

# **ORE TRANSPORTATION PLAN**

## **ENERGY FUELS RESOURCES CORPORATION**

### **1.0 Introduction**

Energy Fuels Resources Corporation's (Energy Fuels') procedures and methods for shipping uranium ore from a mine site to an offsite mill are described in this plan. The plan may also be used for shipping to an off-site ore buying station, should one become available. The plan is based on compliance with federal, state and local regulations. The primary regulatory authority for ore haulage is the U.S. Department of Transportation (USDOT). To allow for efficient interstate commerce, the Colorado Department of Transportation (CDOT), the Utah Department of Transportation (UDOT) and other adjacent state highway departments have adopted USDOT regulations in their entirety. USDOT's regulations for transport of radioactive materials are codified in Title 49 of the Code of Federal Regulations (CFR). The procedures in this plan are designed to meet the requirements of Title 49 and are to be incorporated into contractual arrangements with the trucking and milling companies prior to the start of offsite ore shipments.

References to specific sections of CFR title 49 are referenced in this plan by part number only, e.g., CFR Title 49 Part 173.436 is referenced as (173.436)

### **2.0 Ore Characteristics and Shipping Classification**

The majority of the ore that will be shipped will average 0.15 to 0.25 percent  $U_3O_8$  based on gamma readings (typically expressed as  $eU_3O_8$ ). This is equivalent to a uranium activity level of approximately  $1.4 \times 10^{-9}$  Curies/gram (Ci/g). Although this represents a relatively low radioactivity level, it is above USDOT's exemption level for uranium of  $2.7 \times 10^{-11}$  Ci/g for natural uranium (173.436). Accordingly, uranium ore is regulated as a Class 7 radioactive material under the hazardous material regulations (173.403). Uranium ores and concentrates of uranium ore are classified as Low Specific Activity (LSA), Group - 1 material. Because of their low specific activity, ore shipments are generally exempt from most of the packaging, marking, labeling, and placarding requirements of other Class 7 radioactive materials.

In addition to uranium ore, LSA-1 material may also include other low-toxicity alpha emitters that may be shipped from the mine to the mill such as:

- 1) Precipitated residues from the water treatment plant
- 2) Soils and rubble contaminated by uranium
- 3) Loaded ion exchange resins from water treatment facilities (not proposed at this time)

Materials 1 and 2 can be loaded and shipped in the same manner as uranium ore. Some additional restrictions apply to ion exchange resins that should be incorporated into the plan if resin columns are installed at a mine site for water treatment purposes.

### **3.0 Loading Requirements**

The uranium ore is to be loaded into highway haul trucks using a front-end loader. Required dust and contamination control measures during loading include:

- 1) The loader operator and truck driver are to avoid inhalation of dust during loading operations. The ore is expected to be moist to wet when hauled from the mine to the ore pad. If the ore should dry out prior to loading, the stockpile will be sprayed with water to minimize the amount of dust generated during loading operations. Water sprays will be applied only to the extent necessary to moisten the ore and ore pad area.
- 2) Spillage onto the transport truck is to be avoided during loading operations. Any loose material that drops onto the cab, bumpers, running boards, or other exterior surfaces will be removed and placed back on the ore pad prior to leaving the site. The truck tailgate will be closed and a tarpaulin (or other suitable cover) will be placed over the entire load and adequately secured so that fine ore particles cannot be released to the environment during transport.
- 3) The tonnage to be shipped is not limited by Title 49, but rather, by the size of the trailer(s) and any weight restrictions imposed by local or state agencies on the roads to be traveled. Care shall be taken to not overload transport vehicles.
- 4) Shipment during muddy conditions is to be avoided to minimize off-site contamination and the potential for an accident. Muddy conditions could result in the tracking of ore material from the site onto adjacent public roads. A gravel tracking pad will be constructed at the exit to the ore pad if muddy conditions cannot be completely avoided.

