

ARTHUR S. ROOD

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EDUCATION

M.S. - Health Physics, Radioecology, Colorado State University, 1987

B.S. - Geology, Mesa State College, 1982

AA - Mathematics, Santa Monica College, 1978

SUMMARY

Over thirty years of experience in multimedia contaminant fate and transport modeling, dose and risk assessment. Developed and implemented mathematical models for contaminant fate and transport in environment systems, conducted numerical uncertainty analysis, and designed and implemented environmental sampling and monitoring programs.

EMPLOYMENT HISTORY

PRIVATE CONSULTANT (7/1994 - PRESENT)

K-Spar Inc. Idaho Falls, Idaho

Develop and implement mathematical and computer models for assessment of multimedia transport of contaminants (radionuclides and other) in the environment. Quantify uncertainty and sensitivity of model predictions using Monte Carlo sampling techniques. Validate models using environmental monitoring data and compute health risk associated with predicted environmental media concentrations. Specific projects that addressed reconstruction of radionuclide concentrations and doses include the former Rocky Flats Plant in Golden CO, former Uravan uranium mill in western CO, former UMETCO uranium fabrication facility in Apollo PA, Mallinckrodt Chemical Works, St. Louis MO, radionuclide releases to the Columbia River from Hanford Reservation, Fukushima nuclear reactor accident, and Cero Grande fire at Los Alamos NM. Mr. Rood also performed modeling for low-level radioactive waste performance assessments at U.S. Ecology site in Richland Washington, Remote Handled Low-Level Radioactive Waste facility at the Idaho National Laboratory, Waste Control Specialists in Andrews TX, and the Calcine Solid Storage Facility at the Idaho National Laboratory. Other projects include evaluation of ambient air monitoring networks at the Idaho National laboratory and Hanford Reservation, development of contaminant transport models for contaminated soils at Los Alamos National Laboratory, and development radionuclide limits in wastewater and sediments for the Waste Control Specialists low-level waste site.

Instructor for Risk Assessments Corporation courses on radiological risk assessment held in Washington DC (2009, 2012, 2013), Bristol UK (2009), and Nuclear Regulatory Commission (2015, 2017). Member of Task Group 98 of the International Commission on Radiation Protection.

ADVISORY SCIENTIST (RETIRED), 5/1994 – 1/2013

Modeling and Measurements Group, Idaho National Laboratory, Idaho Falls, Idaho

Research, develop, and apply state-of-the-art techniques for assessment of environmental transport and impacts associated with release of radioactive material and hazardous chemicals. Specific modeling expertise includes chronic and accident air dispersion, food-chain transport, groundwater flow and transport, dose and risk assessment, thermodynamic chemical vapor models, shielding and external exposure calculations, and first order kinetic models. Major efforts were directed toward low-level waste performance assessment at the three Idaho National Laboratory low-level waste disposal sites and near-field and long-range atmospheric dispersion calculations for evaluation of toxic pollutants emitted to the air from INL facilities using the AERMOD and CALPUFF dispersion models.

Provide lead technical guidance for INL and Department of Energy-wide programs requiring complex environmental assessments and safety analyses. Provide technical guidance for an international study on uncertainty estimates in reactor consequence code evaluation. Assist the National Low-Level Waste program in providing technical assistance to waste compact states and foreign countries. Instructor for the University of Idaho graduate-level course, **Environmental Modeling** (INTER 504) from 1991 to 1999.

Principal Investigator for a national survey of naturally occurring radioactive material (NORM) in oil and gas production

equipment. Member of the Health Physics Society/ANSI working group on NORM.

