Appendix A

Scope of Work – Commodity Flow Study

The project will construct and publish a comprehensive report on the goods that are moving through the particular area of interest. The study will identify hazardous materials transportation flow patterns in the study area, identify fixed facilities that handle, store, and transport hazardous materials, perform a general assessment of issues regarding hazardous materials transport, and perform an analysis of the data and assess vulnerabilities. Transportation Research Board's Guidebook for Conducting Local Hazardous Materials Commodity Flow Studies is designed to support risk assessment, emergency response preparedness, resource allocation, and analyses of hazardous commodity flows across jurisdictions. This Guidance needs to be followed for all hazardous materials commodity flow survey (HMCFS) projects funded with HMEP grant program funds. To view this guidance or to order it, please refer to the link http://www.trb.org/Publications/Blurbs/165775.aspx. The following components should be included in the study:

General Summary

Provide a brief overview of:

- Background of the study (hazardous materials transportation overview, objective, project concept, data requirements).
- Regulations and statutes (compliance with requirements of Emergency Planning and Community Right to Know Act (EPCRA), local statutes) Utilization of information (purpose, how the product will be utilized).

Study Area Profile

Describe county profile briefly based on the following information:

- Geographic.
- Demographic.
- Climate and Weather.
- Transportation.
- Infrastructure.
- Emergency Response Organizations.
- Critical Facilities.

Data Collection

- Flow of Hazardous Materials through the Roads and Highways
  - **Existing Data Overview:**
    - Identify the routes used for hazardous materials transportation using locally or institutionally available data (transportation of hazardous materials in the study area by modes and routes).
    - Acquire information on incident and accident information for the study area; previous HMCFS), local, state and federal data on hazardous materials transportation, information maintained by local hazardous materials facilities and carriers, trade, environmental, and social advocacy organizations, and printed maps, etc.).
    - Electronic databases and reports (databases and reports that have information about transportation networks, commodity movements, system performance (traffic) levels, historical incident and accident occurrences and locations).
    - Identify facilities in the jurisdiction that receives, produces and transports hazardous materials, identify the transportation routes and the chemicals transported.
    - Evaluate existing data such as flow of commodities, hazardous materials, hazard class, traffic corridors, hazard traffic origin/destination, hazardous materials transported, etc. through the jurisdiction.
    - Analyze existing data and evaluate new data needs.

- **New Data Collection:**
  - Interview shippers, receivers, and carriers to determine type and quantity of hazardous materials by time, mode, and route, origin/destination, if possible.
  - Interview local emergency responders, emergency managers, etc. to determine priority survey locations, transportation corridors, volume, frequency and time of shipments, and content of hazardous materials transport, etc.
  - Develop strategies for field data collection in collaboration with LEPCs/emergency managers/local subject matter experts.
    - ✓ Develop a Survey Plan:
      - ❖ Survey locations – maps and target survey sites, determine how the data collection sites will be chosen based on consultation with locals.
      - ❖ Dates, times, and duration of surveys.
      - ❖ Develop project data collection methods, count intervals, and describe precision, efficiency, and accuracy.
      - ❖ Data collection of main targets (see the data analysis section for additional information):
        - Overall truck traffic passing through the study area.
        - Local movement of hazardous materials by container type and configuration;
        - Local movements by hazard class and division and UN NA number.
        - Total movement and peak transportation times of the day.
        - Total movement and peak transportation by day of the week.
        - Placard count per site and per traffic direction – east/west/north/south or turning movements at intersections.
        - Routes and/or locations with highest placard counts.
        - Shipment sizes and packing methods, specific materials, and shipment origin and destination; and
        - Identification of top ranked thirty chemicals transported through local roads and highways.

    - ✓ Data Collection Strategy:
      - ❖ Use appropriate statistical methods to determine sample size per segment of a road
        - The confidence level for sample size must be equal to or great than 90%; and
        - The margin of error (confidence interval) for sample size less than 5%
      - ❖ Count Intervals – things to be considered:
        - Starting count intervals on the 30-minute or hour can ease data analysis for differences in traffic patterns by time of day;
        - Using count intervals in even fractions of an hour simplifies the extrapolation of counting segments into 1-hour periods; 1-hour counts are preferred and 30-minute is a secondary option;
        - Conducting at least 1-hour or 30-minute counts reduces the effects of traffic variation while providing sufficient timeframes for recording traffic counts; and
        - Longer count durations are possible, but they should be recorded in separate 30-minute or 1-hour segments.
    - ✓ Determine what resources will be needed for field data collection.
    - ✓ Determine the data elements that will be collected during the survey (type of vehicles, no of vehicles, placard ID, hazard class, etc.) – develop the survey form.
    - ✓ Determine:
      - ❖ Number of data collection sites per county, per road, or per highway segment.
      - ❖ Sample size based on statistical requirements and availability of resources.
      - ❖ Number of observations to be collected at a collection site during a 24 hour period to determine the peak traffic.
      - ❖ Number of observations to be collected at a collection site during the peak hours to determine flow of hazardous materials/commodities (collect at least six 1-hour samples per

day per location for each traffic direction. Use appropriate intervals to spread the data collection throughout the day.

- ❖ Number of days will be spent on data collection per location to determine the variation of hazardous materials traffic through the day of the week (collect data for at least 5 days a week).
- ❖ Schedule data collection - times of the day, days of the week, times of the year, etc.; and
- ❖ Submit data collection strategy/plan, survey form to KDEM for review and approval before data collection begins.

