

Annual Audit of the WRT Radiation Protection Program

March 2016



Water Remediation Technology LLC

A handwritten signature in black ink, appearing to read "T G Adams". The signature is written in a cursive style and is positioned above a solid horizontal line.

Theodore G. Adams, PMP
Corporate RSO

March 1, 2016

Annual Audit of the WRT Radiation Protection Program

March 2016

1.0 Overview

An annual audit of the Water Remediation Technology, Inc., (WRT) Radiation Protection Program was performed by Mr. Ted Adams, WRT Corporate Radiation Safety Officer (CRSO). The audit consisted of an ongoing review of various WRT activities that were supported by the Radiological Protection Group throughout the calendar year 2015.

The audit included an evaluation of various WRT drinking water treatment facilities and WRT onsite activities (media exchanges, packaging/shipping, internal/external inspections, postings, placement of dosimetry, radiological controls, housekeeping, waste storage), as well as, an evaluation of the status of training, dosimetry, surveys, instrument calibration, and related documentation. The audit also included interviews with various WRT personnel and reviews of records/documentation supporting the WRT Radiation Protection Program. The audit also evaluated the effectiveness of the WRT Radiation Protection Program.

2.0 Surveys

Surveys performed by WRT during 2015 included baseline surveys, media exchange surveys, inspection surveys, packaging/shipping surveys, maintenance/operational surveys, and miscellaneous surveys for other needs.

A review of selected surveys that were performed by WRT radiological personnel during media exchanges or facility inspections/visits in 2015 was performed as part of the audit. The following surveys were reviewed:

1. Bass Lake, CA- February 24, 2015- (Resin Exchange)
2. Antioch, IL Well 9- July 13-16, 2015- (Media Exchange)
3. Sycamore, IL Well 8- March 23-25, 2015- (Media Exchange)
4. Oswego, IL, Well 9- October 9-12, 2015- (Media Exchange)
5. Oswego, IL Well 11- August 17-19, 2015- (Media Exchange)
6. Aqua NJ, Hamilton Well 12- October 26-29, 2015- (Media Exchange)
7. Bordentown, NJ – October 20, 2015- (Baseline)
8. Castagna Pauling, NY-October 21, 2015- (Baseline)
9. Aqua NC Cope Acres, NC- January 19-22, 2015- (Media Exchange)
10. Aqua NC, Hollywood, NC- January 23-26, 2015- (Media Exchange)
11. Aqua NJ S 14, NJ- February 9-15, 2015- (Media Exchange)
12. Sycamore, IL Well 6- November 9-12, 2015- (Media Exchange)
13. Grand Island, NE- May 20, 2015- (Resin Exchange)
14. Antioch, IL Well 10- June 22-26, 2015- (Media Exchange)
15. Bartlett, IL Well 4- July 27-31, 2015- (Media Exchange)
16. Oswego, IL Well 4- June 8-11, 2015- (Media Exchange)
17. Farmington, MO Well 15/19- September 28-October 2, 2015- (Media Exchange)

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18. Elburn, IL Well 5-July 28-31, 2014 - (Media Exchange)
19. Brady, TX Pilot- September 23, 2015- (Pilot)
20. Farmington, MO Well 14, March 4-12, 2015- (Media Exchange)
21. Aqua NJ Erial, NJ, Well 15-April 20-24, 2015 - (Maintenance)
22. Aqua NJ Hamilton, NJ Well 11, -May 15, 2015- (Media Exchange)
23. Grand Island, NE Central Basin Train 2- March 24, 2015- (Resin Exchange)
24. Highfields, NY Well 6- May 19, 2015 - (Media Exchange)
25. Utah Ca Pilot- October 7, 2015- (Pilot)
26. WI Semi-Annual-June 26-27/October 12-15,16-17,21, 2015- (Semi-Annual Inspections)
27. Mission Springs/Bass Lake, CA- August 5-11, 2015- (Media Exchange)
28. Oswego, IL Well 10-November 3-6, 2015- (Media Exchange)
29. Grand Island, NE Central Basin Train 1- November 11-12, 2015- (Resin Exchange)
30. Upper Deerfield, Love Lane- April 10-14, 2015- (Media Exchange)
31. Vineland, NJ Well 6- May 15, 2015- (Media Exchange)
32. Cotter Schwartzwald, CO V1 & V2- April 2 & 6, 2015- (Resin Exchanges)
33. Cotter Schwartzwald, CO V3 & V4- May 28 & June 8-12, 2015- (Resin Exchanges)
34. Cotter Schwartzwald, CO V1 & V2- August 3-4 & August 24-25, 2015- (Resin Exchanges)
35. Cotter Schwartzwald, CO V4- October 7-8, 2015- (Resin Exchange)
36. Cotter Schwartzwald, CO V1 & V3- November 5, 9-12 & September 16-17, 2015, 2015- (Resin Exchanges)

These surveys were reviewed/signed off by the Sr. RCT who performed the surveys and the CRSO. The review of the all of the surveys listed above found the related survey documentation complete, legible, and appropriately reviewed.

