

From: [Chimood, Jane](#)
To: [: Chance, Brenda J.](#)
Cc: [Jones, Andrea](#); [Freeman, Stanley](#)
Subject: FW: RE: License Application XB1337 for CF-252 for Iraq
Date: Thursday, August 09, 2018 4:19:21 PM
Attachments: [CB Omni Data Sheet.pdf](#)
[Z100.pdf](#)

Brenda,

Thank you for the quick turnaround. We will proceed further with review of this application.

Regards,
Jane

From: Chance, Brenda J. [mailto:brenda.chance@thermofisher.com]
Sent: Thursday, August 09, 2018 4:04 PM
To: Chimood, Jane <Jane.Chimood@nrc.gov>
Subject: [External_Sender] RE: License Application XB1337 for CF-252 for Iraq

Hello Jane

Thank you for the call this after. I hope the below answers your questions for this License.

1. The sources are manufactured in different strengths in according to the below explanations.
The sources ordered for this system are 2 units with a measurement of 29 micrograms per source of Californium-252. I also attached the drawing from the vendor and an actual picture of a source capsule.

The raw material which comes from the Isotope Reactor vessel is used to make the Californium is manufactured and supplied by the below Department Of Energy at the facility at Oak Ridge Office of Environmental Management, Federal Bldg. 200 Administration Road Oak Ridge, Tn. 37830.

2. The actual weight of a sealed capsule is just over .50 ounces.

3 and 4. Can be summarized on the below and the attached copy of our Data form for the Omni Analyzer.

The analysis technique used in all Thermo Scientific analyzers is called Prompt Gamma Neutron Activation Analysis (PGNAA). PGNAA is based on the principle that each element, when activated by neutrons, emits gamma rays of unique characteristics which allow the

identification and quantification of the elements present.

The CB Omni uses the Prompt Gamma Neutron Activation (PGNAA) technique to measure material composition in the cement manufacturing process. With accurate minute-by-minute analysis on their entire material flow, manufacturers can improve their product while reducing costs.

The PGNAA process is based on a subatomic reaction between a neutron and the nucleus of any atom. When a thermal, or slow, neutron approaches close enough to a nucleus, it will be absorbed by that nucleus. This absorption process causes the nucleus to become excited, a condition which is relieved by the nearly instantaneous release of energy in the form of a gamma ray.

The source used in the Thermo Fisher Scientific CB Omni has a half-life of 2.6 years (meaning that every 2.6 years the source strength decreases by half). If there were no replenishment after 2.6 years, the static repeatability will degrade by about 30%. It is for this reason that we require static repeatability testing to occur within three months following the delivery of the sources on site.

The gamma ray counts are proportional to the amount of material in front of the detector. Therefore, for static repeatability testing, we require a minimum belt loading as specified in the Static Repeatability section of the proposal.

I hope this explains everything if you need me to reply to anything else please feel free to give me a call.

Thanks in advance,
Brenda Chance

Brenda Chance

Global Californium Source Coordinator
Licensed Customs Broker
Import | Export Coordinator

Thermo Fisher Scientific
22 Alpha Road Chelmsford, MA 01824
Telephone +1 | Mobile +1 (978) 412-2174

Brenda.Chance@thermofisher.com

From: Chimood, Jane [<mailto:Jane.Chimood@nrc.gov>]

Sent: Thursday, August 09, 2018 2:19 PM

To: Chance, Brenda J. <brenda.chance@thermofisher.com>

Subject: License Application XB1337 for CF-252 for Iraq

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Brenda,

As discussed please provide more information about the following:

1. ...ordered 2-29ug, box 10
2. 1 oz in box 10c.
3. Type of device that contains the source, a gauging device or radiography equipment.
4. Please write two or 3 sentences to specify how these sources will be used in manufacturing of the raw cement products.

Thank you.

Jane Chimood
Licensing Officer
Office of International Programs
Phone: (301) 287-9225
Email: Jane.Chimood@nrc.gov