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Region Eight (8) Hazardous Materials Team Inspection, Bakken Formation, North Dakota

SUMMARY

NORTH DAKOTA - THE NEXT HAZARDOUS MATERIAL FRONTIER

The 2012 region eight hazardous materials (HM) group as part of their National Safety Program Plan (NSPP) has focused on new HM shipper start ups in the Dakotas. A focused inspection was conducted in October 2011 to determine if the oil “boom” in the Dakotas (Bakken Formation) is of a magnitude that will impact rail safety or present a safety concern to HM transportation. Based on our initial assessment, through discussions with major HM shipper facility management, the ramp up for crude oil shipments is underway and the growth will triple over the next few years. The region eight HM team conducted their second inspection in June 2012 to again review new operations and follow-up on the progress since the initial inspections. Below is an update to those findings. Overall, we see improvement in the HM loading process, the training of HM employees, and many safety improvements to site, facilities, and loading techniques that will help continue to improve HM safety. We are seeing a higher level of management s involvement in HM safety and safety performance. The FRA presence has had an impact on many shippers and must continue. It must be stated however the growth is stronger than first assessed, and more and more companies and facilities are getting involved in the transportation of HM. The FRA will continue to play a vital role in safe start up and continuing operations for this new HM tank car shipment volume, with the support, monitoring and inspection of new facilities and training programs, and follow-up to NARs and 5800.1 trends (non-accident releases).

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NORTH DAKOTA THE NEXT HAZARDOUS MATERIAL FRONTIER

NSPP Project: **Project Number: R8-HM-02-12**

Name of Project: Focused Inspections at HM developing locations

Time Frame: October 1, 2011 to September 30, 2012

Brief description of proposed project, including purpose:

This project is to focus on startup and newly formed HM shippers in areas identified as generating the most significant increases in HM shipments. Currently there are HM shippers being established monthly in the Dakotas. Called the Bakken Shale, the 200,000-square-mile formation covering parts of Montana, North Dakota and Saskatchewan contains large oil reserves. As more oil companies establish wells in the Bakken, railroads are transporting more inbound car loads of frac sand, drilling pipe and other materials used to build wells or horizontally drill. As more crude oil is extracted, the railroads continue to grow in the transport to refineries and other end users thousands of miles away in the Gulf Coast, California, Oklahoma or points in Canada. By 2011's end, about 1,800 new wells, each requiring 23 carloads of rail-delivered materials during construction are projected to join the thousands already operating in the Bakken. Oil companies are expediting plans to build or expand terminals that can load or transload 95 to 118 tank car unit trains, which can transport 60,000 to 68,000 barrels per trip.

Regionally HM will monitor the growth of these startups and conduct team inspections at facilities to insure HM regulatory compliance. Two major inspection events will be conducted during this period.

FIRST EVENT: October 24-28, 2011. Team consisted of four HM R8 inspectors, one HM inspector in training, one MP&E inspector, one Specialist (Chief) inspector, and one HM Supervisory/Specialist. The group consisted of four teams

of two, each assigned specific facilities, and locations of North Dakota starting from Minot.

SECOND EVENT: June 18th-22, 2012. Team consisted of three HM inspectors and one HM Supervisory/Specialist. The groups centered in Newtown, heading out to different locations each day. There were 28 inspections performed and the areas of New Town, Minot, Columbus, Beulah, Dickinson, Donnybrook, Williston, Stanley, Tioga, Lignite, Trenton, Ross, Epping and Dore.



Figure 1. Map showing Williston Basin Province boundary (in red), Bakken-Lodgepole Total Petroleum System (TPS) (in blue), and major structural features in Montana, North Dakota, and South Dakota.

Summary of Hazardous Material safety concerns: Findings from the second visit are in Red.