3.0 Inspections

Both internal (WRT performed) and external (responsible regulatory agency performed) inspections were reviewed.

3.1 Internal Inspections

The following WRT internal inspections were reviewed:

1. Semi-annual inspections of the Wisconsin treatment systems (Pewaukee Well 2, Arbors Trust Well 1, Ethan Allen Well 3, and Brookfield Well 1) were performed on June 25, 2015 and October 16, 2015 by Mr. P. Tschida, Sr. RCT.
2. Quarterly inspections of the treatment systems performed by the responsible WRT field service representative (Mr. Mike Hubler, NJ/NY/NC/SC/VA/GA: Mr. Juan Ocampo, TX and Mr. Jim Etheridge, IL/WI/MO).

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3. Periodic inspections conducted by Mr. Ted Adams, WRT Corporate RSO, Mr. K. Stovall, RSO and Mr. P. Tschida and other WRT personnel.

Semi-Annual Inspections

The review of the semi-annual inspections (June 25 and October 16, 2015) of the Wisconsin treatment systems performed by Mr. Tschida found the inspection/survey documentation in order, complete, legible, and prepared in a timely manner.

Quarterly Inspections

WRT requires that its treatment systems be inspected at least quarterly by the WRT field service representatives. These inspections include housekeeping, waste storage area(s), postings, , dosimetry, exposure rate measurements and documentation required to be maintained at the treatment system facility site.

The review by the auditor of the quarterly inspections performed by the WRT field service representatives found the inspection/survey documentation for the most part, to be in order, complete, legible, and being completed in a timely manner. Awareness training regarding the importance of these inspections and related inspection documentation continues to be provided to the WRT field service representatives.

The overall responsibility of ensuring that the quarterly inspections and related inspection documentation are performed continues to be the responsibility of Mr. Dave Melancon, Operations Manager. Mr. Rick Blaes, Media Production Plant Supervisor has done an outstanding job of ensuring that these inspections are being carried out and maintaining the tracking system for these inspections current.

Periodic Inspections

The following selected internal inspections performed by the CRSO, RSO, and other WRT personnel during 2015 were reviewed:

1. Grand Island, NE – February 17, 2015- Inspector- J. Nemecek
2. Cañoncito, NM – March 18, 2015 - Inspector – N. Hummel
3. Denton, NE-April 22, 2015 – Inspector-J. Nemecek
4. New Underwood, SD- June 24, 2015- Inspector – J. Nemecek
5. Grand Island, NE – August 18, 2015- Inspector- J. Nemecek
6. Denton, NE-August 19, 2015 – Inspector-J. Nemecek
7. Golden State Water, CA-August 27, 2015-Inspector-S. Wychoff

During the inspections, attention was placed on postings, housekeeping, surveys/survey documentation, instrumentation and related daily checks/ calibration, radiological control practices, and personnel awareness of radiological safety. The inspections of the Grand Island, NE, Cañoncito, NM, Denton, NE,

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New Underwood, SD, and the Golden State Water, CA, facilities resulted in no deficiencies being identified.

The new WRT Media Production Plant went online in the fall of 2015. The Media Production Plant will be used to produce media/resin used in the uranium and radium treatment systems throughout the U.S. and for the production of special media/resin used 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. 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 2016 annual audit of the WRT radiation protection program, the Media Production Plant will be included on the list of facilities to be inspected/audited.

3.2 External Inspections

There were a number of external inspections at the WRT drinking water treatment sites that were performed by state regulators during the 2015 period. These included, but are not limited to:

1. Illinois Emergency Management Agency (IEMA):

Bartlett, IL Well 4- July 28, 2015 – Inspector Mr. K. Grahn

No findings were identified by the IEMA inspector as a result of this inspection.

2. New Jersey Department of Environmental Protection, Bureau of Environmental Radiation

New Jersey American Water- Well 13- June 24, 2015 - Inspector- Ms. Sarah Engeholm

Aqua NJ, Hamilton- Well 12- October 27, 2015- Inspector – Mr. James McCullough

No findings or recommendations were identified by the NJDEP inspectors.

3. New Mexico Environmental Department/Bureau of Radiation

Cañoncito, NM- June 22, 2015-Inspector- Mr. V. Diaz

A Notice of Violation (NOV) was issued by Mr. Diaz. See Section 4.0.