✓ Collect Field Data:

Determine traffic network by time of the day; collect at least five 1-hour or ten 30-minute samples per day per location for each traffic direction, during the study period to capture a realistic representation of the traffic flow through the jurisdiction. Conduct:

- ❖ Commercial vehicle survey.
- ❖ Total truck survey.
- ❖ Truck type and configuration:
  - Type: tank, van/box, step bed/flat bed, service/utility, refrigerated, other cargo bodies, etc.
  - Configuration – straight trucks, tractor trailer, tractor with multiple trailers, etc.
- ❖ UN/NA (United Nations/North American Identification) placard ID purvey.
- ❖ Combined commercial vehicle and UN/NA placard ID survey:
  - Total truck and UN/NA placard ID surveys.
  - Truck type and configuration and UN/NA placard ID survey.
- ❖ Conduct directional (E-W-N-S) and intersection surveys.

o Data Validation

Validate collected field data to ensure that the collected field data meet the data requirements of the HMCFS objectives. Check if precision of collected data match data requirements and what other information might help meet the HMCFS objective data requirements. Verify:

- ❖ If the collected data are appropriately documented.
- ❖ If there are data outliers or questionable values.
- ❖ Were the data collected at similar locations consistent; and
- ❖ If the information consistent across different sources (existing and new data from interviews, databases, surveys, etc.).
- ❖ Assess the need for new data collection and data refinement and address any issues.

- **Flow of Hazardous Materials through the Railroad** - Collect waybill hazardous materials information from railroad carriers (Standard Transportation Commodity Code data (STCC), collect data on release incidents, accidents, fatalities, and derailments.
- **Movement of Hazardous Materials through the Pipelines** - Map pipelines, obtain flow summary of materials transported through pipelines, incident information, etc.
- **Movement of Commodities by Air** - Airports and commodity transported/Storage of fuel in the airport.

Analyze Collected Data:

Determine flow of Hazardous Materials by road, rail, pipeline, air; produce maps, charts and tables, as applicable. Validate collected data and analyze to determine:

- **Roads and Highways**
  - o Overall truck traffic passing through the study area.
  - o Movement of hazardous materials by container type and configuration.

- Local movements by hazard class and division transported.
- Local movements by UN NA number – list.
- Total movement per time segment & hazardous materials shipments as a percentage of total traffic.
- Proportions of truck traffic by type and configuration and the percentages of placarded truck.
- Identification of directional movements for both directions of a roadway or for turning movements at intersections.
- Hazardous materials shipments in both placarded and un-placarded vehicles, shipment sizes and packing methods, specific materials, and shipment origin and destination.
- Placard count per site and predicted routes.
- Placard count per traffic direction – east/west/north/south.
- Peak transportation times and days for identified routes.
- Routes and/or locations with highest placard counts.
- Lists variation of hazardous materials traffic from Placard Survey by day of week.
- Establish major traffic corridors used for hazardous materials transportation.
- Identify top ranked 30 chemicals transported through roads and highways.

- **Rail Road**
  - Analyze data on train derailments and chemical releases, depicts in tables.
  - Analyze data on roadway-rail grade crossings, determine vulnerable locations.
  - Include summary of hazardous incidents involving trains.
  - Estimates peak hour of traffic through the rail traffic corridor, list in tables.
  - List top 30 hazardous chemicals passing through the study area by the railroads in the region

- **Pipeline**
  - Provide relative breakdown of hazardous materials shipped through pipelines by total volume
  - Evaluate past accidents and trends.
  - Identify pipeline corridors and vulnerable areas.
  - Provide a summary of yearly volume of hazardous materials shipped via pipeline.

- **Air**
  - Determine relative breakdown of air cargo hazardous material shipments by total volume.
  - Determine air cargo hazardous materials shipments by county.
  - Assess hazards due to storage of fuel.

Hot Spots:

- Identify hot spots:
  - Identify areas and facilities along major traffic routes that are at a higher level of risk.
  - Geographical areas where a spill or release could create significant risk to the population.

- Evaluate potential impact on critical facilities along the traffic corridor due to a hazardous materials release.
- Evaluate impact of a spill or release on environmentally sensitive areas and bodies of water that are sources of drinking water.
- Evaluate risks at rail grade crossing.

Identify Emerging Risk Sources:

- Identify potential issues arising from community changes that could elevate risk and vulnerability along emergency routes.
- Consider traffic growth exceeding capacity.
- Development of future critical facilities along the traffic corridor Identify growth of population requiring special consideration.
- Likelihood of spill event based on past experience and worst-case scenarios Potential increase in hazardous materials transportation.
- Number of major roadway transport corridors included in the Commodity Flow Survey area increases.

Conclusion and Recommendations:

- Consider variability of local needs and conditions, assumptions and limitations, make recommendation;
- Need for new data in the future, gaps observed.
- Describe of regional emergency response capacity, on and off facility sites, public and private
- Identify community coordinators and facility emergency coordinators responsible for developing and implementing the emergency plans.
- Outline of emergency release notification procedures in effect and recommend improvements.
- Describe the probable affected areas and populations by anticipated releases of Extremely Hazardous Materials (EHSs); how information can be used including identification of most frequent or greatest threats, needs for additional intelligence, etc.
- Describe local emergency equipment assets and facilities and the persons responsible.
- Outline existing evacuation and sheltering in-place plans and recommend changes as may be appropriate
- Recommend training programs for emergency responders (based on local need, identified hazards, and probable response time-lines)
  Recommend methods and schedules for exercising emergency response plans.
  Suggest ways to effectively integrate the above into the all-hazards community Emergency Operations Plan (EOP).
  Recommend maintenance of the plan.

Resources:

- Text, matrices, lists, tables, charts, graphs, maps, etc. for different materials classifications, modes, and network segments, including all existing data sources, reports, statistics, and documents that were used, glossary , acronyms, and references.
- The LEPC should provide the statistical basis of data collection and design of the Commodity Flow Study with the grant application or the contract.