Attachment 1

GEO-HYDRO, INC.
Consulting in Geology and Hydrogeology

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July 26, 2019

Mr. Christopher Bowers
Southern Environmental Law Center
Ten 10th Street NW
Suite 1050
Atlanta, GA 30309

Subject: Review of Closure Permit Application and Other Pertinent Materials
Plant Scherer Ash Pond 1

Dear Chris,

I provide the following report at the request of Southern Environmental Law Center (SELC). I have reviewed a variety of documents pertinent to the current status and proposed closure of Ash Pond 1 (AP-1) at Georgia Power Company's (Georgia Power) Plant Scherer, located in Juliette, central Georgia. Throughout this report I cite to certain documents and evidence upon which I base my observations, opinions and conclusions. That does not mean, however, that the cited materials are the only sources of supporting evidence.

A central tenet of responsible waste management is that it be prevention-based. The United States Environmental Protection Agency (EPA) articulated this tenet in its 1993 guidance for owners and operators of solid waste disposal facilities stating: "Ground water is … used extensively for agricultural, industrial, and recreational purposes. Landfills can contribute to the contamination of this valuable resource if they are not designed to prevent waste releases into ground water … Cleaning up contaminated ground water is a long and costly process and in some cases may not be totally successful."[1]

Unlike other forms of solid waste such as municipal solid waste (MSW), inorganic coal combustion residuals and the metals they contain do not biodegrade. Coal ash that is left in unlined ash basins will be capable of leaching toxic metals into Georgia's groundwater at any time in the present, the near, or distant future for as long as soluble metals in the ash are allowed to come into contact with water. This is true for unlined facilities[2] whether or not a lateral barrier is placed along a portion of the ash impoundment, or whether a cap is placed on the top of the disposal area.

Therefore, an effective closure of coal ash storage sites requires that the coal ash waste be securely and permanently isolated from water: including precipitation, surface water, and groundwater. Failure to isolate coal ash waste from water will result in leaching of contaminants, i.e. formation of leachate. "Leachate" "includes liquid, including any suspended

[1] EPA, 1993, p.3
[2] Facilities constructed with no low permeability bottom liner that adequately restricts subsurface water flow

or dissolved constituents in the liquid, that has percolated through or drained from waste or other materials placed in a landfill, or that passes through the containment structure (e.g., bottom, dikes, berms) of a surface impoundment."[3] If released to groundwater or surface water, leachate from coal ash impoundments impairs and degrades water quality and the environment. Due to the lack of a bottom liner, unlined coal ash impoundments "allow the leachate to potentially migrate to nearby groundwater, drinking water wells, or surface waters."[4]

EPA concluded that leachate generated by coal-fired plants that use unlined surface impoundments equal about 70,300 toxic-weighted pound equivalents per year.[5] Thus, leachate from coal-fired power plants generates more equivalent toxic water pollution than the entire coal mining industry.[6] This finding illustrates the importance of implementing effective closures at coal ash impoundment sites. My review of Georgia Power's proposed Closure Plan for Plant Scherer AP-1 focused primarily on identifying factors that would inhibit the effectiveness of the proposed closure plan.

1. Background

Georgia Power is applying to the Georgia Environmental Protection Division (GAEPD) for a permit to close AP-1 under Georgia Rules for Solid Waste Management, Chapter 391-3-4-.10 (the state Coal Combustion Residuals (or "CCR") Rule). This letter documents the results of my review to date and identifies several significant findings that should be of interest and concern to GAEPD personnel. I reserve the right to amend, supplement or clarify my opinions based on the review of additional data and evidence, including any evidence uncovered by more complete and accurate disclosures by Georgia Power concerning Plant Scherer's AP-1.

2. Summary of Significant Findings

The following are the major findings that resulted from my review to date:

- The former channel of Berry Creek has been buried by at least 75-feet of saturated coal ash.
- Coal ash within the AP-1 impoundment is saturated by and is degrading the quality of groundwater within, beneath, and downgradient of AP-1. This impairment and degradation of groundwater quality will continue post-closure.
- The bottom of the ash is located less than 5-feet above the uppermost natural water table. In fact, the uppermost natural water table is above the bottom of the ash within AP-1, and will continue to be above that level post-closure.
- The southeast boundary of the proposed AP-1 closure area is located approximately 0.75 miles from a ground-water recharge area, a finding that indicates that a liner and leachate collection system should be required in order to permit a new waste disposal facility in

[3] EPA, 2015a, at 67,838 and 67,847
[4] EPA, 2015a, at 67,847
[5] EPA, 2015b, at 10-39 (Table 10-18)
[6] EPA, 2016, at 2-26 (listing equivalent pollution from other industries, including coal mining)

this location. Since Georgia state law flatly prohibits unlined municipal solid waste (MSW) landfills in this area, there is no valid reason for GAEPD to issue a permit for an unlined coal ash impoundment in this location.

- Georgia Power's Closure Plan proposes to close the unlined impoundment AP-1 in place on the floodplain of Berry Creek where the disposed waste will be subjected to re-wetting and erosion during high water events.
- Georgia Power appears to have no plans to evaluate the thickness or volume of saturated coal ash waste that would remain in place below the proposed cap contemplated by the closure plan.
- The bottom of the ash impoundment is and would remain unlined under the closure plan. Lack of a bottom liner, together with the depth of the groundwater table in relation to the depth of coal ash in AP-1 will result in coal ash remaining submerged in groundwater post-closure, degrading groundwater quality in perpetuity.
- There is no indication that Georgia Power intends to determine the extent of contamination that has already migrated from AP-1 and been detected in the current groundwater monitoring system.
- The existing groundwater monitoring system has detected elevated concentrations of ash-related contaminants, including: Boron, Calcium, Chloride, Cobalt, Fluoride, pH, Sulfate and TDS in wells located downgradient of the ash pond.
- Georgia Power's proposed closure plan does not appear to account for the fact that ash-related contaminants will continue to be released from the AP-1 basin post-closure. Nor would the plan evaluate the fate and extent of contaminants from the capped but unlined ash impoundment.
- The true magnitude and extent of current and foreseeable post-closure releases of ash-related contaminants from AP-1 have not been evaluated under Georgia Power's current monitoring and closure plan. As a result, there has been no comprehensive and substantive evaluation of the potential impacts to human health and the environment caused by the AP-1 impoundment, even though the evidence indicates that impacts are occurring, and will continue post-closure.
- The closure plan for AP-1 will not control, minimize, or eliminate post-closure infiltration of liquids into the waste, or releases of CCR, leachate, or contaminated run-off to the ground or surface waters. The closure plan will not accomplish these objectives because it would leave tens of feet of ash unlined, submerged in groundwater within a porous media.[7]
- For these reasons, the closure plan for AP-1 will not preclude the probability of future impoundment of water, sediment or slurry. Nor will the closure plan eliminate free liquids from AP-1 post-closure.
- Moreover, for the reasons stated herein, the closure plan will not minimize the need for further maintenance of AP-1.