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4.0 Notices of Violations

There was one Notice of Violation (NOV) issued to WRT in 2015. This NOV was issued by Mr. Victor Diaz of the New Mexico Environmental Department/Radiation Control Bureau following his inspection of the Cañoncito, NM facility and related records on June 22, 2015. The subject NOV was issued on June 29, 2015. The basis of the NOV was that WRT did not provide the increased FA amount for the radium treatment at Cañoncito. WRT provided a letter response to the subject NOV on August 27, 2015. As of the date of this audit, the NMED had not responded to the WRT letter.

As a result of an inspection of the Cotter Schwartzwalder Mine site on December 12, 2014 by Mr. E. Etherington, Colorado Department of Public Health and Environment of the Schwartzwalder Mine Site, a Notice of Apparent Violation (NOAV) was issued by the inspector for failure of WRT to maintain the required documentation at the site as required by the current WRT CO license/license condition. WRT addressed the NOAV by requesting a license amendment to delete this license condition. This NOAV is included in this audit because the CDPHE has yet to respond/act on the WRT request.

5.0 Postings, Signs and Notices

During the various internal/external, inspections/audits performed during 2015 there were no issues identified related to postings, signs, or notices (Notice to Workers). Many of the regulatory agencies update/revise their "Notice to Employees" without notification to the licensee. This requires the licensee to continuously go to the regulatory agency's website to identify any changes in the radiation protection regulations including revised notices subject notices during the time of the audit. The auditor recognizes this challenge of maintaining current regarding the most recent notice and regulations. (See Section 15.0)

6.0 Radiological Instrumentation

Condition

Radiological instrumentation used by WRT to support media exchanges and other related work was evaluated both during onsite use and offsite storage (WRT Corporate Offices). All instrumentation was found to be in good working condition and in calibration. Daily instrument source and background checks were performed by the WRT RSO prior to use and appropriately documented. A review of the daily instrument source and background forms found the documentation to be complete.

Calibration

A review of the instrumentation (listed in Attachment 1) currently being stored at the WRT Corporate Offices in Arvada, Colorado was performed on March 1, 2016 and found to be in good working order and in current calibration. A review of the calibration certificates for all of the instruments in use by WRT (either by WRT field service representatives, WRT RCT, or the WRT RSO were found to be complete, appropriately filed, and available to the auditor for inspection. The status of the instrumentation is managed and maintained by the RSO via a database/matrix (Survey Meter and

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Detector Head Inventory) which presents all of the instrumentation, model and serial numbers, status of calibration, and copies of calibration certifications.

WRT currently uses Ludlum Instruments, Sweetwater, Texas and Griffin Instruments, Kingston, Tennessee as their calibration vendors. As part of their service, Griffin Instrument provides the RSO with a notice of calibrations due which serves as an independent check on the status of the calibration of the instrument(s).

Instrument Check Sources

Check sources used to perform daily instrument performance checks are maintained by the RSO in a locked box which is located in lockable file cabinet located in the RSO's office. The main WRT building is also locked after hours. An inspection of the check sources demonstrated that all of the check sources were inventoried/listed and accounted for.

7.0 Media Exchanges

Media exchanges performed during 2015 are presented in Attachment 2.

8.0 Training

The auditor reviewed documentation in support of WRT personnel and CWS/HOA personnel radiation safety training. See Attachment 3.

WRT Personnel Training

Training documentation of WRT personnel was reviewed during the audit. In general, there is a relatively clear paper trail to confirm that appropriate WRT individuals have received the required training (Radiation Worker, DOT HazMat, etc).

CWS/HOA Personnel Training

The audit found a strong continuous effort was made to ensure that appropriate initial and refresher Radiation Safety Awareness Training was provided to the CWS Utility Operators and Managers and HOA personnel. However, there appeared to be a small number of CWS personnel that may have not received the subject refresher training since a number of the required reading sign-off sheets were not returned as requested. See Attachment 3.

The auditor recognizes that maintaining the training of CWS/HOA personnel current is a challenge. CWS/HOA personnel staff are continuously changing (many times without WRT's knowledge) at any given CWS/HOA and some CWSs and/or individuals failed to return the required reading sign-off sheets.

Attachment 3 lists the Radiation Safety Awareness Training that was provided to CWS/HOA personnel in 2015. As part of the subject training program, WRT continues to prepare a simplified "required reading" for the refresher training of the CWS/HOA personnel that is included as part of the annual dosimetry

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reports issued to the CWA/HOA personnel. As a result of a 2014 audit suggestion, amount of information contained in the training program was revised commensurate with the CWS personnel activities while complying with list of training topics identified in CWS training program presented in the Client/WRT license applications.

