



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

April 14, 2004

Docket No. 03036499  
Control No. 134442

License No. 01-30362-01

Mark Fellows  
Vice President  
Eastern Technologies, Inc.  
P.O. Box 409  
Ashford, AL 36312

SUBJECT: EASTERN TECHNOLOGIES, INC., REQUEST FOR ADDITIONAL  
INFORMATION CONCERNING APPLICATION FOR NEW LICENSE,  
CONTROL NO. 134442

Dear Mr. Fellows:

This is in reference to your application dated January 29, 2004 applying for a Nuclear Regulatory Commission license. In order to continue our review, we need the following additional information:

1. You have requested that you be named Radiation Safety Officer (RSO) on your license. In support of this request, please provide specific dates for your radiation safety training and your practical radiation safety experience with each of the duties typical of an RSO. Your specific training and experience as the proposed RSO must address the full scope of uses of licensed material to be authorized under your NRC license. Provide a statement delineating the RSO duties and responsibilities for carrying out the radiation safety program. Section 8.7.1 of NUREG-1556, Volume 18 (enclosed) discusses the duties and responsibilities of the RSO and may be helpful in developing your response.
2. Item 5.C of your application requests a possession limit of 350 grams of uranium-235 (U-235), 200 grams of uranium-233 (U-233), and 220 grams of plutonium (Pu). It would be unusual for a nuclear laundry to possess special nuclear material in quantities and forms sufficient to form a critical mass. Absent additional justification, we will not approve a possession limit for special nuclear material for such a license when the sum of the ratios of U-235, U-233, and plutonium (in any form other than plutonium-beryllium neutron sources) exceeds unity in the following formula:

$$\frac{\text{grams U-235}}{350} + \frac{\text{grams U-233}}{200} + \frac{\text{grams Pu}}{200} \leq 1$$

The possession limits you requested for U-235, U-233, and plutonium result in the sum of the ratios exceeding unity. In addition, licensees authorized to possess plutonium in excess of 2 curies (approximately 32 grams) in unsealed form must meet the requirements of 10 CFR 70.22(i), including development of an emergency plan. Please provide revised possession limits for U-235, U-233, and plutonium. If you propose a possession limit for plutonium which exceeds 32 grams, please submit additional

- information that meets the requirements of 10 CFR 70.22(i), including an emergency plan. In addition, please confirm that you will possess special nuclear material in quantities and forms not sufficient to form a critical mass and that the sum of the ratios of special nuclear material possessed under your license will not exceed unity.
3. Item 8.10.2.A of your application describes your radiation monitoring instruments. Please provide the manufacturer and model number for your portable radiation survey instruments and probes, range of each instrument (milliroentgens per hour or counts per minute) and the intended use (monitoring, surveying, assaying, or measuring).
  4. Item 8.10.2.B of your application states that you will not calibrate instruments utilized for measurement of dose rate and that these instruments will be calibrated by the manufacturer or other such qualified facility. Please confirm that all portable survey instruments used for measuring dose rates will be calibrated annually by individuals specifically authorized by NRC or an Agreement State to perform such calibrations.
  5. Section 8.10.3 of your application describes your procedures for material receipt and accountability.
    - A. Please confirm that you will conduct physical inventories at intervals not to exceed six months to account for all sealed sources and devices received and possessed under your license.
    - B. Describe your procedures for maintaining records of receipt, transfer, and disposal. Table 8.3 of NUREG-1556, Volume 18 provides a list of types of records and length of time that records must be maintained.
  6. Item 9 of your application, Facilities and Equipment, contains diagrams of your facility. Please provide the locations of monitoring stations and a description of the ventilation system, including pertinent air flow rates and sample collection points, on your diagrams. In addition, Drawing Nos. PF001, PF002, and PF003 depict three wastewater discharge tanks. Drawing PF005, Revision 1, depicts four wastewater discharge tanks and Item 9.C., Wastewater Filtration System describes four Filtered Wastewater Holding Tanks. Please provide the correct number of holding tanks which will be used in the Wastewater Filtration System.
  7. Item 9.A.6 of your application describes temporary storage of radioactive waste in sea/land type containers. Please provide the location where these sea/land containers will be stored and the security measures which will be used for control of access to these containers.
  8. Item 9.A.7 of your application describes measurement of radioactive materials for incoming and outgoing shipments. Please provide a description of the facilities (e.g., counting laboratory) where air, water and wipe samples will be analyzed. In addition, please provide the calibration procedures for the equipment used for gross beta/gamma, gross alpha and gamma spectroscopy activity analyses and the lower limit of detection for your counting system(s).