[7] Ash and the underlying unconsolidated soils beneath, downgradient, and adjacent to AP-1

3. Qualifications

I express the opinions in this letter based on my formal education in geology and over thirty-nine years of experience on a wide range of environmental characterization and remediation sites. My education includes Bachelor of Science and Masters of Science degrees in geology from Northern Illinois University and the University of Illinois at Chicago, respectively. I am a registered Professional Geologist (PG) in Kansas, Nebraska, Indiana, Wisconsin, and North Carolina, a Certified Professional Geologist by the American Institute of Professional Geologists, and am a Past President of the Colorado Ground Water Association.

My entire professional career has been focused on regulatory, site characterization, and remediation issues related to waste handling and disposal practices and facilities, for regulatory agencies and in private practice. I have worked on contaminated sites in over 35 states and the Caribbean. My site characterization and remediation experience includes activities at sites located in a full range of geologic conditions, including soil and groundwater contamination in both consolidated and consolidated geologic media, and a wide range of contaminants. I have served in various technical and managerial roles in conducting all aspects of site characterization and remediation including definition of the nature and extent of contamination (including developing and implementing monitoring plans to accurately characterize groundwater contamination), directing human health and ecological risk assessments, conducting feasibility studies for selection of appropriate remedies to meet remediation goals, and implementing remedial strategies. Much of my consulting activity over the last 13 years has been related to groundwater contamination and permitting issues at coal ash storage and disposal sites in numerous states, including Alabama, Arizona, Colorado, North Carolina, Illinois, Indiana, Kansas, Maryland, Minnesota, Mississippi, Montana, New Mexico, Nevada, North Carolina, South Carolina, Pennsylvania, Virginia, Wisconsin. My current resume is enclosed.

4. Discussion

The following sections of this letter summarize my observations on reviewed documents that support these findings.

Impoundment Location and Construction

AP-1 is a 776 acre basin that Georgia Power constructed by placing an earthen embankment dam of approximately 8,000 feet across and around the Berry Creek drainage.[8] Materials used to build the dam and dikes surrounding the impoundment included residual soils from within and adjacent to AP-1. Earthen dams are prone to leaks in locations that may be referred to as "seeps." A construction drawing[9] and a pre-development USGS topographic map[10] show that the lowest portion of the impoundment is at an elevation between 410 and 420 feet above mean sea level along Berry Creek.

[8] Georgia Power, 2016a, History of Construction
[9] Georgia Power, 2016a, History of Construction, Drawing E1H1029, pdf p. 12 of 26
[10] USGS, 1973, East Juliette, GA, 1:24,000 Topographic Map

Federal Coal Combustion Residuals (CCR) regulations require owners of coal ash impoundments to certify whether impoundments are lined or unlined, and whether the base of the impoundment is a minimum of 5-feet above the uppermost aquifer. Georgia Power has confirmed[11] that AP-1 is unlined and fails to provide 5-feet of vertical separation between the waste and the uppermost aquifer.

The southeast boundary of the proposed AP-1 closure area is located approximately 0.75 miles, and the entire proposed closure area is within the 2-mile restriction zone, of a significant ground-water recharge area.[12] Georgia's Comprehensive Solid Waste Management Act requires that any municipal solid waste (MSW) landfill located within 2-miles of a significant groundwater-recharge area have a liner and leachate collection system.[13] The logic behind that law flatly barring unlined MSW applies with at least equal force to the pollutants contained in coal ash as it does for household garbage – *it shouldn't be allowed to pollute Georgia's sensitive groundwaters in perpetuity*. Since Georgia state law flatly prohibits unlined MSW landfills in this area, there is no valid reason for GAEPD to issue a permit for an unlined coal ash impoundment in this location.

USGS topo maps[14] show that the impoundment was constructed by erecting a dam across Berry Creek at the approximate location where the creek changed from a perennial to an intermittent stream.[15] Berry Creek was identified as an intermittent stream above the location of the dam and as a perennial stream below the location of the dam. Surface water backed up behind the dam to a normal pool elevation of 495 feet above mean sea level.[16] Current aerial photographs show that a coal ash delta has formed and that exposed ash now covers the deepest portions of the impoundment, including the pre-existing channel of Berry Creek. Assuming that the exposed ash is no higher than the normal pool elevation,[17] the channel of Berry Creek within AP-1 is now buried under 75 to 85-feet of saturated coal ash. Georgia Power estimates that AP-1 currently contains approximately 15,700,000 cubic yards of CCR.[18]

The outer edge of the current coal-ash delta within impoundment AP-1 is located on the floodplain of Berry Creek and within the 1% annual chance flood area[19] indicated on the current Federal Emergency Management Agency (FEMA) Flood Hazard map[20] of the area. Locating a permanent waste disposal facility on the floodplain is problematic for at least two reasons. First,

[11] Georgia Power, 2016b and 2016c

[12] Georgia Geologic Survey, 1989

[13] O.C.G.A. 12-8-25.2 (Sites within two miles of a significant ground-water recharge area)

[14] USGS, 1973 and 2011, East Juliette, GA, 1:24,000 Topographic Maps

[15] A perennial creek or stream is one that has a continuous flow of water in at least parts of the stream bed all year round during years of normal rainfall. Intermittent streams regularly cease flowing during certain times of the year.

[16] Georgia Power, 2016a, History of Construction, Drawing E1H1058, pdf p. 20 of 26

[17] This assumption may result in an underestimation of ash delta thickness since ash is typically deposited on the surface of the delta. This practice often results in build-up of ash above normal pool elevation.

