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Nelson, Sherrie

From: Dugan, Joseph [duganj@sddc.army.mil]
Sent: Monday, August 30, 2004 2:10 PM
To: 'Sherrie.Nelson@rspa.dot.gov'; 'Fred.Ferate@rspa.dot.gov'
Cc: Wyrosdick, Mark, Maj, USAF
Subject: Request for New DOT-E

Sherrie: RSPA - 2004-19309 - 1

Please see attached request for New DOT-E.

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DEPARTMENT OF THE ARMY
MILITARY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND
OPERATIONS CENTER
661 SHEPPARD PLACE
FORT EUSTIS, VA 23604-1644

REPLY TO
ATTENTION OF

Safety Division

August 30, 2004

Mr. Delmer Billings
Director, Approvals Branch
Office of Hazardous Materials Transportation
Research and Special Programs Administration
U.S. Department of Transportation
400 Seventh Street, SW
Washington, DC 20590

Dear Sir:

In accordance with the provisions of Title 49, Code of Federal Regulations, Section 107.105, application is hereby made for issuance of a new Department of Transpiration Exemption (DOT-E) , on behalf of the Department of Defense. The following file number has been assigned:

File Number: 170-04 (0830)
Re: Application for New DOT-E for a 2 year period.
Request exemption from 49 CFR 173.427(b).
Final Rule as published, FR 3632, January 26, 2004.

Proponent: US Army

The Department of Defense requests review of our application for exemption from the requirements of the provisions of Title 49, Code of Federal Regulations (CFR) specifically citation 173.427(b). This exemption would authorize transport of LSA-II waste material as if exclusive use, bulk packagings consisting of gondola rail cars with a super load wrapper gondola lining system (or equivalent) were industrial packaging type "IP-2" packages. These wastes primarily contain elevated concentrations of thorium-230 and would be transported to a properly permitted disposal site through fiscal year 2009.

This application for exemption is predicated on the safe use of gondola rail cars with the gondola lining systems for the shipment of the specifically defined radiologically contaminated soil and soil-like radioactive LSA-II waste material and associated debris, compliantly throughout the shipping period as stated above. No additional material is being generated so shipments of this material should conclude by 2010.

This waste stream consists of comparatively homogenous soil and soil-like materials with limited debris from the remediation of sites within the St. Louis, MO metropolitan area. Further, the waste materials contain residual quantities of pre-1978 mill tailings from the process of uranium bearing materials (.e.g., uranium feed materials including uranium ores).

Uranium and radium-226 were preferentially extracted from a variety of feed materials from 1942 until 1958. This resulted in processing residuals such that thorium-230 is the primary radioisotope of concern in the waste stream. These uranium processing residuals were disposed of such that significant quantities of soils were contaminated. Potential radiological hazards of the waste materials are primarily those associated with the ingestion or inhalation of contaminated soils with limited potential for external exposures due to the very limited quantity of gamma emitting radionuclides and the relatively long half lives of the radionuclides involved.

The extraction of most uranium and radium-226 resulted in a waste stream such that thorium-230 and lead-210 were the uranium-238 daughter products present in equilibrium concentrations. Given that 2.2 percent of the activity from uranium is uranium-235, long-lived uranium -235, daughter products (i.e., protactinium-231 and actinium-227) were initially present at about 4.5 percent of the concentrations of uranium-238 and its daughter products. Given the 21-year half-lives for lead-210 and 22- year half-life for actinium-227, 2 to 2 ½ half-lives has

passed since ores were processed. Potential hazards of residues are currently primarily those associated with residual quantities of the thorium-230. Lesser potential hazard may exist from residual uranium and radium and to long-lived uranium daughters including protactinium-231, actinium-227, and lead-210. (Short-lived daughters decayed away shortly after initial processing of the uranium feed materials and have not built back in from existing parent materials in significant quantities due to the long half-years of the parents relative to the period since processing occurred.)

The material shipped to date contains Th-230 concentrations below the current LSA-I threshold but greater than the new definition of LSA-I stated in 49 CFR 173.403 such that material must e shipped as LSA-II upon implementation of the 26 January 2004 revision to 49 CFR. Isotopes other than thorium-230 are generally below LSA-I limits.

To date, the waste stream has contained mean concentrations of radium-226, thorium-230 and uranium-238 of about 40, 700 and 20 pCi/g, respectively, with corresponding median concentrations of about 7, 180, and 8 pCi/g respectively. The corresponding maximum concentration of thorium-230 is about 5400 pCi/g. This maximum concentration of thorium-230 equates to a total of about 500 mCi for a rail car containing about 105 tons (about 80 cubic yards) of waste. Comparison of remedial investigation sampling results indicates that concentrations are not expected to change significantly from those shipped in the past.

