

Site Visit and Inspection of the WRT Media Production Plant

August 24, 2016



Water Remediation Technology LLC

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1.0 General Overview

The new WRT Media Production Plant located at 16340 Table Mountain Parkway, Golden, CO went online in the fall of 2015. During the initial operations the Plant handled non-radioactive media materials. The Media Production Plant will be used to produce media/resin used in WRT and non-WRT uranium and radium treatment systems throughout the U.S. and for the production of special media/resin used for the removal of other radionuclides in other parts of the world. The Media Production Plant will also handle the spent uranium resin that has been stripped of its original natural uranium content and now can be further processed to be reused in other uranium treatment systems. Furthermore, the Plant will be used for the handling and storage of pilot test and laboratory media/resin samples, PES bottles, and spent stripped uranium resin.

This new Plant has been included in the WRT Colorado license renewal application package sent to the CO DPHE on July 2, 2015. As part of the 2015 annual audit of the WRT radiation protection program, the Media Production Plant was identified as one of the facilities to be inspected/audited during the 2016 annual audit.

2.0 Inspection

On August 24, 2016, Mr. T. Adams, CRSO, Mr. K. Stovall, RSO and Mr. P. Tschida, Sr. RCT visited the WRT Media Production Plant. The visit included a full walk-through inspection of the Media Production Plant and an interview with Mr. R. Blaes, the Plant Supervisor.

The Media Production Plant areas inspected during the visit included:

- Spent resin washing/rinsing area
- Spent resin storage area(s)
- Spent resin disinfecting area
- General media washing/preparation area(s)
- Storage location of the roll-off container with spent resin containing elevated radium levels
- Laboratory and Offices
- PES bottle, media sample, Pilot Test storage area(s)
- Liquid Storage Pit
- Discharges to the environment (liquid discharge to the sanitary sewer)

3.0 Interview

The interview with Mr. R. Blaes, Media Production Plant Supervisor included, but was not limited to the following topics/items:

3.1 Overall Process Operations of the Plant.

This discussion included a complete presentation of the radium media washing/production process (Photo 1), the spent uranium resin washing (Photos 2 and 3), disinfection and storage processes (Photos 4 and 5).

3.2 History and Cause of the Unexpected Production of Spent Uranium Resin Residual/Fines Containing Elevated Concentrations of Radium

This discussion identified that the spent resin had originated from the Grand Island, Nebraska uranium treatment facility and was shipped to the Cameco, Crow Butte, Nebraska uranium recycle/recovery facility where it was “stripped” of its uranium content and then returned to WRT for processing and repackage for reuse. Several tankers containing the stripped resin had been processed prior to the discovery of the contaminated residuals/fines.

The root cause of this unexpected event was that WRT management personnel, including the Supervisor, were unaware that the spent stripped resin contained elevated radium concentrations in the residuals/fines when the resin was rinsed and packaged for storage and reuse. The fines from the resin washing/rinsing operations which contained the radium were then carried over to and through the rest of the spent resin process. Controls have been put in place to limit the amount of stripped resin from Grand Island/Cameco to reduce the amount of fines/residuals that would be processed through the Media Production Plant at any one time.

At the time of the inspection, the contaminated residuals/fines were containerized in a roll-off (Photos 6 and 7), had been sampled for radium analysis, and arrangements had been made with Clean Harbors for disposition at their Deer Trail, CO landfill.

3.3 Sampling the Discharge of Plant Liquids to the Sanitary Sewer

This discussion included the required sampling (pH and TSS) of the liquid discharge from the Media Production Plant that is required by the discharge permit issued by the CO Metro Wastewater Reclamation District, Permit # 3860-3-2A. At the time that the application for the subject permit was prepared, discharge of any radioactive material was not considered due to the fact that the facility would not be producing and/or discharging such material. However, with the event involving the stripped resin containing elevated concentrations of radium, that was/is not the case.