### **4.0 Vehicle Survey and Shipping Papers**

Prior to leaving the site, the loaded truck must be surveyed for leakage and radiation. Shipping papers must be completely filled out and in the possession of the driver. Mine personnel will be required to maintain records of the inspections and radiation scans performed for each shipment. Specific survey and shipping requirements include:

- 1) The truck will be scanned to verify that it meets gamma exposure rates stipulated in Title 49. Radiation levels shall not exceed 1rem/hr (10 millisievert/hr (mSv/hr)) at 3 meters from the load for an unshielded cargo (173.427), 200 mrem/hr (2 mSv/hr) on the conveyance or package surface, and 10 mrem/hr (0.1 mSv/hr) at 2 meters from the conveyance or package surface (173.441). The transport index (TI) is equal to the maximum gamma exposure rate in mrem/hr at 1 meter (3.3 feet) from the conveyance or package surface, rounded up to the nearest tenth. The TI must be below 10. The TI measurements will be performed at the front of the tractor, on both sides of the trailer, and at the tailgate.

- 2) A gamma survey will be conducted within the cab of the transport tractor. The average reading in mrem/hr will be recorded to verify that the occupied space does not exceed the regulatory limit of 2 mrem/hr (173.441).
- 3) The truck and trailer will be visually inspected to ensure that the load is adequately covered, there is no leakage from the bed of the truck/trailer, and there is no loose ore spilled onto the tractor or trailer.
- 4) Shipping papers will be prepared by mine personnel and provided to the truck driver. Each ore shipment must include the following information.
  - a) Date of shipment:
  - b) Name and address of shipper:
  - c) Name and address of transporter:
  - d) Name and address of mill destination:
  - e) Shipping name: RQ, Radioactive Material, Low Specific Activity (LSA-1), Fissile Exempted
  - f) Form: Solid ore
  - g) Hazard Class: Class 7 Radioactive Material
  - h) Identification Number: UN 2912
  - i) Quantity of Material (lbs.):
  - j) Transport Index:
  - k) Grade  $U_3O_8$ :
  - l) Activity of Radioactive Material (Terabecquerels, T bq):
  - m) Emergency Contact Telephone Numbers:
  - n) Energy Fuels' shipper certification
  - o) Exclusive use statement: Exclusive Use Shipment

The activity level of the shipped ore is dependent on the tonnage and grade. The activity level, in units of terabecquerels (T bq), can be found from the table presented in Appendix A. One T bq is equal to about 27 Curies (Ci).

The emergency contact numbers in the shipping papers should include the emergency response contractor stipulated in the ore haulage contract, appropriate Energy Fuels personnel, appropriate mill personnel, state patrol offices, and local fire station and sheriff offices. Home telephone numbers are to be included for all key response personnel.

The shipping papers will include the following certification statement that will be signed by the responsible person at the mine: *"This is to certify that the above-named materials are properly classified, described, packaged and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."* (172.204(1))

As an alternative one may include the following certification statement: *"I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper*

*condition for transport according to applicable international and national governmental regulations.”*

An exclusive use statement must be included on or with the shipping papers indicating that the tractor and trailer are used exclusively for shipping uranium ore. An example of an exclusive use statement is: *“This shipment of uranium ore is being shipped as an exclusive (sole) use shipment.”* Accordingly, the contents of the shipment must be loaded at the mine and unloaded at the mill, absent any unloading or additional loading prior to delivery at the mill. The transportation conveyance trailer must be utilized only for uranium ore transport until such time that mill personnel conduct a survey of the interior and exterior of the trailer and determine that the trailer can be released for unrestricted use. At such time that the trailer is released for unrestricted use, all markings related to the radioactive material must be removed from the conveyance trailer.”

## **5.0 Ore Transport**

The contract carrier will be responsible for compliance with all applicable laws and adhering to the following procedures and protocols during transport of the ore from the mine to the mill.