Gondola rail cars fabricated in accordance with specifications defined by the Association of American Railroads (AAR) Manual of Standards and Recommended Practices, M1001, will be used in lieu of IP-2 packagings. The rail cars to be used have a service life that extends far beyond the anticipated shipping schedule. Each 2,743 cubic foot, 110 ton, 52.5 foot, gondola-type rail car, is rated for a 286,000 pound gross rail load and was modified to assure the conveyance performs effectively.

The weep holes along with other openings in the cars' bodies have been eliminated to remove any pathways that could allow the gondolas to leak. Interior surfaces of the gondola-type rail cars are covered using the nominal 18-20 mil thick Super Load Wrapper TM (or equivalent) Gondola Lining System. This combination has about six (6) feet overlapping flaps and assures that the packagings effetely contain the material being transported while concurrently minimizing contamination within the rail car and facilitating the unloading of the waste material.

Each rail car is subjected to appropriate inspections immediately prior to being offered for transportation. In addition, rail car structural inspections are performed pursuant to the provisions of 49 CFR, Part 215, Appendix D. Repairs to railcars used by DOD meet current engineering specifications to assure that cars are fully compliant with requirements. No discrepancies have been noted to date regarding structural integrity or serviceability of gondola rail cars for their intended purpose of transporting waste.

Given that uranium (uranium-234, 235 and 238) and radium-226 were preferentially extracted from the feed materials and thorium-230 and other radionuclides present in the waste products do not emit significant gamma radiation, the residues exhibit very low potential for whole body exposure even in the event of derailment such that contaminated soils are released from the rail car. Potential radiological hazards of the waste material are, therefore, limited primarily to those associated with the intake (ingestion or inhalation) of contaminated waste. Gondola derailment is the only credible scenario that would offer the potential for significant intake of contaminated waste.

Transporting this type of material by rail has been demonstrated to be safer and more efficient than containerized shipment of bulk material of this nature for a number of reasons, including

1. Transporting materials by rail results in significantly lower risk of fatalities than transportation by motor vehicle in that the motor vehicle accident rate is significantly greater and the number of shipments/packages would increase proportional to the capacity of the packagings. Adddionally, use of intermodal IP-2 packages by rail would necessitate the transportation of waste on highways to transload facilities at which intermodals could be transferred to flatbed rail cars. These facts result in the conclusion that continued use of gondolas has a significantly lower risk of such accidents than alternatives involving the use of intermodal IP-2 packages

2. Material exposure to workers per unit volume of material is minimized. The number of gondola rail cars required to transport a given volume of waste is much less than the number of non-bulk, IP-2 containers that would be required.

3. Movement by rail reduces transport hazards per unit volume of material moved to the deposal facility as use of gondolas minimizes the risk associated with movement of waste by truck.

4. Elevated concentrations of thorium-230 must be disposed of at a disposal faculty for which unloading of gondolas is highly automated, requires minimal handling and at which safety is enhanced by the existence of a structure to minimize the potential for personnel exposure.

There are no safety tradeoffs due to utilization of bulk rail transport rather than containerization of this material. Rail transport of waste containing higher concentrations of thorium-230 in gondola rail cars with gondola lining system is clearly a better alternative than containerization in IP-2 packagings followed by translocation of such alternative packagings by truck either to a disposal facility or to a rail transload facility. DOD has shipped these materials by gondola rail car to properly permitted disposal facilities successfully for over five years without any significant incidents.

Over the last several years, DOD has shipped about 500,000 cubic yards of low level radioactive wasted (LLRW) by rail car. This waste consisted primarily of about 6200 gondola rail cars of pre-1978 11(e)(2) byproduct materials that was shipped in rail cars as specified for the proposed packagings. The Th-230 concentration has ranged to almost 5,400 pCi/g for waste shipped to date. Gondola rail cars have been safely used by other organizational entities for shipment of similar radioactive wastes.

To date DOD has a zero accident rating (on-site and off-site) with respect to these rail car shipments. There would be no increased risk resulting from the use of this mode of transportation relative to the risk experienced to date. If this exemption is granted all containment aspect of the rail cars used to date to retain the radioactive contents remain unchanged or have been further enhanced.

This request is submitted by Mr. Joseph P. Dugan, phone 757-878-8294, Directorate of Plans, Readiness and Mobilization, Safety Team: Headquarters Military Traffic Management Command, 661 Sheppard Place, Fort Eustis, VA 23604-1644.

Sincerely,

Mark P. Wyrosdick

Mark P. Wyrosdick
Major, US Air Force
Chief of Safety