9.0 Dosimetry

The WRT Dosimetry Program consists of dosimeters issued for WRT personnel, CWS personnel, and for System (Primary and Secondary stages vessels) and Areas (a distance away from vessel), and specifically for NJ, the placement of a dosimeter on all vessels, area, and fence line.

WRT Dosimetry

The Dosimetry Program which involves WRT personnel appeared to be well executed and maintained. Results of doses are provided to WRT personnel on an annual basis. The CRSO reviews/signs-off on all quarterly and annual dosimetry reports.

CWS/HOA Dosimetry

A review of the CWS/HOA portion of the WRT Dosimetry program revealed that the execution and maintenance of the program is satisfactory. There were still some instances that occurred in 2015 (delayed installation/return, lost badges) that demonstrate that continued attention to these instances are warranted.

As previously identified in the 2014 audit and repeated for emphasis, with the increase in the number of radium and uranium treatment systems being installed and operated throughout the U.S., and hence, an increase in the number of dosimeters to be managed, it is important that close attention be placed on this item to minimize the identified issues. This is especially important since WRT's long term goal is to reduce the number of dosimeters that will be required to be issued. A database continues to be maintained to track the status of dosimeter exchanges and results. This will assist in monitoring the execution of the dosimetry program.

Copies of dosimetry reports for the NJ CWSs (personnel, vessel, and area) were sent to the NJDEP within the 15-day requirement specified in the CWS license conditions. Quarterly and annual dosimetry reports are being reviewed by the CRSO. Annual dosimetry reports are being sent to the CWS/WRT personnel.

A review of the various CWS dosimetry reports was performed in 2015. As a result of this review which identified the low (near background levels) dose to the CWS personnel due to the operation of the WRT treatment systems, WRT decided to initiate action to eliminate the use of personnel dosimeters for CWS personnel. The first groups of dosimeters to be eliminated were the Wisconsin and Missouri CWS personnel dosimeters. During 2016 WRT plans to eliminate personnel dosimeters for New Jersey and Illinois CWS personnel.

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10.0 Radiological Protection Plan and Field Procedures

The WRT Radiation Protection Program is described in detail in the various WRT license applications. However, this Program is not readily available to WRT personnel for their use or to regulatory personnel who may want to review the Program during their routine audits of the WRT Radiation Protection.

In response to a 2014 audit finding, the existing radiological field procedures were signed off by the CRSO and the WRT President and issued for implementation.

There is a need to incorporate the WRT Radiological Protection Program described in the various license applications into a separate stand-alone document (i.e. "WRT Radiation Protection Plan"). Action should be taken to complete the preparation of this document as soon as possible. This is a carryover from the previous 2014 audit. The audit did identify that a draft of the "WRT Radiation Protection Plan" had been prepared but not finalized.

11.0 License(s) Status

The current WRT licenses were reviewed. The status of the licenses is provided in the following section.

WRT Licenses

A number of license/amendments/renewals were prepared and or obtained in 2015. These include but are not limited to:

WRT, Illinois-February 23, 2015- License Renewal

WRT, Colorado- July 2, 2015 - License Renewal

WRT, Georgia – March 27, 2015-License Renewal

WRT, Corrine Pilot, Utah- May 26, 2015- License Amendment

WRT, WI- Pewaukee Well 5 Pilot- March 11, 2015-License Amendment

Client Licenses

WRT also supported a number of new/initial licenses, license renewals and license amendments for various Clients during 2015. These include but are not limited to:

NJ American Water, New Jersey- September 16, 2015- License Renewal

Borough of Newfield, New Jersey - April 7, 2015- License Amendment

City of Bordentown, New Jersey- October 30, 2015- New/Initial License

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12.0 Records

Records documenting surveys, training, dosimetry, instrument calibration, and shipping/manifest were evaluated during the audit. Documentation of such is maintained in both hard copy (Central File) and electronic version ("P Drive").

Surveys

Documentation of all surveys reviewed was found to be complete, legible and well maintained. Daily instrument performance check logs were reviewed and found to be complete, legible, and well maintained.

Training

The audit reviewed randomly selected documentation in support of the Radiation Safety Training provided to WRT personnel and the Radiation Safety Awareness Training provided to CWS/HOA personnel in 2015 (See Attachment 3). The audit found continued improvements in the documentation of training records for the various CWS personnel, as well as, WRT personnel. Annual WRT training and CWS/HOA training are tracked on a separate spreadsheet.

WRT Personnel Training

Training documentation of WRT personnel was reviewed during the audit. In general, the documentation provides a relatively clear paper trail to confirm that appropriate WRT individuals have received the required training (Radiation Worker, DOT HazMat, etc).

