BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF PUBLIC SERVICE COMPANY OF NEW MEXICO'S ABANDONMENT OF SAN JUAN GENERATING STATION UNITS 1 AND 4	)))Case No. 19-00018-UT))

DIRECT TESTIMONY AND EXHIBITS

OF

MARK A. HUTSON, P.G.

ON BEHALF OF
NEW ENERGY ECONOMY

NOVEMBER 6, 2019

BACKGROUND AND EXPERIENCE

Q. Please state your name and business address.

A. My name is Mark A. Hutson, and my business address is 16 Mesa Oak, Littleton, CO.

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of New Energy Economy, before the New Mexico Public Regulation Commission ("Commission" or "NMPRC").

Q. Please describe your professional experience.

A. I express my opinions 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 Illinois, Indiana, Kansas, Nebraska, 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, 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 unconsolidated geologic media, and a wide range of contaminants. I have served in various technical and managerial roles, conducting all aspects of site characterization and remediation including definition of the nature and extent of 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 facilities at coal fired generation facilities 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, and Wisconsin.

Q. How does your experience relate to your testimony in this proceeding?

A. 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.

Q. Have you previously given testimony before regulatory and legislative bodies?

A. I have provided testimony for various state, judicial, and regulatory bodies in more than 8 proceedings or hearings on the subjects of waste disposal, environmental contamination and hydrogeologic effects proposed coal mining. My full educational and professional background is presented in Exhibit MAH-1, attached and incorporated herein.

Q. What is the purpose of your testimony?

A. 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." The purpose of my testimony is to identify issues related to waste handling and disposal at the Public Service Company of New Mexico ("PNM")'s San Juan Generating Station (SJGS) and the adjacent San Juan Mine (SJM) that are impacting or will impact water quality.

Q. Have you formed opinions on the potential for environmental impacts from the SJGS or adjacent SJM?

A. My ability to form opinions about environmental impacts at these facilities has been hindered by a lack of documents and information. Typically, I am provided numerous documents and data sources that I review to identify information useful in forming opinions about the impacts of a facility. This evaluation typically occurs over a period of two to three months after receiving the data. A site visit is generally performed after reviewing the available data so that knowledge about the data can inform decisions about what areas of facility should be targeted for field observation and/or sample collection. In this case I have had neither the information nor the time required to fully evaluate the situation and form many opinions. Documentation requested by me to support my review included:

- All plans, reports, or other documentation that identifies or describes all locations on the site where coal ash has been deposited on or below ground surface.
- All monitoring plans, reports, or other documentation that describe groundwater and surface water quality on and around the site.

- All hydrogeologic studies, reports, or other documentation that describe hydrogeologic conditions at the site.
- All groundwater flow and/or transport model files, reports and other documentation that describes such modeling.
- All mine dewatering plans, reports, or other documentation that describes planned or actual mine dewatering activities, including projected and actual drawdown of groundwater on or around the site.
- All plans, reports or other documentation that describe planned Reclamation or Reclamation progress on the San Juan Mine.
- All plans, reports, or other documentation that describes geochemical testing, analyses, modeling or other evaluations of coal ash and coal ash constituents and their interaction with native geologic materials and/or groundwater.

In response to this request I was provided with three documents that contain information relative to groundwater or water quality. PNM Exhibit NEE 5-3A, Quarterly Discharge Monitoring Reports, included groundwater monitoring data from a single monitoring event, the first quarter of 2015. PNM-3B Exhibit NEE 5-3B, NPDES Quarterly Monitoring Data Reports, provides analyses of iron concentrations from regulated surface water discharge points. PNM Exhibit NEE 5-3C, Nitrate Investigation Report, described an investigation of the source of elevated nitrate in monitoring well QNT. No other information about the hydrogeology or water quality at the site has been made available. However, I have been able to form a few opinions, even with the limited information and time available.

