CANADIAN EMERGENCY RESPONSE REQUIREMENTS AND CAMECO'S EXPERIENCE

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ABSTRACT

Cameco Corporation based out of Saskatoon is a world leader in the mining of uranium and it's processing. Cameco transports and receives front end nuclear fuel cycle material from many locations around the world. Within Canada there exists a regulatory requirement for Cameco to provide assistance in the event of a transport incident involving not only the products shipped by Cameco but also product destined for Cameco.

This requirement is part of the Federal government of Canada's Transportation of Dangerous Goods Act and Regulation and is referred to as an Emergency Response Assistance Plan (or ERAP). The assistance provided may range in nature from information given over the telephone to the immediate deployment of a trained team of emergency responders. This paper will outline the regulatory requirements that exist in Canada and the efforts that have been undertaken by Cameco to provide assistance to public response agencies. Examples of actual transport incidents and the lessons learned are presented in the paper.

Given the vast and remote geography of Canada, coupled with the possibility of extreme weather conditions, Cameco faces a variety of challenges in responding to transport incidents. As such Cameco depends on third party contractors to support efforts in reaching and assisting with the initial response and subsequent clean up efforts. The training and management of this network of for-hire emergency responders is essential to providing timely, safe and vital emergency response. Additionally, and since 2003, Cameco has conducted an outreach program to provide training to public first response agencies and others along the main transport corridors in an effort to familiarize them with Cameco's products and what support to expect from Cameco. These efforts have proven to be beneficial and critical in several incidents.

INTRODUCTION

Cameco is an integrated front end nuclear fuel company with operations in Canada, the United States and Kazakhstan as well as exploration projects in these and several other countries. Safe and dependable transport of these fuel cycle materials is critical to Cameco's business. A key component in safe transport is the ability to quickly and effectively respond to a transport incident. This paper will focus on the transport of fuel cycle materials within Canada and those materials shipped by Cameco and other producers into Canada from various locations around the world.

Cameco transport of fuel cycle materials covers several million kilometers of road every year within

Canada. Road transport is the mode of transport in the majority of cases with rail making up a smaller fraction. Cameco operates a number of facilities within Canada including several mines, mills, a refinery, conversion plant and fuel bundle manufacturing facilities. Each of these operations includes a well trained emergency response team with an offsite capability to respond to transport incidents. Given the sometimes long distances between these operations and the remoteness of parts of Canada, there exists a good possibility that transport incident will occur many hundreds of kilometers from any one of these operations making it difficult to effectively mobilize a Cameco team with sufficient equipment to reach the incident in a timely manner. Provisions have been made to retain contracted emergency responders to accompany Cameco and mobilize a trained and equipped team to an incident to support the response efforts.

REGULATORY REQUIREMENT

Emergency response to transport incidents involving dangerous goods including radioactive materials in Canada is regulated by the Federal Transportation of Dangerous Goods Act and Regulation. Within this regulation for specified dangerous goods shipped over a threshold quantity, there is a requirement for the producer (or importer if the producer is not located in Canada) of the goods to prepare and submit an Emergency Response Assistance Plan (ERAP) to Transport Canada. Transport Canada is responsible for reviewing the plan and if the ERAP meets the needs of the regulations, granting approval of the ERAP and assigning a plan number. Cameco currently has three separate ERAP's approved for the following dangerous goods:

- Class 7 materials (uranium ore concentrate, various uranium oxides and uranium hexafluoride)
- Anhydrous Hydrogen Fluoride
- Nuclear fuel bundles

The ERAP is a document which contains a variety of information regarding the materials being shipped and what actions are initiated upon activation of the plan. The Cameco ERAP's contains general information about Cameco Corporation and products shipped as well as specific information regarding how the plan is activated and guidelines on tactics that can be employed at the incident site.

CAMECO EMERGENCY RESPONSE

The Cameco ERAP relies on a three tiered approach to incident response.