CWS/HOA Personnel Training

The audit found that a strong effort continues to be made to ensure that appropriate initial and refresher Radiation Safety Awareness Training was provided to the large number of CWS Utility Operators and Managers and HOA personnel. However, during the 2014 audit, there were still a small number of CWS personnel that had not received the initial training. This deficiency was addressed on December 12, 2015 when these individuals received the subject training.

At the time of this audit, there were several CWS treatment facilities that had not responded/returned the "Required Reading" form which confirms that the individual reviewed/received the subject refresher training. The auditor identified CWS individuals from San Angelo, Texas; Eden, Texas; Falling Water, Texas; Fox Run, Virginia and Arbors, Wisconsin that had not returned the form.

While WRT System Specialists are responsible for the handling of any of the radioactive material and CWS personnel are not involved in any radioactive material handling activities, such voluntary training is more for "awareness/peace of mind" for the CWS personnel rather than health and safety, and it is not directly required for the performance of the CWS personnel tasks in and around the treatment systems.

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As stated in the 2014 audit and re-emphasized during this audit, the auditor recognizes that maintaining the training of CWS/HOA personnel current is a challenge. CWS/HOA personnel staff are continuously changing (many times without WRT's knowledge) at any given CWS/HOA. Furthermore, the cost and time required to provide a classroom training opportunity for the subject training is increasing.

Based on the above, continued priority attention needs to be given to providing initial and refresher Radiation Safety Awareness Training to CWS personnel and to ensure the implementation and maintenance of this training.

During this audit, it was discussed with Mr. K. Stovall, RSO the success of the simplified "required reading" for the refresher training of the CWS/HOA personnel that is included as part of the annual dosimetry reports issued to the CWA/HOA personnel. The result of this approach has shown promise and is working relatively well, with noted exceptions. Also discussed was the result of streamlining the initial CWS Radiation Safety Awareness Training. This streamlining/simplification of the subject training has been received positively by most of the CWS/HOA personnel.

Dosimetry

Documentation of dosimetry records was found to be complete and well maintained (with continued effort). Reports are being submitted to the NJDEP for NJ CWSs within the required 15- day period specified in the CWS license condition. Annual dose reports are sent to all CWS/HOA personnel.

Instrument Calibration

Documentation of instrument calibrations was found to be complete and well maintained. No issues were identified during the audit. See Attachment 2A for instruments which calibration certifications were reviewed and Attachment 2B for daily instrument check documentation.

Shipping Documentation

Documentation of shipping records/waste manifests in support of media/resin exchanges were found to be complete and well maintained. No issues were identified during the audit.

13.0 Staffing

The WRT radiological protection program staff consists of: Mr. T. Adams, CRSO, Mr. K. Stovall, RSO, Mr. P. Tschida and Mr. D. Bollig, VP of Environmental and Government Affairs. This staff supports/implements the radiological program and licensing efforts for WRT and Clients/CWSs under contract which requires radiological services. This support effort includes, but is not limited to: media exchanges, inspections, surveys, training, dosimetry, shipping/disposal, maintenance of radiological instrumentation, and licensing.

Based on the review of the needs for this support during 2015, the subject staffing appears to be adequate at his time to continue to adequately support the future needs of WRT.

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14.0 ALARA

A review of the WRT and CWS personnel dosimetry records revealed that doses were maintained reasonably low. There were no unusual doses recorded. The program is being implemented effectively and thus, no modifications are necessary at this time to the WRT ALARA Program. WRT personnel and CWS personnel doses were reported to be less than 4mRrem/yr.

15.0 Changes in Agreement State/NRC Radiation Protection Standards and Requirements

A review of the various Agreement States (New Jersey, New York, North Carolina, Virginia, Colorado, Nevada, California, Texas, Nebraska, Illinois, Georgia, Wisconsin, New Mexico, South Carolina, South Dakota, Missouri, Nevada) and NRC where WRT has a license or has a uranium/radium and/or uranium/radium removal system/pilot system operating in 2015, radiation protection standards and requirements was performed. Based on this review, no changes or modification to the WRT Radiation Protection Program are necessary.

It was recognized by the auditor that the NJDEP has implemented an "Annual Registration Program" for those CWSs who operate a uranium treatment system under a General License. In addition, the IEMA has developed and implemented guidance and related regulations (Section 3330.4) for the disposition of radionuclides (radium) from drinking water treatment facilities, Sewage Treatment Plants, and other industries that generate TENORM and dispose of the material in local landfills or local farmland. The subject regulation does directly affect the disposition of radium residuals from WRT IL CWS to local IL landfills. Attention to this relatively recent regulations/guidance should be given for potential future impacts to the WRT radiation protection program and licensing efforts.