9. Item 9.B.1 of your application states that a press may be employed to extract free liquids as a substitute for a washer extractor. Please describe your radiation safety procedures for the use of this press.
10. Item 9.B.3 of your application states that appropriate health physics considerations will be followed when using soiled material handling equipment. Please describe the health physics considerations which will be applied.
11. Item 9.C, Wastewater Filtration System, and Diagram PF005, Revision 1, of your application describes the use of a microfiltration system consisting of filters capable of removing particles less than 20 microns. Please provide a detailed description of this system and a discussion of why you believe it will be able to meet the needs of your proposed facility. In addition, please confirm that you will submit any proposed modifications of your wastewater filtration system to NRC for prior approval before implementing any modifications to your wastewater filtration system.
12. Item 9.B.5 of your application states that exhaust from the HEPA filtered negative pressure unit will be ducted outside of the sorting area. Please describe where this exhaust will be ducted to and describe any filtering or monitoring equipment associated with this exhaust system.
13. On page 5 of the Radiation Protection Program section of your application, you provide exposure limits for certain emergency situations. The NRC does not have limits for these situations. Please remove these limits from your application.
14. On page 12 of the Radiation Protection Program section of your application and on page 3 of the Posting and Control of Radiologically Restricted Areas section of your application, you state that no eating, drinking, smoking, or chewing is permitted inside the RCA *unless the Radiation Safety Officer allows such behavior on a case by case basis*. Please confirm that no eating, drinking, smoking, or chewing will be permitted inside the RCA *at any time*.
15. The Bioassay section of your application does not specify the instrumentation used in your bioassay program for performing whole body gross activity analysis and whole body counter. Please specify your instrumentation and calibration procedures, including the type(s) of phantom you will use.
16. The Security Provisions section of your application describes access control techniques to be followed during non-operational hours to prevent unauthorized access to owner controlled or radiologically controlled areas of your facility. Please describe your procedures for access control techniques to be followed during operational hours to prevent unauthorized access to these areas.
17. The Contamination-Dose Rate Surveys section of your application states that the number and location of air samples to be collected is to be based on associated operational considerations. Please specify the type and frequency at which routine surveys for airborne licensed materials in restricted areas are performed (e.g., breathing zone and general work area air sampling, hood and room ventilation air flow rate

- measurement, and stack effluent sampling. Describe the instrumentation that will be used for sample collection and analysis, the calibration method and frequency for each, and specify the lower limit of detection and actions levels for each.
18. The Monitor-Survey Requirements section of your application describes liquid releases to unrestricted areas.
    - A. The discharge limits in 10 CFR Part 20 Appendix B, Table 3 are for releases to the sanitary sewer. Please confirm that you will not be discharging liquid effluents to the sanitary sewer. In addition, please indicate how you will ensure a representative sample of liquid from your holdup tanks has been taken. Please provide the units for results from gross beta/gamma, gross alpha, and gamma spectroscopy activity analyses and a detailed, specific description of any mathematical formulas used to convert units to microcuries per milliliter (uCi/ml).
    - B. Please indicate how your evaluation of the wastewater sample analytical results meet the requirements in 10 CFR 20.1302 regarding compliance with dose limits for individual members of the public.
    - C. Based on your operating experience at other nuclear laundry facilities, describe your expected radionuclide mix and concentrations and the expected monthly releases in water.
  19. The Monitor-Survey Requirements section of your application describes airborne releases to unrestricted areas.
    - A. Please describe your procedures for complying with 10 CFR 20.1302 for effluent releases in air to unrestricted areas. In addition, licensees must comply with the constraint on air emissions as described in 10 CFR 20.1101(d). Regulatory Guide 4.20 (enclosed) provides acceptable methods to demonstrate compliance with 10 CFR 20.1101(d).
    - B. Based on your operating experience at other nuclear laundry facilities, describe your expected radionuclide mix and concentrations and the expected monthly releases in air.
  20. In Section VI of the Rad Handling Procedure section of your application, you describe handling of contaminated sludge waste. Please describe the procedures you will use for handling and processing of contaminated sludge as described in Section VI. In addition, please include any safety issues that must be addressed with handling and processing of the contaminated sludge.
  21. In Section VII of the Rad Handling Procedure section of your application, you describe survey and release guidelines for unrestricted release of material, including sludge, from the RCA. Please provide the sensitivity of the instrumentation you will use to analyze the sludge samples. In addition, describe your experience with releasing sludge for unrestricted use at your nuclear laundry facility in Alabama. Please describe the "bulk solid material" mentioned in this section.