SENIOR SCIENTIST, 5/1990 - 5/1994

Integrated Earth Science/Geotechnologies, Idaho National Laboratory

Provide lead technical guidance and funding management for Idaho National Engineering Laboratory (INEL) and DOE-wide programs requiring complex environmental assessments and safety analyses. Developed groundwater transport models and computer codes (GWSCREEN) for assessment of CERCLA sites and performance assessment of low-level waste disposal facilities at the INEL. Performed the groundwater modeling and dose assessment section for the Radioactive Waste Management Complex Performance Assessment at the Idaho National Engineering Laboratory. Co-author of the food-chain model (COMIDA) for the MAACS reactor consequence code, an internationally-recognized reactor accident assessment code. Participated in four "AIRDOS/CAP-88" radiological assessment courses for another DOE laboratory, INEL contractor, and state personnel. Conducted Performance Assessment Workshops and provided technical assistance to the low level waste compact states for the National Low-Level Waste Management Program.

STAFF SCIENTIST, 8/1989 - 4/1990

UNC Geotech, Grand Junction, Colorado

Radon Laboratory - Performed indoor radon assessments and developed instrumentation for measurement of radon progeny using alpha and beta spectroscopy. Conducted quality control experiments of radon measuring devices and wrote software for data acquisition systems and computer controlled instrumentation.

ENVIRONMENTAL SCIENTIST, 9/1987 - 7/1989

Environmental Sciences and Engineering Unit, Idaho National Laboratory, Idaho Falls, Idaho

Environmental Sciences and Engineering - Research, develop, and apply state-of-the-art techniques assessing the environmental transport and impacts associated with release of radioactive material and hazardous chemicals. Specific modeling experience includes chronic and accident air dispersion, food-chain transport, groundwater contaminant transport, and dose and risk assessment.

SENIOR HEALTH PHYSICS TECHNICIAN, 11/1984 - 9/1986

Oak Ridge National Laboratory, Grand Junction, Colorado

Coordinated gamma spectroscopy laboratory for gamma spectral analysis of soil samples contaminated with uranium mill tailings. Wrote and implemented spectral analysis algorithms, multichannel analyzer control programs and data base software. Designed, constructed, and calibrated an activated charcoal radon measurement device. Developed and implemented laboratory quality control procedures.

ASSOCIATE MINE GEOLOGIST, 8/1982 - 12/1983

Plateau Resources LTD, Grand Junction, Colorado

Supervised uranium mine longhole-drilling program for ore body fringe development and preparation for full scale production. Evaluated drilling results for ore trend production and ore reserve calculations.

GEOSCIENTIST I, 1/1981 - 7/1982

Bendix Field Engineering, Grand Junction, Colorado

Assisted in researching uranium ore body development and exploration indicators and writing results published in Department of Energy reports. Tasks included interpretation of electric drill hole logs and generation of isopleth maps and cross sections from the data.

PHYSICAL SCIENCE AIDE, 5/1980 - 9/1980

U.S. Department of Energy, Grand Junction, Colorado

Assisted staff geologist in reviewing resource maps and assessment data for the 1980 National Uranium Resource Evaluation Report.

AFFILIATIONS

Chairman of the Health Physics Society Working Group on Naturally Occurring Radioactive Material

Member of the Health Physics Society

Member of the International Commission on Radiation Protection (ICRP) Task Group 98.

HONORS & AWARDS & LEADERSHIP POSITIONS

- Licensed Invention, GWSCREEN Software System, Lockheed Martin 1996
- President and Executive Board Member, Desert Eagles Model Airplane Club, 2008–2010, 2015-2017

COURSES TAUGHT

Environmental Risk Assessment for the Nuclear Regulatory Commission, Bethesda Maryland, May, 2017.

Environmental Risk Assessment for the Nuclear Regulatory Commission, Bethesda Maryland, April 2015.

Radiological Risk Assessment and Environmental Assessment. Crystal City Marriott, Arlington, VA. Risk Assessment Corporation. March 4-8, 2013. 51 Attendees.

Radiological Risk Assessment for Decision Making, Compliance, and Emergency Response. Crystal City Marriott, Arlington, VA. Risk Assessment Corporation. March 5-9, 2012. 37 Attendees.

Radiological Risk Assessment and Environmental Analysis Course. ITC School of Underground Waste Storage and Disposal. University of Bristol Risk Centre, Bristol, United Kingdom. June 22–26, 2009. 17 Attendees.

