Exhibit 54

January 2025 Rebuttal - Expert Report of David Sabatini, PhD, PE, BCEE

Materials Considered

January 21, 2025

AH Environmental Consultants, 2004. ATSDR Support – Estimation of VOC Removal. December 2004. CL PLG-EXPERT SABATINI 0000002232.

Aral, M. 2024. Expert Report, October 25, 2024.

AWWA (American Water Works Association), 1990. Water Quality and Treatment. 4th edition, McGraw Hill.

Brigham, Jay. 2024. Expert Report Re: Camp Lejeune Water Litigation. December 9, 2024.

Cagiano, Mark. 2025. Affidavit, January 14, 2025. CL PLG-EXPERT SABATINI 0000002302.

Camp Lejeune Water Buffalo Inventory. 1968. CLJA WATERMODELING 01-0000948169 -CLJA WATERMODELING 01-0000948933.

Camp Lejeune Water Buffalo Inventory. 1999. CLJ157174 - CLJ157472.

Cheng, H., Hu, Y., Luo, J. and Sabatini, D. A. 2009. "Multipass Membrane Air-Stripping (MAS) for Removing Volatile Organic Compounds (VOCs) from Surfactant Micellar Solutions." Journal of Hazardous Materials. 170, 2009, 1070-1078.

Crittenden, John C., Trussell, R. Rhodes, Had, David W., Howe, Kerry J. and Tchobanoglous, George, 2012. MWH's Water Treatment: Principles and Design. 3rd edition, Wiley.

EPA, 1983. Treatment of Volatile Organic Compounds in Drinking Water. EPA-600/8-83-019, May, 1983.

ETB (Engineering Tool Box), 2025. https://www.engineeringtoolbox.com/water-discharge-hosed 1524.html, accessed January 7, 2025.

Expert Peer Review Panel Meeting Transcript, April 29, 2009, available at https://www.atsdr.cdc.gov/sites/lejeune/expertpanels.html

Expert Peer Review Panel Meeting Transcript, April 30, 2009, available at https://www.atsdr.cdc.gov/sites/lejeune/expertpanels.html

Expert Peer Review Panel Meeting Transcript, March 28, 2005, available at https://www.atsdr.cdc.gov/sites/lejeune/panel report groundwater.html

Expert Peer Review Panel Meeting Transcript, March 29. 2005, available at https://www.atsdr.cdc.gov/sites/lejeune/panel report groundwater.html

- Faye, R.E. and Green, J.W. 2007. "Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present Day Conditions -Chapter E: Occurrence of Contaminants in Groundwater." ATSDR, December 2007.
- Faye, R.E. et al. 2007. "Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present Day Conditions - Chapter B: Geohydrologic Framework of the Castle Hayne Aquifer System." ATSDR, September 2007.
- Faye, R.E. et al. 2007. "Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present Day Conditions - Chapter C: Simulation of Groundwater Flow." ATSDR, November 2007.
- Faye, R.E. et al. 2008. "Analyses of Groundwater Flow, Contaminant Fate, and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions - Chapter F: Simulation of the Fate and Transport of Tetrachloroethylene (PCE)." ATSDR, February 2008.
- Faye, R.E. et al. 2010. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter C: Occurrence of Selected Contaminants in Groundwater at Installation Restoration Program Sites." ATSDR, October 2010.
- Faye, R.E. et al. 2012. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter B: Geohydrologic Framework of the Brewster Boulevard and Castle Hayne Aquifer Systems and the Tarawa Terrace Aquifer." ATSDR, January 2012.
- Faye, R.E. et al. 2012. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter D: Occurrence of Selected Contaminants in Groundwater at Above-Ground and Underground Storage Tank Sites." ATSDR, December 2012.
- Faye, R.E. et al. 2013. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter A-Supplement 3 - Descriptions and Characterizations of Data Pertinent to Water-Level Data and Groundwater Flow for the Brewster Boulevard and Castle Hayne Aquifer Systems and the Tarawa Terrace Aquifer." ATSDR, March 2013.

GHFC (Garden Hose Flow Calculator), https://www.spikevm.com/calculators/irrigation/gardenhose-flow.php, accessed December 26, 2024.

Guan, J. et al. 2013. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter A-Supplement 5 - Theory, Development, and Application of Linear Control Model Methodology to Reconstruct Historical Contaminant Concentrations at Selected Water-Supply Wells." ATSDR, March 2013.

Hennet, R.J.C. 2024. Expert Report Re: Camp Lejeune Water Litigation. December 9, 2024.