- The rapid growing of oil production, natural gas, rail facilities, and employment will affect training, availability of qualified workers and equipment, etc. There are 250 wells coming on line per week.
 1. Based on our inspection, there are ~2,100 (2,800) tank cars being loaded a week with crude oil, UN 1267, PG I & II. This number of loaded shipments will triple next year to ~6,000 (6,000-9,000) tank cars a week given current expansion plans.
 2. There are ~15(20) unit trains a week; this will be expanded to 60 trains a week inside of two years. This growth rate will surpass the 'ethanol' boom and will present the same safety concerns for large trains containing a very flammable product.
 3. There are 1000 (3000) new 286,000 GRL tank cars that just arrived at Hess Corporation, **Musket and EOG**. There are over **30,000** on order or planned by others.
 4. Facilities that plan on utilizing 286K tank cars are being required to upgrade to at least 132 lbs rail by servicing railroad.
 5. As well as oil, there is a growing business for natural gas (LPG), requiring Hi-pressure tank cars. Currently we show 500 loads a week growing to 2,500 per week next year. (**not inspected this trip**)
 6. There is no permanent housing; man-camps are the next best alternative. BNSF, CP and the Short lines will have difficulty ramping up equipment needs and most importantly trained employees. (**Man-camps still house most workers; they have taken on the role of small towns. New hotels are being built in several areas. Food, grocery stores and basic services still lag demand.**)
 7. HM formal training, training records and OJT are found to be in-order with the larger companies and transloaders. Security Plan and awareness training is lagging behind at most locations. All is a work in progress. Training material was provided by FRA inspectors at most locations. Many of the management had attended the R8- 2011 Shortline/Shipper Conference. (**The area of training has improved significantly since last visit. Crews have settled down, have months of experience, many**

attended the joint FRA/BNSF safety seminar conducted in Williston.)

8. The agriculture season for 2011 was the worst in many years. Flooding, limited planting and low yields were the cause. If we add the agricultural rail needs (Anhydrous Ammonia-major fertilizer) and grain trains to the mix, the rail challenge is even greater. (Looks like a good season for agriculture; the oil process has matured and working around the farmers requirements.)
- Most unit measurements, costs, payment methods are linked to number of barrels. (Barrel equals 42 US Gals). Larger loads earn more; weight overloads could be of a concern.
 1. Currently most crude is trucked (tankers) from well site to rail transload facility. Connecting well sites by pipeline to a single access point is the on- going plan. Kinder Morgan has three major consolidation sites underway in Dore and Stanley. Common formula (rule of thumb) is 220 barrels per tanker truck, three tanker trucks per rail car, 660 barrels or 27,720 gallons per car. Overloads occur not because of volume of produce but weight. Differences in Specific Gravity of oil from varying well sites and the lack of measuring capabilities of some truckers can cause overloads. How much heel that remains in car prior to loading if not known is also a cause for overloads. Cars are determined to be overloaded in rail yards hundreds of miles away. Most are not caught because they are in unit trains, not weighted by scales. (Status: overloads are still a major problem. They occur mostly at transload operations that are working from truck to rail car. Those facilities that are filling from storage tanks, have the latest measuring equipment and are calculating weight and volume in gallons are not having overload issues.)
 2. Major large companies that own the oil have all trucks off loaded to common tanks. Specific Gravity is determined and rail cars are filled and metered from these tanks to prevent overloads. This seems to be the longer term method of loading rail cars. (This has proven to be the case, with many facilities having operations 'under cover' allowing 24 hours loading through all weather conditions.)

3. Large transload facilities are installing scales and all truck loads are weighed. Oil transloaded into rail cars are metered and overloads are being prevented. This is a good system since the transloader is monitoring the weight and volume put in the tank car not the truck driver who is paid by the barrel.
 4. Independent truckers and product owners have unique equipment fittings on transport hoses. Many of the transload operations accommodate these varying configurations. There is no standardization. (this continues, however a smaller portion of the volume)
 5. Many different trucking firms use different size connectors to avoid putting wrong produce in railcars, this system has issues.
 6. One transloader released loaded tank cars that were out of specification (safety appliances). The pressure to ship those cars was more than the risk of failure in transportation or discovery by FRA. (Rail car shortage is a major concern. We have had cases of cars being shipped out of specification.)
- Many transloaders are only utilizing liquid inlet line, therefore no other closures are checked prior to release. Many of the transloaders determine if they have loose closures or leaks after they have loaded the car. (FRA HM inspections will continue to focus on these shippers)
 1. There is no standardization on loading cars or un-loading for that manner. Some of the larger companies are loading at volume through the manway (10-14 cars each 10 minutes). Most are using the inlet valve. Off loading is being done through the bottom outlet valve in many cases. Many captive (dedicated) tank cars have company owned quick connects on valve fittings permanently attached to car to aid transloading. A thorough and complete car inspection of all tank closures is essential.
 2. Currently most of the transloading is being performed by truck drivers, attendance is a requirement. Fire retardant clothing, and grounded equipment, truck and rail cars are mandatory due to the high flammability of the crude and possibility of static discharge. (Strictly enforced)

