

U.S. NUCLEAR REGULATORY COMMISSION
ENVIRONMENTAL ASSESSMENT AND
FINAL FINDING OF NO SIGNIFICANT IMPACT
REGARDING TROXLER ELECTRONIC LABORATORIES, INC. REQUEST FOR
EXEMPTION FROM 10 CFR 32.14

I. Introduction

The NRC has performed an Environmental Assessment (EA) regarding an exemption from the provisions of 10 CFR 32.14 to allow the Troxler Electronic Laboratories, Inc. (hereafter Troxler) to manufacture and distribute the Model Core Reader density gauge as an exempt product. The conclusion of the EA is a Finding of No Significant Impact (FONSI) for the proposed licensing action.

II. Environmental Assessment

1.0 INTRODUCTION

1.1 Background

The Nuclear Regulatory Commission (NRC) staff has evaluated the environmental impacts of an exemption from the provisions of 10 CFR 32.14 to allow Troxler to manufacture and distribute an ionizing measuring instrument for density readings (CoreReader) as an exempt product. This Environmental Assessment (EA) has been prepared pursuant to the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and NRC

regulations (10 CFR Part 51), which implement the requirements of the National Environmental Policy Act (NEPA) of 1969. The purpose of this document is to assess the environmental consequences of the proposed action.

1.2 Review Scope

In accordance with 10 CFR Part 51, this EA (1) presents information and analysis for determining whether to issue a Finding of No Significant Impact (FONSI) or to prepare an (1) Environmental Impact Statement (EIS); (2) fulfills the NRC's compliance with NEPA when no EIS is necessary; and (3) facilitates preparation of an EIS if one is necessary. Should the NRC issue a FONSI, no EIS would be prepared and the license would be granted.

The CoreReader is an ionizing radiation measurement instrument that determines the specific gravity of a compacted asphalt sample. It is a bench top laboratory instrument with overall dimensions of 12.2 inches (31.0 cm) in width, 10.2 inches (25.9 cm) in length, and 29 inches (73.7 cm) in height with a weight of 77 pounds (34.9 kg). The construction is all metal housing and includes lead shielding around the source.

The CoreReader contains eight exempt-quantity cesium-137 sources, 10 microcuries each, with a total activity of 80 microcuries (0.37 MBq, 3 MBq respectively). The sources are installed in a plexiglass disk, one inch diameter, 0.175 inches thick (2.54 cm, 0.44 cm respectively) which is filled and sealed with an epoxy. The sources are held in a subassembly inside the device, constructed from a one inch (2.54 cm) thick aluminum plate. The source assembly is held in place by an aluminum cover plate fastened with four screws. The source

assembly is mounted inside the lower third of the device below the sample chamber. It is not removable and is completely inaccessible to the user.

1.3 Proposed Action

The proposed action is to issue an exemption from 10 CFR 32.14 to the provision limiting the use of exempt quantity sources to ionizing radiation instruments to include a density reading device. The density reading device would use sources identical to those that are permitted by 10 CFR 30.15(a)(9)(ii) for ionizing radiation instruments. This action allows Troxler to distribute the CoreReader as an exempt device instead of a generally licensed device.

1.4 Need for Proposed Action

The use of the CoreReader would be one element in the implementation of the Strategic Highway Research Program (SHRP), which was established by Congress in 1987 to develop and evaluate innovative technologies for roadway construction, maintenance, and operations. SHRP was conducted in the belief that even small improvements in highway construction and maintenance can yield substantial returns on the research investment. The SHRP program produced Superpave, a more reliable asphalt-mix design, analysis, and quality control methodology that uses an advanced technology approach to pavement design. The goal of Superpave is for roads to be maintenance-free for up to 20 years, compared with 10 years for normal pavement.

Implementation of the Superpave-mix design has resulted in superior-performing asphalt pavements. However, the coarser mixtures resulting from Superpave-mix designs have

caused problems with the accuracy and precision of measuring the specific gravity of laboratory specimens and pavement core samples. The overestimation of density results in premature pavement distress and permeability-related problems. Troxler's CoreReader is a technological improvement that overcomes the shortcomings of current water displacement methods for measuring the specific gravity of asphalt samples. Unlike current methods, the CoreReader uses radiation from a distribution of sources to probe the entire volume of an asphalt sample. By doing so, it can accurately measure the coarser Superpave mixes. The CoreReader reduces operator dependence, improves accuracy and precision, and reduces laboratory differences in measurements to produce better pavement designs.

Troxler's experience with the distribution of generally licensed gauges shows that despite the CoreReader's advantages, it would be attractive to end-users only if it could be distributed nationally under uniform licensing with low quantities of radioactive material contained in it. Many potential users have indicated that they are unwilling to deal with additional regulatory burdens associated with generally licensed devices. Therefore, the CoreReader's benefits can be fully realized only if it is licensed for exempt distribution.