As stated in the 2014 audit and re-emphasized during this audit, the auditor does recognize that certain changes such as the revisions of the "Notice to Employees", NRC Safety Culture Policy, and General Notices are a challenge to being able to stay current with these types of changes without going onto each and every regulatory agency website frequently. Continued effort should be made to keep as current as practical.

16.0 Miscellaneous

During the 2014 audit, a walk through inspection of the vessel fabrication/storage area of the WRT Facilities located in Arvada, Colorado was conducted. During the inspection the following items were noticed:

1. There were several 5-gallon buckets of resin being stored in the area. Some of the resin appeared to be "clean/used resin" while other buckets appear to contain some level of uranium loading due to the fact that exposure rates taken in and around these buckets were between 2-3 times background using a L 19. The buckets were not marked or stored in a protective manner. No radiological controls were being implemented for those buckets which appear to contain loaded resin.

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2. There were several "pilot test" units that were stored on the floor with other materials. These units appeared to be in various states and conditions. Some appeared to be clean of resin/media, others contain media/resin, although it was not determined if the media/resin was used in an actual test, and others contained solid residuals of unknown material(s). No radiological surveys had been performed on these units and no radiological controls were being implemented for those units that may have contained loaded resin/media.

As part of the corrective action taken to address this item, the following action was taken by WRT.

In October of 2015 WRT made a run to U.S. Ecology (USEI), Grandview, Idaho to deposition all Z-88° of the pilot media being stored at the WRT office warehouse. The pilot Ra- Z-88° was consolidated into one 27 cu ft palletized waste box for delivery and disposal at USEI.

However, Z-92° uranium pilot resin remains in 5 or 2 gallon buckets stored in the racks at the WRT main office warehouse. Additionally, there is Z-92° uranium pilot resin being stored in a WRT trailer located in the back of the WRT main office.

17.0 Issues

As a result of the audit, the no specific major issues were identified.

18.0 Personnel Interviewed

The list of WRT Personnel interviewed during this audit is presented in Attachment 4.

19.0 Conclusion and Recommendations

Conclusion

As a result of the audit, the WRT Radiation Protection Program including the ALARA Program was found to be effectively implemented. However, a number of items/areas have been identified that need attention to ensure that the Program continues to be efficiently and effectively maintained and implemented.

Recommendations

Based on the results of the 2015 audit, the following recommendations are presented:

1. The WRT radiation protection program is described in detail in the various WRT license applications. However, this Program is not readily available to the WRT personnel to use or to regulatory personnel who may want to review the Program during their routine audits of the WRT Radiation Protection. Hence, there is a need to incorporate the WRT Radiological Protections Program described in the various license applications into a separate stand-alone document. It is recognized that a draft of the Plan was prepared but not finalized. Therefore, it

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is recommended that action be taken to complete the preparation of the WRT Radiation Protection Plan. (Carryover Recommendation)

2. The 5-gal buckets full of resin currently stored in the WRT "Shop" are not properly marked or stored and the radiological control needs undetermined. Therefore, it is recommended resin buckets be evaluated as to the need for appropriate labeling, radiological controls, storage controls, and ultimate disposition of the material, as necessary. (Carryover Recommendation)

3. The "pilot test" units currently stored in the WRT pilot trailers which are currently located/parked at the WRT office are in various states and conditions and the radiological conditions of the units undetermined. Therefore, it is recommended that the units undergo radiological surveys to determine the radiological conditions and need for the appropriate labeling, radiological controls, storage controls, and disposition (relocated to the WRT Media Production Plant), as necessary.

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Attachment 1A 2015 - Radiological Instrumentation- Calibration

<u>Instrumentation</u>	<u>Serial Number</u>	<u>Calibration Date</u>	<u>Calibration Due Date</u>
Ludlum 19	238786	06/02/15	06/02/16
Ludlum 19	244979	06/02/15	06/02/16
Ludlum 19	238715	09/15/15	09/15/16
Ludlum 19	253077	06/09/15	06/09/16
Ludlum 19	282718	08/05/15	08/05/16
Ludlum 19	282794	02/14/15	02/14/16
Ludlum 3030	247403	10/02/15	10/02/16
Ludlum 43-10-1	263693	10/02/15	10/02/16
Ludlum 2241-2	243225	12/01/15	12/01/16
Ludlum 44-9	262082	12/01/15	12/02/16
Ludlum 43-5	262385	12/02/14	12/02/16
Ludlum 2401-P	181421	12/02/14	12/01/16
Ludlum 2401-P	188826	09/15/15	09/15/16
Ludlum 2401-P	190956	09/30/14	Not in Use
Ludlum 2401-P	190859	09/15/15	09/15/16
Ludlum 2401-P	200608	09/10/14	Not in Use
Ludlum 2401-P	200614	11/13/14	Not in Use
Ludlum 2401-P	181491	Not in Use	Not in Use
Ludlum 2241-2	254723	Stolen	Stolen
Ludlum 44-9	271879	Stolen	Stolen
Ludlum 43-5	272560	Stolen	Stolen
Ludlum 2241-2	298489	07/15/15	07/15/16
Ludlum 44-9	325643	07/15/15	07/15/16