Q. Have you formed any opinions regarding impacts to groundwater quality at SJGS?

A. Yes, the Nitrate Investigation Report reaches the conclusion (at page 8 of 106) that monitoring wells NEP-3, NEP-4, and QNT have been impacted by leakage from the North Evaporation Ponds. The full Nitrate Investigation Report is presented in Exhibit MAH-2, attached and incorporated herein. The report goes on to indicate that the North Evaporation Ponds would be closed by capping and that Monitored Natural Attenuation (MNA) would be the appropriate remedial action. The North Evaporation Ponds have since been closed in-place by constructing a soil cap. Unfortunately there is no indication that any of the necessary testing was conducted to verify that MNA is appropriate and works for those contaminants at that site. Representatives of the generating station verified during our site visit that soil caps were placed over the ponds and that Monitored Natural Attenuation (MNA) had been invoked as a remedy without expanding the monitoring system. Determination of the extent of the contaminant plume that has been released is necessary in order to determine whether or not the plume continues to grow or if placing a soil cap over the contaminant source has inhibited plume growth. It appears that SJGS is content to simply assume that their released contaminants will eventually disappear or eventually be captured by the groundwater recovery systems located in the arroyo south of the SJGS without monitoring the plume. Monitoring the contaminant plume is a requirement for implementation of Monitored Natural Attenuation.

Q. Have you formed any additional opinions regarding groundwater quality at SJGS?

A. The other opinion that I have formed regarding water quality at SJGS is that the groundwater monitoring system at the North Evaporation ponds has been operated without an unimpacted upgradient monitoring well since at least 2010. Monitoring well QNT is the furthest upgradient monitoring well located in the Westwater Arroyo. Monitoring well QNT has

admittedly been impacted by leakage from the North Evaporation Ponds since at least 2010, meaning that the monitoring system has been without unimpacted background water quality data in the Westwater Arroyo.

Q. Have you formed other opinions that you would like to share?

A. The far larger concern that I have identified is admittedly in the future, but readily predictable. Coal Combustion Residue (CCR) from the SJGS is being disposed in surface mine pits at the adjacent San Juan Mine (SJM). The mine is permitted to place CCR in layers up to 60-feet thick that are then covered with a minimum of 10-feet (15-feet under drainages) of mine spoils plus a thin layer of topsoil. The mine pits contain many millions of tons of CCR with more being added each day. Until such time that dewatering of the mines pits ceases and the elevation of groundwater in the mine pits recovers sufficiently to allow outward flow, the hydraulic gradient all around and beneath the pits will be inward toward the depressed water levels in the mine pits. Eventually however, the elevation of groundwater in the pits will recover sufficiently to allow groundwater to again flow toward the Westwater and Shumway arroyos, and on toward the San Juan River. The United States Geological Survey (USGS, 2017) produced a groundwater flow model of the site that predicted that it would take hundreds of years for pit water to recover and for contaminants that leach from the disposed CCR to travel to the arroyos. The full 2017 USGS report presented in Exhibit MAH-3, is attached and incorporated herein. Column leach tests of the CCR being placed in the mine pits and described in the USGS report showed that aluminum, arsenic, boron, barium, calcium, selenium, silicon, and vanadium, at a minimum, will leach from the waste when exposed to water.

Of course, by the time the water levels in the pits rise sufficiently to allow outward flow and

contamination has time to migrate into the arroyos, bonds will have been released, monitoring will have been long ago discontinued, and operation of groundwater recovery systems will be long ceased. Future residents of the area will likely be unaware that the CCR–related contaminants are migrating downgradient through the arroyos toward discharge in the San Juan River. This is the predictable future unless safeguards are put in place. We know that CCR contaminants will eventually migrate with groundwater, the relevant question is whether an action or actions will be taken to change this future outcome.

Q. Exactly what are you referring to as coal combustion residuals?

A. "Coal combustion residuals" (CCRs/coal ash) is a catch all term for any by-product of burning coal. It includes "fly ash," "bottom ash," "boiler slag," and "flue gas desulfuration materials." CCRs make up one of the largest industrial waste streams generated in the United States. *See* Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 80 Fed. Reg. 21,302, at 21,303 (April 17, 2015).

