

Jill Weber Aanenson
Scientific Consulting, Inc.

Education

M.S., Radiation Health Physics, Colorado State University, Fort Collins, Colorado, 1995
B.A., Summa Cum Laude, Physics, Augustana College, Sioux Falls, South Dakota, 1993

Professional Experience

Scientific Consulting, Inc.

(1999–present)

Independent Consultant

(1995–1998)

In 1995, started working as an independent consultant and founded Scientific Consulting, Inc. in 1999. Currently working with Risk Assessment Corporation (RAC) on dose reconstruction and environmental risk assessment studies, focusing on historical releases of radioactive and nonradioactive materials and estimating potential risk to surrounding populations. Past work has been supported by the Colorado Department of Public Health and Environment (Rocky Flats Dose Reconstruction), the Radionuclide Soil Action Level Oversight Panel (Radionuclide Soil Action Level Assessment), the Department of Justice for Los Alamos National Laboratory (Los Alamos Technical Audit), the Centers for Disease Control and Prevention (Savannah River Dose Reconstruction, Screening Releases to Columbia River, INEEL Prioritization of Releases), and Colorado State University (Cerro Grande Fire, RACER Project). Recently completed a 5-year study supported by the National Cancer Institute, the National Council on Radiation Protection and Measurements and the Vanderbilt-Ingram Cancer Center conducting dose reconstructions for atomic veterans who served during atmospheric weapons testing in the South Pacific and Nevada during the 1940s and 1950s.

For the Rocky Flats Dose Reconstruction Project, identified mechanisms and models for atmospheric release and transport of contamination leaked to the ground on the Rocky Flats Plant site. Responsible for modeling atmospheric and wind conditions, developed a computer code for suspension of plutonium from onsite locations, and identified the amount of radioactive material released from the Rocky Flats Plant from a plutonium source. Also conducted the uncertainty assessment in the EPA slope factor for Carbon Tetrachloride.

For the Savannah River Site Dose Reconstruction Project, identified documents to determine how much radioactive material was released to the environment and developed an initial estimate of radioactive materials released to surface water in the area surrounding the Savannah River Site. Evaluated uncertainty for tritium releases and uncertainty for chemical source term and releases from the Savannah River Site.

For the Los Alamos Technical Audit for compliance with the Clean Air Act, managed two projects and conducted assessment of the environmental monitoring programs at Los Alamos. Was also involved in assessing the adequacy of the CAP88 annual dose calculations for 1999.

For Radionuclide Soil Action Level Assessment, completed a comparison of soil action levels across the world, developed a sensitivity analysis to evaluate input parameter values for the RESRAD computer code, conducted a comparison of results of RESRAD and Nuclear Regulatory Commission Decontamination and Decommissioning (DandD) codes, completed the sensitivity analysis and recommended input values and probability distributions for an independent analysis of soil action levels at Rocky Flats.

For the independent analysis of the Cerro Grande Fire in May of 2000 at Los Alamos National Laboratory, led the effort to analyze available environmental air monitoring data and performed a risk-based screening analysis on radionuclides for the air pathway. Assisted with risk calculations for both the air pathway and the surface water pathway.

For Screening Releases to the Columbia River from the Hanford Facility, evaluated environmental data and developed pathway analysis for a risk-based screening methodology for radionuclide releases to the Columbia River from past operations of Hanford. Objective was to identify the relevant radionuclides, exposure pathways and critical groups for dose calculations, and ascertain if these had been considered in the Hanford Environmental Dose Reconstruction (HEDR) Project dose calculations. Particular emphasis was placed on exposures to Native Americans.

For Idaho National Engineering and Environmental Laboratory Identification and Prioritization of Radionuclide Releases, conducted the groundwater source term evaluation and environmental monitoring assessment. Completed dose and risk screening calculations for exposure to tritium in groundwater.

In 2002, started working with other RAC contractors on the RACER project at Los Alamos National Laboratory to develop a process and tool to convert environmental data directly to human health risk to facilitate and enhance decision making and communication about risks from chemicals and radionuclides in the environment. Primary tasks included environmental data evaluation, database development, and public involvement.

Completed a project in December 2007 working with the Department of Environmental and Cultural Preservation at the Pueblo de San Ildefonso near Los Alamos National Laboratory in New Mexico. This Pueblo had concerns about risks to tribal members so RAC developed a data analysis and risk calculation system for the Pueblo. Was responsible for scenario development, database development, and staff training.

