

October 8, 1996

Mr. Todd Jackson  
Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, Pennsylvania 19406

**SUBJECT: Summary of Work Plan Responses  
Former Tenneco Polymers Facility  
Fords, New Jersey**

Dear Mr. Jackson:

This letter has been prepared in response to our recent meeting to review the Work Plan previously submitted to the Nuclear Regulatory Commission for the removal of radioactive materials from the former Tenneco Polymers facility (Huls America) in Fords, New Jersey. The information provided within this letter summarizes the location of responses in the Work Plan to the comments made previously by the NRC.

**SUMMARY OF RESPONSES**

- NRC Comment 1:** References cleanup levels which will conform to applicable requirements as noted in Section 3.2.
- NRC Comment 2:** References surface contamination criteria which is addressed in Section 3.2, while the evaluation of building surfaces is summarized in Section 3.10.2, and the radiation detection and monitoring equipment is summarized in Section 3.10.8.
- NRC Comment 3:** References cleanup will be performed to **appropriate criteria** on Page 1-1.
- NRC Comment 4:** References to radium-226 have been removed from the updated HSP.
- NRC Comment 5:** Background concentrations of uranium will be determined as outlined in Section 3.9.
- NRC Comment 6:** Reference to two standard deviations as a criteria is outlined in Section 3.8.5.
- NRC Comment 7:** Reference Section 3.10.6, **On-Site Gamma Spectroscopy**
- NRC Comment 8:** References to the evaluation of fixed surface contamination are made in Section 3.10.2, **Evaluation of Building Surfaces.**
- NRC Comment 9:** Reference to the number of soil samples anticipated is provided on page 4-8. However, the actual number of soil samples that will be obtained as part of final validation work will be based on the area and volume of soil removal in a

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manner consistent with the guidance of NUREG/CR-5849, and through discussions with NRC personnel.

- NRC Comment 10:** Groundwater sampling will be performed in accordance with Section 3.10.4, and the reference to this section will be modified to reflect such sampling in Section 4.3.3. The exact location of such sampling will be determined in the field based on the data developed during detailed site screening.
- NRC Comment 11:** Reference to the removal of soils beneath the slab is provided in Section 4.2.1.
- NRC Comment 12:** Reference to the location of operations is provided in Section 2.1.
- NRC Comment 13:** Surface water drainage considerations are summarized in Section 2.2, while other sections note methods used for screening, sampling, and analysis that will be performed to determine potential impacts to groundwater, drainlines, soils, and equipment as part of the wastewater treatment facility.
- NRC Comment 14:** No operations history is available for the wastewater treatment system but this entire facility will be evaluated since it is located within the area directly adjacent to Building K-12A.
- NRC Comment 15:** Reference to the methods to be used for surveying drains is provided in Section 3.10.5.
- NRC Comment 16:** References to the proper signage are provided in Section 3.5, **Project Site Security**.
- NRC Comment 17:** Reference to the locked gates is provided in Section 3.5, **Project Site Security**.
- NRC Comment 18:** A reference to the backfilling only after NRC site review is provided on page 4-4.
- NRC Comment 19:** The procedures for sawing of concrete are outlined in Section 4.2.2, **Concrete Removal Options**.
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- NRC Comment 20:** The secure storage area will be located inside Building 31, as noted in Section 4.2.4, **Radioactive Material Storage**.
- NRC Comment 21:** No mixed waste is anticipated since benzaldehyde is the chemical of interest and is not recognized by the EPA as a hazardous waste.
- NRC Comment 22:** Air monitoring and sampling will be performed in accordance with Section 3.10.7, **Air Monitoring and Sampling**.
- NRC Comment 23:** Tom Kreutz is no longer with SECOR, thus James Johnson, Ph.D., CHP will fulfill the role of Health and Safety Officer, as well as Site Health and Safety Officer (SH&SO). A resume for Mr. Johnson is attached.
- NRC Comment 24:** Reference to the duties of the SH&SO will be provided in an updated HSP.