Environmental Risk Assessment Analysis Training Course H-401. Training Course H-401 prepared and presented by Risk Assessment Corporation for the U.S. Nuclear Regulatory Commission at the NRC's Professional Development Center, Bethesda, Maryland. January 26–30, 2009. 23 Attendees.

EXPERT TESTIMONY

“Reconstruction of Plaintiff Doses Associated with Residues Stored at the St. Louis Airport Storage Site and the Hazelwood Interim Storage Site and Critique of Opinions by Dr. Clark, Dr. Hu, and Dr. Wells.” In re: Scott D. McClurg, et al. v. Mallinckrodt, Inc et al. 4:12CV00361 AGF, March 17, 2020.

“Reconstruction of Plaintiff Doses Associated with Residues Stored at the St. Louis Airport Storage Site and the Hazelwood Interim Storage Site and Critique of Opinions by Dr. Cheremisinoff, Ms Sears and Dr Clark.” In re: Scott D. McClurg, et al. v. Mallinckrodt, Inc et al. 4:12CV00361 AGF, April 27, 2018.

“Reconstruction of Doses from Atmospheric Releases of Uranium at the Apollo Facility and Critique of Plaintiffs’ Expert Opinions.” In re: McMunn et al. v Babcock & Wilcox, 2:10-cv-00143-DSC-RCM. February 27, 2013

“Reconstruction of Historical Doses from Radionuclides Released to the Environment by the Uravan Mining and Milling Site.” In re: June et al. v. Union Carbide Corporation et al., No.1: 04-CV-00123-MSK-MJW. January 15, 2007.

“Assessment of Thyroid Doses Received by Specified Individuals from Releases of Iodine-131 from Hanford.” In re: Hanford Nuclear Reservation Litigation Master File No. CY-91-3015-WFN. August 13, 2004.

“Historical Public Exposures Studies on Rocky Flats.” August 6, 2004, In re: Cook et al. v. Rockwell et al., U.S. District Court for the District of Colorado, No. 90-K-181. August 6, 2004.

SELECTED PUBLICATIONS AND REPORTS

TEXT BOOK CHAPTERS

Whicker, F.W. and **A.S. Rood**, 2008. “Terrestrial Food Chain Pathways: Concepts and Models” In: *Radiological Risk*

Assessment and Environmental Analysis”, J.E. Till and H.A. Grogan Editors. CRC Press, Boca Raton FL.

Grogan, H.A., J.W. Aanenson, P.D. McGavran, K.R. Meyer, H.J. Mohler, S.S. Mohler, J.R. Rocco, **A.S. Rood**, J.E. Till, and L.H. Wilson, 2006. “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. American Chemical Society, Washington DC.

PEER-REVIEWED PUBLICATIONS (chronological order)

Mohler, H.J., **A.S. Rood**, H.A. Grogan., E.A. Caffrey, and J.E. Till, 2020. “Analysis of Environmental Data to Support Quantification of Historical Releases from a Former Uranium Processing Facility in Apollo, Pennsylvania” *Health Physics* 120(5), pp 495-509

Caffrey, E.A., P.G. Voillequé, **A.S. Rood**, H.A. Grogan, H.J. Mohler, K.R. Meyer, and J.E. Till, 2020. “Reconstruction of Enriched Uranium Released to Air from the Former Apollo Facility, Apollo Pennsylvania.” *Health Physics* 120(4) pp 417-426

Rood, A.S., H.A. Grogan, H.J. Mohler, K.R. Meyer, P.G. Voilleque, and J.E. Till, 2019. “Reconstruction of Atmospheric Concentrations of Enriched Uranium from the Former Apollo Facility, Apollo Pennsylvania”, USA. *J. of Env Radioactivity*, <https://doi.org/10.1016/j.jenvrad.2019.106045>

Rood, A.S., H.A. Grogan, H.J. Mohler, J.R. Rocco, E.A. Caffrey, C. Mangini, J. Cartwright, T. Mathews, C. Shaw, M.E. Packard, and J.E. Till, 2019. “Use of Routine Environmental Monitoring Data to Establish A Dose-Based Compliance System for a Low-Level Radioactive Waste Disposal Site.” *Health Physics*, DOI: 10.1097/HP.0000000000001116 118(1):1–17; 2020.

