencies to set national minimum standards, but does not define such minimums as preempting state regulations that would impose more stringent standards. The U.S. Supreme Court typically prefers interpretations that avoid preempting state laws, especially those passed in an effort to improve current practices that threaten the environment and the general public.[64,65]

When a federal agency determines that regulatory action is necessary and appropriate, it develops and publishes a proposed rule in the Federal Register, soliciting comments from the public.[66] All comments, including those from private companies that the proposed rule might affect, are taken into consideration and addressed before a regulatory action is finalized. On occasion, federal changes to standards and regulations fail to keep up with an industry's rapid growth. In these cases, states may face the need to pass laws or create regulations to protect public health and safety, a role traditionally considered reserved for the states and "the people" by the 10th Amendment of the US Constitution. In these cases, the state's actions could still be vulnerable to federal preemption if and when federal agencies exercise their regulatory authority on a matter under federal authority, such as interstate transportation.

12.2.1 Federal Roles and Responsibilities

Several federal agencies have jurisdiction or responsibilities over aspects of the crude oil/ethanol (under hazardous materials transportation) transportation industry. While some responsibilities are clearly defined and directly impact the industry, others are indirect and more subtle. The summaries below provide an overview of federal department responsibilities related to hazardous materials transportation safety and incident response preparedness.

U.S. Department of Homeland Security (USDHS)

Under a variety of statutes and Executive Orders, the USDHS has been given primary responsibility for assuring security of the nation's critical infrastructure. "Homeland Security Presidential Directive 7" (HSPD-7) identified 17 critical infrastructure and key resource (CI/KR) sectors, and designated Federal Government Sector-Specific Agencies (SSAs) for each of the sectors. One particular sector deals with the energy infrastructure, which is crucial in providing stable energy supplies for the nation. The petroleum segment is most pertinent to crude oil activities, as it entails the exploration, production, transportation, and refinement of crude oil.

The U.S. Department of Energy (USDOE), and other Federal, State, and local government agencies have been working with their security partners, i.e. public/ private utilities, through Energy Sector Coordinating Councils [for oil, natural gas, and electricity] to better secure CI/KR across the nation. The Oil and Natural Gas Sector Coordinating Council (ONG SCC) represents more than 98 percent of Oil and Natural Gas Sector owners and operators. This council, formed

[64] Cornell University School of Law, *Topic: Supremacy Clause, et al*. https://www.law.cornell.edu/supct/cases/topics/tog_supremacy_clause.html (accessed June 22, 2015).
[65] Executive Office of the President, Office of Information and Regulatory Affairs, *Regulations and the Rulemaking Process*, 2015, http://www.reginfo.gov/public/jsp/Utilities/faq.jsp (accessed June 22, 2015).
[66] US Department of Homeland Security, Energy Sector-Specific Plan. *An Annex to the National Infrastructure Protection Plan*, 2010, Print.

by the Oil and Natural Gas trade associations, serves as a broad, industry-wide network to help coordinate ongoing industry initiatives, government partnerships, and responsibilities. The council selects a representative from the industry to serve as chair of the ONG SCC, and act as the liaison to USDHS.[67] USDHS collaborates and coordinates with oil and gas industry stakeholders in developing a more resilient sector, reducing vulnerabilities, and improving response for critical incidents occurring at refineries, along pipeline, etc.

In its Energy Sector-Specific Plan, USDHS states two major goals as it relates specifically to crude oil infrastructure:

- Assess security vulnerabilities at single-point assets, such as refineries, storage terminals, and other buildings, as well as networked features such as pipelines and cyber systems, and;
- Work toward secure cyber networks and Supervisory Control and Data Acquisition (SCADA) systems, which control equipment at refineries, in order to detect and respond to cyber-attacks.[68]

Since 2004, the USDHS has maintained robust infrastructure protection field operations through the Protective Security Advisor (PSA) program.[69] PSAs are subject matter experts trained in critical infrastructure protection and vulnerability mitigation. USDHS regional directors are supervisory PSAs, and are responsible for the activities of eight or more PSAs and geospatial analysts, who ensure all critical infrastructure protection programs and services are delivered to state, local, territorial, and tribal stakeholders and private sector owners and operators. Since regional directors and PSAs are strategically located across the country, they are often the first personnel from USDHS to respond and deploy to federal emergencies and disasters. During an incident, they frequently work within state and local Emergency Operations Centers and at the Federal Emergency Management Agency (FEMA) Joint Field Office, where they:

- Advise the USDHS and other government and private sector representatives on interdependencies, cascading effects, and damage assessments concerning impacts on critical infrastructure.
- Help owners and operators, law enforcement personnel, and state and local officials prioritize and coordinate re-entry and recovery activities.

In addition to the energy sector, USDHS recognizes the transportation systems sector as another component of critical infrastructure. One of the main SSAs for the transportation sector is the Transportation Security Administration (TSA). While the TSA is most known for screening passengers at airports, this arm of the USDHS is also responsible for safeguarding surface transportation. Although not concerned with federal regulations on train speeds and tank car specifications, the TSA is technically responsible for ensuring that carried cargo is safe and will not pose any threats to public safety. USDHS, in collaboration with the U.S. Department of Transportation (USDOT), developed 24 Security Action Items (SAIs) after field reviews and

[67] U.S. Department of Homeland Security. (2011). N*ational Infrastructure Protection Plan: Energy Sector*. http://www.dhs.gov/xlibrary/assets/nipp_energy.pdf

[68] U.S. Department of Homeland Security. (2010). *Energy Sector-Specific Plan: An Annex to the National Infrastructure Protection Plan*. http://www.dhs.gov/xlibrary/assets/nipp-ssp-energy-2010.pdf

[69] U.S. Department of Homeland Security. (April 2015). *Protective Security Advisors*. https://www.dhs.gov/protective-security-advisors

vulnerability analysis of railroad operations. These SAIs are voluntary measures and address three critical areas: system security, access control, and en-route security.[70] TSA actively monitors the level of SAI implementation by railroads. Observations and surveys by TSA surface transportation security inspectors focus on seven specific SAIs, which were selected because of their direct impact on transportation security.

The TSA, through its Corporate Security Review (CSR) program, assesses how a carrier's security plan addresses the transportation of hazardous materials. It reviews and assesses the effectiveness of the plans in seven areas, which includes cyber security, protection of critical assets, security awareness training, and threat assessment.[71] The TSA has a Surface Transportation Security Inspection workforce program, which deploys 175 inspectors in 54 field offices to conduct surveys and inspections of freight rail operations, throughout the nation. The efforts of the inspectors are focused on the areas of highest risk in the freight rail industry. The inspection program is responsible for verifying the implementation of voluntary security measures, conducting vulnerability assessments, and conducting regulatory compliance inspections. These inspectors also act as local liaisons to rail carriers and other government agencies for the purpose of emergency planning and response.[72]

Rail safety and security on the rail systems go hand-in-hand; TSA and USDOT continue to work together closely to address new potential vulnerabilities such as crude by rail.[73] USDHS also helped develop the Rail Corridor Risk Management System, which was a response to the freight rail industry's need for a tool to perform safety and security-route risk analyses.[74] The system meets federal regulatory requirements of HM-232E: Enhancing Rail Transportation Safety and Security for Hazardous Materials Shipment. The system allows rail operators to consider 27 required criteria including network infrastructure, railroad operations, human factors, environmental, and terrorist-related parameters. The Rail Corridor Risk Management System also assists operators in maintaining analyses documentation prior to review by the FRA.

US Department of Transportation (USDOT)

The USDOT is the umbrella agency for the FRA and PHMSA. It has the authority to regulate hazardous material transportation through the Hazardous Materials Transportation Act, the Federal Rail Safety Act, and other related rulemaking. The Hazardous Materials Transportation Act provides the authority to ensure safe and secure shipments of hazardous materials across different modes of transportation. Regulations regarding transportation of hazardous materials are developed by PHMSA and cover classification, packaging, emergency communication, security plans, risk assessments, training, and specific requirements for each transportation mode.

[70] Transportation Security Administration. (2014). *Standards and Regulations*. http://www.tsa.gov/stakeholders/standards-and-regulations-1
[71] Transportation Security Administration. (2014). *Programs and Initiatives*. http://www.tsa.gov/stakeholders/programs-and-initiatives
[72] Ibid.
[73] Sobczak, B. (24 July 2014). *As DOT issues new oil-by-rail rules, DHS lags in its security plans*. EnergyWire. http://www.eenews.net/stories/1060003375
[74] VisualRisk Technologies. (2015). *Rail Corridor Risk Management System*. http://www.vrisk.com/svcRisk.html

Regulations for Oil Spill Prevention and Response Plans (49 CFR 130) describe the minimal planning components required by transport carriers, including having a current, written comprehensive response plan if oil being transported by carriers is greater than 1,000 barrels.[75]

USDOT issued an emergency restriction on May 7, 2014 requiring all railroad carriers that operate trains transporting 1,000,000 gallons or more of Bakken crude oil to provide notification to the State Emergency Response Commissions (SERC) when such trains move through that SERC's state.[76] Minimally, notifications must provide a reasonable estimate of the number of trains that are expected to travel per week through each county, within the state. They also must describe the classification of petroleum crude oil being transported, and provide all applicable emergency response information and transportation routes for the Bakken crude oil.

Federal Railroad Administration (FRA)

The mission of the FRA is to enable the safe, reliable, and efficient movement of people and goods.[77] Under the authority delegated by the U.S. Secretary of Transportation, the FRA is responsible for ensuring secure movement of hazardous freight via railroads and enforcing hazardous materials regulations. This includes regulations on the design and use of equipment, track, locomotives, and cars used to carry hazardous materials.

The FRA is responsible for the general oversight and approval of oil-spill response plans that are developed by each railroad that transports crude oil. Policy calls for the FRA to conduct investigations of rail transportation incidents resulting in the death of a railroad employee, or injury to five or more persons. The FRA also conducts studies on activities that promote railroad safety.[78] Additionally, if an accident is significant enough, the FRA may collaborate with the NTSB during the investigation, and jointly issue safety recommendations.

The FRA has an Office of Rail Safety, which includes approximately 400 federal inspectors conducting investigations and inspections focusing on the compliance and enforcement of regulatory standards and policies. The FRA also trains and certifies state safety inspectors to enforce federal rail-safety regulations. Currently, there are 170 FRA inspectors covering 30 states.[79]

Within the Office of Rail Safety, the Hazardous Materials Division administers a safety program that oversees the movement of hazardous materials throughout the nation's rail transportation system, and ensures that hazardous materials are being packaged and/or contained according to regulations. The Office of Rail Safety also administers:

- The Risk Reduction Program Division- evaluates safety risks through accident data collection and analysis, institutionalizes best practices and lessons learned to the rail industry, provides support to stakeholders to develop strategies and plans

[75] US Department of Transportation, Pipeline Hazardous Materials Safety Administration. *Pipeline Inspections 101*. http://phmsa.dot.gov/pipeline/inspections
[76] US Department of Transportation. *Docket No. DOT-OST-2014-0067: Petroleum Crude Oil Railroad Carriers*. https://www.fra.dot.gov/Elib/Document/3860
[77] US Department of Transportation, Federal Railroad Administration. *About FRA*. https://www.fra.dot.gov/Page/P0002
[78] 49 CFR 225.31(a)
[79] US Department of Transportation, Federal Railroad Administration. *Office of Railroad Safety*. https://www.fra.dot.gov/Page/P0032

to improve safety, and develops and enforces regulations promulgated in response to the Rail Safety Improvement Act of 2008.

- The Safety Regulatory Analysis Division- plans, develops, and administers cost-effective solutions to railroad safety problems, and develops and analyzes rail-safety performance goals.
- The Operating Practices Division- examines railroad carrier operating rules, employee qualification guidelines, and carrier training and testing programs to determine compliance with occupational safety and health standards and accident and personal injury reporting requirements.
- Railroad Safety Information Management- plans and directs all activities relating to the management of railroad safety, including making railroad safety information readily available to railroad companies, research and planning organizations, and the general public.

The FRA has the authority to issue one-time approvals for the movement of compromised or damaged railcars that no longer conform to Hazardous Materials Regulations.[80] It publishes the Hazardous Materials Guidance 127 (HMG-127), which provides procedures for obtaining approvals to move "noncompliant bulk packages." This regulation establishes a "standing approval" for certain minor flaws, meaning that in most cases shippers can move tank cars with defective safety valves, dented metal, leaky heating coils (for heavy crude), or bad bottom outlet valves without formal FRA approval. Revision to this authority (Revision 4) issued October 7, 2014, include:

- Development of a flowchart to assist in determining the appropriate one-time movement approval (OTMA) category for a specific defect
- Clarification that OTMA approval is also required to move an empty non-conforming USDOT specification railcar
- Expansion of the use of a standing approval, provided that an accurate and complete notification is submitted, and that the defect is specifically allowed

Pipeline Hazardous Materials Safety Administration

PHMSA's mission is to protect people and the environment from the risks of hazardous materials transportation. It establishes national policy, sets and enforces standards in pipeline and hazardous materials safety, and works to prepare the public and responders to reduce consequences when an incident occurs.[81]

PHMSA currently has 139 federal inspection and enforcement staff and over 300 state inspectors who regulate the companies who primarily work with and transport hazardous materials. The majority of PHMSA's operations focus on conducting safety-related activities, such as public outreach and awareness, inspections for compliance, enforcement and incident investigations of any entity involved in hazardous materials transportation.

[80] 49 CFR 171-180

[81] US Department of Transportation, Pipeline Hazardous Materials Safety Administration. *PHMSA – Mission and Goals.* http://www.phmsa.dot.gov/about/mission

Found in 49 CFR 100-177, PHMSA has the authority to regulate and enforce hazardous materials procedures that each entity must follow. Each part defines terms and prescribes procedures for regulating hazardous materials safety, handling, and transport. In addition, PHMSA is the USDOT operating administration responsible for promulgating regulations implementing the Hazardous Materials Transportation Act. As authorized by the Clean Water Act (33 USC 1321), PHMSA has implemented regulations which require railroads to formulate comprehensive response plans to be implemented in the event of an oil spill. Those regulations are provided in 49 CFR 130.31.

The following are recent notices and rules issued by PHMSA related to hazardous materials use and transport:

PHMSA-2012-0082 (80 FR 26643): Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains[82] May 8, 2015

This new federal rule intends to reduce the frequency and impacts of rail accidents involving large volumes of flammable liquids. The changes address NTSB recommendations on the accurate classification and characterization of such commodities, enhanced tank car construction, and rail routing.

Under this rule, tank cars constructed after October 1, 2015, that are used to transport flammable liquids as part of a High Hazard Flammable Train (HHFT) will be required to meet specific design requirements or performance criteria (e.g., thermal, top fittings, and bottom-outlet protection; tank-head and shell puncture resistance). A HHFT is a train that includes 20 or more loaded tank cars of a Class 3 flammable liquid in a continuous series, or 35 or more loaded tank cars of a Class 3 flammable liquid total in the train.

The rule requires existing rail tank cars that are used to transport flammable liquids as part of a HHFT to be retrofitted to meet the adopted performance requirements, except for top fittings protection. Railroads operating cars that are not retrofitted may choose to retire, repurpose, or operate them under the new speed restrictions for up to five years, based on packing group assignment of the lading.

PHMSA provides the following timelines for tank cars used as part of HHFT:

1. For Packing Group I, DOT Specification 111 tank cars are not authorized after October 1, 2017;
2. For Packing Group II, DOT Specification 111 tank cars are not authorized after October 1, 2018; and
3. For Packing Group III, DOT Specification 111 tank cars are not authorized after October 1, 2020.

PHMSA-2015-0099, Notice 15-7: Hazardous Materials Emergency Response Information Requirements[83] April 23, 2015

[82] US Department of Transportation, PHMSA. *80 FR 26643*. http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=06b88ec93f83d410VgnVCM100000d2c97898RCRD&vgnextchannel=26a1d95c4d037110VgnVCM1000009ed07898RCRD&vgnextfmt=print

PHMSA issued this notice to remind hazardous materials shippers and carriers of their responsibly to ensure that current, accurate, and timely emergency response information must be immediately available to emergency response officials regarding shipments of hazardous materials, and that such information must be maintained on an ongoing basis.

US Environmental Protection Agency (USEPA)

The USEPA's mission is to protect human health and the environment.[84] It is primarily charged with implementing federal environmental law by developing and enforcing regulations protecting the environment from harm such as hazardous substances released from containment. The USEPA has responsibilities during a hazardous materials release incident, and has authority over hazardous materials through five federal laws: the Clean Air Act (CAA), the Clean Water Act (CWA), the Oil Pollution Act of 1990 (OPA90), the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The CWA covers all waters and pollution prevention. It includes the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and other provisions to protect water quality. Through the CWA, the EPA's National Pollution Discharge Elimination System controls the discharge of any pollutant from a point source into navigable waters through permitting industrial, municipal, and other business facilities where discharges go directly to surface waters.[85]

The CAA requires that any facility that stores or handles hazardous materials greater than a certain amount, and as listed in the USEPA Risk Management Plan Rule, must develop and implement a risk management program that is submitted for review by USEPA.[86]

OPA90 - Originally published in 1973 under the authority of §311 of the Clean Water Act, the Oil Pollution Prevention regulation sets forth requirements related to preventing, responding to, and paying for vessel and facility oil pollution incidents in and along navigable waterways. The term ''facility'' includes any structure, group of structures, equipment, or device (other than a vessel) which is used for one or more of the following purposes: exploring for, drilling for, producing, storing, handling, transferring, processing, or transporting oil. This term includes any motor vehicle, rolling stock, or pipeline used for one or more of these purposes.[87] To prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil, the regulation requires these facilities to develop and implement Spill Prevention, Control, and Countermeasure (SPCC) Plans and establishes procedures, methods, and equipment requirements (Subparts A, B, and C). These regulations can apply at production and loadout

[83] US Department of Transportation, PHMSA. *Notice No. 15-7: Hazardous Materials: Emergency Response Information Requirements*. https://www.federalregister.gov/articles/2015/04/23/2015-09436/hazardous-materials-emergency-response-information-requirements

[84] US Environmental Protection Agency. *Our Mission and What We Do*. http://www2.epa.gov/aboutepa/our-mission-and-what-we-do

[85] Summary of the Clean Water Act, 33 USC Section 1251 wt. seq. Retrieved from https://www.epa.gov/laws-regulations/summary-clean-water-act. March 14, 2015.

[86] US Environmental Protection Agency, *Risk Management Plan Rule, List of Regulated Substances under the Risk Management Plan Program*, http://www2.epa.gov/rmp/list-regulated-substances-under-risk-management-plan-rmp-program

[87] Oil Pollution Act of 1990. Title 1. Section 1001(9).

facilities. At this time, Iowa does not currently have any crude oil loadout facilities; however, this ruling would be applicable if conditions change in the future.

The EPCRA requires states and municipalities to develop state emergency response commissions (SERCs) and local emergency planning committees (LEPCs). SERCs are responsible for establishing procedures for managing and processing requests for information collected under EPCRA, reviewing local emergency response plans, designating local emergency planning districts, appointing LEPCs, and supervising LEPC activities.[88] The LEPCs are responsible for developing emergency response plans for the potential release of hazardous substances.

The CERCLA mandates that USEPA take immediate action in the event of a chemical release that poses an imminent threat to public health and safety.[89] In conjunction with the passage of the act, Congress broadened and strengthened the emergency response capabilities of the National Contingency Plan. Mandated as one of the Special Forces under the NCP, USEPA's Environmental Response Team (ERT) functions in an advisory capacity to USEPA On-Scene Coordinators (OSCs), Remedial Project Managers, Site Assessment Managers, USCG OSCs, other federal, state, and local officials, and foreign governments concerned with hazardous waste sites, spills, and other environmental threats. In addition, the ERT provides training to first responders, such as local firefighters and other emergency personnel, on aspects of emergency spill response and readiness.

12.2.2 State of Iowa - Agencies

Depending on the type and magnitude of an incident, multiple state agencies may have roles and responsibilities. State law establishes state agencies' responsibilities and authorities generally. The Oil and Hazardous Materials (hazmat) Response Emergency Support Function – 10 (ESF-10) to the Iowa Emergency Response Plan (IERP), developed and maintained by Iowa HSEMD, provides direction to Iowa's state agencies and local governments. The following section identifies agencies with responsibilities and roles for preparedness, response, and recovery activities involving crude oil incidents.

Iowa Homeland Security and Emergency Management Division

Established under Iowa Code 29C, Iowa HSEMD is responsible for the administration of emergency planning matters, including emergency resource planning in this state, cooperation with, support of, funding for, and tasking of the United States Air Force Auxiliary- Civil Air Patrol for missions not qualifying for federal mission status.[90]

During emergencies and disasters, Iowa HSEMD provides resources and mutual aid to local political subdivisions in the state when local jurisdictions have depleted their own resources or do not have sufficient capability to manage an incident. Iowa HSEMD may also activate the State Emergency Operations Center and/or deploy state coordinated resources as needed to assist with emergency operations.

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[88] US Environmental Protection Agency, *State Emergency Response Commissions*, http://www2.epa.gov/epcra/state-emergency-response-commissions

[89] US Environmental Protection Agency. *Summary of the Comprehensive Environmental Response, Compensation, and Liability Act.* http://www2.epa.gov/laws-regulations/summary-comprehensive-environmental-response-compensation-and-liability-act

[90] Iowa Code, Chapter 29C, *Emergency Management Security*. Print.

State resources coordinated through Iowa HSEMD include the homeland security and emergency response teams. These teams are deployed as a state asset only by a directive from the administrator or under a governor's disaster proclamation, unless the sponsoring local agency's response team is needed to perform emergency services within its own jurisdiction.

At its discretion, an Iowa HSEMD emergency response team may deploy at the direct request of a local jurisdiction, without a directive from the Iowa HSEMD administrator or without a Governor's disaster proclamation. In such cases, a team deployed upon local request may seek compensation from the local jurisdiction making the request and in accordance with any current mutual aid agreements.[91]

Iowa HSEMD provides staff and support to local jurisdictions to review, and amend as appropriate, the hazardous materials portion and at a minimum of 20 percent of the remaining ESF's or portions of local emergency operations plans on a yearly basis. Through the review process, Iowa HSMED ensures the hazardous materials plans meet the minimum requirements of federal law, 42 U.S.C. §11003 for Comprehensive Emergency Response Plans. The complete local emergency operations plans are reviewed entirely, and amended as appropriate, every five years.

Also chartered through Iowa Code 29C, Iowa HSEMD develops and maintains a public emergency notification system called "Alert Iowa." This public mass notification and emergency messaging system is limited to imminent emergency and public safety-related issues. Iowa HSEMD also provides access to the system for use, as needed or desired, to county and local emergency management coordinator offices, and is under the control of the Local Emergency Management Commissions.[92] As of November 16, 2015, there were 87 of Iowa's 99 counties signed up to use the Iowa Alert system. Out of the 87 counties, 76 are able to register users and issue alerts, while the remaining 11 counties are still preparing their systems for use.[93]

Iowa Department of Natural Resources (DNR)

The Iowa DNR oversees response regulations and EPCRA reporting, and requires that all persons manufacturing, storing, transporting, handling, or disposing of a hazardous substance to report all hazardous conditions to DNR and local law enforcement as soon as possible, but no later than six hours after discovery of the incident. The Iowa DNR also provides technical and regulatory support to first responders responding to incidents creating a hazardous condition.

As noted under the Private Sector section above, the Iowa DNR provides a listing of contractors as a courtesy to a responsible party (RP) to help expedite spill responses. Iowa DNR does not register, certify, or endorse hazardous materials response contractors, nor do they require responsible parties (RP) to hire contractors on the department's list. Once hired by the RP, contractors are urged to communicate with Iowa DNR to ensure they are aware of site conditions, response timelines, and expectations for remediation. A list of private contractors can be found through the DNR at www.iowadnr.com/spills/

[91] Iowa Administrative Code. Homeland Security and Emergency Management Department [605]. *Chapter 12*. Print.
[92] Iowa Code, Chapter 29C, *Emergency Management Security*. Print.
[93] Iowa Alert Statewide Messaging System. Retrieved from http://homelandsecurity.iowa.gov/about_HSEMD/alert_iowa.html on December 08, 2015.

The Iowa Environmental Protection Commission (Iowa EPC) provides policy oversight to the state's Department of Natural Resources (Iowa DNR), and consists of a panel of citizens, appointed by the Governor and confirmed by vote of the Senate, who provide oversight over Iowa's environmental protection efforts.[94] The Iowa EPC is primarily concerned about air, land, and water quality standards. Its primary statutory responsibilities include establishing policy for Iowa DNR approving or denying the issuance of hazardous waste disposal site licenses, and approving budgets related to projects advancing public and environmental health and safety.

While the Iowa EPC works to establish sound policy to protect public and environmental health and safety, Iowa DNR is charged with enforcing the state's environmental laws and addresses any concerns by the public regarding anything that may have a detrimental impact to the Iowa's natural resources. Iowa DNR has environmental jurisdiction over publicly owned land and water.

The Iowa EPC and Iowa DNR understand the importance of not only environmental laws but also the implementation and enforcement of such laws to ensure that Iowa's natural resources are preserved. Through authority established by the Iowa legislature, the Iowa DNR is charged with ensuring compliance with state environmental laws and regulations by private companies, relevant stakeholders, and the general public. To ensure compliance, the Iowa EPC and Iowa DNR have established several programs to educate citizens and promote awareness of applicable laws and the impacts on Iowa's natural resources. In addition, the Iowa DNR issues administrative orders to individuals and companies who have violated state laws and regulations, and uses a variety of tools to ensure regulatory compliance ranging from technical assistance to legal actions.

Iowa Department of Transportation

Iowa DOT is the primary entity that oversees rail transportation within the state through its Office of Rail Transportation. The Office of Rail Transportation is primarily responsible for all rail interests within the state's 3,869[95] miles of operational track. Its actions are governed by applicable federal and state policymaking authorities along with related resources.[96] The 2009 Iowa Railroad System Plan serves as a guide for the improvement of the State's rail network, with respect to the Iowa's communities and economy. The plan also identifies the key issues that the Iowa's rail network faces, and provides an action plan for addressing these issues.[97] An updated plan was being developed at the time of this study; a 2016 Iowa Railroad System Plan is anticipated.

The Office of Rail Transportation conducts research, analysis, and recommendations on how to improve overall rail transportation as it relates to public safety, environmental health, and economic impacts. It also provides resources to relevant stakeholders, railroad companies, and the general public. The Office of Rail Transportation assists any person or entity with questions or concerns regarding rail transportation and directs them to the appropriate agency or representative, as appropriate.[98]

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[94] Iowa Code 2015. 455A.6 Environmental Protection Commission- appointment and duties.
[95] Association of American Railroads, *Railroads and States*. https://www.aar.org/data-center/railroads-states#state/IA. Retrieved January 13, 2016.
[96] Iowa DOT, Office of Rail Transportation. *About Us*. http://www.iowadot.gov/iowarail/aboutus/contactus.htm
[97] Iowa DOT. *Rail Transportation Plan*. http://www.iowadot.gov/iowainmotion/rail.html
[98] Iowa DOT, Office of Rail Transportation. *Office of Rail*. http://www.iowadot.gov/iowarail/index.htm

Although Iowa DOT is responsible for rail transportation within the state, it has limited regulatory authority. The state has limited legislation regarding railroads and follows federal policies. The state defers its jurisdiction over railroads to the FRA and Surface Transportation Board (STB).[99] Iowa DOT does participate and make the state's voice heard during FRA and STB rule making. It also assists in resolving complaints about railroads through a formal contested case process involving the Iowa Department of Inspections and Appeals.

Iowa code also specifically states that any statute conflicting with federal laws, rules, or regulations applicable to railway will be suspended to the extent necessary to eliminate inconsistency.[100]

Iowa Utilities Board

The Iowa Utilities Board (IUB) regulates utilities to ensure safe and environmentally responsible utility services are available to the public. As stated in Iowa Code, the IUB has the authority to supervise all pipelines within the state. It is also primarily responsible for regulating the rates and services of electric, natural gas, and water utilities, the services of communications utilities, and the transmission, sale, and distribution of electrical current.[101]

In 2001, the Iowa Legislature passed a law requiring utility companies to obtain approval from railroad companies to allow their utilities to cross any railroad right-of-way. A railroad right-of-way is essentially an interest or property owned, occupied, operated, or managed by a railroad corporation.[102] As a result, the IUB adopted rules requiring each railroad and each public utility with a facility crossing railroad right-of-way to file with the IUB contact information for emergency notifications 24 hours per day, seven days per week.[103] The IUB currently lists all the emergency contact information for railroads and public utilities, as well as a state railroad map on its website.

[99] Iowa DOT, Office of Rail Transportation. *Regulatory Jurisdiction Over Railroads*. http://www.iowadot.gov/iowarail/railroads/regulatory/whoregulates.htm
[100] Iowa Code 2015. 327D.200 Inconsistency with federal law- railroads
[101] Iowa Utilities Board. *Jurisdiction*. https://iub.iowa.gov/jurisdiction-of-the-board
[102] Iowa Code 2015. 476.27 *Public utility crossing- railroad rights-of-way*.
[103] Iowa Administrative Code. 199 IAC 42.4(2) Emergency notice and repairs.

13.0 Crude Oil and Ethanol Transportation: Risk and Vulnerability Assessment Methodology

This section presents a top-level summary of the risks and vulnerabilities associated with transporting crude oil and ethanol by rail through Iowa. The Risk and Vulnerability Assessment (RVA) is a tool that considers crude oil transportation routes, recorded previous events, likelihood of future incidents, and potential impacts from those incidents to derive an aggregate value for risk. County-specific information may be available to those who are authorized to review it upon official request to Iowa DOT.

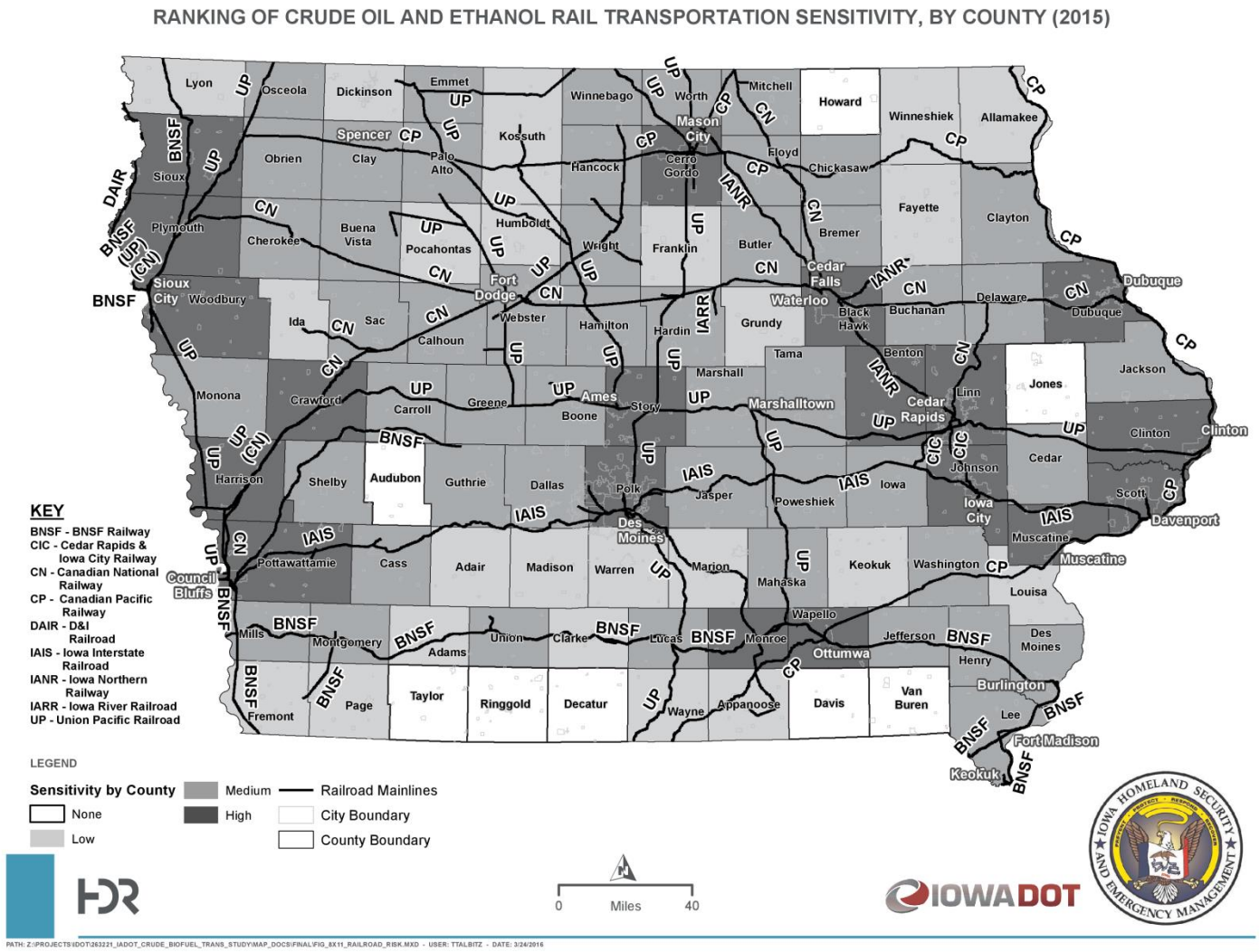
This RVA is a building block process using various factors, such as length of railroad track, volume of traffic on the rails, and populations, critical facilities, and environmentally important segments within an identified hazard area. The individual factors are analyzed to determine and overall risk for a given county. The data and information provided for this RVA are the best available data at the time of collection and should be regarded as a snapshot in time; data could change over time. In addition, all risk assessment results are based on methodology designed specifically for the State of Iowa using Iowa-specific data, statistics, and conditions.

The results of the "Risk and Vulnerability Assessment," in its entirety, can be found in Appendix E. It is intended for planning purposes only, including prioritization and development of prevention, protection, mitigation, response, and/or recovery strategies and resources.

13.1 Results

Figure 19, below, depicts a graphical ranking by Iowa county of bulk crude oil and ethanol rail transportation sensitivity. It is crucial to note that this map does not indicate the likelihood of a rail transportation incident, but aids in reinforcing the intended actions of the RVA.

Figure 19. Ranking of Crude Oil and Ethanol Rail Transportation Sensitivity, by County (2015)



Source: HDR, Inc. as of 3/24/2016

14.0 Recommendations, Measurements, Policy, and Action Plan

This section presents recommendations for policy changes, actions, and measures that could be undertaken in the State of Iowa to aid in reducing the risk of incidents involving crude oil and ethanol transportation by rail in Iowa. By improving the preparedness and response to incidents, and the recovery from incidents the risks to life, public safety, property, and the environment may be reduced. All recommendations made are with the intent to maintain and enhance the economic competitiveness of Iowa's agricultural, industrial, and transportation industries, while also improving the quality of life and safety of Iowa's residents and visitors. These recommendations are intended to maintain Iowa's environmental stewardship and protection, and provide transparency to Iowa's citizens about the processes and plans that the state could implement in reducing risks to casualty of life, property, and the environment.

The recommendations are categorized as follows:

1. Identifying key communications protocols and practices improvements.
2. Training, equipping, coordination, and organization improvements.
3. Railroad safety practices, equipment, infrastructure, and organization improvements.
4. Shipper safety practices, equipment, infrastructure, and organization improvements.
5. Creating measurement methods for quantifying improvement in safety, reduction in risk, and effectiveness of policies.
6. Policy recommendations for organization of emergency response, , training and assistance, communications and response management, railroad and shipper inspection and public transparency.

Additionally, an Action Plan concept was developed that will aid all stakeholders in describing the key actions that can be taken to reduce risk of crude oil and ethanol rail and improve prevention, preparedness, and response. Iowa DOT and Iowa HSEMD will cooperate on the completion of the Action Plan prior to the release of the Study. The Action Plan concept is further described in Section 15.0.

Note: Tables 6 - 9, in Section 15, present a cohesive view of the findings, recommendations, and improvement actions related to crude oil and ethanol rail transportation, respective of Iowa's prevention, preparedness, response, and recovery capabilities.

14.1 Identification of Communications Improvements

The Study Team inquired about communications capabilities for local and state government departments and railroads operating in Iowa. Information was collected on day-to-day planning, training, exercise, and maintenance of situational awareness communications among the emergency management, first responder, and railroad operator community. The emergency communications capabilities study area focused on interoperable communications and the ability for the various members of the emergency response community (including railroad operators) to communicate with each other in support of emergency operations. Identified potential areas of improvement are provided below.

14.1.1 Non-Emergency Communications

Emergency management, first responders, and railroads in Iowa could potentially make the following improvements:

- Iowa DOT, Iowa DNR, and Iowa HSEMD may consider developing a hazardous materials transportation incident response planning committee to develop guidance and work with Local Emergency Planning Committees (LEPC) and emergency management coordinators to develop local incident-specific response plans and capabilities.
- Iowa HSEMD, on behalf of the SERC, should continue to work with local LEPC coordinators and emergency management coordinators to ensure that bulk Class 3 flammable liquid train traffic notifications are shared with emergency response partners who would normally be a member of an active LEPC, including the fire chief, police chief, and other response operational groups. [104]
- The state should consider working with the United States Department of Transportation (USDOT) to ensure the Fixing America's Surface Transportation (FAST) Act of 2015 addresses the gap between advance notification of Bakken oil and ethanol rail transportation when both commodities, carried in quantity are identified as high-hazard flammable trains by the FRA and Pipeline and Hazardous Materials Safety Administration's (PHMSA), and present the same risk to the local communities.[105]
- LEPCs should consider actively seeking participation by railroads and shippers, and providing them with a statewide schedule of LEPC meetings and agendas.
- Local emergency managers and first responders should consider working with the railroads on confidentiality agreements in order to receive commodity flow information annually from the railroads so that they have a better understanding of all potential hazardous materials that are transported along the tracks through their jurisdiction.
- The state of Iowa could create a series of public service announcements (e.g. short videos, social media, etc.) to create awareness for the critical facilities (e.g. daycare centers, nursing homes, hospitals, schools, etc.) located within hazard areas. This could provide emergency managers, who usually work with these facilities, another tool to educate the public and create awareness.

14.1.2 Emergency Communications

Emergency management, first responders, and railroads could potentially make the following improvements:

[104] H.R. 22, 114th Congress, FAST Act, Title VII. Subtitle C. Section 7302(a)(3)(C).
[105] Fixing America's Surface Transportation Act. Specifically, Sec. 7302(a)(3). December 1, 2015. Retrieved from http://transportation.house.gov/uploadedfiles/crpt-114hrpt-hr22.pdf. January 11, 2016.

- Railroads, state and local authorities could work together to promote the "AskRail" mobile application statewide and work with first responders to obtain the required training and clearances to access the application.
- The state should consider updating its railroad GIS databases with an identification of the present ownership and operation of each railroad segment in Iowa and the appropriate railroad contact information. The state should consider furnishing this database to Iowa railroads and request verification of the information annually.
- The state should consider meeting with Iowa railroads to identify strategies to simplify and standardize methods of communication and coordination with railroads during an incident and share that information with local emergency managers.

14.2 Improvements to Training, Equipping, Coordination, and Organization

This section identifies improvements to training, equipping, coordination, and organization for the state's railroads, producers/shippers, emergency management/response agencies and other state agencies.

14.2.1 Railroads

Railroads in Iowa could potentially make the following improvements:

- Provide additional safety and awareness training for railroad employees who work on or near active railroad property in order to better identify potential defects to track, bridges and structures, grade crossing surfaces, and signals and mechanical defects on locomotives and railcars in order to minimize the likelihood of derailments, hazardous materials incidents, personal injury, and other accidents.
- Enhance safety training coordination and discussion of best safety practices between railroads and between railroads and local emergency response agencies, when applicable.
- Recognize varying needs for information used by stakeholders (e.g. seasonal statistics vs. yearly statistics), and custom tailor information appropriately.
- Participate in additional opportunities for joint training exercises with Iowa's shippers/producers and emergency management agencies.
- Share resource maps with all key stakeholders, showing the locations of emergency response equipment and firefighting foam resources. Contact information for railroad hazardous material personnel and hotlines could be included on this map. All information could potentially be reviewed annually and updated to reflect any significant changes.

14.2.2 Producers/Shippers

Producers/shippers in Iowa could potentially make the following improvements:

- Provide additional safety and awareness training for employees who work on or near active railroad track, railcars, and ethanol loading/unloading infrastructure in order to better identify potential mechanical defects, decrease the potential of personal injuries, and to minimize the likelihood of an improperly secured car rolling away and derailing.
- Participate in joint training exercises with Iowa's railroads and emergency management agencies.
- Enhance communication and coordination with railroads and emergency management agencies.

14.2.3 Emergency Management/Response Agencies and Other State Agencies

Emergency management/response agencies in Iowa could potentially make the following improvements:

- Increase participation in joint training exercises with Iowa's railroads and shippers/producers.
- Iowa HSEMD should consider developing a web portal that allows for better information sharing to include identification of lessons learned, exemplary practices, and railroad incident training opportunities to be accessible to all local first responders and emergency managers in the state.
- The state, along with the Hazmat Task Force, Iowa Firefighters Association, and railroads operating in Iowa, may consider assembling a focus group to identify ways to improve training, preparedness, and response capabilities for volunteer emergency responders.
- Iowa HSEMD and state agency and association partners should consider development of a comprehensive, one-stop web portal to provide access and guidance to training opportunities, grants, and other preparedness and response resources.
- The state should consider requesting Iowa railroads to report annually on their derailment prevention program by segment, including current derailment rate, and programs or practices undertaken each year to reduce derailment rate. This information would enable Iowa to target investments in derailment prevention to the counties with the highest risks.
- County officials should consider prioritizing the identification and maintenance of revenue to fund a full-time emergency manager in each county, or consider resource sharing among neighboring counties to create a full-time emergency manager position that serves a larger community or region. This increase in emergency management capacity would better serve the local planning, preparedness, and response needs of the local communities.
- In counties where crude oil and ethanol are transported by rail, local emergency management could profile and analyze rail incident risk and vulnerability to

identify and prioritize mitigation measures through their local and regional Incident Management Standard Operating Guidelines/Procedures.

- Counties and municipalities, with support from the state, should consider identifying, mapping, and assessing the vulnerability of the critical infrastructure and vulnerable populations located within 0.5 mile of rail lines to determine areas of highest risk, and then prioritize preparedness, response, or mitigation actions for those areas to reduce the risk and improve response.
- Iowa HSEMD could assist local emergency managers with the development of local evacuation and sheltering plans for rail incidents where public health and safety is at risk.
- Iowa DNR and Iowa HSEMD may consider polling local emergency managers and first responder groups to determine which counties need assistance enhancing LEPC membership, participation, and best practices.
- Iowa HSEMD on behalf of the SERC should continue to work with local LEPC coordinators and emergency management coordinators to ensure that bulk Class 3 flammable liquid train traffic notifications are shared with emergency response partners who would normally be a member of an active LEPC including the fire chief, police chief, and other response operational groups. [106]
- State departments including Iowa DOT, Iowa HSEMD, and Iowa DNR may consider working with local emergency managers and the railroads to develop local crude oil and ethanol (flammable liquids) transportation incident response standard operating procedures or guidelines.
- The Iowa Fire Service Training Bureau, Hazmat Task Force, and the crude oil transportation industry (including shippers and carriers) should work together to identify, fund, and offer specialized hazardous materials response training to all local, state, and tribal first responders. These partners should consider identifying and providing a mobile, local program of training and exercises that meets the appropriate response level criteria for the level of response anticipated by the local first responders. This response level capability should run from active firefighting response (when adequately trained staff are available) to appropriate geographical and situation stabilization activities in tandem with coordination with specialty response teams sent for support. Some responders may only need training on how to evacuate, shelter, and protect lives, while others may need training to support the regional hazardous materials responders (including foam application and hazardous materials decontamination).
- Iowa HSEMD and the Hazmat Task Force should consider establishing a statewide standard for firefighting foam capabilities for municipal fire department operations at a crude oil or ethanol spill and assist local fire departments and partner resources with designing a path that brings all responders to the same standard.

[106] H.R. 22, 114th Congress, FAST Act, Title VII. Subtitle C. Section 7302(a)(3)(C).

- The Hazmat Task Force should consider conducting a study to determine how much firefighting foam should be accessible on a regional basis that can be deployed to a rail incident involving crude oil or ethanol.
- The state, in partnership with the Hazmat Task Force, should consider purchasing and strategically placing firefighting foam and application tools around the state for rapid deployment.
- Iowa HSEMD may consider developing a capabilities list of all the regional hazmat teams as a database to maintain situational awareness of the varied response capabilities of the teams, including training/certification levels of team members, equipment caches, availability of team members, and fee structures for each team.
- Iowa HSEMD could consider development of a comprehensive database of applicable state, and local equipment and resources, their location, team training and certification levels, availability, subscription or fee structure, and procedure for activation, deployment, and mobilization.
- Iowa HSEMD should consider working with Iowa DNR to update Iowa DNR's list of private contractors operating in Iowa, and to ensure the list of capabilities, certifications, training, and equipment can then be made available to local emergency managers, first responders, and incident responsible parties.
- Iowa DOT and Iowa HSEMD should work with the American Short Line and Regional Railroad Association (ASLRRA) and the Association of American Railroads (AAR) to include Class II and Class III railroads in the "AskRail" mobile application.
- The state should consider increasing state funding and seeking federal grants to focus on high safety benefit-cost ratio improvements such as removal of rail joints in bridges, bridge approaches, and crossings; and installation of asset-protection devices.

14.3 Improvements to Railroad Safety Practices, Equipment, Infrastructure, and Organization

This section identifies improvements to safety practices, equipment, infrastructure, and organization for the state's railroads that can be potentially implemented in the short-term and long-term horizons by the state's railroads and the State of Iowa.

14.3.1 Short-Term Improvements by the Railroads

Iowa's railroads could potentially make the following short-term improvements:

- Replace ties in main tracks, sidings, and yards and make general improvements to track surface as part of a routine track maintenance program.
- Install a fixed derail device on industry trackage at a location with a turnout to a railroad main track or siding.
- Install switch point protectors on main track turnouts.

- Enhance safety, emergency response, and training coordination and communication between railroads and between railroads and local emergency response agencies in Iowa.
- Report annually on their respective infrastructure investment and improvement programs by segment.
- Voluntarily maintain track structure and geometry to higher than federally acceptable levels established for each FRA Track Class, e.g. if the maximum allowable operating speed is 25 mph, or Class 2 for freight trains, then track could be maintained to Class 3 track standards. This practice could result in a higher detection of defects, due to tighter tolerances in track inspection practices. Firmer maintenance practices could also be adapted, allowing for conditions and/or defects to be appropriately remedied. Together, more frequent inspections and enhanced maintenance could result in safer conditions for trains, railroad personnel, and the public.

14.3.2 Short-Term Improvements by the State of Iowa

The State of Iowa could potentially make the following short-term improvements:

- Consider requesting of the Federal Railroad Administration (FRA) that it adjust the railroad's advance crude oil transportation reporting requirements from a 25 percent change in volume to a smaller change in traffic volume (e.g. no more than a 10 train per week range variance or when a 10 percent or greater change in traffic volume is scheduled to occur).
- Consider increasing state funding and seeking federal grants to focus on high-safety benefit-cost ratio improvements such as removal of rail joints in bridges, bridge approaches, and grade crossings in addition to the installation of additional wayside asset-protection devices.

14.3.3 Long-Term Improvements by the Railroads

Iowa's railroads could potentially make the following long-term improvements:

- Replace lighter rail sections (i.e. 75-100 lbs. / yd.) with heavier rail sections (i.e. 110-136 lbs. / yd.) on main tracks and sidings.
- Replace jointed rail sections on main tracks and sidings (including elimination of bridge joints, when applicable) with continuous welded rail that is free of joints.
- Replace main track turnouts.
- Install switch point indicators on select main track turnouts on lines that do not have a wayside signal system.
- Implement a Positive Train Control (PTC) system on Class I railroad main lines in Iowa that are required to have such a system. Under the Rail Safety Improvement Act of 2008, and a subsequent October 2015 extension of the Act, U.S. railroads have until December 31, 2018, to fully implement PTC. Iowa's

Class I railroads have begun the development of PTC systems over main lines in Iowa meeting the criteria for such a system.

- Install additional wayside asset protection devices to mitigate against potential rail equipment defects and failures and associated rail damage (i.e. hot box detectors, dragging equipment detectors, and Wheel Impact Load Detectors).
- Upgrade bridges and other structures to accommodate railcars with heavier maximum allowable gross weights of 286,000 lbs.
- Replace wooden-pile bridge structures with corrugated metal pipes, pre-stressed concrete structures, and steel bridges.
- Convert open-deck bridges to ballast deck bridges to improve track geometry and ride quality.
- Replace rail in road/rail grade crossing surfaces, as necessary.
- Undercut or improve drainage at road/rail grade crossing surfaces, as necessary.
- Upgrade active warning devices at public grade crossings to include flashing light signals and gates, close public grade crossings, or grade separate public grade crossings. Grade crossing closures and grade separations could be prioritized based upon risks, accident trends, and other safety considerations.
- Work with industry organizations (e.g. Association of American Railroads, American Short Line and Regional Railroad Association, American Railway Engineering and Maintenance-of-Way Association, and FRA Railroad Safety Advisory Committee) to develop best practices for defect detector equipment spacing on hazardous material routes in Iowa. Also, these same entities could establish best practices for mud-fouled ballast, and its effects on track surface. Proactive interventions set forth by mud-fouled ballast best practices could help eliminate the frequency of track surface problems for railroads and decrease the likelihood of derailments.

14.3.4 Long-Term Improvements by the State of Iowa

No potential long-term improvements by the State of Iowa were identified.

14.4 Improvements to Producer/ Shipper Safety Practices, Equipment, Infrastructure, and Organization

This section identifies improvements to safety practices, equipment, infrastructure, and organization for the state's producers/shippers that can be potentially implemented in the short-term and long-term horizons by the state's producers/shippers and the State of Iowa.

14.4.1 Short-Term Improvements by Producers/Shippers

Producers/shippers in Iowa could potentially make the following short-term improvements:

- Enhance monitoring of potential mechanical issues and loading/unloading device defects for cars used in the transportation of ethanol in Iowa.

- Continue maintenance of detailed railcar inspection documentation, including an inspection checklist.
- Develop a uniform railcar inspection checklist for use by producers/shippers of ethanol in Iowa.
- Assure that hazardous materials placards on railroad tank cars carrying ethanol, whether loaded or empty with residue only, are properly displayed.
- Invite Iowa DOT track inspectors to inspect track at producer/shipper facilities and implement recommendations.

14.4.2 Short-Term Improvements by the State of Iowa

The State of Iowa could potentially make the following short-term improvements:

- The Iowa DOT should consider hiring an FRA-certified motive power and equipment (MP&E) inspector to visit each Iowa ethanol facility on an annual basis to observe inspection practices and report on training, qualifications, and hand-off of tank cars from the ethanol refinery to the handling railroad. The state should consider coordinating with the FRA to obtain its ethanol refinery inspection reports.

14.4.3 Long-Term Improvements by Producers/Shippers

Producers/shippers in Iowa could potentially make the following long-term improvements:

- Most railcar equipment used in the transportation of ethanol by rail is privately owned by shippers and railcar leasing companies. Continued investment could be made in upgraded or newly constructed railroad tank cars that have a thicker steel covering to increase strength and prevent puncture during a derailment or crash, thermal jacket design to withstand heat and reduce the risk of tank failure by fire impingement, and an enhanced bottom outlet valve designed to withstand impact from a derailment or crash, thus reducing the risk of leaks and spills.

14.4.4 Long-Term Improvements by the State of Iowa

The State of Iowa could potentially make the following long-term improvement:

- Development of an ethanol refinery tank car mechanical inspection program for the state, based on its findings from its first year of ethanol facility inspections and coordination.

14.5 Improvements to Safety, Risk Reduction, and Policy Effectiveness

This section identifies methods for measuring improvements to safety, risk reduction, and policy effectiveness for the state's railroads, producers/shippers, the State of Iowa, and emergency management agencies.

14.5.1 Railroads

Railroads in Iowa could potentially make the following improvements:

- The results from this Study serve as a baseline for future comparisons, since the Study's findings are a snapshot of current practices between Iowa's railroads, producers/shippers, and emergency management personnel. The questionnaires that were sent out by the Study team (found in Appendix H) through Iowa HSEMD's network of emergency management personnel could be easily duplicated in the future. Iowa railroads could potentially administer the same questionnaire and compare results to measure the perceived progress regarding safety, risk reduction, and policy effectiveness.

14.5.2 Producers/Shippers

Producers/shippers in Iowa could potentially make the following improvements:

- Maintain a coordinated inventory of emergency response assets with the railroads.

14.5.3 State of Iowa

The State of Iowa could potentially make the following improvements to the Iowa rail network:

- To maximize public-private coordination efforts, Iowa should recommend that the state, railroads, TRANSCAER, and other railroad-related organizations report annually on the results of their preparedness programs, using simple metrics such as number of local emergency managers and first responder organizations contacted and offered training and exercises; number of coordination meetings attended; and number of first responders trained and number of exercises held. Iowa could facilitate preparedness through tracking and providing the contact information of all local emergency managers and first responder organizations for each of the Iowa railroads, with respect to each railroad's territory.
- The state could consider annual recovery program reporting by Iowa's railroads. This information would enable Iowa to target recovery preparedness to counties where railroad recovery capabilities may have a shortfall.
- The state should consider developing a railroad "key derailment risk matrix" that identifies potential track, bridge, signal, grade crossings, and asset-protection risks, while tracking this over time for each rail line segment.
- The state should consider ranking at-grade crossings based on their risk relative to their exposure to crude oil, ethanol, and other high-risk hazardous commodities such as toxic inhalation gases, and the crossing's proximity to risk to the public, and develop an investment program in conjunction with railroads and local and county governments that targets high-risk crossings.
- The state should consider increasing its funding level for at-grade crossing improvement projects, focusing on high safety benefit-cost ratio improvements such as closure, signage, and signaling.

14.5.4 Local Emergency Management Agencies

Local emergency response agencies in Iowa could potentially make the following improvements:

- In counties through which crude oil and ethanol are transported by rail, local emergency management could profile and analyze rail incident risk and vulnerability to identify and prioritize mitigation measures through their local and regional Hazard Mitigation Plans.
- Counties and municipalities, with support from the state, should consider identifying, mapping, and assessing the vulnerability of the critical infrastructure and vulnerable populations located within 0.5 mile of rail lines to determine areas of highest risk, and then prioritize preparedness, response, or mitigation actions for those areas to reduce the risk and improve response.

14.6 Policy Recommendations

This section includes economic and safety policy recommendations for organization of emergency response, railroad and shipper inspection, training and assistance, communications and response management, and public transparency.

14.6.1 Prevention

- Railroad infrastructure investment programs may vary by railroad, and may not address the most critical needs or match with risk profiles for each county, in Iowa. Railroads may not have the resources to improve track, bridges, signals, and grade crossings, or to install asset-protection devices such as Wheel Impact Load Detectors, Hot-Box Detectors, or Dragging-Equipment Detectors. The state of Iowa has limited knowledge of the practices of individual railroads and their operational and financial capabilities relating to improvements to rail, crossing protection, and safety devices to address critical needs. The state should consider an annual discussion with Iowa's railroads regarding their infrastructure investment and improvement needs.
- The State of Iowa could consider requesting Iowa railroads to report annually on their investment and improvement in infrastructure. This information would enable Iowa to target investments in derailment prevention to the counties with the states perceives to have higher risks.
- Iowa DOT should consider hiring an FRA-certified motive power and equipment (MP&E) inspector to visit each Iowa ethanol facility on an annual basis to observe inspection practices and report on training, qualifications, and hand-off of tank cars from the ethanol refinery to the handling railroad. The state should consider coordinating with the FRA to obtain its ethanol refinery inspection reports.
- The state should evaluate and refine an ethanol refinery tank car mechanical inspection program based on its findings from its first year of inspections and coordination.

14.6.2 Preparedness

- Based on recent federal legislation (FAST Act, December 1, 2015), the Iowa DOT and Iowa HSEMD may consider designating a program coordinator(s) to monitor and track compliance with new hazardous materials and railroad operations rules including, but not limited to, reporting hazardous materials transportation information to fusion centers and the State Emergency Response Commission (SERC) (and subsequent reporting to the state stakeholder agencies and local government emergency response community), High-Hazard-Flammable-Train reporting requirements, and DOT-117 rail car compliance.
- The state may consider requesting of the Federal Railroad Administration (FRA) that it adjust the railroad's advance crude oil transportation reporting requirements from a 25 percent change in volume to a smaller change in traffic volume (e.g. no more than a 10 train per week range variance or when a 10 percent or greater change in traffic volume is scheduled to occur).
- To maximize public-private coordination efforts, Iowa should recommend that the state, railroads, TRANSCAER, and other railroad-related organizations report annually on the results of their preparedness programs, using simple metrics such as number of local emergency managers and first responder organizations contacted and offered training and exercises; number of coordination meetings attended; and number of first responders trained and number of exercises held. Iowa could facilitate preparedness through tracking and providing the contact information of all local emergency managers and first responder organizations for each of the Iowa railroads, with respect to each railroad's territory.

14.6.3 Response

- State departments including Iowa DOT, Iowa HSEMD, and Iowa DNR should consider working with local emergency managers to develop local crude oil and ethanol (flammable liquids) transportation incident response standard operating procedures or guidelines.
- Iowa HSEMD and the Hazmat Task Force should consider establishing a statewide standard for firefighting foam capabilities for municipal fire department operations at a crude oil or ethanol spill and assist local fire departments and partner resources with designing a path that brings all responders to the same standard.
- The Iowa Fire Service Training Bureau, Hazmat Task Force, and the crude oil transportation industry (including shippers and carriers) should work together to identify, fund, and offer specialized hazardous materials response training to all local, state, and tribal first responders. These partners should consider identifying and providing a mobile, local program of training and exercises that meets the appropriate response level criteria for the level of response anticipated by the local first responders. This response level capability should run from active firefighting response (when adequately trained staff are available) to appropriate geographical and situation stabilization activities in tandem with coordination

with specialty response teams sent for support. Some responders may only need training on how to evacuate, shelter, and protect lives, while others may need training to support the regional hazardous materials responders (including foam application and hazardous materials decontamination).