Worked on a complete historical dose reconstruction for a uranium mining and milling facility. In charge of developing a comprehensive database system to take individual exposure histories for individuals and calculate dose specific to years of exposure.

Completed a 5-year project in 2015 conducting dose reconstructions for atomic veterans who served during atmospheric weapons testing in the South Pacific and Nevada during the 1940s and 1950s. In this first phase, methods were developed to calculate individual estimates of exposure and dose with associated uncertainties for a sub-cohort of military veterans who participated in at least one of seven series of atmospheric nuclear weapons testing carried out by the United States. These dose estimates to specific organs will be used in an epidemiological study known as the Million Person Study looking at cancer induction from chronic, low-dose exposures. Was responsible for exposure scenarios and doses to veterans stationed on ships in the South Pacific.

Assisted with performance assessment for low-level radioactive waste disposal at the CWF and FWF facilities and licensed Subtitle C hazardous waste at the RCRA landfill, Andrews, Texas.

Currently working on implementation of RACER across Exelon's fleet of nuclear power plants to manage and evaluate environmental effluent and monitoring data.

Experience in modeling, statistics, meteorology, public involvement, evaluation of historical records, source term development, environmental monitoring, pathway development, risk and dose calculations, risk communication, and database development.

Book and Journal Publications

- Rood, A.S., P.D. McGavran, **J.W. Aanenson**, and J.E. Till. 2001. "Stochastic Estimates of Exposure and Cancer Risk from Carbon Tetrachloride Released to the Air from the Rocky Flats Plant." *Risk Analysis*, 21(4): 675-695.
- Till, J.E., A.S. Rood, P.G. Voillequé, P.D. McGavran, K.R. Meyer, H.A. Grogan, W.K. Sinclair, **J.W. Aanenson**, H.R. Meyer, H.J. Mohler, S.K. Rope, and M.J. Case. 2002. "Risks to the public from historical releases of radionuclides and chemicals at the Rocky Flats Environmental Technology Site." *Journal of Exposure Analysis and Environmental Epidemiology*, 12:355-372.
- Mohler, H.J., K.R. Meyer, H.A. Grogan, **J.W. Aanenson**, and J.E. Till. 2004. Application of NCRP Air Screening Factors for Evaluating Both Routine and Episodic Radionuclide Releases to the Atmosphere. *Health Physics* 86(2): 135-144.
- Grogan, H.A., **J.W. Aanenson**, P.D. McGavran, K.R. Meyer, S.S. Mohler, H. J. Mohler, J.R. Rocco, A.S. Rood, J.E. Till and L.H. Wilson. 2006. "Applied Modeling of the Cerro Grande Fire at Los Alamos: An Independent Analysis of Exposure, Health Risk, and Communication with the Public." In *Applied Modeling and Computations in Nuclear Science*. ACS Symposium Series 945. Edited by T.M. Semkow, S. Pommé, S.M. Jerome, and D.J. Strome. American Chemical Society, Washington, DC.
- Till, J.E., H.L. Beck, **J.W. Aanenson**, H.A. Grogan, H.J. Mohler, S.S. Mohler, and P.G. Voillequé. 2014. "Military Participants at U.S. Atmospheric Nuclear Weapons Testing-Methodology for Estimating Dose and Uncertainty." *Radiation Research*, 181(5):471-484.
- Beck, H.L., J.E. Till, H.A. Grogan, **J.W. Aanenson**, H.J. Mohler, S.S. Mohler, and P.G. Voillequé. 2017. "Red Bone Marrow and Male Breast Doses for a Cohort of Atomic Veterans." *Radiation Research*, 187(2):221-228.
- Till, J.E., H.L. Beck, J.D. Boice Jr, H.J. Mohler, M.T. Mumma, **J.W. Aanenson**, H.A. Grogan. 2019. "Asbestos exposure and mesothelioma mortality among atomic veterans." *International Journal of Radiation Biology*. 93(0) 1128-1144. January 8, 2019. <https://doi.org/10.1080/09553002.2018.1551641>.
- Till, J.E., H.L. Beck, **J.W. Aanenson**, H.A. Grogan, H.J. Mohler, S.S. Mohler, P.G. Voillequé. 2018. "Dosimetry associated with veterans who participated in nuclear weapons testing." *International Journal of Radiation Biology*, DOI: 10.1080/09553002.2018.1551639.
- Aanenson, J.W.**, J.E. Till and H.A. Grogan. 2018. "Understanding and Communicating Radiation Dose and Risk from Cone Beam Computed Tomography in Dentistry." *Journal of Prosthetic Dentistry*. 120 (3); 353-360. DOI: 10.1016/j.prosdent.2018.01.008.
- J. E. Till, Harold L. Beck, **Jill W. Aanenson**, Helen A. Grogan, H. Justin Mohler, S. Shawn Mohler, Paul G. Voillequé. 2022. "Dosimetry associated with veterans who participated in nuclear weapons testing." *Int. J. of Radiation Biology*, special issue. (in press).

