CONRAIL

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RICHARD B. HASSELMAN
SENIOR VICE PRESIDENT
OPERATIONS

August 17, 1979

Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Dear Sir:

Conrail submits the attached comments on the Nuclear Regulatory Commission's June 15 Interim Final Regulations entitled, "Physical Protection of Irradiated Reactor Fuel in Transit." Conrail has been authorized to submit these comments also on behalf of the Chesapeake and Ohio and Norfolk and Western Railroads.

We thank you for this opportunity to submit comment. If you have any questions concerning them please contact Mr. Jeffrey H. Teitel, Director, Regulatory Affairs at (215) 594-4168.

Sincerely,

R B Hasselman

Acknowledged by card 8/21

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COMMENTS ON
NUCLEAR REGULATORY COMMISSION'S
INTERIM FINAL REGULATIONS FOR THE
PHYSICAL PROTECTION OF IRRADIATED REACTOR FUEL IN TRANSIT
(10 CFR PART 73)

The Consolidated Rail Corporation (Conrail), the largest freight rail line in the United States with over 85,000 employees and operating in 16 states, appreciates the opportunity to comment on the Nuclear Regulatory Commission (NRC) June 15, 1979 Interim Final Rule entitled, "Physical Protection of Irradiated Reactor Fuel In Transit." Conrail has been authorized by the Norfolk & Western Ry. Co. and Chesapeake & Ohio Ry. Co. to state their convinctions also that special arrangements should be made for the transportation of irradiated reactor fuel in transit. Conrail welcomes NRC's initiative to regulate in this area but urges the NRC to require shippers to arrange with carriers for special handling of dangerous radioactive materials on a move-by-move basis to minimize the risks and hazards associated with these materials.

Spent fuel shipments with the potential for producing serious radiological consequences need maximum protection through special handling for many reasons. During the past decade terrorist organizations have evidenced a willingness to commit suicidal acts to achieve their objectives, namely publicity. These groups have sought to jeopardize the lives and safety of large numbers of people for the purpose of drawing attention to a real or imagined cause. However, there are many unplanned occurrences on railroads which might result in the same catastrophic circumstances. Special train service to transport irradiated reactor fuel and other radioactive materials offers the best defense against injury and loss of life, and damage to property.

Conrail submits that the NRC's Interim Final Regulations which establish requirements for protection of spent fuel in transit should expressly require special handling which may be offered by special train service. Railroads know best what to do to ensure maximum safety for the transportation of these ultra-hazardous materials. Conrail strongly maintains for several reasons that safety considerations demand nothing less than special arrangements involving, among other things, speed, routing and protective devices.

The transportation of irradiated spent fuel with a reasonable prospect of safety requires planning, the taking of precautions and the observance of procedures far in excess of and wholly foreign to, those required for ordinary freight including even the most dangerous commodities. Requirements of

10 CFR §73.37 (c) will make conformance to shipper's directives as established by these regulations operationally burdensome and superficially safe unless special train service is employed.

Notification, routing, avoidance of intermediate stops and procedures for coping with the threats of sabotage would present operational difficulties for regular train service. Shippers may not only be disinterested in operational and safety considerations concerning the transportation of radioactive materials but for the most part lack expertise in this area. In the absence of NRC endorsement of special train service shippers of spent fuel and potentially dangerous radioactive materials may construe special train service as either unnecessary or superfluous. Railroads know best that certain operational and safety practices are prudent, reasonable and essential.

Special freight train service which may be appropriate at times essentially consists of a train, whose consist would include, as needed, one or more buffer and guard cars; the train would carry no other commodities. Special train speed is restricted when it would meet or pass another train, one of the two trains would stop to allow the other to pass. The protective cask car or cars carrying the radioactive material would neither be humped nor switched with engine detached. The train would operate in through service by-passing freight yards and highly populated areas.

Unlike many hazardous substances awaiting movement in a freight yard, the potential danger of radioactive materials is not to the shipment but to railroad personnel and the public. Over one-third of all train accidents occur in yards. Therefore, even in a stationary position, it is realistic to surmise that a car holding a protective cask containing radioactive material may be involved in either a rear-end, head-on, or obligue colli. on.

Once in motion, the risk of collision or derailment and the seriousness of the consequences are increased greatly by the s eed and mass of the train in which the shipment is being carried. Whether or not a train derails is dependent on many factors If the energy from impact is not absorbed by the acceleration of the car being struck plus the breaking action and absorption of some slack forces, the sudden impact will cause extensive destruction.

In a serious accident there is frequently a tendency for the cars to pile up and for lighter cars to ride up over heavier cars. In a pile up of mixed freight, a cask of spent fuel elements would quite likely be at the bottom with its water jacket broken and its cooling system out of operation. It is not difficult to surmise that spent fuel, covered with debris, could easily get hot enough to set the debris on fire and melt the lead shielding.