R.M Shubbar, D.I. Lee, H.A. Gzar, and **A.S. Rood**, 2019. “Modeling Air Dispersion of Pollutants Emitted from the Daura Oil Refinery, Baghdad-Iraq using the CALPUFF Modeling System.” *Journal of Environmental Informatics Letters*, 2(1) pp 28–39 doi: 10.3808.

Rood, A.S., A.J. Sondrup, and P.D. Ritter, 2016. “Quantitative Evaluation of an Air Monitoring Network using Atmospheric Dispersion Modeling and Frequency of Detection Methods” *Health Physics* 110(4).

Till, J.E., **A.S. Rood**, C.D. Garzon, and R.H. Lagdon, 2014. “Comparison of the MACCS2 Atmospheric Transport Model with Lagrangian Puff Models as Applied to Deterministic and Probabilistic Safety Analysis.” *Health Physics*, 107(2): 213-230.

Rood, A.S., 2014. “Performance Evaluation of AERMOD, CALPUFF, and Legacy Air Dispersion Models using the Winter Validation Tracer Study Dataset.” *Atmospheric Environment*, 89: 707-720.

Till, J.E., H.A. Grogan, J.H. Mohler, J.R. Rocco, **A.S. Rood**, and S.S. Mohler, 2011. “An Integrated Approach to Data Management, Risk Assessment, and Decision Making.” *Health Physics*, 102(4): 367-377.

Rood, A.S., P.G. Voillequé, S.K. Rope, H.A. Grogan, and J.E. Till, 2008. “Reconstruction of Atmospheric Concentrations and Deposition of Uranium and Decay Products Released from the Former Uranium Mill at Uravan Colorado USA.” *Journal of Environmental Radioactivity*, 99: 1258–1278.

Rood, A.S., 2004. “A Mixing-Cell Model for Assessment of Contaminant Transport in the Unsaturated Zone Under Steady-State and Transient Flow Conditions.” *Environmental Engineering Science*, 21(6): 661–677.

Abbott, M.L., D.D. Susong, D.P. Krabbenhoft, **A.S. Rood**, 2002. “Mercury Deposition in Snow near an Industrial Emission Source in Southeastern Idaho and the Teton Range, Wyoming,” *Water, Air, and Soil Pollution*, 139: 95–114.

Rood, A.S., H.A. Grogan, J.E. Till, 2002. “A Model for a Comprehensive Evaluation of Plutonium Released to the Air from the Rocky Flats Plant, 1953–1989.” *Health Physics*, 82(2).

Till, J.E., **A.S. Rood**, P.G. Voilleque, 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 (5): 355-372

White, G.J., and **A.S. Rood**, 2001. “Radon Emanation from NORM-Contaminated Pipe Scale and Soil at Petroleum Industry Sites.” *Journal of Environmental Radioactivity*, 54: 401–413.

Rood, A.S., P.D. McGavran, J. Aanennson, 2000. “Stochastic Estimates of Carcinogenic Risk with Uncertainty from Carbon Tetrachloride Released from the Rocky Flats Plant.” *Risk Analysis*, 21(4): 675-696.

Rood, A. S., G. G. Killough, J. E. Till, 1999 “Evaluation of Atmospheric Transport Models for use in Phase II of the Historical Public Exposure Studies at the Rocky Flats Plant.” *Risk Analysis*, 19(4): 559-576.

McGavran, P. D., **A. S. Rood**, J. E. Till, 1999. “Chronic Beryllium Disease and Cancer Risk Estimates with Uncertainty for Beryllium Released to the Air from the Rocky Flats Plant.” *Environmental Health Perspectives*, 107(8): 731-744.

Rood, A. S., G. J. White, and D. T. Kendrick, 1998. “Measurement of ^{222}Rn Flux, ^{222}Rn Emanation, and ^{226}Ra Concentration from Injection Well Pipe Scale” *Health Physics*, 75(2): 187-192.