J.E. Till, Harold L. Beck, John D. Boice Jr, H. Justin Mohler, Michael T. Mumma, **Jill W. Aanenson**, Helen A. Grogan. 2022. "Asbestos exposure and mesothelioma mortality among atomic veterans." 2022. .” Int. J. of Radiation Biology, special issue. (in press).

Technical Publications

Meyer H.R., S.K. Rope, T.F. Winsor, P.G. Voillequé, K.R. Meyer, L.A. Stetar, J.E. Till, and **J.M. Weber**, 1996. *Rocky Flats Dose Reconstruction Project Phase II: Toxicity Assessment and Risk Characterization, Task 2: The Rocky Flats Plant 903 Area Plutonium Source Term Development*. RAC Report No. 2-CDPHE-RFP-1996-DRAFT. Radiological Assessments Corporation, Neeses, South Carolina. February.

Weber J.M. 1996. *Adaptation of Atmospheric Resuspension Formulations For Use in the Source Term Determination at the Rocky Flats Plant 903 Area*. RAC Technical Memorandum Feb22-CDPHE-RFP-1996. Phase II, Rocky Flats Historical Public Exposure Studies. Radiological Assessments Corporation. February.

Weber J.M., A.S. Rood, P.G. Voillequé, K.R. Meyer, H.R. Meyer, and J.E. Till. 1996. *903 Area Dosimetry Spreadsheet: How does it work and what does it tell us?* RAC Technical Memorandum Sep13-CDPHE-RFP-1996. Phase II, Rocky Flats Historical Public Exposure Studies. Radiological Assessments Corporation. September.

Weber J.M. 1996. *Calculations of Plutonium Releases from the 903 Area Using a Suspension Code*. RAC Technical Memorandum Dec2-CDPHE-RFP-1996. Phase II, Rocky Flats Historical Public Exposure Studies. Radiological Assessments Corporation. December.

Weber J.M., A.S. Rood, H.R. Meyer, and J.E. Till. 1999. *Development of the Rocky Flats Plant 903 Area Source Term, Task 2: Independent Analysis of Exposure, Dose, and Health Risk to Offsite Individuals*. RAC Report No. 8-CDPHE-RFP-1998-FINAL(Rev. 1). Phase II, Rocky Flats Historical Public Exposure Studies. Radiological Assessments Corporation. August.

Weber J.M. 1997. *Determining the Best Estimate of a Slope Factor for Carbon Tetrachloride*. RAC Technical Memorandum Sep05-CDPHE-RFP-1997. Phase II, Rocky Flats Historical Public Exposure Studies. Radiological Assessments Corporation. September.

Weber J.M., S.J. Maheras, H.J. Mohler, P.G. Voillequé, and J.E. Till. *Independent Audit of Los Alamos National Laboratory for Compliance with the Clean Air Act, 40 CFR 61, Subpart H*. RAC Report No. 3-DOJ-LANL Audit-1998-Partial Draft. Radiological Assessments Corporation, Neeses, South Carolina. May.

Weber J.M. and J.E. Till. 1999. *Task 1: Cleanup Levels at Other Sites*. RAC Report No. 6-RSALOP-RFSAL-1999-DRAFT FINAL. Risk Assessment Corporation, Neeses, South Carolina. April.

Killough G.G., A.S. Rood, **J.M. Weber**, K.R. Meyer, and J.E. Till. 1999. *Task 2: Computer Models*. RAC Report No. 4-RSALOP-1999-DRAFT FINAL. Risk Assessment Corporation, Neeses, South Carolina. July.

Aanenson J.W., G.G. Killough, K.R. Meyer, A.S. Rood, and J.E. Till. 1999. *Task 3: Inputs and Assumptions*. RAC Report No. 15-RSALOP-RFSAL-FINAL. Risk Assessment Corporation, Neeses, South Carolina. October.

Killough, G.G., A.S. Rood, **J.W. Aanenson**, K.R. Meyer, H.A. Grogan, W.K. Sinclair, J.E. Till. 2000. *Task 5: Independent Calculation*. RAC Report No. 16-RSALOP-RSAL-FINAL. Risk Assessment Corporation, Neeses, South Carolina. February.