HG (Home and Garden), https://homeandgardentalk.com/gpm-flow-rate-household-garden-hose, accessed December 26, 2024.

HPWTP Area Flow Rates. CLJ134936 - CLJ134949.

HPWTP Area Pressures. CLJ134936 - CLJ134949.

Hunt, Ernest. 2025. Affidavit, January 14, 2025. CL PLG-EXPERT SABATINI 0000002300.

Jang, W. and Aral, M.M.. 2008. "Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present Day Conditions -Chapter H: Effect of Groundwater Pumping Schedule Variation on Arrival of Tetrachloroethylene (PCE) at Water-Supply Wells and the Water Treatment Plant." ATSDR, February 2008.

Jang, W. et al. 2008. "Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present Day Conditions - Chapter G: Simulation of Three-Dimensional Multispecies, Multiphase Mass Transport of Tetrachloroethylene (PCE) and Associated Degredation By-Products." ATSDR, April 2008.

Jang, W. et al. 2013. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter A-Supplement 7 - Source Characterization and Simulation of the Migration of Light Nonaqueous Phase Liquids (LNAPLs) in the Vicinity of the Hadnot Point Industrial Area." ATSDR, March 2013.

Jones, L.E. et al. 2013. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter A-Supplement 6 Characterization and Simulation of Fate and Transport of Selected Volatile Organic Compounds in the Vicinities of the Hadnot Point Industrial Area and Landfill." ATSDR, March 2013.

Jones, N. and Davis, J. 2024. Expert Report, October 25, 2024.

Lawrence, S.J. et al. 2007. "Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present Day Conditions - Chapter D: Properties and Degradation Pathways of Common Organic Compounds in Groundwater." ATSDR, September 2007.

Lipe, K. M., Sabatini, D. A., Hasegawa, M., and Harwell, J. H. 1996. "Micellar Enhanced Ultrafiltration and Air Stripping for Surfactant-Contaminant Separation and Surfactant Reuse." Ground Water Monitoring and Remediation. 16(1), Winter 1996, 85-92.

Little, J. C. 1992. Applying the two-resistance theory to contaminant volatilization in showers. Environmental Science and Technology. 26(7), 1341-1349.

Martel, S., 2024. Deposition and exhibits, November 12, 2024.

Maslia, M.L. (Editor). 2005. "Expert Peer Review Panel Evaluating ATSDR's Water-Modeling Activities in Support of the Current Study of Childhood Birth Defects and Cancer at U.S Marine Corps Base Camp Lejeune, North Carolina." ATSDR, Meeting March 28-29, 2005, published October 2005.

Maslia, M.L. (Editor). 2009. "Expert Panel Assessing ATSDR's Methods and Analyses for Historical Reconstruction of Groundwater Resources and Distribution of Drinking Water at Hadnot Point, Holcomb Boulevard, and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina." ATSDR, April 29-30, 2009, published December 2009.

Maslia, M.L. 2024. Expert Report Re: Camp Lejeune Water Litigation. October 25, 2024.

Maslia, M.L. et al. 2007. "Analyses of Groundwater Flow, Contaminant Fate, and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions - Chapter A: Summary of Findings." ATSDR, July 2007.

Maslia, M.L. et al. 2009(a). "Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions - Chapter I: Parameter Sensitivity, Uncertainty, and Variability Associated with Model Simulations of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water." ATSDR, February 2009.

Maslia, M.L. et al. 2013. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter A: Summary and Findings." ATSDR, March 2013.

Mattingly, Chris. Norman Director of Utilities and formerly director of Norman Water Treatment Plant. Personal Discussion, December 18, 2024.

McKone, T.E. and Knezovich, J.P., 1991. The transfer of trichloroethyene (TCE) from a shower to indoor air: experimental measurements and their implications. Journal of the Air & Waste Management Association, 41(6), pp.832-837.

Nakasone, H. 1987. Study of aeration at weirs and cascades. Journal of environmental engineering, 113(1), pp. 64-81.

NRC (National Research Council) - Committee on Contaminated Drinking Water at Camp Lejeune, 2009. "Contaminated Water Supplies at Camp Lejeune: Assessing Potential Health Effects." The National Academy Press, ISBN 978-0-309-13699-0 | DOI 10.17226/12618, 338 pp.

O'Haver, J. H., Walk, R., Kitiyanan, B., Harwell, J. H. and Sabatini, D. A. 2004. "Packed Column and Hollow Fiber Air Stripping of a Contaminant-Surfactant Stream." Journal of Environmental Engineering Division - ASCE. 130(1), 2004, 4-11.