22. In several sections of your application, you describe procedures for responding to various types of emergencies. These procedures should include provisions for immediate response, after-hours notification, handling of each type of emergency, equipment, and the appropriate roles of users and the radiation safety staff. Please provide emergency procedures which clearly demonstrate your staff's role(s) in an emergency with step-by-step instructions and clear direction of whom to contact. Appendix P to NUREG-1556, Volume 7 (enclosed), includes model emergency procedures which may be helpful in developing your response.
23. In several sections of your application, you describe the use of HEPA filters for removing airborne contamination. Please describe your radiation safety procedures for changing these filters. In addition, please confirm that HEPA filters will be treated as radioactive waste.
24. In several sections of your application, you describe procedures for monitoring for personnel contamination. Please provide action levels for decontaminating skin and procedures for informing the RSO that a contamination incident has occurred.
25. 10 CFR 20.1201 requires, in part, that skin dose be limited to 50 rems per year. 10 CFR 20.2203(b) requires, in part, that each report filed in response to a reportable event include an estimate of each individual's dose. Describe your procedures for assessing dose from skin contamination with licensed material. In addition, provide your procedures for identifying "hot particles" and performing dose estimates for both "hot particle" and non-"hot particle" contamination events.
26. Your application states that combinations of launderable cotton or poly/cotton garments, launderable OREX garments, rubber goods, etc. are shipped collectively by the utilities to the service vendor for treatment. Please provide procedures for sorting of the OREX garments from the non-OREX garments. In addition, please describe what would occur if an OREX garment goes through a normal wash process or if a non-OREX garment goes through the OREX washing process. Will either of these situations result in clogged drain lines? Will workers need to manually handle the material in the washers? Discuss any potential destruction of the filtration systems or other process malfunctions that may have worker safety/exposure and/or environmental release consequences.
27. Please confirm that any trailers or mobile laundry units which contain radioactive material or contamination and are stored on site will be locked to prevent access to the radioactive material.
28. Please describe your method used to determine the concentration of hard-to-detect beta emitters in your wastewater analysis.
29. The potential for the spread of radioactive contamination outside the radiologically controlled area (RCA) exists at your facility. Please provide a description of your routine survey program that includes areas outside the RCA to be surveyed (i.e., rest rooms, hallways, offices, etc.,) the types and levels of radiation and contamination considered to be acceptable, and provisions for maintaining records of surveys.

M. Fellows  
Eastern Technologies, Inc.

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30. Your action level for requiring assessment of internal dose from airborne radioactive materials is based on the concentrations of radioactive material allowed in effluent air released to the environment (Appendix B, Table 2, Column 1). These airborne effluent concentration limits could result in doses to members of the public of 50 millirem in a year, and are based on assumptions of exposure duration and breathing rates that are different than the assumptions used for workers who might receive occupational doses. However, your use of the airborne effluent concentration limits is conservative compared to the requirement in 10 CFR 20.1502, which requires you to assess internal dose to a worker if that worker is likely to exceed 10% of the annual limit (10% of 5000 millirem, which is 500 millirem) due to internal dose. Therefore, we have no objection to your action level.

We are currently reviewing your financial assurance documents and will provide any correspondence regarding these documents under separate cover. Please note that you may not possess licensed material until financial assurance is approved by the NRC.

In accordance with 10 CFR 2.790, a copy of this letter will be placed in the NRC Public Document Room and will be accessible from the NRC Web site at <http://www.nrc.gov/reading-rm.html>.

We will continue our review upon receipt of this information. Please reply to my attention at the Region I Office and refer to Mail Control No. 134442. If you have any technical questions regarding this deficiency letter, please call Donna Janda at (610) 337-5371.

If we do not receive a reply from you within 30 calendar days from the date of this letter, we shall assume that you do not wish to pursue your application.

Sincerely,

**Original signed by John D. Kinneman**

John D. Kinneman, Chief  
Nuclear Materials Safety Branch 2  
Division of Nuclear Materials Safety

Enclosures:

1. 10 CFR Parts 19, 20, 30, 40, and 70
2. Regulatory Guide 4.20

3. NUREG-1556, Volume 7

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