Rood, A. S., 1994, “GWSCREEN: A Model for Assessment of the Groundwater Pathway from Surface or Buried Contamination”, *The Environmental Professional*, 16(3):196-210.

Nguyen, H. D., S. Paik, **A. S. Rood**, 1994, “Effects of Thermally Generated Convection on the Migration of Radionuclides in Saturated Geologic Formations” *International Journal Engineering Science*, 32(10): 1605-1614.

Abbott, M. L. and **A. S. Rood**, 1994 “COMIDA: A Radionuclide Food-Chain Model for Acute Fallout Deposition”, *Health Physics*, 66(1):17-29.

Martz, D. E., **A. S. Rood**, J. L. George, M. D. Pearson, G. H. Langner, 1991, “Year-to-Year Variations in Annual Average Indoor ^{222}Rn Concentrations”. *Health Physics*, 61(3): 409-413.

Walton, J. C., **A. S. Rood**, R. G. Baca and M. D. Otis, 1989, “Model for Estimation of Chlorinated Solvent Releases from Waste Disposal Sites”, *Journal of Hazardous Materials*, 21, 15-34.

COMPANY TECHNICAL PUBLICATIONS (alphabetical order)

Abbott, M. L. and **A. S. Rood**, 1990. *Concentration Factors for Fusion-Related Radionuclides Calculated Using the Food-Chain Model FUSEMOD*, EGG-EST-9223, Idaho National Engineering Laboratory, September.

Abbott M. L. and **A. S. Rood**, 1993. *COMIDA: A Radionuclide Food-Chain Model for Acute Fallout Deposition*, EGG-GEO-10367, Idaho National Engineering Laboratory, November.

Abbott, M. L. S. L. Harms, **A. S. Rood**, 1993. *Dose Calculations for Accidental Airborne Releases of ITER Activation Products*, EGG-EEL-10994, Idaho National Engineering Laboratory, December.

Abbott, M. L. and **A. S. Rood**, 1996. *Source Group Optimization Program (SGOP): A Program the Groups Emission Sources for Input into Air Dispersion Models* INEL-96/0376 Idaho National Engineering Laboratory, Idaho Falls, Idaho.

Brown, J., M. L. H. J. Goossens, B. C. P. Kraan, R. M. Cooke, J. A. Jones, F. T. Harper, F. E. Haskin, M. L. Abbott, M. L. Young, S. C. Hora, **A. S. Rood**, 1997. Probabilistic Accident Consequence Uncertainty Analysis: Food Chain Uncertainty Assessment. NUREG/CR-6523 U.S. Nuclear Regulatory Commission, Washington D.C.

Caffrey, E.A., **A.S. Rood**, H.A. Grogan, and C.D. Mangini, 2020. *Chemical Waste Management Northwest, Inc. Landfill Radiological Dose and Risk Assessment for Bakken Oilfield Disposals in Arlington OR*. Report 06-Arlington Landfill 2020 FINAL. Risk Assessment Corporation, Neeses, SC. September 1, 2020.

Caffrey, E.A., H.A. Grogan, T.E. Johnson, H.J. Mohler, J.R. Rocco, and **A.S. Rood**, 2016. *Dose and Risk Assessment of Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) Disposals at the Blue Ridge Landfill*. Report 1-BRLF TENORM 2016 FINAL. Risk Assessment Corporation, Neeses, SC. October 11, 2016.

Case, M.J., **A.S. Rood**, J.M. McCarthy, S.O. Magnuson, B.H. Becker, T.K. Honeycutt, 2000. *Technical Revision of the Radioactive Waste Management Complex Low-Level Waste Radiological Performance Assessment for Calendar Year 2000*. INEEL/EXT-2000-01089. Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho.

Electric Power Research Institute (EPRI), 2014. *EPRI Recommendations for the National Academies' Pilot Study of Cancer Risks in Populations around Nuclear Facilities*. Report prepared by H. Grogan and **A. Rood**. Technical Report 3002003163. Electric Power Research Institute, Palo Alto, CA.