Sabatini, D.A. 2025. Appendix A: Response to Reports of Remy J.-C. Hennet & Jay Brigham Regarding Water Buffaloes; January 14, 2025

Sabatini, D.A. 2025. Spray diameter for three showers at mid-point from showerhead to bathtub -6", 7", 7.5"; spay velocities – showerhead to shower floor – ranged from 10 - 13 ft/sec for ten trials and two showers; January 10, 2025.

Sahmel, J., Devlin, K., Paustenbach, D., Hollins, D. and Gaffney, S. 2010. "The Role of Exposure Reconstruction in Occupational Human Health Risk Assessment: Current Methods and a Recommended Framework." Critical Reviews Toxicology. 40(9), 799-843.

Sautner, J.B. et al. 2013. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter A-Supplement 1 - Descriptions and Characterizations of Data Pertinent to Water-Supply Well Capacities, Histories, and Operations." ATSDR, March 2013.

Sautner, J.B. et al. 2013. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter A-Supplement 8 - Field Tests, Data Analyses, and Simulation of the Distribution of Drinking Water with Emphasis on Intermittent Transfers of Drinking Water Between the Hadnot Point and Holcomb Boulevard Water-Distribution Systems." ATSDR, March 2013.

Schwarzenbach, R.P., Gschwend, P.M. and Imboden, D.M., 1993. Environmental Organic Chemistry. Wiley and Sons.

Schwarzenbach, R.P., Gschwend, P.M. and Imboden, D.M., 1995. Environmental Organic Chemistry: Illustrative Examples, Problems, and Case Studies. Wiley and Sons.

Shiau, B. J., Hasegawa, M. A., Brammer, J. M., Carter, T., Goodspeed, M., Harwell, J. H., Sabatini, D. A., Knox, R. C. and Szekeres, E. 2003. "Field Demonstration of Surfactant-Enhanced DNAPL Remediation: Two Case Studies." in Henry, S. M. and S. D. Warner eds., Chlorinated Solvent and DNAPL Remediation: Innovative Strategies for Subsurface Cleanup. American Chemical Society Symposium Series 837, ACS, Washington, D.C., 2003, 51-72.

Smith, J.H., Bomberger, D.C., and Haynes, D.L. 1980. Prediction of the Volatilization Rates of High-Volatility Chemicals from Natural Water Bodies. Environmental Science and Technology. 14(11), November 1980, 1332-1337.

Spiliotopoulos, Alexandros. 2024. Expert Report Re: Camp Lejeune Water Litigation. December 9, 2024.

Suarez-Soto, et al. 2013. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter A-Supplement 4 - Simulation of Three-Dimensional Groundwater Flow." ATSDR, March 2013.

Telci, I.T. et al. 2013. "Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina - Chapter A-Supplement 2 - Development and Application of a Methodology to Characterize Present-Day and Historical Water-Supply Well Operations." ATSDR, March 2013.

Thomas, R.G. 1990. Volatilization from Water. In: Lyman, W.J. et al., Handbook of Chemical Property Estimation Methods. American Chemical Society, Washington, D.C.

Waddill, D. 2024. Deposition and exhibits, August 6, 2024.

Williams, S. 2024. Deposition and exhibits, November 15, 2024.

Zinni, A. 2024. Deposition and exhibits, May 28, 2024.

TM9-2330-213-14 Army Technical Manual (1964). BRIGHAM USA 0000041587

TM9-2330-213-14P Army Technical Manual (1990). BRIGHAM USA 0000044016.

TM9-2330-267 14 Army Technical Manual (1964). BRIGHAM USA 0000041997

TM9-2330-267 14 Army Technical Manual C1 (1965). BRIGHAM USA 0000043018

TM9-2330-267-14 Army Technical Manual C3 (Dec. 1968). BRIGHAM USA 0000041969

TM9-2330-267-14 Army Technical Manual C3 (Dec. 1968). BRIGHAM USA 0000041973

TM9-2330-267-14P Army Technical Manual (1963). BRIGHAM USA 0000042907

TM9-2330-267-14P Army Technical Manual (1981). BRIGHAM USA 0000043121

TM9-833 Army Technical Manual (1943), BRIGHAM USA 0000043022.

TM9-2330-213-14 Army Technical Manual (1972), CL PLG-EXPERT SABATINI 0000000456.

TM9-2330-213-14 Army Technical Manual (August 1972), CL PLG-EXPERT SABATINI 0000000691.