- 1) The truck must be equipped with appropriate vehicle markings. The words “RADIOACTIVE LSA” must be stenciled or otherwise affixed to both sides of the trailer in 3-inch letters.
- 2) The trailer must be kept closed at all times, when containing uranium ore and when empty, by use of a tarpaulin or other suitable cover. The carrier must ensure that there is no leakage or spillage of uranium ore from the truck trailer. The trailer must remain placarded when it is empty (172.514).
- 3) The carrier will inform appropriate mine and mill personnel of the route to be taken from the mine to the mill.
- 4) Shipments of ore will be transported without unnecessary delay from the mine to the mill. The carrier may designate suitable locations for temporary storage of vehicles along the route from the mine to the mill if it is necessary to coordinate delivery times at the mill. These “safe havens” are subject to approval by the mine and the mill.
- 5) Carrying and delivering to the mill a copy of the shipping papers.
- 6) Maintaining exclusive use of the transport vehicle for uranium ore shipment. An unrestricted use release survey will have to be conducted by the mill before the vehicle can be used for other purposes.
- 7) Unloading the uranium ore shipment at the mill in accordance with the procedures stipulated by the mill.
- 8) Carrying and adhering to an Emergency Response Plan (see Section 6).
- 9) Ensuring that all drivers are properly trained (see Section 7).

## **6.0 Emergency Response**

Emergency response information is to be immediately available to all persons who transport, offer to transport, or handle uranium ore (170.600). That information can be provided by Energy Fuels Resources or the transportation contractor. The transportation contractor is responsible for implementing the plan in the event of an accident that results in the spillage of uranium ore (or other spillage during transport) on public roads. The plan must meet the requirements of (172.600) and be immediately available to responders (172.602).

Energy Fuels can and would prefer to be the primary provider of technical support and cleanup assistance in the event of an accident because the company has the expertise and specialized equipment necessary to do the work. However, emergency response functions may also be provided by the transportation contractor, the mill, or a 3<sup>rd</sup>-party emergency response contractor. The mine's role in an accident will depend on contractual requirements between the mine and the transportation contractor. These responsibilities need to be clearly spelled out and understood prior to the start of ore haulage. The emergency response plan must clearly define who is responsible for each type of emergency response action and provide the necessary emergency contact information.

The Emergency Response Plan must contain the following information: (172.602)

1. The basic description and technical name of the hazardous material
2. Immediate hazards to health
3. Risks of fire or explosion
4. Immediate precautions to be taken in the event of an accident or incident
5. Immediate methods for handling fires
6. Initial methods for handling spills or leaks in the absence of fire and
7. Preliminary first aid measures.

## **7.0 Training**

Mine safety personnel will provide training to mine and carrier personnel for the proper loading and transporting of uranium ore. The training will include: basic radiation concepts, dust and contamination control, vehicle scanning requirements, exclusive use transport provisions, and emergency response contact and response information. The training record will be documented and maintained on site.

The transportation contractor will be required to provide training to its drivers (172.602) including job functions to be performed by the employee, emergency response procedures, self protection measures, and accident prevention methods. A record of current training, inclusive of the preceding three years, will be kept for every employee of the transportation contractor. Guidance on evaluating the effectiveness of an Emergency Response Plan is presented in Appendix B of this plan.

In accordance with the requirements of 49 CFR 177.800 and 177.816, each truck driver and any other carrier personnel involved in the loading or unloading of uranium ore onto and from the

uranium transport truck must be trained in the applicable requirements of 49 CFR Parts 390 through 397 and the procedures necessary for the safe operation of the vehicle. Driver training must include the following subjects:

- 1) Pre-trip safety inspection;
- 2) Use of vehicle controls and equipment, including operation of emergency equipment;
- 3) Operation of vehicle, including turning, backing, braking, parking, handling, and vehicle characteristics including those that affect vehicle stability, such as effects of braking and curves, effects of speed on vehicle control, dangers associated with maneuvering through curves and steep grades, and dangers associated with weather or road conditions that a driver may experience (e.g., storms, high winds);
- 4) Procedures for crossing through tunnels, bridges, and railroad crossings;
- 5) Requirements pertaining to attendance of vehicles, parking, smoking, routing, incident reporting, and loading and unloading of materials.

The above training is the responsibility of the transportation contractor and may be satisfied by compliance with the current requirements of a Commercial Driver's License with a hazardous materials endorsement.