- Iowa HSEMD may consider developing a capabilities list of all the regional hazmat teams as a database to maintain situational awareness of the varied response capabilities of the teams, including training/certification levels of team members, equipment caches, availability of team members, and fee structures for each team.
- Iowa HSEMD should consider working with Iowa DNR to update Iowa DNR's list of private contractors operating in Iowa, and to ensure the list of capabilities, certifications, training, and equipment can then be made available to local emergency managers, first responders, and incident responsible parties.
- Iowa DOT may consider establishing hazardous materials transportation reporting for Class II and III railroads operating in the state, to be consistent with the USDOT requirement for Class I railroad reporting.
- Iowa HSEMD and the Hazmat Task Force should consider establishing a statewide standard for firefighting foam capabilities for municipal fire department operations at a crude oil or ethanol spill and assist local fire departments and partner resources with designing a path that brings all responders to the same standard.

14.6.4 Recovery

- The state should consider annual reporting by Iowa railroads on their recovery program. This information would enable Iowa to target recovery preparedness to counties where railroad recovery capabilities may have a shortfall.

15.0 Action Plan and Improvement Implementation Strategy

15.1 Introduction

In July 2015, Iowa DOT commissioned a study of crude oil and ethanol railroad transportation incident response preparedness within the state and by an independent party. The study was developed to serve as a tool to assist Iowa's state, local, and tribal government departments in determining the status of current prevention, preparedness, response, and recovery for crude oil and ethanol railroad transportation incidents across the state. The geographic, administrative, and operational areas identified in the report were qualitatively and quantitatively assessed for risks, vulnerabilities, and capabilities. Results of the assessments then provided challenges and recommendations to reduce risk and vulnerability through policy change, planning, training and education, communication, and additional resources. Note that the principal biofuel transported by railroads in and through Iowa is ethanol, but risks, vulnerabilities, and recommendations are in most cases general to all flammable liquids transported by rail.

This Improvement Strategy for Iowa's work toward improving safety in crude oil and ethanol railroad transportation is designed to provide a strategic roadmap to address potential areas of improvement. It provides the list of challenges and recommendations and incorporates program enhancements to align the relevant aspects of emergency management and response programs with nationally recognized standards and exemplary practices. Improvements will involve participation and input from agencies, departments, and staff from across Iowa's state departments, local governments, and railroad operators

The Improvement Strategy is organized by the following recognized emergency management pillars: prevention, preparedness, response, and recovery in concert with the organization of the findings and recommendations in the report.

15.2 Objective

The vision of the Iowa DOT and Iowa HSEMD [and request from the participants of the Study Stakeholder Committee meetings] was to ensure that this study does not become a static document, but rather something that can be integrated to augment Iowa's readiness to serve its communities and people. Therefore, the objective of this Implementation Strategy is to provide a roadmap that addresses areas where modifications or enhancements in Iowa's emergency management and response program activities are desired, in order to reduce risk and vulnerability, while improving life and property protection when a crude oil or ethanol railroad transportation incident occurs. These improvement initiatives are anticipated as part of an overall effort to continue to build strong emergency management and disaster response capabilities to serve the residents of Iowa.

15.3 Improvement Implementation Strategy Overview

The Improvement Implementation Strategy is based on the assessment, findings, and recommendations that were uncovered as part of the Study. State and local-level agencies and departments, ethanol producers/shippers, and railroads all provided interviews and documentation to aid in determining Iowa's capability to respond and manage crude oil and ethanol transportation incidents.

This Improvement Implementation Strategy builds on the findings and recommendations provided in the Study and identifies actions that Iowa state and local departments can take to work toward improved crude oil and ethanol transportation safety, preparedness, and response. The Improvement Implementation Strategy, found in Table 6 through Table 9 below, outlines the 35 recommendations of the report and identifies actions to address each recommendation.

To supplement the Improvement Implementation Strategy, Iowa DOT and Iowa HSEMD will be utilizing an Improvement Implementation Worksheet to identify agency responsibilities and the steps or actions needed to complete each Improvement Action. The worksheet also serves as a planning aid in identifying resources, while also helping to track the progress of each of the improvement actions. Ultimately, the document will help to establish realistic benchmarks to help accomplish tasks by their appropriate due dates. Iowa DOT and Iowa HSEMD will receive regular updates on program improvement progress from the assigned staff that are responsible for the Improvement Actions.

15.3.1 Improvement Implementation Strategy – Prevention

Table 6. Improvement Implementation Strategy – Prevention

Findings/Challenges	Recommendations	Improvement Actions
Prevention		
1. At-grade crossing collisions, which can lead to derailments and incidents, are a single type of risk that requires coordination among state and local government entities to reduce and eliminate. At-grade grade-crossing signal improvements, separations, or closures can be costly and/or difficult to accomplish.	**1.A:** The state should consider ranking at-grade crossings based on their risk relative to their exposure to crude oil, ethanol, and other high-risk hazardous commodities such as toxic inhalation gases, and the crossing's proximity to the public, and develop an investment program in conjunction with railroads and local and county governments that targets public funds onto higher-risk crossings.	**1.A-1:** Reassess the current at-grade crossing benefit-cost process related to hazardous commodities risk. **1.A-2:** Include hazardous materials as a variable in the crossing consolidation formula. **1.A-3:** Build awareness through education and enforcement via the law enforcement and judiciary communities.
	1.B: The state should consider increasing its funding level for at-grade crossing improvement projects, focusing on high safety benefit-cost ratio improvements such as closure, signage, and signaling.	**1.B-1:** Advocate for state and federal funding for railroad-highway grade crossings.
2. The state has limited knowledge of shipper mechanical and safety inspection practices and execution for ethanol tank cars loaded at ethanol producers in Iowa.	**2.A:** The Iowa DOT should consider hiring an FRA-certified motive power and equipment (MP&E) inspector to visit each Iowa ethanol facility on an annual basis to observe inspection practices and report on training, qualifications, and hand-off of tank cars from the ethanol refinery to the handling railroad. The state should consider coordinating with the FRA to obtain its ethanol refinery inspection reports.	**2.A-1:** Work with the Regional FRA to determine whether a state MP&E inspector is necessary and beneficial. **2.A-2:** If determined necessary, advocate for a new position. **2.A-3:** Discuss with ethanol producers and railroads on how a program could be implemented. **2.A-4:** Increase communication with regional FRA MP&E and hazmat inspectors.
	2.B: The state should evaluate and refine an ethanol refinery tank car mechanical inspection program based on its findings from its first year of inspections and coordination.	**2.B-1:** Collect related information from the FRA and refineries for program evaluation. Include Iowa railroads during implementation process.

Findings/Challenges	Recommendations	Improvement Actions
3. Railroad infrastructure investment programs help reduce risk of derailments. Potential impacts of derailments, from the state's perspective, are different in each area based on the built and physical environment adjacent to the rail line, and the capabilities of the local response system. Railroad infrastructure investment programs would help the state to reduce risk of derailments. Public investments could include track, bridges, signaling and grade crossings improvements, or installation of asset-protection devices such as Wheel Impact Load Detectors, Hot-Box Detectors, or Dragging-Equipment Detectors.	**3.A:** The state should consider an annual discussion with Iowa's railroads regarding their infrastructure investment and improvement needs. This discussion would enable private /public partnerships for Iowa to target public investments in derailment prevention to the areas that the state perceives to have higher physical and natural environment risks and lower response capabilities.	**3.A-1:** Set up a regular channel to discuss infrastructure investment and improvement needs.
	3.B: The state should consider developing a "public investment inventory" to share with the railroads that identifies improvements supported with public funds including past and anticipated decision criteria.	**3.B-1:** Annually track infrastructure improvements that have been made through public investment.
	3.C: The state should consider increasing state funding and seeking federal grants to focus on high safety benefit-cost ratio improvements such as removal of rail joints in bridges, bridge approaches, and crossings; and installation of asset-protection devices.	**3.C-1:** Advocate for additional funding and seek grant opportunities.

15.3.2 Improvement Implementation Strategy – Preparedness

Table 7. Improvement Implementation Strategy – Preparedness

Findings/Challenges	Recommendations	Improvement Actions
Preparedness		
1. Local emergency preparedness activities, including that for rail incidents involving crude oil or ethanol, is the responsibility of local emergency managers/coordinators. Many local emergency coordinators are not full-time employees and/or have multiple responsibilities/assignments often not related to emergency management.	**1.A:** County officials should consider prioritizing the identification and maintenance of revenue to fund a full-time emergency manager in each county, or consider resource sharing among neighboring counties to create a full-time emergency manager position that serves a larger community or region. This increase in emergency management capacity would better serve the local planning, preparedness, and response needs of the local communities.	**1.A-1:** Conduct outreach to the Iowa Emergency Managers Association, League of Cities, and Iowa State Association of Counties to fully inform them of the importance of the roles the Emergency Manager undertakes, and form a study group to identify areas where regional emergency management coverage would be of benefit.

Findings/Challenges	Recommendations	Improvement Actions
2. Many counties and municipalities plan along "all-hazards lines" in Iowa and generally do not specifically separate out the risks and vulnerabilities related to crude oil and ethanol transportation by rail or related mitigation measures that can reduce risk.	**2.A:** In counties where crude oil and ethanol are transported by rail, local emergency management could profile and analyze rail incident risk and vulnerability to identify and prioritize mitigation measures through their local and regional Incident Management Standard Operating Guidelines/Procedures.	**2.A-1:** Continue to support activities through current and future funding streams. **2.A-2:** Encourage coordination at a systems level for this particular hazard.
3. Many local jurisdictions do not have adequate mapping or information gathering capabilities to identify critical infrastructure or vulnerable populations within a 0.5-mile buffer area of railroad main tracks carrying crude oil or ethanol, or within 0.5 miles of major yards.	**3.A:** Counties and municipalities, with support from the state, should consider identifying, mapping, and assessing the vulnerability of the critical infrastructure and vulnerable populations located within 0.5 mile of all railroad main tracks and major yards to determine areas of highest risk, and then prioritize preparedness, response, or mitigation actions for those areas to reduce the risk and improve response.	**3.A-1:** Develop a better understanding of GIS capabilities at the state and local level. Update the status of GIS capabilities by exploring ways to enhance and support locals. **3.A-2:** Iowa HSEMD could advocate for an additional GIS position to help support these activities. **3.A-3:** Iowa DOT/HSEMD can provide critical infrastructure and vulnerable population data created for this study **3.A-4:** Iowa DOT and HSEMD should determine and maintain an appropriate update cycle for this shareable GIS data. **3.A-5:** Quadrenially update risk vulnerability assessment by county.
4. Not all local jurisdictions have written evacuation and shelter plans related to a rail incident involving crude oil or ethanol and other hazardous materials transported by rail.	**4.A:** Iowa HSEMD could assist local emergency managers with the development of local evacuation and sheltering plans tailored for rail incidents where public health and safety is at risk.	**4.A-1:** Iowa HSEMD can provide tailored technical assistance and guidance when evacuation and sheltering plans are updated. **4.A-2:** Create public outreach for instructional media related to evacuation and sheltering activities for people in the hazard areas or buffer zones.
5. Emergency Managers noted that railroads do not typically attend Local Emergency Planning Committee (LEPC) meetings. Some ethanol plants attend, but not all.	**5.A:** LEPCs should consider actively seeking attendance by railroads and shippers, and providing them with a statewide schedule of LEPC meetings and agendas.	**5.A-1:** Disseminate LEPC meeting information and dates, with advanced notice, to all interested stakeholders. **5.A-2:** Encourage Iowa DOT District involvement in LEPCs.

Findings/Challenges	Recommendations	Improvement Actions
		5.A-3: Advocate rail issues in general emergency management venues.
	5.B: Iowa DNR and Iowa HSEMD may consider polling local emergency managers and first responder groups to determine which counties need assistance enhancing LEPC membership, participation, and best practices.	**5.B-1:** Iowa HSEMD can provide an online survey tool to gauge the needs of LEPC management. **5.B-2:** Provide a LEPC best-practices workshop. **5.B-3:** Advocate rail issues in general emergency management venues.
	5.C: Iowa DOT, Iowa DNR, and Iowa HSEMD may consider developing a crude oil and ethanol transportation incident response planning committee to develop guidance and work with LEPCs and emergency management coordinators to develop local incident specific response plans and capabilities.	**5.C-1:** Develop a crude oil and ethanol transportation incident response planning working group from the IERC
6. Federal, state, and industry training and readiness information is often difficult to locate and access.	6.A: Iowa HSEMD, state agencies, and association partners should consider development of a comprehensive, one-stop web portal to provide access and guidance to training opportunities, grants, and other preparedness and response resources.	**6.A-1:** Iowa HSEMD will create a consolidated training calendar on their website. **6.A-2:** Iowa HSEMD can internally try to coordinate grant resources and rail training in a more consolidated form.
7. Federally required crude oil traffic notifications from the railroads to the state have too great a range of traffic volume for effective situational awareness and response planning purposes in some areas. The 25 percent range of change in volume is too broad for some local planners to be comfortable about knowing how much crude oil is being transported through their community.	**7.A:** The state should consider requesting of the FRA that it adjust railroad advance crude oil transportation reporting requirements to notify Iowa HSEMD on behalf of the State Emergency Response Commission (SERC) in advance of scheduled shipments, from a 25 percent change in volume to a smaller range of traffic volume (e.g. no more than a 10 train per week range variance or when a 10 percent or greater change in traffic volume is scheduled to occur).	**7.A-1:** Continue to work with the railroads to find satisfactory reporting regimens that work with both the local responders and the railroads.
8. Federally required Bakken oil train traffic notifications are provided by the railroads to the Iowa HSEMD, on behalf of the SERC, then passed on to the LEPC, local emergency management coordinator,	**8.A:** Iowa HSEMD, on behalf of the SERC, should continue to work with local LEPC coordinators and emergency management coordinators to ensure the oil train traffic notifications are shared with emergency response partners who would normally be a member of an active LEPC including the fire chief, police chief, and other response operational	**8.A-1:** Iowa HSEMD will continue to notify Iowa LEPCs and emergency managers on the affected routes. **8.A-2:** Iowa HSEMD will continue to notify relevant state partners.

Findings/Challenges	Recommendations	Improvement Actions
Iowa DOT, and other response entities with a need to know as allowed by state and federal law. Some counties do not have LEPCs that meet regularly to receive and act on new information.	groups.	**8.A-3:** Iowa HSEMD will assure all emergency managers understand what to expect from the reporting process.
9. Under the standing USDOT Emergency Order, Class I railroads are required to share information on changes to Bakken oil train traffic volume with the SERC. They are not required to share the same information for ethanol trains or other trains that also operate as High-Hazard Flammable Trains (HHFT), and present a similar hazard to railroad communities across Iowa.	**9.A:** The state should consider working with the USDOT to address the information-sharing gap between Bakken oil, and other oil, ethanol, and other commodities when carried in quantity and identified as high-hazard flammable trains by the FRA and PHMSA, and present similar risks to local communities.	**9.A-1:** Local, state, and railroads should continue to work together to find common ground on these issues.
	9.B: Local emergency managers and first responders should consider requesting hazardous commodity flow information from the railroads so that they have a better understanding of all potential hazardous materials that are transported along the tracks through their jurisdiction.	**9.B-1:** Local, state, and railroads should continue to work together to find common ground on these issues.
10. Local and rail industry information sharing related to exemplary practices for preparedness, response capability, and mutual aid, as well as public sector outreach and rail-specific training opportunities are not equal for all communities across the state.	**10.A:** The state should consider developing a web portal that allows for better information sharing, lessons learned, exemplary practices, and railroad incident training opportunities to be accessible to all local first responders and emergency managers in the state	**10.A-1:** Iowa HSEMD can open discussion with the rail industry to determine ways to improve information sharing.
11. Iowa's railroads do not have similar methods for measuring the effectiveness or accomplishments of their preparedness programs.	**11.A:** To maximize public-private coordination efforts, Iowa should recommend that the state, railroads, TRANSCAER, and other railroad-related organizations report annually on the results of their preparedness programs, using simple metrics such as number of local emergency managers and first responder organizations contacted and offered training and exercises; number of coordination meetings attended; and number of first responders trained and number of exercises held. Iowa could facilitate preparedness through tracking and providing the contact information of all local emergency managers and first responder organizations for each of the Iowa railroads, with respect to each railroad's territory.	**11.A-1:** The state is willing to work with the railroads on tracking and reporting of all preparedness, response, and training efforts as part of the public outreach and education program. **11.A-2:** Iowa HSEMD can provide emergency manager and first responder contact information to the railroads. **11.A-3:** Iowa DOT can provide the railroad contact information to Iowa HSEMD for dissemination to appropriate local authorities. **11.A-4:** Iowa HSEMD and Iowa DOT will work with the railroads to encourage exercises when testing planning assumptions.

15.3.3 Improvement Implementation Strategy – Response

Table 8. Improvement Implementation Strategy – Response

Findings/Challenges	Recommendations	Improvement Actions
Response		
1. Many local emergency operations plans, annexes, incident response plans, and standard operating procedures/guidelines take an all-hazards approach and do not specifically address rail incidents involving crude oil or ethanol or other flammable liquids.	**1.A:** State departments including Iowa DOT, Iowa HSEMD, and Iowa DNR should consider working with local emergency managers to develop local crude oil, ethanol, and other flammable liquids transportation incident response standard operating procedures or guidelines.	**1.A-1:** Iowa HSEMD will work with local emergency managers and LEPCS to provide technical assistance on their plans.
2. Many local first responders are not trained or equipped to appropriately respond to a large rail incident involving crude oil or ethanol on their own. (It is not the goal, however, to have every responder capable of an active response where scene security and notification is the appropriate response).	**2.A:** The Iowa Fire Service Training Bureau, the Iowa Firefighter's Association, Hazmat Task Force, and the crude oil transportation industry and ethanol transportation industry (including shippers and carriers) should work together to identify, fund, and offer specialized hazardous materials response training to all local, state, and tribal first responders. These partners should consider identifying and providing a mobile, local program of training and exercises that meets the appropriate response level criteria for the level of response anticipated by the local first responders. This response level capability should run from active firefighting response (when adequately trained staff are available) to appropriate geographical and situation stabilization activities in tandem with coordination with specialty response teams sent for support. Some responders may only need training on how to evacuate, shelter, and protect lives, while others may need training to support the regional hazardous materials responders (including foam application and hazardous materials decontamination).	**2.A-1:** Encourage the formation of an IERC crude oil transportation incident response planning working group to coordinate these issues.
	2.B: The state, along with the Hazmat Task Force, Iowa Firefighters Association, and railroads operating in Iowa, may consider assembling a focus group to identify ways to improve training, preparedness, and response capabilities for volunteer emergency responders.	**2.B-1:** Encourage the formation of an IERC crude oil transportation incident response planning working group to coordinate these issues.
3. Local firefighting foam resources in rural areas are not sufficient to fight large-scale rail incidents involving crude oil, ethanol, or other flammable liquids.	**3.A:** Iowa HSEMD, the Hazmat Task Force, and the Fire Service Training Bureau of the Department of Public Safety should consider conducting a study to determine how much firefighting foam should be accessible on a regional basis that can be deployed to a rail incident involving crude oil, ethanol, or other flammable liquids.	**3.A-1:** Iowa HSEMD can take the lead in coordinating the group on this issue. **3.A-2:** Coordinate with the railroads on this issue.

Findings/Challenges	Recommendations	Improvement Actions
	3.B: Iowa HSEMD, the Hazmat Task Force, and the Fire Service Training Bureau of the Department of Public Safety should consider establishing a statewide standard for firefighting foam resources for municipal fire department operations at a crude oil, ethanol, or other flammable liquids spill and assist local fire departments and partner resources with designing a path that brings all responders to the same standard.	**3.B-1:** Iowa HSEMD can take the lead in coordinating the group on this issue. **3.B-2:** Coordinate with the railroads on this issue.
	3.C: Iowa HSEMD, the Hazmat Task Force, and the Fire Service Training Bureau of the Department of Public Safety should consider purchasing and strategically placing firefighting foam and application tools around the state for rapid deployment.	**3.C-1:** Iowa HSEMD can take the lead in coordinating the group on this issue. **3.C-2:** Coordinate with the railroads on this issue.
4. Counties across the state rely on Hazmat teams to provide hazardous materials response capabilities, usually at a subscription fee, and with varied degrees of capability and availability to respond due to distance from the hazmat team's home base.	**4.A:** Iowa HSEMD may consider developing and maintaining a capabilities list of all the regional hazmat teams as a database to maintain situational awareness of their varied response capabilities including: equipment caches, location, team training and certification levels, availability, and procedures for activation, deployment, and mobilization.	**4.A-1:** Iowa HSEMD can take the lead in coordinating the group on this issue. **4.A-2:** Coordinate with the railroads on this issue.
5. No individual state department maintains a centralized, comprehensive database of private crude oil, ethanol, or other flammable liquids incident response equipment, qualified spill response contractors, and related resources.	**5.A:** Iowa HSEMD may consider developing and maintaining a response capabilities list of all the railroads as a database to maintain situational awareness of their varied response capabilities including: equipment caches, location, team training and certification levels, and procedures for activation, deployment, and mobilization.	**5.A-1:** Iowa HSEMD and Iowa DNR will work with the railroads, AAR, and ASLRRA to devise an easy and well-maintained process.
	5.B: Iowa HSEMD should consider working with Iowa DNR to update Iowa DNR's list of private contractors operating in Iowa, and to ensure the list of capabilities, their location, certifications, training, and equipment can then be made available to local emergency managers, first responders, and incident responsible parties.	**5.B-1:** Iowa HSEMD and Iowa DNR will work with the railroads, AAR, and ASLRRA to devise an easy and well-maintained process.
6. Local first responders need real-time electronic access to cargo manifest data for rail shipments.	**6.A:** Railroads, state and local authorities should work together to promote and facilitate, statewide, the use of "AskRail" mobile application and work with first responders to obtain the required training and clearances to access the application.	**6.A-1:** Poll stakeholders to determine obstacles to the use of "AskRail," if any. **6.A-2:** Ask the AAR for plain language summaries of appropriate and inappropriate use of the "AskRail" application. **6.A-3:** Promote the clarification of the legal concerns related to the access and use of the "AskRail" application.

Findings/Challenges	Recommendations	Improvement Actions
	6.B: Iowa DOT and Iowa HSEMD should work with the short line railroad association and the AAR to include Class II and Class III railroads in the "AskRail" mobile application.	**6.B-1:** Iowa HSEMD and Iowa DOT should contact AAR and ASLRRA.
7. GIS databases that identify railroad ownership and operators are not completely accurate, particularly in urban areas where trackage is complex. First responders may be delayed in contacting the correct railroad in the event of an incident.	**7.A:** The state should consider updating its railroad GIS databases with accurate information on the railroad responsible for dispatching each line segment, including contact information for that railroad. The state should consider annually furnishing this database to Iowa railroads and request verification of the information.	**7.A-1:** Promote the railroad crossing identifiers (Emergency Notification System signs) that provide the railroad contact information. **7.A-2:** Promote the availability to Iowa DOT's current GIS data. **7.A-3:** Explore the feasibility of adding and improving GIS staffing, capabilities, and data.
8. Railroad notification in the event of an incident is unique to each railroad.	**8.A:** The state should consider meeting with Iowa railroads and discussing methods to simplify and standardize how railroads are contacted and coordinated with during an incident and share that information with local emergency managers.	**8.A-1:** Facilitate an open discussion with railroads on this issue. **8.A-2:** Iowa DOT will continue education and outreach to local responders and dispatch centers on the meaning and use of Emergency Notification System.

15.3.4 Improvement Implementation Strategy – Recovery

Table 9. Improvement Implementation Strategy - Recovery

Findings/Challenges	Recommendations	Improvement Actions
Recovery		
1. The railroads methods for recovering from incidents are unique to each railroad. Railroads may have different financial and organizational capability to respond to in incident. The state has low visibility into railroad capabilities.	**1.A:** The state should consider requesting Iowa railroads to report annually on their recovery program.	**1.A-1:** Work with the railroads to refine the challenge and recommendation, then determine a path forward.

Crude Oil and Biofuels Rail Transportation Study

Appendices

April 2016

Contents

1.0 Appendix A – Rules and Regulations for the Rail Haulage of Crude Oil and Ethanol

1.1 Rules and Regulations for Rail Haulage of Crude Oil and Ethanol

Table A-1. Rules and Regulations for Rail Haulage of Crude Oil and Ethanol

Rules and Regulations	Description
PHMSA	
PHMSA-2012-0082 – Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains[1]	This new federal rule[2] intends to reduce the frequency and impacts of rail accidents involving large volumes of flammable liquids. The changes address NTSB recommendations on the accurate classification and characterization of such commodities, enhanced tank car construction, and rail routing. The final rule is effective July 7, 2015. Under this rule, tank cars constructed after October 1, 2015, that are used to transport flammable liquids as part of a High Hazard Flammable Train (HHFT) would be required to meet specific design requirements or performance criteria (e.g., thermal, top fittings, and bottom-outlet protection; tank-head and shell puncture resistance). A HHFT is a train that includes 20 or more loaded tank cars of a Class 3 flammable liquid in a continuous series, or 35 or more loaded tank cars of a Class 3 flammable liquid total in the train.[3] PHMSA received comments through September 30, 2014, on the redesign of railcar DOT Specification 117 to replace DOT 111 series railcars. The rule requires existing rail tank cars that are used to transport flammable liquids as part of a HHFT to be retrofitted to meet the adopted performance requirements, except for top fittings protection. Railroads operating cars that are not retrofitted may choose to retire, repurpose, or operate them under the new speed restrictions for up to five years, based on packing group assignment of the lading.[4] The rule also requires one of these options for new tank cars constructed after October 1, 2015, if those tank cars are used as part of HHFT. In addition, for all three options, PHMSA provides the following timelines for tank cars used as part of HHFT: • For Packing Group I, DOT Specification 111 tank cars are not authorized after October 1, 2017; • For Packing Group II, DOT Specification 111 tank cars are not authorized after October 1, 2018; and • For Packing Group III, DOT Specification 111 tank cars are not authorized after October 1, 2020.
PHMSA-2015-0099, Notice 15-7 – Hazardous Materials: Emergency Response Information Requirements[5]	On April 17, 2015, PHMSA issued this notice to remind hazardous materials shippers and carriers of their responsibly to ensure that current, accurate, and timely emergency response information must be

[1] U.S. Department of Transportation, DOT Announces Final Rule to Strengthen Safe Transportation of Flammable Liquids by Rail, http://www.dot.gov/briefing-room/final-rule-on-safe-rail-transport-of-flammable-liquids (accessed June 22, 2015).

[2] U.S. Department of Transportation, Pipeline Hazardous Materials Safety Administration, Hazardous Materials: Rail Petitions and Recommendations to Improve the Safety of Railroad Tank Car Transportation, Federal Register 80, No.89, (May 8, 2015), 26644, http://www.regulations.gov/#!docketDetail;D=PipelineHazardousMaterialsSafetyAdministration-2012-0082 (accessed June 22, 2015).

[3] Ibid.

[4] Sixty-fourth Legislative Assembly of North Dakota, North Dakota Senate Bill No. 2008, January 6, 2015, http://www.legis.nd.gov/assembly/64-2015/documents/15-8141-06000.pdf?20150622211124 (accessed June 22, 2015).

[5] U.S. Department of Transportation, Federal Railroad Administration. Safety Advisory 2014-01/Pipeline Hazardous Materials Safety Administration-2014-0049; Notice 14-07 – Recommendations for Tanks Cars Used for the

Rules and Regulations	Description
	immediately available to emergency response officials regarding shipments of hazardous materials, and that such information must be maintained on an ongoing basis.
FRA	
Docket No. FRA-2014-0032, Notice No. 2, Securement of Unattended Equipment	On July 29, 2015, the FRA issued the Final Rule for Securement of Unattended Equipment. This amends the brake system safety standards for freight and other non-passenger trains and equipment to strengthen the requirements relating to the securement of unattended equipment.
FRA Emergency Order No. 30, Notice No. 1 – Operating Speed in High-Threat Urban Areas for Trains Transporting Certain Flammable Liquids[6]	On April 17, 2015, the FRA issued an Emergency Order to require that trains transporting large amounts of Class 3 flammable liquid through designated highly populated areas adhere to a maximum authorized operating speed limit. Affected trains must not exceed 40 miles per hour in high threat urban areas, as defined in 49 CFR 1580.3.
FRA Safety Advisory 2015-02/PHMSA 2015-0118, Notice 15-11, Hazardous Materials – Information Requirements Related to Certain Trains Carrying Flammable Liquids[7]	On April 17, 2015, FRA and PHMSA issued this notice to remind railroads operating HHFTs, trains comprised of 20 or more loaded tank cars with a Class 3 flammable liquid in a continuous block, or any train with 35 or more loaded tank cars of a Class 3 flammable liquid across the entire train (as well as the offerors of the materials being transported), that specific requested information may be required by PHMSA and/or FRA personnel during the course of an investigation immediately following an accident.
FRA Safety Advisory 2015-01 – Inspections and Standards for Certain Trains Transporting Flammable Liquids	On April 17, 2015, the FRA issued this advisory recommending enhancements to the mechanical safety of the cars in trains transporting large quantities of Class 3 flammable liquids. This advisory recommends that railroads use highly qualified individuals to conduct the brake and mechanical inspections, and recommends a reduction to the impact threshold levels the industry currently uses for wayside detectors. These threshold levels measure wheel impacts to ensure the tank cars' wheel integrity.
Docket No. DOT-OST-2014-0067 – Petroleum Crude Oil Railroad Carriers[8]	This notice, issued May 7, 2014, is an Emergency Restriction/Prohibition Order from USDOT pursuant to 49 United States Code (USC) 5121(d). The order went to all railroad carriers that transport, in a single train in commerce within the US, at least 1 million gallons or more of Class 3 light sweet crude oil. USDOT now requires the railroads to provide notification to State Emergency Response Commissions (SERCs) when trains meeting this criteria move through that SERC's state. Notification must identify each county through which the trains will operate.
FRA Safety Advisory 2014-	This safety advisory provides notice to companies that ship bulk

Transportation of Petroleum Crude Oil by Rail, http://www.fra.dot.gov/eLib/details/L05222 (accessed June 22, 2015).

[6] U.S. Department of Transportation, Emergency Order: Emergency Restriction/Prohibition, 2014, http://www.transportation.gov/sites/dot.gov/files/docs/Emergency%20Restriction%20-%20Prohibition%20Order%20(Docket%20DOT-OST-2014-0025).pdf (accessed June 22, 2015).

[7] U.S. Department of Transportation, Pipeline Hazardous Materials Safety Administration, Notice 15-7 – Hazardous Materials: Emergency Response Information Requirements, 2015-0099, April 17, 2015, http://www.phmsa.dot.gov/staticfiles/PipelineHazardousMaterialsSafetyAdministration/DownloadableFiles/Files/PipelineHazardousMaterialsSafetyAdministration_Notice_15_7_Emergency_Response_Info_Requirements.pdf (accessed June 22, 2015).

[8] U.S. Department of Transportation, Federal Railroad Administration, Notice of Safety Advisory 2015-02/Pipeline Hazardous Materials Safety Administration 2015-0118, Hazardous Materials: Information Requirements Related to the Transportation of Trains Carrying Specified Volumes of Flammable Liquids, http://phmsa.dot.gov/staticfiles/PipelineHazardousMaterialsSafetyAdministration/DownloadableFiles/Files/fra_phmsa_info_sa_4_17_15_2015_04_16_181411.pdf (accessed June 22, 2015).

Rules and Regulations	Description
01/PHMSA-2014-0049; Notice 14-07 – Recommendations for Tanks Cars Used for the Transportation of Petroleum Crude Oil by Rail[9]	quantities of Class 3 light sweet crude oil within the US. It encourages offerors and rail carriers to take additional precautionary measures to enhance the safe shipment of light sweet crude oil by rail. The advisory urges offerors and carriers to select and use the railroad tank car designed with the highest level of integrity that is reasonably available within their fleet.
One Time Movement Authorization Revision	FRA has the authority to issue one-time approvals for the movement of compromised or damaged railcars that no longer conform to Hazardous Materials Regulations (49 CFR 171-180). FRA publishes the Hazardous Materials Guidance 127 (HMG-127), which provides the procedures to be followed by the regulated community to obtain approvals to move such cars (known as "noncompliant bulk packages"). HMG-127 establishes a "standing approval" for certain minor flaws. That means, in most cases, shippers can move tank cars with defective safety valves, dented metal, leaky heating coils (for heavy crude), or bad bottom outlet valves without formal FRA approval. Revision to this authority (Revision 4) issued October 7, 2014, include: Development of a flowchart to assist in determining the appropriate one-time movement approval (OTMA) category for a specific defect Clarification that OTMA approval is also required to move an empty non-conforming USDOT specification railcar Expansion of the use of a standing approval, provided that an accurate and complete notification is submitted, and that the defect is specifically allowed
Private Industry	
BNSF-Specific Crude Oil Safety Measures	A BNSF press release issued in March 2015 provided a list of BNSF-specific actions aimed to reduce risk of rail accidents. Actions that became effective in March and April 2015, include lower train speeds of 35 mph for all shale oil trains operating through municipalities with populations of 100,000 or more; formal community outreach initiative; development of a real-time geographic information system (GIS) tracking application for state emergency responders; increased track inspections along critical waterways; and increased trackside safety technology with Hot Bearing Detectors spaced every 10 miles along critical waterways.[10]

[9] Bakken Crude Stabilization Act of 2015, HR1679, 114th Congress, Congressional Record, https://www.congress.gov/bill/114th-congress/house-bill/1679?q=%7B%22search%22%3A%5B%22HR+1679%22%5D%7D (accessed June 22, 2015).

[10] BNSF. Specific Crude Oil Safety Measures Implemented by Railroads (2014 and 2015). Print.

1.2 Chronology of PHMSA and FRA Safe Transportation of Energy Products Regulations

Table A-2. Chronology of PHMSA and FRA Safe Transportation of Energy Products Regulations

PHMSA and FRA Safe Transportation of Energy Products Chronology September 2012 – October 2015	
October 14, 2015	PHMSA invited comments on the topic of Flammable Hazardous Materials by Rail Transportation. This information collection pertains to requirements for the creation of a sampling and testing program for unrefined petroleum-based products and rail routing for High Hazard Flammable Trains (HHFTs), routing requirements for rail operators, and the reporting of incidents that may occur from HFFTs. This reporting requirement would require owners of non-jacketed DOT-111 tank cars in Packing Group I service in an HHFT to report to DOT the following information regarding the retrofitting progress: The total number of tank cars retrofitted to meet the DOT-117R specification; The total number of tank cars built or retrofitted to meet the DOT-117P specification; The total number of DOT-111 tank cars (including those built to CPC-1232 industry standard) that have not been modified; The total number of tank cars built to meet the DOT-117 specification; and The total number of tank cars built or retrofitted to a DOT-117, 117R, or 117P specification that are Electronically Controlled Pneumatic (ECP) brake ready or ECP brake equipped.
August 20, 2015	FRA issued a Safety Advisory to emphasize the importance of timely repairing ballast defects and conditions on main tracks. FRA notes that ballast defects and ballast conditions that are not repaired in a timely manner can lead to future defects.
August 18, 2015	PHMSA invited comments on the topic of Hazardous Materials Shipping Papers and Emergency Response Information. This information collection is for the requirement to provide a shipping paper and emergency response information with shipments of hazardous materials.
July 29, 2015	The FRA issued the Final Rule for Securement of Unattended Equipment. This amends the brake system safety standards for freight and other non-passenger trains and equipment to strengthen the requirements relating to the securement of unattended equipment.
May 28, 2015	DOT announced that the May 2014 Emergency Order regarding emergency response notifications for shipments of petroleum crude oil by rail will remain in full force and effect until further notice while the agency considers options for codifying the May 2014 disclosure requirement on a permanent basis.
May 14, 2015	PHMSA invited comments on the topic of Flammable Hazardous Materials by Rail Transportation. In the final rule entitled "Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains" PHMSA and FRA adopted a risk-based timeline for the retrofit of existing tank cars to meet an enhanced CPC-1232 standard when used as part of an HHFT. The retrofit timeline focuses on two risk factors, the packing group and differing types of DOT-111 and CPC-1232 tank cars. The timeline provides an accelerated risk reduction that more appropriately addresses the overall risk. The timeline is provided in the §§ 173.241, 173.242, and 173.243 tables of the final rulemaking (80 FR 26643) and includes a January 1, 2017 deadline for of non-jacketed DOT-111 tank cars in PG I service in an HHFT. Not adhering to the January 1, 2017 deadline would trigger a reporting requirement. This reporting requirement would require owners of non-jacketed DOT-111 tank cars in Packing Group I service in an HHFT to report to DOT the following information regarding the retrofitting progress: The total number of tank cars retrofitted to meet the DOT-117R specification; The total number of tank cars built or retrofitted to meet the DOT-117P specification;

PHMSA and FRA Safe Transportation of Energy Products Chronology September 2012 – October 2015	
	The total number of DOT-111 tank cars (including those built to CPC-1232 industry standard) that have not been modified; The total number of tank cars built to meet the DOT-117 specification; and The total number of tank cars built or retrofitted to a DOT-117, 117R, or 117P specification that are Electronically Controlled Pneumatic (ECP) brake ready or ECP brake equipped. Although this reporting requirement applies to individual owners of non-jacketed DOT-111 tank cars in PG I service in an HHFT, DOT would accept a consolidated report from a group representing the affected industries. Furthermore, while not adhering to the January 1, 2017 retrofit deadline triggers an initial reporting requirement, it would also trigger a requirement that would authorize the Secretary of Transportation to request additional reports of the above information with reasonable notice.
May 1, 2015	USDOT announced Final Rule to strengthen the safe transportation of flammable liquids by rail. The Final Rule applies to trains transporting large volumes of flammable liquids and will make significant and extensive changes to improve accident prevention, mitigation, and emergency response.
April 17, 2015	PHMSA issued a Safety Advisory to remind hazardous materials shippers and carriers of their responsibility to ensure that current, accurate and timely emergency response information is immediately available to first responders. PHMSA and FRA issued a Safety Advisory to remind railroads operating a high-hazard flammable train that certain information may be required by PHMSA and/or FRA personnel during the course of an investigation immediately following an accident. FRA issued an Emergency Order to require that trains transporting large amounts of Class 3 flammable liquid through certain highly populated areas adhere to a maximum authorized operating speed of 40 mph. FRA issued a Safety Advisory recommending that railroads use highly qualified individuals to conduct the brake and mechanical inspections and recommends a reduction to the impact threshold levels the industry currently uses for wayside detectors that measure wheel impacts to ensure the wheel integrity of tank cars in those trains. FRA issued a notice and comment request seeking to gather additional data concerning rail cars carrying petroleum crude oil in any train involved in an FRA reportable accident. FRA Acting Administrator sent a letter to the Honorable Edward Hamberger, president of the Association of American Railroads, asking continued commitment of its member railroads to address the safety issues presented.
February 5, 2015	USDOT submitted a draft Final Rule on the safe transportation of flammable liquids (including crude oil) by rail to the Office of Management and Budget for formal review.
December 11, 2014	PHMSA hosted a follow-up meeting with emergency response officials to address gaps in preparedness and training since February 10, 2014 engagement.
July 23, 2014	USDOT released comprehensive rulemaking proposal to improve the safe transportation of large quantities of flammable materials by rail, including a Notice of Proposed Rulemaking for enhanced tank car standards, an Advanced Notice of Proposed Rulemaking seeking to expand oil spill response planning requirements for shipments of flammable materials, and a report summarizing the analysis of Bakken crude oil data gathered by PHMSA and FRA.
May 13, 2014	Secretary Foxx dispatched a letter to 48 state governors and select city mayor's alerting them about the issuance of Emergency Order OST-2014-0067 and urging them to facilitate coordination between the rail industry, State Emergency Response Commissions and local first responders.
May 7, 2014	USDOT issued Emergency Order requiring railroad carriers to inform first responders about crude oil being transported through their towns and communities.
May 7, 2014	PHMSA and FRA issued a Safety Advisory requesting companies to take all possible

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	steps to avoid the use of DOT 111 tank cars when transporting Bakken crude oil.
May 1, 2014	USDOT sent a comprehensive PHMSA rulemaking package to the White House Office of Information and Regulatory Affairs (OIRA). The proposal includes options for enhancing tank car standards and retrofitting.
April 1, 2014	As an outgrowth of the Working Groups established at the August 2013 Emergency Meeting of FRA's RSAC, two of the working groups produced recommendations that were adopted by the full RSAC for consideration in future rulemakings. Based upon the efforts of the Securement Working Group and the approval of the full RSAC, the FRA plans to issue a Notice of Proposed Rulemaking (NPRM) later this year. The RSAC recommendations on train securement would prohibit certain unattended freight trains or standing freight cars on main track or sidings and require railroads to adopt and implement procedures to verify securement of trains and unattended equipment for emergency responders. It would also require locomotive cabs to be locked and reversers to be removed and secured. Railroads would also be required to obtain advance approval from FRA for locations or circumstances where unattended cars or equipment may be left. Additionally, the full RSAC approved four recommendations of the Hazardous Materials Issues Working Group relating to identification, classification, operational control and handling of certain shipments. The four recommendations, directed to the Pipeline and Hazardous Materials Safety Administration (PHMSA), include amending or revising the definitions of "residue" and "key train," and clarifying its regulatory jurisdiction over the loading, unloading and storage of hazmat before and during transportation. (See May 1, 2014 entry below.). The third Working Group, established to consider Appropriate Train Crew Size requirements was unable to reach a consensus. However, the valuable input received during their deliberations will allow FRA to move forward with developing a proposed rule on train crew size that will protect the public while recognizing the nuance of railroad operations. A Notice of Proposed Rulemaking requiring two-person train crews on crude oil trains and establishing minimum crew size standards for most main line freight and passenger rail operations is expected later this year.
March 6, 2014	To provide further clarity for shippers and to prevent attempts to circumvent the requirements in the recent Emergency Order concerning the safe transport of crude oil by rail, USDOT issued an amended version that specifies which tests are required, while also prohibiting shippers from switching to an alternate classification that involves less stringent packaging.
February 25, 2014	USDOT issued Emergency Order requiring stricter standards to transport crude oil by rail.
February 20, 2014	Transportation Secretary Foxx sent a letter to the Association of American Railroads (AAR) with a list of actions to be voluntarily taken immediately by industry to dramatically improve the safety of railroads transporting crude oil and the communities they move through. AAR President and CEO Edward Hamberger signed the agreement that same day, subsequently followed by individual member railroads. Other railroad signatories include: Genesee & Wyoming, Inc., the Iowa Interstate Railroad, Iowa Pacific Holdings, Wheeling and Lake Erie Railway Company.
February 12, 2014	In response to the Secretary's Call to Action, the American Short Line and Regional Railroad Association (ASLRRA) identified five actions that it believes small railroads can voluntarily take to contribute to a safer national rail network: Train Speed: Unit trains of crude oil will operate at a top speed of no more than 25 mph on all routes. Emergency Response: Railroads will develop a program of best practices to ensure a seamless system of timely and effective emergency response to crude oil spills. Recovery and Environmental Remediation: Railroads will sign master service

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	agreements with qualified environmental cleanup providers to ensure prompt and effective remediation in all areas subjected to unintentional discharge of crude oil. Tank Car Standards: ASLRRA will support and encourage the development of new tank car standards. Risk Reduction Program: Contingent upon securing a 6-12-month pilot project grant from FRA, ASLRRA plans to create the Short Line Safety Institute.
February 10, 2014	PHMSA met with emergency response stakeholders and industry groups to discuss training and awareness related to the transport of Bakken crude.
January 22, 2014	Secretary Foxx issued follow-up letter to Call to Action participants summarizing industry commitments.
January 16, 2014	Secretary Foxx met with rail company CEOs and rail and energy association leadership as part of the Department's Call to Action to discuss how to maintain safety record even as domestic crude oil production and movement has increased.
January 2, 2014	PHMSA issued a safety alert to notify the general public, emergency responders, shippers, and carriers that the type of crude oil being transported from the Bakken region may be more flammable than traditional heavy crude.
November 20, 2013	PHMSA and FRA issued a safety advisory reinforcing the importance of proper characterization, classification, and selection of a packing group for Class 3 materials.
October 1, 2013	FRA Administrator Szabo sends a letter to railroad industry organization asking they detail actions they have taken in response to the Safety Advisory issued August 2.
September 6, 2013	PHMSA published an Advance Notice of Proposed Rulemaking seeking public comment on a proposed rule requiring comprehensive improvements to rail safety of flammable liquids.
August 29, 2013	Administrator Quarterman and Administrator Szabo address the Railroad Safety Advisory Committee during an emergency session.
August 27-28, 2013	FRA and PHMSA host a joint public meeting to receive public input on improving the safe transport of hazardous materials by rail.
August 2, 2013	FRA issued Emergency Order No. 28, requiring railroads to properly secure rolling equipment. FRA also published a Safety Advisory recommending additional actions.
July 29, 2013	In a letter to the American Petroleum Institute, FRA informed industry that it will use PHMSA's test sampling program to ensure that crude oil is being properly tested and classified.
July 18, 2013	FRA and PHMSA announced a two-day public meeting on August 27 and 28 in Washington, DC, to receive public input on improving the safe transport of hazardous materials by rail, including a discussion on enhanced design specifications for the DOT-111 tank cars commonly used to transport petroleum crude oil and ethanol and operational issues related to the rail transportation of hazardous materials.
December 2012	FRA initiated several steps to address the risks related to increases in rail traffic in the Bakken Oil Region, the point of origin for most crude oil by rail shipments in the U.S. Under our Bakken Rail Accident Mitigation Project (RAMP), FRA conducted additional hazardous materials safety inspections in the area as well as facilitating hazardous materials safety training seminars with shippers, consignees, contractors, and sub-contractors. In addition, as a result of increased commercial motor vehicle traffic in the region associated with crude oil production, FRA worked with stakeholders, participating agencies, local officials and rail carriers on highway-rail grade crossing safety and trespass prevention, to increase law enforcement patrols at grade crossings and expanded educational outreach to professional drivers (including public service announcements and advertisements at major truck stops in the area).
October 2012	PHMSA Bakken Field Working Group established to increase inspection focus on hazmat shipments by truck and rail from the Bakken region and increase awareness within the emergency response community.
September 2012	PHMSA Administrator Quarterman visits North Dakota Bakken Region to observe operations at rail loading facilities and the application of USDOT regulations.

1.3 Bills of Relevance – 114th U.S. Congress

Table 4. Bills of Relevance – 114th U.S. Congress

Number	Name	Sponsor	Date Introduced	Date Referred to Committee	Summary
H.R. 2834	To enact certain laws relating to the environment as title 55, United States Code, "Environment"[11]	Rep. Tom Marino [R-PA]	6/18/2015	6/18/2015	The purpose of this Act is to codify certain existing laws relating to the environment as a positive law title of the United States Code.
S. 1462	Eliminating Dangerous Oil Cars and Ensuring Community Safety Act[12]	Sen. Charles Shumer [D-NY]	5/22/2015	5/22/2015	Bill to improve the safety of oil shipments by rail and for other purposes.
H.R. 2379	To prohibit the transportation of certain volatile crude oil by rail.[13]	Rep. Nita Lowey [D-NY]	5/15/2015	5/18/2015	To prohibit the transportation of certain volatile crude oil by rail
S. 1175	Hazardous Materials Rail Transportation Safety Improvement Act of 2015[14]	Ron Wyden [D-OR]	4/30/2015	4/30/2015	To improve the safety of hazardous materials rail transportation, and for other purposes
H.R. 2074	The Toxics by Rail Accountability and Community Knowledge (TRACK) Act[15]	Rep. Donald Norcross [D-NJ]	4/28/2015	4/29/2015	Bill to "improve hazmat-by-rail safety by implementing a series of recommendations made by the National Transportation Safety Board (NTSB) following the 2012 train derailment in Paulsboro, NJ.

[11] U.S. Congress, H.R.2834 - To enact certain laws relating to the environment as title 55, United States Code, "Environment." https://www.congress.gov/bill/114th-congress/house-bill/2834/text (accessed June 29, 2015).

[12] U.S. Congress, S.1006 - Eliminating Dangerous Oil Cars and Ensuring Community Safety Act https://www.congress.gov/bill/114th-congress/senate-bill/1462/text?q=%7B%22search%22%3A%5B%22%5C%22s1462%5C%22%22%5D%7D (accessed June 29, 2015).

[13] U.S. Congress, H.R.2379 - To prohibit the transportation of certain volatile crude oil by rail. https://www.congress.gov/bill/114th-congress/house-bill/2379/text?q=%7B%22search%22%3A%5B%22%5C%22hr2379%5C%22%22%5D%7D (accessed June 29, 2015).

[14] U.S. Congress, S.1175 - Hazardous Materials Rail Transportation Safety Improvement Act of 2015, https://www.congress.gov/bill/114th-congress/senate-bill/1175/text?q=%7B%22search%22%3A%5B%22%5C%22s1175%5C%22%22%5D%7D (accessed June 29, 2015).

[15] U.S. Congress, All Bill Information for S. 546 – RESPONSE Act of 2015, https://www.congress.gov/bill/114th-congress/senate-bill/546/all-info#summary (accessed June 29, 2015).

Number	Name	Sponsor	Date Introduced	Date Referred to Committee	Summary
S. 1041 H.R. 1930	End Polluter Welfare Act of 2015[16]	Sen. Bernard Sanders [I-VT]/ Rep. Keith Ellison [D-MN]	4/22/2015	S. 1041: 4/22/2015 HR 1930: 08/18/15	Amends a variety of environmental acts, including, the Oil Pollution Act to eliminate the limitation on liability for offshore facilities and pipeline operators for oil spills
S. 1006	Positive Train Control Safety Act[17]	Sen. Dianne Feinstein [D-CA]	4/16/2015	4/16/2015	Bill to modify specific sections of Section 20157 (a) (1) of title 49, U.S. Code. Among the changes is incentivizing early adoption of positive train control.
H.R. 1804	Crude-By-Rail Safety Act[18]	Rep. Jim McDermott [D-WA]	4/15/2015	4/16/2015	Bill to protect the public, communities across America, and the environment by increasing the safety of crude oil transportation by railroad, and for other purposes.
H.R. 1789	Tank Car Safety and Security Act of 2015[19]	Donald Payne [D-NJ]	4/14/2015	4/27/2015	Directs the Secretary of Transportation (DOT) to revise federal regulations regarding DOT-111 tank cars used to move flammable liquids. Directs the Administrator of the Transportation Security Administration to issue regulations to require that all rail safety coordinators ensure that no tank car containing crude oil is left unattended during any period that it is being transferred between railroad carriers or between a railroad carrier and a shipper. Directs the Secretary to submit to Congress a plan to phase out older-model DOT-111 tank cars that are not retrofitted to meet the new federal requirements.
H.R. 1679	Bakken Crude	Rep. John	3/26/2015	3/27/2015	This bill authorizes Bakken crude

[16] U.S. Congress, S.1041 - End Polluter Welfare Act of 2015, https://www.congress.gov/bill/114th-congress/senate-bill/1041?q=%7B%22search%22%3A%5B%22%5C%22s1041%5C%22%22%5D%7D (accessed June 29, 2015).

[17] U.S. Congress, S.1006 - A bill to incentivize early adoption of positive train control, and for other purposes https://www.congress.gov/bill/114th-congress/senate-bill/1006?q=%7B%22search%22%3A%5B%22%5C%22s1006%5C%22%22%5D%7D (accessed June 29, 2015).

[18] U.S. Congress, H.R.1804 - Crude-By-Rail Safety Act, https://www.congress.gov/bill/114th-congress/house-bill/1804?q=%7B%22search%22%3A%5B%22%5C%22hr1804%5C%22%22%5D%7D (accessed June 29, 2015).

[19] U.S. Congress, H.R.1789 - Tank Car Safety and Security Act of 2015, https://www.congress.gov/bill/114th-congress/house-bill/1789?q=%7B%22search%22%3A%5B%22%5C%22hr1789%5C%22%22%5D%7D (accessed June 29, 2015).

Number	Name	Sponsor	Date Introduced	Date Referred to Committee	Summary
	Stabilization Act of 2015[20]	Garamendi [D-CA]			oil to be transported by rail only if it has a Reid vapor pressure of not more than 9.5 pounds per square inch (the maximum volatility set by the New York Mercantile Exchange for crude oil futures contracts).
S. 859	Crude-by-Rail Safety Act	Sen. Maria Cantwell [D-WA]	3/25/2015	3/25/2015	Bill calls for enhanced breaking mechanisms, raising the standards for tank car safety, increasing crude-by-rail inspections, increasing penalties for non-compliance, considerable changes for all rail oil spill response plans, and further research on tank car design and oil-volatility levels. The bill also includes many changes to emergency response resource inventories and would mandate reporting on "close-call" incidents.
H.R. 1290	To provide for a study by the Transportation Research Board of the National Academies on the impact of diverting certain freight rail traffic to avoid urban areas, and for other purposes.21	Rep. Keith Ellison [D-MN]	3/4/2015	3/5/2015	To provide for a study by the Transportation Research Board of the National Academies on the impact of diverting certain freight rail traffic to avoid urban areas, and for other purposes.

[20] U.S. Congress, H.R.1679 - Bakken Crude Stabilization Act of 2015, https://www.congress.gov/bill/114th-congress/house-bill/1679?q=%7B%22search%22%3A%5B%22Bakken+Crude+Stabilization+Act+2015%22%5D%7D (accessed June 29, 2015).

[21] U.S. Congress, H.R.1290 - To provide for a study by the Transportation Research Board of the National Academies on the impact of diverting certain freight rail traffic to avoid urban areas, and for other purposes. https://www.congress.gov/bill/114th-congress/house-bill/1290/titles?q=%7B%22search%22%3A%5B%22provide+for+study+the+Transportation+Research+Board+National+Academies+impact+diverting+certain+freight+rail+traffic+avoid+urban+areas%22%5D%7D (accessed June 29, 2015).

2.0 Appendix B - Past State Studies of Crude Oil and Ethanol Transportation Risks, Prevention, and Response

2.1 Summary of State and Federal Studies

2.1.1 California

State of California Interagency Rail Safety Working Group. "Oil by Rail Safety in California: Preliminary Findings and Recommendations." June 10, 2014. 20 pages.

Report Initiatives and Purpose

This preliminary study was the first document released by the state's Rail Safety Working Group, an interagency committee comprised of representatives from six state agencies that was convened by the California Governor's Office in January 2014 to examine safety concerns associated with crude-by-rail transportation and recommend actions the state and local agencies should take in response to those risks. The Rail Safety Working Group consists of representatives from the California Public Utilities Commission; California Office of Emergency Services; California Environmental Protection Agency, Department of Toxic Substances Control; California Energy Commission; California Natural Resources Agency; California Office of the State Fire Marshal, Department of Oil, Gas and Geothermal Resources, and Office of Spill Prevention and Response.

This report is a summary of the initial recommendations put forth by the working group.

Report Summary and Scope

Within the span of one year, between 2012 and 2013, the way in which oil is transported within California changed dramatically. In 2012, about 70 percent of the oil imported by California refineries came through marine terminals and only 0.3 percent (about 1 million barrels) came by rail. One year later, crude by rail shipments in California increased six-fold, to 6.3 million barrels, and projections indicate the volume of oil entering the state by rail could jump to 25 percent of all refinery imports, up to 150 million barrels, by 2016. Most of the crude oil that has arrived in California by rail has come from North Dakota and Canada.

The study indicated that while the incidents involving crude by rail transportation have been minimal, the potential for highly dangerous or deadly incidents will increase because of the shear increase in the volume of crude oil transported by rail.

The study summarized the eight major crude-by-rail incidents that occurred in 2013 and 2014, and their causes. The working group identified and mapped the major rail routes traversed by unit trains of crude oil and identified the locations along each route with potential high vulnerability (such as high-derailment-risk urban areas and mountainous areas, and areas of vulnerable natural resources), and the locations of emergency response teams in relation to these highly vulnerable areas.

The study also looked at the state's ability to respond to CBR incidents and found the following:

- High-hazard areas for derailments are primarily located in the mountains, with at least one such site along every rail route into California. Other high-hazard areas are located in urban areas. In ten years (2002-2013), these areas encompass two percent of the state's trackage but have experienced 18 percent of the state's reported train derailments.

- Areas of vulnerable natural resources are located throughout California, and are locations where any rail incident would place waterways and sensitive ecosystems at risk.
- Urban areas are generally well covered by hazardous material response teams, but none are located near the high-hazard areas in rural and mountainous northern California. Other rural areas only have "Type III Hazmat" teams that are only able to provide a support role, not a lead role, in case of a major chemical or oil incident.

The study briefly summarized federal and state actions taken to increase the safety of crude-by-rail transportation. The bulk of the study was devoted to presenting recommendations from the working group.

2.1.2 Massachusetts

Commonwealth of Massachusetts Department of Environmental Protection. "Large Volume Ethanol Spills—Environmental Impacts and Response Options." Prepared by Shaw's Environmental and Infrastructure Group. July 2011. 107 pages.

Report Initiatives and Purpose

Growing volumes of ethanol shipments through Massachusetts in the late 2000s prompted the state Department of Environmental Protection to commission this study. By 2010, two to three unit trains of ethanol per week had been operating through Massachusetts, with each train carrying approximately three million gallons of ethanol, and one barge shipment per week had been carrying approximately 630,000 gallons of ethanol.

The Massachusetts Department of Environmental Protection, concerned about the increasing volumes of ethanol being transported by rail and barge through the state, and the differences in ethanol compared to standard gasoline, commissioned Shaw to prepare a study containing information on the environmental impacts of ethanol spills and emergency response techniques for treating ethanol and ethanol blends spills and fires.