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Attachment 1A 2015 - Radiological Instrumentation- Calibration - Continued

<u>Instrumentation</u>	<u>Serial Number</u>	<u>Calibration Date</u>	<u>Calibration Due Date</u>
Ludlum 43-5	325345	07/15/15	06/15/16
Ludlum 2241-2	237687	08/06/15	08/06/16
Ludlum 44-9	251821	08/06/15	08/06/16
Ludlum 43-5	252521	08/06/15	08/06/16
Ludlum 3030	328279	09/17/15	09/17/16
Ludlum 43-10-1	337586	09/17/15	09/17/16
Ludlum 2241-2	255639	01/26/15	01/26/16
Ludlum 44-10	273154	01/26/15	01/26/16
Ludlum 2241-2	313893	10/15/15	10/15/16
Ludlum 44-9	334312	10/15/15	10/15/16
Ludlum 43-5	342622	10/15/15	10/15/16

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Attachment 1B 2015 - Daily Performance Check Logs/Efficiency and Operating Range Sheets

<u>Instrumentation</u>	<u>Serial Number</u>
Ludlum 2241-2	255639
Ludlum 44-10	273154
Ludlum 3030E	328279
Ludlum 43-10-1*	337586
Ludlum 3030E	247403
Ludlum 43-10-1 *	263693
Ludlum 2241-2	313893
Ludlum 43-5*	342622
Ludlum 44-9*	343120
Ludlum 2241-2	298489
Ludlum 43-5*	262385
Ludlum 44-9*	325643
Ludlum 2241-2	243225
Ludlum 43-5 *	262385
Ludlum 44-9*	262082
Ludlum 19	244979
Ludlum 19	282718

Note: * the serial numbers for the detectors are preceded by a "PR"

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Attachment 2 2015 -Media Exchanges

A list of the media exchanges performed in 2015 is presented in Attachment 2.

PROJECT	DATE	KEY DOCUMENTATION					WASTE DISPOSAL DOCUMENTATION					RAD coverage
		COMPLETED	P-DRIVE	C-FILE	CWS	STATE-FILE	COMPLETED	P-DRIVE	C-FILE	CWS	STATE-FILE	
Grand Island Repairs	1/12-1/16	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	PT
Aqua NC Cope Acres	1/19-1/22	X	X	X	N/A	X	X	X	X	N/A	X	KS
Aqua NC Hilly Wood	1/23-1/26	X	X	X	N/A	X	X	X	X	N/A	X	KS
Aqua NJ Southern 14	2/9-2/15	X	X	X	X	N/A	X	X	X	X	N/A	PT
Bass Lake CA	2/23-2/27	X	X		N/A	X	X	X	X	N/A	X	KS
MO-FAR W14, 18, 19	3/4-3/12	X	X	X	N/A	N/A	X	X	X	N/A	N/A	PT
IL-SYC W8	3/23-3/27	X	X	X	X	N/A	X	X	X	X	N/A	PT
NE-GRA	3/23-3/27	X	X		X	N/A	X	X	X	X	N/A	KS
CO-COT V1	4/2	X	X		N/A	N/A	N/A	N/A	N/A	N/A	N/A	KS
CO-COT V2	4/6	X	X		N/A	N/A	N/A	N/A	N/A	N/A	N/A	KS
UDT LvLn	4/10-4/14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NH
NJ-ERI W15(maint)	4/20-4/24	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	PT
NJ-HAM W11	5/5	X	X		X	N/A	X	X	X	X	N/A	KS
NJ-VIN W6	5/15	X	X	X	X	N/A	X	X	X	X	N/A	PT
NY-HIG	5/19	N/A	N/A	N/A	N/A	N/A	X	X	X	N/A	N/A	PT
NE-GRA	5/20	X	X		X	N/A	X	X	X	X	N/A	KS
CO-COT V3	5/28	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PT
IL-OSW W4 (maint)	6/8-6/12	X	X		N/A	N/A	N/A	N/A	N/A	N/A	N/A	KS
CO-COT V4	6/17	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PT
IL-ANT W10	6/22-6/26	X	X	X	N/A	N/A	X	X	X	N/A	N/A	PT
WI-Semi Srvys	6/26-6/27	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	X	PT
IL-ANT W9	7/13-7/17	X	X		N/A	N/A	X	X	X	N/A	N/A	KS
IL-BAR W4	7/27-7/31	X	X	X	N/A	N/A	X	X	X	N/A	N/A	PT
CO-COT V1	8/3-8/4	X	X		N/A	N/A	N/A	N/A	N/A	N/A	N/A	KS
CA-MIS/BAS	8/5-8/11	X	X	X	N/A	X	X	X	X	N/A	X	PT
IL-OSW W11	8/17-8/21	X	X		N/A	N/A	X	X	X	N/A	N/A	KS
CO-COT V2	8/24-8/25	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PT
CO-COT V3	9/16-9/17	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PT
MO-FAR W15, 19	9/28-10/2	X	X	X	N/A	N/A	X	X	X	N/A	N/A	PT
UT-CAR pilot	10/7	X	X		N/A	N/A	X	X	X	N/A	N/A	KS
CO-COT V4	10/7-10/8	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	DB
IL-OSW W9	10/12-10/15	X	X	X	N/A	N/A	X	X	X	N/A	N/A	PT
WI-Semi Srvys	10/16-10/17	X	X	X	N/A	X	N/A	N/A	N/A	N/A	N/A	PT
NJ-BOR baseline	10/19-10/22	X	X		X	N/A	N/A	N/A	N/A	N/A	N/A	KS
NY-CAST baseline	10/21	X	X		X	N/A	N/A	N/A	N/A	N/A	N/A	KS
NJ-HAM W12	10/26-10/30	X	X		X	N/A	X	X	X	X	N/A	KS

