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Transit for class 7 radioactive cobalt-60 sources can help to save lives

REVISS is the world's second biggest supplier of sealed Cobalt-60 (Co-60) radiation sources to the radiation processing industry; serving medical device, pharmaceutical, cosmetics, packaging and food markets. At this year's IAPH World Ports Conference, the company will be highlighting the importance of a review in the management and implementation of shipping legislation governing the approval of transit for Co-60 radiation sources.

Denial of transit for Class 7 cargo has become commonplace meaning that a vessel carrying even one container of cobalt-60 sources will be denied passage through certain ports to off-load other cargo. Consequently, source manufacturers struggle to find carriers who can access reliable shipping routes to such destinations as the Far East and Africa, when the carrier must necessarily transit multiple ports in Europe to offload en route. Further difficulties are encountered with routes that require trans-shipment; a number of hubs used by carriers are unable to accept class 7 cargo for transshipment to feeder vessels. Even within "class 7 friendly" ports, only specific terminals may be able to accept class 7 cargo; the carrier is unlikely to deviate from the preferred terminal to accommodate just one or two ISO containers which further limits the number of shipping options available.

Costs for shipping class 7 cargo are very high, therefore users of Co-60 tend to take large infrequent deliveries - for example, one ISO container every two years. Gamma energy from Co-60 sources falls by 12% per year so sterilisation operators typically work on a replenishment cycle that runs from significant over capacity to under capacity. This heightens the need for prompt Co-60 delivery to minimise any negative impact on processing throughput at the end of the cycle; the processing rate for sterilising medical devices reduces by 1% per month.

45% of the world's single use medical supplies are sterilised using gamma radiation from cobalt-60 sources. This means that if you have ever had an injection or used a sterile dressing you have probably already benefited from a global industry that has just two major suppliers of Co-60; both are equally dependent upon the reliable transportation of Class 7 radioactive material to approximately 200 sterilisation facilities around the world. Suppliers ship a total of just 100 ISO containers per year; this is insignificant business to the shipping industry but vital in maintaining global healthcare. Suppliers can struggle for upwards of six months to find a carrier for this critical manufacturing component, only to have the ISO container rejected by the ship's master on the point of loading! Ultimately this has the potential to impact all our lives in many unexpected ways:

In our Hospitals

- 80% of surgical gloves, sterilised using Co-60
- Blood may be irradiated before transfusion to prevent the fatal Transfusion Associated Graft versus Host (TA GvH) disease
- Bottle teats for premature baby units are sterilised using Co-60
- Food is irradiated to protect immune compromised patients from food-bourn illness.

In our Homes

- Food packaging is sterilised using Co-60
- Natural ingredients in cosmetics and pharmaceuticals are irradiated to avoid transmission of infection
- Wound dressings are sterilised using Co-60
- Feathers in soft furnishings may be sterilised to prevent transmission of bird flu
- Pet chews are irradiated to prevent transmission of salmonella

In our Environment

- Mosquitoes are made infertile by irradiation to gradually eradicate malaria by interrupting the breeding cycle
- Horticultural growing mats, pots and fleeces may be sterilised for re-use, reducing waste
- Hospital waste is sanitised before disposal
- Sewage may be sanitised before use as organic fertiliser.



These are just some of the uses of Cobalt-60 radiation sources that benefit every one of us in our everyday lives.



Of particular benefit to carriers and dock workers is the growing phytosanitary application of irradiation; using gamma radiation from Co-60 sources to rid tropical fruits and bulk commodity crops of quarantine and spoilage pests in place of dockside and on-board fumigation with Methyl Bromide - a Class I cancer agent, banned for agricultural applications in the developed world since 2005. However, these irradiation facilities are often located in regions with difficult access routes and take small, infrequent deliveries of Co-60 sources.

Fear for port workers' radiological safety is misplaced. The routine intermittent handling of Co-60 cargo by port workers will have essentially no impact on their annual radiation dose uptake. A measure of the effectiveness of the radiation shielding used in the Type B(U) flasks that are used for the transportation of Co-60 sources is that the measured annual dose absorbed by REVISS classified industry workers, who handle these flasks in close proximity on a daily basis, is equal to approximately 2 units. This is less than the 2.5 units of background radiation that we all absorb each year from atmospheric emissions when we fly, through geological emissions from the natural environment, or when we undergo medical x-rays. The same argument also applies to the dose uptake by containers placed adjacent to the Co-60 container; it will be essentially nil and have no impact upon the product within.



Since July 2001 sea freight has been the only transport option available to the sterilisation industry for the overseas shipment of cobalt-60. In July 2005, the IMO Facilitation Committee discussed the increasing difficulties encountered in the shipment of IMDG Code Class 7 radioactive material, in particular Co-60. The committee reported its concerns about the potential adverse consequences on public health of the denial of shipment of Co-60 used in medical applications in FAL.6/Circular 12. The IMO recommended that member governments bring the contents of this circular and the annexed advice on the shipment of Co-60, to the attention of their Public Authorities, owners, operators and masters of ships and operators of ports located under their jurisdiction. The IMO then urged member governments to bring to the attention of the Facilitation Committee any instances, together with reasons, where the shipment of Co-60 encounters difficulties or is refused aboard ship, or through ports so they might determine the actions required. To-date REVISS has submitted approximately 20 specific cases of denial to the Facilitation Committee but has not noticed any unilateral improvement in the situation. That is not to say that there are no success

stories. When the supply frequency is of the order of one to ten containers per month, as it is between the UK, North America and Northern Europe, suppliers of Co-60 have established good relationships with carriers and port authorities and all involved work hard to maintain reliability.



For both security and commercial reasons, suppliers of Co-60 sources make every effort to minimise the time flasks are held dockside for physical and documentary examination by Customs. REVISS has gained the status of Authorised Economic Operator (AEO) which is an internationally recognised quality mark for businesses trading in a global market. The equivalent authority in the USA is C-TPAT, Customs and Trade Partnership Against

Terrorism, with which REVISS is also registered. In this way Co-60 suppliers endeavour to heighten regulatory awareness of our business, improve product security and minimise the impact of the class 7 status of our cargo on carriers and port authorities.



In support of public health and environmental conservation worldwide, we would urge Ports and Harbours, the IMO and the IAEA to conduct an urgent review of the management and implementation of shipping legislation governing the approval of transit for Co-60 radiation sources. Visitors to this year's exhibition at the IAPH World Ports Conference in Genoa, Italy, (25-29 May 2009) can discuss these issues in further detail with representatives of REVISS Services at its stand, D32 in the exhibition hall.

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