Report Summary and Scope

This is the only comprehensive state-sponsored study that could be found assessing the environmental impacts and emergency response options for incidents involving rail and barge shipments of ethanol. The report contends that by 2010, denatured ethanol had become the largest volume hazardous material shipped by rail. This study considers assessment and response actions for rail and barge spills of denatured ethanol. The anticipated users of the study were local, state, and federal responders.

Thirty-two federal, state, and local agencies provided information and support for the study. Not only were agencies within the state of Massachusetts contacted, but six other states participated as well; the Ohio DEP, Illinois DEP, and Pennsylvania DEP provided information. In addition, six private-sector organizations were contacted, including one regional railroad, one transload operator, one refinery, and an oil company.

The study was divided into seven chapters, covering:

- Objectives and scope of document
- Physical and chemical characteristics of ethanol and gasoline blends

- Summary of ethanol spill incidents
- Fate and transportation characteristics of ethanol released in the environment
- Health effects and environmental risks of ethanol
- Spill assessment and delineation
- Response options for various types of ethanol spills and releases

The study provides a thorough look at the field response techniques for treating large-volume releases of denatured alcohol or ethanol blends during transportation by rail or barge. It does not address incidents or releases associated with the production, transloading, storage, or highway shipment of ethanol, although much of the information on the characteristics of ethanol and potential environmental risks resulting from spills and fires would be relevant.

2.1.3 Minnesota

Minnesota Department of Public Safety. "Minnesota's Preparedness for an Oil Transportation Incident." January 15, 2015. 192 pages

Report Initiatives and Purpose

1. Summarize the preparedness and emergency response framework in the state
2. Provide an assessment of costs and needs of fire departments and other emergency first responders for training and equipment to respond to discharge or spill incidents involving transportation of oil
3. Develop a comprehensive public and private response capacity inventory that, to the extent feasible, includes statewide identification of major emergency response equipment, equipment staging locations, mutual aid agreements, and capacities across industries involved in transportation and storage of oil
4. Provide information and analysis that forms the basis for allocation of funds under Minnesota Statutes, section 299A.55
5. Develop benchmarks or assessment criteria for the evaluation under Subdivision 2 [an evaluation of response preparedness and funding to be completed by January 2017]
6. Assist in long-range oil transportation incident preparedness planning
7. Make recommendations for any legislative changes

Report Study, Scope, and Methods

- Focuses on public safety preparedness and response to an oil transportation incident involving railroads or pipelines in Minnesota
    - does not provide analysis or recommendations on prevention activities, environmental mitigation and clean-up, infrastructure development (such as transportation or health system infrastructure), or relative merits of different modes of oil transportation
- Methods

- Review and analysis of information on state and federal laws, state and federal agencies, approaches developed by other states and provinces, and research, analysis, guidance from experts in the field of emergency preparedness and response
- Comprehensive interviews with subject matter experts, including rail and pipeline company representatives, state agency representatives, and associations of first responders and local governments
- A survey of fire department chiefs, sheriffs, police department chiefs, and emergency managers in jurisdictions that are potentially affected by an oil transportation incident
- Focused interviews with state and local elected officials in areas potentially affected by an oil transportation incident

Responsibilities

Under state and federal law, Minnesota has a comprehensive framework that would apply to an oil transportation incident:

- Railroad and pipeline companies are ultimately responsible for responding to an emergency involving the substances they transport. They must have plans in place to prevent and respond to discharges, and they must pay any costs associated with responding to a discharge.
- State agencies, particularly DPS and MPCA, have responsibilities associated with evaluating preparedness, coordinating agency response, and providing advice and resources to local governments during significant emergencies.
- Local governments are responsible for ensuring public safety in their communities; in all but the most catastrophic incidents, local officials are the incident commanders on scene. Local governments develop plans to respond to emergencies that may affect their communities, and they are empowered to develop mutual aid agreements and interjurisdictional organizations.
- Minnesota's statutory framework places an emphasis on coordination and collaboration across governments and sectors.

2.1.4 New York State – First Report

New York State Department of Transportation, New York State Department of Environmental Conservation, New York State Department of Health, New York State Division of Homeland Security and Emergency Services, and New York State Energy Research and Development Authority. "Transporting Crude Oil in New York State: A Review of Incident Response and Prevention Capacity – Status Update." December 2014. 58 pages.

Report Initiatives and Purpose

This report summarized actions taken by five State of New York regulatory agencies in the six-month period since the April 30, 2014 release of publication EO 125 (also summarized below) entitled "Transporting Crude Oil in New York State: A Review of Incident Response and Prevention Capacity." The original publication contained a list of action items and recommendations be taken by state and local government agencies and private industry,

including 11 recommendations the State should implement in order to reduce the State's vulnerability from accidents and spills related to the transportation of crude oil. The Status Update report summarized progress made on those action items.

Report Summary and Scope

The December 2014 Status Update report was intended to memorialize the following actions that had been taken by the State of New York in the six months since the April 2014 publication of EO 125 and included:

- Securing the commitment of the U.S. Coast Guard, Environmental Protection Agency (EPA), and National Oceanic and Atmospheric Administration to expedite emergency response activities and update environmental and contingency response plans
- Arranging for EPA, in consultation with the State Department of Environmental Conservation, to inspect the four Major Oil Storage Facilities in the state where crude oil is transferred from rail tank cars to other transportation modes
- Submitting comments on all federal proposed rulemaking activities related to crude-by-rail transportation and emergency planning issued by FRA, PHMSA, EPA, and other federal agencies. Also petitioning federal agencies to improve emergency plans and matched federal funding programs available to states for emergency preparedness
- Arranging for seven rail inspection "blitzes" conducted by FRA and NYSDOT representatives focusing on inspecting rail mainlines, rail yards, and tank car mechanical safety equipment. Inspections were held at three CSXT yards and two mainlines, and two Canadian Pacific yards and one mainline.
- Hiring five new state DOT rail inspectors to augment the state's existing inspection partnership with FRA
- Creating an interagency working group that has arranged training exercises, emergency drills and oil-related training for local and state responders, working with freight railroads, port and oil terminal operators, and state agencies
- Issuing new guidance from the State Division of Homeland Security and Emergency Services for fire department operations during the initial phases of a rail incident involving crude oil, including estimates of needed supplies such as foam and water depending on the magnitude of the incident (number of tank cars on fire, and number of cars exposed)
- One terminal operator, after reviewing the State's April 2014 report announced it would phase out the use of DOT-111 tank cars and require only CPC-1232 tank cars on its property

2.1.5 New York State – Second Report

New York State Department of Transportation, New York State Department of Environmental Conservation, New York State Department of Health, New York State Division of Homeland Security and Emergency Services, and New York State Energy Research and Development Authority. "Transporting Crude Oil in New York State: A Review of Incident Response and Prevention Capacity." April 30, 2014. 138 pages.

Report Initiatives and Purpose

This report, abbreviated as the Executive Order 125 report, was issued by New York State on April 30, 2014, and prepared by five different state agencies. The need for the New York State report came from an Executive Order issued by the Governor of New York directing the agencies to conduct a review of the state's crude oil incident prevention and response capabilities.

"In recognition of the increased risk of accidents and public concerns associated with the significant volume of crude oil transported through New York State, on January 28, 2014, Governor Andrew M. Cuomo issued Executive Order 125 (EO 125), directing state agencies to immediately conduct a coordinated review of New York State's crude oil incident prevention and response capacity. In EO 125, Governor Cuomo called upon state agencies to address the following specific issues:

1. the State's readiness to prevent and respond to rail and water incidents involving petroleum products;
2. statutory, regulatory, or administrative changes needed at the State level to better prevent and respond to incidents involving the transportation of crude oil and other petroleum products by rail, ship, and barge;
3. the role that local governments across the State play in protecting their communities and their residents from spills of petroleum products shipped by rail and water; and
4. enhanced coordination between the State and federal agencies to improve the State's capacity to prevent and respond to incidents involving the transportation of crude oil and other petroleum products by rail, ship, and barge.

Report Summary and Scope

This report provided an overview of the increase in crude oil transportation by rail and vessel through New York State and assessed the state's ability to effectively prevent and respond to incidents involving the transportation, transloading, and storage of crude oil. The base of information and assessments came from each of the five State agencies with responsibilities for rail safety, environmental protection, emergency response, public health, and energy development.

The Executive Order 125 report was divided into four main parts:

5. The Current Situation: Rising Concerns About the Transportation of Crude Oil (15 pages)
6. Findings and Recommendations: Recommendations and action steps for the federal government, state government, and industry partners (30 pages)
7. Timeline of Events Demonstrating New York State's Commitment to Protect Public Safety and the Environment (4 pages)
8. Appendices: Executive Order 125; Letters to Federal and Industry Partners; Rail Incident and Incident Data; Jurisdictional Agency and Role Descriptions (55 pages)

Key Judgments Made by Report

The first section, assessing the Current Situation, looked at the growth of U.S. and Canadian oil production, and the resulting change in transportation dynamics that has occurred. The report looked at incidents per billion ton-miles of crude oil transported and summarized recent crude oil incidents occurring on rail and inland waterways. The report discussed different crude oil classifications and their risks. The report also discussed railroads in the state involved in CBR transportation and noted that based on ten years of incident reporting rail safety has improved. The report also noted that the increase in crude-by-rail and crude-by-barge transportation has introduced new risks that the state should prepare for. Those risks were summarized in 11 key judgments, as follows:

- New York State is a major conduit for the North American crude oil boom
- The transportation of Bakken and Canadian synthetic and blended crudes each present unique risks
- Major recent incidents involving crude oil transportation have heightened national awareness
- Federal and State agencies have a strong hazardous material oversight safety record, but the sharp increase in crude oil poses new challenges
- The majority of the tank cars used to transport crude oil are outdated
- Recently adopted voluntary measures are incomplete and need to be incorporated into mandatory regulations on an expedited basis
- New York State needs for Bakken producers to provide critical information on crude oil characteristics and to mitigate at the source to ensure safe transportation
- Federal environmental and contingency response plans need to be expanded and updated to account for crude oil
- Trend and train-specific information is needed to prevent and respond to crude oil related incidents
- State legislative, regulatory, and administrative changes would enhance prevention and response capacity
- Local response agencies are the first line of defense and need to be properly trained and equipped

2.1.6 Pennsylvania

University of Delaware. "Assessment of Crude by Rail (CBR) Safety Issues in Commonwealth of Pennsylvania." Prepared by Dr. Allan Zarembski. August 13, 2015. 84 pages.

Report Initiatives and Purpose

The Commonwealth of Pennsylvania commissioned this study to assess the current level of risk associated with Crude by Rail shipments through the state and advise how the state could reduce the risk of a crude-by-rail incident.

Report Summary and Scope

The report used data from various government regulatory agencies, including the Federal Railroad Administration, Pipeline and Hazardous Materials Safety Administration, National Academy of Sciences, and Association of American Railroads, along with federal reports and railroad testimony at government hearings associated with CBR and rail safety. Individual Class I railroads that own track in the Commonwealth of Pennsylvania were contacted for the report.

The risk assessments provided in the report focus on three major areas of crude-by-rail safety:

- Risk of Derailment
- Risk of Tank Car Breach/Rupture
- Regulatory Oversight

The assessment of derailment risk included a summary of derailments by major categories (track, equipment, signals, etc.) both in the state of Pennsylvania and across the U.S. Data for this assessment came from the FRA's track safety database. The report compared incidents by major category (equipment, human factors, track, signal, etc.) that had occurred in Pennsylvania with nationwide totals over a 10-year period. The report also summarized major CBR derailments in the U.S. from 2013 to 2015 and noted the causes, as posted on the FRA's safety database.

The report identified ways to improve inspection or maintenance practices to reduce the potential for occurrence of the highest-risk derailment categories and categories where tank car failures might occur. The report also catalogued the number of asset protection devices (i.e., Hot Box Detectors) currently in place on Pennsylvania's Class I railroads.

The assessment also looked at proposed improvements to tank cars and operations (such as speed reductions) intended to reduce the risk of tank car rupture or breaches. This included a summary of proposed recommendations for various tank car types used to haul crude oil, including an effectiveness rating of puncture resistance for each car type. The report also assessed the risk reduction for tank car breaches from changes to two operating practices: reducing train speed for CBR, and use of ECP braking and other braking performance technologies (two-way end-of-train devices, distributed power).

The regulatory oversight section focused on efforts to reduce the volatility of Bakken crude oil prior to top loading in railcars, efforts for railroads to develop routing plans and procedures for high-hazard flammable trains, and a summary of federal and state agencies with regulatory oversight responsibilities for the transportation of hazardous materials or emergency management activities. The section included a summary of state rail inspection programs, based on information found in the FRA's Rail State Safety Participation Program. The section concluded with a summary of recent improvements and voluntary efforts prescribed the FRA and AAR, and specific operating practices implemented by CSX Transportation and Norfolk Southern to improve the safety and operation of CBR trains.

The report concluded with 27 recommendations for action to be taken by state agencies and railroads operating within the state.

2.1.7 Washington

Washington State Department of Ecology. "Washington State Marine & Rail Oil Transportation Study Preliminary Findings and Recommendations." October 1, 2014. 110 pages.

Report Initiatives and Purpose

This preliminary report preceded a larger, more comprehensive study (570 pages long) that was issued on March 1, 2015.

In April 2014, the Washington State Legislature directed and funded the state Department of Ecology to conduct a study on marine and oil transportation, in consultation with the FRA and state DOT, utilities commission, and emergency management division. The preliminary report containing recommendations for action was released in advance of the larger, comprehensive report as a result of a directive issued by the Governor of Washington State urging a quicker disclosure of findings and recommendations. The purpose of the study was to identify new safety challenges and environmental risks associated with the increase in rail and marine transportation of crude oil from the Bakken field, Canadian bitumen sands, and other new deposits. The report is intended to provide information that the Governor and State Legislature can use to determine what legislative, regulatory, or budgetary actions might be required to maximize the protection of public safety, the environment, Tribal Treaty rights, and the State's natural and economic resources as a result of the changing pattern of crude oil transportation.

Report Summary and Scope

The preliminary report was divided into six sections.

9. The Changing Oil Transportation Picture, which discussed the changes in rail and marine oil transportation, both nationally and in Washington State, the growth in transportation of Bakken crude oil and Canadian bitumen, and the growth of CBR rail-marine transload activities in Washington State.
10. Concerns about Crude by Rail Transportation Risk, which looked at the potential risks of CBR transportation in the areas of public health and safety, tribal treaties, the environment, and socio-economics.
11. Mitigating Risks from Crude by Rail Transportation through Prevention, which assessed the current regulatory framework and presented 11 findings and recommendations
12. Mitigating Potential Risks from Crude by Rail Marine Transportation through Prevention, which included 11 findings and recommendations
13. Mitigating Risks at CBR/marine transload terminals, which included 3 findings and recommendations
14. Mitigating Risk through Preparedness and Response, which included 15 findings and recommendations for action at the national, state, local, and industry level

The report used data from various government and regulatory agencies, including the Federal Railroad Administration, Energy Information Administration, Pipeline and Hazardous Materials Safety Administration, U.S. Coast Guard, and Association of American Railroads. The report also used data previously compiled by the Washington State Department of Ecology and other

state agencies, reports prepared by Washington State universities and regional coalitions, as well as individual correspondence with transload terminal operators.

2.1.8 Government Accountability Office

United States Government Accountability Office. "Report to Congressional Requesters. Oil and Gas Transportation: Department of Transportation Is Taking Actions to Address Rail Safety, but Additional Actions Are Needed to Improve Pipeline Safety." August 2014. 65 pages.

Report Initiatives and Purpose

The U.S. Government Accountability Office (GAO) was asked by the U.S. Senate Committee on Commerce, Science, and Transportation to examine the impact of shale oil and gas development on transportation infrastructure and safety. The GAO focused its review on the following areas:

- Overall challenges facing transportation infrastructure as a result of increased U.S. oil and gas production
- Specific pipeline safety risks and how the USDOT is addressing them
- Specific rail safety risks and how the USDOT is addressing them

Report Summary and Scope

To prepare its report, the GAO analyzed federal transportation infrastructure and safety data primarily from 2008 to 2012 or 2013, reviewed documents, and interviewed agency, industry, and safety stakeholders, as well as state and industry officials in states with large-scale shale oil and gas development.

The report is divided into seven sections covering:

- Challenges to transportation infrastructure from increased oil and gas production that could pose environmental, safety, or economic risks
- Safety risks from the expansion of unregulated gathering pipelines
- Federal efforts to address risks related to growing crude-by-rail traffic
- Conclusions and recommendations
- Study objectives, scope, and methodology
- Impacts of shale oil and gas development on highways in selected states
- Comments from the USDOT

The report found that from 2007 through 2012 annual production from shale and tight sandstone formations increased more than six fold for crude oil and fivefold for natural gas, aided significantly by advances in hydraulic fracturing and horizontal drilling. Much of the growth in production has occurred in regions with limited transportation linkages to processing facilities. In particular, the limited pipeline capacity to transport crude oil from these new production regions has resulted in an increased use of rail, truck, and barge. Use of these modes has increased safety risks to the natural and human environment, particularly when oil or gas is transported by truck, in comparison to pipeline transportation, which is underground. Use of these modes can also be

more expensive than pipelines and contribute to lost revenue, higher energy prices, and hindered development.

The report discussed the new pipelines being built in regions of increased shale oil and gas production. These new pipelines are being built as gathering pipelines, which traditionally are used as feeder pipelines to reach facilities or feed to higher-volume long-distance pipelines. However, the new generation of gathering pipelines under construction are larger in size and will operate at a higher pressure, increasing the safety risk. Neither the PHMSA nor states have a systematic method of gathering data on new construction of gathering pipelines, although one trade group estimates an annual increase of 14,000 miles of gas gathering pipelines and 7,800 miles of oil gathering pipelines per year through 2035. Further, in rural areas, the operation of gathering pipelines is unregulated, and these pipelines do not have to comply with PHMSA's emergency response planning requirements, even though the new pipelines will be larger and operating at the size and pressure (and therefore with similar risk) as federally regulated transmission lines.

The USDOT began a rulemaking to address this issue in 2011 but did not issue proposed rules. Subsequently, new gathering pipeline infrastructure has continued to grow, with industry predicting such growth will continue for the foreseeable future, raising concerns where such pipelines are not subject to safety regulations.

Rail shipments of crude oil in 2013 grew to 407,761 carloads per year, a dramatic increase from the approximately 9,700 carloads of crude oil moved in 2008. The majority of the oil is transported in unit trains consisting of 80 to 120 tank cars, each carrying about 30,000 gallons of oil. Nearly 50,000 tank cars were used to transport crude oil by rail as of April 2014. According to STB data, about 69 percent of the crude oil transported by rail in 2012 originated in North Dakota; Texas originated an additional 11 percent of crude oil carloads. The growth in shipments of crude oil by rail has revealed risks not fully addressed by current rail safety regulations, particularly in ensuring that oil is properly tested and packaged for shipping.

Changes to regulations have primarily focused on upgrades to tank car safety standards, although other areas of railroad transportation also should be looked at to improve the safety of crude-by-rail transportation, such as track inspection requirements. The DOT has begun to issue emergency orders and proposed rulemakings covering railroad operations that begin to address safety risks of transporting crude oil by rail. Railroads have also entered into a voluntary agreement with the USDOT in February 2014 to improve the safety of crude oil trains, including increased track inspections, improved emergency braking capabilities, use of a risk-based routing tool to identify the safest routes for transporting crude oil, lower-speed operation for crude oil trains, and emergency response training and planning.

2.1.9 Congressional Research Service

Congressional Research Service. "U.S. Rail Transportation of Crude Oil: Background and Issues for Congress." December 4, 2014. 28 pages.

Report Initiatives and Purpose

This report was prepared for the members and committees of the U.S. Congress to provide background information and issues associated with U.S. rail transportation of crude oil. Several rail incidents that occurred in 2013 involved unit trains of crude oil, including the fatal fire and

explosion in Lac-Mégantic, Quebec, prompted regulatory agencies in the United States and Canada to issue new regulations and propose additional rules governing the transportation of crude oil by rail. Some members of Congress called for stricter regulations governing the design of tank cars, prevention of train derailments, and the selection of preferred routes for transporting oil. Many of these issues faced a possibility of being included in a reauthorization of the Rail Safety Improvement Act of 2008. This report was prepared to succinctly summarize the issues associated with crude oil transportation by rail.

Report Summary and Scope

The report discusses the increases in rail transportation of crude oil, driven by the rapid growth of oil production in the U.S. and Canada and the lack of sufficient pipeline infrastructure from new production regions to domestic markets. The report also stressed that railroads consistently spill less crude oil per ton-mile than other modes of land transportation.

The report is divided into four sections covering:

- The role of railroads, barges, and trucks in crude oil transportation
- Oil spill concerns, particularly those associated with Bakken crude and Canadian dilbit
- Federal oversight of oil transport by rail
- Issues for Congress concerning tank car safety, derailment prevention, railroad operations, incident response, and tradeoffs over rail vs. other modes in oil transportation

The report was prepared by specialists in transportation policy, energy policy, energy economics, environmental policy, and energy and infrastructure policy.

There were no findings or recommendations.

2.2 Discussion of Each Study's Findings and Recommendations

2.2.1 California Study Findings and Recommendations

Table B-1. California Study Findings and Recommendations

Finding	Recommendation
The number of state rail inspectors that handle inspections, investigations, and risk assessment and analysis for rail operations is inadequate for the current and projected volumes of oil shipments occurring in California.	Increase the number of California Public Utilities Commission rail inspectors by seven to increase agency inspections and enforcement actions related to tank cars, railroad lines, bridges, and hazardous material shipping requirements associated with the increases in crude-by-rail transportation.
The state's oil spill program prevents, prepares for, and cleans up oil spills in waters off the California coast, and is funded by a per-barrel oil fee of 6.5 cents on oil transported over marine water. There is no comparable fee structure or authority for preparedness activities for pipeline or crude-by-rail.	Expand the state's Oil Spill Prevention and Response program to cover inland oil spills, and the per-barrel fee to fund the program should be expanded to cover all sources of crude oil sent to refineries in the state.
Local emergency response offices, particularly those in rural areas do not have adequate resources to respond to crude-by-rail accidents. Many of these offices rely on volunteer firefighting departments, which lack the	Provide additional state funding for local emergency responders and establish regional hazardous material response teams that could be called upon to respond to CBR incidents and assist local offices as needed.

Finding	Recommendation
necessary forces, training, and equipment to respond to an oil-by-rail incident.	
Emergency response plans are developed at the federal, state, and local level, and implemented by local and regional agencies without regulated uniformity.	The state Office of Emergency Services (OES) should review and update local, state, and federal emergency response plans to ensure they address the risks associated with the increased transportation of oil by rail. The state OES should also update six Regional Plans for Hazardous Materials Emergency Response, with the goal of developing a more standardized approach to local emergency planning and include elements for responding to crude-by-rail incidents.
Emergency responders lack basic, critical information needed to plan for crude-by-rail incidents, including what resources railroads can provide in the event of an accident and how railroads would respond to one.	The state OES should request from the railroads a complete inventory of their firefighting equipment and spill recovery resources. In addition, OES should request that railroads provide "Worst Case Scenario" plans for responding for a multi-car tank-car rail derailment incident in any part of the state.
State and local emergency response teams and firefighters are unsure of the best response techniques or resources quantities necessary to respond to crude-by-rail incidents or associated explosions.	The Office of the State Fire Marshal (OSFM) should request that the United States Fire Administration issue guidance on resources required to respond to CBR incidents, such as training guidelines based on lessons learned during recent rail incidents. The U.S. Fire Administration should also provide training in multiple formats (web-based, video, or instructor-led) that allows each state's fire service training organization to deliver the training to meet specific needs.
California firefighters and first responders lack specialized training in the areas of oil rail safety and flammable liquid safety, and generally do not have financial resources to attend out-of-state training opportunities.	The State OES and OSFM should partner with railroads and oil companies to fund the establishment of a multi-agency West Coast Regional Training Center in Sacramento to maximize in-state training capabilities.
Tank car placards do not provide an indication of the flash point or vapor pressure of the specific type of crude oil within the car, thus requiring emergency teams to request this information from a railroad during an incident, which then prolongs emergency response decisions that can be made for each incident.	The United Nations, which assigns hazardous materials identifiers on tank placards, should recommend new classifications based on crude oil characteristics, to provide relevant information for first responders. If the United Nations is unwilling to expand identifiers on tank placards, the state OES and PUC should encourage the U.S. Department of Transportation to require some kind of external visual identification on tank cars containing Bakken crude oil and similar types of crude oil to aid first responders nationwide.
Although the USDOT recently issued an order requiring railroads transporting more than 1 million gallons of crude oil from the Bakken shale formation to provide the State with information on expected weekly shipments of crude oil and the routes they will traverse, railroads are not providing actual, real-time information on the types and quantities of oil being shipped into California, which would be helpful when responding to emergency incidents.	The state OES and PUC should require Class I railroads operating in California to establish a system where emergency responders can login and access the daily location and status of railcars and train consists, including hazmat carload detail for Bakken crude oil and other hazardous substances.
Communities want more information about what steps railroads are taking to ensure the safety of CBR shipments.	The state PUC and OES should request that railroads provide better outreach programs and more information to communities, including interactive websites and open community forums, on voluntary rail safety

Finding	Recommendation
	advancements,
Local response agencies and communities want more information on what steps railroads are taking to ensure the safety of CBR shipments and where those shipments are being transported.	The state should develop and post on a public website an interactive map depicting areas along rail lines with potential high vulnerability from CBR incidents, with map layers showing major rail lines, locations of earthquake faults near rail lines, water crossings and ecosystems, schools and hospitals, rail segments with a historically high frequency of derailments, and the location of certified emergency response hazmat teams.
Growing evidence suggests that older model DOT-111 tank cars are inadequate to protect against vapor explosions of highly flammable crude oil such as that from the Bakken shale formation.	The state PUC should request that the USDOT move quickly to finalize regulations for new and retrofitted tank cars in order to more rapidly phase out DOT-111 tank cars.
New rail safety improvements such as Positive Train Control (PTC) and Electronically Controlled Pneumatic brakes (PTC) have the potential to provide additional layers of safety and lower the risk of rail incidents.	The state PUC should request that the Federal Railroad Administration require the implementation of PTC on any rail lines over which crude oil trains are expected to operate, and request that FRA require ECP brake technology on crude oil trains.
There in inconsistency in the ways and timeliness with which railroads report incidents involving hazardous materials releases; some fail to report incidents.	The state PUC should clarify incident-reporting requirements for the release of hazardous substances by rail to ensure adequate and timely reporting.
Although individual accident reports are available on FRA's website, the state does not have access to broader data that FRA receives that determine accident and injury rates and trends for railroads operating in California (so-called "normalizing data") such as rate of accidents and injuries based on locomotive miles, freight train miles, employee hours, etc.	The state PUC should request that FRA provide state-specific normalizing data, including trend analysis and risk assessment, to evaluate the risks presented by the transportation of oil by rail.
Voluntarily efforts by the industry railroad to make crude oil transportation safer have no compliance components.	The U.S. Department of Transportation should codify the railroad industry's voluntary measures to improve CBR safety into regulations that are fully enforceable by federal and state authorities.
Voluntary efforts by the railroad industry to make crude oil transportation safer are not enough to ensure safety.	The USDOT should expand upon the railroad industry's voluntarily measures and strengthen regulations in the following areas: increased track inspections (with the state PUC conducting at least one additional inspection of crude oil routes each year); improved braking systems (with the state PUC requesting information and monitoring compliance of railroad efforts to improve braking systems); use of rail traffic routing technology (with the state PUC to request that the FRA provide the analysis and results of railroad industry rail route analyses); oil train speed restrictions (with the state PUC establishing additional areas where lower speed limits could reasonably enhance safety and enforcing compliance at those locations); and the installation of wayside wheel bearing detectors every 40 miles along rail lines with trains carrying 20 or more crude oil cars (with the state PUC conducting an inventory of wayside train inspection devices on oil shipment routes and recommending additional actions if necessary)
Multiple state agencies need timely and complete data to evaluate and regulate the risks from oil transportation by rail.	State agencies should put in place or strengthen existing measures to protect confidential railroad business information and data that may impact national security,

Finding	Recommendation
	while obtaining protected access to timely and complete railroad information to determine the risks of CBR transportation.

2.2.2 Massachusetts Study Findings and Recommendations

Table B-2. Massachusetts Study Findings and Recommendations

Findings	Recommendations
In some cases, ethanol rail incidents result in fire. In many cases, these fires have been significant, involving multiple tank cars and large volumes of ethanol.	
First responders to ethanol spills generally have been local firefighters that have focused on necessary evacuations, fire containment, and protection of nearby structures or tanks.	First responders must have available the training and equipment that will allow them to counter both the water-solubility and flammability of ethanol.
In most cases, ethanol fires have been allowed to burn out. Most incidents have not occurred in highly populated areas. Cooling water has been used to protect structures, tanks, and uninvolved railcars.	Contained burning is an effective response to an ethanol spill incident. It has been used in numerous spill incidents, albeit those incidents have not generally occurred in highly populated areas.
In some cases, where large amounts of water use were necessary to fight an ethanol fire, run-off to nearby streams occurred. In one case, the stream was subsequently dammed, and 500,000 gallons of impacted water were removed for disposal.	The use of cooling water may be necessary to protect structures, tanks, or uninvolved rail cars. However, the application of water to an ethanol fire, unless in sufficient volume, does not substantially decrease the flammability of ethanol. Runoff from water use should be contained and/or recovered to the extent possible to prevent infiltration to groundwater and impacts to surface water.
Alcohol resistant foam (AR-AFFF) has had limited use in large ethanol spill and fire situations, most likely because of the limited volume of foam available to local firefighters and concerns with migration and/or recovery of the foam/ethanol.	Local fire department stocks of alcohol resistant foam should be increased, as its use is effective. The foam must be alcohol resistant, or rapid degradation and loss of the foam blanket can occur.
When AR-AFFF has been used in ethanol spills, it most commonly was used to extinguish specific breached and burning cars that were blocking passage, or to extinguish fires inside tank cars prior to removal of the contents and movement of the car. The use of AR-AFFF has been effective in these circumstances.	In situations where foam is used to treat an ethanol spill and the ethanol/foam can be recovered, environmental impacts will be limited. Unless recovery of the foam/ethanol occurs, the potential for migration to storm drains, sanitary sewer lines, groundwater, and surface water will be present. Foam not recovered that reaches surface water can increase the biochemical oxygen demand loading to streams compared to the ethanol alone. In addition, foam use on unpaved surfaces does not limit the migration of ethanol to groundwater.
The fires have consumed large volumes of ethanol, thus limiting impacts to environmental media.	Contained burning is an effective response to an ethanol spill incident. However, additional efforts by first responders to control or prevent the migration of ethanol should also be considered, as these efforts will have benefits in reducing future response actions to address groundwater or surface water impacts, and will eliminate flammability hazards from ethanol that migrates into soil or other surfaces.
The most significant impacts related to ethanol spills have been to surface water. In some cases, surface water impacts have resulted in fish kills several days after the	Ethanol pools or impacts to soils should be identified as quickly as possible to prevent infiltration to groundwater and runoff to surface water. The high solubility of

Findings	Recommendations
spill as a result of oxygen depletion. These impacts have occurred some distance from the site of the original spill.	ethanol can result in rapid transport in these media. Recovery and excavation have largely been used to address such situations. Controlled burn has not been used, but could be considered in some situations.
Due to concerns of surface water impacts, response activities have more recently involved efforts to prevent discharge to surface water through damming. Aeration of small creeks and large rivers has also been used to improve dissolved oxygen content.	Ethanol impacts to surface water are a significant concern. Ethanol spills reaching ditches or small creeks can be addressed by damming, thus allowing time for biodegradation and preventing releases to larger water bodies. Aeration of these smaller water bodies can be used to improve their dissolved oxygen content and enhance biodegradation, but these actions may not reduce ethanol content sufficiently prior to discharge to a large water body. Once ethanol is discharged to a larger river, response options are limited. Monitoring of both dissolved oxygen and ethanol should be conducted in order to determine whether concentrations are approaching anoxic or toxic levels. Barge aerators can be used to improve dissolved oxygen levels.
Migration of spilled ethanol from the surface through soil to groundwater is also an area of concern, due to possible groundwater contamination and discharge to surface water, as well as methane generation. Where possible, spilled material has been recovered by pumping. In some cases, spilled material was not identified, and migration to groundwater and surface water occurred. In cases where groundwater impacts have occurred, ethanol has degraded relatively rapidly, although gasoline constituents have been more persistent.	Ethanol incidents in the marine environment have been rare, with none of a significant volume occurring in harbors or near-shore areas. Response options in such cases are similarly limited to the use of aeration to improve dissolved oxygen levels, although this would only be effective in smaller areas, such as inlets.

2.2.3 Minnesota Study Recommendations

1. Increase awareness about oil transportation incidents, and then develop additional capacity. This initial focus on building awareness more consistently across the state should be augmented by plans for large-scale drills and hands-on training for those jurisdictions that are prepared for those activities. Ultimately, DPS recommends expanding the state's training program to support more hands on training and exercises related to emergency preparedness in general.
2. Conducting the awareness-level training already underway for fire departments and other responders
3. Developing online resources for the public and first responders, such as awareness materials and training videos
4. Developing guidance for first responders and local governments on responding to an oil incident, including assessment and evacuation protocols
5. Connect funding for training and equipment to regional coordination.
6. DPS therefore intends to direct HSEM to develop a process for organizations to apply for training or equipment funding available in the Railroad and Pipeline Safety Account.

Requirements for funding should include the formation or expansion of a multi-county or regional collaborative group to identify and share resources.

7. Delay significant changes to the Railroad and Pipeline Safety Account and related allocations.
8. DPS recommends that the funding allocation and assessment be maintained as-is until the next report required under the 2014 legislation. At that time, there will be more information regarding the state's preparedness efforts and the impact of the changes underway.
9. Develop a state-level program evaluation approach to assess hazardous materials preparedness activities.
10. In order to effectively evaluate the state's actions under the 2014 legislation, DPS recommends that the state develop a program evaluation process and framework for hazardous materials incident preparedness. Agencies participating in the State Agency Responders Committee (particularly DPS and MPCA) should jointly develop a list of priority results for preparedness activities and establish timelines and measures to show progress towards these results.
11. Enhance existing databases (or develop new databases) to provide more comprehensive information about response resources across the state.
12. DPS intends to direct HSEM to identify whether its existing resource database system can be modified to include additional information regarding resources from state agencies, private sector organizations, and local governments, including but not limited to resources needed to respond to an oil transportation incident.
13. Establish Standards for Pipeline Preparedness and Response
14. For local and state government to be able to determine what resources may be needed to develop capacity for an oil transportation incident, it will be necessary to determine if rail and pipeline companies are adequately prepared to respond. The most concrete ways to evaluate preparedness are to examine an organization's written plan against established criteria and to test the organization's preparedness through exercises or drills. The new requirements for rail companies will allow the state to examine rail preparedness efforts, but pipeline companies do not have similarly well-defined responsibilities. Pipelines also transport significant quantities of potentially dangerous material in Minnesota, so additional attention to pipeline preparedness is warranted.
15. DPS recommends that the state adopt response standards, including timelines, for pipeline companies that are similar in scope and content to the response standards applicable to railroads.
16. DPS has not developed a position regarding the appropriate response times for pipeline companies, but will participate in the legislative process as requested.

2.2.4 New York State Study Recommendations – First Report

The 11 state government recommendations made in the original EO 125 report were:

1. Hire additional railroad inspectors and train new and existing staff in other inspection program components
2. Partner with federal, local, and industry partners to increase the number, frequency, and variety of preparedness training opportunities and drills
3. Enact legislation requiring crude oil producers to provide information on the volume and characteristics of crude oil transiting the state (federal action from USDOT subsequently addressed that information need)
4. Develop a one-stop Web portal that provides access to emergency points of contact, training, grants, and other preparedness and response resources
5. Develop a comprehensive database of available emergency response equipment to support timely and effective response
6. Partner with federal, industry, and local response organizations to develop and implement a comprehensive, geographically-tiered equipment network to ensure timely and effective response in underserved areas
7. Partner with EPA and USCG to expand existing environmental and contingency and plans, and develop Geographic Response Plans for all areas of the state
8. Develop regulations that require placing oil containment booms around waterborne crude oil transfers and restrict transfer operations only to locations that meet state regulatory requirements or have USCG approval
9. Amend existing state legislation to improve rail incident reporting requirements and ensure railroad reporting compliance
10. Develop more effective airborne contaminant plume modeling capability to assist first responders
11. Conduct a review of current federal, state, local, and industry response plans to ensure efficient planning and application
12. Amend the state's Navigation Law to enable greater Oil Spill Fund program capabilities (this was a later recommendation not part of the original report)

2.2.5 New York State Study Findings and Recommendations – Second Report

The main focus of the report was the development of 27 recommended action items listed below for the state to pursue at the federal, state, local, and industry level to increase its incident prevention and response capabilities in the event of a marine or rail incident involving the transportation of crude oil. The report included 11 the State should implement in order to reduce the State's vulnerability from accidents and spills related to the transportation of crude oil.

Table B-3. New York State Study Findings and Recommendations from Second Report

Finding	Recommendation
Federal Level	
The DOT-111 tank car used to transport oil is inadequate to protect public safety and the environment	USDOT should finalize new and retrofitted tank car regulations immediately
Railroad industry voluntary efforts are incomplete and	USDOT should strengthen the voluntary measured put

Finding	Recommendation
lack the permanence and protection of government regulations	forward by the AAR and codify them in regulations
Bakken crude oil is significantly different from other forms of crude, but the transportation classification criteria do not distinguish the difference	The United Nations (which assigns hazardous material identifiers) should recommend new classifications based on crude oil characteristics to enable appropriate packaging and transmission of information on the qualities of oil being transported
Railroads do not have the same emergency response plan requirements as tanker and barge operators	USDOT should update regulations requiring railroads to develop route-specific contingency plans for lines that carry crude oil
Federal hazmat grant funding is inadequate to address the increased risk posed by crude-by-rail transportation	USDOT should increase matched funding available to states through the Hazardous Materials Emergency Preparedness Grant Program
Federal environmental planning documents and contingency response plans need to be updated	U.S. Coast Guard, EPA, and NOAA should quickly update environmental and contingency response plans
Industrial facility railroad tracks are not regulated or inspected to the same level as mainline and rail yard track	USDOT should subject industrial facility railroads to the same standards and inspection protocols as the rest of the general railroad network
The federal oil spill response Research and Technology Plan, which informs technology decisions and best practices and was mandated by law in 1990, has never been finalized	The Coast Guard and EPA should update and complete the plan, and revise it every five years as required by law (Oil Pollution Act of 1990)
U.S. Coast Guard personnel rotate every three years, taking with them accumulated experience and relationships	USCG should establish a civilian Contingency Planning position in New York State to provide organizational continuity and support state emergency preparedness and response efforts
USCG Vessel Response Plans may not be sufficient given the boom in crude oil transportation	USCG should update Vessel Response Plans for tankers and tugs carrying crude oil in New York State to ensure response protocols address the risks associated with transporting crude oil
Existing U.S. Homeland Security grant programs will not fund the purchase of firefighting equipment critical for crude oil incidents, such as foam concentrate	USDHS should update the list of authorized equipment eligible for grant funding to include crude oil firefighting equipment
State Level	
New York State only participates in FRA and PHMSA inspection programs on a limited basis	The state should hire additional railroad inspectors
The State is not taking advantage of all available preparedness training and drill scenarios available for state and local safety personnel	Partner with federal, local, and industry partners to increase the number, frequency, and variety of preparedness training opportunities and drills
There is no mechanism for collecting information on the crude oil moving through New York State	Work with industry and federal partners to establish a mechanism for obtaining more complete information on the volume and characteristics of oil being transported and stored in the state
Access to federal, state, and industry training and readiness information is not well publicized and difficult to find	Establish a one-stop web portal that provides access to emergency points of contact, training, grants, and other preparedness resources
Response assets are not efficiently spaced around the state	Partner with federal, industry, and local response organizations to develop a geographically-tiered equipment network to ensure timely responses in underserved areas
New York State does not have a comprehensive database of crude oil-specific response assets	Develop a comprehensive database of available emergency response equipment to support the timely and effective response to crude oil incidents
New York does not have detailed Geographic Response	Work with the EPA and the USCG, which maintains

Finding	Recommendation
Plans to guide crude oil spill response	Area Contingency Plans, to develop Geographic Response Plans that serve as both a planning response document and spill response tool
Waterborne crude oil spills can often be quickly mitigated by pre-staging booms at transfer points	Develop state regulations that require placing oil containment booms around waterborne transfer facilities and only allow transfer operations at locations that meet state regulatory requirements or have USCG approval
Railroad incident reporting is inconsistent	Enact legislation to improve rail incident reporting and ensure railroad reporting compliance
The State has limited capabilities for toxic plume modeling	Develop more effective plume modeling capabilities
Federal, state, local, and industry emergency response plans often overlap	The State should review federal, state, and local statues, regulations, and policies to ensure efficient planning and application; assess where emergency plans overlap; and recommend changes, while also ensuring that all plans are current, comprehensive, and maintained
Industry Level	
The volatility of Bakken crude could be significantly reduced if dissolved gas were separated from the crude at the source	Urge the American Petroleum Institute and member oil companies to reduce the volatility of Bakken crude before loading it into a tank car
Emergency responder access to crude-by-rail shipment information is uneven	Class I railroads should implement a Web-based information access system to provide real-time information on hazardous materials
Communities on crude-by-rail routes have a limited ability to affect public health and safety outcomes	The AAR should work with API to clarify and expand community engagement requirements, particularly in regard to voluntary measures undertaken by railroads
Crude oil train route risk analysis has not been completed	Class I railroads should conclude their computer model-based route risk analysis as soon as possible and update it regularly

2.2.6 Pennsylvania Study Recommendations

The report concluded with 27 recommendations for action. Eighteen recommendations were categorized as "primary," meaning those that the state could implement on its own or in cooperation with freight railroads. The other nine recommendations were categorized as "secondary," because they were considered more difficult to implement or required action by a federal agency or entity other than the state or a freight railroad.

Primary Recommendations

Recommendations for Railroads

1. Routes carrying CBR trains in Pennsylvania should be tested at least three times per year to maintain an annual service defect rate of no greater than 0.04 to 0.06 service failures per mile
2. Routes carrying CBR trains in Pennsylvania should be tested by a railroad-owned Track Geometry Car at least four times per year
3. Routes carrying CBR trains in Pennsylvania should be tested by a vision-based joint bar inspection system at least once per year, in lieu of one of the required on-foot inspections, as permitted by FRA

4. Class I railroads hauling CBR trains in Pennsylvania should adopt the BNSF Railway voluntary speed reduction to 35 mph for crude oil trains through cities with a population greater than 100,000 people
5. Routes carrying CBR trains in Pennsylvania should be equipped with Wild Impact Load Detector units along their entire route and with a spacing that ensures that any route within the state will have a WILD unit no more than 200 miles preceding (in the loaded direction) that location
6. Any WILD measurement that exceeds 120 Kips should require the train to be stopped and the wheel inspected, and if conditions allow, proceed at a reduced speed of 30 mph until the alerting car can be set out for repairs to be made; any WILD measurement that exceeds 90 kips should require the car to be flagged and the identified wheels replaced no later than 1500 miles of additional travel
7. Railroads should equip all routes in the state with sufficient Hot Box Detectors to adequately monitor oil train movements, with a maximum spacing of 25 miles between Hot Box detectors
8. Routes carrying CBR trains in Pennsylvania should have at least one Acoustic Bearing Detector installed
9. Yards and sidings that handle significant CBR volumes should be inspected by Railroad inspectors at an interval one level higher than the assigned FRA track class (i.e., yards that are FRA Class 1 should be inspected at the FRA Class 2 level)
10. Railroads operating unit oil trains in Pennsylvania should equip those trains with Electronically Controlled Pneumatic (ECP), or in the absence of ECP brakes use two-way end-of-train devices or Distributed Power to improve braking performance
11. Class I railroads hauling CBR trains in Pennsylvania should complete their initial route analysis of High-hazard flammable train routes in the state as soon as possible

Recommendations for the Commonwealth

1. Designate appropriate state and local officials to work with Class I railroads to provide all needed information and assist in the route analysis
2. Perform coordinated railroad inspections by both Pennsylvania Public Utility Commission (PUC) track inspectors and Federal Railroad Administration track inspectors to inspect major CBR routes within the state, focusing on track, equipment, hazmat, and operating practices. Prioritize inspections on mainline turnouts, sidings, and yards that have significant CBR volumes, including track owned by railroads and track owned by refineries
3. Coordinate with FRA to perform annual inspections of all routes carrying CBR trains in Pennsylvania using the FRA's T-18 Gage Restraint Measurement System test vehicle; testing should include both GRMS and conventional track geometry measurements
4. Fill existing vacancies for Pennsylvania PUC track inspectors, and assess whether additional inspectors are required in the eastern part of the state where refineries are located

5. Pennsylvania Emergency Management Agency (PEMA) should work with Class I railroads in the state to implement information-sharing technology tools and make those tools available to emergency responders located along CBR routes
6. PEMA should work with the Class I railroads to hold a full-scale emergency response exercise involving emergency responders from communities along heavy oil train routes
7. PEMA should work with all communities along all routes carrying CBR trains to ensure that the communities have appropriate emergency response plans
8. PEMA should work with the Class I railroads to obtain an inventory of emergency response resources along all routes carrying CBR trains to include locations for the staging of emergency response equipment

Secondary Recommendations

Recommendations for Railroads:

1. In addition to conventional Track Geometry Car tests, all routes carrying CBR trains in Pennsylvania should be inspected by Autonomous Track Geometry Measurement (ATGM) and/or Vehicle Track Interaction (VTI) measurement systems
2. Class I railroads operating in Pennsylvania should verify that they have an adequate number of Hot Wheel Detectors on oil train routes, particularly on routes with terrain where wheels could be more prone to overheating (such as steeply graded routes)
3. Routes carrying CBR trains in Pennsylvania should be equipped with at least one Track Defect Detector (such as a Lateral Load Measurement System) to monitor loaded oil train cars

Recommendations for the Commonwealth:

1. Ensure that the Class I railroads owning track in Pennsylvania equip routes with Positive Train Control technology, in accordance with federally mandated implemented schedules
2. Direct the State of Pennsylvania track inspectors to focus attention on the conditions of turnouts on major CBR routes in the state
3. Direct State of Pennsylvania track inspectors to work with FRA inspectors to develop a coordinated inspection program for all yards and sidings that handle a significant number of CBR cars
4. Actively work with federal regulators on the development of national Minimum Characteristics Standards for all Crude By Rail shipments, with defined target characteristics
5. Direct the PUC to work with the FRA and Class I railroads to ensure that railroads are maintaining a Bridge Safety Management Program in accordance with the Code of Federal Regulations
6. Actively work with federal regulators and the railroad industry to support increasing tank car thermal protection standards to 800 minutes for a pool fire

2.2.7 Washington Study Findings and Recommendations

The Washington State report had 40 findings and associated recommendations.

Table B-4. Washington Study Findings and Recommendations

Finding	Recommendation
Crude by Rail Transportation	
Federal laws and regulations governing CBR are changing	The State should actively comment and engage the FRA and PHMSA in the establishment of operating requirements for CBR that provide the highest level of protection; strict classifications of what constitutes a high-hazard flammable train; and the most stringent requirements possible for tank car standards
Derailment prevention is key to public safety, health, and environmental protection	Modify the railroad regulatory fee structure to enable the state to hire additional FRA-certified state rail inspectors and increase inspections of railroad track, hazardous materials, operations, motive power, equipment, and grade crossing installations
CBR compliance measures are not consistently enforced or apply to all types high-hazard flammable trains/Key trains	The State should establish voluntary agreements with railroads operating in the State to operate loaded HHFT/Key Trains at a maximum speed of 45 mph
Washington State does not have enough state rail inspectors	Modify the railroad regulatory fee structure to enable the state to hire additional FRA-certified state rail inspectors and increase inspections
The state Utilities and Transportation Commission (UTC) has limited authority to conduct hazmat inspections on private shipper property	Amend statutory regulations to allow UTC state inspectors to enter a private shipper's property to conduct hazmat inspections related to rail operations
The state UTC has identified a number of at-grade highway-rail crossings with characteristics that increase the risk of an accident/incident, the severity of which would likely be increased in the event of an incident with a crude oil train	Provide state authority and funding to conduct a diagnostic review to determine whether the identified crossings have sufficient protective devices
The state UTC does not have jurisdiction over grade crossings in "first-class cities;" those cities are free to open, close, or modify grade crossings without UTC involvement	Amend state law to require first-class cities to report to the UTC when grade crossings are opened or closed, and allow those cities to opt in to the UTC's railroad crossing inspection and enforcement program
Federal and state safety and inspection regulations do not apply to private grade crossings	Amend state law to give the UTC jurisdiction over private crossings and enforce minimum safety standards
Current tank car hazardous material placarding does not provide enough information for non-railroad first responders in the event of an incident	The USDOT should amend hazardous material identification requirements on trains to be more user-friendly to first responders
FRA and state rail incident databases are not updated quickly enough, are difficult to use and navigate, and in some cases have inconsistent information between what the state reports and what the FRA reports	FRA, in conjunction with state and local governments, should review and enhance the usability of existing databases to include sort-ability by state and incident type, and ensure that state and federal preliminary accident investigation forms are placed online within one month
There is no mechanism for railroads, regulatory agencies, and stakeholders, to discuss rail safety and cooperative approaches to reducing accidents and promoting safe practices	FRA, PHMSA, and the state UTC should develop a Railroad Safety Committee to improve communication between state and federal agencies and railroads, and develop cooperative safety efforts. The program could be modeled after the U.S. Coast Guard/Washington State harbor safety committee
CBR Marine Transportation	
Build on the State's successful vessel spill and accident	The State Department of Ecology and Pilotage

Finding	Recommendation
prevention measures	Commission should continue to support maritime safety programs and continue to conduct training and drills in spill prevention and preparedness
Risk mitigation options that address human error and improve situational awareness are the most effective	The State Department of Ecology should develop marine safety, industry oversight, and inspection criteria to reduce human error and improve situational awareness, including supporting proposed USCG rulemaking on barge inspections and crew working hours, installing an automated track control system into mobile navigational systems used by state pilots, and advocating crew situational awareness training on all classes of vessels including commercial fishing and towing vessels
Modern ships with protected fuel tanks (a requirement for all vessels built after 2010) have been shown to reduce oil spill probability	The State should require all newly permitted or significantly expanded marine terminals to accept vessels built after 2010 only if equipped with the new fuel tank construction
There has been no railroad representation on the state Harbor Safety Committee, Area Maritime Committee, or area planning committees, all of which are involved in improving spill and accident prevention and maritime safety and security	Encourage railroads in Washington State to participate in the State's three harbor safety committees, two Area Maritime Security committees, the Northwest Area Committee, and local area planning committees; the state Ecology department and USCG should increase funding for the harbor safety committees
Tug Escort Requirements for oil tankers are not required at Grays Harbor or on the Columbia River, though some facilities have voluntary mandated them	Expand state regulations to require tug escorts for tank vessels not just along Puget Sound (existing requirement) but also for tank vessels on the Columbia River and at Grays Harbor
Other countries have funded programs to station Emergency Tow/Rescue Tugs at key points to stop drifting vessels from grounding on leeward shores or as passive escorts to high-risk ships	The State should evaluate the effectiveness of implementing an Emergency Tow/Rescue Tug program for Turn Point, Grays Harbor, and the Columbia River, working with the U.S. Coast Guard and Harbor Safety Committee
Current criteria used to classify a High-Risk Vessel are based on incorrect or inconsistent data	The State Department of Ecology should lead an analysis with the USCG and Harbor Safety Committee to develop a consistent precise definition of a High-Risk Vessel, and develop standards and tug escort requirements for High-Risk Vessels
A formal Vessel Tracking System (VTS), which would reduce shipping accidents such as collisions and groundings, is not in service at Grays Harbor. Existing VTS systems are facing reductions in funding and resources	The USCG should establish a long-term waterways management plan that includes appropriate VTS services to accommodate increased vessel traffic on the Columbia River, Grays Harbor, and the outer coast
Bunkering operations in Puget Sound have the potential to increase as a result of rising CBR transloading activities	The State Department of Ecology should work with USCG and the Harbor Safety Committees to update bunkering restrictions and evaluate limiting or moving bunkering activities to locations that have, or could implement, enhanced prevention and preparedness capabilities
Speed restrictions on container ships may reduce the likelihood of collisions with other vessels	The State Department of Ecology should work with the USCG and Harbor Safety Committees to restrict the speed of container ships in congested areas of ports or shipping channels in Puget Sound to reduce the likelihood of collisions
Foreign-flag tankers that import crude oil introduce additional risk by anchoring off the coast to store crude	Work with the USCG to enact regulations, voluntary actions, or revised harbor safety standards that eliminate

Finding	Recommendation
oil in their hulls and making multiple trips from anchorage to berth and back during the off-loading process	the industry practice of multiple berthing/partial discharging/anchoring of tankers carrying foreign crude oil
Crude by Rail Terminals	
The State Facility Oil Handling Regulation has not been updated for facility spill prevention standards since 1994 and does not include standards for crude by rail transload terminals	The State Department of Ecology should revise the Design Standards for Class 1 facilities to address all modes of oil handling into and out of a Class 1 facility
Existing state-established Best Achievable Protection (BAP) standards for preventing and preparing for oil spills only exist for tank vessels and has not been extended to facilities handling oil	The State Legislature should modify the BAP Planning Standards to all facilities handling oil
Oregon has differing regulations from Washington for oil spill prevention from tanker ships and facilities, which increases risk on the shared waterway of the Lower Columbia River	Encourage the state of Oregon to adopt facility oil handling regulations that include a requirement to pre-boom oil transfers to mitigate risk of and enhance protection from oil spills
Oil Spill Planning and Emergency Response	
Federal regulations governing oil spill response plans for High-Hazard Flammable Trains are being updated	The State should actively participate in the Notice of Proposed Rulemaking comment process with FRA and PHMSA to establish revised and more stringent requirements for oil spill response plans
Railroad equipment is not covered under state-approved oil spill contingency plans	Modify the State statutory definition of "facility" to include moving unit oil trains, as well as stationary trains conducting oil spill transfers in State Oil Spill Contingency Plans. Direct the State Department of Ecology to develop rules related to oil spill contingency plans for trains as per existing facility regulations
Washington State has not established a level of financial responsibility for oil handling facilities, including rail that would require a responsible party to pay for the costs and damages of an oil spill up to a certain amount	Modify State regulations and direct the State Department of Ecology extend financial responsibility requirements to rail and mobile facilities, and issue Certificates of Financial Responsibility to ensure that those transporting oil can pay for cleanup costs and damages resulting from oil spills
The current state definition of oil may not include certain heavy oils, diluted bitumen, synthetic crudes, or other types of oil produced in Canada that are being transported to Washington	The State Legislature should amend the definitions of oil to include crude oil, bitumen, synthetic crude oil, natural gas well condensate, and all other types of oil
State and local agencies do not have the means to gather information on the type or volume of oil being shipped through Washington	Modify state regulations to require railroads to submit advance notice to the State on the volume and characteristics of oil being transferred by rail facilities to other facilities or to vessels
Local, County, and State Emergency Preparedness Response Capabilities	
Almost two-thirds of local fire departments and fire districts do not have adequate funding to plan, train, and equip their communities for a crude oil incident, or purchase necessary equipment such as oil spill containment devices and responder health and safety monitoring and fire suppression devices	The State should establish and fund a grant program for enhanced and continuous oil spill response equipment and local first responder firefighting equipment; ongoing funding should also be made available to provide periodic training to first responders
Local responders have a lack of knowledge in the equipment and response resources available, and railroads plans in place, in the event of a crude-by-rail incident	Washington Military Department's Emergency Management Division (EMD) should adapt county-level emergency plans to address crude-by-rail Oil and Hazards Materials Response; the State should work with FRA and PHMSA to establish a strategy for railroads to work with local responders to identify response

Finding	Recommendation
	strategies, equipment, and available resources
Most local emergency response agencies do not have sufficient resources to adequately train their personnel or conduct emergency planning	The Washington Office of Financial Management and the state fire marshal should develop funding options for the legislature to provide coordinated training. The state fire marshal should work with the railroads to develop a mandatory first responder tank car training program, and expand existing centralized hazardous material training systems to address the unique hazards of transporting crude oil by rail
The State has not implemented a 2006 plan to form regional hazardous materials response teams	The State Department of Ecology and fire marshal should determine startup and recurring costs for establishing regional hazmat response teams, and determine a plan of action for how such teams should be composed, equipped, trained, located, funded, and directed to assist
Geographic Response Plans, which direct immediate actions for oil spills to water, have not been developed for most of the rail corridors through which crude by rail trains operate, and do not address new marine risks such as potentially submerged or sinking oils	The State Department of Ecology should update existing and develop new Geographic Response Plans for inland and marine areas at risk from oil spills, and include all rail corridors through which crude by rail trains are transiting or will transit in future
Oil Spill Response Resources	
The shift away from oil tanker vessels to rail and pipeline has caused a drop in revenues to the State's Spill Prevention, Preparedness, and Response Program	The State should identify new funding options to adequately fund the spills program
The State's oil spill response resources, planning standards, and response tactics may not adequately cover the changing oil characteristics and transportation modes that have occurred as a result of the shift to pipeline and crude by rail	Permitting agencies should require crude-by-rail facility applicants to conduct a thorough evaluation of specific locations of risk for train and/or vessel incidents; the State's Northwest Area Contingency Plan should establish a task force to analyze the type of volume of Group V oils currently moving into the region and target planning efforts at sinking oil
Plans to construct crude-by-rail transload facilities at Grays Harbor and on the Columbia will require enhancements to the current regulatory response planning and purchases of response equipment for oil spills from the facilities or tank vessel traffic serving them	The Department of Ecology should review statewide regulatory planning standards to determine whether the equipment standards are adequate for the potential increase in crude-by-rail facilities and associated tank vessel traffic, particularly at Grays Harbor and the Columbia River; Ecology should established and fund an enhanced and ongoing spill response equipment grant program, and work with local first responder groups to identify additional equipment and training needs
Mitigating Future Risk	
Oil transportation in the State needs to be evaluated as an ongoing, long-term process	Ensure permanent ongoing funding for the State Department of Ecology to develop and continually update a Rail Transportation Risk Analysis and continue updating a Vessel Transportation Risk Analysis
There is great concern among the public and stakeholder groups about the effect of crude oil transportation by rail and vessel	The State should continue outreach efforts on the changing energy picture to potentially affected tribes, communities, and stakeholders to further refine the issues of concern for future studies and action

2.2.8 U.S. Government Accountability Office Study Findings and Recommendations

Findings

1. The increase in U.S. oil and gas production presents challenges for transportation infrastructure because some of the increase is occurring in production areas with inadequate transportation linkages.
2. In particular, insufficient pipeline capacity has resulted in the increased use of rail, truck, and barge to transport crude oil from production areas to refineries.
3. These transportation limitations and related effects could pose environmental risks and have economic implications.
4. Additional pipeline capacity is being constructed to transport crude oil and natural gas. The new pipelines are gathering pipelines (defined as pipelines that transport products to processing facilities and other long-distance pipelines), but differ from older gather pipelines because they are larger in size and operate at higher pressure. Gathering pipelines, if located in rural areas, are generally not subject to USDOT or state safety regulations or emergency response requirements.
5. The increase in size and pressure of newer gathering pipelines raises safety concerns because they could affect a greater area in the event of an incident.
6. Crude oil carloads moved by rail in 2012 increased by 24 times over that moved in 2008, which has raised concerns about testing and packaging of crude oil, use of unit trains (trains of about 80 to 120 crude oil cars), and emergency response preparedness.
7. The USDOT has issued safety alerts on the importance of proper testing and packaging of crude oil. However, industry stakeholders said that DOT's guidance on this issue is vague and that clarity about the type and frequency of testing is needed. In July 2014, DOT proposed new regulations for crude oil shippers to develop a product-testing program subject to DOT's review.
8. Unit trains, which can carry 3 million or more gallons of crude oil, are not covered under DOT's comprehensive emergency response planning requirements for transporting crude oil by rail because the requirements currently only apply to individual tank cars and not unit trains. In July 2014, DOT sought public comment on potential options for addressing this gap in emergency response planning requirements for transporting crude oil by rail.