[18] Georgia Power, 2016d, Initial Written Closure Plan, p.2

[19] The 1% annual chance flood, commonly referred to as the 100-year flood, is the area of the Berry Creek floodplain that has a 1% chance of flooding during any calendar year

[20] FEMA National Flood Hazard Layer Viewer

the coal ash waste in the unlined waste disposal cell would be re-wetted from below by rising groundwater associated with even relatively minor flood events. During high water events groundwater flows from the stream into surrounding sediments and the groundwater elevation rises in response. Where the bottom of the unlined waste disposal cell is located at or below the normal water table, such as at AP-1, rising groundwater elevations will re-wet wastes that are normally located above the water table and result in stimulated leachate production. Minimizing the potential for leachate generation and subsequent migration out of containment are key goals of permanent waste site closure that are not achieved under the Georgia Power Closure Plan

The second issue with the location of the waste disposal facilities adjacent to Berry Creek is the increased danger of damage and/or catastrophic release of coal ash during flood events. These dangers were illustrated in 2018 during the aftermath of Hurricane Florence when rising floodwaters at Duke Energy's L.V. Sutton power plant flowed through current and former ash impoundments, breached an ash landfill, and released an unknown quantity of ash. Under major flood events such as the 1%-annual-chance-flood, or greater, erosion of the new North Berm that is proposed to contain the disposed coal ash wastes in the deepest portions of the impoundment would be expected. Locating waste containment structures such as the proposed North Berm adjacent to the rerouted Berry Creek Channel and within the 100-year floodplain should be viewed, at best, as unacceptable waste management planning and practice with potentially catastrophic results for future Georgia residents.

Proposed Closure Plan

The Plant Scherer Closure Plan[21] establishes Georgia Power's intent to close AP-1 by the following major actions:

- Purportedly to remove free water from the impoundment;
- Route surface water flow around the outer edge of delta and outside of the proposed North Berm;
- Construct the new North Berm across the basin to contain the existing ash delta and ash that would be relocated from other areas of the impoundment;
- Excavate thin ash layers located outside of the North Berm and consolidate onto the delta. Ash would be consolidated over the deepest portion of the buried valley; and
- Place a composite final cover system over the ash purportedly to minimize vertical infiltration of precipitation into the ash.

No bottom liner or leachate collection system is proposed by the Closure Plan. No modeling to predict the amount of saturated ash that would remain after closure has been submitted. Nor has modeling been submitted to predict the extent of current or future groundwater contamination. These omissions are troubling. It is common practice to perform a comprehensive site characterization that can be used as a basis to develop a conceptual site model. This allows regulatory agencies to evaluate site characteristics and assess potential future impacts from a

[21] Georgia Power, 2018, Sections 7 and 8

given closure plan. Here, the lack of such data will impair GAEPD's ability to evaluate the extent of groundwater and environmental degradation that can and will likely result from the Closure Plan's implementation. Such considerations, particularly as relate to potential adverse impacts to human health, should be considered of paramount importance given the many residences located in close proximity to the site.

Impoundment Site Geology

The groundwater monitoring plan[22] describes the geology of the AP-1 site as underlain by regolith consisting of residual soils and saprolite overlying fractured, crystalline bedrock. Local bedrock consists of gneiss with layers and lenses of schist and amphibolite. Residual soils, primarily sandy silt, silty sand, sandy clay and silty clay, occur as variably-thick blanket overlying bedrock across most of the site. The thickness of residual soil ranges from a minimum of approximately 17 feet to as much as 168 feet. The thickness of saprolitic soil and/or saprolitic rock is variable.

Impoundment Site Hydrogeology

The groundwater monitoring plan[23] describes groundwater as occurring within both the regolith and fractured bedrock beneath the site. The water-table occurs within the overburden and is generally unconfined. Groundwater flows through the porous regolith, is recharged by precipitation and typically discharges into streams and rivers. The water table surface is generally a subdued reflection of surface topography. Recharge to the bedrock aquifers comes from groundwater that infiltrates into the rock through zones of enhanced permeability (*i.e.* fractures).

There is no subsurface confining layer below or adjacent to AP-1 that would otherwise act to restrict the post-closure migration of groundwater into AP-1, infiltration of liquids into AP-1, lateral migration of contaminants from AP-1, future impoundment of water within the ash basin, or the continuing presence of liquids within AP-1 post-closure.

Prior to impoundment construction, groundwater flowed from higher topographic areas located north, west, and south of the creek toward discharge areas along Berry Creek. Groundwater that discharged from the regolith into Berry Creek flowed downstream and was rapidly removed from the local hydrogeologic system.

The filling of the Berry Creek valley with water and coal ash radically altered groundwater flow directions, pathways, ingress, and egress from the site. Under current conditions groundwater continues to flow toward the impoundment from slightly higher elevations to the west, and out of the pond to recharge groundwater on the north, south, and east sides of the impoundment. Flow of water out of the impoundment and into groundwater under current conditions is reflected in groundwater quality monitoring results described below.

[22] AECOM, 2018, Closure Permit Application Part A- Section 6
[23] AECOM, 2018, Closure Permit Application Part A- Section 6

Removal of the free standing water as contemplated by the proposed Closure Plan will significantly reduce the hydraulic head that currently drives Plant Scherer's AP-1 coal ash contaminants out of the Berry Creek valley. This reduction of the head would be a positive development if the accumulated ash materials were located above the water table. But the closure plan proposes to leave the accumulated ash delta in place, without a bottom liner -over the deepest portions of the impoundment. With removal of the free standing surface water, groundwater will attempt to return to natural flow conditions. Unfortunately, however, the groundwater will be unable to return to pre-development conditions because discharge areas along the previous surface water channel will remain buried under the coal ash waste. Groundwater that previously discharged from the regolith to surface water or into alluvial sediments along the creek will now discharge *into* the accumulated coal ash in perpetuity. Rather than being rapidly removed from the hydrogeologic flow system as stream flow under conditions as they existed prior to the area being used as a waste disposal area, the water will instead discharge into another porous media, coal ash within AP-1. This change will cause saturated conditions to exist at higher elevations than those present prior to burying the area in coal ash for as long as the ash remains in that location. This will in turn promote generation of leachate that will eventually discharge into the creek, carrying mobilized coal ash pollutants with it.

Other generation facilities[24] that have proposed similar Cap–In-Place closure scenarios for ash impoundments have typically conducted multiple phases of groundwater flow and transport monitoring in at least an ***attempt*** to predict how much of the buried waste will remain saturated, and to further predict how far downstream water quality impacts may persist after waste consolidation and capping. Here, no such predictive modeling effort has been conducted in support of the AP-1 Closure Permit Application. This omission results in the lack of important data. Nevertheless, currently available information supports the findings set forth above concerning present and future groundwater degradation, future impoundment and release of leachate, and contamination of Berry Creek by post-closure discharge of leachate from AP-1. Additional site investigation would serve to more accurately assess those impacts in comparison with the relatively limited dataset provided by Georgia Power.