EPRI. 2016. *Batch and Continuous Releases to the Atmosphere from Nuclear Power Plants: Comparison of Environmental Concentrations and Doses*. Report prepared by H. Grogan and **A. Rood**. Technical Report 3002008166. Electric Power Research Institute, Palo Alto CA. November.

DOE (U.S. Department of Energy), 2007. *Performance Assessment for the RWMC Active Low-Level Waste Disposal Facility at the Idaho National Laboratory Site*. DOE/NE-ID-11243. Idaho National Laboratory, Idaho Falls, ID.

DOE, 2008. *Composite Analysis for the RWMC Active Low-Level Waste Disposal Facility at the Idaho National Laboratory Site*. DOE/NE-ID-11244. Idaho National Laboratory, Idaho Falls, ID.

DOE, 2011. *Performance Assessment for the Idaho CERCLA Disposal Facility Landfill*. DOE/ID-10978. Idaho National Laboratory, Idaho Falls, ID.

DOE, 2012. *Performance Assessment for the Idaho National Laboratory Remote-Handled Low-Level Waste Disposal Facility*. DOE/ID-11421. Idaho National Laboratory, Idaho Falls, ID.

DOE, 2018. *Performance Assessment for the Idaho National Laboratory Remote-Handled Low-Level Waste Disposal Facility*. DOE/ID-11421, Rev 2. Idaho National Laboratory, Idaho Falls, ID.

DOE, 2018. *Methods, Implementation, and Testing to Support Determination of Performance Assessment Compliance for the RHLLW Disposal Facility WAC*. U.S. Department of Energy Idaho Operations Office

DOE, 2019. *Performance Assessment for the INTEC Calcined Solids Storage Facility at the INL Site*. DOE/ID-12008. Idaho Cleanup Project, U.S. Department of Energy Idaho Operations Office

Grogan, H. A., P. D. McGavran, K. R. Meyer, H. R. Meyer, J. Moler, **A. S. Rood**, W. K. Sinclair, P. G. Voillequé, J. M. Weber, 1999. *Technical Summary Report of the Historical Public Exposures Studies for Rocky Flats Phase II*. 14-CDPHE-RFP-1999-DRAFT, Radiological Assessments Corporation, Neeses, South Carolina. August.

Grogan, H.A., **A.S. Rood**, J.W. Aanenson, and E.B. Liebow, 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 Assessments Corporation, Neeses, South Carolina.

Grogan, H.A., B. Jacobs, and **A.S. Rood**, 2010. *Source Term and Transport Modeling for Single-Shell Tanks at the Hanford Site*. RAC Report No. 1-WA-2009-FINAL. Risk Assessments Corporation, Neeses, South Carolina.

Maheras, S.J. **A. S. Rood**, S. O. Magnuson, M. E. Sussman, R. N. Bhatt, 1994. *Radioactive Waste Management Complex Low-Level Waste Radiological Performance Assessment*. EGG-WM-8773, Idaho National Engineering Laboratory, May.

McGavran, P. D., **A. S. Rood**, 1999. *Estimated Exposure and Cancer Risk from Beryllium Released to the Air from the Rocky Flats Plant*. 02-CDPHE-RFP-1997 (Rev. 1), Radiological Assessments Corporation, Neeses, South Carolina. August.

McGavran, P. D., **A. S. Rood**, 1999. *Estimated Exposure and Cancer Risk from Carbon Tetrachloride Released to the Air*

from the Rocky Flats Plant. 04-CDPHE-RFP-1997 (Rev. 1), Radiological Assessments Corporation, Neeses, South Carolina. August.

Rood, A. S., 1988. *Environmental Transport Concentration Factors for the FUSECRAC Fusion Reactor Safety Code*, EGG-ESE-8033, Idaho National Engineering Laboratory, May.

Rood, A. S., R. C. Arnett, J. Barraclough, 1989. *Contaminant Transport in the Snake River Plain Aquifer: Phase 1, Part 1: Simple Analytical Model of Individual Plumes*, EGG-ER-8623, Idaho National Engineering Laboratory, May.