- Most major companies are utilizing sub-contractors (Watco) for product transload and rail equipment inspections. Watco for example hires and provides the HM training for all the rail tank car loaders. They maintain the files for their employees. The company that hires the ‘sub-contractors’ must be equally accountable and aware of sub-contractors HM compliance. (Dealing with professional transloading firms has proven beneficial. They are railroad oriented, knowledgeable and use of HM regulations, and have only the HM transportation focus)
 1. Watco Company has a separate division for transloading and rail shipments. They operate the facilities at both Hess and EOG. They provide all the HM training for transload and rail equipment inspecting personnel. (Savage Services is another large facility operator in Trenton N.D.)
 2. A sample inspection was performed on the first Hess loaded unit train with their new hi-capacity tank cars. The lack of a complete inspection was apparent given several major closure issues discovered. Total train had to be re-inspected by Watco. (New tank cars are presenting problem for all users. We, FRA have informed the shippers that they cannot count on new equipment to be in compliance. They must perform complete inspections prior to their use.)
 3. EOG has just recently shipped their one millionth barrel. That translates to ~1,400 rail tank cars. These shipments are all going exclusively to their own facility in Oklahoma. EOG received the “Stewardship Award” in 2010 from the BNSF.

Ownership, responsible party, accountability is difficult to determine. Between developers, well owner, sub-contractors, marketing companies, distribution companies, trucking concerns, independents, tank farms (product holding companies), track owners, and end users; compliance is challenging.

1. If a company sub-contracts a transloader, the accountability for safety performance and inspection results should remain theirs, as well as the sub-contractor performing the transloading task. (Per a review with FRA Chief Council, transloaders are responsible for the pre-transportation functions they perform. Also, marketing companies that sign the Shipper Certification are responsible for the shipment while in transportation.)

2. Security planning/training and site control is that of the owner company; sub-contractors should be a part of the plan, trained on the plan, but not control the plan?
 3. Some of the larger companies are contracting with UTLX to support car inspections and repair. (F and G Facility on site) Company should be held accountable for their results.
- Difficulty to get railcars repaired and a limited understanding of FRA Movement Approval process.
 1. In two cases a non-conforming tank car was found at the facility. Neither transload operator knew how to forward these cars on for repair. One facility simply wrapped up the manway and BOV with 'yellow caution tape' and sent the car back to the origin.
 2. FRA inspectors distributed DVD's outlining the OTMA process to several locations visited.
 - HM inspections, travel, hotels are limited, advanced planning is required.
 1. HM inspector is located in Bismarck; all weekly inspections will require hotel and extensive travel time and mileage. (position vacant, job has been bulletined)
 2. Hotels are booked weeks and months in advance; this practice will also be required. Rates are currently above government allowed rate and will require the higher cost. (with more hotels coming on line, this pressure is diminishing)
 3. Inspectors must and should wear fire retardant clothing. Access to most properties will require this PPE as a standard. New retardant clothing will be required more frequently because fire protection deteriorates with each washing. (permanent inspector should have his own PPE's including fire retardant overalls)
 4. Weather is an important factor in this territory; our effectiveness will be limited as a result of winter. Four wheel drive vehicles could extend our inspection

effectiveness. (More and more facilities are constructing indoor facilities to deal with the weather.)

5. Due to the magnitude and the number of new start-ups and expansions, additional HM resources are required in this area. Ensuring training of HM employees by employers and good job specific instruction will be our largest area of focus. Inspection of cars at facilities will be limited at best. There are currently few yards or sidings that hold railcars for inspection. (With the vacant Bismarck position and the need for FRA presence in the Bakken on-going, the inspector from Billings will provide the inspection coverage until a trained replacement has been assigned. The balance of regional HM inspectors will backfill and cover all areas as required.)
6. New issue: several new companies are shipping the crude oil as “Petroleum crude oil, 3, PGIII.” The shipping description deferrers from the site MSDS’s reviewed which classified the material as PG 1 or PG II. Also, this is not consistence with the majority of other companies shipping basically the same HM, as PGII. We have asked that these companies provide use with ‘test’ conducted to determine the Packing Group. Packing group is an indicator or the level of hazard the produce presents. The PG levels can affect the selected emergency response and even the type of package required or tank car in this case.

Railroads Operating in North Dakota