Groundwater Quality Monitoring

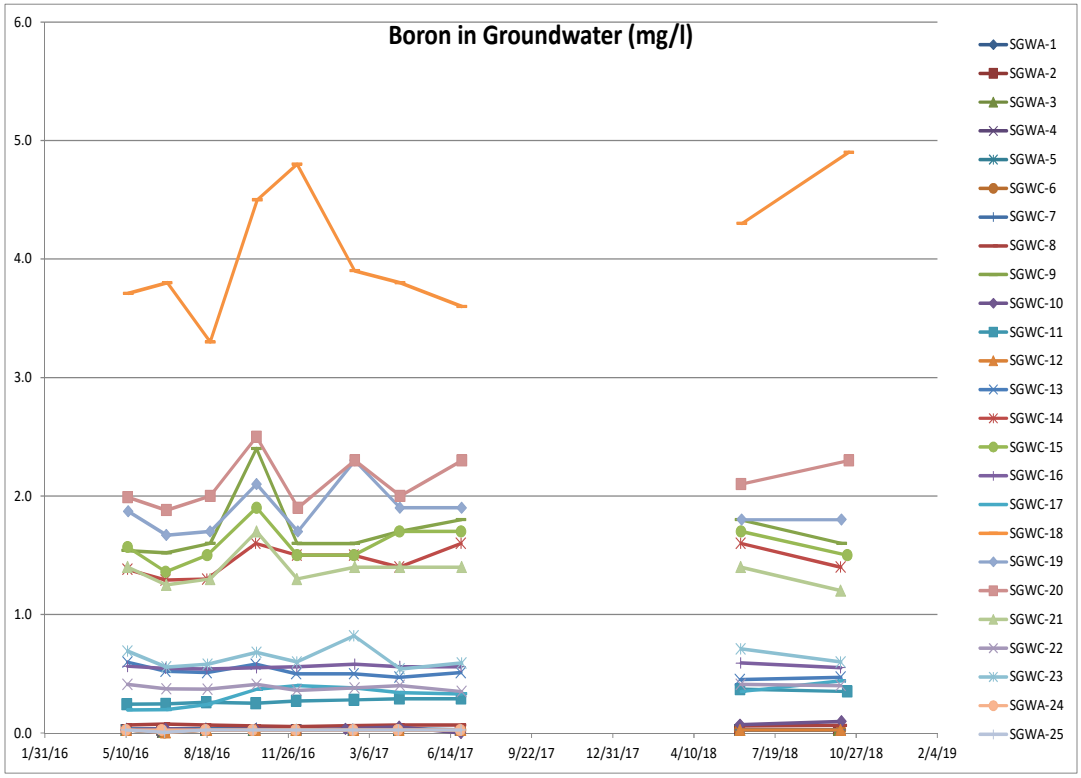
Groundwater quality monitoring required by the Federal CCR rule has shown that groundwater around the AP-1 impoundment is impacted with coal ash-related contaminants. Ash-related contaminants detected above background include the common ash–related contaminants Boron, Calcium, Chloride, Fluoride, pH, Sulfate and TDS.[25] Impacted wells include: SGWC-7, SGWC-8, SGWC-9, SGWC-10, SGWC-11, SGWC-12, SGWC-13, SGWC-14, SGWC-15, SGWC-16,

[24] Examples include the Roxboro, Mayo, and Belews Creek Generating Stations in North Carolina. On April 1, 2019, the North Carolina Department of Environmental Quality determined based on the science that excavation of these and three other unlined coal ash impoundments is the only closure option that met state standards "to best protect public health and the environment." Department of Environmental Quality, North Carolina Closure Determination April 1, 2019, see https://deq.nc.gov/news/key-issues/deq-orders-all-coal-ash-excavated

[25] Boron, Calcium, Chloride, Fluoride, pH, Sulfate and TDS are Federal CCR rule Appendix III coal ash parameters

SGWC-17, SGWC-18, SGWC-19, SGWC-20, SGWC-21, SGWC-22, and SGWC-23. The time versus concentration plot of Boron concentrations in groundwater (below) illustrates the variation in groundwater quality impacts between wells.

Monitoring well SGWC-18 is the most highly impacted of the monitoring wells, with concentrations of cobalt, boron, sulfate and TDS notably higher than the other monitoring wells. A statistically significant increase in Cobalt[26] was documented in the 2018 annual monitoring report.[27] Well SGWC-18 is located off the southeast corner of the impoundment at end of the dam.



Using a flawed sampling methodology, Georgia Power's consultants attempt to attribute the contaminants to a source other than the coal ash within AP-1, which is implausible. A more comprehensive sampling protocol is necessary to render an accurate picture of the sources of contamination detected at and in the vicinity of Plant Scherer AP-1. For example, rather than investigate the extent of the statistically significant increase in Cobalt and other ash-related parameters, Georgia Power submitted an Alternate Source Demonstration[28] that purports to attribute this contamination to natural site conditions. But there is insufficient information to determine whether the Alternate Source Demonstration for Cobalt is valid. Specific information missing from the Alternative Source Demonstration is identification of the depth of interstitial water samples collected from within the ash delta. For instance, it is commonly understood that samples collected from upper layers of an ash basin often show relatively low concentrations of

[26] Cobalt is a Federal CCR rule Appendix IV coal ash parameter
[27] Golder Associates, 2019
[28] Golder, 2019, Appendix C

ash-related contaminants due to dilution from precipitation and the short contact time between the ash and water at that depth, in comparison with samples collected from within lower portions of the water column. Interstitial water samples collected within lower portions of the ash column provide a better indication of the chemistry of leachate that is leaving the impoundment and impacting underlying groundwater quality.

A more accurate assessment of Cobalt concentrations would collect samples screened at multiple depths within the ash, where higher concentrations can be expected to occur. No data concerning sample collection depth, much less collection at multiple depths in the ash are provided in the Alternative Source Demonstration. These omissions render the conclusions of the Alternate Source Demonstration materially unreliable. GAEPD should require collection of samples from multiple depths within the ash in at least three locations within AP-1, to ensure complete accurate data for comparison against upgradient background values for Cobalt and other coal ash constituents detected at the site, including Calcium, Chloride, Fluoride, pH, Sulfate and TDS.