TM9-2330-213-14 Army Technical Manual (September 1985), CL PLG-EXPERT SABATINI 0000000921.

TM9-2330-213-14&P Army Technical Manual (1985), CL PLG-EXPERT SABATINI 000000001.

TM9-2330-267-14 Army Technical Manual (1971), CL PLG-EXPERT SABATINI 0000001384.

TM9-2330-267-14 Army Technical Manual (June 1971), CL PLG-EXPERT SABATINI 0000001548.

TM9-2330-267-14P Army Technical Manual (1991), CL PLG-EXPERT SABATINI 0000001712.

TM9-875B M104 and M106 Army Technical Manual (1951), CL PLG-EXPERT SABATINI 0000002067.

Photographs, M107A1, Bell Legal, CL PLG-EXPERT SABATINI 0000002405- CL PLG-EXPERT SABATINI 0000002405- CL PLG-EXPERT SABATINI 0000002412.

Photographs, 194 M107A2, 1954 M107,

https://web.archive.org/web/20220528223903/http://vintagemilitarytrucks.com/TRLW05 1954 Fruehauf XM107E2 Military-Water-Buffalo-Trailer For-Sale-Texas.htm, CL PLG-EXPERT SABATINI 0000002304 - CL PLG-EXPERT_SABATINI_0000002329.

Photographs, 1956 M107,

https://web.archive.org/web/20220528235219/http://vintagemilitarytrucks.com/TRLW13 M107 A2 MILITARY-WATER-BUFFALO-TRAILER.htm, CL PLG-EXPERT SABATINI 0000002330-CL PLG-EXPERT SABATINI 0000002336

Photographs, 1966 M149, https://www.ebay.com/itm/223995969791, CL PLG-EXPERT SABATINI 0000002337-CL PLG-EXPERT SABATINI 0000002347 Photographs, 1967 M149,

https://web.archive.org/web/20220528232744/http://vintagemilitarytrucks.com/TRLW11 M149 MILITARY-WATER-BUFFLAO-TRAILER FOR-SALE.htm, CL PLG-EXPERT SABATINI 0000002348- CL PLG-EXPERT SABATINI 0000002356

Photographs, 1968 M149, CL PLG-EXPERT SABATINI 0000002357-CL PLG-EXPERT SABATINI 0000002397

Photographs, 1970 M149,

https://web.archive.org/web/20220528221744/http://vintagemilitarytrucks.com/Military Water Buffalo Trailer Lufkin 322.htm, CL PLG-EXPERT SABATINI 0000002398-CL PLG-EXPERT SABATINI 0000002404

Photographs, M149A1, https://www.bigiron.com/Lots/1968Army400-Gal2-WheelM149TankTrailer.

Photographs, Tank Filling, https://itoldya420.getarchive.net/amp/media/us-marine-corps-lancecpl-codi-heggemeier-2nd-medical-d523c0.

Photographs, Tank Filling, https://www.alamy.com/a-service-members-at-fort-mccoy-wis-forthe-86th-training-divisions-combat-support-training-exercise-cstx-86-18-02-fills-a-water-tank-atimproved-tactical-training-base-liberty-on-north-post-on-aug-8-2018-the-86th-is-holding-theexercise-as-part-of-the-us-army-reserve-commanding-generals-combat-support-trainingprogram-thousands-of-service-members-with-the-army-as-well-as-other-military-services-andforeign-militaries-are-participating-in-the-multinational-exercise-including-canadian-armedforces-members-cstx-86-18-02-is-the-second-of-two-cstxs-by-the-86th-taking-place-at-fort-mimage218541597.html?imageid=7D23ADD4-DE29-445D-A5B2-5F209B22D886&p=725760&pn=1&searchId=0552ab94b97dc8d1ff6efee3a2cf3201&searchtype

Photographs, Tank Filling, https://www.nationalguard.mil/Resources/Image-Gallery/News-Images/igphoto/2000709524/. Last accessed January 14, 2025.

Photographs, Tank Filling,

https://www.usmilitariaforum.com/forums/uploads/monthly 2024 09/Screenshot2024-09-23at21-01-23WaterWorks.png.a78205954b395f11a15d1e0aadbc071e.png. Last accessed January 14, 2025.

Video, Cleaning Army Water Buffalos at West Point New York. May 12, 206, https://www.youtube.com/watch?v=2juC4Ry9hS4&ab channel=axeandsmash48g. Last accessed January 14, 2025. CL PLG-EXPERT SABATINI 0000002299.