**APPENDIX A**  
**ACTIVITY OF RADIOACTIVE MATERIAL**  
**CONTAINED IN TRUCK (TBq)**

**Activity of radioactive material Contained in Truck (TBq)**

Grade (%U <sub>3</sub> O <sub>8</sub> )	Net Pounds of Ore in Truck													
	Net Tons of Ore in Truck													
	36,000	38,000	40,000	42,000	44,000	46,000	48,000	50,000	52,000	54,000	56,000	58,000		
	18	19	20	21	22	23	24	25	26	27	28	29		
0.20	0.0018	0.0019	0.0020	0.0021	0.0022	0.0023	0.0024	0.0025	0.0026	0.0027	0.0028	0.0029	0.0029	0.0029
0.21	0.0019	0.0020	0.0021	0.0022	0.0023	0.0024	0.0025	0.0026	0.0027	0.0028	0.0029	0.0030	0.0030	0.0030
0.22	0.0020	0.0021	0.0022	0.0023	0.0024	0.0025	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0031	0.0031
0.23	0.0021	0.0022	0.0023	0.0024	0.0025	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0032	0.0032	0.0032
0.24	0.0022	0.0023	0.0024	0.0025	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0032	0.0033	0.0033	0.0033
0.25	0.0023	0.0024	0.0025	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0032	0.0033	0.0034	0.0034	0.0034
0.26	0.0023	0.0025	0.0026	0.0027	0.0029	0.0030	0.0031	0.0033	0.0034	0.0035	0.0036	0.0037	0.0037	0.0038
0.27	0.0024	0.0026	0.0027	0.0028	0.0030	0.0031	0.0032	0.0034	0.0035	0.0036	0.0038	0.0039	0.0039	0.0039
0.28	0.0025	0.0027	0.0028	0.0029	0.0031	0.0032	0.0034	0.0035	0.0036	0.0038	0.0039	0.0041	0.0041	0.0041
0.29	0.0026	0.0028	0.0029	0.0030	0.0032	0.0033	0.0035	0.0036	0.0038	0.0039	0.0041	0.0042	0.0042	0.0042
0.30	0.0027	0.0029	0.0030	0.0032	0.0033	0.0035	0.0036	0.0038	0.0039	0.0041	0.0042	0.0044	0.0044	0.0044
0.31	0.0028	0.0029	0.0031	0.0033	0.0034	0.0036	0.0037	0.0039	0.0040	0.0042	0.0043	0.0045	0.0045	0.0045
0.32	0.0029	0.0030	0.0032	0.0034	0.0035	0.0037	0.0038	0.0040	0.0042	0.0043	0.0045	0.0046	0.0046	0.0046
0.33	0.0030	0.0031	0.0033	0.0035	0.0036	0.0038	0.0040	0.0041	0.0043	0.0045	0.0046	0.0048	0.0048	0.0048
0.34	0.0031	0.0032	0.0034	0.0036	0.0037	0.0039	0.0041	0.0043	0.0044	0.0046	0.0048	0.0049	0.0049	0.0049
0.35	0.0032	0.0033	0.0035	0.0037	0.0039	0.0040	0.0042	0.0044	0.0046	0.0047	0.0049	0.0051	0.0051	0.0051
0.36	0.0032	0.0034	0.0036	0.0038	0.0040	0.0041	0.0043	0.0045	0.0047	0.0049	0.0050	0.0052	0.0052	0.0052
0.37	0.0033	0.0035	0.0037	0.0039	0.0041	0.0043	0.0044	0.0046	0.0048	0.0050	0.0052	0.0054	0.0054	0.0054
0.38	0.0034	0.0036	0.0038	0.0040	0.0042	0.0044	0.0046	0.0048	0.0049	0.0051	0.0053	0.0055	0.0055	0.0055
0.39	0.0035	0.0037	0.0039	0.0041	0.0043	0.0045	0.0047	0.0049	0.0051	0.0053	0.0055	0.0057	0.0057	0.0057
0.40	0.0036	0.0038	0.0040	0.0042	0.0044	0.0046	0.0048	0.0050	0.0052	0.0054	0.0056	0.0058	0.0058	0.0058
0.41	0.0037	0.0039	0.0041	0.0043	0.0045	0.0047	0.0049	0.0051	0.0053	0.0055	0.0057	0.0059	0.0059	0.0059
0.42	0.0038	0.0040	0.0042	0.0044	0.0046	0.0048	0.0050	0.0053	0.0055	0.0057	0.0059	0.0061	0.0061	0.0061
0.43	0.0039	0.0041	0.0043	0.0045	0.0047	0.0049	0.0052	0.0054	0.0056	0.0058	0.0060	0.0062	0.0062	0.0062
0.44	0.0040	0.0042	0.0044	0.0046	0.0048	0.0051	0.0053	0.0055	0.0057	0.0059	0.0062	0.0064	0.0064	0.0064
0.45	0.0041	0.0043	0.0045	0.0047	0.0050	0.0052	0.0054	0.0056	0.0059	0.0061	0.0063	0.0065	0.0065	0.0065
0.46	0.0041	0.0044	0.0046	0.0048	0.0051	0.0053	0.0055	0.0058	0.0060	0.0062	0.0064	0.0066	0.0066	0.0066
0.47	0.0042	0.0045	0.0047	0.0049	0.0052	0.0054	0.0056	0.0059	0.0061	0.0063	0.0066	0.0068	0.0068	0.0068
0.48	0.0043	0.0046	0.0048	0.0050	0.0053	0.0055	0.0058	0.0060	0.0062	0.0065	0.0067	0.0070	0.0070	0.0070
0.49	0.0044	0.0047	0.0049	0.0051	0.0054	0.0056	0.0059	0.0061	0.0064	0.0066	0.0069	0.0071	0.0071	0.0071
0.50	0.0045	0.0048	0.0050	0.0053	0.0055	0.0058	0.0060	0.0063	0.0065	0.0068	0.0070	0.0073	0.0073	0.0073