Rood, A. S., J. L. George, G. H. Langner, 1990. *Variation in the Annual Average Radon Concentration Measured in Homes in Mesa County, Colorado*, DOE/ID/12584-57 UNC/GJ-50(TMC), U. S. Department of Energy, Grand Junction, Colorado, April.

Rood, A. S. *Assessment of Impacts at the Advanced Test Reactor as a Result of Chemical Releases at the Idaho Chemical Processing Plant*, EGG-EST-9523, Idaho National Engineering Laboratory, February, 1991.

Rood, A. S. and M. L. Abbott, 1991. *Comparison of Dose and Dose-rate Conversion Factors from the Soviet Union, United Kingdom, U.S. Department of Energy and the Idaho National Engineering Laboratory Fusion Safety Program*, EGG-FSP-9865, Idaho National Engineering Laboratory, December.

Rood, A.S., 1994. *GWSCREEN: A Semi-Analytical Model for Assessment of the Groundwater Pathway from Surface or Buried Contamination: Theory and Users Manual Version 2.0*, EGG-GEO-10797, Revision 2, Idaho National Engineering Laboratory, June.

Rood, A. S., H. A. Grogan, 1999. *Estimated Exposure and Lifetime Cancer Incidence Risk from Plutonium Released from the 1969 Fire at the Rocky Flats Plant*. 07-CDPHE-RFP-1999, Radiological Assessments Corporation, Neeses, South Carolina. August.

Rood, A. S., H. A. Grogan, 1999. *Comprehensive Assessment of Exposure and Lifetime Cancer Incidence Risk from Plutonium Released from the Rocky Flats Plant*. 13-CDPHE-RFP-1999, Radiological Assessments Corporation, Neeses, South Carolina. September.

Rood, A. S., H. A. Grogan, 1999. *Estimated Exposure and Lifetime Cancer Incidence Risk from Plutonium Released from the 1957 Fire at the Rocky Flats Plant*. 02-CDPHE-RFP-1999, Radiological Assessments Corporation, Neeses, South Carolina. August.

Rood, A. S., H. A. Grogan, 1999. *Estimated Exposure and Lifetime Cancer Incidence Risk from 903 Area Plutonium Releases at the Rocky Flats Plant*. 01-CDPHE-RFP-1999, Radiological Assessments Corporation, Neeses, South Carolina. August.

Rood, A. S., 1999. *Performance Evaluation of Atmospheric Transport Models*. 3-CDPHE-RFP-1996 (Rev. 1), Radiological Assessments Corporation, Neeses, South Carolina. August.

Rood, A. S., 1999. *Estimated Exposure and Lifetime Cancer Incidence Risk from Routine Plutonium Releases at the Rocky Flats Plant*. 08-CDPHE-RFP-1997 (Rev. 1), Radiological Assessments Corporation, Neeses, South Carolina. August.

Rood, A.S. 2005. *Mixing Cell Model: A One-Dimensional Numerical Model for Assessment of Water Flow and Contaminant Transport in the Unsaturated Zone*. ICP/EXT-05-00748, Idaho National Laboratory, Idaho Falls, ID. March .

Rood, A.S., and B.L. Jacobs, 2008. *Response Surface Model User Documentation*. 32-RACER LANL 2008 FINAL. Risk Assessment Corporation, Neeses, South Carolina.

Rood, A.S., and A.J. Sondrup, 2014. *Development and Demonstration of a Methodology to Quantitatively Assess the INL Site Ambient Air Monitoring Network*. INL/EXT-14-33194. Idaho National Laboratory, Idaho Falls, Idaho.

Rood, A.S., H.J. Mohler, H.A. Grogan, and J.E. Till, 2014. *Methodology and Example Calculations for Effluent Discharge Limits and Sediment Concentration Limits for the LLRW Federal Waste Facility Discharge Evaporation Pond*. 1-WCS-TO2-

2014. Risk Assessment Corporation, Neeses, SC.

Rood, A.S., and A.J. Sondrup, 2015. *Application of Frequency of Detection Methods in Design and Optimization of the INL Site Ambient Air Monitoring Network*. INL/EXT-15-36544. Idaho National Laboratory, Idaho Falls, Idaho.