First Response Agencies

The first arriving emergency responders in Canada for transportation incidents are typically fire departments with support from provincial environment officials, police and emergency medical agencies. The fire departments consist of career and volunteer departments across the country. They take command of the emergency site and direct operations during the emergency phase of the incident.

Cameco Response Teams

Each of Cameco's operating sites maintains a trained and properly equipped emergency response team. These teams have off-site capabilities and are available to be mobilized to any transport incident involving an ERAP product that may occur in their region. Additionally, a corporate team is available to support in incident should it occur some distance from an operating site. This team is made up of

personnel from different disciplines typically a member from each of Safety/ HAZMAT, environmental and radiation. Cameco has made the commitment through our ERAP to respond in person with a trained team to all activations of this plan. Incidents that have occurred in recent years have been effectively managed in part due to the presence of Cameco teams to offer important guidance and support of our Class 7 products for all phases of the emergency.

Contracted Emergency Response Providers

The third tier of response to a transport incident involves contracted emergency response providers across North America. Established professional response companies are retained as network providers in both Canada and the United States. In Canada and the U.S. a network administrator subcontracts members of country-wide network resulting in Cameco having to call one contact number in each country to initiate appropriate response support in the region where the incident has occurred. In Canada, the members of this network of service providers belong to a self-governing association which oversees and maintains standard levels of training and the inventory of equipment that is stocked. This group, which is known as the Canadian Emergency Response Contractors Alliance (CERCA), conducts third party verification of each of the member companies to ensure that the standards are being achieved and maintained. Cameco has recently become a corporate member of this alliance in support of the efforts of this organization. The use of CERCA members ensures that a high level of trained personnel and a good selection of equipment will be available if needed. Additionally, and in support of Cameco's ERAPs, the Canadian response companies forming the network are routinely assessed and trained in radiation safety and provided information on Cameco ERAP products and response strategies. This training is performed by Cameco on a reoccurring basis. The network administrator response companies are audited on a biannual basis by Cameco safety auditors.

CAMECO INITIATIVES

In 2003 Cameco recognized the opportunity to provide training to key fire departments due to the volume of product shipped and the relative lack of awareness of uranium ore concentrate with respect to emergency response. This awareness training program consists of hazard awareness of the UOC as well as recommended personal protective equipment and containment tactics. An important part of the training was an opportunity for first emergency response groups to ask questions especially with regard to radiological properties as this tends to be an area of concern.

Figure 1 below shows the UOC transport route from Northern Saskatchewan to the Cameco Blind River Refinery. Also shown along the route via blue circles, are the locations that Cameco targets to deliver the awareness training. This program has proved very valuable for Cameco in meeting and building a relationship with these key response groups prior to an incident occurring.