- NRC Comment 25:** On-site personnel will be in routine direct contact with Tenneco personnel that are managing the project.
- NRC Comment 26:** Reference to the use of respirators in accordance with 10 CFR 20.1700 has been provided in the updated HSP on page 10.
- NRC Comment 27:** Reference to compliance with various parts of 10 CFR are provided in Section 3.2, **Regulatory Compliance**.
- NRC Comment 28:** A copy of the sample collection and analysis QA/QC procedures are noted in Section 3.10.9, **Sample Collection and Analysis QA/QC**.
- NRC Comment 29:** A summary of the radiation detection and monitoring equipment is provided in Section 3.10.8, **Radiation Detection and Measurement Equipment**.
- NRC Comment 30:** All final survey data will be included within the final report as noted in Section 4.4.
- NRC Comment 31:** A correct reference to the uranyl nitrate loss in provided on page 2.1.

#### **CLOSING REMARKS**

I appreciate the time you spent with me to review the Work Plan and look forward to meeting with you to tour the facility. If you have any questions, or if we can be of assistance, please give me a call.

Sincerely,  
**SECOR International Incorporated**



Dale W. Evans, P.E.  
Chief Engineer

cc: Roger Towe - Tenneco  
James Johnson, Ph.D.

Attachment: Resume for James Johnson

**JAMES E. JOHNSON, Ph.D., C.I.H.**  
Chief Nuclear Scientist

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Ph.D.	Radiation Biology, 1965 Colorado State University
M.S.	Health Physics, 1959 University of Rochester
B.S.	Chemistry, 1957 Houghton College

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Dr. Johnson's extensive credentials spans over 37 years and exemplifies his expertise in radiology, radiation biology, and radiation safety. He currently serves as a Professor for the Department of Radiology and Radiation Biology at Colorado State University (CSU) and as the Director of Health Physics Departments at both CSU and the University of New Mexico. Dr. Johnson has significant background with the hands-on remediation of nuclear waste materials involving a broad range of nuclides. This work has included the removal of contaminated soils and concrete at the Denver Radium Superfund sites and the management of all field activities for decommissioning the Fort St. Vrain nuclear reactor managed by Public Service Company of Colorado. Dr. Johnson's contribution to research and development has included radioactivity analyses and detection limit problems, the transfer coefficients of selected radionuclides to animal products, coefficient prediction models of radioactivity transport, technetium metabolism, and the transfer of Cs<sup>137</sup> to milk and meat in Hungary from the Chernobyl fallout. Dr. Johnson is the renowned author of over 50 publications related to nuclear research. His professional experience is described below.

## Professional Experience

### Consulting Experience

- Involved in the decontamination of Denver, Colorado Ra-226 site for a major chemical corporation's site in Denver. Responsible for the entire cleanup of the uranium processing building and the entire site assessment.
- Involved in the decontamination of a university office building in downtown Denver, Colorado, in which the seventh floor was originally used by the U.S. Bureau of Mines.
- Involved in the decontamination of an old building which belonged to an major electronics manufacturer in downtown Denver, Colorado, where the upper floors were used for Ra-226 watch dial painting. Responsible for entire cleanup.
- Involved in the decontamination assessment for a site in Denver, Colorado, which was owned by an industrial property development entity and is a Superfund site.
- Involved in the decontamination of an aerospace manufacturer's plant in Eatontown, New Jersey.
- Involved in the completion of 22 individual Nuclear Regulatory Commission (NRC) licenses for manufacturing and distribution of Am-241-containing smoke detectors for U.S. firms.

- Involved in the completion of environmental radioactivity assessments for various uranium mine and mill sites in the U.S.

### **Academic Experience**

- Served as a Research Professor in the Department of Chemical and Nuclear Engineering at the University of New Mexico in Albuquerque.
- Served as Visiting Professor, GSF, Neuherberg, Federal Republic of Germany.
- Currently serving as a Professor in the Department of Radiology and Radiation Biology for nearly 20 years at CSU. Additionally, he served as Associate Professor and Assistant Professor in the Department of Animal Sciences and the Department of Radiology and Radiation Biology at CSU for the nine years prior.
- Served as Director for the Whole-Body Counter for the Department of Radiology and Radiation Biology at CSU for the past 28 years. Served an additional two years as a Research Assistant.
- Served as Radiation Safety Officer for CSU.
- Served as an Instructor for CSU and the University of New Mexico.