**APPENDIX B**  
**EMERGENCY RESPONSE GUIDELINES**  
**ORE TRANSPORTATION CARRIERS**

## **EMERGENCY RESPONSE GUIDELINES ORE TRANSPORTATION CARRIERS**

The following guidelines provide direction to Energy Fuels personnel in evaluating the effectiveness of an Emergency Response Plan (Plan) for ore transportation carriers. Each ore transportation contractor must have a comprehensive plan in place for responding to accidents and other incidents involving the spillage of uranium ore. It is recommended that the principal emergency responders named in each Plan be contacted to verify their capability of responding to an incident that might occur anywhere along the proposed haulage route(s).

Emergency Contact Information: The Plan should include emergency telephone numbers for the transportation contractor, the mine, the mill, and a third-party emergency response contractor, if applicable. Additionally, the Plan should include telephone numbers for the state patrol, local fire stations, local law enforcement, and emergency medical services. These telephone numbers should include all localities along the carrier's route to the mill. The plan should clearly spell out who is to be contacted depending on location and type of incident. The driver should also be provided with a radio and/or mobile telephone suitable for the area traveled. Because of the relative remoteness of our mine sites, some communication units may not provide adequate coverage.

Scene Assessment: Prior to performing any action at an accident, the scene will need to be quickly evaluated for potential hazards including injuries, fires, fuel spills, downed power lines, traffic hazards, and proximity to streams or rivers. Identified hazards are to be avoided and, if possible, abated as soon as possible. It is recommended that the driver carry a copy of USDOT's current Emergency Response Guidebook and be trained in its use so that he/she can better identify potential hazards and the appropriate response procedures. Contacting the local fire station and/or sheriff's department is often the fastest method for gaining assistance when responding to identified hazards.

Succession of Authority: The driver, if capable, is responsible for the accident site and related area on public roads or highways until the arrival of the fire department or law enforcement personnel. Once the site has been secured and the preliminary investigation is complete, the assigned supervisor of the contracted Emergency Response Team shall be in charge of traffic control and cleanup activities.