Recommendations

1. The USDOT, in conjunction with the PHMSA, should move forward with a Notice of Proposed Rulemaking that addresses the risks of larger-diameter, higher-pressure gathering pipelines, including subjecting such pipelines to emergency response planning requirements that currently do not apply.
2. Because of the ongoing rail safety rulemakings, the GAO did not make additional recommendations related to rail in this report.

3.0 Appendix C - Detailed Characteristics of Rail Routes Currently Carrying Bulk Crude in Iowa

3.1 BNSF

Table C-1. Characteristics of BNSF Network Subdivisions Currently Carrying Bulk Crude in Iowa

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Crude Oil Trains Daily by Segment
BNSF Marshall Subdivision	Iowa / Minnesota state line near Lester, Iowa-Sioux City, Iowa (75.7 miles)	One main track with passing sidings	Automatic Block Signal (ABS) / Track Warrant Control (TWC)	Class 4	49 mph	N/A	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). TWDs exist at 15-25 mile intervals, and include Hot Box Detector (HBD) and Dragging Equipment Detector (DED) installations near Alvord, Perkins, and West Le Mars, Iowa	Unknown	0-1
BNSF Sioux City Subdivision	Sioux City, Iowa-Iowa / Nebraska state line near Sioux City, Iowa (2.6 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 4	30 mph	N/A	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). Existing TWD includes a High/Wide/Shifted Load Detector (SLD) at Floyd (Sioux City), Iowa	Unknown	0-1
BNSF Creston Subdivision	Iowa / Nebraska state line near Pacific Junction, Iowa-Creston, Iowa	Segments of two main tracks and one main track	Centralized Traffic Control (CTC)	Class 4	60 mph	79 mph (Amtrak)	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). TWDs exist at 5-7 mile intervals. All	Unknown	0-1

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Crude Oil Trains Daily by Segment
	(86.1 miles)							installations include a DED (every 5-7 miles) and some installations include a DED and a HBD (every 15-25 miles). TWDs exist near Pacific Junction (two installations), Glenwood, Malvern, Hastings, Emerson, McPherson, Red Oak, Stanton, Villisca (two installations), Nodaway, Brooks, Corning, Prescott, Cromwell, and Creston, Iowa		
BNSF Ottumwa Subdivision	Creston, Iowa-Iowa / Illinois state line at Burlington, Iowa (188.1 miles)	Two main tracks	Mixture of Centralized Traffic Control (CTC), Track Warrant Control (TWC), and Yard Limits (YL)	Class 4	60 mph	79 mph (Amtrak)	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). TWDs exist at 5-30 mile intervals. All installations include a DED (every 5-30 miles) and some installations include a DED and a HBD (every 15-30 miles). TWDs exist near	Unknown	0-1

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Crude Oil Trains Daily by Segment
								Thayer, Osceola, Russell, Melrose, Halpin, Albia, Maxon, Agency City, Fairfield, Mount Pleasant, and Dayman, Iowa.		
BNSF Chillicothe Subdivision	Iowa / Illinois state line at Fort Madison, Iowa-Fort Madison, Iowa (2.5 miles)	Two main tracks	Centralized Traffic Control (CTC)	Class 5	55 mph freight	79 mph (Amtrak)	286,000 lbs.	No Trackside Warning Devices (TWD) on the segment of this subdivision in Iowa.	Unknown	0-1
BNSF Marceline Subdivision	Fort Madison, Iowa-Iowa / Missouri state line near Argyle, Iowa (17.7 miles)	Two main tracks	Centralized Traffic Control (CTC) and Automatic Train Stop (ATS)	Class 5	70 mph	90 mph (Amtrak)	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). TWDs exist at 5-7 mile intervals. All installations include a DED and HBD. TWD installations exist near Bricker and Argyle, Iowa.	Unknown	0-1

3.2 CP

Table C-2. Characteristics of CP Network Subdivisions Currently Carrying Bulk Crude in Iowa

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Crude Oil Trains Daily by Segment
CP Marquette Subdivision	Iowa / Minnesota state line at New Albin, Iowa-Sabula Junction, Iowa (136.5 miles) Note: CP has approximately 1.9 miles of trackage rights over the CN Dubuque Subdivision at Dubuque, Iowa, that are not included in the mileage listed above.	One main track with passing sidings	Centralized Traffic Control (CTC) Sabula Junction-Lake, Iowa; Track Warrant Control (TWC) Lake, Iowa-Iowa / Minnesota state line at New Albin, Iowa	Class 3	40 mph	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 25-35 mile intervals. All installations include a DED and HBD. TWDs exist near New Albin, Harpers Ferry, Guttenberg, Spechts Ferry, and Green Island, Iowa. TWDs near New Albin, Spechts Ferry, and Green Island also have a Hot Wheel Detector (HWD).	CP anticipates future installation of a Wheel Impact Load Detector (WILD) on the Marquette Subdivision.	0-2
CP Davenport Subdivision	Sabula Junction, Iowa-Nahant (Davenport), Iowa (54.2 miles)	One main track with passing sidings	Centralized Traffic Control (CTC) Sabula Junction-Deer Creek, Iowa;	Class 3	40 mph	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 25-30 mile intervals. All installations include a DED and HBD. TWDs exist near Le	Unknown	0-2

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Crude Oil Trains Daily by Segment
			Automatic Block Signals (ABS) / Track Warrant Control (TWC) Deer Creek-Davenport, Iowa; Yard Limits (YL) Davenport-Nahant, Iowa					Claire and Deer Creek, Iowa.		
CP Ottumwa Subdivision	Nahant (Davenport), Iowa-Ottumwa, Iowa (107.1 miles)	One main track with passing sidings	Mixture of Centralized Traffic Control (CTC); Automatic Block Signals (ABS) / Track Warrant Control (TWC); and Yard Limits (YL)	Class 4 / Class 3	49 mph (Nahant-Muscatine); 40 mph (Muscatine-Ottumwa)	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 20-30 mile intervals. All installations include a DED and HBD. TWDs exist near Rutledge, Rubio, Ainsworth, Letts, and Montpelier, Iowa.	Unknown	0-2

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Crude Oil Trains Daily by Segment
CP Laredo Subdivision	Ottumwa, Iowa-Iowa / Missouri state line near Sewal, Iowa (61.2 miles)	One main track with passing sidings	Yard Limits (YL) at Ottumwa, Iowa; Track Warrant Control (TWC) Ottumwa, Iowa-Iowa / Missouri state line near Sewal, Iowa	Class 3	40 mph	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 25-30 mile intervals. All installations include a DED and HBD. TWDs exist near Seymour and Blakesburg, Iowa.	Unknown	0-2

4.0 Appendix D - Detailed Characteristics of Rail Routes Currently Carrying Ethanol in Iowa

4.1 BNSF

Table D-1. Characteristics of BNSF Network Subdivisions Currently Carrying Bulk Ethanol in Iowa

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
BNSF Marshall Subdivision	Iowa / Minnesota state line near Lester, Iowa-Sioux City, Iowa (75.7 miles)	One main track with passing sidings	Automatic Block Signal (ABS) / Track Warrant Control (TWC)	Class 4	49 mph	N/A	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). TWDs exist at 15-25 mile intervals, and include Hot Box Detector (HBD) and Dragging Equipment Detector (DED) installations near Alvord, Perkins, and West Le Mars, Iowa	Unknown	0-3
BNSF Sioux City Subdivision	Sioux City, Iowa-Iowa / Nebraska state line near Sioux City, Iowa (2.6 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 4	30 mph	N/A	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). Existing TWD includes a High/Wide/Shifted Load Detector (SLD) at Floyd (Sioux City), Iowa	Unknown	0-3
BNSF Creston Subdivision	Iowa / Nebraska state line near Pacific Junction, Iowa-Creston, Iowa	Segments of two main tracks and one main track	Centralized Traffic Control (CTC)	Class 4	60 mph	79 mph (Amtrak)	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). TWDs exist at 5-7 mile intervals. All	Unknown	0-2

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
	(86.1 miles); note that the BNSF line segment between Red Oak, Iowa, and Shenandoah, Iowa, is designated a BNSF industrial lead of the Creston Subdivision (not included in the subdivision mileage above) and is approximately 21.2 miles long.							installations include a DED (every 5-7 miles) and some installations include a DED and a HBD (every 15-25 miles). TWDs exist near Pacific Junction (two installations), Glenwood, Malvern, Hastings, Emerson, McPherson, Red Oak, Stanton, Villisca (two installations), Nodaway, Brooks, Corning, Prescott, Cromwell, and Creston, Iowa		
BNSF Ottumwa Subdivision	Creston, Iowa-Iowa / Illinois state line at Burlington, Iowa (188.1 miles)	Two main tracks	Mixture of Centralized Traffic Control (CTC), Track Warrant Control (TWC), and Yard Limits (YL)	Class 4	60 mph	79 mph (Amtrak)	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). TWDs exist at 5-30 mile intervals. All installations include a DED (every 5-30 miles) and some installations include a DED and a HBD (every 15-30 miles). TWDs exist near	Unknown	0-2

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
								Thayer, Osceola, Russell, Melrose, Halpin, Albia, Maxon, Agency City, Fairfield, Mount Pleasant, and Dayman, Iowa.		
BNSF Hannibal Subdivision	Burlington, Iowa-Iowa / Missouri state line at Keokuk, Iowa (44.4 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph	N/A	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). TWDs exist at 25-30 mile intervals. All installations include a DED and HBD. A TWD exists near Montrose, Iowa.	Unknown	0-2
BNSF Chillicothe Subdivision	Iowa / Illinois state line at Fort Madison, Iowa-Fort Madison, Iowa (2.5 miles)	Two main tracks	Centralized Traffic Control (CTC)	Class 5	55 mph	79 mph (Amtrak)	286,000 lbs.	No Trackside Warning Devices (TWD) on the segment of this subdivision in Iowa	Unknown	0-2
BNSF Marceline Subdivision	Fort Madison, Iowa-Iowa / Missouri state line near Argyle, Iowa (17.7 miles)	Two main tracks	Centralized Traffic Control (CTC) and Automatic Train Stop (ATS)	Class 5	70 mph	90 mph (Amtrak)	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). TWDs exist at 5-7 mile intervals. All installations include a DED and HBD. TWD installations exist near Bricker	Unknown	0-2

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
								and Argyle, Iowa.		
BNSF Council Bluffs Subdivision	Pacific Junction, Iowa-Council Bluffs, Iowa (18.4 miles)	One main track with passing sidings	Track Warrant Control (TWC) Pacific Junction, Iowa-Council Bluffs, Iowa; Yard Limits (YL) at Council Bluffs, Iowa	Class 2	25 mph	N/A	286,000 lbs.	No Trackside Warning Devices (TWD).	Unknown	0-1
BNSF Napier Subdivision	Pacific Junction, Iowa-Iowa / Missouri state line near Hamburg, Iowa (33.0 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 4	49 mph	N/A	286,000 lbs.	BNSF designates as Trackside Warning Devices (TWD). One TWD exists on this segment and includes a DED and HBD installation near Pacific Junction, Iowa.	Unknown	0-1
BNSF Bayard Subdivision	Council Bluffs, Iowa-Bayard, Iowa (100.0 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 2	25 mph	N/A	286,000 lbs.	No Trackside Warning Devices (TWD).	Unknown	0-1
BNSF Aberdeen Subdivision	Sioux City, Iowa-Iowa / South Dakota	One main track with passing sidings	Restricted Limits (RL)	Class 2	10-25 mph	N/A	286,000 lbs.	No Trackside Warning Devices (TWD).	Unknown	0-1 (DAIR trackage

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
	state line near North Sioux City, South Dakota (7.1 miles)									rights trains over BNSF)

4.2 CN

Table D-2. Characteristics of CN Network Currently Carrying Bulk Ethanol in Iowa

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
CN Dubuque Subdivision	Iowa / Illinois state line near Dubuque, Iowa-Hilltop (Waterloo), Iowa (90.0 miles)	One main track with passing sidings	Centralized Traffic Control (CTC)	Class 4	50 mph	N/A	286,000 lbs.	CN designates as Defect Detectors (DD). DDs exist at 20 to 35 mile intervals, and include Hot Box Detector (HBD). It is not known if the DDs also have a Dragging Equipment Detector (DED). DD installations exist near Epworth and Masonville, Iowa. CN has a Wheel Impact Load Detector (WILD) installation near Farley, Iowa.	Unknown	0-2
CN Waterloo Subdivision	Hilltop (Waterloo), Iowa-Tara, Iowa (109.2 miles)	One main track with passing sidings	Centralized Traffic Control (CTC) Hilltop, Iowa-Waterloo, Iowa; Automatic	Class 3	50 mph	N/A	286,000 lbs.	CN designates as Defect Detectors (DD). CN has one DD on the subdivision near Iowa Falls, Iowa.	Unknown	0-1

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
			Block Signals (TWC) / Yard Limits (YL) at Waterloo, Iowa; Centralized Traffic Control (CTC) Waterloo, Iowa-Tara, Iowa							
CN Cherokee Subdivision	Tara, Iowa-Sioux City, Iowa (127.6 miles)	One main track with passing sidings	Track Authority (TA) Tara, Iowa-Le Mars, Iowa; Automatic Block Signals (ABS) / Track Warrant Control (TWC) Le Mars, Iowa-Sioux City, Iowa	Class 3	40 mph	N/A	286,000 lbs.	CN designates as Defect Detectors (DD). CN has one DD on the subdivision near Pomeroy, Iowa.	Unknown	0-1
CN Omaha Subdivision	Tara, Iowa-Council Bluffs, Iowa (130.2	One main track with passing sidings	Track Authority (TA);	Class 3	40 mph	N/A	286,000 lbs.	CN designates as Defect Detectors (DD). CN has one	Unknown	0-1

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
	miles)		Centralized Traffic Control (CTC) at Ida, Iowa					DD on the subdivision near Dunlap, Iowa.		
CN Ida Grove Subdivision	Ida, Iowa-Ida Grove, Iowa (24.5 miles)	One main track	Track Authority (TA)	Class 2	25 mph	N/A	286,000 lbs.	No Trackside Warning Devices (TWD)	Unknown	0-1
CN Osage Subdivision	Mona Junction (Waterloo), Iowa-Iowa / Minnesota state line at Lyle, Minnesota (75.6 miles)	One main track with passing sidings	Track Authority (TA)	Class 3	40 mph	N/A	268,000 lbs.	No Trackside Warning Devices (TWD)	Unknown	0-1
CN Cedar Rapids Subdivision	Manchester-Iowa-Cedar Rapids, Iowa (41.6 miles)	One main track with passing sidings	Track Authority (TA)	Class 3; Class 2 (varies by segment)	40 mph; 25 mph (varies by segment)	N/A	286,000 lbs.	No Trackside Warning Devices (TWD)	Unknown	0-1

4.3 CP

Table D-3. Characteristics of CP Network Currently Carrying Bulk Ethanol in Iowa

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
CP Marquette Subdivision	Iowa / Minnesota state line at New Albin, Iowa-Sabula Junction, Iowa (136.5 miles) Note: CP has approximately 1.9 miles of trackage rights over the CN Dubuque Subdivision at Dubuque, Iowa, that are not included in the mileage listed above.	One main track with passing sidings	Centralized Traffic Control (CTC) Sabula Junction-Lake, Iowa; Track Warrant Control (TWC) Lake, Iowa-Iowa / Minnesota state line at New Albin, Iowa	Class 3	40 mph	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 25-35 mile intervals. All installations include a DED and HBD. TWDs exist near New Albin, Harpers Ferry, Guttenberg, Spechts Ferry, and Green Island, Iowa. TWDs near New Albin, Spechts Ferry, and Green Island also have a Hot Wheel Detector (HWD).	CP anticipates future installation of a Wheel Impact Load Detector (WILD) on the Marquette Subdivision.	0-3
CP Davenport Subdivision	Sabula Junction, Iowa-Nahant (Davenport), Iowa (54.2 miles)	One main track with passing sidings	Centralized Traffic Control (CTC) Sabula Junction-Deer Creek, Iowa;	Class 3	40 mph	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 25-30 mile intervals. All installations include a DED and HBD. TWDs exist near Le	Unknown	0-3

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
			Automatic Block Signals (ABS) / Track Warrant Control (TWC) Deer Creek-Davenport, Iowa; Yard Limits (YL) Davenport-Nahant, Iowa					Claire and Deer Creek, Iowa.		
CP Ottumwa Subdivision	Nahant (Davenport), Iowa-Ottumwa, Iowa (107.1 miles)	One main track with passing sidings	Mixture of Centralized Traffic Control (CTC); Automatic Block Signals (ABS) / Track Warrant Control (TWC); and Yard Limits (YL)	Class 4 / Class 3	49 mph (Nahant-Muscatine); 40 mph (Muscatine-Ottumwa)	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 20-30 mile intervals. All installations include a DED and HBD. TWDs exist near Rutledge, Rubio, Ainsworth, Letts, and Montpelier, Iowa.	Unknown	0-3

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
CP Laredo Subdivision	Ottumwa, Iowa-Iowa / Missouri state line near Sewal, Iowa (61.2 miles)	One main track with passing sidings	Yard Limits (YL) at Ottumwa, Iowa; Track Warrant Control (TWC) Ottumwa, Iowa-Iowa / Missouri state line near Sewal, Iowa	Class 3	40 mph	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 25-30 mile intervals. All installations include a DED and HBD. TWDs exist near Seymour and Blakesburg, Iowa.	Unknown	0-3
CP Chicago Subdivision	Iowa / Illinois state line at Sabula, Iowa-Sabula Junction, Iowa (1.0 mile)	One main track	Centralized Traffic Control (CTC)	Class 3	25 mph	N/A	286,000 lbs.	No TWDs exist on this segment in Iowa.	Unknown	0-3
CP Bay Subdivision	Island, Iowa-Lake, Iowa (at Sabula Junction, Iowa) (0.3 mile)	One main track	Centralized Traffic Control (CTC)	Unkn-own	10 mph	N/A	286,000 lbs.	No TWDs exist on this segment in Iowa.	Unknown	0-3
CP Mason City Subdivision	Marquette, Iowa-Mason City, Iowa (116.7 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 25 to 40 mile intervals. All installations include a DED and	Unknown	0-2

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
								HBD. TWDs exist near Luana, Calmar, Lawler, and Rudd, Iowa.		
CP Sheldon Subdivision	Mason City, Iowa-Sheldon, Iowa (136.7 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 2	25 mph	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). TWDs exist at 25 to 40 mile intervals. All installations include a DED and HBD. TWDs exist near Clear Lake, Hutchins, and Cylinder, Iowa.	Unknown	0-1
CP Owatonna Subdivision	Mason City, Iowa-Iowa / Minnesota state line at Lyle, Minnesota (28.2 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph	N/A	286,000 lbs.	CP designates as Trackside Warning Detectors (TWD). One TWD installation, including a DED and HBD, exists near Plymouth, Iowa.	Unknown	0-1

4.4 UP

Table D-4. Characteristics of UP Network Currently Carrying Bulk Ethanol in Iowa

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
UP Geneva Subdivision	Iowa / Illinois state line near Clinton, Iowa-Clinton, Iowa (2.1 miles)	Two main tracks	Centralized Traffic Control (CTC) / Automatic Train Control (ATC)	Class 5	70 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD). TDD installations on this subdivision in Illinois include a DED and a HBD. No TDDs exist on this subdivision in Iowa.	Unknown	0-3
UP Clinton Subdivision	Clinton, Iowa-Boone, Iowa (196.6 miles)	Two main tracks	Centralized Traffic Control (CTC) / Automatic Train Control (ATC)	Class 5	70 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD). This subdivision includes over 60 TDD installations, most of which are DEDs spaced at short intervals of under 5 miles. TDDs with a combined DED / HBD installation exist at 15-20 mile intervals.	Unknown	0-3
UP Boone Subdivision	Boone, Iowa-East Missouri Valley, Iowa	Two main tracks	Centralized Traffic Control	Class 5	70 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD).	Unknown	0-3

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
	(121.0 miles)		(CTC) / Automatic Train Control (ATC)					TDDs exist at varying intervals. TDDs with a DED installation only are spaced at short intervals and exist near Boone (three installations) and Ogden, Iowa. TDDs with a combined DED / HBD installation are spaced at 15-25 mile intervals, and exist near Beaver, Scranton, Carroll, Vail, Haley, and Woodbine, Iowa.		
UP Mason City Subdivision	Des Moines, Iowa-Mason City, Iowa (119.5 miles)	One main track with passing sidings	Centralized Traffic Control (CTC) Des Moines, Iowa-Nevada, Iowa; Automatic Block Signals (ABS) / Track	Class 4	60 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD). TDDs exist at 5-20 mile intervals. All installations include a DED (every 5-20 miles) and some installations include a DED and a HBD (every 15-30 miles). TDDs exist near Elkhart, South	Unknown	0-3

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
			Warrant Control (TWC) Nevada, Iowa-Flint, Iowa; Automatic Block Signals (ABS) / Yard Limits (YL) Flint, Iowa-Mason City, Iowa					Chicago Junction (Nevada), Garden City, Buckeye, Iowa Falls (two installations), Argon, Chapin, and Flint, Iowa.		
UP Oskaloosa Subdivision	Marshalltown, Iowa-Bridgeport, Iowa (68.7 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 2	25 mph	N/A	286,000 lbs.	No Train Defect Detectors (TDD).	Unknown	0-1
UP Jewell Subdivision	West Ames, Iowa-Goldfield, Iowa (55.5 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph (West Ames, Iowa-Eagle Grove, Iowa); 30 mph (Eagle Grove, Iowa-Goldfield, Iowa)	N/A	286,000 lbs.	No Train Defect Detectors (TDD).	Unknown	0-1
UP Fort Dodge Subdivision	Eagle Grove, Iowa-Moorland, Iowa (25.5 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 4	49 mph	N/A	286,000 lbs. Moorland, Iowa-South Fort Dodge,	No Train Defect Detectors (TDD).	Unknown	0-1

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
			Moorland, Iowa-Eagle Grove, Iowa; Yard Limits (YL) at Eagle Grove, Iowa				Iowa; 268,000 lbs. South Fort Dodge, Iowa-Vincent, Iowa; 286,000 lbs. Vincent, Iowa-Eagle Grove, Iowa			
UP Estherville Subdivision	Goldfield, Iowa-Superior, Iowa (79.3 miles) Note: UP has approximately 41.6 miles of trackage rights over the CP Sheldon Subdivision between the UP Estherville Subdivision at Emmetsburg, Iowa, and Hartley, Iowa, that are not included in the	One main track with passing sidings	Track Warrant Control (TWC)	Class 4	49 mph	N/A	286,000 lbs.	No Train Defect Detectors (TDD).	Unknown	0-1

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
	mileage listed above.									
UP Rake Subdivision	Iowa / Minnesota state line near Rake, Iowa-Estherville, Iowa (51.9 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph	N/A	286,000 lbs. Iowa / Minnesota state line near Rake, Iowa-Rake, Iowa; 268,000 lbs. Rake, Iowa-Estherville, Iowa	No Train Defect Detectors (TDD).	Unknown	0-1
UP Tara Subdivision	East Grand Junction, Iowa-Rolfe, Iowa (58.1 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph (East Grand Junction, Iowa-Tara, Iowa); 30 mph (Tara, Iowa-Rolfe, Iowa)	N/A	286,000 lbs. (East Grand Junction, Iowa-Tara, Iowa); 268,000 lbs. (Tara, Iowa-Rolfe, Iowa)	No Train Defect Detectors (TDD).	Unknown	0-1
UP Laurens Subdivision	Rolfe, Iowa-Albert City, Iowa (28.5 miles)	One main track	Track Warrant Control (TWC)	Class 3	30 mph	N/A	268,000 lbs.	No Train Defect Detectors (TDD).	Unknown	0-1
UP Blair Subdivision	East Missouri Valley, Iowa-Iowa / Nebraska state line near Blair, Nebraska (14.2 miles)	Two main tracks and one main track	Centralized Traffic Control (CTC) / Automatic Train	Class 4	60 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD). TDDs exist at 20-25 mile intervals on this subdivision. All	Unknown	0-3

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
			Control (ATC) East Missouri Valley, Iowa-Allen Creek, Iowa; Centralized Traffic Control (CTC) Allen Creek, Iowa-Iowa / Nebraska state line near Blair, Nebraska					installations include a DED and a HBD. One TDD exists on this subdivision in Iowa near Allen Creek.		
UP Omaha Subdivision	Missouri Valley, Iowa-Iowa / Nebraska state line at Council Bluffs, Iowa (23.1 miles)	Three main tracks, two main tracks, one main track	Centralized Traffic Control (CTC) / Automatic Train Control (ATC) Missouri Valley, Iowa-Council Bluffs, Iowa; Centralized	Class 4	60 mph	N/A	286,000 lbs. (Missouri Valley, Iowa-Council Bluffs, Iowa); 315,000 lbs. (Council Bluffs, Iowa-Iowa / Nebraska state line at Council Bluffs,	UP designates as Train Defect Detectors (TDD). TDDs exist at short intervals on this subdivision. All installations include a DED and one installation includes a DED and a HBD. TDDs exist on this subdivision in Iowa near South Missouri Valley, (three installations),	Unknown	0-3

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
			Traffic Control (CTC) Council Bluffs, Iowa-Iowa / Nebraska state line at Council Bluffs, Iowa				Iowa)	Crescent, and North Council Bluffs (three installations), Iowa.		
UP Sioux City Subdivision	California Junction, Iowa-Sioux City, Iowa (70.4 miles)	One main track with passing sidings	Centralized Traffic Control (CTC) California Junction, Iowa-Modale, Iowa; Automatic Block Signals (ABS) / Track Warrant Control (TWC) Modale, Iowa-Sioux City, Iowa; Yard Limits	Class 4	49 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD). TDDs exist at 15-25 mile intervals on this subdivision. All installations include a DED and a HBD. TDDs exist near Mondamin, Blencoe, and Salix, Iowa.	Unknown	0-2

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
			(YL) at Sioux City, Iowa							
UP Albert Lea Subdivision	Mason City, Iowa-Iowa / Minnesota state line near Northwood, Iowa (24.4 miles)	One main track with passing sidings	Yard Limits (YL) at Mason City, Iowa; Centralized Traffic Control (CTC) Mason City, Iowa-Iowa / Minnesota state line near Northwood, Iowa	Class 4	50 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD). TDDs exist at 15-25 mile intervals on this subdivision. All installations include a DED and a HBD. One TDD exists on this subdivision in Iowa near Manly.	Unknown	0-3
UP Worthington Subdivision	Le Mars, Iowa-Iowa / Minnesota state line near Bigelow, Minnesota (55.7 miles) Note: UP has approximately 22.5 miles of trackage rights over the CN Cherokee	One main track with passing sidings	Track Warrant Control (TWC)	Class 4	49 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD). TDDs exist at 20-mile intervals. All installations include a DED and a HBD. TDDs exist near Carnes, Sheldon, and Sibley, Iowa.	Unknown	0-2

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
	Subdivision between the UP Worthington Subdivision at Le Mars, Iowa, and Sioux City, Iowa, that are not included in the mileage listed above.									
UP Fairmont Subdivision	Mason City, Iowa – Iowa / Minnesota state line near Scarville, Iowa (34.0 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD). One TDD installation exists on the subdivision near Scarville, Iowa, and includes a DED and a HBD.	Unknown	0-1
UP Trenton Subdivision	Des Moines, Iowa-Iowa / Missouri state line near Lineville, Iowa (87.0 miles)	One main track with passing sidings	Centralized Traffic Control (CTC) Des Moines, Iowa-Beech, Iowa; Automatic Block Signals (ABS) / Track	Class 4	60 mph	N/A	286,000 lbs.	UP designates as Train Defect Detectors (TDD). TDDs exist at 15-25 mile intervals. Installations include a DED and a HBD. TDDs exist near Carlisle, Melcher, Chariton, and Corydon, Iowa, and on the Iowa /	Unknown	0-3

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
			warrant Control (TWC) Beech, Iowa-Williamson, Iowa; Centralized Traffic Control (CTC) Williamson, Iowa-Iowa / Missouri state line near Lineville, Iowa					Missouri state line near Lineville, Iowa.		

4.5 IAIS

Table D-5. Characteristics of IAIS Network Currently Carrying Bulk Ethanol in Iowa

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
IAIS Iowa City Subdivision	Iowa / Illinois state line near Davenport, Iowa-South Amana, Iowa (77.4 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph	N/A	286,000 lbs.	IAIS designates as Trackside Warning Detectors (TWD). TWDs exist at 25-mile intervals, and include Hot Box Detector (HBD), Dragging Equipment Detector (DED), and Hot Wheel Detector (HWD) installations near Stockton, Downey, and Oxford, Iowa.	Unknown	0-2
IAIS Newton Subdivision	South Amana, Iowa-East Des Moines, Iowa (93.2 miles)	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph	N/A	286,000 lbs.	IAIS designates as Trackside Warning Detectors (TWD). TWDs exist at 25 to 30 mile intervals, and include Hot Box Detector (HBD), Dragging Equipment Detector (DED), and Hot Wheel Detector (HWD) installations near Victor, Grinnell, and	Unknown	0-1

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
								Colfax, Iowa.		
IAIS Council Bluffs Subdivision	Des Moines, Iowa-Council Bluffs, Iowa (127.8 miles) Note: IAIS has approximately 2.7 miles of trackage rights over the UP Perry Subdivision – Des Moines Industrial Lead in Des Moines and to the IAIS Council Bluffs Subdivision at West Des Moines, Iowa, that are not included in the mileage listed above.	One main track with passing sidings	Track Warrant Control (TWC)	Class 3	40 mph	N/A	286,000 lbs.	No Trackside Warning Devices (TWD)	Unknown	0-1
IAIS Cedar Rapids Subdivision (owned by CIC; controlled by IAIS)	Yocum Connection (South Amana), Iowa-Cedar Rapids, Iowa (17.8 miles)	One main track	Track Warrant Control (TWC)	Class 3	25 mph	N/A	286,000 lbs.	No Trackside Warning Devices (TWD)	Unknown	0-2 (IAIS)

4.6 IANR

Table D-6. Characteristics of IANR Network Currently Carrying Bulk Ethanol in Iowa

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
IANR Manly Subdivision	Manly, Iowa-Cedar Falls Junction, Iowa (67.3 miles) Note: IANR has approximately 8.7 miles of trackage rights over the CN Waterloo Subdivision and North Waterloo Industrial Lead between the IANR Manly Subdivision at Cedar Falls Junction, Iowa, and Waterloo, Iowa, that are not included in the mileage listed above.	One main track with passing sidings	Yard Limits (YL) at Manly, Iowa; Track Warrant Control (TWC) Manly, Iowa-Cedar Falls Junction, Iowa	Class 2	25 mph Note: IANR limits any train carrying hazardous materials to 10 mph over sections of main track with jointed rail. At the grain elevator in Shell Rock, Iowa, IANR trains operate with a 10 mph head-end restriction through all grade crossings owing to restricted visibility around standing cars on adjacent	N/A	286,000 lbs.	No Trackside Warning Devices (TWD)	Unknown	0-1

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
					elevator tracks.					
IANR Cedar Rapids Subdivision	Waterloo, Iowa-Cedar Rapids, Iowa (50.2 miles) Note: IANR has approximately 7.2 miles of trackage rights over the UP Clinton Subdivision – Waterloo Industrial Lead between the IANR Cedar Rapids Subdivision at Waterloo, Iowa, and the IANR Oelwein Subdivision at Dewar, Iowa; and approximately 4.0 miles of trackage rights over the UP Cedar Rapids Industrial Lead in Cedar	One main track with passing sidings	Yard Limits (YL) at Waterloo, Iowa; Track Warrant Control (TWC) Waterloo, Iowa-Cedar Rapids, Iowa	Class 2	25 mph Note: IANR limits any train carrying hazardous materials to 10 mph over sections of main track with jointed rail. At the grain elevators in La Porte City and Vinton, Iowa, IANR trains operate with a 10 mph head-end restriction through all grade crossings owing to restricted visibility around standing cars on adjacent	N/A	286,000 lbs.	No Trackside Warning Devices (TWD)	Unknown	0-1

Railroad and Operating Subdivision Within Iowa	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
	Rapids, Iowa, that are not included in the mileage listed above.				elevator tracks.					
IANR Oelwein Subdivision	Dewar, Iowa-Oelwein, Iowa (approximately 19.0 miles)	One main track	Track Warrant Control (TWC) Dewar, Iowa-Oelwein, Iowa; Yard Limits (YL) at Oelwein, Iowa	Class 1	10 mph	N/A	268,000 lbs.	No Trackside Warning Devices (TWD)	Unknown	0-1

4.7 Other Short Lines

Table D-7. Characteristics of Other Short Line Rail Networks Currently Carrying Ethanol in Iowa

Railroad	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
CIC	CIC network consists of trackage in the Cedar Rapids and Iowa City, Iowa, areas (approximately 57 miles). Ethanol trains use several segments of the network in Cedar Rapids only. The CIC-owned 17.8-mile segment between Cedar Rapids, Iowa, and Yocum Connection (South Amana), Iowa, is controlled by IAIS and its likely ethanol train volumes are described in Table D-7 above.	One main track with passing sidings	Yard Limits (YL); Restricted Speed (RS); Track Warrant Control (TWC)	Class 1, Class 2, Class 3 (varies by segment)	10-25 mph (varies by segment)	N/A	286,000 lbs.	No Trackside Warning Detectors (TWD)	Unknown	0-1 on CIC network in Cedar Rapids

Railroad	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
DAIR	Segments of trackage rights over State of South Dakota-owned trackage between Hudson and Elk Point, South Dakota (designated as the DAIR Hawarden Subdivision), and the BNSF Aberdeen Subdivision between Elk Point, South Dakota, and Sioux City, Iowa (approximately 34.0 miles of the DAIR Hawarden Subdivision and 7.0 miles of the BNSF Aberdeen Subdivision is located in Iowa); for characteristics	One main track with passing sidings (DAIR only)	Restricted Speed (RS) – DAIR only	Class 2 (DAIR only)	20 mph (DAIR only)	N/A	286,000 lbs. (DAIR only)	No Trackside Warning Detectors (TWD) – DAIR only	Unknown	0-1

Railroad	Segment in Iowa and Approximate Mileage	Track Configuration	Method of Operation	FRA Track Class	Maximum Authorized Speed for Freight Trains	Maximum Authorized Speed for Passenger Trains	Maximum Allowable Gross Weight per Car	Existing Wayside Asset Protection Devices and Spacing	Proposed Wayside Asset Protection Devices	Likely Average Number of Ethanol Trains Daily by Segment
	of the BNSF Aberdeen Subdivision between Elk Point, South Dakota, and Sioux City, Iowa, see Table D-7 above.									
IARR	Steamboat Rock, Iowa-Ackley, Iowa (8.5 miles)	One main track	Unknown	Class 1	10 mph	N/A	265,000 lbs.	No Trackside Warning Devices (TWD)	Unknown	0-1

5.0 Appendix E – Risk and Vulnerability Assessment: Data and Results

Crude Oil and Ethanol Transportation: Risk and Vulnerability Assessment Methodology

This section presents a top-level summary of the risks and vulnerabilities associated with transporting crude oil and ethanol by rail through Iowa. The analysis considers crude oil transportation routes, recorded previous events, likelihood of future incidents, and potential impacts from those incidents to derive an aggregate value for risk. County-specific information may be available to those who are authorized to review it upon official request to Iowa DOT.

This risk assessment is a building block process using various factors, such as length of railroad track, volume of traffic on the rails, and populations, critical facilities, and environmentally important segments within an identified hazard area. The individual factors are analyzed to determine and overall risk for a given county. The data and information provided for this risk and vulnerability assessment are the best available data at the time of collection and should be regarded as a snapshot in time; data could change over time.

It is important to note that eight counties were excluded from the RVA results. This is because no unit-train quantities of bulk crude oil and ethanol are hauled through them [at the time of the Study], or there were no critical infrastructure, population, or environmental exposures located within the hazard buffer zone. Reference Figure 6 - Current Iowa Railroad Routes for Bulk Crude Oil and Ethanol Transportation when examining Tables E-9 thru E-12 and Tables E-15 thru E-16.

The results of the "Risk and Vulnerability Assessment" are provided in Table E-16 (and Figure E-1) and are intended for planning purposes only, including: to prioritize and develop prevention, protection, mitigation, response, and/or recovery strategies and resources. Sections 5.1 through 5.8 describe the terms used within the risk and vulnerability assessments, the associated methodologies, and the data collection references. Section 5.9 provides the results of the assessment.

Note: All risk assessment results are based on methodology designed specifically for the State of Iowa using Iowa-specific data, statistics, and conditions.

5.1 Hazard Area

The "hazard area" is set at the geographic area within 0.5-miles of the centerline of the identified crude oil and ethanol rail transportation infrastructure.

This hazard area is expressed as a "buffer" (a constant offset from a non-point geographical feature). This buffer distance was selected because 0.5-miles corresponds to the USDOT Emergency Response Guidebook evacuation zone for a crude oil and ethanol rail transportation incident involving fire and explosion, which represents the worst-case scenario.

5.2 Exposure

"Exposure" refers to the population, structures, and environment within the identified hazard area.

The following exposure categories were researched and analyzed:

- Population – The estimated number of people living within the buffer

- Housing – The estimated number of housing units within the buffer
- Critical Facilities – The estimated number of critical facility structures within the buffer zone. For the purposes of this report, this category includes public safety, fire, emergency medical (ambulance) facilities, jails, prisons, courthouses, K-12 schools, childcare centers, hospital facilities, nursing homes, town and city halls, and water intake facilities.
- Environmental – The estimated number of acres of environmentally sensitive lands. For the purposes of this report the environmental impact researched and studied includes the following:
    - Significant Public Lakes – Significant public lakes are managed by the Iowa Department of Natural Resources to be accessible and provide fishing opportunities for any angler.[22]
    - Federal Reservoirs – Large natural or artificial lakes used as a source of water supply. Federal reservoirs in Iowa include:
        - Saylorville
        - Red Rock
        - Rathbun
        - Coralville[23]
    - Protected Wetlands and Setbacks – Wetlands are transitional areas, sandwiched between permanently flooded environments and well-drained uplands. They include mangroves, marshes, swamps, forested wetlands, bogs, wet prairies, prairie potholes, and vernal pools.[24]
    - Outstanding Streams – a surface water that Iowa DNR has classified as an outstanding state resource water body in the water quality standards.[25]
    - Designated Streams – water bodies that maintain flow throughout the year, or contain sufficient pooled areas during intermittent flow periods, to maintain a viable aquatic community.[26]
    - Protected Streams – land areas adjacent to five designated scenic rivers in Iowa. These areas are legislatively authorized as having outstanding cultural and natural resource values in accordance with Iowa code. They are:
        - Wapsipinicon River (Sweets Marsh to Mississippi)
        - Middle Raccoon River (Panora to Redfield)

[22] Iowa Department of Natural Resources. Retrieved from http://www.iowadnr.gov/Fishing/Where-to-Fish/Lakes-Ponds-Reservoirs. December 7, 2015.
[23] The Handbook of Iowa Boating Laws and Responsibilities. Iowa Department of Natural Resources. 2014. Print.
[24] USGS National Wetlands Research Center. Retrieved from http://www.nwrc.usgs.gov/wetlands.htm. December 2, 2015.
[25] Iowa Antidegredation Implementation Procedure. Iowa Department of Natural Resources Water Resources Section. February 17, 2010. Print.
[26] Iowa Surface Water Classifications (567 IAC 61.3). 2010. Print.

- Upper Iowa River (Kendallville to Highway 76)
- Little Sioux River (Spencer to Linn Grove)
- Boone River ((Brewers Creek to Des Moines River)[27]

A "top ten list" of County Exposure Rankings is located in Appendix F, and County Profiles are listed in Appendix G.

5.3 Vulnerability

"Vulnerability" is defined as the population, facilities, and environment that are susceptible to impacts by the hazard. Vulnerability is a subset of exposure. As it relates to crude oil and ethanol by rail accidents, any particular incident is likely to affect only a small portion of the buffer. Therefore, an accepted planning assumption of 10 percent of the total exposure per linear rail mile within each county was determined to be vulnerable. The 10 percent value was derived from calculations of population distribution along the railroads coupled with the fact that freight trains are rarely more than one mile long meaning an area of impact would be no greater than one mile along any 10-mile stretch of railroad.

Average Total Exposure Per Linear Mile × 10% = Vulnerability

5.4 Impact

The "impact" is the potential effect an incident might have on populations, facilities, and the environment, including casualties, damage to buildings, and/or harm to the environment.

5.4.1 Impact Level

In order to analyze impact, an Impact Rating Scale was developed. The Impact Rating Scale, shown in Table E-1, assigns a qualitative level (low, medium, or high) to the effects an incident would likely have on vulnerable assets – that is, 10 percent of an average population or number of critical facilities along one linear mile of track and within the buffer. Environmental impacts, having a fixed geographic location are factored at 10 percent impact of the total vulnerable area. This report assumes all exposed areas to have the potential to suffer at least a low impact level.

Table E-1. Impact Rating Scale

Impact Level	Potential Population Impact	Potential Critical Facilities Impact	Potential Environmental Impact
Low	No more than one injury or fatality	Less than 10% damage impact to critical facilities	0 acres or 0 linear miles environmentally sensitive land affected
Medium	More than one but fewer than 10 injuries and/or fatalities	At least 10% and less than 20% damage to critical facilities	.01 – 10 acres or .01 – 1 mile of environmentally sensitive land affected
High	10 or more injuries and/or	At least 20% damage to	>10 acres or >1 linear mile

[27] Iowa Department of Natural Resources. *Protected Waters*. http://www.iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Stream-Care/Protected-Water-Areas.

Impact Level	Potential Population Impact	Potential Critical Facilities Impact	Potential Environmental Impact
	fatalities	critical facilities	of environmentally sensitive land affected

The impact levels were assigned as described below.

5.4.2 Population Impact Level

The Population Impact Level results are provided in Table E-9. They were assigned quantitatively, based on Table E-1 above where the population vulnerability was analyzed, by county, to be:

- zero (0) to one (1) injuries and/or fatalities, a low value was assigned;
- one (1) or more, but fewer than ten (10) injuries and/or fatalities, a medium value was assigned; or
- ten (10) or more or more injuries and/or fatalities, a high value was assigned.

5.4.3 Critical Facilities Impact Level

The Critical Facilities Impact Level results are provided in Table E-10. They were assigned quantitatively, based on Table E-1 above where the critical facilities vulnerability was analyzed, by county, to be:

- less than 10 percent damage to critical facilities, a low value was assigned;
- at least 10 percent but less than 20 percent damage to critical facilities, a medium value was assigned; or
- At least 20 percent damage to critical facilities, a high value was assigned.

5.4.4 Environmental Impact Level

The Environmental Impact Level results are provided in Tables E-11 and E-12. They were assigned quantitatively, based on Table E-1 above where the environmental vulnerability was analyzed, by county, to be:

- 0 acres or 0 linear miles, a low value was assigned;
- 0.01-10 acres or 0.01 to 1 linear miles, a medium value was assigned; or
- >10 acres or >1 linear mile, a high value was assigned.

5.4.5 Average Impact Value

An average impact value for each county was calculated by assigning a quantitative value to each impact level within each exposure category (population, critical facilities, and environmental impacts). The values were weighted and multiplied to produce a non-linear distribution of results, to better identify highly impacted outliers. (Refer to Table E-2).

Table E-2. Impact Value

Impact Level	Impact Value
Low	1
Medium	3
High	5

To calculate the Average Impact Value:

(Population Impact Value + Critical Facility Impact Value + Environmental Impact Value)÷3 = Average Impact Value

5.5 Likelihood

Likelihood is an estimate of how often an incident might occur within the buffer. Incidents may occur within the buffer with or without impact. In this Study, likelihood is described by a Likelihood Rating Scale – an assessment of the chances that a hazard event might occur in the buffer zone during a 20-year timespan, based on a review of historic events and available data.

The railroad likelihood value was derived in a multi-step process. Each county's total train miles was determined by multiplying the total linear mile of main track by the average number of trains per day that traverse the tracks. The average number of trains per day was calculated using the highest combined value of the ranges of both crude oil and ethanol trains, based on the most recent available data provided by the railroads. The highest values were used to develop a worst-case scenario for planning purposes. It is important to note that the actual number of trains per day can vary depending on crude oil and ethanol production and transportation routing. This assessment should be considered as a snapshot of a regularly changing and adjusting transportation industry.

(Linear Mile of Main Track × Average # Trains) = Train Miles

Each county's train miles were evaluated to determine the percent of total main train miles within the state.

County Train Miles ÷ State Train Miles = % Total Train Miles

The county's percent of the total train miles was then multiplied by the total number of incidents projected to occur in Iowa within a 20-year period. This resulted in the Railroad Likelihood Value. Historical incident values are provided in the Railroad Likelihood results, Section 3.9.4.

% Total Train Miles × 20 = Railroad Likelihood Value (20-year)

The result is a projected number of incidents that could occur in any county over the next 20 years, from which probability is derived.

The 20-year probability was then annualized by dividing the railroad likelihood value by 20.

Railroad Likelihood Value ÷ 20 = Annual Probability

Table E-3. Likelihood Rating Scale

Likelihood Value	Likelihood Level	% Probability per 20 years
1	Negligible	<0.10%
2	Low	0.11% – 0.99%
3	Moderate	1.00% – 1.99%
4	High	2.00%-2.99%
5	Highest	>3.0%

5.6 Risk (Sensitivity)

"Risk" is a metric that aggregates all the analyses described above. It combines the potential impacts with the likelihood of occurrence. In this report, risk is expressed using three metrics: risk level (H, M, L); risk (sensitivity) value (an absolute numeric value).

5.6.1 Risk (Sensitivity) Value

A numeric value representing each county's risk (sensitivity) was calculated by multiplying the Average Impact Value by the assigned Likelihood Value.

Average Impact Value × Likelihood Value= Risk (Sensitivity) Value

5.6.2 Risk (Sensitivity) Level

Each county was assigned a risk level using the calculated Risk Value as shown in Table E-4.

Table E-4. Assigning Risk (Sensitivity) Level

Risk (Sensitivity) Value	Risk (Sensitivity) Level
0.00-4.99	Low
5.00-9.99	Medium
10.00+	High

5.7 Data Collection and Metadata

5.7.1 Transportation Network Datasets

The following datasets were used to derive the buffer zones based on known crude oil and ethanol transportation railroads:

Table E-5. Transportation Network Datasets

Data Name	Data Provided By	Data Description	Data Type
Railroad Mainline	Iowa DOT	Railroad Mainlines	Esri FGDB Feature Class Polyline File

5.7.2 Population Vulnerability

The following datasets were used to derive the vulnerable population based on geographic location (not demographic factors):

Table E-6. Population Datasets

Data Name	Data Provided By	Data Description	Data Type
Housing Units	Iowa DNR Natural Resources Geographic Information Systems Library	2010 Census Block Level Housing Units	Esri FGDB Feature Class Polygon File
Population	Iowa DNR Natural Resources Geographic Information Systems Library	2010 Census Block Level Population	Esri FGDB Feature Class Polygon File

Population estimates were interpolated from the proportional area of each block level group population within the 1-mile corridor for each county.

5.7.3 Critical Facilities Vulnerability

The following datasets were used to derive the vulnerable critical facilities:

Table E-7. Critical Facilities Vulnerability

Data Name	Data Provided By	Data Description	Data Type
Medical Ambulances, Fire Protection	Iowa DOT	Locations of Medical Ambulance and Fire Protection Services	Esri FGDB Feature Class Point File
Courthouses Prisons, Jails, Public Safety Providers	Iowa DOT (via Info Group)	Locations of Courthouses Prisons and Safety Providers(Police, Fire)	Esri FGDB Feature Class Point File
School K-12	Iowa DOT	Location of K-12 Schools	Esri FGDB Feature Class Point File
Childcare Centers	Iowa DOT (via Info Group)	Locations of Childcare Centers	Esri FGDB Feature Class Point File
Hospitals	Iowa DOT (via Info Group)	Locations of Hospitals / Health Providers	Esri FGDB Feature Class Point File
Nursing Homes	Iowa DOT (via Info Group)	Locations of Nursing Homes	Esri FGDB Feature Class Point File
Town and City Halls	Iowa DOT (via Info Group)	Locations of Town Halls, City Halls, Government facilities	Esri FGDB Feature Class Point File
Surface Water Public	Iowa DNR	Surface water intakes (and infiltration galleries) at	Esri FGDB

Data Name	Data Provided By	Data Description	Data Type
Intake	Natural Resources Geographic Information Systems Library	facilities with operating permits for Public Water Supplies (systems that serve 25 or more people) for drinking water. This data is from the Iowa DNR's Safe Drinking Water Information System (SDWIS).	Feature Class Point File

5.7.4 Environmental Vulnerability

The following datasets were used to derive the environmental vulnerability:

Table E-8. Environmental Vulnerability

Data Name	Data Provided By	Data Description	Data Type
Significant Public Lakes	Iowa DNR Natural Resources Geographic Information Systems Library	Public lakes are the recognized significant publicly-owned lakes by the Iowa Department of Natural Resources	Esri FGDB Feature Class Polygon File
Federal Reservoirs	Iowa DNR Natural Resources Geographic Information Systems Library	Federally Owned Reservoirs of Iowa	Esri FGDB Feature Class Polygon File
Designated Wetland Setbacks	Iowa DNR Natural Resources Geographic Information Systems Library	Wetlands Designated as Protected by the Iowa DNR	Esri FGDB Feature Class Polygon File
Outstanding Iowa Waters	Iowa DNR Natural Resources Geographic Information Systems Library	A surface water that Iowa DNR has classified as an outstanding state resource water in the water quality standards	Esri FGDB Feature Class Polyline File
Designated Rivers	Iowa DNR Natural Resources Geographic Information Systems Library	This coverage consists of designated stream segments in the state of Iowa. Classifications for designated streams are determined through a Use Assessment/Use Attainability Analysis. The coverage was developed using the National Hydrography Dataset (NHD) and Hydro Event Management (HEM) tools. Stream segments delineated from the NHD were related to the Surface Water Classification Document (SWC), which is the rule referenced document in Chapter 61.3(5)	Esri FGDB Feature Class Polyline File
Protected Water Areas	Iowa DNR Natural Resources Geographic	Protected water area means a water area permanently designated by the Natural Resource Commission for inclusion in the protected water area system	Esri FGDB Feature Class Polyline File

Data Name	Data Provided By	Data Description	Data Type
	Information Systems Library		
Conservation and Recreation Lands	Iowa DNR Natural Resources Geographic Information Systems Library	Conservation and Recreational Lands with public access (Parks, WMA, DNR Lands)	Esri FGDB Feature Class Polygon File

5.8 Metadata

Each exposure dataset was overlaid and "clipped" by the 0.5-mile buffer using geographic information systems (GIS) to produce four *exposure* datasets for each county:

- Population exposed to rail hazards
- Housing units exposed to rail hazards
- Critical infrastructure exposed to rail hazards
- Environmental areas exposed to rail hazards

A summary of county data can be found in Appendix B: County Profiles.

5.9 Crude Oil and Ethanol by Rail Transportation Risk and Vulnerability

5.9.1 Railroad Vulnerable Population Impact

While each county's vulnerability accounts for the linear miles of railroad that transports either crude oil or ethanol, or both, the amount of railroad infrastructure in a county is not directly proportionate to the risk to population. For example, Harrison County contains the most linear miles of railroad main track (130.16 miles), with 6,706 people and 3,173 housing units within the 0.5-mile buffer zone. Linn County has the largest population (45,876) and number of housing units (20,325) within the 0.5-mile buffer zone, and contains 118.32 linear miles of main track, or 387.73 people per mile of railroad compared to 51.52 people per mile of railroad in Harrison County.

Table E-9 provides, by county, the length of railroad, estimated population, and housing units within the buffer, and the vulnerable population impact level. Methodology for Population Impact is provided in Section 5.4.2.

Table E-9. Railroad Vulnerable Population Impact

County	Estimated Linear Mile of Railroad	Estimated Population	Average Vulnerable Population per Linear Mile of Track	Impact to 10% of the Population per Linear Mile	Impact Level
Adair	7.75	1,409	182	18	High
Adams	34.88	1,499	14	1	Low

County	Estimated Linear Mile of Railroad	Estimated Population	Average Vulnerable Population per Linear Mile of Track	Impact to 10% of the Population per Linear Mile	Impact Level
Allamakee	40.14	3,954	14	1	Low
Appanoose	22.36	1,339	12	1	Low
Benton	74.55	10,724	24	2	Medium
Black Hawk	77.65	38,100	164	16	High
Boone	49.18	9,525	65	6	Medium
Bremer	23.65	5,994	253	25	High
Buchanan	27.45	6,881	84	8	Medium
Buena Vista	36.27	11,915	329	33	High
Butler	46.00	6,421	140	14	High
Calhoun	40.67	3,380	83	8	Medium
Carroll	74.65	7,530	25	3	Medium
Cass	25.82	3,723	144	14	High
Cedar	57.23	5,435	19	2	Medium
Cerro Gordo	77.70	25,388	54	5	Medium
Cherokee	29.80	5,656	190	19	High
Chickasaw	33.35	4,727	47	5	Medium
Clarke	51.92	4,580	29	3	Medium
Clay	24.39	7,245	297	30	High
Clayton	59.29	5,251	13	1	Low
Clinton	102.66	20,639	40	4	Medium
Crawford	109.52	8,483	19	2	Medium
Dallas	17.50	2,549	146	15	High
Delaware	38.68	4,668	121	12	High
Des Moines	44.70	14,700	110	11	High
Dickinson	2.18	143	65	7	Medium
Dubuque	62.16	26,166	60	6	Medium
Emmet	36.22	4,570	126	13	High
Fayette	0. 50*	295	295	15	High
Floyd	64.52	8,133	42	4	Medium
Franklin	26.16	1,830	17	2	Medium
Fremont	26.93	381	14	1	Low
Greene	61.53	3,543	14	1	Low
Grundy	3.01*	10	3	1	Low
Guthrie	25.76	2,218	86	9	Medium
Hamilton	51.03	7,598	149	15	High
Hancock	24.30	3,508	144	14	High
Hardin	58.09	4,804	21	2	Medium
Harrison	130.16	6,706	9	1	Low
Henry	38.72	7,135	61	6	Medium
Humboldt	31.36	1,199	38	4	Medium
Ida	8.92	1,892	212	21	High
Iowa	34.03	4,017	39	4	Medium
Jackson	32.96	2,602	16	2	Medium
Jasper	38.22	8,870	232	23	High
Jefferson	53.19	5,212	12	1	Low
Johnson	27.20	32,980	606	61	High

County	Estimated Linear Mile of Railroad	Estimated Population	Average Vulnerable Population per Linear Mile of Track	Impact to 10% of the Population per Linear Mile	Impact Level
Keokuk	9.40	81	2	0	Low
Kossuth	54.51	5,093	93	9	Medium
Lee	79.03	14,750	62	6	Medium
Linn	118.32	45,876	65	6	Medium
Louisa	19.01	2,030	21	2	Medium
Lucas	73.65	5,327	12	1	Low
Lyon	18.49	1,092	15	1	Low
Madison	8.54	1,450	170	17	High
Mahaska	25.31	7,614	301	30	High
Marion	16.35	1,425	29	3	Medium
Marshall	67.55	10,076	37	4	Medium
Mills	66.50	4,063	15	2	Medium
Mitchell	30.45	4,121	135	14	High
Monona	25.71	3,648	71	7	Medium
Monroe	72.19	4,207	6	1	Low
Montgomery	46.89	4,724	25	3	Medium
Muscatine	50.35	16,641	83	8	Medium
O' Brien	12.75	3,673	96	10	High
Osceola	18.00	2,285	63	6	Medium
Page	11.83	3,263	276	28	High
Palo Alto	51.61	5,701	110	11	High
Plymouth	84.80	10,627	18	2	Medium
Pocahontas	36.87	2,882	78	8	Medium
Polk	56.62	41,180	182	18	High
Pottawattamie	126.60	29,784	59	6	Medium
Poweshiek	48.63	9,641	198	20	High
Sac	35.05	1,768	50	5	Medium
Scott	62.49	38,248	87	9	Medium
Shelby	24.16	1,304	54	5	Medium
Sioux	59.56	7,824	19	2	Medium
Story	90.94	34,614	95	10	High
Tama	50.75	2,678	18	2	Medium
Union	44.23	6,067	46	5	Medium
Wapello	84.24	10,088	15	1	Low
Warren	14.04	2,447	58	6	Medium
Washington	25.62	4,773	37	4	Medium
Wayne	43.00	2,591	12	1	Low
Webster	86.74	18,314	211	21	High
Winnebago	16.32	2,188	134	13	High
Winneshiek	29.71	2,708	46	5	Medium
Woodbury	41.16	31,035	108	11	High
Worth	45.33	4,022	89	9	Medium
Wright	21.63	3,843	44	4	Medium

** Fayette and Grundy counties do not have crude oil or ethanol rail transportation within their jurisdictional borders, but do have areas within the 0/5 mile buffer zones. The Estimated Linear Miles of Railroad for these counties refer to these buffer zones.*

5.9.2 Railroad Critical Facilities Impact

The potential impact of a railroad incident on critical facilities was estimated through an analysis of the number of critical facilities within the buffer (refer to Table E-10). Methodology for Critical Facilities Impact is provided in Section 5.4.3.