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Attachment 3 2015- Training/Refresher Training

The following WRT and CWS/HOA training was reviewed:

WRT

Radiation Safety Training for System Specialists

Radiation Safety	Refresher	Required Reading	04/10/15
Radiation Safety	Refresher	Required Reading	04/21/15
Radiation Safety	Refresher	Required Reading	04/22/15
Radiation Safety	Refresher	Required Reading	05/04/15
Radiation Safety	Refresher	Required Reading	05/20/15
Radiation Safety	Refresher	Required Reading	06/01/15

CWS/HOA

Radiation Safety Awareness Training for CWS/HOA personnel

San Angelo, TX	Refresher	Required Reading	Not Completed*
Eden, TX	Refresher	Required Reading	Not Completed
Elburn, IL	Refresher	Required Reading	Not Completed
Cortland, IL	Refresher	Required Reading	Not Completed
Bartlett, IL	Refresher	Required Reading	Not Completed
	Initial	K. Stovall/P. Tschida	12/12/15
IPE, IL	Refresher	Required Reading	04/12/15
Antioch, IL	Refresher	Required Reading	Not Completed
Sycamore, IL	Refresher	Required Reading	04/21/15
Oswego, IL	Refresher	Required Reading	06/01/15
	Initial	K. Stovall/P. Tschida	12/12/15
Farmington, MO	Refresher	Required Reading	06/02/15

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Zavala, TX	Refresher	Required Reading	04/30/15
Falling Waters, TX	Refresher	Required Reading	Not Completed
Fox Run, VA	Refresher	Required Reading	Not Completed
Arbors, WI	Refresher	Required Reading	Not Completed
Brookfield, WI	Refresher	Required Reading	05/04/15
Ethan Allen, WI	Refresher	Required Reading	04/21/15
Pewaukee, WI	Initial	K. Stovall/P. Tschida	12/12/15
Bass Lake, CA	Refresher	Required Reading	04/29/15
Mission Springs, CA	Refresher	Required Reading	04/13/15
Royal Carrizo, CA	Refresher	Required Reading	04/13/15
Golden State Water, CA	Refresher	Required Reading	04/17/15
Lawrenceville, GA	Refresher	Required Reading	04/15/15
ANC Brookwood/LaGrange, NC	Refresher	Required Reading	05/29/15

Note: * Not Completed- Required Reading package sent to CWS/HJOA requiring sign-off that the package was read and the sign-off sheet(s) be returned to WRT. Failure of the CWS/HOA to return the sign-off sheet(s) in a timely manner resulted in WRT making several attempts/sending emails to the CWSs/HOAs to remind them of the "Required Reading" requirements. At the time of this audit, the CWSs/HOAs listed as "Not Completed" had not returned their respective sign-off sheet(s).

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Attachment 4: WRT Personnel Interviewed

1. Duane Bollig
2. Kent Stovall
3. David Jones
4. Mike Dimitriou
5. Dan Debello
6. David Jones
7. Paul Tschida
8. Mark Thompson
9. Ron Dollar
10. Rory Roman
11. John Thome
12. Dave Melancon
13. Rick Blaes