### **Research Experience**

- Served as Principal Investigator, Risk/Benefit, of the disposal of mixed waste for the University of New Mexico and DOE's MERC.
- Served as Principal Investigator for environmental radiation surveillance at the Ft. St. Vrain nuclear reactor.
- Served as Principal Investigator for a study of plutonium in the aquatic systems of Rocky Flats environs.
- Served as Co-Principal Investigator with research which has included Po<sup>210</sup> Metabolism in ruminants, skin absorption of Pu-DMSO, transfer of fallout Cs<sup>137</sup> from troposphere to man, and a study of unsupported polonium-210 for ion exchange in soils and uptake in vegetation.

### **Professional Memberships**

Health Physics Society

### **Professional Certifications and Registrations**

Certified in Health Physics, American Board of Health Physics, 1969

### **Professional Training and Continuing Education Courses**

Course work, Postdoctoral Biophysics, Harvard Medical School, 1967

## Publications

Ward, G. M., J. E. Johnson and H. F. Stewart. "Variation between Breeds and among Individual Cows in the Levels of Cesium-137 Secreted in Milk," *J. Dairy Sci.* 47, 11, 1964.

Johnson, J. E., C. Tengerdy, G. M. Ward, and D. W. Wilson. "Fallout Determination, Separation, and Recovery of Cs<sup>137</sup> from <sup>95</sup>Zr-Nb in Forage Samples," *J. Agric. Food Chem.* 13, 568-571, 1965.

Johnson, J. E. and G. M. Ward, "Cs<sup>137</sup> in Milk from Dry-Lot and Pasture Fed Cows in Fort Collins, Colorado, in 1963," *Radiol. Health Data* 6, 29, 1965.

Stewart, H. F., G. M. Ward and J. E. Johnson, "The Availability of Fallout Cs<sup>137</sup> to Dairy Cattle from Different Types of Feed," *J. Dairy Sci.* 48, 173, 1965.

Ward, G. M., H. F. Stewart, and J. E. Johnson, "Effects of Feeding Practices on Cs<sup>137</sup> Levels of Milk," *J. Dairy Sci.* 48, 38-43, 1965.

Ward, G. M. and J. E. Johnson, "The Cesium-137 Content of Beef from Dairy and Feed-Lot Cattle," *Health Physics* 11, 95, 1965.

Ward, G. M., J. E. Johnson and H. F. Stewart, "Cesium-137 Passage from Precipitation to Milk," in *Radioactive Fallout from Nuclear Weapons Tests*, Alfred W. Klement, Ed., pp. 703-710, AEC Symposium Series 5, November 1965.

Ward, G. M., J. E. Johnson, and D. W. Wilson, "Determination of Fallout Radionuclides in Environmental Samples by Gamma-Ray Spectrometry," Intl. Symposium on Radioisotopes Measurement Techniques in Medicine and Biology, Vienna, 24-28 May 1965.

Johnson, J. E., G. M. Ward, and H. F. Stewart, "Interpretation of Gamma-Ray Spectra of Environmental Forage Samples," *Health Phys.* 12, 37-42, 1966.

Johnson, J. E., G. M. Ward, D. W. Wilson and R. W. Thompson, "Separation and Measurement of Cs<sup>137</sup> in Precipitation," *Annal. Chimica Acta.* 34, 59-63, 1966.

Johnson, J. E., G. M. Ward, and D. W. Wilson, "The Appearance of I<sup>131</sup> and Ba-La<sup>140</sup> in Fallout Due to the Second Chinese Nuclear Test," *Radiol. Health Data* 7, 1, 1966.

Johnson, J. E. and G. M. Ward, "Body Composition of Live Animals as Determined by K<sup>40</sup>. I. A Crystal-Type Whole-Body Counter for Determining Body Composition of Live Animals," *J. Dairy Sci.* 49, 1163-1165, 1966.

Johnson, J. E., D. W. Wilson, and W. L. Lindsay, "Transfer of Fallout Cs<sup>137</sup> from Soil to Dairy Cattle Feeds," *Soil Sci. Proc.* 30, 416-417, 1966.

Johnson, J. E. and G. M. Ward, "An *In-Vivo* Gamma-Ray Spectrometer for Isotope Metabolism Studies in Dairy Cattle," Seminar on the Use of Radioisotopes and Radiation in Dairy Science and Technology, IAEA-FAO, Vienna, July 1966.

Ward, G. M., J. E. Johnson and D. W. Wilson, "Evaluation of Cs<sup>137</sup> of Milk in Terms of Feed Contamination and the Fallout Rate," *Public Health Reports* 81, 639-645, 1966.