- Till, J.E., K.R. Meyer, **J.W. Aanenson**, G.G. Killough, A.S. Rood, H.A. Grogan, W.K. Sinclair. 2000. *Technical Project Summary. RAC Report No. 1-RSALOP-RSAL-FINAL. Risk Assessment Corporation*, Neeses, South Carolina. February.
- Meyer, K.R., J. Mohler, **J.W. Aanenson**. 2000. *Identification and Prioritization of Releases from the Idaho National Engineering and Environmental Laboratory. RAC Report No. 3-CDC-Task Order 5-2000-DRAFT. Risk Assessment Corporation*, Neeses, South Carolina. September 30.
- Aanenson, J.W.**, H.J. Mohler, P.G. Voillequé, S.J. Maheras, A.S. Rood, H.A. Grogan, J.E. Till. 2000. *Independent Technical Audit of Los Alamos National Laboratory for Compliance with the Clean Air Act, 40 CFR 61, Subpart H in 1999. RAC Report No. 4-DOJ-LANL Audit-2000-FINAL. Risk Assessment Corporation*, Neeses, South Carolina. December.
- Aanenson, J.W.**, P.J. Boelter, M.J. Case, M. Dreicer, H.A. Grogan, M.O. Langan, P.D. McGavran, K.R. Meyer, H.R. Meyer, H.J. Mohler, A.S. Rood, R.C. Rope, S.K. Rope, L.A. Stetar, P.G. Voillequé, T.F. Winsor, W. Yang, and J.E. Till. 2001. *Savannah River Site Environmental Dose Reconstruction Project. Phase II: Source Term Calculation and Ingestion Pathway Data Retrieval. Evaluation of Materials Released from the Savannah River Site. RAC Report No. 1-CDC-SRS-1999-FINAL. Risk Assessment Corporation*, Neeses, South Carolina. April 30.
- Aanenson, J.W.**, P.D. McGavran, H.A. Grogan, W.K. Sinclair, and J.E. Till. 2001. *Analysis of Exposure and Risks to the Public from Radionuclides and Chemicals Released by the Cerro Grande Fire at Los Alamos. Task 1.1: Analysis of Air and Biota Monitoring Data. RAC Report No.3-NMED-2001-FINAL. Risk Assessment Corporation*, Neeses, South Carolina. May 3.
- Aanenson, J.W.**, P.D. McGavran, A.S. Rood, H.A. Grogan, P.G. Voillequé, H.J. Mohler, and J.E. Till. 2002. *Analysis of Exposure and Risks to the Public from Radionuclides and Chemicals Released by the Cerro Grande Fire at Los Alamos. Task 1.3: Analysis of Potential Releases of Radionuclides and Chemicals to Air. RAC Report No.8-NMED-2001-FINAL. Risk Assessment Corporation*, Neeses, South Carolina. January 11.
- Grogan, H.A., **Aanenson, J.W.**, K.R. Meyer, and J.E. Till. 2002. *Analysis of Exposure and Risks to the Public from Radionuclides and Chemicals Released by the Cerro Grande Fire at Los Alamos. Task 1.5: Exposure Scenarios and Risk Factors for Assessing the Air Pathway. RAC Report No.14-NMED-2001-FINAL. Risk Assessment Corporation*, Neeses, South Carolina. February 4.
- Killough, G.G., **Aanenson, J.W.**, A.S. Rood, and J.E. Till. 2002. *Evaluation of Exposures Due to Plutonium Resuspension. Task 3e-3f: Model Development and Validation. RAC Report No.11-NMED-2001-FINAL. Risk Assessment Corporation*, Neeses, South Carolina. April.
- Mohler, H.J., K.R. Meyer, **J.W. Aanenson**, H.A. Grogan, and J.E. Till. 2002. *Analysis of Exposure and Risks to the Public from Radionuclides and Chemicals Released by the Cerro Grande Fire at Los Alamos. Task 3: Calculating and Communicating Risks: Observations and Recommendations. RAC Report No.15-NMED-2001-FINAL(Rev.1). Risk Assessment Corporation*, Neeses, South Carolina. June 12.
- Rood, A.S., **J.W. Aanenson**, S.S. Mohler, P.D. McGavran, H.J. Mohler, H.A. Grogan, and J.E. Till. 2002. *Analysis of Exposure and Risks to the Public from Radionuclides and Chemicals Released by the Cerro Grande Fire at Los Alamos. Task 1.7: Final Report on Estimated Risks from Releases to Air. RAC Report No. 3-NMED-2002-FINAL(Rev.1). Risk Assessment Corporation*, Neeses, South Carolina. June 12.