Setting aside the flawed sample and reporting methodologies for Cobalt, there is no question, however, that these multiple other common ash-related constituents are found in high concentrations in the same well evaluated in the Alternate Source Demonstration. In fact, monitoring well SGWC-18 is the downgradient monitoring well showing higher concentrations than any other well in the monitoring system. Georgia Power has made no apparent effort to determine the magnitude and extent of ash-related groundwater contamination caused by AP-1. The Company appears more interested in attributing away the detected pollution to sources other than its massive coal ash waste disposal unit than in providing an accurate picture of site contamination.

The above findings are based on my review of available sources, including materials submitted by Georgia Power to GAEPD, the content of Georgia Power's CCR Rule Compliance Data and Information website, and my education, qualifications, experience, and expertise. I would be happy to discuss the planned closure of Plant Scherer AP-1 with you and/or GAEPD at any time.

Please let me know if you have questions or comments.

Sincerely,

Mark A. Hutson, P.G.
303-948-1417
mhutson@geo-hydro.com

Enclosure

Documents Reviewed

Data and information sources reviewed included the following documents:

AECOM, 2018, CCR Surface Impoundment, Ash Pond 1, Closure Permit Application, Monroe County, Georgia, November 2018.

EPA, 1993, *Criteria for Solid Waste Disposal Facilities, A Guide for Owners/Operators*, EPA/530-SW-91-089, March 1993, *available at* https://www.epa.gov/sites/production/files/2016-03/documents/landbig.pdf

EPA, 2015a, Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category, 80 Fed. Reg. (November 3, 2015) (40 C.F.R. Part 423), available at https://www.govinfo.gov/content/pkg/FR-2015-11-03/pdf/2015-25663.pdf

EPA, 2015b, Technical Development Document for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category, EPA-821-R-15-007 (September 2015), available at https://www.epa.gov/sites/production/files/2015-10/documents/steam-electric-tdd_10-21-15.pdf

EPA, 2016, Annual Effluent Guidelines Review Report, EPA-821-R-16-002 (June 2016), available at https://www.epa.gov/sites/production/files/2016-06/documents/2015-annual-eg-review-report_june-2016.pdf

FEMA National Flood Hazard Layer (NFHL) Viewer, 1% Annual Chance of Flood Hazard, at https://fema.maps.arcgis.com/apps/webappviewer/index.html?id=29f87515702d4845a906419b287e2049

Georgia Geologic Survey, 1989, Most Significant Ground-Water Recharge Areas of Georgia, Hydrologic Atlas 18, reprinted 1992, available at https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/HA-18.pdf

Georgia Power, 2016a, History of Construction, 40 C.F.R. Part 257.73(c)(1)(i)-(xii), Plant Scherer Ash Pond (AP-1), at https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-scherer/20161017-constrhist-sch-ap1-final.pdf

Georgia Power, 2016b, Location Restriction Demonstration, Uppermost Aquifer (40 C.F.R. 257.60), plant Scherer Ash Pond 1 (AP-1), at https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-scherer/20181017_aquifer_sch_ap1_final.pdf

Georgia Power, 2016c, Liner Design Criteria, 40 C.F.R. Part 257.71, Plant Scherer Ash pond (AP-1), at https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-scherer/20161017-liner-sch-ashpond-final.pdf

Georgia Power, 2016d, Initial Written Closure Plan, 40 C.F.R. Part 257.102, Plant Scherer Ash pond (AP-1),at https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-scherer/20161017-clospln-sch-ap-final.pdf

Golder Associates, 2018, 2017 Annual Groundwater Monitoring and Corrective Action Report, Georgia Power Company – Plant Scherer, Ash pond (AP-1), January 30, 2018, at

https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-scherer/20180131-annualgwreport-sch-ap-final-rev1.pdf

Golder Associates, 2019, 2018 Annual Groundwater Monitoring and Corrective Action Report, Georgia Power Company – Plant Scherer, Ash pond (AP-1), January 31, 2019, at https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-scherer/20190131_AnnualGWReport_SCH_AP_FINAL.pdf

United States Geological Survey, 1973, East Juliette, GA, 1:24,000 Topographic Map.

United States Geological Survey, 2011, East Juliette, GA, 1:24,000 Topographic Map.

Enclosure

Resume of Mark Hutson, P.G.

Mark A. Hutson, P.G.

Summary of Qualifications

Over 38 years professional experience performing and managing site characterization, RI/FS's, RFI's, and soil and/or groundwater remediation projects. Management experience includes all aspects of projects for industrial, governmental, and non-profit clients. I have provided technical review, comments, and oversight on preparation of numerous permit applications and a wide array of projects.

Professional Experience

Geo-Hydro, Inc., 2006-Present, Principal/Senior Scientist
Weston Solutions, Inc., 2002-2006, Senior Project Manager/Business Line Operations Manager
Ellis Environmental Group, LLC, 2001-2002, Senior Project Manager
Foothill Engineering Consultants, 1997-2001, Senior Project Manager
Burns & McDonnell Waste Consultants, Inc., 1996-1997, Senior Project Manager
Hydro-Search, Inc., 1990-1996, Senior Project Manager/Operations Manager
Roy F. Weston, Inc., 1984-1990, Senior Geologist/ Project Manager
University of Illinois at Chicago, 1982-1984, Teaching Assistant
Ecology and Environment, Inc., 1980-1982, Hydrogeologist
Illinois Environmental Protection Agency, 1978-1980, Environmental Protection Specialist

Professional Registrations, Memberships, and Affiliation

Professional Geologist - Wisconsin (No. 889), Illinois (196.001465), Indiana (No. 754), Kansas (No. 709), Nebraska (No. G-0329), North Carolina (No. 2513)

American Institute of Professional Geologists - Certified Professional Geologist (No. 7302)

Colorado Ground Water Association - (Past-President 2015-2016), President 2014-2015, Vice President 2013-2014, Education Committee Chair, 2011-2018)

Education

M.S., Geology, University of Illinois at Chicago, 1989
B.S., Geology, Northern Illinois University, 1978
Graduate Studies in Business, Northern Illinois University, 1979-81
Various courses on computer software and geographic information systems

Select Project Experience

Technical Oversight and Consulting

- Consultant tasked with reviewing and summarizing water quality data from 66 Coal Combustion Residual sites to gain insight into the nature and magnitude of the documented impacts that CCR units have on groundwater quality. Results were submitted to EPA by my client during the public comment period on proposed revisions to the 2015 Coal Combustion Residual Rules.