Ward, G. M. and J. E. Johnson, "Feeding Practices as a Means of Reducing the Concentration of Fallout Cs<sup>137</sup> in Cows' Milk," Seminar on the Use of Radioisotopes and Radiation in Dairy Science and Technology, IAEA-FAO, Vienna, July 1966.

Ward, G. M., J. E. Johnson, and T. R. Tyler, "The Relationship of Potassium as Determined by K<sup>40</sup> to Moisture and Feed in Ground Beef," *J. Anim. Sci.* 26, 298-301, 1967.

Ward, G. M., J. E. Johnson, and D. L. Whelan, "Transfer Determination of Cs<sup>137</sup> Content and Related Sampling Problems of Dairy Cattle Feed," *J. Assoc. Off. Anal. Chem.* 51, 792-796, 1967.

Ward, G. M., J. E. Johnson, and L. B. Sasser, "Transfer Coefficients of Fallout Cs<sup>137</sup> to Milk of Dairy Cattle Fed Pasture, Green-Cut Alfalfa, or Stored Feed," *J. Dairy Sci.* 50, 1092-1096, 1967.

Wilson, D. W., G. M. Ward and J. E. Johnson, "Fallout Cs<sup>137</sup>: Direct Aerial Transfer as an Important Source of Foliar Contamination," *Radiat. Botany* 7, 313, 1967.

Ward, G. M. and J. E. Johnson, "Balance of Cs<sup>137</sup> and Potassium and Whole-Body Levels in Young Male Subjects," *Am. J. Clin. Nutr.* 21, 149-153, 1968.

Moore, F. D., J. M. Hartsuck, R. E. Zollinger, and J. E. Johnson, "Reference Models for Clinical Studies by Isotope Dilution," *Annals of Surg.* 168, 671-700, 1968.

Johnson, J. E., G. M. Ward, K. L. Knox and E. Firestone, "Metabolism of Potassium and Radiocesium by Dairy Cattle as Influenced by High or Low Forage Diets," *J. Nutr.* 94, 282-288, 1968.

Johnson, J. E., D. Garner and G. M. Ward, "Influence of Dietary Potassium, Rubidium, or Sodium on the Retention Time of Radiocesium in Rats," in *Proceedings of the Society for Experimental Biology and Medicine*, 127, 857-860, 1968.

Johnson, J. E. and J. A. Johnson, "A New Value for the Ion Component of the Effective Half-Retention Time of <sup>203</sup>Hg in the Human, *Health Phys.* 14, 265-266, 1968.

Johnson, J. E. and J. M. Hartsuck, "Counting of <sup>42</sup>K by Cerenkov Radiation," *Health Phys.* 16, 755, 1968.

Hartsuck, J. M., J. E. Johnson and F. D. Moore, "Potassium in Bone: Evidence for a Nonexchangeable Fraction," *Metabolism* 18, 33-37, 1969.

Johnson, J. E., J. M. Hartsuck, R. Zollinger, Jr. and F. D. Moore, "Radiopotassium Equilibrium in Total Body Potassium: Studies Using <sup>43</sup>K and <sup>42</sup>K," *Metabolism* 18, 663-668, 1969.

Johnson, J. E., T. R. Tyler, and G. M. Ward, "Transfer of Fallout Cs<sup>137</sup> from Feed to Meat of Cattle," *J. Anim. Sci.* 29(5), 695-699, 1969.

Watters, R. L. and J. E. Johnson, "Skin Absorption of Plutonium in DMSO Solution," *Health Phys.* 18, 318-320, 1970.

Paine, D., J. E. Johnson, and R. L. Watters, "Plutonium Movement in Aquatic Systems: A Review," in *Proceedings of the Rocky Flats Symposium on Safety in Plutonium Handling Facilities*, CONF-710401, USAEC, 1971.

Ward, G. M. and J. E. Johnson, "Nuclear Techniques for *In Vivo* Determination of "Body Composition: A Review," in *Proceedings of the Symposium on the Use of Isotopes in Studies on the Physiology of Domestic Animals with Special Reference to Hot Climates*, IAEA, 1972.

Ward, G. M. and J. E. Johnson, "Evaluation of  $^{82}\text{Br}$  and an ECW Tracer in Ruminants," in *Proceedings of the Symposium on the Use of Isotopes in Studies on the Physiology of Domestic Animals with Special Reference to Hot Climates*, IAEA, 1972.