- Rocco, J.R., K.R. Meyer, H.J. Mohler, **J.W. Aanenson**, L. Hay Wilson, A.S. Rood, P.D. McGavran, and J.E. Till. 2002. Analysis of Exposure and Risks to the Public from Radionuclides and Chemicals Released by the Cerro Grande Fire at Los Alamos. Task 2.7: Estimated Risks from Releases to Surface Water. Final Report, RAC Report No.4-NMED-2002-FINAL(Rev.1). *Risk Assessment Corporation*, Neeses, South Carolina. June 12.
- Mohler, S.S., **J.W. Aanenson**, H.A. Grogan, L. Hay Wilson, P.D. McGavran, K.R. Meyer, Ph.D., H.J. Mohler, J.R. Rocco, A.S. Rood, and J.E. Till. 2002. *Analysis of Exposure and Risks to the Public from Radionuclides and Chemicals Released by the Cerro Grande Fire at Los Alamos. Summary Report. RAC Report No. 5-NMED-2002-FINAL. Risk Assessment Corporation*, Neeses, South Carolina. June 12.
- Grogan, H.A., A.S. Rood, **J.W. Aanenson**, E.B. Liebow, and J.E. Till. 2002. *A Risk-based Screening Analysis for Radionuclides Released to the Columbia River from Past Activities at the U.S. Department of Energy Nuclear Weapons Site in Hanford, Washington. RAC Report No.3-CDC-Task Order 7-2000-FINAL. Risk Assessment Corporation*, Neeses, South Carolina. September.
- Aanenson, J.W.**, J. Goldberg, H.A. Grogan, L.H. Wilson, G.G. Killough, K.R. Meyer, H.J. Mohler, S. Mohler, J.R. Rocco, A.S. Rood, P. Shanahan, W.K. Sinclair, C. Slack, E.A. Stetar, J. Wilson, J E. Till. 2004. Risk Analysis, Communication, Evaluation, and Reduction at LANL-Contemporary Risk Assessment: Demonstration of an Integrated Methodology. RAC Report No. 11-RACER LANL-2004-FINAL. *Risk Assessment Corporation*. Neeses, South Carolina. December.
- Aanenson, J.W.**, H.J. Mohler, K.R. Meyer, J E. Till. 2004. Risk Analysis, Communication, Evaluation, and Reduction at LANL-Data Verification and Validation Summary. RAC Report No. 15-RACER LANL-2005-FINAL. *Risk Assessment Corporation*. Neeses, South Carolina. April.
- Aanenson, J.W.**, H.A. Grogan, B. Jacobs, G.G. Killough, K.R. Meyer, H.J. Mohler, S. Mohler, J.R. Rocco, A.S. Rood, E.A. Stetar, L.H. Wilson, and J.E. Till. 2009. "Ranking Tool Methodology." Risk Analysis, Communication, Evaluation, and Reduction at LANL. RAC Report No. 35-RACER LANL-2008-FINAL. April.

Conference Proceedings

- H.J. Mohler, **J.W. Aanenson**, H.A. Grogan, and J.E. Till. 2005. "Creating Spatially-Linked Data and Risk Evaluation Tools to Support Community Participation and Decision Making for a Contaminated Site." Proceedings of EnviroInfo 2005, 19th International Conference Informatics for Environmental Protection, Networking Environmental Information, Brno, Czech Republic, September, 7 – 9.
- A.S. Rood, P.S. B. Jacobs, P. Shanahan, J.R. Rocco, L.H. Wilson, H.A. Grogan, J.E. Till, H.J. Mohler, and **J.W. Aanenson**. 2009. "Overview of Environmental Transport Models Contained in the Risk Analysis, Communication, Evaluation and Reduction (RACER) Software at Los Alamos National Laboratory." Waste Management for the Nuclear Renaissance, March 1-5, 2009, Phoenix, Arizona. Waste Management 2009. www.wmsym.org.
- Aanenson, J.W.**, J.E. Till, and H.A Grogan. 2017. "Understanding and Communicating Radiation Dose and Risk from Cone Beam Computed Tomography in Dentistry." Presented at The

American Academy of Restorative Dentistry's 87th Annual Meeting, Chicago, Illinois,
February 26, 2017.