- Consultant tasked with reviewing and providing my Expert Opinions on EPA's proposed revisions to the 2015 Coal Combustion Residual rules. Opinions were submitted to EPA by my client during the public comment period.

- Consultant tasked with reviewing and providing comments on Site Assessment Plans, Comprehensive Site Assessments, and Corrective Action Plans for coal ash impoundments at the Mayo, Roxboro, and Belews Creek Generating Stations in North Carolina. Coal ash impoundments at each of these sites were constructed in stream valleys and resulted in burying perennial streams below sluiced ash.

- Consultant for the Western Environmental Law Center initially tasked with reviewing and providing comments on the mine permit application for the Bull Mountains Mine, Montana. I was subsequently asked to provide testimony about concerns over inadequate evaluation of potential impacts to springs and seeps as well as water supplies on surrounding properties.

- Consultant tasked with reviewing closure plan information and monitoring reports from the Santee Cooper Grainger Generating Station ash pond closure. The site is located near Conway, SC. Documents were reviewed to evaluate the effectiveness of the proposed closure plan and comments were provided to counsel for use in negotiations with the company.

- Technical Consultant tasked with reviewing and preparing comments on the Draft Environmental Impact Statement for the Four Corners Power Plant and Navajo Mine Energy Project in New Mexico. Reviewed documentation from Office of Surface Mining Reclamation and Enforcement sources and prepared comments covering the effects of current and previous mining and coal ash disposal practices and identifying proposed activities likely to adversely impact environmental quality.

- Consultant providing support to counsel by reviewing and providing comments on Groundwater Assessment Work Plans and Drinking Water Supply Well and Receptor Surveys at 14 coal ash disposal facilities located in the southeast. The document reviews were conducted in order to evaluate the appropriateness of proposed characterization, make recommendations to improve characterization, and identify any sites that showed a particularly high risk to off-site receptors.

- Consultant tasked with reviewing and preparing comments on the 2012 reports covering the Plant Area, Stage One and Stage Two Evaporation Ponds Area, and Units 3 & 4 Evaporation Holding Ponds Area of the Colstrip Steam Electric Station located at Colstrip, MT. Reviewed documents and prepared comments and talking points that were submitted subsequently submitted to regulators.

- Consultant on the Pines Groundwater Plume Site through a USEPA Technical Assistance Program grant from PRPs to local citizens' group. The Pines site is a coal combustion waste landfill with significant spread of contaminants. Provide assistance to the citizens through grant to provide assessment and feedback on site work products as they are developed and implemented, explain the remediation processes and activities to the citizens, and serve as technical liaison between citizens and remediation team.

- Technical Consultant tasked by with reviewing a variety of documents and monitoring data from the Rosebud Mine located near Colstrip, MT. Document and data reviews included groundwater monitoring data, MPDES permits and discharge monitoring reports, and permit renewal documents. In each case, documentation and data were reviewed and comments were prepared and submitted to counsel.

- Technical Consultant providing support at the Massachusetts Military Reservation (MMR) on Cape Cod, MA. Under contract to the Corps of Engineers, provided third-party technical support services for the Selectmen of four towns surrounding MMR from 1998 thru 2011. The project involved oversight of impact area characterization and remediation activities including UXO location and disposal, and characterization of explosive impacted soil and groundwater, volatile organics, and perchlorate. Provided technical review of remediation data as well as comments and advice to the Selectmen on technical issues.

- Environmental Consultant to the City of Afton, MN to review and provide comments on an application to develop a coal combustion waste landfill on the site of a former sand and gravel mining operation. On behalf of the City of Afton, GHI reviewed the available materials, identified data gaps and potential concerns, and submitted detailed comments on the plan. Major concerns included the susceptibility of the local water supply to contamination from the facility, the unacceptable geologic characteristics of the site for construction of a waste disposal facility, poor characterization of wastes to be placed in the facility, improper modeling of the site conducted in support of the EIS, and the location of many potential receptors downgradient of the facility.

- Project Manager and Consultant tasked with reviewing and providing technical comments on the Faulkner, Westland and Brandywine coal combustion waste disposal facilities in rural Maryland. Provided comments on the adequacy of characterization of the nature and extent of contaminants released from these facilities. Subsequently supported the legal team in negotiating the details of necessary actions to be taken during closure of these facilities to protect human health and the environment.

- Consultant tasked with reviewing and preparing comments on a permit amendment application for the Savage Mine located in eastern Montana. Comments submitted to counsel primarily concerned the adequacy of the site characterization, the hydrologic balance and probable hydrologic consequences of proposed application.

- Project Manager and Consultant on the review and preparation of technical comments on an application by a major utility to develop an unlined coal combustion waste (CCW) disposal facility in western Kansas. Major issues included the leachability of CCW in the landfill environment, inadequacy of the proposed groundwater monitoring plan and the lack of necessary groundwater protection systems in the design. Comments were provided to counsel for inclusion in the public review process.

- Environmental Consultant tasked with reviewing and preparing comments on a permit application for a proposed lignite mine located near South Heart, North Dakota. Comments submitted to counsel included identification of inadequacies in the site characterization, the monitoring plan, the Probable Hydrologic Consequences, and the evaluation of potential alluvial valley floors. Comments were submitted to counsel.

- Project Manager and Consultant for Robinson Township and Environmental Integrity Project on a review of a permit application submitted to the State of Pennsylvania to mine coal refuse, generate electricity and dispose of coal combustion waste at the location of a large coal refuse pile. Services included permit application review and preparation of comments. Review identified deficiencies in the characterization of geologic materials, groundwater, surface water, and the hydrologic balance provided in the permit application.

- Geologist on a geologic and hydrogeologic assessment of a proposed regional landfill in Kendall County, Il. Research documented problems with the geologic and hydrogeologic characterization, including karst features in the area that had not been noted or anticipated in the permit application materials.

Site Characterization and Remediation

- Lead author on a Groundwater Impact Assessment at a coal combustion waste disposal facility in Illinois. This project was conducted to assist an electric generating station investigate the nature and extent of

contaminants that had been released to the groundwater and to investigate remedial options necessary to minimize future releases. Results of this study are currently being implemented by the company and are projected to adequately contain contamination and avoid exposures to surrounding residents.