McInroy, J. F., R. L. Watters, and J. E. Johnson, "Polonium-210 Absorption in Rats: Effects of Biological Modification," *Nature* 236, 118, 1972.

Johnson, J. E., *Laboratory Training Manual on the Use of Radionuclides and Radiation in Animal Research*, IAEA, Vienna, 1972.

Johnson, J. E., B. A. Berven, and S. T. Bard, "Tritium in Tropospheric Water Vapor," *Health Phys.* 33, 333, 1977.

Hollo, J., J. Toth, R. P. Tengerdy, and J. E. Johnson, "Denitrification and Removal of Heavy Metals from Waste Water by Immobilized Micro-Organisms," *Amer. Chem. Soc. Symposium Series* 106, 73-86, 1979.

Myer, H. R., J. E. Johnson, R. P. Tengerdy, and P. M. Goldman, "Use of Bacteria Polymer Composite to Concentrate Plutonium for Aqueous Media," *Health Phys.* 40, 222-225, 1981.

Pascuzzo, G. J., J. E. Johnson, and E. L. Pautler, "Glucose Transport in Isolate Pigment Epithelium," *Exp. Eye Res.* 30, 53, 1980.

Berven, B. and J. E. Johnson, "Depth Dose in Tissue from  $\beta$ -Particles of  $^{85}\text{Kr}$ ," *Health Phys.* 40, 222-225, 1981.

Ennis, S. R., J. E. Johnson and E. L. Pautler, "*In Situ* Kinetics of Glucose Transport Across the Blood-Retinal Barrier in Normal Rats and Rats with Streptozocin-Induced Diabetes," *Invest. Ophthalmology Vis. Sci.* 23, 447-456, 1982.

Ward, G. M., J. E. Johnson and J. Stager, "Body Composition. Methods of Estimation and Effect Upon Performance," *Clinics in Sports Med.* 3, 705-722, 1982.

Ward, G. M. and J. E. Johnson, "Validity of the Term: Transfer Coefficient," *Health Phys.* 50, 411-414, 1986.

Johnson, J. E. and J. A. Johnson, "Radioactivity Analyses and Detection Limit Problems of Environmental Surveillance at a Gas-Cooled Reactor," in *Detection in Analytical Chemistry, Importance, Theory, and Practice*, Ch. 14, Lloyd A. Currie, Ed., *Amer. Chem. Soc. Symposium Series* 361, 1987.

Ennis, M. E., Jr., J. E. Johnson, G. M. Ward and G. M. Voight, "A Specific Activity Effect in the Metabolism of Technetium," *Health Phys.* 54, No. 2, 157-160, 1988.

Ennis, M. E., Jr., G. M. Ward, J. E. Johnson and K. N. Boamah, "Transfer Coefficients of Selected Radionuclides to Animal Products," in "Comparison of Milk and Meat from Dairy Cows and Goats," *Health Phys.* 54, No. 2, 161-166, 1988.

Cordain, L., R. E. Whicker, and J. E. Johnson, "Body Composition Determination in Children Using Bioelectric Impedance," *Growth, Devel. & Aging* 52(1), 37-40, 1988.

Ward, G. M. and J. E. Johnson, "Assessment of Milk Transfer Coefficients for Use in Prediction Models of Radioactivity Transport," *The Sci. of the Total Envir.* 85, 287-294, 1989.

Ennis, M. E., J. E. Johnson, G. M. Ward and K. N. Boamah, "Technetium Metabolism by Lactating Goats," *Health Phys.* 57, No. 2, 321-330, 1989.

Ward, G. M., Z. Keszthelyi, B. Kányar, U. P. Kralovansky, and J. E. Johnson, "Transfer of the Cs<sup>137</sup> to Milk and Meat in Hungary from Chernobyl Fallout with Comparisons of the Worldwide Fallout in the 1960s," *Health Phys.* 57, No. 4, 587-592, 1989.

Cordain, L., J. E. Johnson, C. N. Bainbridge, R. E. Whicker, and J. M. Stöckler, "Potassium Content of the Fat Free Body in Children," *J. Sports Med. & Phys. Fitness* 29, No. 2, 170-176, 1989.

(A total of 55 journal publications in the open literature.)