

November 27, 2007

Stephen L. Fowler
Fowler Associates, Inc.
3551 Moore-Duncan Highway
Moore, SC 29369

SUBJECT: Electron Beam Irradiation of Diamonds

Dear Mr. Fowler:

I am responding to your letter dated October 19, 2007 that discussed the issue of electron beam irradiation of diamonds to enhance their color.

In your letter you described a process, used by your client, of accelerator irradiation of the diamonds using an electron beam with energy below 1.5 MeV. You indicated that it is well known that electron beams well below 2 MeV have insufficient energy to activate diamonds and make them radioactive. You also provided information from the analysis of irradiated and non-irradiated diamonds from this process. You request that you be informed if the process used by your client is covered by Nuclear Regulatory Commission (NRC) regulations for requirements for expanded definition of byproduct material that were published on October 1, 2007.

NRC can provide clarification of its regulations as it applies to your situation and process, but final determination of whether the regulations in Title 10 Code of Federal Regulations apply must be made by the individual client. The expanded definition of byproduct material, as it applies to your client, addresses material made radioactive in an accelerator. Any material that has been made radioactive by use of a particle accelerator; and is produced, extracted, or converted after extraction for use for a commercial, medical, or research activity is included in the definition of byproduct material and subject to NRC requirements, especially 10 CFR Parts 20, 30 and 32. The NRC does not have authority to regulate the possession or use of particle accelerators. Material exposed in an accelerator that is not made radioactive is not covered under our regulations.

Therefore, if, in the use of an accelerator, material that is produced, or extracted, for a commercial, medical, or research activity is not made radioactive, it does not fall under NRC jurisdiction. The facility using the accelerator needs to make the determination of whether the material is made radioactive or not.

Sincerely,

/RA/

Joseph E. DeCicco, Senior Health Physicist
State Agreements
and Industrial Safety Branch
Division Materials Safety
and State Agreements
Office of Federal and State Materials
and Environmental Management Programs

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