Traffic Control: Initially, reflective triangles, flares, and volunteer flaggers can be used to control traffic until emergency responders arrive. Professional traffic control measures will be needed for any subsequent clean-up actions.

Qualifications of Emergency Response Crews: General construction skills are needed plus experience in the use of radiological monitoring instruments. Emergency response crews should be located in close proximity to the ore haulage route. If a haulage route is relatively long, different crews may be needed to respond to different sections of the route.

Potential for Exposure: The uranium ore transported to the mill ranges from 0.15 to 0.35 percent  $eU_3O_8$ . Based on EPA and NRC health-based standards, a cleanup action of material having this low of uranium content will not result in a worker becoming overexposed to radiation, even if the action extends over several work days.

Required Personal Protection Equipment (PPE): Level “D” PPE consisting of work pants, sleeved work shirt, and sturdy work boots or shoes is required. Gloves, hard hats, safety glasses, dust masks, and steel-toed safety shoes/boots may be also required as needed.

Cleanup Procedures: Because of its potential to cause a fire or contaminate nearby water courses, containment and cleanup of any fuel spills is normally the first priority. Many of the fire departments carry adsorbents and booms to contain and clean up these types of spills. Spilled ore materials, depending on the size of the spill, can be cleaned up with a loader, hand shovels, rakes, and shop brooms. If the spill is large, the ore should be transferred directly to another truck approved for uranium ore haulage. Smaller spills can be placed in barrels or other suitable containers. If it is windy, dust can be controlled with light water sprays; however, large volumes of water should not be used because this could result in runoff of water containing uranium and other contaminants. If the spill occurs near or within a stream or river, efforts should be made to limit the quantity of ore released to the water course. Because of its relatively low uranium content, however, no long-term environmental impacts would be expected if some of the material cannot be safely recovered.

Cleanup Verification: After visible spilled ore material has been removed, a scintillometer or gamma meter should be used to identify any “hot spots” of residual radiation on ground surfaces. The hot spots can be marked using spray paint, chalk, or utility flags. After these hot spots are further cleaned, they should be rechecked with the instrument to verify that the area is at or near background radiation levels. This is normally readily achievable on hard surfaces such as concrete or asphalt. Some over-excavation of underlying soils may be necessary in gravel or grassy areas. If there is a concern regarding the cleanup levels achieved, soil samples can be taken of the contaminated area and a nearby uncontaminated area to establish background levels. Cleanup to a level of 5 pCi/g above background is normally considered adequate for protection of the environment.

Disposal of Recovered Materials: Recovered materials that have been loaded for transport can be released by the assigned cleanup supervisor to be transported to the mill. Any materials contaminated with oil or fuel should be containerized and transported to a suitable holding area for later characterization and appropriate disposal.

Decontamination of Equipment and Tools: The contract Emergency Response Team should have specific procedures in place for decontaminating equipment and tools for “free release” of these items. These procedures generally include cleaning protocols, collecting swipe samples for analysis, and scanning for radiation levels.

Agency Notifications: Depending on the severity of the incident, one or more state and federal agencies may need to be notified. These notifications may include both verbal and written requirements and should be made by the transportation contractor with the assistance of the

Emergency Response Team supervisor. Notification requirements, including contact information, should be included in the carrier's Plan. Depending on location, potential notifications include:

1. Colorado Department of Public Health and Environment, Division of Emergency Management: (303) 756-4455
2. The Utah Department of Environmental Quality, 24-Hour Answering Service: (801) 536-4123
3. The U.S. Environmental Protection Agency, National Response Center: (800) 227-8914
4. The U.S. Department of Transportation: Written report within 30 days

The reportable quantity (RQ) for uranium is 0.1 Ci or 0.0037 TBq (see 49 CFR 172.101). It is unlikely that this threshold will be exceeded in an accident unless the ore is of relatively high grade and the entire load is spilled (see activity levels in Appendix A). However, associated events such as fire, serious injury, public evacuation, or closure of a major transportation artery can also trigger the reporting requirement. Agency notifications typically have time limits that must be observed, so it is important that the Plan clearly lists the notification requirements for each agency that may be involved.