Table E-10. Railroad Vulnerable Critical Facilities Impact

County	Estimated Linear Mile of Railroad	EMS and Fire	Court-houses and Public Safety	K - 12 Schools	Childcare Centers	Hospital Facilities	Nursing Homes	Town and City Halls	Water Intake Facilities	Average # of Facilities per Train Mile of Track	10% Impact to Facilities per Mile of Track	Impact Level
Adair	7.75	2	3	0	0	1	1	3	0	1.29	12.91%	Medium
Adams	34.88	2	8	3	1	2	0	11	1	0.80	8.03%	Low
Allamakee	40.14	4	5	5	5	4	1	15	0	0.97	9.72%	Low
Appanoose	22.36	1	2	3	0	0	0	4	0	0.45	4.47%	Low
Benton	74.55	5	13	10	2	4	2	26	0	0.83	8.32%	Low
Black Hawk	77.65	4	20	20	11	11	7	31	0	1.34	13.39%	Medium
Boone	49.18	2	8	11	3	4	7	19	0	1.10	10.98%	Medium
Bremer	23.65	3	2	7	3	4	3	2	0	1.01	10.15%	Medium
Buchanan	27.45	3	3	12	4	4	3	5	0	1.24	12.39%	Medium
Buena Vista	36.27	3	7	13	4	4	4	24	0	1.63	16.27%	Medium
Butler	46.00	6	9	6	3	5	5	10	0	0.96	9.56%	Low
Calhoun	40.67	1	8	6	1	3	6	20	0	1.11	11.06%	Medium
Carroll	74.65	3	16	7	7	13	2	25	0	0.98	9.78%	Low
Cass	25.82	2	8	1	3	5	1	17	0	1.43	14.33%	Medium
Cedar	57.23	5	9	7	3	4	3	9	0	0.70	6.99%	Low
Cerro Gordo	77.70	3	7	18	15	25	8	12	0	1.13	11.33%	Medium
Cherokee	29.80	6	10	10	6	4	3	22	0	2.05	20.47%	High
Chickasaw	33.35	0	7	6	4	3	3	15	0	1.14	11.39%	Medium
Clarke	51.92	3	8	3	2	2	5	10	0	0.64	6.36%	Low
Clay	24.39	2	12	7	5	4	2	15	1	1.97	19.68%	Medium
Clayton	59.29	3	4	6	4	1	7	10	0	0.59	5.90%	Low
Clinton	102.66	6	14	16	6	7	4	16	1	0.68	6.82%	Low
Crawford	109.52	5	6	12	2	5	5	33	0	0.62	6.21%	Low
Dallas	17.50	2	2	3	2	0	0	3	0	0.69	6.86%	Low
Delaware	38.68	6	6	5	7	3	6	20	0	1.37	13.70%	Medium
Des Moines	44.70	4	12	13	6	9	3	23	0	1.57	15.66%	Medium
Dickinson	2.18	1	1	0	0	0	0	1	0	1.38	13.76%	Medium
Dubuque	62.16	4	16	19	12	12	9	32	0	1.67	16.73%	Medium
Emmet	36.22	1	8	4	2	4	2	13	0	0.94	9.39%	Low
Fayette	0.50*	0	0	0	0	0	0	0	0	0.00	0.00%	Low
Floyd	64.52	2	5	7	8	6	6	10	0	0.68	6.82%	Low
Franklin	26.16	0	3	1	0	0	0	5	0	0.34	3.44%	Low

County	Estimated Linear Mile of Railroad	EMS and Fire	Court-houses and Public Safety	K - 12 Schools	Childcare Centers	Hospital Facilities	Nursing Homes	Town and City Halls	Water Intake Facilities	Average # of Facilities per Train Mile of Track	10% Impact to Facilities per Mile of Track	Impact Level
Fremont	26.93	1	0	0	0	1	0	0	0	0.07	0.74%	Low
Greene	61.53	2	4	3	1	2	3	16	0	0.50	5.04%	Low
Grundy	3.01*	0	0	0	0	0	0	0	0	0.00	0.00%	Low
Guthrie	25.76	2	4	3	0	2	1	4	0	0.62	6.21%	Low
Hamilton	51.03	4	9	8	2	5	0	25	0	1.04	10.39%	Medium
Hancock	24.30	2	3	2	1	7	2	14	0	1.28	12.76%	Medium
Hardin	58.09	4	4	2	3	8	3	8	0	0.55	5.51%	Low
Harrison	130.16	4	13	13	4	9	3	23	0	0.53	5.30%	Low
Henry	38.72	1	9	7	5	6	8	18	0	1.39	13.95%	Medium
Humboldt	31.36	0	0	4	0	0	0	4	0	0.26	2.55%	Low
Ida	8.92	2	3	5	1	2	1	9	0	2.58	25.79%	High
Iowa	34.03	2	7	3	2	1	2	12	0	0.85	8.52%	Low
Jackson	32.96	2	3	3	0	1	1	7	0	0.52	5.16%	Low
Jasper	38.22	3	9	6	7	8	4	17	0	1.41	14.13%	Medium
Jefferson	53.19	2	9	8	0	7	4	19	1	0.94	9.40%	Low
Johnson	27.20	8	15	11	23	31	3	46	1	5.07	50.74%	High
Keokuk	9.40	0	0	0	0	0	0	0	0	0.00	0.00%	Low
Kossuth	54.51	4	8	8	1	2	1	18	0	0.77	7.70%	Low
Lee	79.03	4	14	8	6	1	7	19	2	0.77	7.72%	Low
Linn	118.32	15	33	16	26	29	12	58	1	1.61	16.06%	Medium
Louisa	19.01	0	2	2	2	1	0	2	0	0.47	4.73%	Low
Lucas	73.65	3	4	7	3	4	2	17	1	0.56	5.57%	Low
Lyon	18.49	2	1	2	0	0	0	6	0	0.59	5.95%	Low
Madison	8.54	1	0	3	1	1	0	3	0	1.05	10.54%	Medium
Mahaska	25.31	1	5	8	10	2	5	14	0	1.78	17.78%	Medium
Marion	16.35	1	1	3	0	1	0	3	0	0.55	5.50%	Low
Marshall	67.55	4	10	8	6	8	1	19	0	0.83	8.29%	Low
Mills	66.50	4	8	4	3	3	9	19	0	0.75	7.52%	Low
Mitchell	30.45	1	8	6	1	2	5	12	0	1.15	11.49%	Medium
Monona	25.71	1	6	4	1	0	3	13	0	1.09	10.89%	Medium
Monroe	72.19	2	4	5	3	5	8	8	0	0.48	4.85%	Low
Montgomery	46.89	2	7	5	2	2	4	18	0	0.85	8.53%	Low
Muscatine	50.35	5	13	6	5	3	1	19	0	1.03	10.33%	Medium

County	Estimated Linear Mile of Railroad	EMS and Fire	Court-houses and Public Safety	K - 12 Schools	Childcare Centers	Hospital Facilities	Nursing Homes	Town and City Halls	Water Intake Facilities	Average # of Facilities per Train Mile of Track	10% Impact to Facilities per Mile of Track	Impact Level
O' Brien	12.75	3	2	3	2	6	4	12	0	2.51	25.09%	High
Osceola	18.00	1	3	0	0	1	4	13	0	1.22	12.22%	Medium
Page	11.83	1	4	5	2	0	3	4	0	1.61	16.06%	Medium
Palo Alto	51.61	0	10	12	5	5	9	25	0	1.28	12.79%	Medium
Plymouth	84.80	4	13	15	5	8	8	26	0	0.93	9.32%	Low
Pocahontas	36.87	2	5	8	1	0	4	8	0	0.76	7.59%	Low
Polk	56.62	5	59	12	19	31	16	128	2	4.80	48.04%	High
Pottawattamie	126.60	5	20	17	17	16	10	31	0	0.92	9.16%	Low
Poweshiek	48.63	3	5	5	1	6	3	13	1	0.76	7.61%	Low
Sac	35.05	1	3	4	0	1	2	9	0	0.57	5.71%	Low
Scott	62.49	5	14	20	13	11	6	31	1	1.62	16.16%	Medium
Shelby	24.16	4	5	3	0	0	2	3	0	0.70	7.04%	Low
Sioux	59.56	4	3	8	2	10	5	11	0	0.72	7.22%	Low
Story	90.94	7	16	14	6	11	6	37	0	1.07	10.67%	Medium
Tama	50.75	2	4	5	0	0	0	7	0	0.35	3.55%	Low
Union	44.23	2	7	8	4	2	5	13	1	0.95	9.50%	Low
Wapello	84.24	4	10	8	2	9	3	22	5	0.75	7.48%	Low
Warren	14.04	2	2	3	2	0	0	1	0	0.71	7.12%	Low
Washington	25.62	1	7	4	2	2	2	13	0	1.21	12.10%	Medium
Wayne	43.00	3	7	7	1	6	2	9	1	0.84	8.37%	Low
Webster	86.74	7	22	15	9	15	9	49	0	1.45	14.53%	Medium
Winnebago	16.32	2	3	5	2	2	2	8	0	1.47	14.70%	Medium
Winneshiek	29.71	3	4	7	2	3	0	8	0	0.91	9.09%	Low
Woodbury	41.16	4	22	23	22	24	8	46	1	3.64	36.45%	High
Worth	45.33	6	12	6	3	2	4	14	0	1.04	10.37%	Medium
Wright	21.63	1	3	3	2	2	2	3	0	0.74	7.40%	Low

** Fayette and Grundy counties do not have crude oil or ethanol rail transportation within their jurisdictional borders, but do have areas within the 0/5 mile buffer zones. The Estimated Linear Miles of Railroad for these counties refer to these buffer zones.*

5.9.3 Railroad Vulnerable Environmental Impact

Tables E-11 and E-12 provide, by county, the total area, in acres or linear miles within the buffer, and the determined impact level. The entire area, each of these summed, is used to calculate the vulnerability for each county from which the impact level was assigned as described in Section 5.4.4 Environmental Impact Level.

Table E-11. Railroad Vulnerable Environmental Impact in Acres – Lakes, Reservoirs, Wetlands, and Setbacks

County	Public Lakes	Federal Reservoirs	Protected Wetlands and Setbacks	Vulnerable Acres	Impact Level
Adair	0.00	0.00	0.00	0.00	Low
Adams	0.00	0.00	0.00	0.00	Low
Allamakee	0.00	0.00	0.00	0.00	Low
Appanoose	0.00	75.49	0.00	7.55	Medium
Benton	0.00	0.00	528.15	52.81	High
Black Hawk	28.29	0.00	0.00	2.83	Medium
Boone	0.00	0.00	100.91	10.09	High
Bremer	0.00	0.00	0.00	0.00	Low
Buchanan	0.00	0.00	0.00	0.00	Low
Buena Vista	200.22	0.00	469.29	66.95	High
Butler	0.00	0.00	0.00	0.00	Low
Calhoun	0.00	0.00	0.00	0.00	Low
Carroll	0.00	0.00	0.00	0.00	Low
Cass	21.39	0.00	0.00	2.14	Medium
Cedar	0.00	0.00	0.00	0.00	Low
Cerro Gordo	732.72	0.00	1,181.27	191.40	High
Cherokee	0.00	0.00	0.00	0.00	Low
Chickasaw	0.00	0.00	0.00	0.00	Low
Clarke	20.37	0.00	0.00	2.04	Medium
Clay	0.00	0.00	1,999.60	199.96	High
Clayton	0.00	0.00	721.81	72.18	High
Clinton	0.00	0.00	0.00	0.00	Low
Crawford	6.62	0.00	0.00	0.66	Medium
Dallas	0.00	0.00	0.00	0.00	Low
Delaware	0.00	0.00	4.71	0.47	Medium
Des Moines	0.00	0.00	479.98	48.00	High
Dickinson	0.00	0.00	0.00	0.00	Low
Dubuque	0.00	0.00	0.00	0.00	Low
Emmet	0.00	0.00	467.04	46.70	High
Fayette	0.00	0.00	0.00	0.00	Low
Floyd	0.00	0.00	0.00	0.00	Low
Franklin	36.06	0.00	0.00	3.61	Medium
Fremont	0.00	0.00	0.00	0.00	Low
Greene	0.00	0.00	0.00	0.00	Low
Grundy	0.00	0.00	0.00	0.00	Low
Guthrie	0.00	0.00	0.00	0.00	Low
Hamilton	35.58	0.00	28.94	6.45	Medium
Hancock	26.02	0.00	972.66	99.87	High
Hardin	0.00	0.00	0.00	0.00	Low
Harrison	0.00	0.00	1,039.27	103.93	High
Henry	0.00	0.00	0.00	0.00	Low
Humboldt	0.00	0.00	0.00	0.00	Low
Ida	0.00	0.00	0.00	0.00	Low

County	Public Lakes	Federal Reservoirs	Protected Wetlands and Setbacks	Vulnerable Acres	Impact Level
Iowa	0.00	0.00	0.00	0.00	Low
Jackson	0.00	0.00	0.00	0.00	Low
Jasper	0.00	0.00	0.00	0.00	Low
Jefferson	0.00	0.00	0.00	0.00	Low
Johnson	11.89	0.00	0.00	1.19	Medium
Keokuk	0.00	0.00	0.00	0.00	Low
Kossuth	0.00	0.00	0.00	0.00	Low
Lee	0.00	0.00	0.00	0.00	Low
Linn	0.00	0.00	0.00	0.00	Low
Louisa	0.00	0.00	0.00	0.00	Low
Lucas	0.26	0.00	13.14	1.34	Medium
Lyon	0.00	0.00	0.00	0.00	Low
Madison	0.00	0.00	0.00	0.00	Low
Mahaska	0.00	0.00	0.00	0.00	Low
Marion	0.00	0.00	0.00	0.00	Low
Marshall	0.00	0.00	0.00	0.00	Low
Mills	0.00	0.00	0.00	0.00	Low
Mitchell	0.00	0.00	0.00	0.00	Low
Monona	0.00	0.00	0.00	0.00	Low
Monroe	0.00	0.00	0.00	0.00	Low
Montgomery	7.64	0.00	0.00	0.76	Medium
Muscatine	0.00	0.00	8.73	0.87	Medium
O’ Brien	0.00	0.00	0.00	0.00	Low
Osceola	0.00	0.00	0.00	0.00	Low
Page	0.00	0.00	0.00	0.00	Low
Palo Alto	252.59	0.00	0.00	25.26	High
Plymouth	0.00	0.00	0.00	0.00	Low
Pocahontas	0.00	0.00	0.00	0.00	Low
Polk	67.56	0.00	180.35	24.79	High
Pottawattamie	0.00	0.00	0.00	0.00	Low
Poweshiek	6.44	0.00	0.00	0.64	Medium
Sac	0.00	0.00	1,094.30	109.43	High
Scott	0.00	0.00	0.00	0.00	Low
Shelby	0.00	0.00	0.00	0.00	Low
Sioux	0.00	0.00	0.00	0.00	Low
Story	0.00	0.00	0.00	0.00	Low
Tama	0.00	0.00	2,565.67	256.57	High
Union	12.41	0.00	0.00	1.24	Medium
Wapello	12.64	0.00	0.00	1.26	Medium
Warren	0.00	0.00	0.00	0.00	Low
Washington	0.00	0.00	0.00	0.00	Low
Wayne	0.00	0.00	0.00	0.00	Low
Webster	0.00	0.00	0.00	0.00	Low
Winnebago	0.00	0.00	867.51	86.75	High
Winneshiek	26.77	0.00	0.00	2.68	Medium
Woodbury	0.00	0.00	0.00	0.00	Low
Worth	0.00	0.00	0.00	0.00	Low
Wright	0.00	0.00	0.00	0.00	Low

Table E-12. Railroad Vulnerable Environmental Impact in Linear Miles – Streams

County	Outstanding Streams	Designated Streams	Protected Streams	Vulnerable Miles	Impact Level
Adair	0.00	1.65	0.00	0.16	Medium
Adams	0.00	14.91	0.00	1.49	High
Allamakee	1.34	5.06	0.00	0.64	Medium
Appanoose	0.00	4.74	0.00	0.47	Medium
Benton	0.00	30.89	0.00	3.09	High
Black Hawk	0.00	28.65	2.08	3.07	High
Boone	0.00	4.57	0.00	0.46	Medium
Bremer	0.00	11.13	0.00	1.11	High
Buchanan	0.00	5.79	6.71	1.25	High
Buena Vista	0.00	2.09	0.00	0.21	Medium
Butler	0.00	43.08	0.00	4.31	High
Calhoun	0.00	5.02	0.00	0.50	Medium
Carroll	0.00	20.16	0.00	2.02	High
Cass	0.00	11.91	0.00	1.19	High
Cedar	0.00	9.05	0.00	0.90	Medium
Cerro Gordo	0.00	32.12	0.00	3.21	High
Cherokee	0.00	9.15	0.00	0.91	Medium
Chickasaw	0.00	12.56	0.00	1.26	High
Clarke	0.00	0.00	0.00	0.00	Low
Clay	0.00	12.08	0.33	1.24	High
Clayton	8.72	18.99	0.00	2.77	High
Clinton	0.00	19.43	1.82	2.13	High
Crawford	0.00	56.13	0.00	5.61	High
Dallas	0.00	15.09	0.00	1.51	High
Delaware	0.00	8.77	0.00	0.88	Medium
Des Moines	0.00	7.74	0.00	0.77	Medium
Dickinson	0.00	0.00	0.00	0.00	Low
Dubuque	0.00	26.00	0.00	2.60	High
Emmet	0.00	13.48	0.00	1.35	Medium
Fayette	0.00	0.18	0.00	0.02	Medium
Floyd	0.00	21.44	0.00	2.14	High
Franklin	0.00	6.52	0.00	0.65	Medium
Fremont	0.00	0.00	0.00	0.00	Low
Greene	0.00	13.02	0.00	1.30	High
Grundy	0.00	0.00	0.00	0.00	Low
Guthrie	0.00	10.00	0.00	1.00	High
Hamilton	0.00	21.54	2.80	2.43	High
Hancock	0.00	1.01	0.00	0.10	Medium
Hardin	0.00	6.94	0.00	0.69	Medium
Harrison	0.00	41.53	0.00	4.15	High
Henry	0.00	3.94	0.00	0.39	Medium
Humboldt	0.00	9.31	0.00	0.93	Medium
Ida	0.00	11.96	0.00	1.20	High
Iowa	0.00	23.09	0.00	2.31	High
Jackson	0.00	4.16	0.00	0.42	Medium
Jasper	0.00	13.74	0.00	1.37	High
Jefferson	0.00	6.98	0.00	0.70	Medium
Johnson	0.00	22.97	0.00	2.30	High
Keokuk	0.00	3.11	0.00	0.31	Medium
Kossuth	0.00	7.51	0.00	0.75	Medium
Lee	0.00	11.34	0.00	1.13	High

County	Outstanding Streams	Designated Streams	Protected Streams	Vulnerable Miles	Impact Level
Linn	0.00	43.78	2.44	4.62	High
Louisa	0.00	1.04	0.00	0.10	Medium
Lucas	0.00	17.75	0.00	1.77	High
Lyon	0.00	2.73	0.00	0.27	Medium
Madison	0.00	0.00	0.00	0.00	Low
Mahaska	0.00	19.15	0.00	1.91	High
Marion	0.00	3.73	0.00	0.37	Medium
Marshall	0.00	19.39	0.00	1.94	High
Mills	0.00	9.00	0.00	0.90	Medium
Mitchell	0.00	2.60	0.00	0.26	Medium
Monona	0.00	11.07	0.00	1.11	High
Monroe	0.00	16.04	0.00	1.60	High
Montgomery	0.00	11.39	0.00	1.14	High
Muscatine	0.00	29.17	0.00	2.92	High
O' Brien	0.00	9.03	0.00	0.90	Medium
Osceola	0.00	7.60	0.00	0.76	Medium
Page	0.00	2.99	0.00	0.30	Medium
Palo Alto	0.00	2.66	0.00	0.27	Medium
Plymouth	0.00	72.42	0.00	7.24	High
Pocahontas	0.00	1.16	0.00	0.12	Medium
Polk	0.00	25.52	0.00	2.55	High
Pottawattamie	0.00	36.44	0.00	3.64	High
Poweshiek	0.00	26.75	0.00	2.68	High
Sac	0.00	20.46	0.00	2.05	High
Scott	0.00	16.15	1.55	1.77	High
Shelby	0.00	19.40	0.00	1.94	High
Sioux	0.00	58.41	0.00	5.84	High
Story	0.00	10.70	0.00	1.07	High
Tama	0.00	19.48	0.00	1.95	High
Union	0.00	10.05	0.00	1.01	High
Wapello	0.00	25.07	0.00	2.51	High
Warren	0.00	5.77	0.00	0.58	Medium
Washington	0.00	8.81	0.00	0.88	Medium
Wayne	0.00	1.48	0.00	0.15	Medium
Webster	0.00	17.23	0.00	1.72	High
Winnebago	0.00	3.77	0.00	0.38	Medium
Winneshiek	0.00	6.50	0.00	0.65	Medium
Woodbury	0.00	9.30	0.00	0.93	Medium
Worth	0.00	5.80	0.00	0.58	Medium
Wright	0.00	10.14	0.00	1.01	High

5.9.4 Railroad Likelihood

While future rail incidents cannot be predicted, a historical review can be used to conservatively estimate the chances of railroad accidents per year. Based on PHMSA data, Iowa experienced ten serious railroad incidents from 2004 through 2014.[28] PHMSA considers a railroad incident to be "serious" if it involves:

- A fatality or major injury caused by the release of a hazardous material.

[28] U.S. Department of Transportation, Pipeline Hazardous Materials Safety Administration, *Incident Reports Database Search*, https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/ (accessed December 4, 2015).

- The evacuation of 25 or more employees or responders or any number of the general public as a result of release of a hazardous material or exposure to fire.
- A release or exposure to fire which results in the closure of a major transportation artery.
- The alteration of an aircraft flight plan or operation.
- The release of radioactive materials from Type B packaging.
- The suspected release of a "Risk Group 3" or "Risk Group 4" infectious substance.
- The release of over 11.9 gallons or 88.2 pounds of a severe marine pollutant.
- The release of a bulk quantity (over 119 gallons or 882 pounds) of a hazardous material.[29]

Table E-13. Railroad 10 Year Incident

2004–2014		
	10 Year Average	*10 Year Range*
Incident Count	1	0 - 10
# Evacuated	15.81	1581
Fatalities	0	0
Injuries	0.2	2
Property Damage	$0	$0 - $0

Causative factors range from human error, to equipment malfunction, to infrastructure failure. Table E-15 is calculated by tank car, rather than per incident.

Table E-14. Serious Railroad Incidents by Cause

Failure Cause Description	% of All Accidents
Over-pressurized	20%
Loose Closure	30%
Liner	10%
Missing Component	10%
Misaligned Component	10%
Derailment	10%
Human Error	10%

Based on historical data presented in Table E-14, Iowa is estimated to experience an annualized one significant railroad incidents per year, or approximately ten incidents over the next ten years (based on annualized incidents). Of those ten incidents, based on statistical data, it is reasonable to assume that approximately one of those would be caused by derailment.

[29] U.S. Department of Transportation, Pipeline Hazardous Materials Safety Administration, *Serious Incident Definition*, http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=706851d415b7c110VgnVCM1000009ed07898RCRD&vgnextchannel=8010dd246007c110VgnVCM1000009ed07898RCRD (accessed December 4, 2015).

5.9.5 Railroad Incident Likelihood

Railroad: Likelihood Rating

The likelihood rating was then assigned by examining the percent probability and assigning the appropriate value as outlined in Table E-15. Methodology for Likelihood Rating is provided in Section 5.5.

Table E-15. Railroad Likelihood Rating

County	Estimated Linear Miles of Rail	Number of Trains per day	Total Train Miles	% Total Train Miles (Statewide) per day	Likelihood Value	Annual Probability	Likelihood Level
Adair	7.75	1	7.75	0.05%	0.01	0.05%	Negligible
Adams	34.88	3	104.64	0.66%	0.13	0.66%	Low
Allamakee	40.14	7	281.01	1.78%	0.36	1.78%	Moderate
Appanoose	22.36	5	111.80	0.71%	0.14	0.71%	Low
Benton	74.55	6	447.30	2.84%	0.57	2.84%	High
Black Hawk	77.65	3	232.94	1.48%	0.30	1.48%	Moderate
Boone	49.18	3	147.55	0.94%	0.19	0.94%	Low
Bremer	23.65	1	23.65	0.15%	0.03	0.15%	Low
Buchanan	27.45	3	82.35	0.52%	0.10	0.52%	Low
Buena Vista	36.27	1	36.27	0.23%	0.05	0.23%	Low
Butler	46.00	1	46.00	0.29%	0.06	0.29%	Low
Calhoun	40.67	1	40.67	0.26%	0.05	0.26%	Low
Carroll	74.65	4	298.60	1.89%	0.38	1.89%	Moderate
Cass	25.82	1	25.82	0.16%	0.03	0.16%	Low
Cedar	57.23	5	286.13	1.82%	0.36	1.82%	Moderate
Cerro Gordo	77.70	6	466.17	2.96%	0.59	2.96%	High
Cherokee	29.80	1	29.80	0.19%	0.04	0.19%	Low
Chickasaw	33.35	3	100.05	0.63%	0.13	0.63%	Low
Clarke	51.92	3	155.76	0.99%	0.20	0.99%	Low
Clay	24.39	1	24.39	0.15%	0.03	0.15%	Low
Clayton	59.29	7	415.04	2.63%	0.53	2.63%	High
Clinton	102.66	5	513.30	3.26%	0.65	3.26%	Highest
Crawford	109.52	4	438.07	2.78%	0.56	2.78%	High
Dallas	17.50	1	17.50	0.11%	0.02	0.11%	Low
Delaware	38.68	1	38.68	0.25%	0.05	0.25%	Low
Des Moines	44.70	3	134.11	0.85%	0.17	0.85%	Low
Dickinson	2.18	1	2.18	0.01%	0.00	0.01%	Negligible
Dubuque	62.16	7	435.14	2.76%	0.55	2.76%	High
Emmet	36.22	1	36.22	0.23%	0.05	0.23%	Low
Fayette	0.50*	1	0.50	0.00%	0.00	0.00%	Negligible
Floyd	64.52	3	193.56	1.23%	0.25	1.23%	Moderate
Franklin	26.16	4	104.63	0.66%	0.13	0.66%	Low
Fremont	26.93	1	26.93	0.17%	0.03	0.17%	Low
Greene	61.53	4	246.12	1.56%	0.31	1.56%	Moderate
Grundy	3.01*	1	3.01	0.02%	0.00	0.02%	Negligible
Guthrie	25.76	1	25.76	0.16%	0.03	0.16%	Low
Hamilton	51.03	1	51.03	0.32%	0.06	0.32%	Low
Hancock	24.30	1	24.30	0.15%	0.03	0.15%	Low
Hardin	58.09	4	232.34	1.47%	0.29	1.47%	Moderate
Harrison	130.16	6	780.97	4.96%	0.99	4.96%	Highest
Henry	38.72	3	116.15	0.74%	0.15	0.74%	Low

County	Estimated Linear Miles of Rail	Number of Trains per day	Total Train Miles	% Total Train Miles (Statewide) per day	Likelihood Value	Annual Probability	Likelihood Level
Humboldt	31.36	1	31.36	0.20%	0.04	0.20%	Low
Ida	8.92	1	8.92	0.06%	0.01	0.06%	Negligible
Iowa	34.03	3	102.08	0.65%	0.13	0.65%	Low
Jackson	32.96	5	164.79	1.05%	0.21	1.05%	Moderate
Jasper	38.22	1	38.22	0.24%	0.05	0.24%	Low
Jefferson	53.19	8	425.55	2.70%	0.54	2.70%	High
Johnson	27.20	2	54.39	0.35%	0.07	0.35%	Low
Keokuk	9.40	5	46.99	0.30%	0.06	0.30%	Low
Kossuth	54.51	1	54.51	0.35%	0.07	0.35%	Low
Lee	79.03	3	237.08	1.50%	0.30	1.50%	Moderate
Linn	118.32	6	709.90	4.50%	0.90	4.50%	Highest
Louisa	19.01	5	95.04	0.60%	0.12	0.60%	Low
Lucas	73.65	6	441.88	2.80%	0.56	2.80%	High
Lyon	18.49	4	73.95	0.47%	0.09	0.47%	Low
Madison	8.54	1	8.54	0.05%	0.01	0.05%	Negligible
Mahaska	25.31	1	25.31	0.16%	0.03	0.16%	Low
Marion	16.35	3	49.05	0.31%	0.06	0.31%	Low
Marshall	67.55	4	270.21	1.71%	0.34	1.71%	Moderate
Mills	66.50	4	265.98	1.69%	0.34	1.69%	Moderate
Mitchell	30.45	1	30.45	0.19%	0.04	0.19%	Low
Monona	25.71	2	51.42	0.33%	0.07	0.33%	Low
Monroe	72.19	9	649.75	4.12%	0.82	4.12%	Highest
Montgomery	46.89	4	187.56	1.19%	0.24	1.19%	Moderate
Muscatine	50.35	4	201.41	1.28%	0.26	1.28%	Moderate
O' Brien	12.75	3	38.26	0.24%	0.05	0.24%	Low
Osceola	18.00	2	36.00	0.23%	0.05	0.23%	Low
Page	11.83	1	11.83	0.08%	0.02	0.08%	Negligible
Palo Alto	51.61	1	51.61	0.33%	0.07	0.33%	Low
Plymouth	84.80	7	593.62	3.77%	0.75	3.77%	Highest
Pocahontas	36.87	1	36.87	0.23%	0.05	0.23%	Low
Polk	56.62	4	226.50	1.44%	0.29	1.44%	Moderate
Pottawattamie	126.60	4	506.41	3.21%	0.64	3.21%	Highest
Poweshiek	48.63	1	48.63	0.31%	0.06	0.31%	Low
Sac	35.05	1	35.05	0.22%	0.04	0.22%	Low
Scott	62.49	7	437.40	2.78%	0.56	2.78%	High
Shelby	24.16	1	24.16	0.15%	0.03	0.15%	Low
Sioux	59.56	7	416.89	2.65%	0.53	2.65%	High
Story	90.94	4	363.76	2.31%	0.46	2.31%	High
Tama	50.75	3	152.26	0.97%	0.19	0.97%	Low
Union	44.23	3	132.69	0.84%	0.17	0.84%	Low
Wapello	84.24	8	673.90	4.28%	0.86	4.28%	Highest
Warren	14.04	3	42.13	0.27%	0.05	0.27%	Low
Washington	25.62	5	128.08	0.81%	0.16	0.81%	Low
Wayne	43.00	5	215.02	1.36%	0.27	1.36%	Moderate
Webster	86.74	1	86.74	0.55%	0.11	0.55%	Low
Winnebago	16.32	1	16.32	0.10%	0.02	0.10%	Low
Winneshiek	29.71	2	59.43	0.38%	0.08	0.38%	Low
Woodbury	41.16	7	288.10	1.83%	0.37	1.83%	Moderate
Worth	45.33	1	45.33	0.29%	0.06	0.29%	Low
Wright	21.63	4	86.52	0.55%	0.11	0.55%	Low

** Fayette and Grundy counties do not have crude oil or ethanol rail transportation within their jurisdictional borders, but do have areas within the 0.5-mile buffer zones. The Estimated Linear Miles of Railroad for these counties refer to these buffer zones.*

5.9.6 Crude Oil and Ethanol Railroad Transportation Sensitivity

Table E-16 summarizes the likelihood, impact, and associated sensitivity (risk) in each county for railroad crude oil and ethanol rail transportation based on utilizing the methodology presented in Section 5.6: Risk. Figure 1 depicts the sensitivity levels for each county where crude oil and/or ethanol are transported by rail. All other maps supporting the RVA are located in Appendix I: Maps. Methodology for Railroad Risk (Sensitivity) is provided in Section 5.6.

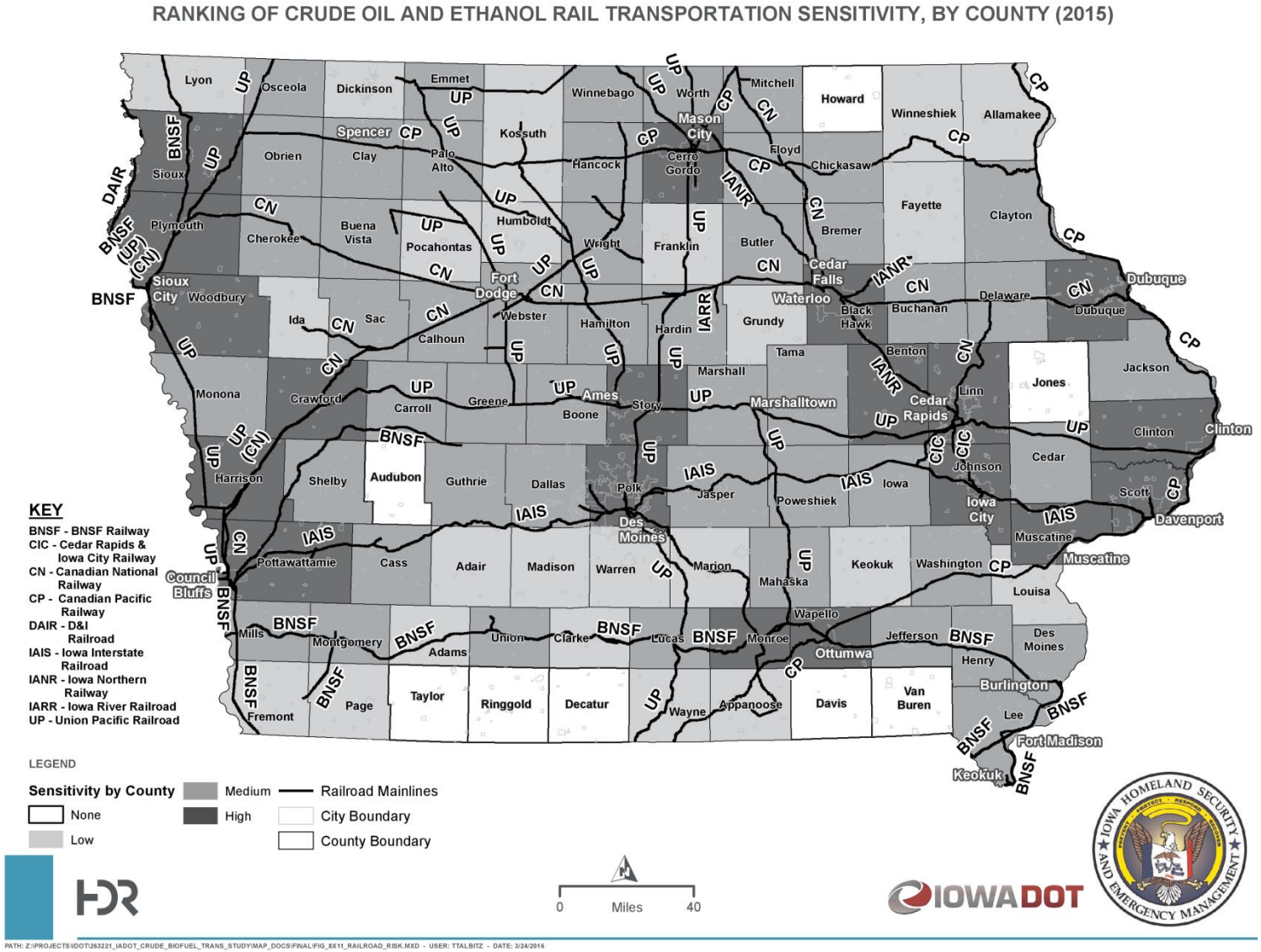
Table E-16. Sensitivity

All Counties	Population Impact Level	Critical Facilities Impact Level	Environ-mental Impact Level	Average Impact Value	Likelihood Level	Likelihood Value	Sensitivity Value	Assigned Sensitivity Level
Adair	5	3	3	3.67	Negligible	1	3.67	Low
Adams	1	1	5	2.33	Low	2	4.67	Low
Allamakee	1	1	3	1.67	Moderate	3	5.00	Low
Appanoose	1	1	3	1.67	Low	2	3.33	Low
Benton	3	1	5	3.00	High	4	12.00	High
Black Hawk	5	3	5	4.33	Moderate	3	13.00	High
Boone	3	3	5	3.67	Low	2	7.33	Medium
Bremer	5	3	5	4.33	Low	2	8.67	Medium
Buchanan	3	3	5	3.67	Low	2	7.33	Medium
Buena Vista	5	3	5	4.33	Low	2	8.67	Medium
Butler	5	1	5	3.67	Low	2	7.33	Medium
Calhoun	3	3	3	3.00	Low	2	6.00	Medium
Carroll	3	1	5	3.00	Moderate	3	9.00	Medium
Cass	5	3	5	4.33	Low	2	8.67	Medium
Cedar	3	1	3	2.33	Moderate	3	7.00	Medium
Cerro Gordo	3	3	5	3.67	High	4	14.67	High
Cherokee	5	5	3	4.33	Low	2	8.67	Medium
Chickasaw	3	3	5	3.67	Low	2	7.33	Medium
Clarke	3	1	3	2.33	Low	2	4.67	Low
Clay	5	3	5	4.33	Low	2	8.67	Medium
Clayton	1	1	5	2.33	High	4	9.33	Medium
Clinton	3	1	5	3.00	Highest	5	15.00	High
Crawford	3	1	5	3.00	High	4	12.00	High
Dallas	5	1	5	3.67	Low	2	7.33	Medium
Delaware	5	3	3	3.67	Low	2	7.33	Medium
Des Moines	5	3	5	4.33	Low	2	8.67	Medium
Dickinson	3	3	1	2.33	Negligible	1	2.33	Low
Dubuque	3	3	5	3.67	High	4	14.67	High
Emmet	5	1	5	3.67	Low	2	7.33	Medium
Fayette	5	1	3	3.00	Negligible	1	3.00	Low
Floyd	3	1	5	3.00	Moderate	3	9.00	Medium
Franklin	3	1	3	2.33	Low	2	4.67	Low
Fremont	1	1	1	1.00	Low	2	2.00	Low
Greene	1	1	5	2.33	Moderate	3	7.00	Medium
Grundy	1	1	1	1.00	Negligible	1	1.00	Low
Guthrie	3	1	5	3.00	Low	2	6.00	Medium
Hamilton	5	3	5	4.33	Low	2	8.67	Medium

All Counties	Population Impact Level	Critical Facilities Impact Level	Environ-mental Impact Level	Average Impact Value	Likelihood Level	Likelihood Value	Sensitivity Value	Assigned Sensitivity Level
Hancock	5	3	5	4.33	Low	2	8.67	Medium
Hardin	3	1	3	2.33	Moderate	3	7.00	Medium
Harrison	1	1	5	2.33	Highest	5	11.67	High
Henry	3	3	3	3.00	Low	2	6.00	Medium
Humboldt	3	1	3	2.33	Low	2	4.67	Low
Ida	5	5	5	5.00	Negligible	1	5.00	Low
Iowa	3	1	5	3.00	Low	2	6.00	Medium
Jackson	3	1	3	2.33	Moderate	3	7.00	Medium
Jasper	5	3	5	4.33	Low	2	8.67	Medium
Jefferson	1	1	3	1.67	High	5	8.33	Medium
Johnson	5	5	5	5.00	Low	2	10.00	High
Keokuk	1	1	3	1.67	Low	2	3.33	Low
Kossuth	3	1	3	2.33	Low	2	4.67	Low
Lee	3	1	5	3.00	Moderate	3	9.00	Medium
Linn	3	3	5	3.67	Highest	5	18.33	High
Louisa	3	1	3	2.33	Low	2	4.67	Low
Lucas	1	1	5	2.33	High	4	9.33	Medium
Lyon	1	1	3	1.67	Low	2	3.33	Low
Madison	5	3	1	3.00	Negligible	1	3.00	Low
Mahaska	5	3	5	4.33	Low	2	8.67	Medium
Marion	3	1	3	2.33	Low	2	4.67	Low
Marshall	3	1	5	3.00	Moderate	3	9.00	Medium
Mills	3	1	3	2.33	Moderate	3	7.00	Medium
Mitchell	5	3	3	3.67	Low	2	7.33	Medium
Monona	3	3	5	3.67	Low	2	7.33	Medium
Monroe	1	1	5	2.33	Highest	5	11.67	High
Montgomery	3	1	5	3.00	Moderate	3	9.00	Medium
Muscatine	3	3	5	3.67	Moderate	3	11.00	High
O' Brien	5	5	3	4.33	Low	2	8.67	Medium
Osceola	3	3	3	3.00	Low	2	6.00	Medium
Page	5	3	3	3.67	Negligible	1	3.67	Low
Palo Alto	5	3	5	4.33	Low	2	8.67	Medium
Plymouth	3	1	5	3.00	Highest	5	15.00	High
Pocahontas	3	1	3	2.33	Low	2	4.67	Low
Polk	5	5	5	5.00	Moderate	3	15.00	High
Pottawattamie	3	1	5	3.00	Highest	5	15.00	High
Poweshiek	5	1	5	3.67	Low	2	7.33	Medium
Sac	3	1	5	3.00	Low	2	6.00	Medium
Scott	3	3	5	3.67	High	4	14.67	High
Shelby	3	1	5	3.00	Low	2	6.00	Medium
Sioux	3	1	5	3.00	High	4	12.00	High
Story	5	3	5	4.33	High	4	17.33	High
Tama	3	1	5	3.00	Low	2	6.00	Medium
Union	3	1	5	3.00	Low	2	6.00	Medium
Wapello	1	1	5	2.33	Highest	5	11.67	High
Warren	3	1	3	2.33	Low	2	4.67	Low
Washington	3	3	3	3.00	Low	2	6.00	Medium
Wayne	1	1	3	1.67	Moderate	3	5.00	Low
Webster	5	3	5	4.33	Low	2	8.67	Medium
Winnebago	5	3	5	4.33	Low	2	8.67	Medium
Winneshiek	3	1	3	2.33	Low	2	4.67	Low

All Counties	Population Impact Level	Critical Facilities Impact Level	Environ-mental Impact Level	Average Impact Value	Likelihood Level	Likelihood Value	Sensitivity Value	Assigned Sensitivity Level
Woodbury	5	5	3	4.33	Moderate	3	13.00	High
Worth	3	3	3	3.00	Low	2	6.00	Medium
Wright	3	1	5	3.00	Low	2	6.00	Medium

Figure E-1. Ranking of Crude Oil and Ethanol Railroad Transportation Sensitivity, by County (2015)



Source: HDR, as of 3/24/2016

5.9.7 Sensitivity Examples

The following examples of sensitivity calculations are provided to aid in understanding of how each county was assessed, and how the results of the assessment determined the county's sensitivity rating:

Marion County – Low Sensitivity Rating

Marion County has an estimated population of 33,365 with 1,425 (4.27 percent) of that total population residing within ½ mile of the crude oil and ethanol transporting railroads. This results in an averaged 29 people per train mile of track. Using a 10 percent impact factor, the assessment assumes a potential population impact to be three people, resulting in a medium population impact rating (Value: 3).

There are a total of nine critical facilities within the identified hazard area of Marion County, which averages out to 0.55 facilities per mile of track. A 10 percent impact to critical facilities per mile of track equals 5.5 percent, which is less than 10 percent for overall loss to the facilities and results in a low critical facility impact rating (Value: 1).

Marion County has no exposed water bodies but it does have 3.73 miles of exposed stream length, creating a 10 percent vulnerability of 0.37 miles. This results in a low impact rating for water bodies and a medium impact rating for streams. Since the overall potential impact to the county is 0.37 miles, the overall impact rating is medium (Value: 3).

The population, critical facility, and environmental factors are calculated together to create an Average Impact Value of 2.33.

Marion County has 16.35 miles of active railroads that transport crude oil and ethanol. They average three crude oil/ethanol trains per day, which calculates out to be 49.05 total train miles, or 0.31 percent of the total train miles in Iowa. Given the historical accounts for significant rail incidents during transport in Iowa, the annual probability, or likelihood, of occurrence in Marion County is 0.31 percent, a low likelihood rating (Value: 2).

The Average Impact Value and Likelihood Value are multiplied together, resulting in the Low Sensitivity Level with a Sensitivity Rating of 4.67.

Wright County – Medium Sensitivity Rating

Wright County has an estimated population of 12,480 with 3,843 (29.93 percent) of that total population residing within ½ mile of the crude oil and ethanol transporting railroads. This results in an averaged 44 people per train mile of track. Using a 10 percent impact factor, the assessment assumes a potential population impact to be four people, resulting in a medium population impact rating (Value: 3).

There are a total of 16 critical facilities within the identified hazard area of Wright County, which averages out to 0.74 facilities per mile of track. A 10 percent impact to critical facilities per mile of track equals 7.4 percent, which is less than 10 percent for overall loss to the facilities and results in a low critical facility impact rating (Value: 1).

Wright County has no exposed water bodies but it does have 10.14 miles of exposed stream length, creating a 10 percent vulnerability of 1.01 miles. This results in a low impact rating for

water bodies and a high impact rating for streams. Since the overall potential impact to the county is 1.01 miles, the overall impact rating is high (Value: 5).

The population, critical facility, and environmental factors are calculated together to create an Average Impact Value of 2.33.

Wright County has 21.63 miles of active railroads that transport crude oil and ethanol. They average four crude oil/ethanol trains per day, which calculates out to be 86.52 total train miles, or 0.55 percent of the total train miles in Iowa. Given the historical accounts for significant rail incidents during transport in Iowa, the annual probability, or likelihood, of occurrence in Wright County is 0.55 percent, a low likelihood rating (Value: 2).

The Average Impact Value and Likelihood Value are multiplied together, resulting in the Medium Sensitivity Level with a Sensitivity Rating of 6.00.

Dubuque County – High Sensitivity Rating

Dubuque County has an estimated population of 96,370 with 26,166 (27.15 percent) of that total population residing within ½ mile of the crude oil and ethanol transporting railroads. This results in an averaged 60 people per train mile of track. Using a 10 percent impact factor, the assessment assumes a potential population impact to be six people, resulting in a medium population impact rating (Value: 3).

There are a total of 104 critical facilities within the identified hazard area of Dubuque County, which averages out to 1.67 facilities per mile of track. A 10 percent impact to critical facilities per mile of track equals 16.73 percent, which is between 10 percent and 20 percent for overall loss to the facilities and results in a medium critical facility impact rating (Value: 3).

Dubuque County has no exposed water bodies but it does have 26.0 miles of exposed stream length, creating a 10 percent vulnerability of 2.60 miles. This results in a low impact rating for water bodies and a high impact rating for streams. Since the overall potential impact to the county is 2.60 miles, the overall impact rating is high (Value: 5).

The population, critical facility, and environmental factors are calculated together to create an Average Impact Value of 2.33.

Dubuque County has 62.16 miles of active railroads that transport crude oil and ethanol. They average seven crude oil/ethanol trains per day, which calculates out to be 435.14 total train miles, or 2.76 percent of the total train miles in Iowa. Given the historical accounts for significant rail incidents during transport in Iowa, the annual probability of occurrence in Dubuque County is 2.76 percent, a high likelihood rating (Value: 4).

The Average Impact Value and Likelihood Value are multiplied together, resulting in the High Sensitivity Level with a Sensitivity Rating of 14.69.

6.0 Appendix F - County Exposure Rankings: Top Ten Counties in Iowa

6.1 Percent of Total County in the Buffer Zone

Table F-1. Percent of Total County in the Buffer Zone

County	Percent of Total County in the Buffer Zone
Wapello	19.97%
Harrison	18.68%
Lucas	17.10%
Monroe	16.65%
Linn	16.50%
Butler	16.42%
Story	15.88%
Crawford	15.33%
Lee	15.27%
Mills	15.20%

6.2 Percent of County Population Exposed

Table F-2. Percent of County Population Exposed

County	Percent of County Population Exposed
Palo Alto	62.66%
Lucas	61.22%
Cerro Gordo	58.70%
Buena Vista	57.90%
Worth	52.75%
Monroe	52.58%
Poweshiek	51.64%
Floyd	50.58%
Hamilton	50.26%
Clarke	49.70%

6.3 County Housing Units Exposed

Table F-3. Percent of County Housing Units Exposed

County	Percent of County Housing Units Exposed
Lucas	61.66%
Palo Alto	61.08%
Cerro Gordo	56.55%
Buena Vista	54.84%
Worth	54.73%
Floyd	52.10%
Monroe	50.72%
Hamilton	50.23%
Union	49.65%
Clarke	49.25%

6.4 Total County Facilities Exposed

Table F-4. Total County Facilities Exposed

County	Facilities Exposed (#)
Polk	272
Linn	190
Woodbury	150
Johnson	138
Webster	126
Pottawattamie	116
Black Hawk	104
Dubuque	104
Scott	101
Story	97

6.5 Total Lakes, Reservoirs, & Wetlands, Exposed

Table F-5. Total Lakes, Reservoirs, & Wetlands, Exposed

County	Lakes, Reservoirs, & Wetlands, Exposed (Acres)
Tama	2,565.67
Clay	1,999.60
Cerro Gordo	1,913.98
Sac	1,094.30
Harrison	1,039.27
Hancock	998.69
Winnebago	867.51
Clayton	721.81
Buena Vista	669.51
Benton	528.15

6.6 Total Length of Streams Exposed

Table F-6. Total Length of Streams Exposed

County	Length of Streams Exposed (Miles)
Plymouth	72.42
Sioux	58.41
Crawford	56.13
Linn	46.22
Butler	43.08
Harrison	41.53
Pottawattamie	36.44
Cerro Gordo	32.12
Benton	30.89
Black Hawk	30.74

6.7 Total Exposed Conservation and Recreation Lands

Table F-7. Total Exposed Conservation and Recreation Lands

County	Exposed Conservation and Recreation Lands (Acres)
Clayton	10,067
Allamakee	9,266
Jackson	7,564
Clinton	6,159
Dubuque	6,127
Scott	5,698
Lee	5,618
Muscatine	3,534
Tama	2,943
Polk	2,917

7.0 Appendix G - County Profiles

7.1 Adair County Profile

Overview	
Total County Area (square miles)	569.27
Estimated Linear Miles of Railroad	7.75
Percent Total County in the Buffer Zone	1.36%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	7,454
Estimated Exposed Population	1,409
Percent Total County Population Exposed	18.90%
Total County Housing Units (2014)	3,674
Estimated Exposed Housing Units	664
Percent Total County Exposed Housing Units	18.06%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	3
K-12 Schools	0
Childcare Centers	0
Hospital Facilities	1
Nursing Homes	1
Town and City Halls	3
Water Intakes	0
Total County Exposed Facilities	10

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	11
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	1.65
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	1.65

7.2 Adams County Profile

Overview	
Total County Area (square miles)	423.44
Estimated Linear Miles of Railroad	34.88
Percent Total County in the Buffer Zone	8.24%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	3,875
Estimated Exposed Population	1,499
Percent Total County Population Exposed	38.70%
Total County Housing Units (2014)	2,010
Estimated Exposed Housing Units	772
Percent Total County Exposed Housing Units	38.39%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	8
K-12 Schools	3
Childcare Centers	1
Hospital Facilities	2
Nursing Homes	0
Town and City Halls	11
Water Intakes	1
Total County Exposed Facilities	28

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	8
K-12 Schools	3
Childcare Centers	1
Hospital Facilities	2
Nursing Homes	0
Town and City Halls	11
Water Intakes	1
Total County Exposed Facilities	28
Total Exposed Conservation and Recreation Lands (acres)	27
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	14.91
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	14.91

7.3 Allamakee County Profile

Overview	
Total County Area (square miles)	639.08
Estimated Linear Miles of Railroad	40.14
Percent Total County in the Buffer Zone	6.28%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	14,038
Estimated Exposed Population	3,954
Percent Total County Population Exposed	28.17%
Total County Housing Units (2014)	7,650
Estimated Exposed Housing Units	2,669
Percent Total County Exposed Housing Units	34.89%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	5
K-12 Schools	5
Childcare Centers	5
Hospital Facilities	4
Nursing Homes	1
Town and City Halls	15
Water Intakes	0
Total County Exposed Facilities	39

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	9,266
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	1.34
Designated Streams (length in miles)	5.06
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	6.40

7.4 Appanoose County Profile

Overview	
Total County Area (square miles)	497.29
Estimated Linear Miles of Railroad	22.36
Percent Total County in the Buffer Zone	4.50%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	12,661
Estimated Exposed Population	1,339
Percent Total County Population Exposed	10.58%
Total County Housing Units (2014)	6,578
Estimated Exposed Housing Units	685
Percent Total County Exposed Housing Units	10.42%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	2
K-12 Schools	3
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	4
Water Intakes	0
Total County Exposed Facilities	10

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	513
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	75.49
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	75.49
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	4.74
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	4.74

7.5 Benton County Profile

Overview	
Total County Area (square miles)	716.27
Estimated Linear Miles of Railroad	74.55
Percent Total County in the Buffer Zone	10.41%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	25,680
Estimated Exposed Population	10,724
Percent Total County Population Exposed	41.76%
Total County Housing Units (2014)	11,079
Estimated Exposed Housing Units	4,717
Percent Total County Exposed Housing Units	42.58%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	5
Courthouses, Prisons, and Public Safety	13
K-12 Schools	10
Childcare Centers	2
Hospital Facilities	4
Nursing Homes	2
Town and City Halls	26
Water Intakes	0
Total County Exposed Facilities	62

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	436
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	528.15
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	528.15
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	30.89
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	30.28

7.6 Black Hawk County Profile

Overview	
Total County Area (square miles)	565.77
Estimated Linear Miles of Railroad	77.65
Percent Total County in the Buffer Zone	13.72%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	132,897
Estimated Exposed Population	38,100
Percent Total County Population Exposed	28.67%
Total County Housing Units (2014)	56,890
Estimated Exposed Housing Units	16,775
Percent Total County Exposed Housing Units	29.49%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	20
K-12 Schools	20
Childcare Centers	11
Hospital Facilities	11
Nursing Homes	7
Town and City Halls	31
Water Intakes	0
Total County Exposed Facilities	104

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	2741
Significant Public Lakes (acres)	28.29
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	28.29
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	28.65
Protected Streams (length in miles)	2.08
Total Exposed Length of Streams (length in miles)	30.74

7.7 Boone County Profile

Overview	
Total County Area (square miles)	571.57
Estimated Linear Miles of Railroad	49.18
Percent Total County in the Buffer Zone	8.60%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	26,433
Estimated Exposed Population	9,525
Percent Total County Population Exposed	36.03%
Total County Housing Units (2014)	11,793
Estimated Exposed Housing Units	4,400
Percent Total County Exposed Housing Units	37.31%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	8
K-12 Schools	11
Childcare Centers	3
Hospital Facilities	4
Nursing Homes	7
Town and City Halls	19
Water Intakes	0
Total County Exposed Facilities	54

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	231
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	100.91
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	100.91
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	4.57
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	4.57

7.8 Bremer County Profile

Overview	
Total County Area (square miles)	435.48
Estimated Linear Miles of Railroad	23.65
Percent Total County in the Buffer Zone	5.43%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	24,721
Estimated Exposed Population	5,994
Percent Total County Population Exposed	24.25%
Total County Housing Units (2014)	10,136
Estimated Exposed Housing Units	2,085
Percent Total County Exposed Housing Units	20.57%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	2
K-12 Schools	7
Childcare Centers	3
Hospital Facilities	4
Nursing Homes	3
Town and City Halls	2
Water Intakes	0
Total County Exposed Facilities	24

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	436
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	11.13
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	11.13

7.9 Buchanan County Profile

Overview	
Total County Area (square miles)	571.02
Estimated Linear Miles of Railroad	27.45
Percent Total County in the Buffer Zone	4.81%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	21,038
Estimated Exposed Population	6,881
Percent Total County Population Exposed	32.71%
Total County Housing Units (2014)	8,990
Estimated Exposed Housing Units	2,990
Percent Total County Exposed Housing Units	33.26%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	3
K-12 Schools	12
Childcare Centers	4
Hospital Facilities	4
Nursing Homes	3
Town and City Halls	5
Water Intakes	0
Total County Exposed Facilities	34

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	24
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	5.79
Protected Streams (length in miles)	6.71
Total Exposed Length of Streams (length in miles)	12.50