Q. How can coal plants properly dispose of CCRs?

A. Groundwater contamination is more likely when CCRs are in a disposal area that is not adequately lined and where coal ash is disposed without separation between the CCR and groundwater. Composite lining, which includes a plastic geomembrane and several feet of compacted soil to act as a buffer, reduces the risk of groundwater contamination. Disposing of CCR at elevations above the uppermost water table can reduce the potential for significant groundwater impacts. Unfortunately, the pits being reclaimed with CCR at the SJM are unlined and the waste is being disposed below the elevation of the future water table. 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 or dissolved constituents in the liquid, that has percolated through or drained from waste or other materials placed in a disposal cell, or that passes through the containment structure (e.g., bottom, dikes, berms), where present. If released to groundwater or surface water, leachate from coal ash disposal cells impairs and degrades water quality and the environment.

Q. How long does it take for coal combustion residuals to break down to a state where they are no longer hazardous to human health or the environment?

A. 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 disposal cells will be capable of leaching toxic metals into New Mexico's groundwater at any time in the present, the near future, or distant future for as long as soluble metals remain in the ash and are allowed to come into contact with water. This is true for unlined facilities whether or not a cap is placed on the top of the disposal area.

Q. How many tons of coal combustion residuals have been produced in total since SJGS has been operating?

A. According to PNM's answer to NEE's interrogatory 1-98, Thomas Fallgren, Vice President of Generation testified that: "As of June 30, 2019, PNM estimates that approximately 59,000,000 tons of CCR's have been produced since SJGS has been operating."

Q. What are your on site findings?

A. A sample of surface water found flowing in the Shumway arroyo just downstream of the

original groundwater recovery trench and upstream of the new Shumway groundwater recovery structure was collected and submitted for chemical analysis. Parameters selected for analysis consisted of constituents commonly encountered in groundwater and surface waters on and around coal-fired generating stations. Results of the analysis are summarized in the table below.

SJGS SW-1 ANALYTICAL RESULTS			
Parameter	Result	USEPA MCL	USEPA Secondary MCL
Chloride	**499**		250
Fluoride	1.30	4.0	
Nitrate as N	2.37	10	
Total Dissolved Solids (TDS)	**9090**		500
Sulfate	**4850**		250
Boron	2.62		
Calcium	311		
Lithium	0.205		
Sodium	1790		
Antimony	<0.0020	0.006	
Arsenic	0.0027	0.010	
Cadmium	<0.0010	0.005	
Chromium	0.0026	0.1	
Cobalt	0.0043		
Manganese	0.0794		0.05
Molybdenum	0.0032		
Selenium	0.0143	0.05	
Thallium	<0.0010	0.002	
Vanadium	<0.0050		
All values in milligrams per liter Bolded Parameters Exceed MCL or Secondary MCL			

The USEPA Maximum Contaminant Level (MCL) and Secondary MCL for several of the parameters are included on the table for comparison purposes. The water can be characterized as

a high TDS water with elevated concentrations of sulfate, sodium, chloride, boron, and lithium. This suite of parameters is often found at elevated concentrations on and around coal ash impacted facilities. I hope that since groundwater recovery in the Shumway Arroyo has recently been activated, that this water is being collected and returned to the SJGS evaporation ponds. However, I have not been provided with any information about the operation of the recovery system to confirm that this is the case. Additional investigation and characterization of unimpacted background concentrations would be required to identify specific sources of these parameters.

CONCLUSION

Q. Do you have concluding thoughts?

A. Yes I do. My testimony identifies concerns for current and future groundwater quality associated with the SJGS and SJM. Investigating and remediating current contaminant releases on the SJGS is readily achievable if the will is there to do so. Evaluating and controlling the predictable future impacts from coal ash disposed in the SJM will require those involved to identify ways to technically and financially mitigate impacts to future generations. I fear that avoiding future environmental impacts from actions taken today will be a much more challenging endeavor.

Q. Does this conclude your testimony?

A. Yes, at this time.