- PCP Contaminated Soil Remediation, Beaver Wood Products, Columbia Falls, MT, Project Manager. Manager of a project to investigate, excavate and bio-remediate PCP impacted soils at a former pole treatment site. Soil treatment was conducted via an on-site Land Treatment Unit (LTU). At the time of project completion over 20,000 cubic yards of impacted soil had been excavated, treated, and returned to the site. Responsible for project planning and execution, budget and schedule tracking, and cost control.

- Project Manager of a project to remediate and remove an oil interceptor pond containing PCB-contaminated sediment at a generating facility in North Dakota. Oily sludge in the pond contained PCB's in sufficient concentrations to require special handling and disposal. Responsible for all aspects of the project including evaluating remedial action alternatives, preparing construction plans, representing the client with regulatory agencies, and implementation of the approved site closure. Fly ash was added as a stabilizing agent to stabilize the sediment within the pond. Stabilized and characterized sediment was shipped to a permitted TSCA facility for disposal.

- Remediation of hydrocarbon contaminated soils at natural gas collection and pumping Stations, KN Energy, Project Manager. The project consisted of identification of areas of visually impacted soils, excavation of soils to visually clean, screening soils with field instrumentation, collecting verification samples for laboratory analysis, directing contaminated soil excavation, and replacing excavated soil with clean backfill. Impacted soil was transported to pre-existing landfarm areas for treatment by the client.

- Project Manager and Principal Investigator on a mixed waste treatability study performed for Kerr-McGee Corporation to investigate methods of making radiologically impacted hydrocarbon sludge acceptable for disposal without increasing the total volume. The project included characterization of the physical, chemical, and radiologic composition of the available waste materials, and evaluating the feasibility of combining wastes to produce an acceptable material. Pilot scale testing was conducted on the most promising materials to identify the proportions necessary to produce an optimum mixture.

- Project Manager on a groundwater remedial design project at a Phillips Petroleum facility in Beatrice, Nebraska. Project tasks included a general site characterization, geophysical surveys, soil borings and chemical analysis, pump testing, and design of ground water remediation system. Remedial technologies selected utilized air stripping and carbon absorption.

- Project Geologist involved in the installation of a petroleum hydrocarbon recovery system at the Hess Oil refinery on St. Croix US Virgin Islands. Activities included daily coordination with refinery personnel and drilling contractors, logging and installing recovery wells, and performing recovery tests on completed installations.

- Project Manager of a program to investigate, design and construct ground water remediation systems at three Chevron facilities in Puerto Rico. Project included ground water characterization, pump testing and conceptual and detailed designs of remediation systems. Systems were constructed, operated for a period of approximately 2 years and have now been removed.

- Prepared Detailed Plans and Specifications for construction and operation of a land treatment unit to remove hydrocarbon and volatile organics from soil in North Dakota, Project Manager. Managed a team of people involved in preparation of a complete design and specifications package for construction and operation of a land treatment unit to treat soils impacted with petroleum hydrocarbon and chlorinated solvents. This project was completed on schedule, has been built and was successfully completed.

- Project Manager and author of a revised and updated Site Decommissioning Plan for the Kerr-McGee facility in Cushing, OK. Plan preparation included summarizing site conditions, establishing clean-up criteria, specifying remedial actions for each of 16 radioactive materials areas (RMAs) including measurement and sorting of materials, and planning final survey procedures. The scope of the

remediation was negotiated with Nuclear Regulatory Commission headquarters and regional personnel as the document was being drafted to attempt to minimize the time for subsequent review and approval.

- Project Manager of a multi-million dollar U.S. Army program to identify and properly abandon wells located on Rocky Mountain Arsenal (RMA) that could possibly be conduits for downward migration of contamination. This work was conducted in accordance with an Administrative Order ceasing remedial activities at RMA. Over 350 wells were identified and abandoned under this program.

- Project Manager on the characterization of Bombing Target 5 for the Pueblo of Laguna, NM. Portions of the Laguna Pueblo were used during WWII as a bombing practice area. The project consisted of preparation of detailed UXO planning documents, surface clearance of the area around the target, and excavation of the target to a depth of 5-feet below the surface. Material found to potentially present and explosive hazard were collected on-site and detonated on-site at the end of the project. The Pueblo of Laguna and the Corps of Engineers approved all procedures and field activities.

- Multi-phase AFCEE Soil And Groundwater Investigation And Monitoring Program at the Former Bergstrom Air Force Base in Austin, Texas, Project Manager. Investigation areas included an oil-water separator at an engine test facility, a former maintenance facility, and the base landfills. Soils were contaminated with heavy metals including lead and solvents. Contaminated soils were excavated and disposed at an off-site facility. Closure reports for all three areas were submitted and approved by TNRCC.

- Project Manager on a contract to the Department of Energy to perform a surface clearance for UXO at three former bombing targets at the Tonopah Test Site in Nevada. Materials encountered included practice bombs and rockets that had been fired several decades ago. UXO technicians inspected each piece of material for potential explosive hazards. Materials that potentially contained explosive hazards were blown-in-place by Tonopah personnel. Scrap material was secured on-site and disposed appropriately at the end of the project.

- Project Manager for the investigation of subsurface contamination at several high priority solid waste management units at Rocky Flats Plant. Work included identification and characterization of surface and subsurface soil contamination, source characterization, and evaluation of ground water quality and movement.

- Project Manager under contract to Rockwell International to develop usable and defensible background geochemical data sets for various media at the Rocky Flats Plant. The occurrence of low-level radioactive material contamination from many years of plant operations, surrounding land uses, and atomic test fallout necessitated an extensive program to develop data and apply statistical analysis to describe background conditions. Additional statistical testing was performed to identify investigative results that showed results above defensible background values.

- Project Manager on a multi-phase soil and groundwater investigation and monitoring program at the former Bergstrom Air Force Base in Austin, Texas. Investigation areas included an oil-water separator at an engine test facility, a former maintenance facility, and the base landfills. Closure reports for all three areas are currently being prepared.

- Project Manager on a geophysical survey program at the Rocky Flats Plant designed to identify sources of chemical and radiological contamination at high priority solid waste management units. Surveys included electromagnetic, magnetic, and electrical resistivity methods used in conjunction with aerial photographs to identify possible source areas.