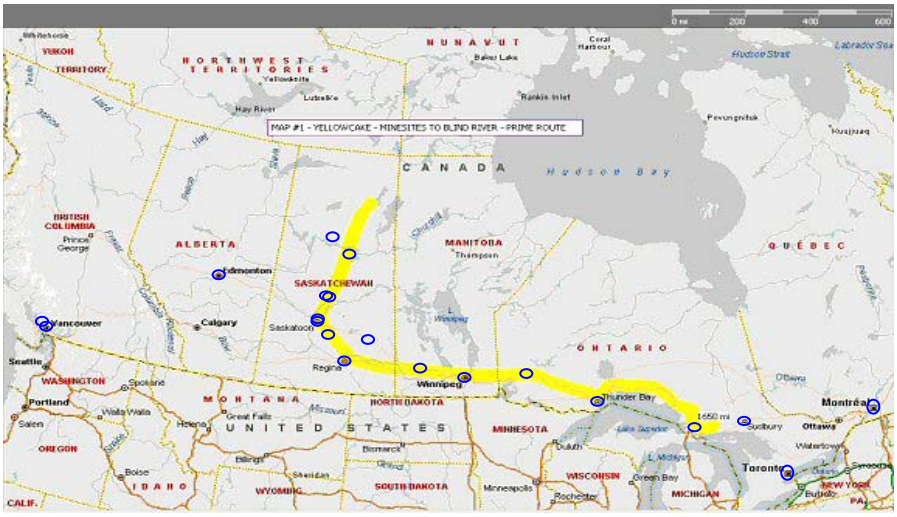

Figure 1. Illustration showing the transport route targeted for outreach

INCIDENTS AND LESSONS LEARNED

Cameco materials have been involved in several motor vehicle accidents over the past 22 years. During this time period there has not been an accident where product has been released from the conveyance. Two incidents are described below and include the circumstances, a description of the response activities and the lessons that Cameco learned from the events.

Uranium Ore Concentrate Transport Incident

On July 2, 2006 a transport of uranium ore concentrate was involved in an accident. The transport unit, a 53 foot dry van trailer and tractor, carrying 47 drums of UOC was forced to drive off the road in order to avoid a collision with a car that stopped without signaling to apparently make a turn. The transport unit left the road at highway speed and as the ground was wet and muddy, came to an abrupt stop. This sudden stoppage caused drums to move forward forcing three drum lids to become dislodged. No UOC was spilled from the drums and no fuel or automotive fluids were released from the truck.

The ERAP was immediately activated and a Cameco team from Saskatoon was mobilized via charter aircraft. The contracted emergency response provider, who was only 60 kilometers from the incident scene and had previously received training for responding to UOC, was also mobilized. The public first responders were a volunteer fire department and were unfamiliar with the product, however the Emergency Management coordinator, who also attended the event had recently been given the Cameco outreach presentation for this product. The familiarity he had with the product as well as recently meeting one of the Cameco team members at the outreach session, got the incident off to a good beginning. The incident concluded with the drums being moved one-by-one back into their original formation, gravel being put down to fortify the road and the trailer towed back onto the road. The damaged drums were overpacked and loaded onto replacement trailers and transported.

Lessons learned from this incident include the following:

- A recent Cameco contractual requirement to have a transport company representative present at all ERAP activations proved helpful
- The recent outreach session with the emergency management coordinator in the area was very beneficial
- A dedicated Cameco emergency response vehicle was required and purchased
- Contracted emergency response personnel and the equipment they provided was essential to the response
- An on-call summer schedule for Cameco team members was implemented

Port Incident

In December, 2007 a sea container containing 35 drums of uranium ore concentrate was involved in an incident that occurred at a port container terminal while the container was being stored in the course of transport. A snow plough struck the sea container with the blade causing damage to the side of the ISO and as a result, dented and created a small hole in one of the drums of concentrate. No product was released onto the container floor with the hole causing a small patch of contamination in the immediate area of the damage to the drum. This incident resulted in a request for Cameco assistance per the mutual aid agreement that Cameco has with several organizations. A Cameco team was dispatched as was the regional subcontracted emergency response provider. The sea container was patched and was moved to a nearby warehouse where the damaged drum and several adjacent drums were overpacked. The load was transferred into a replacement sea container and returned to Cameco's facility. All activities and container movements were reviewed and approved by Transport Canada representatives who attended the incident.

Lessons learned from this incident included the following:

- The mutual aid agreement between Cameco and other organizations was effective
- The contracted emergency response provider once again proved valuable
- Class 7 emergency response training sessions given over the years to the port response personnel was very helpful
- The Cameco commitment of responding in person to ERAP activations was once again effective

CONCLUSIONS

The system that Cameco has put in place is appropriate and effective in responding to incidents involving Class 7 radioactive materials. The three tiers of response personnel made up of first responders, contracted and Cameco's own teams work well together on incidents. Training and outreach programs for first responders and contracted teams will continue to be performed in support of the Cameco ERAP's as this has proven valuable in real emergencies.