Any fire that lasts over a half-hour is a serious threat to a lead shielded cask. A ditch along a railroad right-of-way is a perfect trap to hold flammable liquids from a damaged tank car; that is also a likely place for a spent fuel cask to land following a derailment. The National Fire Protection Association encourages evacuation from a railroad fire involving a tank car until the fire burns itself out. If spent fuel is shipped in regular train service along with tank cars of flammable liquids, and there is an accident resulting in a fire near a tank car, no one will go near the wreck until the fire burns itself out - which may be days later! The cask's internal heat by that time will have melted the lead shielding. If the cask is covered with debris, with the help of outside heat from other fires, the temperature could get hot enough to melt the cask itself. The physical threshold limits of protective casks have not in fact been tested and therefore are not known exactly.

Spent fuel is an unusual commodity in that it produces heat, and will continue to produce heat indefinitely; since lead has a melting point of 621° F, this is of particular concern regarding the use of casks. However, a cask wall comprised of 6" of lead and an additional 9" of water is used for shielding.

In the event of an accident, if the shield breaks water will run out and the lead wall will begin to melt.

Blasts and fire would be just one cause of injury or death following a radioactive materials accident. An accident involving high-level materials in which a protective cask's shielding is lost would likely result in death to anyone exposed to the effects, including a clean-up crew. It is not necessary for a protective cask to be breached or contents lost for harm to arise: fission gases, vapors and contaminated water may be released upon breach of the cask, causing injury or death to any one within the radiation zone. Reportedly, seven fuel elements in a protective cask, if exposed in an accident, would give a fatal dose of radiation to a man ten feet away in 1.8 seconds; a person standing one hundred feet from an accident would receive a fatal dose of 500 rem in three minutes. If the damage to the jacket and containment shell were on the bottom of the cask, it could appear to be intact while emitting invisible but deadly radiation.

An accident involving spent nuclear fuel would result in uncertain long range effects that would impact on people away from the accident scene. Property damage could be significant to the extent that the area of the accident could not be used for a long period of time.

EPA's "Background Report" entitled, "Considerations of Environmental Protection Criteria for Radioactive Wastes," (February 1978) states on page 3:

> "[A]s a starting point, it seems clear that radioactive wastes should include materials restricted by regulatory controls from discharge to the general environment."

The same rationale applies to the transportation of a nuclear waste which exposes humans to damaging radioactivity.

> "Any waste material that is restricted from discharge to the general environment should be considered radioactive waste and subjected to environmental protection requirements when being managed or disposed of; this is especially applicable to ... fission products from fuel reprocessing ..."
> (Emphasis supplied). Page 5.

Any radioactive waste material requires careful control to ensure minimum human exposure to harmful radiation.

Radioactive wastes and materials vary greatly in activity, form, volume and radiological hazard implications. The transporter should treat all shipments as safely as possible:

"[H]igh-level wastes containing fission products emit penetrating gamma radiation, which means that near proximity to the material may be hazardous. Also, most quantities of such wastes produce sufficient heat from radioactive decay to increase the potential for uncontrolled release to the environment. Following such a release, dilution would reduce the direct radiation hazard so that inhalation and ingestion hazards would then predominate. These pathways to people arise from volatilization, particulate dispersion, and dissolution of the waste. The actual hazard would vary with the isotopic composition of the material. In the case from the waste of reprocessed nuclear fuels, for example, SR-90 and CS-137 would be the controlling inhalation hazard, and SR-90 would be the controlling ingestion hazard for the first <u>few hundred years</u> after the material is produced."
(Emphasis supplied.) (Pages 6 and 7).

Even low-level wastes may result in radiation exposure via water that may come into contact with the waste material and leach various radionuclides into solution. They may eventually be ingested by humans through their food, milk and drinking water. Radioactive dust may result from poor handling of materials of subsequent inhalation of the dust which would pose serious health hazards. (Page 8.). Also, exposure to these radioactive materials significantly increase the risk of cancer.

Nuclear materials are commodities with unique characteristics; their transportation presents unique hazards unlkie those associated with the handling of any other freight which the railroads carry. Because of the unique characteristics of nuclear materials and the potentially devastating consequences of an accident involving them, the NRC should ensure maximum public protection through the use of special trains.

Serious releases of radioactive fuel elements can be expected to occur in regular train service in extremely severe accidents; the likelihood of serious consequences from accidents can be ameliorated by reduced speed, selective routing, and a high degree of control over shipments during transport. A significant danger exists to the railroad and the public if radioactive commodities are routinely exposed to the normal railroad environment.

