

To: Canadian Radium & Uranium Corp. Site File

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From: Samuel Cheek, Weston Solutions, Inc.

Subject: Area of Observed Contamination Determination

An Area of Observed Contamination (AOC) according to HRS for gamma radiation is an area where the gamma radiation exposure rate equals or exceeds two times (2x) the site-specific background gamma radiation exposure rate, as measured at 1 meter from the ground surface or 1 meter away from an aboveground source.

Procedures for finding site specific background

The Canadian Radium and Uranium Corp. (CRU) site-specific background level was determined from a gamma walkover survey for the site as well as identifying an area that best exhibits site conditions unaffected by the radioactive contamination. The procedure took into account historical land usage, building materials, and geologic features that might affect background levels at the site. The general background radiation levels at the site were initially determined from results of the first gamma walkover survey performed on September 19, 2013. A more extensive search was conducted on November 20, 2013 to determine the best area potentially exhibiting a site-specific background for gamma radiation. Two locations were selected: S07 and S08. S07 was found to be suitable for a site-specific background location based on the gamma exposure rate at the location. From this location, background was measured to be approximately 7,500 counts per minute (cpm) at 1 meter above the ground surface. Ten-minute counts were conducted at both the ground surface and at 1 meter for each background location. S08 was subsequently found to be unsuitable as a background location due to the Ra-226 concentration being 3.4 pCi/g, which is slightly elevated above the background level and appears to indicate a low level of impact from the site.

Procedures in determining the AOC

The extent of the AOC was established by performing a gamma scan of the site with a Ludlum 2221 rate meter with a Ludlum 44-10 2x2 Sodium Iodide (NaI) probe. Upon review of the scan data, potential areas for onsite background and AOCs were determined. The areas where gamma radiation exposure rates equaled or exceeded 2x background levels were painted, flagged or chalked on the ground to visually depict the AOC boundary, after which an additional walkover survey was performed with the Ludlum rate meter with 2x2 probe in the areas to establish the AOC boundaries and depict them on the map.

For CRU, three AOCs were observed: Source 1 contained 1505.964 ft², Source 2 contained 112.501 ft², and Source 3 contained 645.984 ft² for a total of 2260.445 ft² on the CRU site. The AOCs are separated by areas where gamma radiation exposure rates did not equal or exceed 2x background; this phenomenon is due either to the absence of contaminated soil in these areas or the shielding of the gamma radiation by the asphalt and concrete pavement on the western portion of the property.

Shine and Shielding

Some of the building materials stored at the CRU Site, such as palletized stone and bricks, are known to have some degree of radioactivity. Some elevated gamma screening results exceeding 2x background in the vicinity of these materials were evaluated as “shine” not derived from the subsurface contamination. The stored products observed to exhibit “shine” were not included in the exposure determination or evaluated as AOCs.

Additionally, some stockpiled, concrete paving and palletized materials might have shielded other possible AOC areas, leading to lower gamma radiation measurements than would be present without the shielding material.



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