- Project Manager on a contract for USEPA Region 5 to plan and execute an investigation of the Federal Marine Terminals site near Detroit, Michigan. The investigation included a detailed review of historical aerial photographs, geophysical surveys of potential burial sites, soil sampling, monitoring well construction and sampling, and preparation of a site investigation report. Documentation and depositions

on findings were provided to Region 5 enforcement.

- Project Geologist on a preliminary investigation of possible JP-4 impacts to soil and groundwater from the fueling system at Forbes Field Air National Guard base in Topeka, KS. The investigation included drilling through runway and ramp areas, around fuel storage facilities, and evaluation of possible migration pathways.

- Project Geologist on a project to use electromagnetic geophysical techniques to trace the lateral migration of shallow, high TDS groundwater plumes associated with three DOE uranium mill tailings sites located in different parts of the western U.S. Results of these surveys showed that electromagnetics was useful for tracing the plumes and allowed a minimal number of subsequent monitoring wells to be installed to quantify leading edge impacts.

Remedial Investigations/Feasibility Studies

- Project Manager for the Remedial Investigation at a former Atlas Missile site located near Holton, Kansas, Responsible for completion of a site investigation and risk assessment for the Kansas City District. Direct push soil sampling, sonic drilling and well installation, and indoor air, surface water, sediment, and groundwater sampling have been conducted in and around the former facility to determine the level and extent of contamination that may be present. An ecological and human health risk assessment was conducted to evaluate the potential health risks associated with the site.

- Project Manager on a Remedial Investigation and Focused Feasibility Study of JP-4 contaminated soils at the Fire Protection Training Area at Minot Air Force Base. Performed under contract to the U.S. Corp of Engineers, this project utilized Laser Induced Fluorescence, an innovative investigation technique, to characterize the extent of subsurface contamination. The Focused Feasibility Study examined eight potential remedial actions and was successful in gaining State acceptance of on-site land treatment as the chosen remedial alternative.

- Project Manager for the Remedial Investigation/Feasibility Study (RI/FS) of the Landfill Solids and Gases Operable Units at the Lowry Landfill CERCLA site. This project involves the characterization and assessment of the extent of potential contamination within the unsaturated solid and gaseous phases of the materials at this high profile site. Responsible for coordinating the activities of up to 30 project staff assigned to multiple concurrent tasks. Responsibilities also included extensive coordination and interaction with multiple clients and PRP groups as well as the Colorado Department of Health and Environment and USEPA Region 8 personnel.

- Technical Advisor under contract to EPA Region V on the Remedial Investigation at the Marion Bragg Landfill CERCLA site. Provided technical assistance to the project team related to investigation techniques to be used in characterizing the landfill and surrounding areas, including evaluating and providing remedies to difficult well installation encountered during the remedial investigation.

- Project Manager on a Feasibility Study/Risk Assessment program at a former Rocketdyne fuel test facility located near Spanish Springs, NV. This program included performing a risk assessment on an impacted groundwater plume, performing a feasibility study to evaluate appropriate remedial options, and performing treatability studies on two alternatives to verify and quantify effectiveness and estimate costs.

- Project Geologist and Site Manager on contract to USEPA Region V on the Remedial Investigation of the Skinner Landfill CERCLA site located near Cincinnati, OH. Prepared planning documents including the Sampling and Analysis Plan, Quality Assurance Project Plan, and Health and Safety Plan. Managed implementation of the remedial investigation that included geophysical surveys, aquatic biology surveys, well installation, and soil and groundwater sampling.

Publications and Presentations

Hutson, M.A., " Oil Interceptor Pond Closure, Sediment, PCB's and Groundwater on a Budget", presented at the 2005 Air Force Environmental Symposium, Louisville, KY, March 2005.

Holliway, K.D., Witt, M.E., and M.A. Hutson, "Abandoned Well Closure Program at a Hazardous Waste Facility, Rocky Mountain Arsenal, Denver, Colorado" Hazardous Materials Control, vol. 5, no.1, January 1992.

Karnauskas, R.J., Deigan, G.J., Schoenberger, R.J., and M. A. Hutson, "Closure of Lead Contaminated Glass Manufacturing Waste Lagoons" Proceedings of HAZMACON 87, April 1987.

Hutson, M.A., and R. J. Karnauskas, "Groundwater Contamination Study, Forbes Field Air National Guard Based, Shawnee County Kansas, Defense Technical Information Center, 1985.

Testimony and Depositions Given

Denver, CO, 2017, Montana Board of Environmental Review, Cause No. BER 2016-07 SM, Appeal Amendment Application AM3, Signal Peak Energy LLC's Bull Mountain Mine No. 1, Permit No. C1993017. Deposition concerning opinions expressed in permit application comments.

Chapel Hill, NC, 2017, Roanoke River Basin Association vs. Duke Energy Progress, LLC, United States District Court for the Middle District of North Carolina, Civil Action Nos. 1:16-cv-607 and 1:17-cv-0042. Deposition concerning opinions expressed in Expert Report.

Chapel Hill, NC, February 2017, State of North Carolina, ex rel, North Carolina Department of Environmental Quality, et. al. v. Duke Energy Progress, LLC., Civil Action No. 13-CVS-11032 and 13-CVS-14461. Deposition concerning opinions expressed in Expert Report.

Chapel Hill, NC, July 2016, State of North Carolina, ex rel, North Carolina Department of Environmental Quality, et. al. v. Duke Energy Progress, LLC., Civil Action No. 13-CVS-11032 and 13-CVS-14461. Deposition concerning opinions expressed in Expert Report.

Denver, CO, 2015, Montana Environmental Information Center et. al. v. Montana Department of Environmental Quality, et. al., 16th Jud. Dist. No. DV 12-42. Deposition concerning opinions expressed in Expert Report.

Denver, CO, 2015, City of Loves Park, IL vs. Browning Ferris Industries. Deposition on behalf of Browning Ferris Industries regarding meetings held and documents produced during employment at the Illinois Environmental Protection Agency.

Chicago, IL, 1982, United States Environmental Protection Agency vs. Federal Marine Terminals. Deposition on behalf of USEPA regarding findings of site investigation at a Federal Marine Terminals site in Detroit, Mi.

Dixon, IL, 1980, Illinois Environmental Protection Agency vs. Lee County Landfill, Testified in state court on behalf of the IEPA regarding violations of state environmental laws at the Lee County landfill.