Rood, A.S., 2017. *DOSEMM: A Model for Assessment of Airborne Releases and Multimedia Terrestrial Transport and Dose Assessment*. RAC Report No. 01-2017-FINAL. Risk Assessment Corporation, Neeses SC.

Rood, A.S., 2018. *Analysis of the Hanford Site Ambient Air Monitoring Network*. HNF-62564. Mission Support Alliance, Richland Washington,

Rood, A.S., E.A. Caffrey, H.A. Grogan, and C.D. Mangini, 2020. *Analysis of Leachate Management Practices for the Chemical Waste Management of Northwest Facility in Arlington*. OR. Technical Memorandum 5-CWMNW Arlington-2020. Risk Assessment Corporation, Neeses, SC May 29, 2020.

Rood, A.S., E.A. Caffrey, H.A. Grogan, and C.D. Mangini, 2020. *Models and Methods for Radon Pathway Exemption at the Chemical Waste Management of the Northwest Arlington, OR, Facility* Technical Memorandum 6-CWMNW Arlington-2020. Risk Assessment Corporation, Neeses, SC November 18, 2020.

Rood, A.S., 2020. *Analysis of Background Radon Concentrations for the Homestake Mining Company Reclamation Project, Grants New Mexico*. K-Spar Inc, Idaho Falls Idaho.

Seitz, R. R. **A. S. Rood**, G. A. Harris, S. J. Maheras, M. Kotecki, 1991. *Sample Application of Sensitivity/Uncertainty Analysis Techniques to a Groundwater Problem*, DOE/LLW-108, U. S. Department of Energy, National Low-Level Waste Program, June.

Sondrup, A.J., and **A.S. Rood**, 2019. *Assessment of INL Ambient Air Radiological Monitoring for Idaho Falls Facilities*. INL/EXT-19-53491. Idaho National Laboratory, Idaho Falls, Idaho.

Weber, J.M., **A. S. Rood**, H. R. Meyer, 1999. Development of the Rocky Flats Plant 903 Area Plutonium Source Term. 08-CDPHE-RFP-1998 (Rev. 1), *Radiological Assessments Corporation*, Neeses, South Carolina. August.

White, G.J. and **A.S. Rood**, 1998. *Characterization of the National Petroleum Reserve NO. 3 (NPR-3) Site for Naturally Occurring Radioactive Material (NORM)*. DOE/5AC304. National Petroleum Technology Office, U.S. Department of Energy, Tulsa Oklahoma.

White, G.J. and **A.S. Rood**, 1999. *Radon Emanation from NORM-Contaminated Pipe Scale, Soil, and Sediment at Petroleum Industry Sites*. DOE/ID/13223-2. National Petroleum Technology Office, U.S. Department of Energy, Tulsa Oklahoma.

PRESENTATIONS AND SYMPOSIUM PROCEEDING (chronological order)

Rood, A.S., A.J. Sondrup, A.L. Schafer, B.J Orchard, B.D. Welty, 2019. "Technical Basis and Implementation of Groundwater Pathway Models Used for INL's RH LLW Disposal Facility Performance Assessment." Waste Management 2019, Phoenix, AZ March 4 – March 7, 2019

Rood, A.S., J.M. McCarthy, A.M. Parsons, and D.J. Thorne, 2019. "Performance Assessment for Closure of the Calcined Solids Storage Facility at the INL Site." Waste Management 2019, Phoenix, AZ March 4 – March 7, 2019.

A.J. Sondrup, A.L. Schafer, B.J Orchard, B.D. Welty, and **A.S. Rood**, 2019. "Natural and Engineered Features Supporting Environmental Performance of Idaho National Laboratory's Remote-Handled Low-Level Waste Disposal Facility. Waste Management 2019, Phoenix, AZ March 4 – March 7, 2019

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