

**From:** "Oscar Paulson" <paulson@tribcsp.com>  
**To:** "Stephen Cohen" <SJC7@nrc.gov>  
**Date:** 09/05/2006 4:29:26 PM  
**Subject:** Contaminated Soil Excavation - Kennecott

Stephen Cohen:

The following pertains to the excavation:

#### Main/Planned Excavation

The main/planned portion of the excavation as originally depicted in the license amendment request has been completed. The excavation bottom has been sampled. Grids that involve the highwall have not been sampled since there is no way to do so effectively until filling begins in the bottom so that sampling of higher areas specifically the walls can be accomplished. Some grids are entirely consumed by the slopes of the pit wall. Areas of the pit wall immediately South of the Mill Building and East of the slab containing the tanks will not be sampled since these portions of the wall will be covered by plastic as backfilling progresses.

#### Additional Excavation

Currently the area East of the Mill Building and North of the planned excavation is being excavated to remove the contamination discovered in the Northern pit wall and described to you in my e-mails of Monday, July 10, 2006 4:24 PM and Thursday, July 13, 2006 4:45 PM. The e-mail of Thursday, July 13, 2006 4:45 PM described a sample result of 6,040 milligrams per kilogram however a subsequent sample collected on July 17, 2006 returned a result of 27,900 milligrams per kilogram Diesel Range Organics (DRO). This is why the excavation is being extended to the North.

#### Radium-226 Sampling

In my e-mail of Thursday, July 06, 2006 5:03 PM, I described the radium-226 analysis procedure that would involve sealing the sample cans in the field, counting them upon arrival in the laboratory to obtain a preliminary radium-226 analysis results and then opening, drying and reclosing them, allowing them to ingrow to obtain a final result. This procedure has been followed.

The excavation is being sampled by collecting a nine (9) point composite of each grid as well as a spot sample of each grid corner and the spot at the center of each grid. No final Radium-226 result of any sample (composite or spot) in the pit bottom has exceeded the 16.4 picoCurie per gram threshold (1.4 picoCuries per gram (background) above 15.0 picoCuries per gram). Not all of the final samples have been received however. A single preliminary radium-226 has exceeded the 16.4 picoCurie per gram threshold that being the composite sample for grid R-6 which has a preliminary result of 22.1 picoCuries per gram.

The following pertains to this sample:

R-6 (Composite)  
S-6 Spot  
R-6 Spot  
R-7 Spot  
S-7 Spot  
R-6 Center/Spot

(R-6 Grid Composite)  
(NE Grid Corner- R-6)

(NW Grid Corner- R-6)  
(Southwest Grid Corner- R-6)  
(Southeast Grid Corner- R-6)  
Spot Sample Center of Grid - R-6

Radium-226

22.1 picoCuries per gram  
10.5 picoCuries per gram  
9.6 picoCuries per gram  
9.1 picoCuries per gram  
8.3 picoCuries per gram  
9.4 picoCuries per gram

pH  
8.28

Sulphate

207 milligrams per kilogram

Thorium-230

5.8 picoCuries per gram

Natural Uranium

16.6 milligrams per kilogram

Diesel Range Organics

12 milligrams per kilogram

Gamma Counts

16154 counts per minute

10118 counts per minute  
11343 counts per minute  
9968 counts per minute  
11364 counts per minute

Spot samples are also collected at the corner of each ten (10) meter by ten (10) meter grid as well as in the center of each grid. The spot samples collected at each corner point and in the center are only analyzed for radium-226. They could be analyzed for pH, sulphate, thorium-230, natural uranium and diesel range organics if requested as the samples are archived by the laboratory.

Please note that only the composite sample exceeded the limit. The spot samples collected at each corner of the grid and at the grid's center were below the 16.4 picoCurie per gram threshold. In addition, the activity of uranium-238 (parent of radium-226) is approximately 340 picoCuries per milligram. Uranium-238 comprises 99.2830% of natural uranium, thus the composite sample contains approximately 16.5 milligrams per kilogram uranium-238. This equates to an activity of (16.5 milligrams per kilogram \* 340 picoCuries per milligram) 5610 picoCuries per kilogram or 5.61 picoCuries per gram. Clearly the uranium-238 activity is not in equilibrium with the radium-226 activity in this sample. It is interesting to note that the thorium-230 activity is in equilibrium with the uranium-238 activity. The sample however, does not show any effects from mill fluids such as low pH or elevated sulphate concentration.

Grid R-6 is in the ramp leading down into the excavation and is not in the body of the excavation as designed to remove contaminated material. It is in what would be the Eastern side slope of the excavation. Surface gamma readings were collected in the excavation at all the surveyed grid corners and grid center points using a Ludlum Model 44-10 gamma probe set in a lead side shield. Each point was counted for one (1) minute. Background (determined for an undisturbed area South of the facility) was 9353 counts per minute. The highest point around Grid R-6, S-6, was 1.7 times background. It also had the highest preliminary radium-226 concentration.

#### Current Plan

The four (4) corner and the center sample for grid R-6 will be analyzed for natural uranium, pH, sulphate, thorium-230 and diesel range organics.

An additional two (2) feet will be stripped from Grid R-6 to determine if the contamination is due to some surface spillage and the grid resampled.

Since the other grids especially those against the highwall beneath the tanks and the Mill Building are clean, backfilling will begin there as soon as the northern extension to the excavation is completed. This backfilling should be started quickly due to the immediate exposure of the soils underlying the Mill Building and tank slabs and the potential for collapse of materials beneath these slabs.

The grids that involve highwalls around the excavation will be sampled as backfilling progresses since that is the only practical way to access these grids.

No grids that will be covered by liner as the excavation is backfilled will be sampled since any grids in highwall sections covered by liner are assumed to be contaminated which is why they are being covered.

This describes the current status and current plan for the excavation. If you have any comments or suggestions please do not hesitate to contact me.

Thank you!

Oscar Paulson

Facility Supervisor

**CC:** <shelley@tribcsp.com>

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