3.4 Rinsing of the Stripped Resin

This discussion reviewed the process and setup of the stripped resin rinsing process. The process includes the generation and handling of liquid rinse water and packaging of the processed resin (Photos 2 and 3). It was noted during this discussion and view of the setup that the potential for contamination of the area (floor and related process/handling equipment) existed. The area did not have any postings or contamination controls in place during the rinsing process and packaging process.

3.5 Disinfection of the Stripped Resin

This discussion involved the disinfection of the stripped resin and the general area of the disinfection process which included a container of the fines/residuals from this process. A storage container full of these residuals/fines had been generated at the time of the inspection. The material had not been

sampled or analyzed for radiological constituents. It was discussed that the material would need to be disposed of at some time in the near future (Photos 4 and 5).

3.6 Storage Area

This discussion revealed that a smaller storage area for existing radioactive materials had been setup in the Media Production Plant (Photo 8). At the time of the inspection this area contained (2 PES bottles). The area was fenced but was not secured with a lock nor did it have an inventory sheet to maintain an awareness/control of the material that was being stored in this area. This area appeared to be adequate for the amount of material being stored currently, but may not be large enough when more material needed for storage (PES bottles, pilot test columns/sample or lab samples) are received. A much larger area for storage of radioactive materials was identified in the WRT license amendment application submitted to the CO CDPHE and as such may need to be utilized in the near future (Photos 9 and 10).

3.7 Pilot Test Columns and Material

This discussion identified that several pilot test columns and other materials were being stored in trailers located both at the Media Production Plant and the WRT Warehouse at the Main Office (Photos 11 – 15). The current WRT license does not permit the storage of such materials in this manner. The license amendment application.

3.8 Radiological Survey

This discussion involved a review of a radiological survey performed by Mr. P. Tschida of the Media Plant Production Plant on August 5, 2016. The results of the survey identified several areas (near the stripped resin rinse area, outside this area in walkways near the offices and lab and general storage areas) had elevated beta readings (direct) that were near established release criteria (5,000 dpm/100 cm²) for unrestricted use. There were no direct alpha readings that were above the established release criteria (5,000 dpm/100 cm²). The survey also revealed that there were no alpha or beta removable activities above the established release criteria (1,000 dpm/100cm²).

Due to the fact that the subject survey was performed after the processing of stripped resin and the identification of elevated radium residuals/fines contained in the stripped resin, the results of this survey identified a need to perform a follow up survey to confirm the results of the previous survey. The follow up should include confirmation on whether the elevated direct readings are from natural materials in the concrete or are from contamination as a result of the processing of stripped resin. Some simple decontamination methods (scrubbing, grinding or strippable paint) may be utilized to assist in this determination.

On a related note, it was discussed with the radiological group that inspections/surveys will be performed after every stripped resin rinse operation and periodically as required.

4.0 Recommendations

As a result of the inspection and interview, several recommendations are offered by the auditing/inspection team to improve the radiological controls of the Plant.

These include:

1. Consolidate all of the pilot test columns and other potential contaminated items/material stored in the Warehouse or the pilot trailers located at the warehouse into the Media Production Plant.
2. Set up a temporary "Restricted Area" within the media/resin screening area during the resin rinsing operations.
3. Maintain awareness of the ever changing conditions of the operations of the Plant, and communicate changes to all appropriate WRT personnel.
4. Address the discovery of contaminated resin residual/fines placed in a roll off container for proper handling and disposition.
5. Sample unknown or un-suspected processed resin waste(s) that may contain residual radium/uranium activities to determine the potential radiological issues and disposition requirements.
6. Sample liquid discharge from the Media Production Plant to confirm concentrations of radiological contaminants of concern (uranium and radium).
7. Secure the newly established storage area under lock and key and maintain an inventory of the material stored in this area.
8. Perform follow up survey to confirm radiological conditions in the Media Production Plant.

Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15

