



National Energy
Board

Office national
de l'énergie

Safety Advisory

NEB SA94-1

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Potential for Elevated Radiation Levels In Propane

In November of 1992 the National Energy Board received an incident report from Petroleum Transmission Company Ltd. with respect to elevated, but not unsafe, levels of radiation detected in propane. The origin of this radiation was determined to be natural occurring radioactive materials ("NORM") which occur as a result of radon, a radioactive gas, selectively dissolving in the propane fraction of natural gas liquids. Upon radioactive decay, radon gas is converted into radon progeny particulates. These particulates can accumulate along internal surfaces of tubulars, filters and other equipment surfaces such as those found within extraction facilities or along the propane transmission pipelines. The particular radioactive species identified were radon 222 and radon progeny which are part of the natural uranium (U-238) decay series.

Alberta Occupational Health and Safety ("AOHS"), Radiation Health Branch conducted a further investigation and has since issued a report on its findings. Although the AOHS report indicates that no significant public health risk due to radon or radon progeny in propane product was found, AOHS recommends that the petroleum industry develop a quality assurance program to qualitatively measure the concentration of radon in propane prior to release to the open market. *

The report also indicates that workers are only receiving radiation exposures approaching the safe maximum annual limit when they come in direct contact with equipment and when contact is maintained for a complete work day. Survey measurements indicate that radon progeny are accumulating in various equipment. Although worker proximity at this time does not currently pose a significant health risk, the continued build-up of radon progeny in on-line equipment could change the status quo when equipment is taken off-line for servicing or disposal. Removal of metal housings or machining of contaminated internal surfaces could present an unacceptable level of worker exposure either externally due to radiation emission from radon progeny or internally due to the possible inhalation of these particulates by workers not following acceptable contamination control procedures. Therefore, the report indicates that an on-going radiation monitoring program is a prudent option to consider by all companies with facilities having similar equipment in propane service.

The AOHS report also makes three recommendations dealing with a quality assurance program, a radiation monitoring program and a code of practice.

The National Energy Board wishes to draw to the attention of those pipeline companies within its jurisdiction that ship propane, to the circumstances, events, findings and recommendations of the AOHS report with respect to this incident.

For additional information regarding this advisory please contact the National Energy Board at (403) 292-4800 and ask for assistance from staff who deal with pipeline incident investigation matters. Alberta Human Resources and Employment, Workplace Health and Safety (formerly Alberta Occupational Health and Safety) can be contacted at (780) 427-2687

* Note: Much progress has been made in the study of NORM since the publication of this Safety Advisory. Two definitive documents are available to industry concerning the management of NORM. The "Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM)" is published by Health Canada and is available at:

ENGLISH URL: http://www.hc-sc.gc.ca/ehp/ehd/catalogue/rpb_pubs/00ehd245.pdf

FRENCH URL: http://www.hc-sc.gc.ca/ehp/dhm/catalogue/brp_pubs/00dhm245.pdf

The second document is titled "Guidelines for the Handling of Naturally Occurring Radioactive Material (NORM) in Western Canada" and is available from Alberta Human Resources and Employment, Workplace Health and Safety at the above telephone number.

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