1.5 Alternatives

The alternatives to NRC are:

1. Approve the license request as submitted; or
2. Deny the request. In case of denial, Troxler would have the choice to register the CoreReader as a generally licensed device.

2.0 AFFECTED ENVIRONMENT

The affected environment for Alternative 1 would be the immediate vicinity of the CoreReader device.

The affected environment for Alternative 2 is the same as Alternative 1 if Troxler were to pursue a generally licensed registration.

3.0 ENVIRONMENTAL IMPACTS OF PROPOSED ACTION AND ALTERNATIVES

3.1 Public Health

Alternative 1

The risk to human health from distribution and transportation, routine use, disposal, and accidents and misuse were evaluated in the "Systematic Radiological Assessment of Exemptions for Sources and Byproduct Materials" (NUREG-1717, 2001). The report estimated (Section 2.10) the dose rates for exempt distribution of ionizing radiation-measuring instruments, similar to the CoreReader. For the CoreReader, the dose rates are less or, in one case essentially the same, as the values presented in NUREG-1717. Specifically, for the CoreReader the individual annual effective dose equivalent for distribution and transportation of the device is 0.5 mrem (vs. 0.4 mrem in Section 2.10.4.1; it is to be noted that the 0.5 mrem value is a conservative overestimation of the dose rate because of geometry factors); the individual annual effective dose equivalent for routine use is 10 mrem (vs. 20 mrem in Section 2.10.4.2); the individual annual effective dose equivalent for disposal is 0.00055 mrem

(vs. ≤ 0.001 mrem in Section 2.10.4.3); the individual annual effective dose equivalent for accidents and misuse is 64 mrem (vs. 80 mrem in Section 2.10.4.4).

The dose rates above were calculated from the following activities. The devices will be fabricated on demand and shipped directly to the user without intermediate storage. The projected annual production rate is 120 units. Distribution will occur by truck and airplane. The calculation above assumed that one truck driver does all the deliveries. When in normal use, the operation of the CoreReader consists of three steps: (1) inserting the sample into the device; (2) counting and analyzing the sample; and (3) removing the sample from the device. No user maintenance is required. If licensed as an exempt product, users may dispose of the CoreReader in commercial waste, similarly to other exempt products. However, Troxler encourages the return of the devices to the manufacturer for disposal as radioactive waste.

Alternative 2

No changes to the public health and occupational health under normal conditions are expected as a result of denying this request, because the applicant could choose to register this device as a generally licensed product, but with increased administrative and regulatory burden.

3.2 Water Resources

Alternative 1

The NRC staff has determined that the proposed exemption will not impact the quality of water resources.

Alternative 2

The NRC staff has determined that denial of the proposed request will not impact the quality of water resources.

3.3 Geology, Soils, Air Quality, Demography, Biota, and Cultural and Historic Resources

Alternative 1

The NRC staff has determined that the proposed request will not impact geology, soils, air quality, demography, biota, and cultural and historic resources under normal transport and use conditions.

Alternative 2

The NRC staff has determined that denial of the proposed request will not impact geology, soils, air quality, demography, biota, and cultural and historic resources under normal transport and use conditions.

4.0 Conclusions

The action that NRC is considering is to issue an exemption from 10 CFR 32.14. The proposed action allows Troxler to distribute the CoreReader density gauge as an exempt device.

Based on its review, the NRC staff has determined that the environmental impacts associated with the proposed action do not warrant denial of the exemption request and that the proper action is to issue a FONSI in the Federal Register. The NRC staff considered the environmental consequences of approving the exemption from 10 CFR 30.15(a)(9)(ii) and has determined that the approval of this exemption will have no adverse effect on public health and safety or the environment.

5.0 AGENCIES AND PERSONS CONTACTED

Troxler is located in North Carolina. NRC contacted the Division of Radiation Protection, Department of Environment and Natural Resources, State of North Carolina.

6.0 REFERENCES

U.S. Nuclear Regulatory Commission (NRC), "Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials," June 2001, NUREG-1717

III. Finding of No Significant Impact

The Commission has prepared an EA related to the exemption request. In the assessment, the Commission has concluded that environmental impacts associated with the proposed action would not be significant and do not warrant the preparation of an EIS. Accordingly, the Commission is making a FONSI.

IV. Further Information

Any questions regarding this action can be directed to Dr. John P. Jankovich at (301) 415-7904 or by e-mail at JPJ2@nrc.gov

Dated at Rockville, Maryland, this 13th day of December, 2002.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

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