Impact, explosion, fire, burial, piercing and prolonged torching are sometimes part of the railroad environment; the risk of exposure to these dangers can be drastically reduced by special handling through special freight train service. Conrail cannot in good conscience accept the shipment of these ultra-hazardous materials for <u>regular</u> train carriage if safety must be a paramount need and we believe that it is of primary importance. Attempted compliance with these regulations using regular train service would surely undermine the purpose of these regulations.

Clearly, the intent behind this rulemaking was to ensure safe shipment of radioactive materials. Conrail believes that NRC's regulations virtually reflect special train service. Logically, shipper compliance with 10 CFR 73.37 (c) would seem to require shipment and carriage by special trains.

The NRC's Interim Final Rulemaking to ensure the safest handling of radioactive shipments is wholly consistent with the use of special train service. Conrail submits that most of NRC's requirements would be met by the use of special trains. The thrust of NRC's regulations, listed below, are correlated with advantages of special train service found on pages 12 and 13:

1. .The NRC is notified in advance of each shipment and that the NRC has approved the route in advance of the shipment;
2. Arrangements have been made with the law enforcement agencies along the route of shipments for their response to an emergency or a call for assistance (see (d));
3. The route is planned to avoid, where practicable, heavily populated areas (see (h));
4. The shipment is scheduled where practicable without any intermediate stops except for

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refueling and obtaining provisions, and that at all stops at least one individual maintains surveillance of the transport vehicle (see (f), (h) and (i));

5. Individuals serving as escorts have successfully completed a training program as outlined in Appendix D (see (i));
6. Procedures for coping with threats and safeguard emergencies have been developed (see (d));
7. Each shipment is accompanied by at least one escort in the shipment car or in a separate car that will permit observation of the shipment car (see (e) and (i));
8. Two-way voice communication capability is available in that calls are made at least every two hours to a designated location to advise of the status of the equipment (see (d)); and
9. At least one escort maintains visual surveillance of the shipment car during periods when the train is stopped on sidings or in railyards (see (e) and (i)).

A special train would consist of a locomotive, two buffer cars, the cask car or cars (of spent nuclear fuel or high-level waste), and a caboose. One buffer car would be coupled behind the locomotive; the other would be placed ahead of the caboose.

Special trains offer the following advantages:

(a) Reduced speed,

(b) Reduced switching and less movement in yards,

(c) Increased ability to control speed, acceleration and deceleration,

(d) Special communications,

(e) Reduced size of the train for better observation,

(f) Priority over other trains in using through track which includes stopping other trains to permit clear throughway,

(g) The exclusion on special trains of hazardous materials or explosives which may cause radioactive material release,

(h) Special routing to avoid defective tracks, high population areas and freight yards containing hazardous materials,

(i) Increased opportunity for observation and control by specially instructed train crews;

(j) Minimum train length reducing free slack thereby lessening shock loads,

(k) Reduced time during which the train is exposed to grade crossings (thereby reducing exposure to and from automobiles),

(l) Smaller train size also reduces the likelihood of track structure failure, coupler failure, and train line air hose failure,

(m) Less employee exposure to potential radiation hazards, and

(n) Buffer cars to absorb impacts.

There can be no substitute for maximum protection where a clear and present danger exists which involves ultrahazardous materials. NRC must not ignore the margin of safety afforded by special trains. NRC's discretion here will be a matter of public record in the future. If the public must accept risks of accidents over which they have no control, the NRC should exercise its authority to minimize the risks and liabilities to the public by requiring shippers to use special trains.

Railroads exist to serve the public as well as the shippers of irradiated nuclear fuel and radioactive waste materials. Due care should mean special trains; stricter safety standards must be required to transport radioactive materials. Conrail and other railroads believe that they have a duty to take whatever steps are necessary and within the law to protect themselves and preserve their ability to render service in the public interest. As stated in National Petroleum Association v. A.T. & S. Fe. Ry. Co., 38 I.C.C. 65 (1916) at Page 71:

> "It is the duty of both carriers and shippers, not only with respect to their obligations one to the other, but in consideration of the general public interest, to take no avoidable risks."

The NRC should recognize the special handling expertise offered by railroads for the protection of irradiated reactor fuel and other highly radioactive materials in transit.

Special train service is the safest mode of transporting radioactive materials; it is the best known way of preventing a railroad accident involving such materials. Special train service will afford the public the greatest amount of protection. This service is entirely consistent with NRC's Interim Final Regulations; NRC's regulations are almost tantamount to requiring special train service. Conrail urges the NRC to specify in its regulations that special train service is necessary for the shipment of dangerous radioactive materials to meet its intended safety and security objectives.