7.10 Buena Vista County Profile

Overview	
Total County Area (square miles)	574.92
Estimated Linear Miles of Railroad	36.27
Percent Total County in the Buffer Zone	6.31%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	20,578
Estimated Exposed Population	11,915
Percent Total County Population Exposed	57.90%
Total County Housing Units (2014)	8,299
Estimated Exposed Housing Units	4,551
Percent Total County Exposed Housing Units	54.84%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	7
K-12 Schools	13
Childcare Centers	4
Hospital Facilities	4
Nursing Homes	4
Town and City Halls	24
Water Intakes	0
Total County Exposed Facilities	59

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	416
Significant Public Lakes (acres)	200.22
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	469.29
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	669.51
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	0
Protected Streams (length in miles)	2.09
Total Exposed Length of Streams (length in miles)	2.09

7.11 Butler County Profile

Overview	
Total County Area (square miles)	280.13
Estimated Linear Miles of Railroad	46.00
Percent Total County in the Buffer Zone	16.42%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	15,006
Estimated Exposed Population	6,421
Percent Total County Population Exposed	42.79%
Total County Housing Units (2014)	6,731
Estimated Exposed Housing Units	2,942
Percent Total County Exposed Housing Units	43.71%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	6
Courthouses, Prisons, and Public Safety	9
K-12 Schools	6
Childcare Centers	3
Hospital Facilities	5
Nursing Homes	5
Town and City Halls	10
Water Intakes	0
Total County Exposed Facilities	44

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	687
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	43.08
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	43.08

7.12 Calhoun County Profile

Overview	
Total County Area (square miles)	569.97
Estimated Linear Miles of Railroad	40.67
Percent Total County in the Buffer Zone	7.14%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	9,866
Estimated Exposed Population	3,380
Percent Total County Population Exposed	34.26%
Total County Housing Units (2014)	5,088
Estimated Exposed Housing Units	1,768
Percent Total County Exposed Housing Units	34.75%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	8
K-12 Schools	6
Childcare Centers	1
Hospital Facilities	3
Nursing Homes	6
Town and City Halls	20
Water Intakes	0
Total County Exposed Facilities	45

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	93
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	5.02
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	5.02

7.13 Carroll County Profile

Overview	
Total County Area (square miles)	569.44
Estimated Linear Miles of Railroad	74.65
Percent Total County in the Buffer Zone	13.11%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	20,562
Estimated Exposed Population	7,530
Percent Total County Population Exposed	36.62%
Total County Housing Units (2014)	9,419
Estimated Exposed Housing Units	3,639
Percent Total County Exposed Housing Units	38.64%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	16
K-12 Schools	7
Childcare Centers	7
Hospital Facilities	13
Nursing Homes	2
Town and City Halls	25
Water Intakes	0
Total County Exposed Facilities	73

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	156
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	20.16
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	20.16

7.14 Cass County Profile

Overview	
Total County Area (square miles)	564.27
Estimated Linear Miles of Railroad	25.82
Percent Total County in the Buffer Zone	4.58%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	13,448
Estimated Exposed Population	3,723
Percent Total County Population Exposed	27.69%
Total County Housing Units (2014)	6,564
Estimated Exposed Housing Units	1,902
Percent Total County Exposed Housing Units	28.97%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	8
K-12 Schools	1
Childcare Centers	3
Hospital Facilities	5
Nursing Homes	1
Town and City Halls	17
Water Intakes	0
Total County Exposed Facilities	37

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	142
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	20.16
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	20.16

7.15 Cedar County Profile

Overview	
Total County Area (square miles)	579.44
Estimated Linear Miles of Railroad	57.23
Percent Total County in the Buffer Zone	9.88%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	18,411
Estimated Exposed Population	5,435
Percent Total County Population Exposed	29.52%
Total County Housing Units (2014)	8,116
Estimated Exposed Housing Units	2,407
Percent Total County Exposed Housing Units	29.66%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	5
Courthouses, Prisons, and Public Safety	9
K-12 Schools	7
Childcare Centers	3
Hospital Facilities	4
Nursing Homes	3
Town and City Halls	9
Water Intakes	0
Total County Exposed Facilities	40

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	33
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	9.05
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	9.05

7.16 Cerro Gordo County Profile

Overview	
Total County Area (square miles)	568.31
Estimated Linear Miles of Railroad	77.70
Percent Total County in the Buffer Zone	13.67%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	43,254
Estimated Exposed Population	25,388
Percent Total County Population Exposed	58.70%
Total County Housing Units (2014)	22,238
Estimated Exposed Housing Units	12,576
Percent Total County Exposed Housing Units	56.55%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	7
K-12 Schools	18
Childcare Centers	15
Hospital Facilities	25
Nursing Homes	8
Town and City Halls	12
Water Intakes	0
Total County Exposed Facilities	88

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	2,203
Significant Public Lakes (acres)	732.72
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	1,181.27
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	1,913.98
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	32.12
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	32.13

7.17 Cherokee County Profile

Overview	
Total County Area (square miles)	576.91
Estimated Linear Miles of Railroad	29.80
Percent Total County in the Buffer Zone	5.17%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	11,836
Estimated Exposed Population	5,656
Percent Total County Population Exposed	47.79%
Total County Housing Units (2014)	5,791
Estimated Exposed Housing Units	2,770
Percent Total County Exposed Housing Units	47.84%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	6
Courthouses, Prisons, and Public Safety	10
K-12 Schools	10
Childcare Centers	6
Hospital Facilities	4
Nursing Homes	3
Town and City Halls	22
Water Intakes	0
Total County Exposed Facilities	61

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	15
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	9.15
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	9.15

7.18 Chickasaw County Profile

Overview	
Total County Area (square miles)	504.38
Estimated Linear Miles of Railroad	33.35
Percent Total County in the Buffer Zone	6.61%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	12,264
Estimated Exposed Population	4,727
Percent Total County Population Exposed	38.54%
Total County Housing Units (2014)	5,664
Estimated Exposed Housing Units	2,270
Percent Total County Exposed Housing Units	40.08%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	0
Courthouses, Prisons, and Public Safety	7
K-12 Schools	6
Childcare Centers	4
Hospital Facilities	3
Nursing Homes	3
Town and City Halls	15
Water Intakes	0
Total County Exposed Facilities	38

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	164
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	12.56
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	12.56

7.19 Clarke County Profile

Overview	
Total County Area (square miles)	431.17
Estimated Linear Miles of Railroad	51.92
Percent Total County in the Buffer Zone	12.04%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	9,217
Estimated Exposed Population	4,580
Percent Total County Population Exposed	49.70%
Total County Housing Units (2014)	4,132
Estimated Exposed Housing Units	2,035
Percent Total County Exposed Housing Units	49.25%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	8
K-12 Schools	3
Childcare Centers	2
Hospital Facilities	2
Nursing Homes	5
Town and City Halls	10
Water Intakes	0
Total County Exposed Facilities	33

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	114
Significant Public Lakes (acres)	20.37
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	20.37
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	0
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	0

7.20 Clay County Profile

Overview	
Total County Area (square miles)	567.24
Estimated Linear Miles of Railroad	24.39
Percent Total County in the Buffer Zone	4.30%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	16,515
Estimated Exposed Population	7,245
Percent Total County Population Exposed	43.87%
Total County Housing Units (2014)	8,112
Estimated Exposed Housing Units	3,377
Percent Total County Exposed Housing Units	41.63%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	12
K-12 Schools	7
Childcare Centers	5
Hospital Facilities	4
Nursing Homes	2
Town and City Halls	15
Water Intakes	1
Total County Exposed Facilities	48

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	1,083
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	1,990.60
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	1,990.60
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	12.08
Protected Streams (length in miles)	0.33
Total Exposed Length of Streams (length in miles)	12.41

7.21 Clayton County Profile

Overview	
Total County Area (square miles)	778.54
Estimated Linear Miles of Railroad	59.29
Percent Total County in the Buffer Zone	7.62%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	17,692
Estimated Exposed Population	5,251
Percent Total County Population Exposed	29.68%
Total County Housing Units (2014)	9,032
Estimated Exposed Housing Units	3,168
Percent Total County Exposed Housing Units	35.08%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	4
K-12 Schools	6
Childcare Centers	4
Hospital Facilities	1
Nursing Homes	7
Town and City Halls	10
Water Intakes	0
Total County Exposed Facilities	35

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	10,067
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	721.81
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	721.81
Outstanding Streams (length in miles)	8.72
Designated Streams (length in miles)	18.99
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	27.70

7.22 Clinton County Profile

Overview	
Total County Area (square miles)	694.92
Estimated Linear Miles of Railroad	102.66
Percent Total County in the Buffer Zone	14.77%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	48,051
Estimated Exposed Population	20,639
Percent Total County Population Exposed	42.95%
Total County Housing Units (2014)	21,792
Estimated Exposed Housing Units	9,356
Percent Total County Exposed Housing Units	42.93%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	6
Courthouses, Prisons, and Public Safety	14
K-12 Schools	16
Childcare Centers	6
Hospital Facilities	7
Nursing Homes	4
Town and City Halls	16
Water Intakes	1
Total County Exposed Facilities	70

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	6,159
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	19.43
Protected Streams (length in miles)	1.82
Total Exposed Length of Streams (length in miles)	21.25

7.23 Crawford County Profile

Overview	
Total County Area (square miles)	714.19
Estimated Linear Miles of Railroad	109.52
Percent Total County in the Buffer Zone	15.33%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	17,228
Estimated Exposed Population	8,483
Percent Total County Population Exposed	49.24%
Total County Housing Units (2014)	6,985
Estimated Exposed Housing Units	3,271
Percent Total County Exposed Housing Units	46.82%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	5
Courthouses, Prisons, and Public Safety	6
K-12 Schools	12
Childcare Centers	2
Hospital Facilities	5
Nursing Homes	5
Town and City Halls	33
Water Intakes	0
Total County Exposed Facilities	68

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	373
Significant Public Lakes (acres)	6.62
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	6.62
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	56.13
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	56.13

7.24 Dallas County Profile

Overview	
Total County Area (square miles)	588.45
Estimated Linear Miles of Railroad	17.50
Percent Total County in the Buffer Zone	2.97%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	77,400
Estimated Exposed Population	2,549
Percent Total County Population Exposed	3.29%
Total County Housing Units (2014)	29,884
Estimated Exposed Housing Units	1,108
Percent Total County Exposed Housing Units	3.71%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	2
K-12 Schools	3
Childcare Centers	2
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	3
Water Intakes	0
Total County Exposed Facilities	12

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	70
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	15.09
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	15.09

7.25 Delaware County Profile

Overview	
Total County Area (square miles)	577.76
Estimated Linear Miles of Railroad	38.68
Percent Total County in the Buffer Zone	6.69%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	17,398
Estimated Exposed Population	4,668
Percent Total County Population Exposed	26.83%
Total County Housing Units (2014)	8,026
Estimated Exposed Housing Units	2,077
Percent Total County Exposed Housing Units	25.88%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	6
Courthouses, Prisons, and Public Safety	6
K-12 Schools	5
Childcare Centers	7
Hospital Facilities	3
Nursing Homes	6
Town and City Halls	20
Water Intakes	0
Total County Exposed Facilities	53

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	27
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	4.71
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	4.71
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	8.77
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	8.77

7.26 Des Moines County Profile

Overview	
Total County Area (square miles)	416.12
Estimated Linear Miles of Railroad	44.70
Percent Total County in the Buffer Zone	10.74%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	40,225
Estimated Exposed Population	14,700
Percent Total County Population Exposed	36.52%
Total County Housing Units (2014)	18,463
Estimated Exposed Housing Units	6,716
Percent Total County Exposed Housing Units	36.38%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	12
K-12 Schools	13
Childcare Centers	6
Hospital Facilities	9
Nursing Homes	3
Town and City Halls	23
Water Intakes	0
Total County Exposed Facilities	70

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	751
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	479.98
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	479.98
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	7.74
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	7.74

7.27 Dickinson County Profile

Overview	
Total County Area (square miles)	380.61
Estimated Linear Miles of Railroad	2.18
Percent Total County in the Buffer Zone	0.57%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	16,935
Estimated Exposed Population	143
Percent Total County Population Exposed	0.84%
Total County Housing Units (2014)	13,191
Estimated Exposed Housing Units	65
Percent Total County Exposed Housing Units	0.50%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	1
K-12 Schools	0
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	1
Water Intakes	0
Total County Exposed Facilities	3

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	0
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	0
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	0

7.28 Dubuque County Profile

Overview	
Total County Area (square miles)	608.31
Estimated Linear Miles of Railroad	62.16
Percent Total County in the Buffer Zone	10.22%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	96,370
Estimated Exposed Population	26,166
Percent Total County Population Exposed	27.15%
Total County Housing Units (2014)	40,369
Estimated Exposed Housing Units	11,725
Percent Total County Exposed Housing Units	29.04%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	16
K-12 Schools	19
Childcare Centers	12
Hospital Facilities	12
Nursing Homes	9
Town and City Halls	32
Water Intakes	0
Total County Exposed Facilities	104

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	6,127
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	26.00
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	26.00

7.29 Emmet County Profile

Overview	
Total County Area (square miles)	395.88
Estimated Linear Miles of Railroad	36.22
Percent Total County in the Buffer Zone	9.15%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	9,990
Estimated Exposed Population	4,570
Percent Total County Population Exposed	45.75%
Total County Housing Units (2014)	4,752
Estimated Exposed Housing Units	2,128
Percent Total County Exposed Housing Units	44.78%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	8
K-12 Schools	4
Childcare Centers	2
Hospital Facilities	4
Nursing Homes	2
Town and City Halls	13
Water Intakes	0
Total County Exposed Facilities	34

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	310
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	467.04
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	467.04
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	13.48
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	13.48

7.30 Fayette County Profile

Overview	
Total County Area (square miles)	730.81
Estimated Linear Miles of Railroad	0.50*
Percent Total County in the Buffer Zone	0.07%

*There are no crude oil or ethanol railroads operating in Fayette County, but parts of the county are within ½ mile of an operating crude oil or ethanol railroad in a neighboring county.

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	20,343
Estimated Exposed Population	295
Percent Total County Population Exposed	1.45%
Total County Housing Units (2014)	9,522
Estimated Exposed Housing Units	105
Percent Total County Exposed Housing Units	1.11%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	0
Courthouses, Prisons, and Public Safety	0
K-12 Schools	0
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	0
Water Intakes	0
Total County Exposed Facilities	0

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	0
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	0.18
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	0.18

7.31 Floyd County Profile

Overview	
Total County Area (square miles)	500.63
Estimated Linear Miles of Railroad	64.52
Percent Total County in the Buffer Zone	12.89%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	16,077
Estimated Exposed Population	8,133
Percent Total County Population Exposed	50.58%
Total County Housing Units (2014)	7,516
Estimated Exposed Housing Units	3,916
Percent Total County Exposed Housing Units	52.10%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	5
K-12 Schools	7
Childcare Centers	8
Hospital Facilities	6
Nursing Homes	6
Town and City Halls	10
Water Intakes	0
Total County Exposed Facilities	44

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	326
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	21.44
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	21.44

7.32 Franklin County Profile

Overview	
Total County Area (square miles)	581.97
Estimated Linear Miles of Railroad	26.16
Percent Total County in the Buffer Zone	4.49%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	10,436
Estimated Exposed Population	1,830
Percent Total County Population Exposed	17.54%
Total County Housing Units (2014)	4,860
Estimated Exposed Housing Units	842
Percent Total County Exposed Housing Units	17.32%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	0
Courthouses, Prisons, and Public Safety	3
K-12 Schools	1
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	5
Water Intakes	0
Total County Exposed Facilities	9

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	141
Significant Public Lakes (acres)	36.06
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	36.06
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	6.52
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	6.52

7.33 Fremont County Profile

Overview	
Total County Area (square miles)	511.15
Estimated Linear Miles of Railroad	26.93
Percent Total County in the Buffer Zone	5.27%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	7,022
Estimated Exposed Population	381
Percent Total County Population Exposed	5.43%
Total County Housing Units (2014)	3,445
Estimated Exposed Housing Units	190
Percent Total County Exposed Housing Units	5.52%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	0
K-12 Schools	0
Childcare Centers	0
Hospital Facilities	1
Nursing Homes	0
Town and City Halls	0
Water Intakes	0
Total County Exposed Facilities	2

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	1,141
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	0
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	0

7.34 Greene County Profile

Overview	
Total County Area (square miles)	569.57
Estimated Linear Miles of Railroad	61.53
Percent Total County in the Buffer Zone	10.80%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	9,200
Estimated Exposed Population	3,543
Percent Total County Population Exposed	38.51%
Total County Housing Units (2014)	4,533
Estimated Exposed Housing Units	1,772
Percent Total County Exposed Housing Units	39.09%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	4
K-12 Schools	3
Childcare Centers	1
Hospital Facilities	2
Nursing Homes	3
Town and City Halls	16
Water Intakes	0
Total County Exposed Facilities	31

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	174
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	13.02
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	13.02

7.35 Grundy County Profile

Overview	
Total County Area (square miles)	501.86
Estimated Linear Miles of Railroad	3.01*
Percent Total County in the Buffer Zone	0.6%

*There are no crude oil or ethanol railroads operating in Grundy County, but parts of the county are within ½ mile of an operating crude oil or ethanol railroad in a neighboring county.

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	12,375
Estimated Exposed Population	10
Percent Total County Population Exposed	0.08%
Total County Housing Units (2014)	5,549
Estimated Exposed Housing Units	4
Percent Total County Exposed Housing Units	0.08%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	0
Courthouses, Prisons, and Public Safety	0
K-12 Schools	0
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	0
Water Intakes	0
Total County Exposed Facilities	0

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	0
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	0
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	0

7.36 Guthrie County Profile

Overview	
Total County Area (square miles)	590.62
Estimated Linear Miles of Railroad	25.76
Percent Total County in the Buffer Zone	4.36%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	10,772
Estimated Exposed Population	2,218
Percent Total County Population Exposed	20.59%
Total County Housing Units (2014)	5,749
Estimated Exposed Housing Units	1,076
Percent Total County Exposed Housing Units	18.72%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	4
K-12 Schools	3
Childcare Centers	0
Hospital Facilities	2
Nursing Homes	1
Town and City Halls	4
Water Intakes	0
Total County Exposed Facilities	16

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	185
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	10.00
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	10.00

7.37 Hamilton County Profile

Overview	
Total County Area (square miles)	576.75
Estimated Linear Miles of Railroad	51.03
Percent Total County in the Buffer Zone	8.85%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	15,117
Estimated Exposed Population	7,598
Percent Total County Population Exposed	50.26%
Total County Housing Units (2014)	7,184
Estimated Exposed Housing Units	3,609
Percent Total County Exposed Housing Units	50.23%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	9
K-12 Schools	8
Childcare Centers	2
Hospital Facilities	5
Nursing Homes	0
Town and City Halls	25
Water Intakes	0
Total County Exposed Facilities	53

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	597
Significant Public Lakes (acres)	35.58
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	28.94
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	64.52
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	21.54
Protected Streams (length in miles)	2.80
Total Exposed Length of Streams (length in miles)	24.34

7.38 Hancock County Profile

Overview	
Total County Area (square miles)	571.01
Estimated Linear Miles of Railroad	24.30
Percent Total County in the Buffer Zone	4.26%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	11,027
Estimated Exposed Population	3,508
Percent Total County Population Exposed	31.81%
Total County Housing Units (2014)	5,308
Estimated Exposed Housing Units	1,599
Percent Total County Exposed Housing Units	30.12%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	3
K-12 Schools	2
Childcare Centers	1
Hospital Facilities	7
Nursing Homes	2
Town and City Halls	14
Water Intakes	0
Total County Exposed Facilities	31

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	359
Significant Public Lakes (acres)	26.02
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	972.66
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	998.69
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	1.01
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	1.01

7.39 Hardin County Profile

Overview	
Total County Area (square miles)	569.31
Estimated Linear Miles of Railroad	58.09
Percent Total County in the Buffer Zone	10.20%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	17,311
Estimated Exposed Population	4,804
Percent Total County Population Exposed	27.75%
Total County Housing Units (2014)	8,175
Estimated Exposed Housing Units	2,390
Percent Total County Exposed Housing Units	29.23%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	4
K-12 Schools	2
Childcare Centers	3
Hospital Facilities	8
Nursing Homes	3
Town and City Halls	8
Water Intakes	0
Total County Exposed Facilities	32

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	86
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	6.94
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	0

7.40 Harrison County Profile

Overview	
Total County Area (square miles)	696.85
Estimated Linear Miles of Railroad	130.16
Percent Total County in the Buffer Zone	18.68%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	14,324
Estimated Exposed Population	6,706
Percent Total County Population Exposed	46.82%
Total County Housing Units (2014)	6,747
Estimated Exposed Housing Units	3,173
Percent Total County Exposed Housing Units	47.04%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	13
K-12 Schools	13
Childcare Centers	4
Hospital Facilities	9
Nursing Homes	3
Town and City Halls	23
Water Intakes	0
Total County Exposed Facilities	69

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	340
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	1,039.27
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	1,039.27
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	41.53
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	41.53

7.41 Henry County Profile

Overview	
Total County Area (square miles)	434.33
Estimated Linear Miles of Railroad	38.72
Percent Total County in the Buffer Zone	8.91%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	20,217
Estimated Exposed Population	7,135
Percent Total County Population Exposed	35.29%
Total County Housing Units (2014)	8,274
Estimated Exposed Housing Units	2,894
Percent Total County Exposed Housing Units	34.97%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	9
K-12 Schools	7
Childcare Centers	5
Hospital Facilities	6
Nursing Homes	8
Town and City Halls	18
Water Intakes	0
Total County Exposed Facilities	54

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	259
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	3.94
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	3.94

7.42 Humboldt County Profile

Overview	
Total County Area (square miles)	434.35
Estimated Linear Miles of Railroad	31.36
Percent Total County in the Buffer Zone	7.22%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	9,640
Estimated Exposed Population	1,199
Percent Total County Population Exposed	12.44%
Total County Housing Units (2014)	4,684
Estimated Exposed Housing Units	636
Percent Total County Exposed Housing Units	13.57%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	0
Courthouses, Prisons, and Public Safety	0
K-12 Schools	4
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	4
Water Intakes	0
Total County Exposed Facilities	8

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	52
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	9.31
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	9.31

7.43 Ida County Profile

Overview	
Total County Area (square miles)	431.51
Estimated Linear Miles of Railroad	8.92
Percent Total County in the Buffer Zone	2.07%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	7,042
Estimated Exposed Population	1,892
Percent Total County Population Exposed	26.87%
Total County Housing Units (2014)	3,430
Estimated Exposed Housing Units	960
Percent Total County Exposed Housing Units	28.00%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	3
K-12 Schools	5
Childcare Centers	1
Hospital Facilities	2
Nursing Homes	1
Town and City Halls	9
Water Intakes	0
Total County Exposed Facilities	23

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	45
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	11.96
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	11.96

7.44 Iowa County Profile

Overview	
Total County Area (square miles)	586.46
Estimated Linear Miles of Railroad	34.03
Percent Total County in the Buffer Zone	5.80%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	16,375
Estimated Exposed Population	4,017
Percent Total County Population Exposed	24.53%
Total County Housing Units (2014)	7,267
Estimated Exposed Housing Units	1,863
Percent Total County Exposed Housing Units	25.64%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	7
K-12 Schools	3
Childcare Centers	2
Hospital Facilities	1
Nursing Homes	2
Town and City Halls	12
Water Intakes	0
Total County Exposed Facilities	29

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	26
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	23.09
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	23.09

7.45 Jackson County Profile

Overview	
Total County Area (square miles)	636.04
Estimated Linear Miles of Railroad	32.96
Percent Total County in the Buffer Zone	5.18%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	19,482
Estimated Exposed Population	2,602
Percent Total County Population Exposed	13.36%
Total County Housing Units (2014)	9,458
Estimated Exposed Housing Units	1,445
Percent Total County Exposed Housing Units	15.28%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	3
K-12 Schools	3
Childcare Centers	0
Hospital Facilities	1
Nursing Homes	1
Town and City Halls	7
Water Intakes	0
Total County Exposed Facilities	17

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	7,564
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	4.16
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	4.16

7.46 Jasper County Profile

Overview	
Total County Area (square miles)	730.42
Estimated Linear Miles of Railroad	38.22
Percent Total County in the Buffer Zone	5.23%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	36,872
Estimated Exposed Population	8,870
Percent Total County Population Exposed	24.06%
Total County Housing Units (2014)	16,160
Estimated Exposed Housing Units	4,282
Percent Total County Exposed Housing Units	26.50%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	9
K-12 Schools	6
Childcare Centers	7
Hospital Facilities	8
Nursing Homes	4
Town and City Halls	17
Water Intakes	0
Total County Exposed Facilities	54

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	1,284
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	13.74
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	13.74

7.47 Jefferson County Profile

Overview	
Total County Area (square miles)	435.51
Estimated Linear Miles of Railroad	53.19
Percent Total County in the Buffer Zone	12.21%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	17,325
Estimated Exposed Population	5,212
Percent Total County Population Exposed	30.08%
Total County Housing Units (2014)	7,542
Estimated Exposed Housing Units	2,628
Percent Total County Exposed Housing Units	34.84%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	9
K-12 Schools	8
Childcare Centers	0
Hospital Facilities	7
Nursing Homes	5
Town and City Halls	19
Water Intakes	1
Total County Exposed Facilities	50

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	0
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	6.98
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	6.98

7.48 Johnson County Profile

Overview	
Total County Area (square miles)	614.04
Estimated Linear Miles of Railroad	27.20
Percent Total County in the Buffer Zone	4.43%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	142,287
Estimated Exposed Population	32,980
Percent Total County Population Exposed	23.18%
Total County Housing Units (2014)	58,783
Estimated Exposed Housing Units	15,514
Percent Total County Exposed Housing Units	26.39%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	8
Courthouses, Prisons, and Public Safety	15
K-12 Schools	11
Childcare Centers	23
Hospital Facilities	31
Nursing Homes	3
Town and City Halls	46
Water Intakes	1
Total County Exposed Facilities	138

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	1,552
Significant Public Lakes (acres)	11.89
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	11.89
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	22.97
Protected Streams (length in miles)	9
Total Exposed Length of Streams (length in miles)	22.97

7.49 Keokuk County Profile

Overview	
Total County Area (square miles)	579.18
Estimated Linear Miles of Railroad	9.40
Percent Total County in the Buffer Zone	1.62%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	10,231
Estimated Exposed Population	81
Percent Total County Population Exposed	0.79%
Total County Housing Units (2014)	4,886
Estimated Exposed Housing Units	40
Percent Total County Exposed Housing Units	0.82%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	0
Courthouses, Prisons, and Public Safety	0
K-12 Schools	0
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	0
Water Intakes	0
Total County Exposed Facilities	0

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	54
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	3.11
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	3.11

7.50 Kossuth County Profile

Overview	
Total County Area (square miles)	972.72
Estimated Linear Miles of Railroad	54.51
Percent Total County in the Buffer Zone	5.60%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	15,222
Estimated Exposed Population	5,093
Percent Total County Population Exposed	33.46%
Total County Housing Units (2014)	7,481
Estimated Exposed Housing Units	2,562
Percent Total County Exposed Housing Units	34.25%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	8
K-12 Schools	8
Childcare Centers	1
Hospital Facilities	2
Nursing Homes	1
Town and City Halls	18
Water Intakes	0
Total County Exposed Facilities	42

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	78
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	7.51
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	7.51

7.51 Lee County Profile

Overview	
Total County Area (square miles)	517.52
Estimated Linear Miles of Railroad	79.03
Percent Total County in the Buffer Zone	15.27%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	35,286
Estimated Exposed Population	14,750
Percent Total County Population Exposed	41.80%
Total County Housing Units (2014)	16,173
Estimated Exposed Housing Units	6,695
Percent Total County Exposed Housing Units	41.39%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	14
K-12 Schools	8
Childcare Centers	6
Hospital Facilities	1
Nursing Homes	7
Town and City Halls	19
Water Intakes	2
Total County Exposed Facilities	61

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	5,618
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	11.34
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	11.34

7.52 Linn County Profile

Overview	
Total County Area (square miles)	716.88
Estimated Linear Miles of Railroad	118.32
Percent Total County in the Buffer Zone	16.50%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	217,751
Estimated Exposed Population	45,876
Percent Total County Population Exposed	21.07%
Total County Housing Units (2014)	94,663
Estimated Exposed Housing Units	20,325
Percent Total County Exposed Housing Units	21.47%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	15
Courthouses, Prisons, and Public Safety	33
K-12 Schools	16
Childcare Centers	26
Hospital Facilities	29
Nursing Homes	12
Town and City Halls	58
Water Intakes	1
Total County Exposed Facilities	190

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	2,329
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	43.78
Protected Streams (length in miles)	2.44
Total Exposed Length of Streams (length in miles)	46.22

7.53 Louisa County Profile

Overview	
Total County Area (square miles)	401.77
Estimated Linear Miles of Railroad	19.01
Percent Total County in the Buffer Zone	4.73%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	11,161
Estimated Exposed Population	2,030
Percent Total County Population Exposed	18.18%
Total County Housing Units (2014)	5,006
Estimated Exposed Housing Units	818
Percent Total County Exposed Housing Units	16.25%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	0
Courthouses, Prisons, and Public Safety	2
K-12 Schools	2
Childcare Centers	2
Hospital Facilities	1
Nursing Homes	0
Town and City Halls	2
Water Intakes	0
Total County Exposed Facilities	9

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	8
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	1.04
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	1.04

7.54 Lucas County Profile

Overview	
Total County Area (square miles)	430.59
Estimated Linear Miles of Railroad	73.65
Percent Total County in the Buffer Zone	17.10%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	8,701
Estimated Exposed Population	5,327
Percent Total County Population Exposed	61.22%
Total County Housing Units (2014)	4,204
Estimated Exposed Housing Units	2,592
Percent Total County Exposed Housing Units	61.66%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	4
K-12 Schools	7
Childcare Centers	3
Hospital Facilities	4
Nursing Homes	2
Town and City Halls	17
Water Intakes	1
Total County Exposed Facilities	41

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	1,436
Significant Public Lakes (acres)	0.26
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	13.14
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	13.40
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	17.25
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	17.25

7.55 Lyon County Profile

Overview	
Total County Area (square miles)	587.65
Estimated Linear Miles of Railroad	18.49
Percent Total County in the Buffer Zone	3.15%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	11,683
Estimated Exposed Population	1,092
Percent Total County Population Exposed	9.34%
Total County Housing Units (2014)	4,965
Estimated Exposed Housing Units	416
Percent Total County Exposed Housing Units	8.37%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	1
K-12 Schools	2
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	6
Water Intakes	0
Total County Exposed Facilities	11

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	0
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	2.73
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	2.73

7.56 Madison County Profile

Overview	
Total County Area (square miles)	354.00
Estimated Linear Miles of Railroad	8.54
Percent Total County in the Buffer Zone	2.41%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	15,609
Estimated Exposed Population	1,450
Percent Total County Population Exposed	9.29%
Total County Housing Units (2014)	6,684
Estimated Exposed Housing Units	570
Percent Total County Exposed Housing Units	8.52%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	0
K-12 Schools	3
Childcare Centers	1
Hospital Facilities	1
Nursing Homes	0
Town and City Halls	3
Water Intakes	0
Total County Exposed Facilities	9

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	0
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	0
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	0

7.57 Mahaska County Profile

Overview	
Total County Area (square miles)	570.86
Estimated Linear Miles of Railroad	25.31
Percent Total County in the Buffer Zone	4.43%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	22,370
Estimated Exposed Population	7,614
Percent Total County Population Exposed	34.04%
Total County Housing Units (2014)	9,726
Estimated Exposed Housing Units	3,326
Percent Total County Exposed Housing Units	34.20%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	5
K-12 Schools	8
Childcare Centers	10
Hospital Facilities	2
Nursing Homes	5
Town and City Halls	14
Water Intakes	0
Total County Exposed Facilities	45

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	109
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	19.15
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	19.15

7.58 Marion County Profile

Overview	
Total County Area (square miles)	554.53
Estimated Linear Miles of Railroad	16.35
Percent Total County in the Buffer Zone	2.95%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	33,365
Estimated Exposed Population	1,425
Percent Total County Population Exposed	4.27%
Total County Housing Units (2014)	13,984
Estimated Exposed Housing Units	650
Percent Total County Exposed Housing Units	4.65%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	1
K-12 Schools	3
Childcare Centers	0
Hospital Facilities	1
Nursing Homes	0
Town and City Halls	3
Water Intakes	0
Total County Exposed Facilities	9

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	23
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	3.73
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	3.73

7.59 Marshall County Profile

Overview	
Total County Area (square miles)	572.50
Estimated Linear Miles of Railroad	67.55
Percent Total County in the Buffer Zone	11.80%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	40,866
Estimated Exposed Population	10,076
Percent Total County Population Exposed	24.66%
Total County Housing Units (2014)	16,718
Estimated Exposed Housing Units	4,256
Percent Total County Exposed Housing Units	25.45%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	10
K-12 Schools	8
Childcare Centers	6
Hospital Facilities	8
Nursing Homes	1
Town and City Halls	19
Water Intakes	0
Total County Exposed Facilities	56

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	196
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	19.39
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	19.39

7.60 Mills County Profile

Overview	
Total County Area (square miles)	437.44
Estimated Linear Miles of Railroad	66.50
Percent Total County in the Buffer Zone	15.20%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	14,831
Estimated Exposed Population	4,063
Percent Total County Population Exposed	27.39%
Total County Housing Units (2014)	6,088
Estimated Exposed Housing Units	1,644
Percent Total County Exposed Housing Units	27.01%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	8
K-12 Schools	4
Childcare Centers	3
Hospital Facilities	3
Nursing Homes	9
Town and City Halls	19
Water Intakes	0
Total County Exposed Facilities	50

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	1,164
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	9.00
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	9.00

7.61 Mitchell County Profile

Overview	
Total County Area (square miles)	469.13
Estimated Linear Miles of Railroad	30.45
Percent Total County in the Buffer Zone	6.49

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	10,779
Estimated Exposed Population	4,121
Percent Total County Population Exposed	38.23%
Total County Housing Units (2014)	4,916
Estimated Exposed Housing Units	1,912
Percent Total County Exposed Housing Units	38.89%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	8
K-12 Schools	6
Childcare Centers	1
Hospital Facilities	2
Nursing Homes	5
Town and City Halls	12
Water Intakes	0
Total County Exposed Facilities	35

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	236
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	2.60
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	2.60

7.62 Monona County Profile

Overview	
Total County Area (square miles)	694.07
Estimated Linear Miles of Railroad	25.71
Percent Total County in the Buffer Zone	3.70%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	8,996
Estimated Exposed Population	3,648
Percent Total County Population Exposed	40.56%
Total County Housing Units (2014)	4,715
Estimated Exposed Housing Units	1,817
Percent Total County Exposed Housing Units	38.53%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	6
K-12 Schools	4
Childcare Centers	1
Hospital Facilities	0
Nursing Homes	3
Town and City Halls	13
Water Intakes	0
Total County Exposed Facilities	28

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	0
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	11.07
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	11.07

7.63 Monroe County Profile

Overview	
Total County Area (square miles)	433.72
Estimated Linear Miles of Railroad	72.19
Percent Total County in the Buffer Zone	16.65%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	8,001
Estimated Exposed Population	4,207
Percent Total County Population Exposed	52.58%
Total County Housing Units (2014)	3,892
Estimated Exposed Housing Units	1,974
Percent Total County Exposed Housing Units	50.72%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	4
K-12 Schools	5
Childcare Centers	3
Hospital Facilities	5
Nursing Homes	8
Town and City Halls	8
Water Intakes	0
Total County Exposed Facilities	35

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	200
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	16.04
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	16.04

7.64 Montgomery County Profile

Overview	
Total County Area (square miles)	424.10
Estimated Linear Miles of Railroad	46.89
Percent Total County in the Buffer Zone	11.06%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	10,421
Estimated Exposed Population	4,724
Percent Total County Population Exposed	45.33%
Total County Housing Units (2014)	5,200
Estimated Exposed Housing Units	2,368
Percent Total County Exposed Housing Units	45.53%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	7
K-12 Schools	5
Childcare Centers	2
Hospital Facilities	2
Nursing Homes	4
Town and City Halls	18
Water Intakes	0
Total County Exposed Facilities	40

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	352
Significant Public Lakes (acres)	7.64
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	7.64
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	11.39
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	11.39

7.65 Muscatine County Profile

Overview	
Total County Area (square miles)	437.47
Estimated Linear Miles of Railroad	50.35
Percent Total County in the Buffer Zone	11.51%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	42,903
Estimated Exposed Population	16,641
Percent Total County Population Exposed	38.79%
Total County Housing Units (2014)	17,996
Estimated Exposed Housing Units	7,003
Percent Total County Exposed Housing Units	38.92%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	5
Courthouses, Prisons, and Public Safety	13
K-12 Schools	6
Childcare Centers	5
Hospital Facilities	3
Nursing Homes	1
Town and City Halls	19
Water Intakes	0
Total County Exposed Facilities	52

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	3,534
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	8.73
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	8.73
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	29.17
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	29.17

7.66 O'Brien County Profile

Overview	
Total County Area (square miles)	573.04
Estimated Linear Miles of Railroad	12.75
Percent Total County in the Buffer Zone	2.23%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	14,056
Estimated Exposed Population	3,673
Percent Total County Population Exposed	26.13%
Total County Housing Units (2014)	6,635
Estimated Exposed Housing Units	1,783
Percent Total County Exposed Housing Units	26.88%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	2
K-12 Schools	3
Childcare Centers	2
Hospital Facilities	6
Nursing Homes	4
Town and City Halls	12
Water Intakes	0
Total County Exposed Facilities	32

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	0
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	9.03
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	9.03

7.67 Osceola County Profile

Overview	
Total County Area (square miles)	398.68
Estimated Linear Miles of Railroad	18.00
Percent Total County in the Buffer Zone	4.51%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	6,218
Estimated Exposed Population	2,285
Percent Total County Population Exposed	36.75%
Total County Housing Units (2014)	2,968
Estimated Exposed Housing Units	1,047
Percent Total County Exposed Housing Units	35.27%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	3
K-12 Schools	0
Childcare Centers	0
Hospital Facilities	1
Nursing Homes	4
Town and City Halls	13
Water Intakes	0
Total County Exposed Facilities	22

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	139
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	7.60
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	7.60

7.68 Page County Profile

Overview	
Total County Area (square miles)	534.94
Estimated Linear Miles of Railroad	11.83
Percent Total County in the Buffer Zone	2.21%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	15,496
Estimated Exposed Population	3,263
Percent Total County Population Exposed	21.06%
Total County Housing Units (2014)	7,186
Estimated Exposed Housing Units	1,677
Percent Total County Exposed Housing Units	23.34%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	4
K-12 Schools	5
Childcare Centers	2
Hospital Facilities	0
Nursing Homes	3
Town and City Halls	4
Water Intakes	0
Total County Exposed Facilities	19

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	199
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	2.99
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	2.99

7.69 Palo Alto County Profile

Overview	
Total County Area (square miles)	563.84
Estimated Linear Miles of Railroad	51.61
Percent Total County in the Buffer Zone	9.15%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	9,099
Estimated Exposed Population	5,701
Percent Total County Population Exposed	62.66%
Total County Housing Units (2014)	4,617
Estimated Exposed Housing Units	2,820
Percent Total County Exposed Housing Units	61.08%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	0
Courthouses, Prisons, and Public Safety	10
K-12 Schools	12
Childcare Centers	5
Hospital Facilities	5
Nursing Homes	9
Town and City Halls	25
Water Intakes	0
Total County Exposed Facilities	66

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	1,187
Significant Public Lakes (acres)	252.59
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	252.59
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	2.66
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	2.66

7.70 Plymouth County Profile

Overview	
Total County Area (square miles)	862.89
Estimated Linear Miles of Railroad	84.80
Percent Total County in the Buffer Zone	9.83%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	24,874
Estimated Exposed Population	10,627
Percent Total County Population Exposed	42.72%
Total County Housing Units (2014)	10,668
Estimated Exposed Housing Units	4,672
Percent Total County Exposed Housing Units	43.80%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	13
K-12 Schools	15
Childcare Centers	5
Hospital Facilities	8
Nursing Homes	8
Town and City Halls	26
Water Intakes	0
Total County Exposed Facilities	79

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	142
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	72.42
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	72.42

7.71 Pocahontas County Profile

Overview	
Total County Area (square miles)	577.24
Estimated Linear Miles of Railroad	36.87
Percent Total County in the Buffer Zone	6.39%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	7,138
Estimated Exposed Population	2,882
Percent Total County Population Exposed	40.37%
Total County Housing Units (2014)	3,771
Estimated Exposed Housing Units	1,536
Percent Total County Exposed Housing Units	40.74%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	5
K-12 Schools	8
Childcare Centers	1
Hospital Facilities	0
Nursing Homes	4
Town and City Halls	8
Water Intakes	0
Total County Exposed Facilities	28

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	90
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	1.16
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	1.16

7.72 Polk County Profile

Overview	
Total County Area (square miles)	573.80
Estimated Linear Miles of Railroad	56.62
Percent Total County in the Buffer Zone	9.87%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	459,862
Estimated Exposed Population	41,180
Percent Total County Population Exposed	8.95%
Total County Housing Units (2014)	192,980
Estimated Exposed Housing Units	18,136
Percent Total County Exposed Housing Units	9.40%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	5
Courthouses, Prisons, and Public Safety	59
K-12 Schools	12
Childcare Centers	19
Hospital Facilities	31
Nursing Homes	16
Town and City Halls	128
Water Intakes	2
Total County Exposed Facilities	272

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	2,917
Significant Public Lakes (acres)	67.56
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	180.35
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	247.92
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	25.52
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	25.52

7.73 Pottawattamie County Profile

Overview	
Total County Area (square miles)	950.28
Estimated Linear Miles of Railroad	126.60
Percent Total County in the Buffer Zone	13.32%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	93,128
Estimated Exposed Population	29,784
Percent Total County Population Exposed	31.98%
Total County Housing Units (2014)	39,589
Estimated Exposed Housing Units	12,529
Percent Total County Exposed Housing Units	31.65%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	5
Courthouses, Prisons, and Public Safety	20
K-12 Schools	17
Childcare Centers	17
Hospital Facilities	16
Nursing Homes	10
Town and City Halls	31
Water Intakes	0
Total County Exposed Facilities	116

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	771
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	36.44
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	36.44

7.74 Poweshiek County Profile

Overview	
Total County Area (square miles)	584.93
Estimated Linear Miles of Railroad	48.63
Percent Total County in the Buffer Zone	8.31%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	18,668
Estimated Exposed Population	9,641
Percent Total County Population Exposed	51.64%
Total County Housing Units (2014)	8,953
Estimated Exposed Housing Units	4,097
Percent Total County Exposed Housing Units	45.76%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	5
K-12 Schools	5
Childcare Centers	1
Hospital Facilities	6
Nursing Homes	3
Town and City Halls	13
Water Intakes	1
Total County Exposed Facilities	37

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	312
Significant Public Lakes (acres)	6.44
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	6.44
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	26.75
Protected Streams (length in miles)	0.00
Total Exposed Length of Streams (length in miles)	26.75

7.75 Sac County Profile

Overview	
Total County Area (square miles)	575.01
Estimated Linear Miles of Railroad	35.05
Percent Total County in the Buffer Zone	6.09%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	10,035
Estimated Exposed Population	1,768
Percent Total County Population Exposed	17.62%
Total County Housing Units (2014)	5,407
Estimated Exposed Housing Units	867
Percent Total County Exposed Housing Units	16.04%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	3
K-12 Schools	4
Childcare Centers	0
Hospital Facilities	1
Nursing Homes	2
Town and City Halls	9
Water Intakes	0
Total County Exposed Facilities	20

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	621
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	1094.30
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	1094.30
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	20.46
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	20.46

7.76 Scott County Profile

Overview	
Total County Area (square miles)	458.09
Estimated Linear Miles of Railroad	62.49
Percent Total County in the Buffer Zone	13.64%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	171,387
Estimated Exposed Population	38,248
Percent Total County Population Exposed	22.32%
Total County Housing Units (2014)	73,040
Estimated Exposed Housing Units	17,511
Percent Total County Exposed Housing Units	23.97%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	5
Courthouses, Prisons, and Public Safety	14
K-12 Schools	20
Childcare Centers	13
Hospital Facilities	11
Nursing Homes	6
Town and City Halls	31
Water Intakes	1
Total County Exposed Facilities	101

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	5,698
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	16.15
Protected Streams (length in miles)	1.55
Total Exposed Length of Streams (length in miles)	17.70

7.77 Shelby County Profile

Overview	
Total County Area (square miles)	590.78
Estimated Linear Miles of Railroad	24.16
Percent Total County in the Buffer Zone	4.09%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	11,948
Estimated Exposed Population	1,304
Percent Total County Population Exposed	10.91%
Total County Housing Units (2014)	5,561
Estimated Exposed Housing Units	587
Percent Total County Exposed Housing Units	10.55%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	5
K-12 Schools	3
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	2
Town and City Halls	3
Water Intakes	0
Total County Exposed Facilities	17

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	12
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	19.40
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	19.40

7.78 Sioux County Profile

Overview	
Total County Area (square miles)	768.33
Estimated Linear Miles of Railroad	59.56
Percent Total County in the Buffer Zone	7.75%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	34,681
Estimated Exposed Population	7,824
Percent Total County Population Exposed	22.56%
Total County Housing Units (2014)	12,582
Estimated Exposed Housing Units	3,135
Percent Total County Exposed Housing Units	24.92%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	3
K-12 Schools	8
Childcare Centers	2
Hospital Facilities	10
Nursing Homes	5
Town and City Halls	11
Water Intakes	0
Total County Exposed Facilities	43

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	0
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	58.41
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	58.41

7.79 Story County Profile

Overview	
Total County Area (square miles)	572.82
Estimated Linear Miles of Railroad	90.94
Percent Total County in the Buffer Zone	15.88%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	94,073
Estimated Exposed Population	34,614
Percent Total County Population Exposed	36.79%
Total County Housing Units (2014)	38,103
Estimated Exposed Housing Units	14,280
Percent Total County Exposed Housing Units	37.48%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	7
Courthouses, Prisons, and Public Safety	16
K-12 Schools	14
Childcare Centers	6
Hospital Facilities	11
Nursing Homes	6
Town and City Halls	37
Water Intakes	0
Total County Exposed Facilities	97

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	743
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	10.70
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	10.70

7.80 Tama County Profile

Overview	
Total County Area (square miles)	721.01
Estimated Linear Miles of Railroad	50.75
Percent Total County in the Buffer Zone	7.04%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	17,451
Estimated Exposed Population	2,678
Percent Total County Population Exposed	15.35%
Total County Housing Units (2014)	7,753
Estimated Exposed Housing Units	1,125
Percent Total County Exposed Housing Units	14.52%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	4
K-12 Schools	5
Childcare Centers	0
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	7
Water Intakes	0
Total County Exposed Facilities	18

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	2,943
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	2,565.67
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	2,565.67
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	19.48
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	19.48

7.81 Union County Profile

Overview	
Total County Area (square miles)	423.65
Estimated Linear Miles of Railroad	44.23
Percent Total County in the Buffer Zone	10.44%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	12,516
Estimated Exposed Population	6,067
Percent Total County Population Exposed	48.48%
Total County Housing Units (2014)	5,907
Estimated Exposed Housing Units	2,933
Percent Total County Exposed Housing Units	49.65%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	7
K-12 Schools	8
Childcare Centers	4
Hospital Facilities	2
Nursing Homes	5
Town and City Halls	13
Water Intakes	1
Total County Exposed Facilities	42

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	491
Significant Public Lakes (acres)	12.41
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	12.41
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	10.05
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	10.05

7.82 Wapello County Profile

Overview	
Total County Area (square miles)	421.83
Estimated Linear Miles of Railroad	84.24
Percent Total County in the Buffer Zone	19.97%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	35,212
Estimated Exposed Population	10,088
Percent Total County Population Exposed	28.65%
Total County Housing Units (2014)	16,019
Estimated Exposed Housing Units	4,536
Percent Total County Exposed Housing Units	28.32%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	10
K-12 Schools	8
Childcare Centers	2
Hospital Facilities	9
Nursing Homes	3
Town and City Halls	22
Water Intakes	5
Total County Exposed Facilities	63

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	68
Significant Public Lakes (acres)	12.64
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	12.64
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	25.07
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	25.07

7.83 Warren County Profile

Overview	
Total County Area (square miles)	569.83
Estimated Linear Miles of Railroad	14.04
Percent Total County in the Buffer Zone	2.46%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	47,956
Estimated Exposed Population	2,447
Percent Total County Population Exposed	5.10%
Total County Housing Units (2014)	19,162
Estimated Exposed Housing Units	1,000
Percent Total County Exposed Housing Units	5.22%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	2
K-12 Schools	3
Childcare Centers	2
Hospital Facilities	0
Nursing Homes	0
Town and City Halls	1
Water Intakes	0
Total County Exposed Facilities	10

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	884
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	5.77
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	5.77

7.84 Washington County Profile

Overview	
Total County Area (square miles)	568.84
Estimated Linear Miles of Railroad	25.62
Percent Total County in the Buffer Zone	4.50%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	22,070
Estimated Exposed Population	4,773
Percent Total County Population Exposed	21.63%
Total County Housing Units (2014)	9,540
Estimated Exposed Housing Units	2,127
Percent Total County Exposed Housing Units	22.30%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	7
K-12 Schools	4
Childcare Centers	2
Hospital Facilities	2
Nursing Homes	2
Town and City Halls	13
Water Intakes	0
Total County Exposed Facilities	31

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	341
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	8.81
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	8.81

7.85 Wayne County Profile

Overview	
Total County Area (square miles)	525.44
Estimated Linear Miles of Railroad	43.00
Percent Total County in the Buffer Zone	8.18%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	6,395
Estimated Exposed Population	2,591
Percent Total County Population Exposed	40.52%
Total County Housing Units (2014)	3,181
Estimated Exposed Housing Units	1,358
Percent Total County Exposed Housing Units	42.71%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	7
K-12 Schools	7
Childcare Centers	1
Hospital Facilities	6
Nursing Homes	2
Town and City Halls	9
Water Intakes	1
Total County Exposed Facilities	36

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	222
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	1.48
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	1.48

7.86 Webster County Profile

Overview	
Total County Area (square miles)	715.62
Estimated Linear Miles of Railroad	86.74
Percent Total County in the Buffer Zone	12.12%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	36,955
Estimated Exposed Population	18,314
Percent Total County Population Exposed	49.56%
Total County Housing Units (2014)	17,035
Estimated Exposed Housing Units	7,901
Percent Total County Exposed Housing Units	46.38%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	7
Courthouses, Prisons, and Public Safety	22
K-12 Schools	15
Childcare Centers	9
Hospital Facilities	15
Nursing Homes	9
Town and City Halls	49
Water Intakes	0
Total County Exposed Facilities	126

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	33
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	17.23
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	17.23

7.87 Winnebago County Profile

Overview	
Total County Area (square miles)	400.49
Estimated Linear Miles of Railroad	16.32
Percent Total County in the Buffer Zone	4.08%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	10,559
Estimated Exposed Population	2,188
Percent Total County Population Exposed	20.72%
Total County Housing Units (2014)	5,183
Estimated Exposed Housing Units	1,112
Percent Total County Exposed Housing Units	21.46%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	2
Courthouses, Prisons, and Public Safety	3
K-12 Schools	5
Childcare Centers	2
Hospital Facilities	2
Nursing Homes	2
Town and City Halls	8
Water Intakes	0
Total County Exposed Facilities	24

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	626
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	867.51
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	867.51
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	3.77
Protected Streams (length in miles)	0

7.88 Winneshiek County Profile

Overview	
Total County Area (square miles)	689.87
Estimated Linear Miles of Railroad	29.71
Percent Total County in the Buffer Zone	4.31%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	20,768
Estimated Exposed Population	2,708
Percent Total County Population Exposed	13.04%
Total County Housing Units (2014)	8,813
Estimated Exposed Housing Units	1,238
Percent Total County Exposed Housing Units	14.05%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	3
Courthouses, Prisons, and Public Safety	4
K-12 Schools	7
Childcare Centers	2
Hospital Facilities	3
Nursing Homes	0
Town and City Halls	8
Water Intakes	0
Total County Exposed Facilities	27

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	202
Significant Public Lakes (acres)	26.77
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	26.77
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	6.50
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	6.50

7.89 Woodbury County Profile

Overview	
Total County Area (square miles)	872.83
Estimated Linear Miles of Railroad	41.16
Percent Total County in the Buffer Zone	4.72%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	102,271
Estimated Exposed Population	31,035
Percent Total County Population Exposed	30.35%
Total County Housing Units (2014)	41,510
Estimated Exposed Housing Units	12,231
Percent Total County Exposed Housing Units	29.46%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	4
Courthouses, Prisons, and Public Safety	22
K-12 Schools	23
Childcare Centers	22
Hospital Facilities	24
Nursing Homes	8
Town and City Halls	46
Water Intakes	1
Total County Exposed Facilities	150

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	1,292
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	9.30
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	9.30

7.90 Worth County Profile

Overview	
Total County Area (square miles)	400.12
Estimated Linear Miles of Railroad	45.33
Percent Total County in the Buffer Zone	11.33%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	7,624
Estimated Exposed Population	4,022
Percent Total County Population Exposed	52.75%
Total County Housing Units (2014)	3,523
Estimated Exposed Housing Units	1,928
Percent Total County Exposed Housing Units	54.73%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	6
Courthouses, Prisons, and Public Safety	12
K-12 Schools	6
Childcare Centers	3
Hospital Facilities	2
Nursing Homes	4
Town and City Halls	14
Water Intakes	0
Total County Exposed Facilities	47

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	1,348
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	5.80
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	5.80

7.91 Wright County Profile

Overview	
Total County Area (square miles)	580.42
Estimated Linear Miles of Railroad	21.63
Percent Total County in the Buffer Zone	3.73%

Railroad Incident Exposures Exposed Population Data (Populations in the Buffer Zone)	
Total County Population (2014 Census Estimate)	12,840
Estimated Exposed Population	3,843
Percent Total County Population Exposed	29.93%
Total County Housing Units (2014)	6,494
Estimated Exposed Housing Units	1,801
Percent Total County Exposed Housing Units	27.73%

Railroad Incident Exposures Exposed Facilities (Facilities in the Buffer Zone)	
Fire and EMS	1
Courthouses, Prisons, and Public Safety	3
K-12 Schools	3
Childcare Centers	2
Hospital Facilities	2
Nursing Homes	2
Town and City Halls	3
Water Intakes	0
Total County Exposed Facilities	16

Vulnerable Environmental Areas (Areas in the Buffer Zone)	
Total Exposed Conservation and Recreation Lands (acres)	60
Significant Public Lakes (acres)	0
Federal Reservoirs (acres)	0
Protected Wetlands and Setbacks (acres)	0
Total Exposed Lakes, Reservoirs, & Wetlands (acres)	0
Outstanding Streams (length in miles)	0
Designated Streams (length in miles)	10.14
Protected Streams (length in miles)	0
Total Exposed Length of Streams (length in miles)	10.14

8.0 Appendix H - Local Survey Responses (Online Survey)

#1

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 2:47:54 PM
Last Modified: Wednesday, November 25, 2015 2:57:10 PM
Time Spent: 00:09:16
IP Address: 165.206.58.37

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	David Johnston
Department/Agency:	Iowa HSEMD
Address:	7900 Hickman Road
City/Town:	Windsor Heights
ZIP:	50324
Email Address:	david.johnston@iowa.gov
Phone Number:	515-725-3295

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

HSEMD writes statewide plans: response, recovery, mitigation, etc. HSEMD provides training across all disciplines, to include HAZMAT and transportation/rail. HSEMD conducts exercises to test plans and training across multiple hazards.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

As much as possible

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	I don't know
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESFs, and yes up to date

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	Yes
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes, yes it's active. Multiple disciplines.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

There are several systems. Alert Iowa is a primary one, as is the Duty Officer on call.

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

IMAC covers much of this.

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

HSEMD works with first responders, but those responders coordinate their comms.

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

Coordination is ongoing and is something that everyone at all levels need to continue to work on.

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.

Q29: If you have regular contact with the railroads, which ones?

Much of our knowledge of railroad contacts comes from local EMA and Iowa DOT

Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?

Contacted HSEMD through our HMEP grants person.

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Across Iowa shelters are managed and coordinated by various entities.

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Other (please specify) Iowa HSEMD would assist in a mass casualty event, the definition will be different in different jurisdictions.

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Across the state distance to hospitals, medical services, and burn units will vary.

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Doing real world exercises and improving coordination and communication between EMA, rail, and responders.

#2

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 3:11:12 PM
Last Modified: Wednesday, November 25, 2015 3:12:37 PM
Time Spent: 00:01:24
IP Address: 97.121.113.88

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager
Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.	*Respondent skipped this question*
Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?	*Respondent skipped this question*

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	*Respondent skipped this question*
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	*Respondent skipped this question*
Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?	*Respondent skipped this question*
Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	*Respondent skipped this question*
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*
Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	*Respondent skipped this question*
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?	*Respondent skipped this question*
Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	*Respondent skipped this question*
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*
Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?	*Respondent skipped this question*
Q22: Regarding public education/outreach:	*Respondent skipped this question*
Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).	*Respondent skipped this question*

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:	*Respondent skipped this question*
Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	*Respondent skipped this question*
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	*Respondent skipped this question*
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	*Respondent skipped this question*
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	*Respondent skipped this question*
Q35: How do you define a mass-casualty incident (how many patients)?	*Respondent skipped this question*
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?	*Respondent skipped this question*
Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

#3

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 3:14:10 PM
Last Modified: Wednesday, November 25, 2015 3:27:19 PM
Time Spent: 00:13:08
IP Address: 66.43.193.125

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager

Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**

Name:	Keith Morgan
Department/Agency:	Story Co EMA
Address:	900 6th St
City/Town:	Nevada
ZIP:	50201
Email Address:	kmorgan@storycountyiowa.gov
Phone Number:	515-38207315

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

I am the county coordinator responsible for ESF 10 and I am also the LEPC Chair.

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	Yes
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	Yes

Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**

I have attended their training and we have gotten a commodity flow from them through a fire chief.

Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	No
Q8: **If yes, to whom did you provide assistance?**	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

None

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

N/A

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

We have a major rail line that runs through the county and two ethanol producers so we have a large amount of product. It is difficult for volunteer fire departments to find the time to train on this issue give all the other training they need to do.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

It is up to date with a small group of active members.

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	Yes
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	Yes

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.

My deputy and I have both had training on rail car incidents and other training at the Homeland Security Conference and HAZMAT symposium.

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

It is up to date with a small group of active members.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

We have WENS and we have developed prepared notifications for HAZMAT incidents in general.

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

We have a 28 E with Des Moines HAZMAT to contract for response services.

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

The EMA has bridging units and a few spare radios to link non-Story Co agencies into our trunked 800 MHZ system.

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

We have a moderate level of preparedness for HAZMAT in general, little specific preparedness for rail events. Rail events would be handled like other large scale events.

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Regular contacts

Q29: If you have regular contact with the railroads, which ones?

Union Pacific

Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Per ESFs and dependent on location.

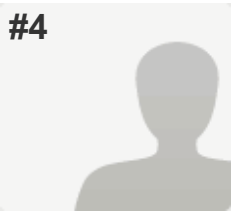
Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Other (please specify) Not procedurally defined for Story Co

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Level II is Mary Greeley, Level 1 is Des Moines.

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

A derailment and subsequent fire in Ames.



#4

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 3:32:44 PM
Last Modified: Wednesday, November 25, 2015 3:38:43 PM
Time Spent: 00:05:59
IP Address: 69.66.250.145

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Dave C Wilson
Department/Agency:	Johnson County EMA
Address:	4529 Melrose Avenue
City/Town:	Iowa City
ZIP:	52246
Email Address:	dave.wilson@jecc-ema.org
Phone Number:	3193566761

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

We are the emergency management agency and coordinator for resources needed in support of an operation.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	No
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

We work with anyone that calls and wants to work together.

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

yes

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	Yes
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	Yes

Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?

ethanol exercises

Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	Yes

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.

awareness level

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

yes

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Reverse 911,

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes
Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	We've talked in the past, but I don't remember who I've talked to.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?

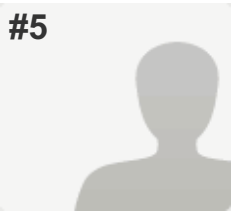
CRANDIC BNSF Transcar

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Red Cross and Salvation Army

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Six or more
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?	*Respondent skipped this question*
Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*



#5

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 3:43:06 PM
Last Modified: Wednesday, November 25, 2015 4:01:43 PM
Time Spent: 00:18:36
IP Address: 70.198.6.117

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Doug Reed
Department/Agency:	Pottawattamie Co Emergency Mgmt
Address:	227 So 6th St, Ste 23B
City/Town:	Council Bluffs
ZIP:	51501
Email Address:	doug.reed@pottcounty-ia.gov
Phone Number:	7123285777

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

We are the agency statutorily required to establish a means of direction, control and coordination of disastervand emergency response and recovery operations per Iowa Code 29C and Admin Code 605--7.3(4)

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	No

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

planning, training, exercise & request an assigned rep to our EOC

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No

Q8: If yes, to whom did you provide assistance?

na

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations? No

Q10: Please describe the incident(s) in detail.

na

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

none

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

na

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

intelligence and information sharing between rail companies and emergency management

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF and hazard specific, yes

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place? Yes

Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.) No

Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents? No

Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?

na

Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents? No

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.

na

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

yes, not active - in process of establishing a multicounty group

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

outdoor sirens, alert iowa, eas, social media, emergency media releases

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

fire-rescue
emergency managers
imac

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

cell phone
provide a local radios to assigned rail crews

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

weak at this point but with high optomism to change that status

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	My contact list may need to be updated.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	No

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

red cross but they are not that functional, that relationship needs modified

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Other (please specify) any # of patients that exceed the immediate response capability

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

council bluffs and omaha -no burn units

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

lack of plannining/response coordination and the historic unwillingness of the rail industry to provide emergency management requested data

#6

INCOMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 4:01:31 PM
Last Modified: Wednesday, November 25, 2015 4:02:35 PM
Time Spent: 00:01:04
IP Address: 216.51.175.221

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager
Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**	*Respondent skipped this question*

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

We are a support function for incident command should anything happen.

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	*Respondent skipped this question*
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	*Respondent skipped this question*
Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**	*Respondent skipped this question*
Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	*Respondent skipped this question*
Q8: **If yes, to whom did you provide assistance?**	*Respondent skipped this question*
Q9: **Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?**	*Respondent skipped this question*
Q10: **Please describe the incident(s) in detail.**	*Respondent skipped this question*
Q11: **What hazardous materials rail incident After Action Reports are available for review/consideration?**	*Respondent skipped this question*

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?	*Respondent skipped this question*
Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	*Respondent skipped this question*
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*
Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?	*Respondent skipped this question*
Q22: Regarding public education/outreach:	*Respondent skipped this question*
Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).	*Respondent skipped this question*

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:	*Respondent skipped this question*
Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	*Respondent skipped this question*
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	*Respondent skipped this question*
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	*Respondent skipped this question*
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	*Respondent skipped this question*
Q35: How do you define a mass-casualty incident (how many patients)?	*Respondent skipped this question*
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?	*Respondent skipped this question*
Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

#7

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 4:35:34 PM
Last Modified: Wednesday, November 25, 2015 4:44:22 PM
Time Spent: 00:08:47
IP Address: 216.81.211.9

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Barry Halling
Department/Agency:	Dallas County EMA
Address:	121 N.9th St.
City/Town:	Adel, Iowa
ZIP:	50003
Email Address:	Barry.Halling@dallascountyiowa.gov
Phone Number:	515-993-2134

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Planning, response, coordination and recovery efforts.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

They will be part of the planning, response and recovery effort.

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF's and is current

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	Yes
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

not active.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).	*Respondent skipped this question*

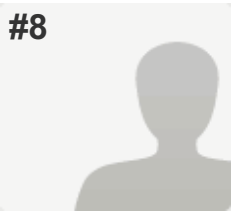
PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	No

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	We've talked in the past, but I don't remember who I've talked to.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	No
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	No
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	No
Q35: How do you define a mass-casualty incident (how many patients)?	Five or more
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?	*Respondent skipped this question*
Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*



INCOMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 4:50:47 PM
Last Modified: Wednesday, November 25, 2015 4:52:13 PM
Time Spent: 00:01:26
IP Address: 74.34.160.121

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Scott Forbes
Department/Agency:	Webster County Emergency Management
Address:	723 1st Ave South
City/Town:	Fort Dodge
ZIP:	50501
Email Address:	ema@webstercountyia.org
Phone Number:	5155703885

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Work with the railroad and facilities that ship via rail.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	*Respondent skipped this question*
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	*Respondent skipped this question*
Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?	*Respondent skipped this question*
Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	*Respondent skipped this question*
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*
Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	*Respondent skipped this question*

Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?	*Respondent skipped this question*
Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	*Respondent skipped this question*
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*
Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?	*Respondent skipped this question*
Q22: Regarding public education/outreach:	*Respondent skipped this question*

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).	*Respondent skipped this question*

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:	*Respondent skipped this question*
Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	*Respondent skipped this question*
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	*Respondent skipped this question*
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	*Respondent skipped this question*
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	*Respondent skipped this question*
Q35: How do you define a mass-casualty incident (how many patients)?	*Respondent skipped this question*
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?	*Respondent skipped this question*
Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

#9

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 4:42:10 PM
Last Modified: Wednesday, November 25, 2015 5:00:54 PM
Time Spent: 00:18:43
IP Address: 69.63.3.71

PAGE 2: General Questions

Q1: What is your role in your community?	Fire Service

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Eugene Beard
Department/Agency:	Jefferson-Monroe Fire Department, Inc.
Address:	2559 120th St NW
Address 2:	PO Box 246
City/Town:	Swisher
ZIP:	52338
Email Address:	jmfd@southslope.net
Phone Number:	3198574756

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Unsure. Would provide emergency response, command structure and notification.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

Include them in command structure and facilitate using thier resources in mitigating incident.

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

Johnson County EMA coordinates and continually updates the plan.

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	No
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	Yes

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.

Yes, several members have attended railroad safety classes provided by the Iowa Fire Service Training Bureau. Primarily increased our awareness of the availability of personnel and resources.

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes, and it is active under JCEMA. Unsure of all entities that participate but our agency does not.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	No
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Reverse 911

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

Approximately 22 Law Enforcement, EMA, Fire, Rescue and EMS agencies in Johnson, Linn, Iowa, Cedar, Muscatine and Washington Counties.

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

Would communicate thru our local PSAP.

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

No opinion

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	We've talked in the past, but I don't remember who I've talked to.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	No
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	No
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Three or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Iowa City, Iowa Yes on burn unit

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Size of incident, assembling sufficient resources and impact on community.

#10

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 8:01:26 PM
Last Modified: Wednesday, November 25, 2015 8:16:24 PM
Time Spent: 00:14:58
IP Address: 208.79.0.198

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager
Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**	*Respondent skipped this question*

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

Assist with railroad officials and hazmat team if an incident happens. Work with local responders in preparations of an incident.

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	Yes
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	Yes

Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**

Union Pacific is very aggressive when an event occurs. Will work to secure perimeter and evacuations if needed.

Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	No
Q8: **If yes, to whom did you provide assistance?**	*Respondent skipped this question*
Q9: **Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?**	No
Q10: **Please describe the incident(s) in detail.**	*Respondent skipped this question*
Q11: **What hazardous materials rail incident After Action Reports are available for review/consideration?**	*Respondent skipped this question*

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

Yes

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	No
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes. Cities, County, Fire/Rescue, Hazmat

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Outdoor sirens, Everbridge [mass notification], social media

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

schools, contiguous counties

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

Unsure if RR's have Vhf frequencies which is what the county responders use.

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

Grade C

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	We've talked in the past, but I don't remember who I've talked to.

Q29: If you have regular contact with the railroads, which ones?

the regular contact is the RR 800 phone number

Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?

Union Pacific

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

City civic center

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Other (please specify) could be any of the above dependent upon type of event

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

County hospital is level 4, next closest is metro area level 1. burn center 100 miles

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

hazardous materials shipped in rail cars and in close proximity to each other. Also ethanol, crude oil, and other unknowns

#11

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, November 25, 2015 9:30:57 PM
Last Modified: Wednesday, November 25, 2015 9:52:58 PM
Time Spent: 00:22:00
IP Address: 71.34.180.119

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	AJ Mumm
Department/Agency:	Polk County Emergency Management Agency
Address:	1907 Carpenter Ave.
City/Town:	Des Moines
ZIP:	50314
Email Address:	aj.mumm@polkcountyiowa.gov
Phone Number:	515-286-2107

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

preparedness, response, recovery, mitigation

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

unified command

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

none

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

Emergency Support Functions and it is up to date

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	Yes
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes. Active. Response agencies and private sector fixed hazmat facilities.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

sirens, automated notification system (code red and alert iowa), media notification, social media

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

statewide (IMAC), countywide fire service

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

face to face/unified command; share radios, national interop channels

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.

Q29: If you have regular contact with the railroads, which ones?

Union Pacific

Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?

Union Pacific and BNSF

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Polk County Emergency Management with staffing support from American Red Cross

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Other (please specify) 10 total patients or 5 critical patients

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

2 trauma centers in Des Moines, no burn unit

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

#12

INCOMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 26, 2015 9:46:46 AM
Last Modified: Thursday, November 26, 2015 9:52:09 AM
Time Spent: 00:05:23
IP Address: 74.42.101.157

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager

Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**

Name:	Gregory MILLER
Department/Agency:	Crawford County EMA
Address:	Please October Box 473
City/Town:	Denison
ZIP:	51442
Email Address:	mlrlyte@frontiernet.net

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

Lead Agency along with local Fire Departments and Law Enforcement and EMS

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	Yes
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	Yes
Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**	*Respondent skipped this question*
Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	Yes
Q8: **If yes, to whom did you provide assistance?**	*Respondent skipped this question*
Q9: **Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?**	Yes

Q10: Please describe the incident(s) in detail.

Leaking gasoline at local ethanol plant

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

Many responding agencies. Good communication and control of incident

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

Up to date

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	I don't know
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Not active

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).	*Respondent skipped this question*

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:	*Respondent skipped this question*
Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	*Respondent skipped this question*
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	*Respondent skipped this question*
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	*Respondent skipped this question*
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	*Respondent skipped this question*

Q35: How do you define a mass-casualty incident (how many patients)?	*Respondent skipped this question*
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?	*Respondent skipped this question*
Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

#13

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 26, 2015 4:22:50 PM
Last Modified: Thursday, November 26, 2015 4:32:11 PM
Time Spent: 00:09:21
IP Address: 208.126.92.169

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager

Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**

Name:	Kimberly Elder
Department/Agency:	Emergency Management Coordinator
Address:	2369 Jessup Avenue
Address 2:	Floor 3 Admin Bldg
City/Town:	Marshalltown
ZIP:	50158
Email Address:	kelder@co.marshall.ia.us
Phone Number:	641-754-6385

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

Logistics

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	Yes
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	Yes

Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**

We have been working with and including the railroad in planning for many years, they are included with our LEPC although they haven't attended in approximately 2 years.

Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	No
Q8: **If yes, to whom did you provide assistance?**	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

n/a

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

n/a

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

Training and proper safety equipment are needed by all responders in my county.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESFs, yes.

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	No
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No

Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?

N/A

Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	Yes

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.

During HazMat symposium, specialized training brought to us by Ethanol plant and also through Homeland Security training. We need much more information.

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

yes, yes. Many entities.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Sirens only for tornado warnings, Alert Iowa not fully implemented yet but in the works, reverse 911 not available due to cost.

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

MANY

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

Radio from communications dispatch, cell phone calls.

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

If there is a good relationship and training the more we work together the better the response will be.

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.

Q29: If you have regular contact with the railroads, which ones?

Union Pacific

Q30: Have any railroads contacted you to offer training, planning, or exercises?	No

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Fire departments and volunteers.

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Other (please specify) More than the agency/hospital can handle, could be more than 2.

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

2 hours for burn unit, 1 hour for trauma service hospital

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

cities that the train runs through

#14

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Saturday, November 28, 2015 2:08:15 PM
Last Modified: Saturday, November 28, 2015 2:16:29 PM
Time Spent: 00:08:13
IP Address: 67.55.239.97

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Thomas A Craighton
Department/Agency:	Franklin County Emergency Management
Address:	105 5th Street SW, PO BOX 57
City/Town:	Hampton
ZIP:	50441
Email Address:	tcraighton@co.franklin.ia.us
Phone Number:	641-512-8717

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Coordination, training and planning

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

having them come in and do training

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	No
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

yes, active we are in an 18 county region in north central iowa. Mason City Haz Mat

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Alert Iowa, Code Red and outdoor warning sirens, facebook

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

all county fire departments, neighboring EMA

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

There would have to be a computer setup to marry the radios for frequency on vhf

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

fair

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	No
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Red Cross, county

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Four or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

30 miles, closest burn unit 130 minutes out

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Adequate evacuation and then containment

#15

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 7:24:38 AM
Last Modified: Monday, November 30, 2015 7:33:57 AM
Time Spent: 00:09:19
IP Address: 64.22.202.189

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager

Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**

Name:	Thomas Berger
Department/Agency:	Dubuque County EMA
Address:	14928 Public Safety Way
City/Town:	Dubuque
ZIP:	52002
Email Address:	tom.berger@dbqcoema.com
Phone Number:	563-589-4170

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

Logistics and assist emergency responders, activate EOC if needed, Planning and training prior to the event

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	Yes
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	Yes

Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**

Dubuque CAER group and through our LEPC

Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	Yes

Q8: **If yes, to whom did you provide assistance?**

Phone call assistance to JoDaviess Co IL, my assistance was very limited tho

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?

Yes

Q10: Please describe the incident(s) in detail.

CP Ethanol Derailment at Sherrill, IA on 2-4-2015

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

We have a powerpoint that was presented at the 2015 Hazmat Symposium

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

Communications was the main thing.

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

If the derailment occurs in a populated area, evacuation

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESFs and yes

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?

No

Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)

No

Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?

Yes

Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?

Tomorrow we are having one at the Dubuque National Guard Armory led by the DOT

Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?

No

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.

I am the only one in the office

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes - Dubuque County

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Outdoor warning sirens, CodeRed emergency Notification, cable TV override

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

All of the Dubuque County public safety agencies and we would use the Iowa Mutual Aid Compact

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

We are on the Racom 800 MHz system and do have a mobile ACU1000 that can be programmed for incoming resources

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

Pretty well prepared, we can always be better

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Regular contacts

Q29: If you have regular contact with the railroads, which ones?

CP and BNSF although that is across the Mississippi River

Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?

CP and BNSF

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

American Red Cross with assistance from local EOC

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Six or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Two trauma facilities in Dubuque (Mercy and Unity Point Finley) - closest burn facility is the U of I

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Evacuations

#16

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 8:17:14 AM
Last Modified: Monday, November 30, 2015 8:23:55 AM
Time Spent: 00:06:41
IP Address: 216.248.99.68

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Robert Kempf
Department/Agency:	Adair & Guthrie County EMAs
Address:	200 North 5th Street #10
City/Town:	Guthrie Center
ZIP:	50115
Email Address:	agcema@guthriecounty.us
Phone Number:	6413323030

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Providing preparedness information and resource contact for response and recovery.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

Keep in contact via email and phone.

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESFs

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	No
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes, active

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	Yes

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Outdoor sirens
Social Media
Mobile App
CodeRED (switching to Alert Iowa 02-01-16)

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

Phone

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

Good

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	No

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Local Jurisdictions

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Four or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Des Moines
Burn units are in Iowa City & Omaha

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

#17

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 8:18:57 AM
Last Modified: Monday, November 30, 2015 8:26:41 AM
Time Spent: 00:07:44
IP Address: 108.161.81.154

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager

Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**

Name:	Kip Ladage
Department/Agency:	Bremer County EMA
Address:	Bremer-Waverly LEC
Address 2:	111 4th St NE
City/Town:	Waverly
ZIP:	50677
Email Address:	kladage@co.bremer.ia.us
Phone Number:	319-352-0133

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

Would assist as permitted with the response. To date, have little or no communications with rail going through Bremer County.

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	I don't know
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	Yes

Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**

I would gladly include them in our planning processes, but have not had communications with them. When asked for info for our ESF-10, we had no response.

Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	No

Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*
Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

None

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

Lines of communications between rail and local officials should be as good as the communications between locals and pipeline operators.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	No
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes - a regional LEPC

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Outdoor warning systems, Alert Iowa, Social Media

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

28E with our hazmat response team

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

We do not know what system the rail uses, so we do not know about communications interoperability.

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

Virtually non-existent

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	I don't have any contacts with the railroads.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*

Q30: Have any railroads contacted you to offer training, planning, or exercises?	No
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Bremer County CERT and/or American Red Cross

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Other (please specify) Dependent on situation and availability of resources

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Waterloo/No

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Do we have it going through the county, who are our contacts if there is an emergency

#18

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 8:36:23 AM
Last Modified: Monday, November 30, 2015 8:51:37 AM
Time Spent: 00:15:13
IP Address: 96.31.31.233

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Nate Huizenga
Department/Agency:	Sioux County EMA
Address:	4363 Ironwood Ave
City/Town:	Orange City
ZIP:	51041
Email Address:	nateh@siouxcounty.org
Phone Number:	712-737-4010

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Planning, Training, and Exercise

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes
Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?	*Respondent skipped this question*
Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*
Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	Yes

Q10: Please describe the incident(s) in detail.

Sioux Center had a rail car explosion during while transferring to a semi. Explosion killed the driver of the truck and started a large fire that had to be contained. This occurred in 2008.

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

Not sure. This occurred before I was EMA. I have some information and reports but not an actuall AAR.

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

The transferring of ethanol is no longer done in the middle of Sioux Center, they are now transferring the product in a rural area.

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

Evacuation, getting help for clean up etc.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

They are organized by ESF format and they are up to date.

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	Yes

Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?

We had a TransCaer Training this summer. We are also planning a large ethanol incident full scale exercise to be performed this summer.

Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	Yes

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.

Attended rail class in Des Moines through DOT this summer. Also attended the TransCaer Training this summer.

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes, NW Iowa LEPC and it is active. It covers the NW corner of Counties in Iowa including; Sioux, Obrien, Osceola, Lyon, Clay, Dickinson, Buena Vista,

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	No
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

The Sioux County Sheriff's Office uses NIXLE which is similar to Alert Iowa. This alerting and message system has been in place for five years.

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

Inter county fire departments as well as some in South Dakota and neighboring that have fire district in our county.

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

We have been improving that relationship over the last couple of years with the classes we have had and also with the planning for our exercise.

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Regular contacts

Q29: If you have regular contact with the railroads, which ones?

BNSF, UP
Craig Johnson was the contact I used for UP. Now have been in contact with Derek Lampkin from BNSF.

Q30: Have any railroads contacted you to offer training, planning, or exercises?	No

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Red Criss

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Four or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Sioux City

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Evacuation and time people would be away from their homes.

A large incident in a town is my biggest concern.

#19

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 8:56:15 AM
Last Modified: Monday, November 30, 2015 9:08:06 AM
Time Spent: 00:11:50
IP Address: 66.43.244.209

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Terry Reekers
Department/Agency:	Emergency Management
Address:	114 North 6th Street Ste. 3
City/Town:	Estherville
ZIP:	51334
Email Address:	ema@emmetcountyia.com
Phone Number:	7123625702

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Emergency Planning and Response.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

We need to establish a contact person and invite them to participate in our planning and training.

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF and is currently approved and up to date

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	No
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes Local Responders, County Government and Regional Hazmat team.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	I don't know

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Alert Iowa, outdoor warning sirens, indoor warning system, NOAA Weather Radio

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

State of Iowa

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

Phone

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

Needs help.

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.

Q29: If you have regular contact with the railroads, which ones?

U P

Q30: Have any railroads contacted you to offer training, planning, or exercises?	No
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Emergency Management and American Red Cross

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Six or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Avera Holy Family Hospital No burn unit.

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Major spill and damage to the environment.

#20

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 8:35:57 AM
Last Modified: Monday, November 30, 2015 9:29:43 AM
Time Spent: 00:53:45
IP Address: 70.198.7.98

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Stefani Hanson
Department/Agency:	Emergency Management Coordinator
Address:	2300 Superior Street
City/Town:	Webster City
ZIP:	50595
Email Address:	shanson@hamiltoncounty.org
Phone Number:	5158329518

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Currently, there is not any crude oil transport through Hamilton County rail systems. Responses to Ethanol spills/fires are managed by Region V Hazmat and supported by local county fire departments. All local fire departments are scheduled for further training in ethanol spill response in 2016.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

Using ICS/NIMS

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	I don't know
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	I don't know
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

None known

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

Ongoing training for ethanol spill response is needed and additional foam carts are needed for the county.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

Yes

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	I don't know
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	I don't know
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes, it is active and meets quarterly. Region V represents multiple local counties.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	I don't know
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	I don't know

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Recent membership to Alert Iowa, weekly outdoor warning sirens, investigating usage of "I am Responding".

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	I don't know
Are they written agreements?	I don't know

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	My contact list may need to be updated.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	I don't know
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	I don't know
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	I don't know
Q35: How do you define a mass-casualty incident (how many patients)?	Six or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Van Diest Medical Center

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Spills occurring in town in semi-residential areas and close to Boone river.

#21

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 9:07:16 AM
Last Modified: Monday, November 30, 2015 9:35:29 AM
Time Spent: 00:28:12
IP Address: 69.66.198.64

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Steve O'Connor
Department/Agency:	Calhoun County EMA
Address:	3rd Floor Courthouse
City/Town:	Rockwell City
Email Address:	soconnor@calhouncountyiowa.com
Phone Number:	712-297-8619

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Prepare - ESF 10
Response - Hazmat Op's trainer to all fire/ems personnel

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

Planning - ESF 10 written with info provided by RR
Response - attends training provided by RR

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	Yes

Q8: If yes, to whom did you provide assistance?

multiple counties providing them Hazard Analysis Summaries including RR

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No

Q10: Please describe the incident(s) in detail.

but responded to numerous RR incidents involving other hazardous materials or involving over the road vehicles

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

none on file

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

Attended an after action report provided by the Ia. Fire's Hazmat Symposium on the crude oil derailment/fire in Dubuque County.

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

Notification in the event of rerouting of crude oil due to a derailment on primary routes through our county

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF 10 - last reviewed 7-2015

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	Yes
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	Yes

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.

This year 3 classes on RR incidents involving crude/ethanol

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

yes, Region V Hazmat Response, multiple counties

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	No
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

WENS/Alert Iowa, EAS, indoor/outdoor warnings

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

County Fire Mutual Aid, Bylaws of the Region V Hazardous materials response includes Calhoun County.

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

County fire channel, state fire, state law, state ems, state ema channels

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

appropriate

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*

Q30: Have any railroads contacted you to offer training, planning, or exercises?	No
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Red Cross, Rubicon, EMA, Public Health

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Five or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Stewart Memorial - Lake City
Burn unit - Omaha or Iowa City

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

We are a small county and not currently a transportation route for crude oil. Would want notification with this were to change.

#22

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 9:15:32 AM
Last Modified: Monday, November 30, 2015 9:37:59 AM
Time Spent: 00:22:26
IP Address: 173.19.115.197

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager, Fire Service

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Don Willett
Department/Agency:	Adams County EMA
Address:	809 7th Street
City/Town:	Corning Iowa
ZIP:	50841
Phone Number:	641-322-3623

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?	*Respondent skipped this question*

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

It is very difficult in the past cases they take over and release your personel

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	Yes

Q8: If yes, to whom did you provide assistance?

Union County Iowa

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

No recent ones

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

Emergency Support Functions and yes

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes and Yes Corning Fire Dept. , Adams County Sheriffs, Corning Hospital, Adams Co. Ambulance, Adams Co. Public Health

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	No
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Alert Iowa

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

The Counties around us

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

Very poor

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

poor

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	We've talked in the past, but I don't remember who I've talked to. , Would have to look up my contacts. , My contact list may need to be updated.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	No

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	I don't know
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	I don't know
Q35: How do you define a mass-casualty incident (how many patients)?	Five or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

100 miles and no

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

The rail road goes right through three towns Corning, Nodaway, and Prescott

#23

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 10:00:01 AM
Last Modified: Monday, November 30, 2015 10:20:38 AM
Time Spent: 00:20:37
IP Address: 40.139.38.26

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager

Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**

Name:	Allan Mathias
Department/Agency:	Clarke County Emergency Management
Address:	100 S Main
City/Town:	Osceola
ZIP:	50213
Email Address:	clarkees1@iowatelecom.net
Phone Number:	6413426654

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**	*Respondent skipped this question*

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	Yes
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	Yes

Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**

notification information

Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	No
Q8: **If yes, to whom did you provide assistance?**	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No

Q10: Please describe the incident(s) in detail.

None that I am aware of.

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

None that I know of.

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

None to compare.

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

Getting in contact with railroad staff.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF's and is up to date.

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

A Regional LEPC which is active and includes Clarke, Decatur, Ringgold, Van Buren, Wapello, Mahaska, Keokuk, and Jefferson

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Outdoor warning sirens, Alert Iowa, and Nixle

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	I don't know
Are they written agreements?	I don't know

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.

Q29: If you have regular contact with the railroads, which ones?

BNSF

Q30: Have any railroads contacted you to offer training, planning, or exercises?	No
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

volunteers

Q34: Do you have the capability to manage a mass-casualty incident?	I don't know
Q35: How do you define a mass-casualty incident (how many patients)?	Five or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

hospital in Osceola but otherwise Des Moines

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

a wreck in a city

#24

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 11:12:35 AM
Last Modified: Monday, November 30, 2015 11:26:07 AM
Time Spent: 00:13:31
IP Address: 167.142.22.161

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Steve O'Neil
Department/Agency:	Cerro Gordo County Emergency Management
Address:	78 S. Georgia Avenue
City/Town:	Mason City
ZIP:	50401
Email Address:	soneil@co.cerro-gordo.ia.us
Phone Number:	641-421-3665

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Coordination

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

I work under the direction of the incident scene commander.

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No

Q10: Please describe the incident(s) in detail.

NA

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

NA

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

NA

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

Would like to see continued outreach training and planning by railroads.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

Emergency Support Functions

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	No
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	Yes

Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?

Tabletop and functional exercises regarding ethanol being transported by a regional railraod.

Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

We belong to a 10 county regional EPC with members from emergency management, private sector, emergency response, public health, law enforccement, DNR, hospital.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

We utilize Code Red, outdoor warning sirens, EAS, NOAA radio.

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

All public agencies through IMAC, and written with local private sector.

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

VHF and 800 mghz radios, cell phones

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

In beginning stages, needs to continue to grow and build.

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Regular contacts

Q29: If you have regular contact with the railroads, which ones?

Iowa Northern, Traction RR,

Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?

Iowa Northern

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Emergency Management/Public Health

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Four or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

North Iowa Mercy Medical Center-Mason City. No burn unit.

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

#25

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 11:14:49 AM
Last Modified: Monday, November 30, 2015 11:41:17 AM
Time Spent: 00:26:27
IP Address: 208.95.1.17

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager
Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**	*Respondent skipped this question*

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

We develop plans for mitigation, response and recovery from such an incident. We also coordinate the response and recovery efforts.

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	Yes
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	Yes

Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**

They should be included and likely will be the "in charge" agency if an incident occurs.

Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	Yes

Q8: **If yes, to whom did you provide assistance?**

Railroad

Q9: **Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?**	Yes

Q10: Please describe the incident(s) in detail.

A rail car had a valve failure and started leaking at an unknown location but was found leaking as it sat in our rail yard. Local responders, Haz Mat from Des Moines, Law enforcement, EMS, EMA, Railroad Haz Mat and other railroad personnel responded. The spill in the yard was held to a fairly low quantity and due to weather conditions and size of the spill, no evacuations were needed and no waterways were affected. The incident took several hours.

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

None

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?

none

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

I think local responders need more training on how the system works with the railroad and the amount of time that it could take to mitigate the incident. I also would like to see a system in place that would require the railroad to secure the area and release local personnel after the initial response is completed so they can go back to their jobs instead of sitting around waiting for a clean-up crew to arrive from the railroad.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESFs and yes it is up to date

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	Yes
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No

Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

not an active one

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

outdoor warning sirens, Alert Iowa, email lists, face book, twitter

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	No
Are they written agreements?	No

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

VHF radios, cell phones and face to face

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

I think it is handled well

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	We've talked in the past, but I don't remember who I've talked to.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	No

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Red Cross

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Six or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Des Moines and yes

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Rapid notification and execution of an evacuation area.

#26

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 12:00:42 PM
Last Modified: Monday, November 30, 2015 12:12:17 PM
Time Spent: 00:11:35
IP Address: 208.87.237.201

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Dave Donovan
Department/Agency:	Scott County EMA
Email Address:	david.donovan@scottcountyiowa.com
Phone Number:	563-505-6992

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Local planning agency

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

By including them in planning for the Transportation and HazMat ESF's within our plan

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*
Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

It seems that there is a certain shroud of secrecy regarding the types of loads going through our communities. I would favor a mandated annual meeting with the LEPC by each company with rail operations in the county, where they outline the types and quantities of loads, response resources available from the railroad and to develop a training and exercise plan for first responders.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF; it is up to date, but we have initiated a re-write process for our entire plan over the next 18 months or so.

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	I don't know
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes. Local fire, police, EMA, health, EMS

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	No
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Outdoor warning sirens and Alert Iowa. Our Alert Iowa is in the infancy period with a low number of persons signed up. Not sure if we have the 911 database loaded yet.

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	I don't know

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

All fire and LE within County. Fire and LE in neighboring counties.

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

We are on the Racom EDACS network with very limited VHF capability

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

I would describe it as limited as best. There does not seem to be a coordinated effort.

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts. , My contact list may need to be updated.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?

CP

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

American Red Cross and Salvation Army

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Five or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Unity Point / Trinity and Genesis both operate trauma centers in our county. Not sure what their burn capabilities are.

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

The fact that these loads are traveling through population centers and crossing major thoroughfares and highways.

#27

INCOMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 12:33:04 PM
Last Modified: Monday, November 30, 2015 12:33:34 PM
Time Spent: 00:00:30
IP Address: 72.35.175.130

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager
Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.	*Respondent skipped this question*
Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?	*Respondent skipped this question*

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	*Respondent skipped this question*
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	*Respondent skipped this question*
Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?	*Respondent skipped this question*
Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	*Respondent skipped this question*
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*
Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	*Respondent skipped this question*
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?	*Respondent skipped this question*
Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	*Respondent skipped this question*
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*
Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?	*Respondent skipped this question*
Q22: Regarding public education/outreach:	*Respondent skipped this question*
Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).	*Respondent skipped this question*

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:	*Respondent skipped this question*
Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	*Respondent skipped this question*
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	*Respondent skipped this question*
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	*Respondent skipped this question*
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	*Respondent skipped this question*
Q35: How do you define a mass-casualty incident (how many patients)?	*Respondent skipped this question*
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?	*Respondent skipped this question*
Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

#28

INCOMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 2:18:18 PM
Last Modified: Monday, November 30, 2015 2:18:35 PM
Time Spent: 00:00:17
IP Address: 96.63.178.61

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager
Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.	*Respondent skipped this question*
Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?	*Respondent skipped this question*

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	*Respondent skipped this question*
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	*Respondent skipped this question*
Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?	*Respondent skipped this question*
Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	*Respondent skipped this question*
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*
Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	*Respondent skipped this question*
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*

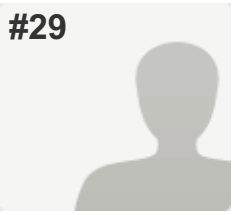
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?	*Respondent skipped this question*
Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	*Respondent skipped this question*
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*
Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?	*Respondent skipped this question*
Q22: Regarding public education/outreach:	*Respondent skipped this question*
Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).	*Respondent skipped this question*

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:	*Respondent skipped this question*
Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	*Respondent skipped this question*
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	*Respondent skipped this question*
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	*Respondent skipped this question*
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	*Respondent skipped this question*
Q35: How do you define a mass-casualty incident (how many patients)?	*Respondent skipped this question*
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?	*Respondent skipped this question*
Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*



#29

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 2:35:25 PM
Last Modified: Monday, November 30, 2015 2:41:17 PM
Time Spent: 00:05:51
IP Address: 184.10.85.100

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager
Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**	*Respondent skipped this question*

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

Response, recovery and mitigation
Emergency management
Iowa Code 29C

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	Yes
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	Yes

Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**

make their representative a member of Unified Command

Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	No
Q8: **If yes, to whom did you provide assistance?**	*Respondent skipped this question*
Q9: **Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?**	No
Q10: **Please describe the incident(s) in detail.**	*Respondent skipped this question*

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

Not enough hard resources available in rural areas

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF, Yes

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	No
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	Yes

Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?

Ethanol, tank car training and use of AFFF foam in fire suppression

Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes, 7 counties in western iowa

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

OWS,

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

surrounding counties, state of SD

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

limited to none

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

minimally prepared

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	We've talked in the past, but I don't remember who I've talked to. , Would have to look up my contacts.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?

BNSF

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

private

Q34: Do you have the capability to manage a mass-casualty incident?	I don't know
Q35: How do you define a mass-casualty incident (how many patients)?	Six or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Sioux City, Yes

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

lack of training by local fire departments

#30

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, November 30, 2015 6:00:23 PM
Last Modified: Monday, November 30, 2015 6:15:48 PM
Time Spent: 00:15:25
IP Address: 108.160.230.14

PAGE 2: General Questions

Q1: What is your role in your community?	Fire Service

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Eric Vandewater
Department/Agency:	North Liberty Fire Department
Address:	P.O. Box 77
City/Town:	North LIBERTY
ZIP:	52317
Email Address:	evandewater@northlibertyiowa.org
Phone Number:	3196265717

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Hazardous Material Awareness Level training with some Operations Level Staff and assistance from the Johnson County Hazardous Material Team.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

Yes, We will most likely have to utilize their expertise and resources to effectively mitigate the incident.

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

All of the above. From what I have read and seen of these types of incidents they can be long time consuming incidents which tax a departments resources and the community.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

Unknown-so I would say no on our part. However due to your survey I will be looking in to it in the near future.

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	No
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	Yes

Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?

Yes, but the training needs to be undated as it was done several years ago by a Cedar Rapids Firefighter.

Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?	*Respondent skipped this question*

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	No
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

All of the above.

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

All Johnson County Fire Departments

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

Unknown

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

Unknown

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	I don't have any contacts with the railroads.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	No
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Six or more, Other (please specify) or more patient to providers

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

University of Iowa

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

Evacuation of the city.

#31

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Tuesday, December 01, 2015 9:27:48 AM
Last Modified: Tuesday, December 01, 2015 9:44:40 AM
Time Spent: 00:16:52
IP Address: 69.66.69.253

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Mike Lamb
Department/Agency:	ADLM Emergency Management
Address:	PO Box 399
City/Town:	Moravia
ZIP:	52571
Email Address:	adlmema@iowatelecom.net
Phone Number:	641-724-3223

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Planning, Training, and Recovery

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

Unknown on prepairdness as they will not offer seperate crude training but rather support only Transcar courses.

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*

Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?

unknown if any

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*

Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?

lack of resources in rural areas to mount a response. Time delay for mutial aid and speciality responders.

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

ESF, Yes

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	Yes
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes, and its active, local government, law enforcement, first responders, and businesses

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Outdoor warning sirens are in use in about half the municipalities I cover, Alert Iowa is active in all four counties as well as reverse 911. Scattered limited usage of private notification systems such as Code Red.

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

Each county has stand alone mutual aid agreements with surrounding entities. list varies depending on location across Appanoose Davis Lucas and Monroe counties.

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

would be limited to cell phone

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts. , My contact list may need to be updated.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes

Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?

BNSF

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Red Cross

Q34: Do you have the capability to manage a mass-casualty incident?	No
Q35: How do you define a mass-casualty incident (how many patients)?	Five or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Iowa City or Des Moines, Yes

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

aged rail car fleet / rails location to populated areas

#32

INCOMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, December 02, 2015 12:06:30 PM
Last Modified: Wednesday, December 02, 2015 12:08:41 PM
Time Spent: 00:02:10
IP Address: 108.161.54.37

PAGE 2: General Questions

Q1: **What is your role in your community?**	Emergency Manager
Q2: **Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.**	*Respondent skipped this question*

Q3: **What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?**

Planner

PAGE 3: Risk and Vulnerability Questions

Q4: **Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?**	*Respondent skipped this question*
Q5: **Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?**	*Respondent skipped this question*
Q6: **How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?**	*Respondent skipped this question*
Q7: **Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?**	*Respondent skipped this question*
Q8: **If yes, to whom did you provide assistance?**	*Respondent skipped this question*
Q9: **Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?**	*Respondent skipped this question*
Q10: **Please describe the incident(s) in detail.**	*Respondent skipped this question*
Q11: **What hazardous materials rail incident After Action Reports are available for review/consideration?**	*Respondent skipped this question*

Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?	*Respondent skipped this question*
Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	*Respondent skipped this question*
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	*Respondent skipped this question*
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	*Respondent skipped this question*
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*
Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?	*Respondent skipped this question*
Q22: Regarding public education/outreach:	*Respondent skipped this question*
Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).	*Respondent skipped this question*

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:	*Respondent skipped this question*
Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?	*Respondent skipped this question*
Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	*Respondent skipped this question*
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	*Respondent skipped this question*
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	*Respondent skipped this question*
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	*Respondent skipped this question*
Q35: How do you define a mass-casualty incident (how many patients)?	*Respondent skipped this question*
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?	*Respondent skipped this question*
Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

#33

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Wednesday, December 02, 2015 4:49:32 PM
Last Modified: Wednesday, December 02, 2015 4:59:21 PM
Time Spent: 00:09:48
IP Address: 69.18.52.34

PAGE 2: General Questions

Q1: What is your role in your community?

Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Jeff Anderson
Department/Agency:	Marion County Emergency Management Agency
Address:	214 E. Main St.
City/Town:	Knoxville
ZIP:	50138
Email Address:	janderson@co.marion.ia.us
Phone Number:	6418282256

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Our local emergency management commission has governing authority over the emergency planning for Marion County, and over the Marion County Hazardous Materials Team.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?

I don't know

Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?

Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

attempt to host rail sponsored/presented trainings locally

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?

No

Q8: If yes, to whom did you provide assistance?

Respondent skipped this question

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

Emergency Support Functions, yes 20% of the overall plan is updated annually. WIthin that, ESF 10, Hazmat is updated annually.

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	No
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	No
Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?	*Respondent skipped this question*
Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

Yes, the Marion County LEPC. Most fire, ems, law enforcement agencies in addition to most of the largest employers in the County.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	Yes
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	Yes
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Alert Iowa, and some outdoor warning sirens in incorporated areas.

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

All fire, ems, law enforcement agencies in Marion County. Marion County has an agreement with Jasper County.

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.

VHF radio system with local repeaters. Swap radios available as is a portable VHF repeater for remote/on-site use.

Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?

Lacking.

Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	No
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*

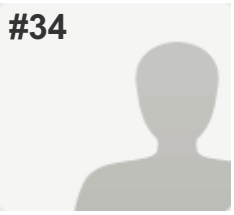
Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	No
Q33: Who manages the shelters, feeding, and related needs?	*Respondent skipped this question*
Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Six or more

Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Des Moines, nearest burn unit is in Iowa City.

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?

lack of training and transparency of shipments.



#34

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, December 03, 2015 3:45:28 PM
Last Modified: Thursday, December 03, 2015 3:58:36 PM
Time Spent: 00:13:07
IP Address: 67.22.192.141

PAGE 2: General Questions

Q1: What is your role in your community?	Emergency Manager

Q2: Are you willing to share your name and contact information so that we may be able to follow-up with you for the purposes of this report? If so, please provide your information below, otherwise your responses will remain anonymous.

Name:	Arden Kopischke
Department/Agency:	Lyon County Emergency Management
Address:	410 South Boone St
City/Town:	Rock Rapids
ZIP:	51246
Email Address:	lyonema@lyoncountyiowa.com
Phone Number:	712-472-8330

Q3: What is your agency/department's role, responsibility, and authority in preparedness and response efforts to crude oil/ethanol rail transportation incidents in Iowa?

Make sure emergency responders are trained and if there is an incident make sure Incident Command is in place.

PAGE 3: Risk and Vulnerability Questions

Q4: Is your jurisdiction at risk from a crude oil/ethanol by rail transportation incident?	Yes
Q5: Do you know how to contact the railroad(s) that crosses your community/county for assistance in an event?	Yes

Q6: How do you intend to work with/integrate the railroad personnel within your preparedness or response efforts?

Incident command will be established and everyone will report to IC.

Q7: Have you ever provided aid or support to another jurisdiction for a crude oil/ethanol by rail transportation incident?	No
Q8: If yes, to whom did you provide assistance?	*Respondent skipped this question*

Q9: Have you ever had any crude oil/ethanol by rail transportation incidents in your jurisdiction that required first responder operations?	No
Q10: Please describe the incident(s) in detail.	*Respondent skipped this question*
Q11: What hazardous materials rail incident After Action Reports are available for review/consideration?	*Respondent skipped this question*
Q12: In relation to crude oil/ethanol by rail transportation incidents, what successes and areas for improvement were observed during the incident response(s)?	*Respondent skipped this question*
Q13: What additional concerns do you have regarding response planning, personnel, equipment/resources, and/or training related to crude oil/ethanol by rail transportation incident prevention, preparedness, or response?	*Respondent skipped this question*

PAGE 4: Existing Capabilities and Resources for Preparedness and Response

Q14: How is your Local Emergency Operations Plan organized (functionally, Emergency Support Functions, or hazards)? Is it up to date?

It is reviewed annually

Q15: Do you have hazardous materials response plans/SOPs/SOGs or other procedural documents in place?	Yes
Q16: If yes, would you be willing to provide a copy of the plans/SOPs/SOGs to inform the findings and recommendations that will be developed for this report? (Please provide your contact information in Question 2 so that we can reach you.)	No
Q17: Have you conducted or participated in any exercise focused on a crude oil/ethanol by rail transportation incidents?	Yes

Q18: If you answered yes to the previous question, describe the crude oil exercise(s) in which you have participated (i.e. what kind of exercise and when it occurred)?

Table top train derailment

Q19: Does your staff receive any specialized training to respond to crude oil/ethanol by rail transportation incidents?	No
Q20: If your staff has received training, describe the training (i.e. what type of training and when did it occur) and indicate if the training improved your capability to manage or respond to a crude oil transportation incident.	*Respondent skipped this question*

Q21: Is there an LEPC in your jurisdiction? If so, is it active? What entities are represented?

We have a Regional LEPC that meets every month.

Q22: Regarding public education/outreach:

Do you conduct public education/outreach efforts related to general preparedness?	No
Do you conduct public education/outreach efforts related to hazardous materials (HAZMAT) incidents?	No
Do you conduct public education/outreach efforts specifically related to crude oil/ethanol by rail transportation incidents?	No

Q23: Describe your warning and notification capabilities (outdoor warning sirens, Alert Iowa, reverse 911, etc.).

Alert Iowa

PAGE 5: Interagency Coordination Questions

Q24: Regarding Mutual/Automatic Aid Agreements or Memoranda of Agreement:

Do you have Mutual/Automatic Aid Agreements or Memoranda of Agreement?	Yes
Are they written agreements?	Yes

Q25: If you have Mutual/Automatic Aid Agreements or Memoranda of Agreement, with whom do you have the agreements?

Contract with Sioux City IA Haz Mat

Q26: Please describe the communication system and capabilities for first responders to communicate with oil/ethanol transportation representatives operating in your jurisdiction.	*Respondent skipped this question*
Q27: How would you describe the preparedness and response coordination between the state, local government, tribal government (if applicable), responding private sector resources, the oil/ethanol companies, and the rail carriers?	*Respondent skipped this question*
Q28: How would you characterize your familiarity with railroads in your jurisdiction? Please select the response that best applies:	Would have to look up my contacts.
Q29: If you have regular contact with the railroads, which ones?	*Respondent skipped this question*
Q30: Have any railroads contacted you to offer training, planning, or exercises?	Yes
Q31: If you have been contacted by railroads about training, planning, or exercise, which ones contacted you?	*Respondent skipped this question*

Q32: Do you have any identified emergency shelter facilities in your jurisdiction?	Yes

Q33: Who manages the shelters, feeding, and related needs?

Public Health and Red Cross

Q34: Do you have the capability to manage a mass-casualty incident?	Yes
Q35: How do you define a mass-casualty incident (how many patients)?	Six or more

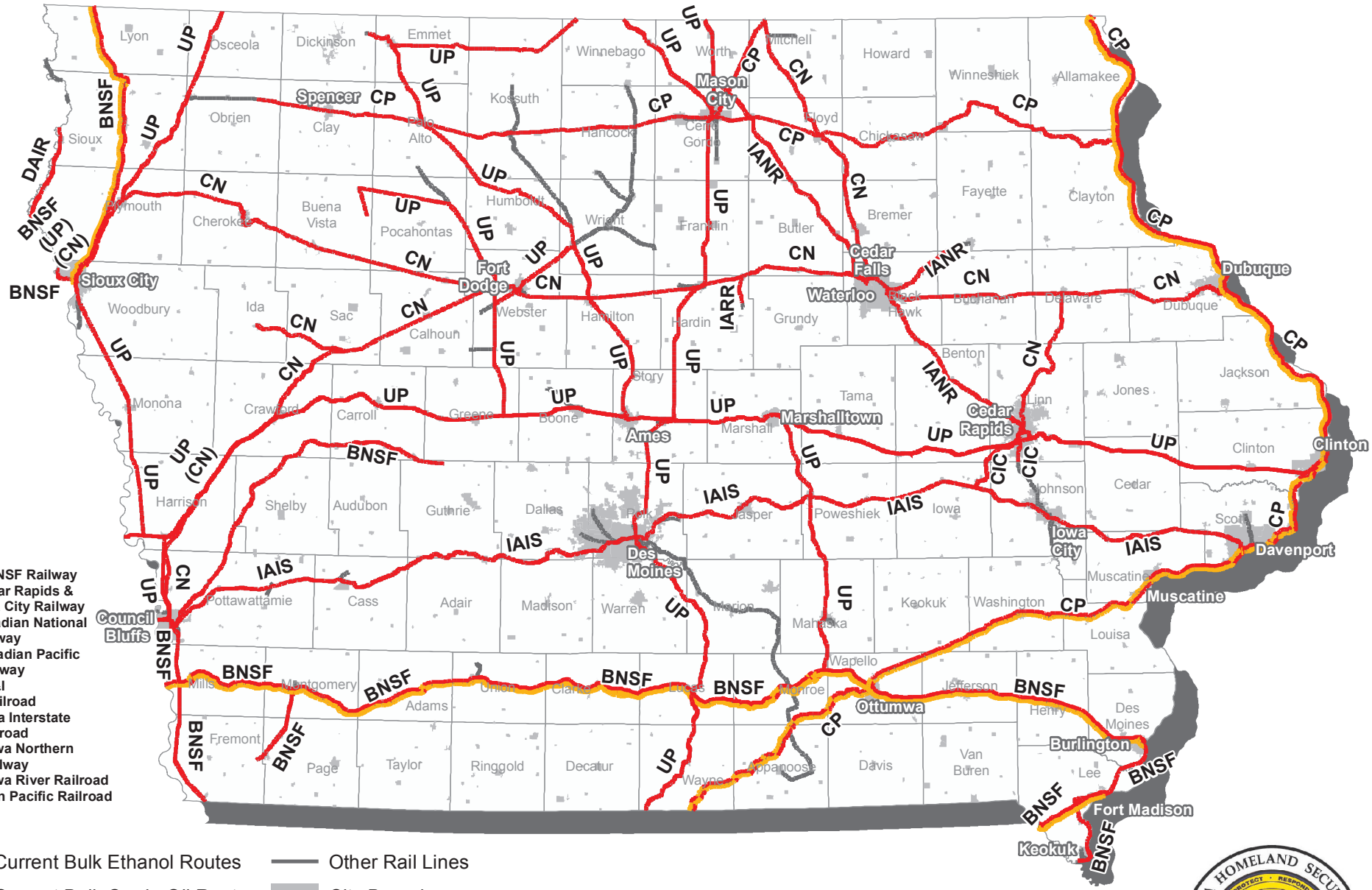
Q36: Where is the closest trauma service hospital to your jurisdiction? Do they have a burn unit?

Sioux Falls SD

Q37: With regard to crude oil/ethanol by rail transportation incidents, what concerns you the most?	*Respondent skipped this question*

9.0 Appendix I - Maps

IOWA ETHANOL AND CRUDE OIL RAIL ROUTES



KEY

BNSF - BNSF Railway
CIC - Cedar Rapids & Iowa City Railway
CN - Canadian National Railway
CP - Canadian Pacific Railway
DAIR - D&I Railroad
IAIS - Iowa Interstate Railroad
IANR - Iowa Northern Railway
IARR - Iowa River Railroad
UP - Union Pacific Railroad

LEGEND

- Current Bulk Ethanol Routes
- Current Bulk Crude Oil Routes
- Other Rail Lines
- City Boundary
- County Boundary

0 Miles 40

IOWA HOMELAND SECURITY AND EMERGENCY MANAGEMENT

IOWADOT

HDR

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IOWA

Biodiesel Ethanol Map

Prepared by

IOWADOT

Phone (515) 239 - 1664

In Cooperation with
United States
Department of Transportation
July 1, 2015

Miles 0 10 20 30 40 50

Kilometers 0 10 20 30 40 50

N W E S

Iowa Plants for Biodiesel and Ethanol

- Under Construction
- In Operation
- 30 Annual Capacity in Millions of Gallons 65

Iowa Road Network

- Interstates
- Designated Routes
- Pending Routes

Railroad Operators

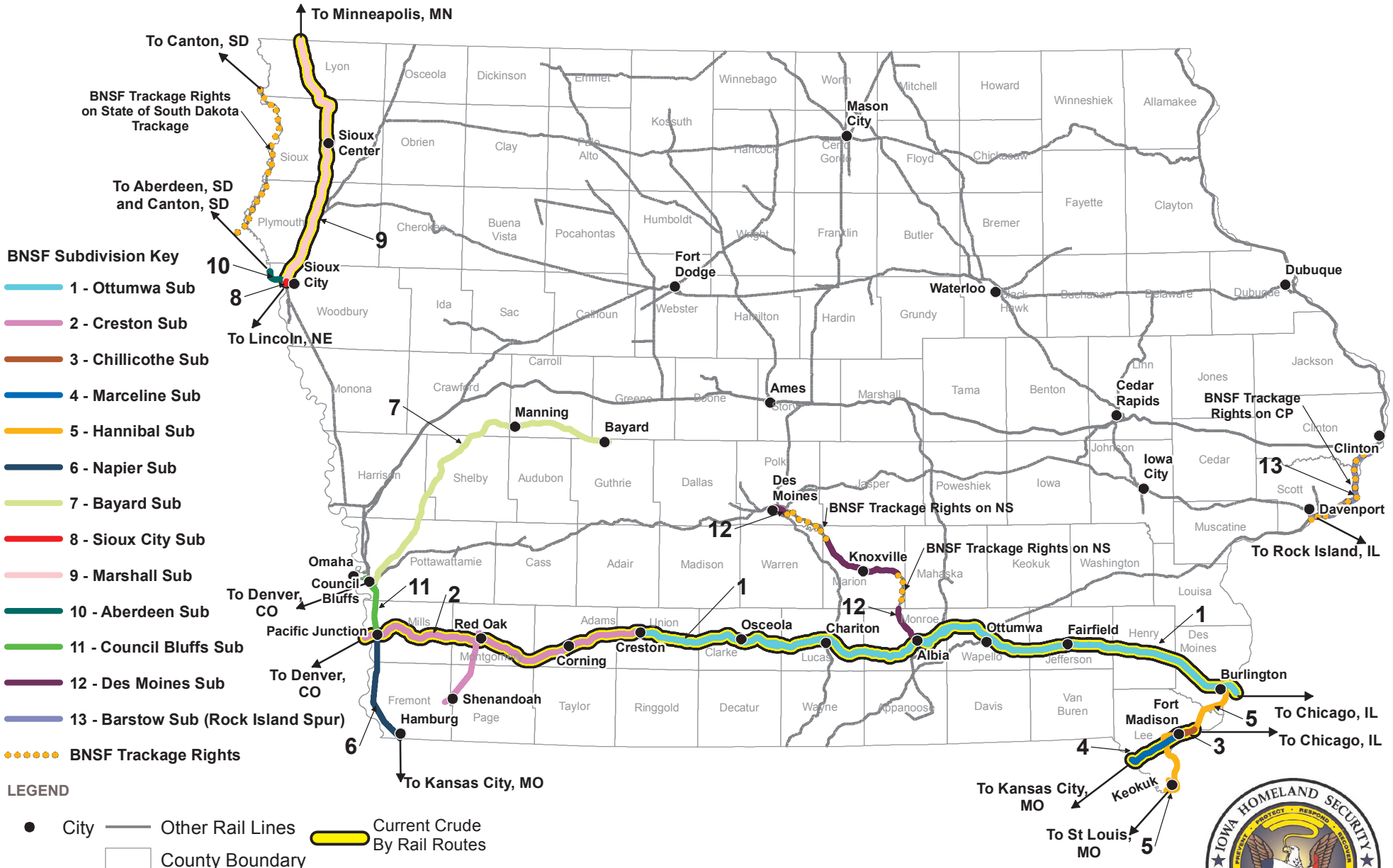
Amtrak	AMTK
Appanoose County Community R.R. Co.	APNC
Boone Scenic Valley R.R.	BSV
Burlington Junction Ry. Co.	BJRY
BNSF Railway Co.	BNSF
Cedar Rapids and Iowa City Ry. Co.	CIC
Cedar River Railroad Co.	CEDR
Chicago, Central & Pacific Railroad	CC
D & I Railroad Co.	DAIR
Dakota, Minnesota and Eastern R.R. Co.	DME
Iowa Interstate R.R. Ltd.	IAIS
Iowa Northern Ry. Co.	IANR
Iowa River Railroad Co.	IARR
Iowa Traction R.R. Co.	IATR
Keokuk Junction Ry.	KJRY
Norfolk and Southern Railway Co.	NS
Soo Line	SOO
Union Pacific Railroad	UP
Private Track – Cargill Alliance	CGAQ

Railroad Owners Non-Operators

Canadian National Railway Co.	CN
Canadian Pacific Railroad	CP
CBEC Railway Co.	CBRX
D & W Railroad Inc.	DWRV
North Central Iowa Rail Corridor	NCIRC
Pioneer Rail Corp.	PNRC
Progressive Rail	PGR
State of South Dakota	SD
Trackage Rights Only	( )
Primary Operator	(<>)

8-24-2015

BNSF NETWORK SUBDIVISIONS CURRENTLY CARRYING BULK CRUDE OIL IN IOWA



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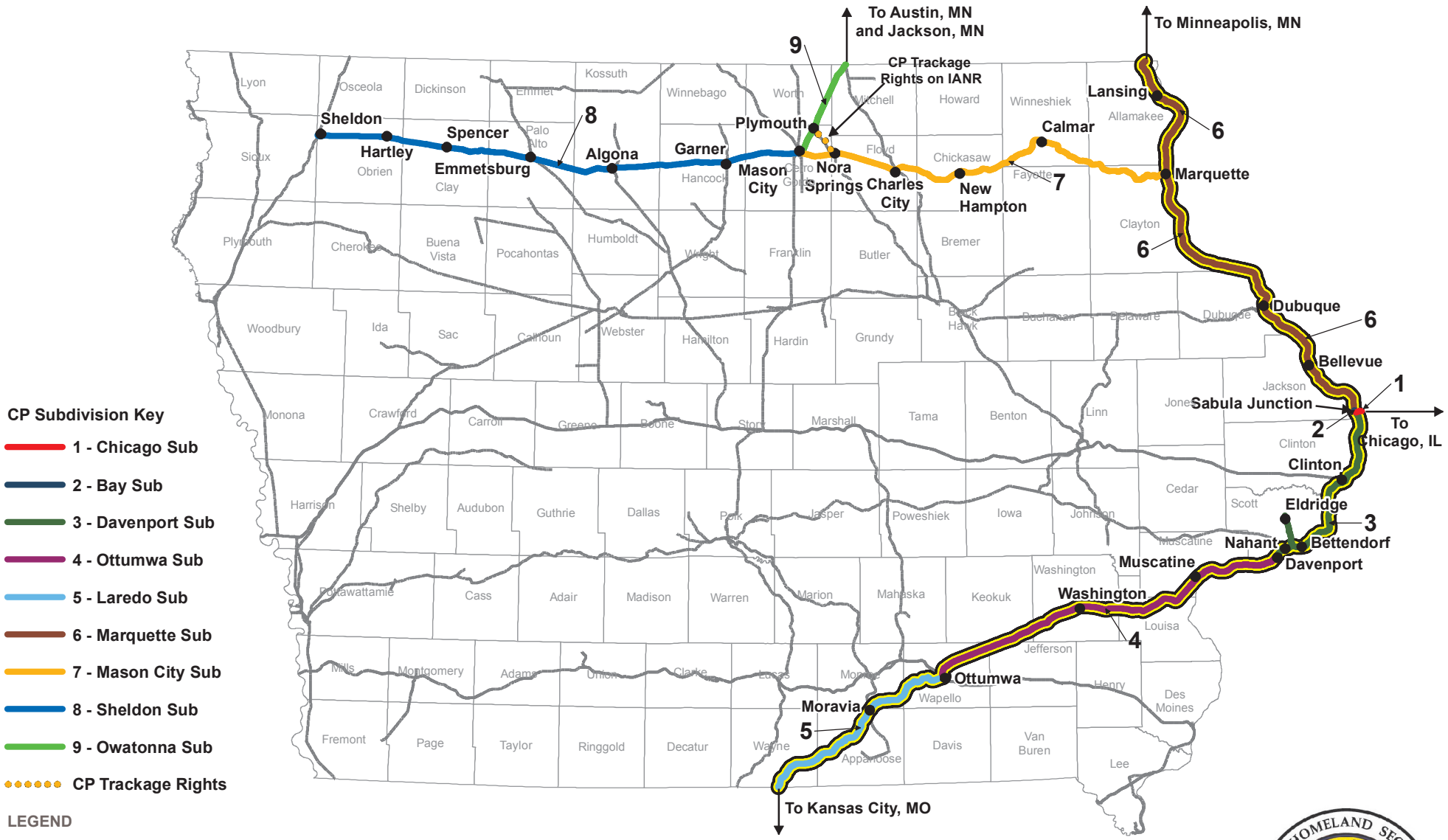
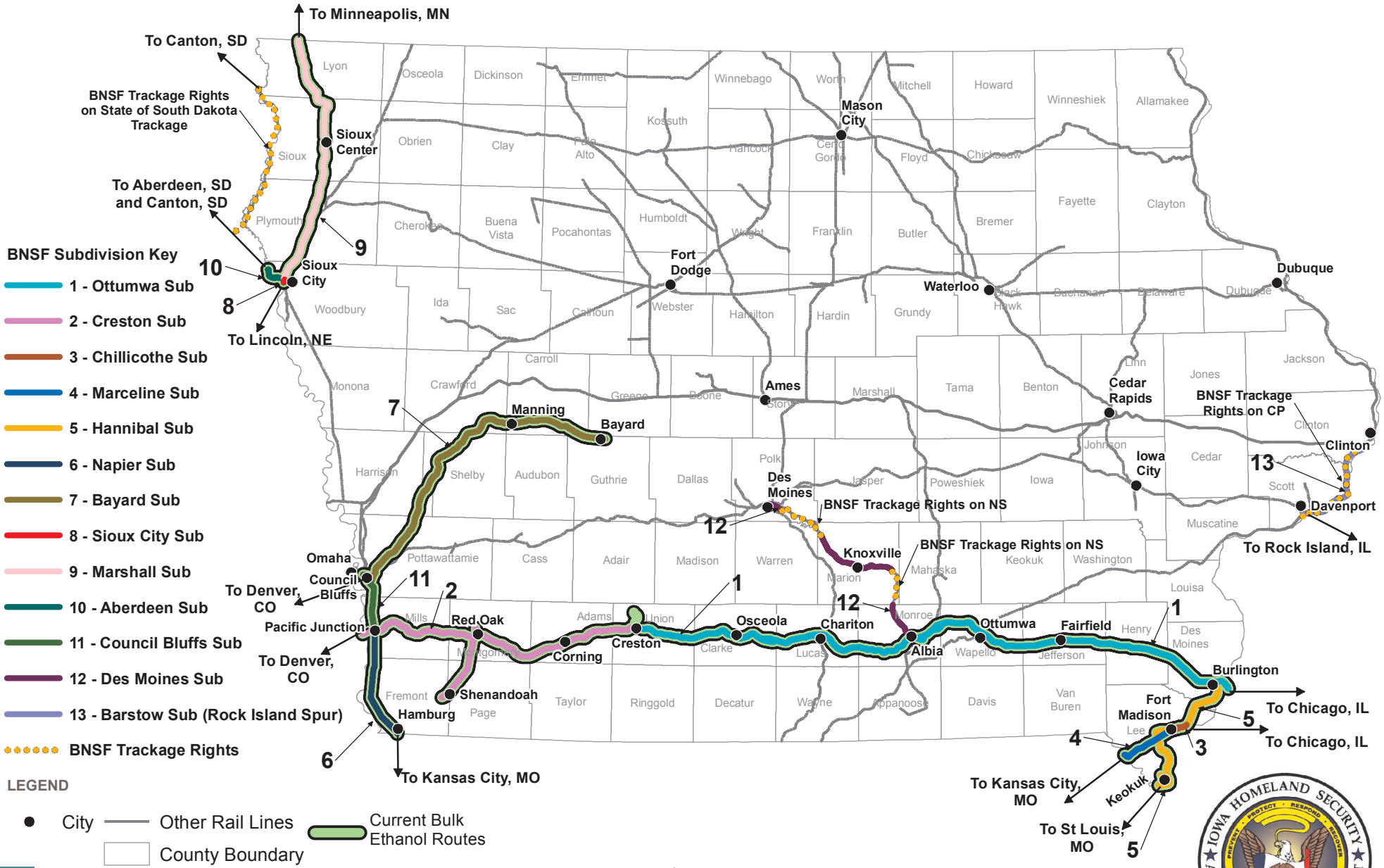
CANADIAN PACIFIC NETWORK SUBDIVISIONS CURRENTLY CARRYING BULK CRUDE OIL IN IOWA



BNSF NETWORK SUBDIVISIONS CURRENTLY CARRYING BULK ETHANOL IN IOWA



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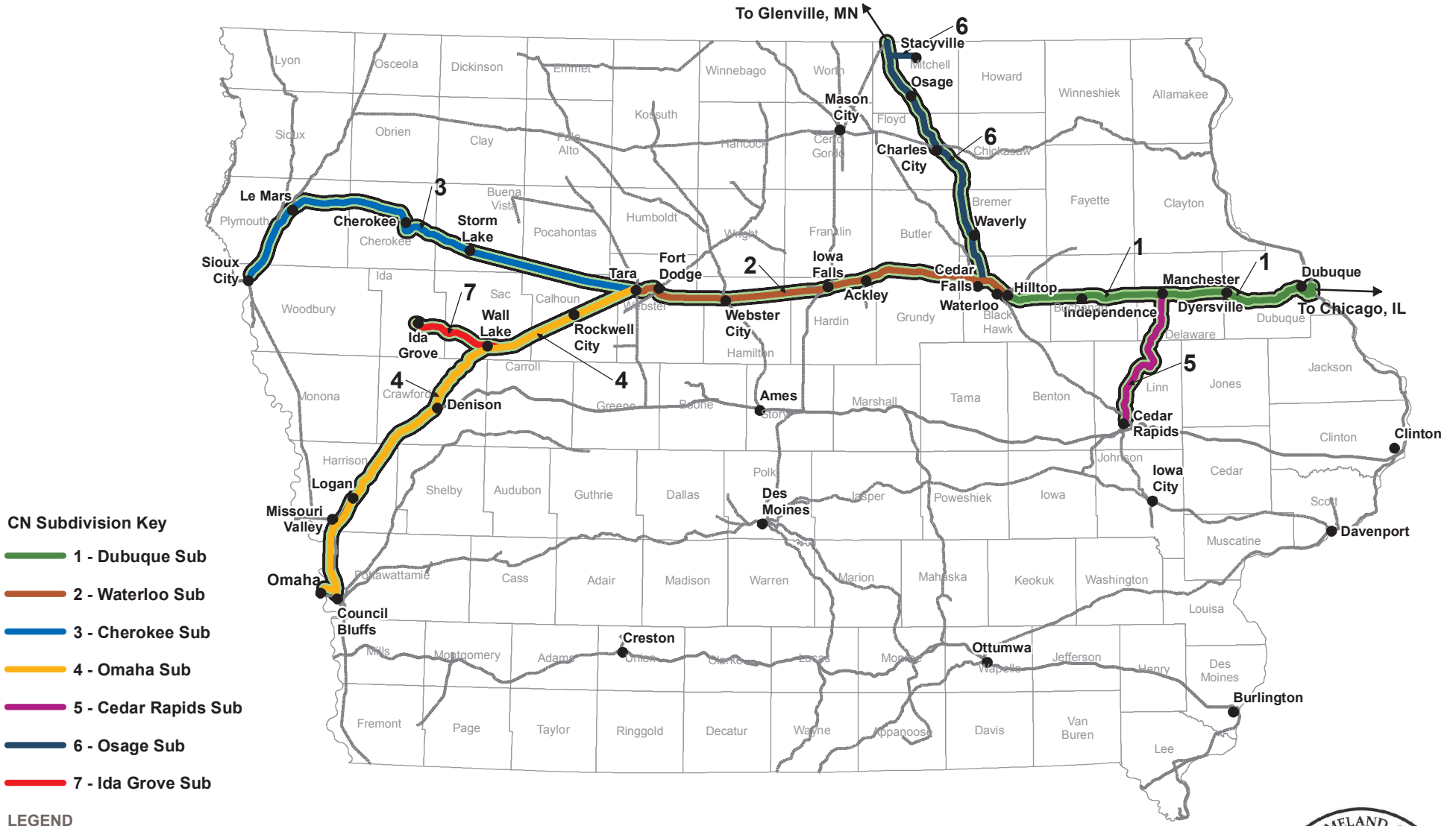
CANADIAN NATIONAL NETWORK SUBDIVISIONS CURRENTLY CARRYING BULK ETHANOL IN IOWA



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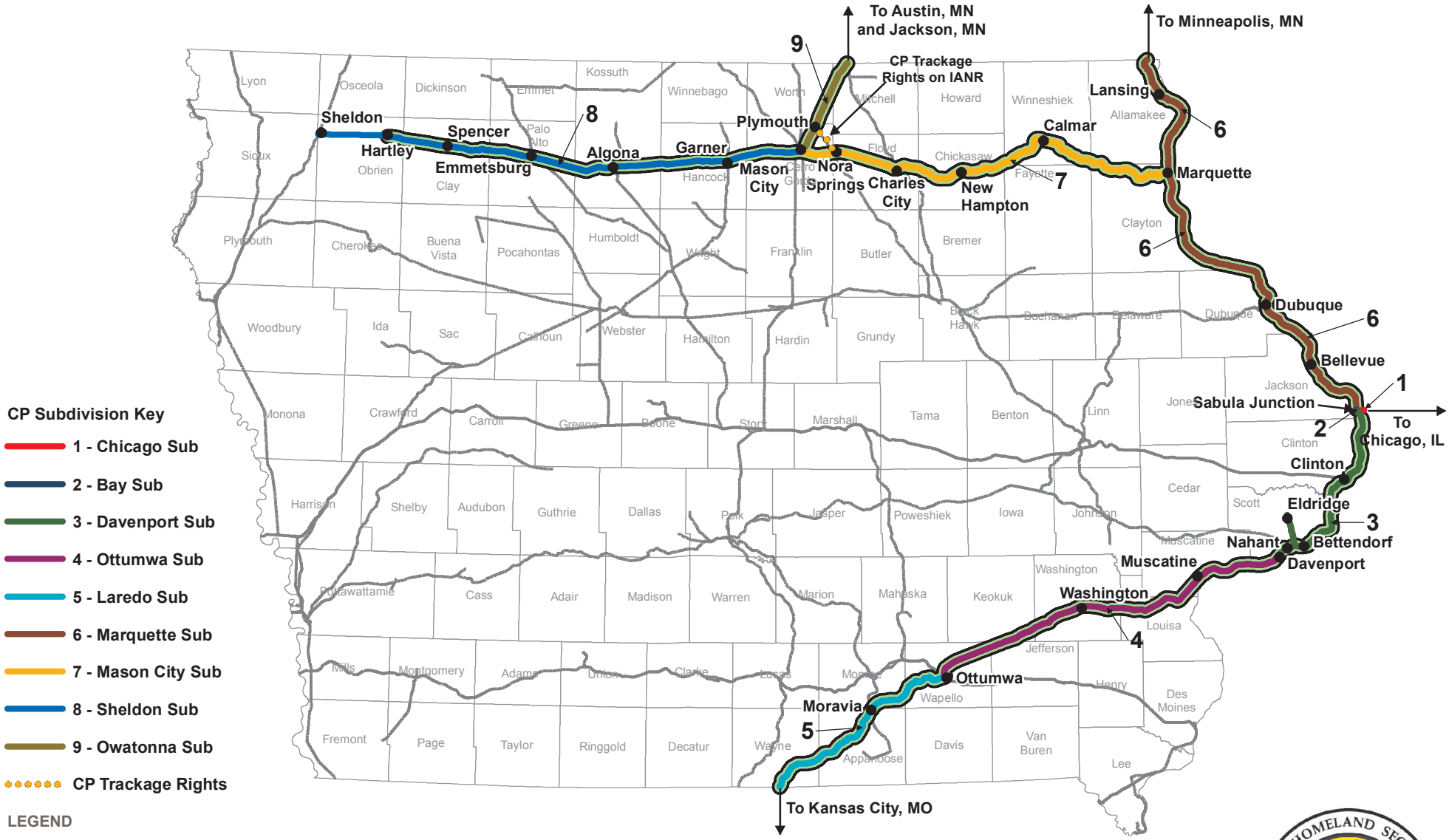
CANADIAN PACIFIC NETWORK SUBDIVISIONS CURRENTLY CARRYING BULK ETHANOL IN IOWA



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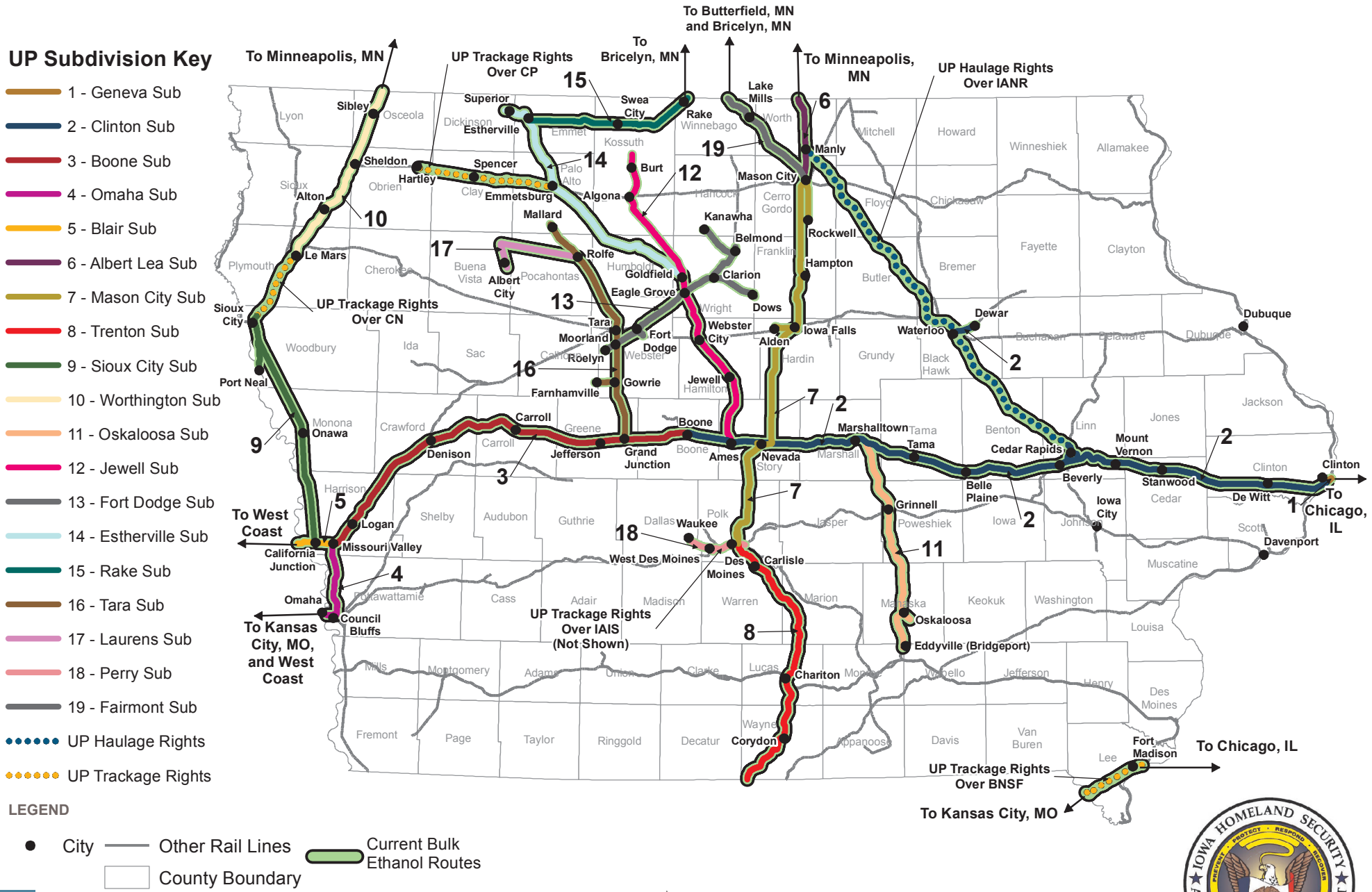
UNION PACIFIC NETWORK SUBDIVISIONS CURRENTLY CARRYING BULK ETHANOL IN IOWA



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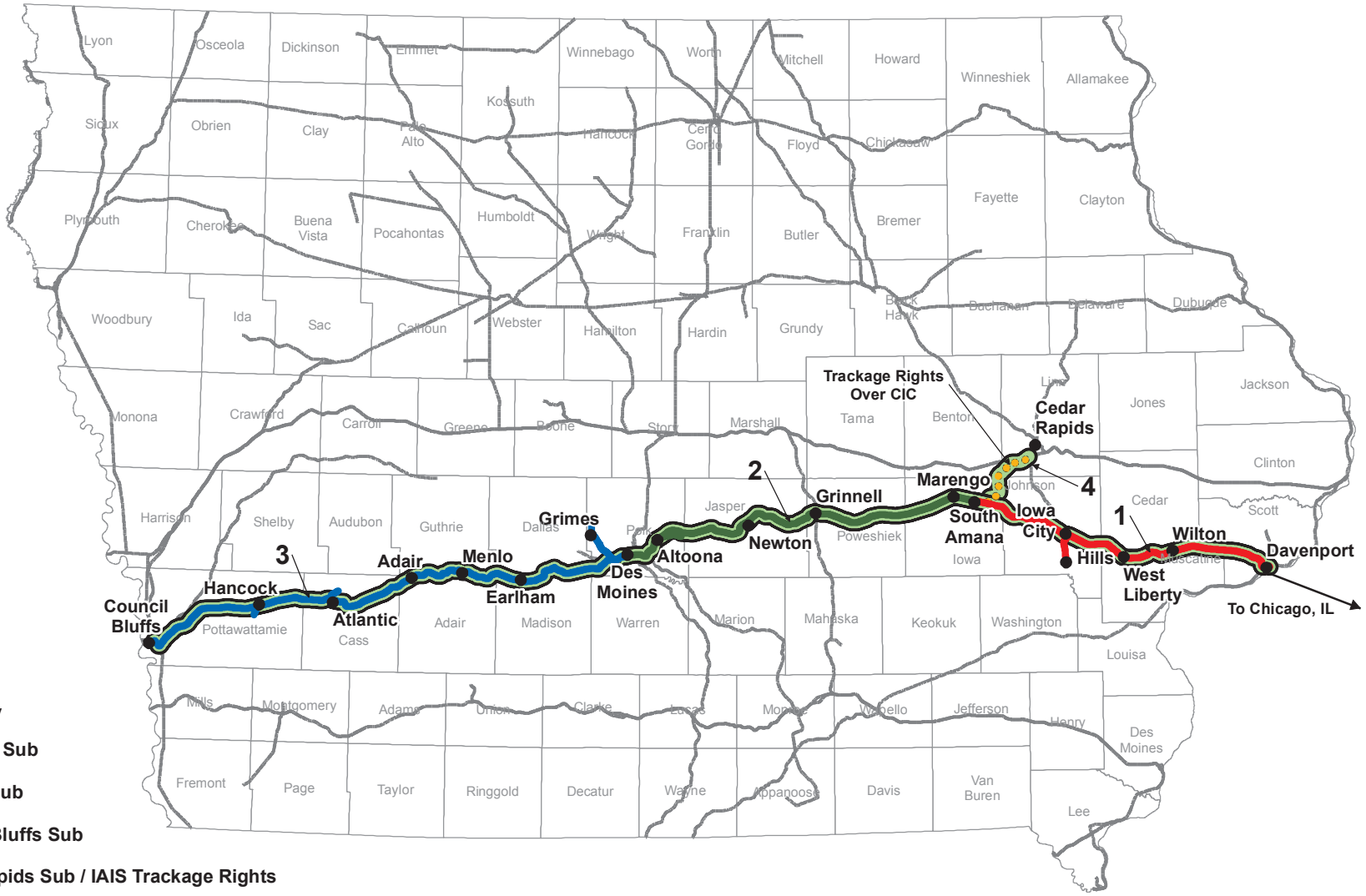
IOWA INTERSTATE NETWORK SUBDIVISIONS CURRENTLY CARRYING BULK ETHANOL IN IOWA



IAIS Subdivision Key

- 1 - Iowa City Sub
- 2 - Newton Sub
- 3 - Council Bluffs Sub
- 4 - Cedar Rapids Sub / IAIS Trackage Rights

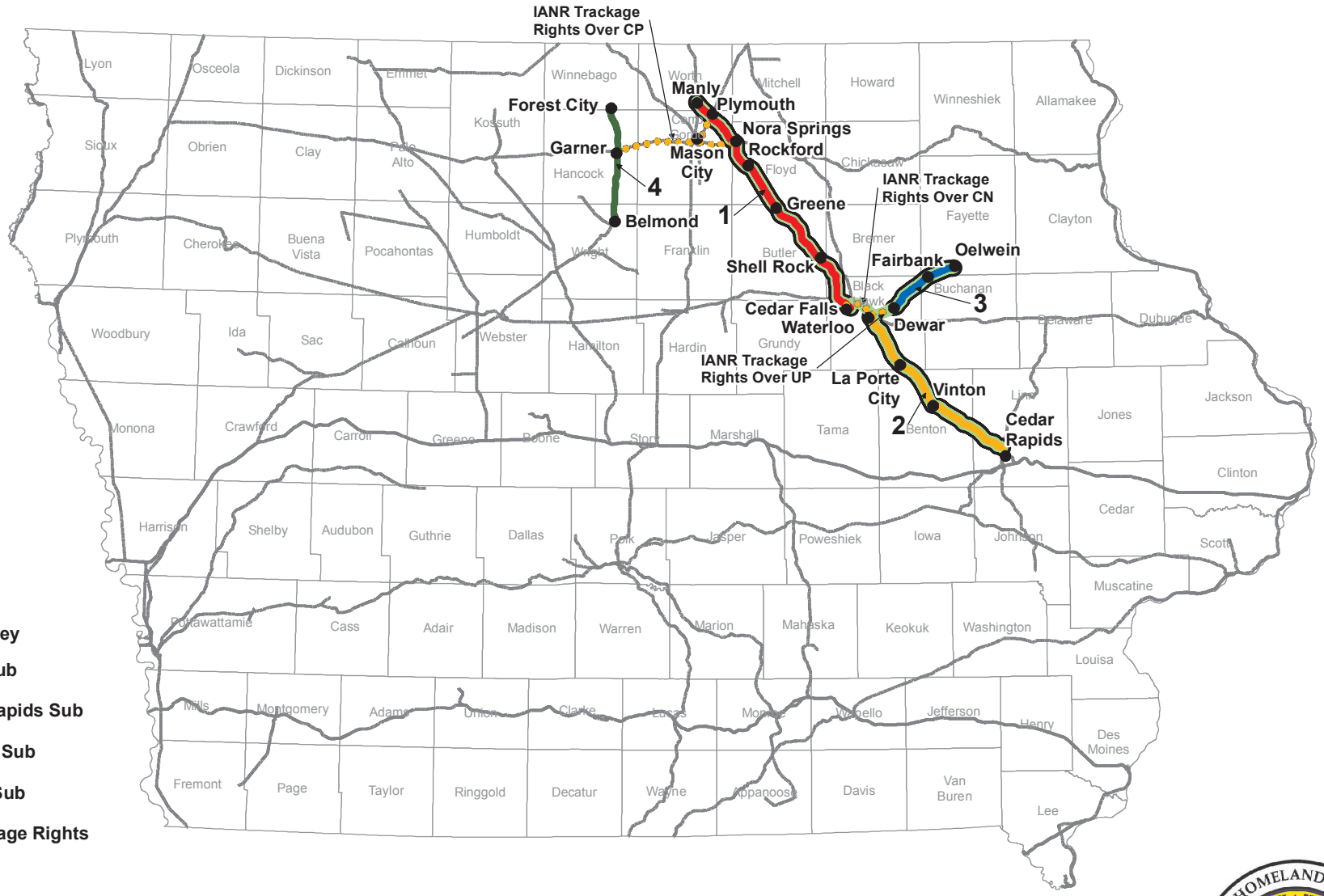
LEGEND

City | Other Rail Lines | Current Bulk Ethanol Routes | County Boundary

0 Miles 40

PATH: Z:\PROJECTS\IDOT\2566691_IOWARAILNETWORKMAPPING\MAP_DOCS\FINAL\FIG_8X11_IAIS_NETWORK_EBR.MXD - USER: TTALBITZ - DATE: 1/28/2016

IOWA NORTHERN NETWORK SUBDIVISIONS CURRENTLY CARRYING BULK ETHANOL IN IOWA



IANR Subdivision Key

- 1 - Manly Sub
- 2 - Cedar Rapids Sub
- 3 - Oelwein Sub
- 4 - Garner Sub
- IANR Trackage Rights

LEGEND

- City
- Other Rail Lines
- Current Bulk Ethanol Routes
- County Boundary

0 Miles 40

IOWA DOT

IOWA HOMELAND SECURITY AND EMERGENCY MANAGEMENT

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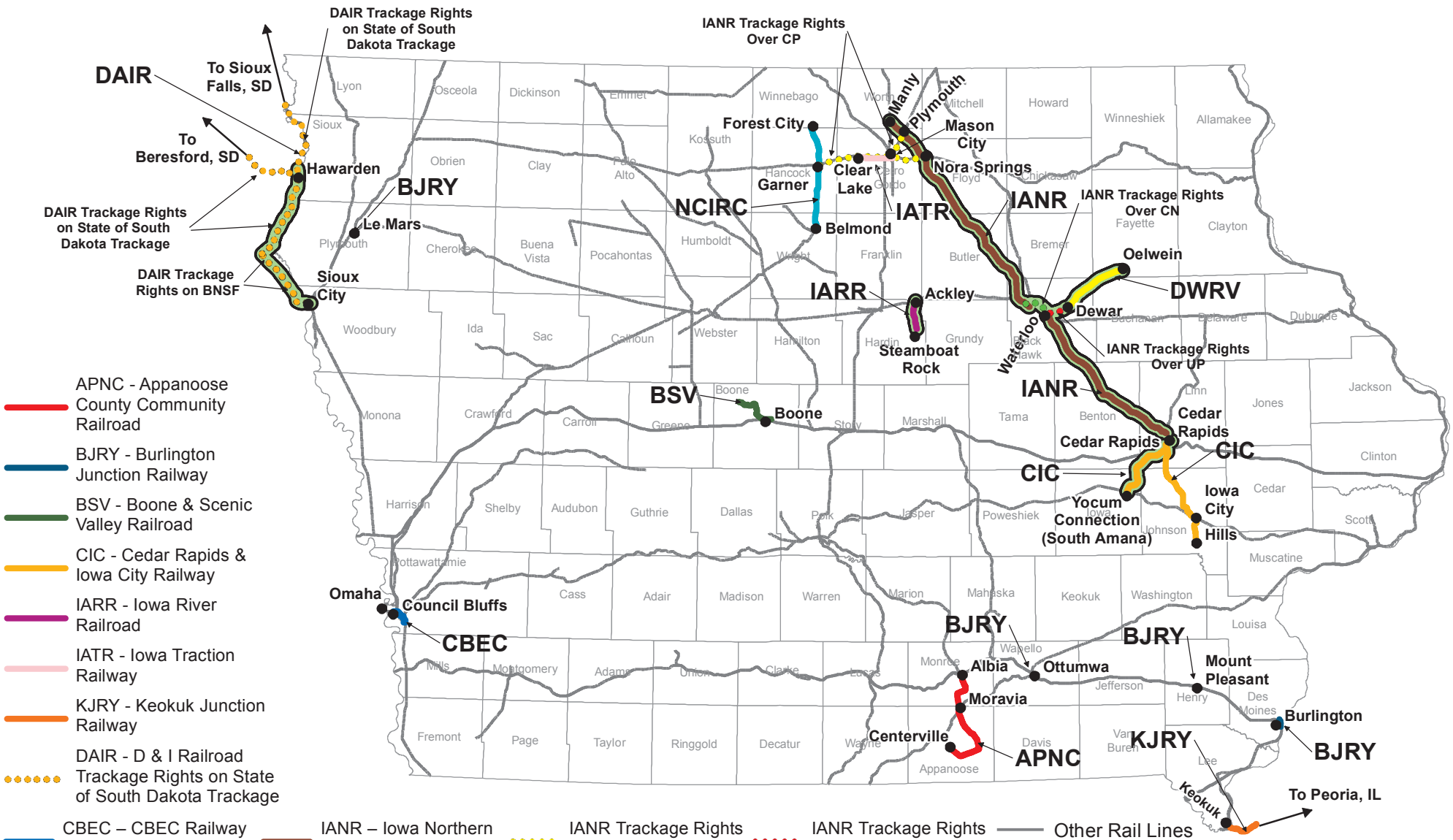
IOWA SRP: CLASS III RAILROADS AND NON-OPERATING RAILROAD OWNERS



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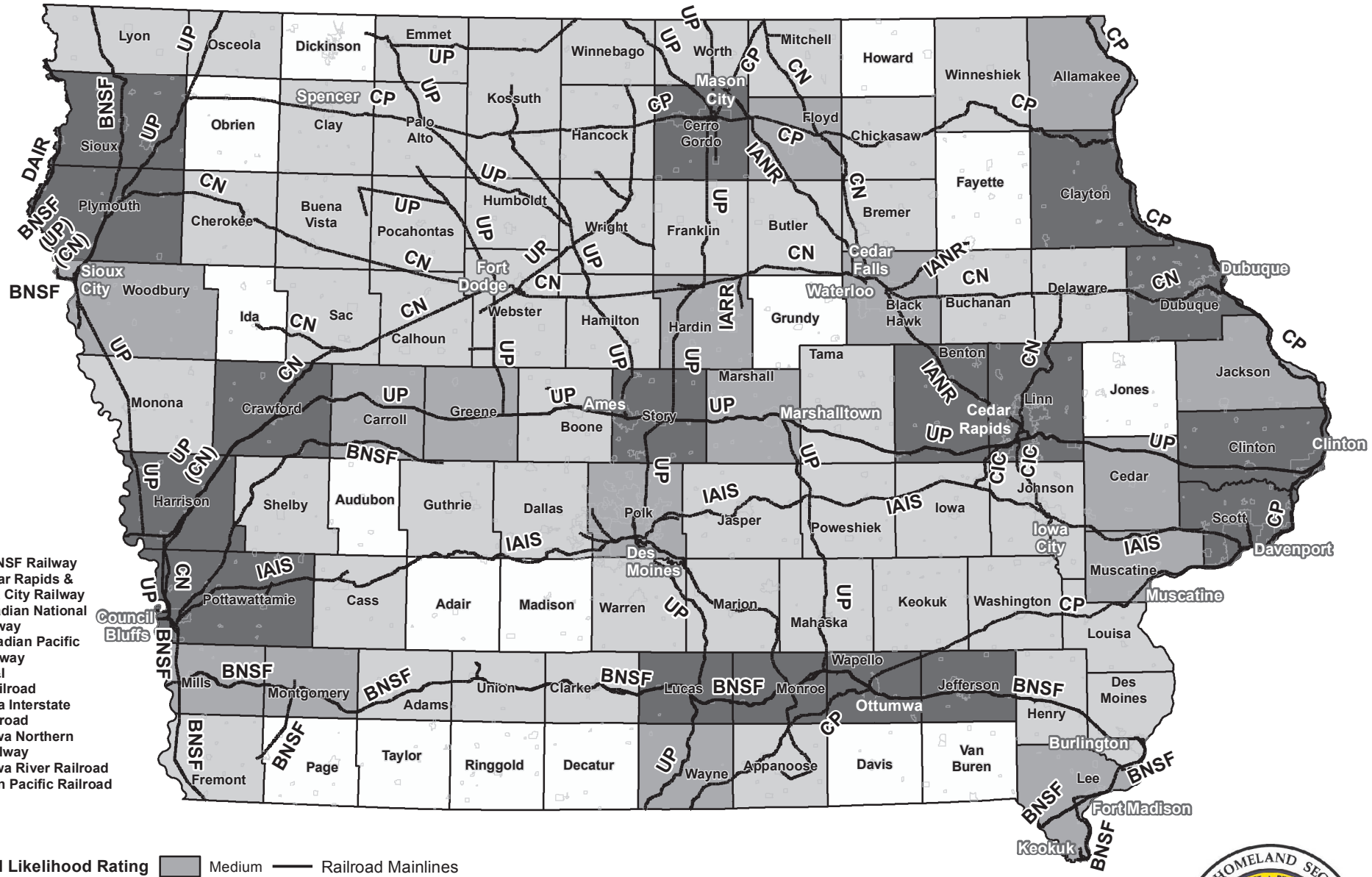
RAILROAD LIKELIHOOD RATING



KEY

BNSF - BNSF Railway
CIC - Cedar Rapids & Iowa City Railway
CN - Canadian National Railway
CP - Canadian Pacific Railway
DAIR - D&I Railroad
IAIS - Iowa Interstate Railroad
IANR - Iowa Northern Railway
IARR - Iowa River Railroad
UP - Union Pacific Railroad

LEGEND

Railroad Likelihood Rating

- None
- Low
- Medium
- High
- Railroad Mainlines
- City Boundary
- County Boundary

0 Miles 40

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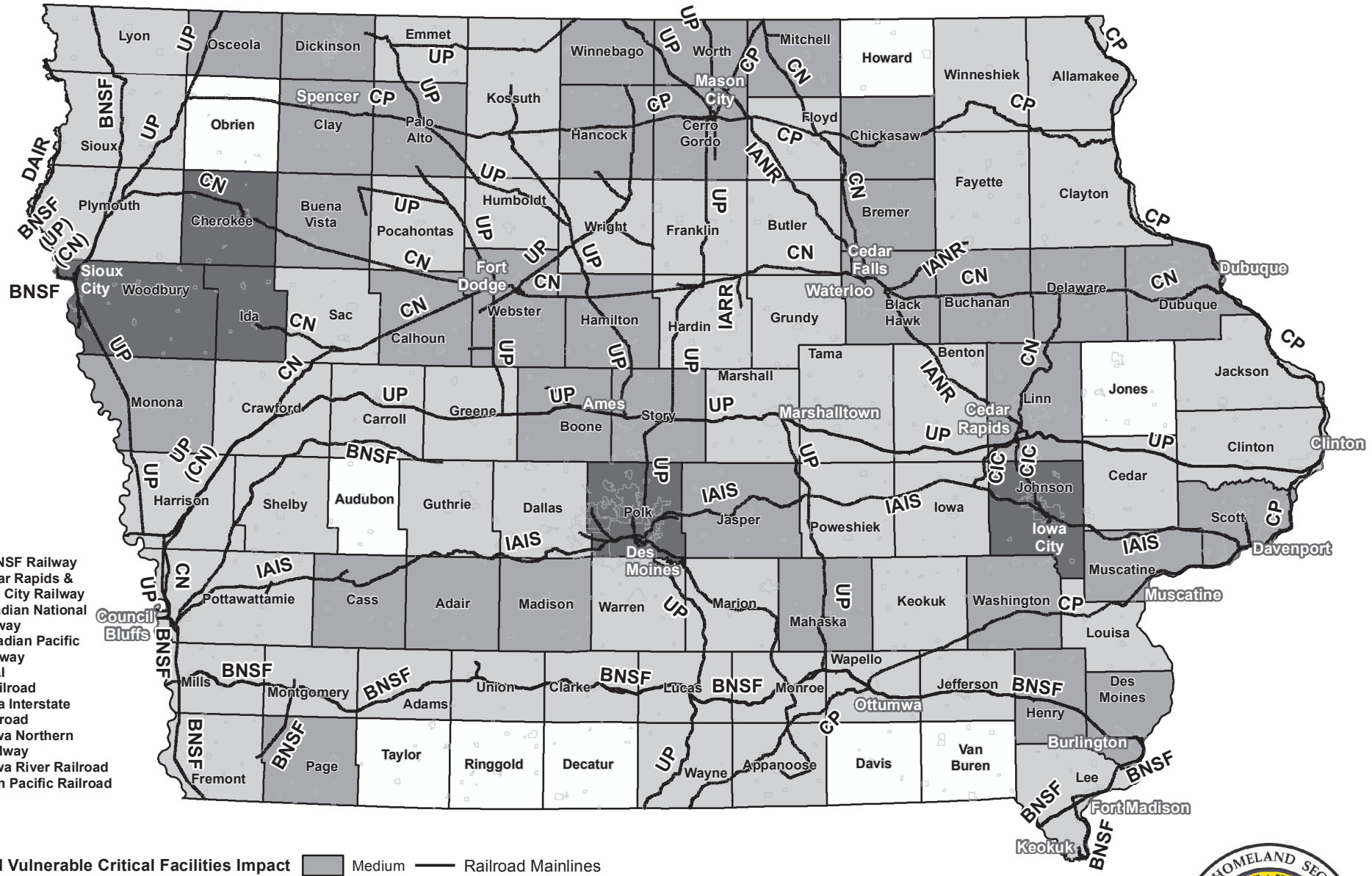
RAILROAD VULNERABLE CRITICAL FACILITIES IMPACT



KEY

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- CP - Canadian Pacific Railway
- DAIR - D&I Railroad
- IAIS - Iowa Interstate Railroad
- IANR - Iowa Northern Railway
- IARR - Iowa River Railroad
- UP - Union Pacific Railroad

LEGEND

Railroad Vulnerable Critical Facilities Impact

- None
- Low
- Medium
- High

- Railroad Mainlines
- City Boundary
- County Boundary

0 Miles 40

IOWADOT

IOWA HOMELAND SECURITY AND EMERGENCY MANAGEMENT

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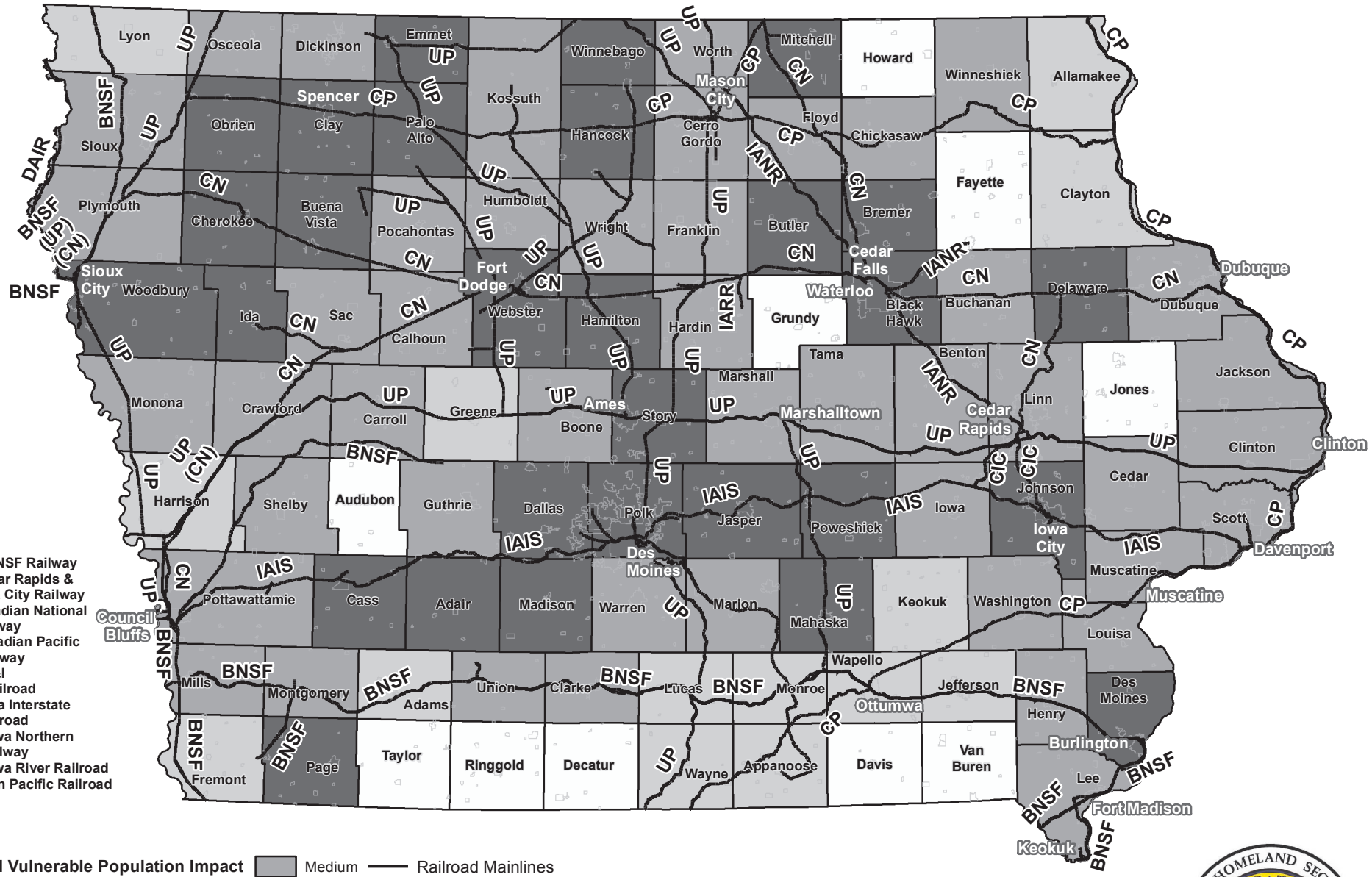
RAILROAD VULNERABLE POPULATION IMPACT



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IANR - Iowa Northern Railway
IARR - Iowa River Railroad
UP - Union Pacific Railroad

LEGEND

Railroad Vulnerable Population Impact

- None
- Low
- Medium
- High
- Railroad Mainlines
- City Boundary
- County Boundary

0 Miles 40

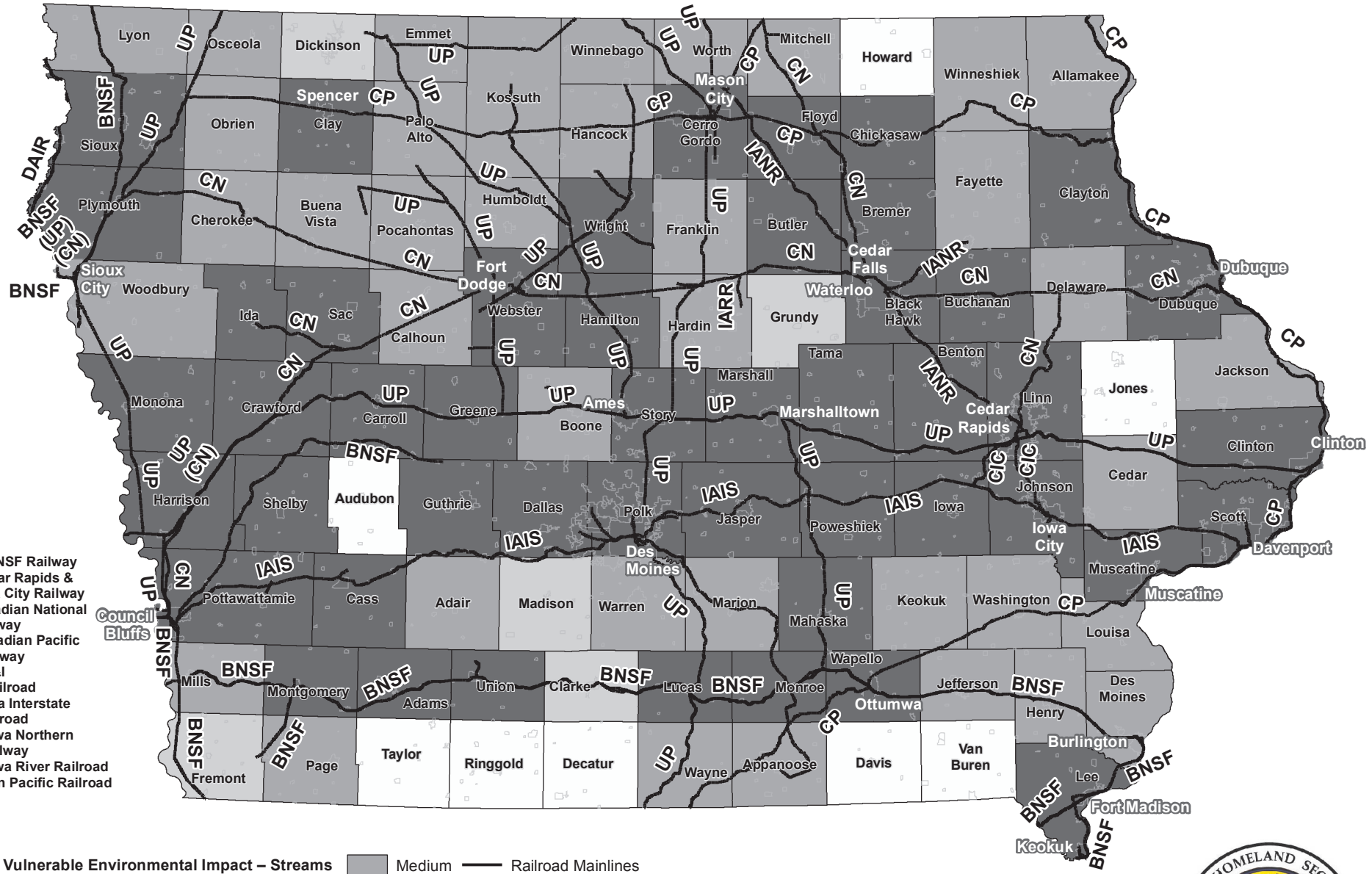
HDR

IOWA DOT

IOWA HOMELAND SECURITY AND EMERGENCY MANAGEMENT

PATH: Z:\PROJECTS\IDOT\263221_IADOT_CRUDE_BIOFUEL_TRANS_STUDY\MAP_DOCS\FINAL\FIG_8X11_VULNERABLE_POPULATION_IMPACT.MXD - USER: TTALBITZ - DATE: 3/25/2016

RAILROAD VULNERABLE ENVIRONMENTAL IMPACT – STREAMS



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IANR - Iowa Northern Railway
IARR - Iowa River Railroad
UP - Union Pacific Railroad

LEGEND

Railroad Vulnerable Environmental Impact – Streams

- None
- Low
- Medium
- High
- Railroad Mainlines
- City Boundary
- County Boundary

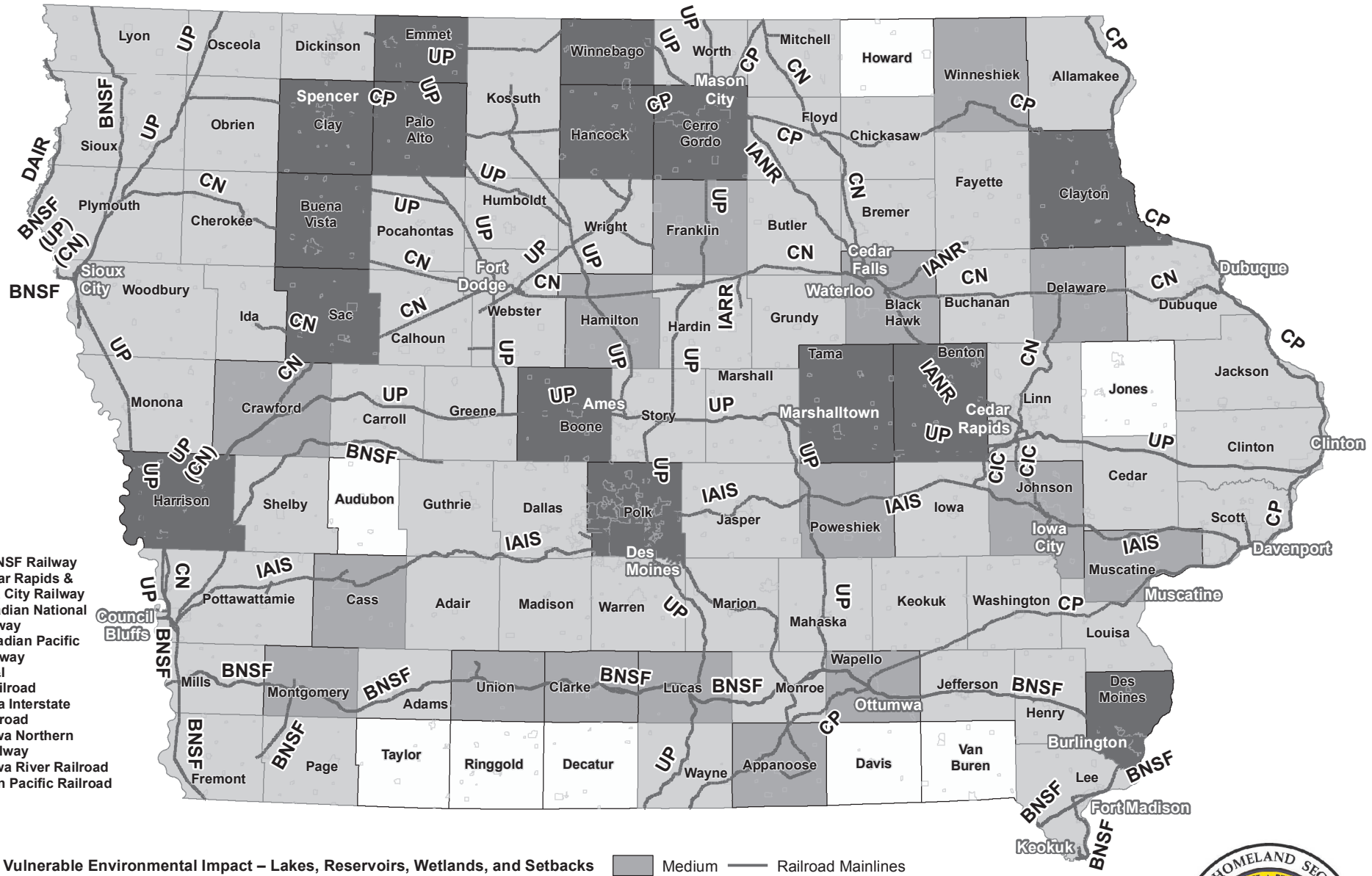
0 Miles 40

IOWADOT

IOWA HOMELAND SECURITY AND EMERGENCY MANAGEMENT

PATH: Z:\PROJECTS\IDOT\263221_IADOT_CRUDE_BIOFUEL_TRANS_STUDY\MAP_DOCS\FINAL\FIG_8X11_STREAMS_IMPACTS.MXD - USER: TTALBITZ - DATE: 3/25/2016

RAILROAD VULNERABLE ENVIRONMENTAL IMPACT – LAKES, RESERVOIRS, WETLANDS, AND SETBACKS



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CN - Canadian National Railway
CP - Canadian Pacific Railway
DAIR - D&I Railroad
IAIS - Iowa Interstate Railroad
IANR - Iowa Northern Railway
IARR - Iowa River Railroad
UP - Union Pacific Railroad

LEGEND

Railroad Vulnerable Environmental Impact – Lakes, Reservoirs, Wetlands, and Setbacks

- None
- Low
- Medium
- High
- Railroad Mainlines
- City Boundary
- County Boundary

0 Miles 40

IOWA HOMELAND SECURITY AND EMERGENCY MANAGEMENT

IOWADOT

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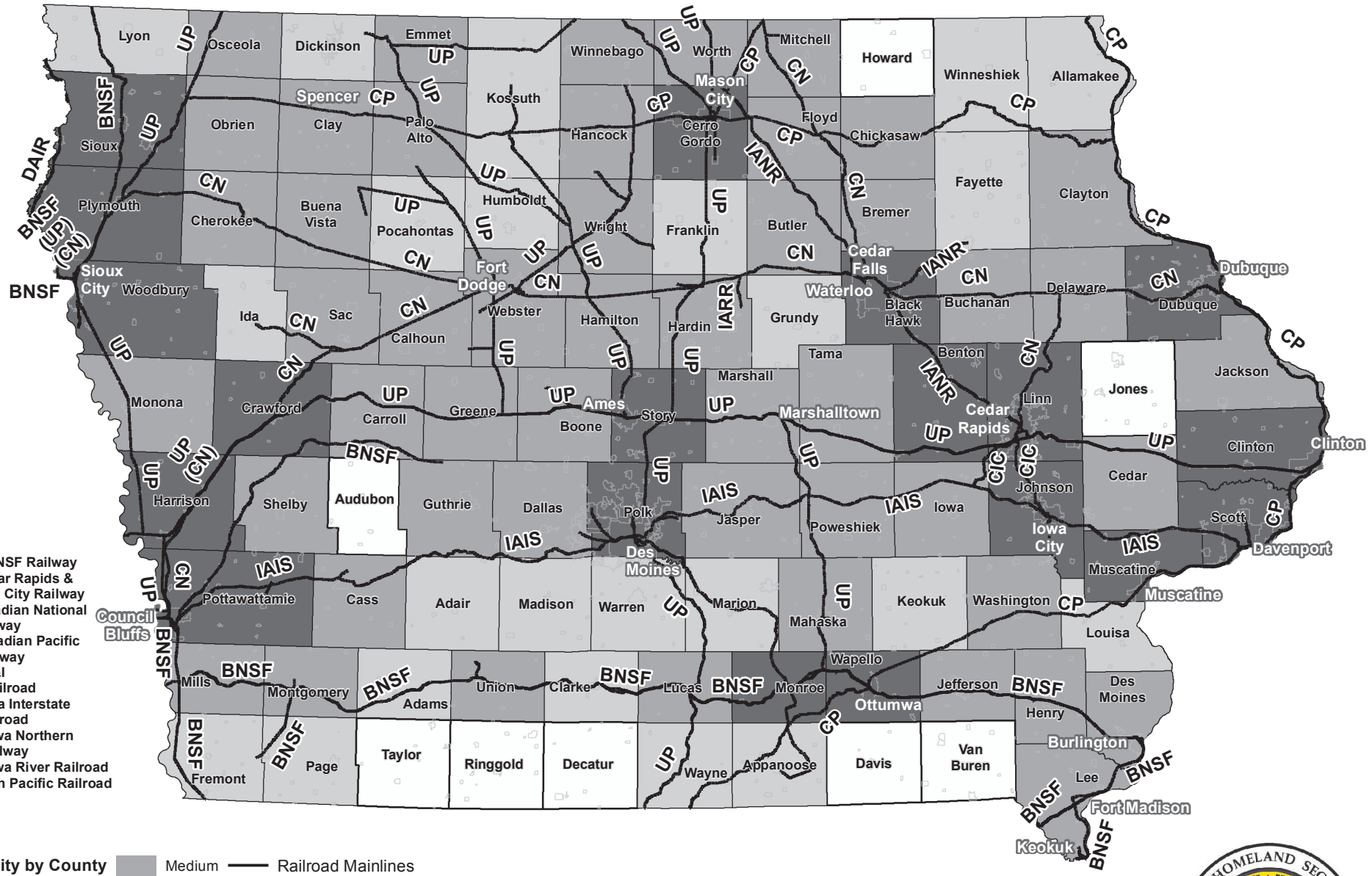
RANKING OF CRUDE OIL AND ETHANOL RAIL TRANSPORTATION SENSITIVITY, BY COUNTY (2015)



KEY

- BNSF - BNSF Railway
- CIC - Cedar Rapids & Iowa City Railway
- CN - Canadian National Railway
- CP - Canadian Pacific Railway
- DAIR - D&I Railroad
- IAIS - Iowa Interstate Railroad
- IANR - Iowa Northern Railway
- IARR - Iowa River Railroad
- UP - Union Pacific Railroad

LEGEND

Sensitivity by County

- None
- Low
- Medium
- High

- Railroad Mainlines
- City Boundary
- County Boundary

0 Miles 40

IOWA DOT

IOWA HOMELAND SECURITY AND EMERGENCY MANAGEMENT

PATH: Z:\PROJECTS\IDOT\263221_IADOT_CRUDE_BIOFUEL_TRANS_STUDY\MAP_DOCS\FINAL\FIG_8X11_RAILROAD_RISK.MXD - USER: TTALBITZ - DATE: 3/24/2016