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HydroQuest Pipeline Reports

Mr. Paul Rubin has experience in the analysis of geologic hazards associated with pipeline construction in karst and other geologic settings in New York, Pennsylvania, New Jersey, West Virginia, Virginia, South Carolina, Alabama, Georgia and Florida. Beyond this, Mr. Rubin has conducted hydrogeologic analyses of karst aquifers, as well assessment of contaminant transport in karst settings. In addition, Mr. Rubin has extensive experience in slope, watershed delineation, field and GIS analyses. Example reports are provided below.

June 2, 2017 - Expert Report: *Second HydroQuest Report Regarding Environmental Issues Associated with Karst Geology Along the Proposed Mountain Valley Pipeline (MVP).* Report to FERC addresses new information regarding karst provided by MVP following the Federal Energy Regulatory Commission's (FERC) publication of a DEIS for the MVP and Equitrans Expansion Projects. Comments were provided regarding the potential effects of the proposed construction and operation of the MVP Project in karstic terrain in Giles, Roanoke, and neighboring counties in Virginia. In addition, rupture-induced blast forces and risk-informed public safety distances from the proposed 42-inch natural gas pipeline and pipeline accidents in karst terrains are documented. Prepared on behalf of Giles & Roanoke Counties, VA; 21 p.

May 8, 2017 - Expert Report: *Review of New Jersey Natural Gas Draft EA Report in Support of U.S. Air Force Granting Easement Rights for a Large Diameter/High Pressure Natural Gas Pipeline Proximal to a High Density and Military Land-Use Area.* Report to the U.S. Air Force addresses lack of empirical environmental data and provides graphics that portray modern risk-informed public safety distances from a proposed 30-inch gas pipeline. Justification is provided to rescind a draft easement agreement with NJNG. Prepared for the Pinelands Preservation Alliance; 11 p.

April 2017 - Expert Report (Rubin & Beinkafner): *Hydrogeologic Study of the Town of Mamakating, Sullivan County, New York.* Report documents groundwater and surface water resources with emphasis on karst hydrology and contaminant threats to a major NYS cave and resident bat population. Report includes recommendations designed to protect karst aquifers, including establishing legislation to ban pipeline construction for transport of liquid and gaseous hydrocarbons throughout the Town; 36 pages plus 32 detailed GIS maps and figures.

January 24, 2017 - Expert Report: *Environmental and Geotechnical Considerations Regarding the Proposed South Jersey Gas Natural Gas Pipeline Crossing Through the Pinelands of New Jersey* for the Pinelands Preservation Alliance regarding the application of South Jersey Gas for approvals to build a 22-mile natural gas transmission pipeline through the Pinelands Forest Area in Cumberland, Atlantic and Cape May Counties; 19 pages.

December 22, 2016 - Expert Report: *Environmental & Public Health Risks Stemming from Placement of Natural Gas Pipelines in Karst Terrains; Virginia Mountain Valley Pipeline Example.* Report addresses potential geotechnical and biological impacts (i.e., karst mitigation plan, cave fauna) relative to pipeline rupture in a proceeding before FERC regarding application for a Certificate of Public Convenience and Necessity pursuant to Section 7(c) of the Natural Gas Act to construct and operate the 301-mile Mountain Valley Pipeline Project (CP16-10-000); Prepared on behalf of Giles & Roanoke Counties, VA; 19 pages.

November 29, 2016 - Expert Report: *HydroQuest Supplemental Technical Comments on the PennEast Pipeline Project DEIS;* Exhibit B of Intervenor's Response to PennEast's October 12, 2016 Submission to the PennEast Pipeline Project; FERC Docket # CP15-558-000. Geotechnical assessment of horizontal direction drilling along the pipeline route in karst terrain, risk of pipeline collapse into sinkholes, seismic impacts, water crossing issues, scientific data deficiencies, and calculation of natural gas arrival times at residences. Prepared for the Eastern Environmental Law Center on behalf of New Jersey Conservation Foundation and Stony Brook-Millstone Watershed Association; 12 pages.

November 4, 2016 - Expert Report: *Comments on New Jersey Natural Gas's Southern Reliability Link Project.* Geotechnical evaluation of New Jersey Natural Gas's proposed 29.5-mile Southern Reliability Link (SRL) project. Geologic interpretation of HDD segment data documented insufficient testing and analysis and failure to address other concerns (e.g., external pipe corrosion, inadvertent fluid returns, acidic groundwater, soft soils and hole collapse; pipe accessibility). Prepared for the New Jersey Conservation Foundation and Pinelands Preservation Alliance; 8 pages.

September 12, 2016 - Power Point Presentation: *Gas Arrival Time Assessment of the Sunoco Mariner East II Natural Gas Liquids Pipeline Proposal as Affects a Delaware County, PA Community.* Presentation includes GIS map graphics developed to assess public health and safety. Prepared on behalf of the Middletown Coalition for Community Safety.

September 12, 2016 - Expert Report: *Technical Comments on the PennEast Pipeline Project DEIS (Docket # CP15-558-000).* Hydrogeologic evaluation conducted of a Karst Mitigation Plan and carbonate portions (i.e., sinkhole and cave-bearing) of a proposed PA/NJ 119-mile natural gas pipeline, inclusive of geotechnical considerations associated with horizontal directional drilling beneath major rivers and other waterways. Public health & safety risks accented with a GIS map depicting natural gas arrival times at homes and business with pipe rupture. Prepared for the Eastern Environmental Law Center on behalf of New Jersey Conservation Foundation and Stony Brook-Millstone Watershed Association; 22 p.

August 24, 2016 - Alternate Pipeline Route Evaluation: Technical review of Rutter & Roy letter and Mott MacDonald Report to the New Jersey Department of Environmental Protection regarding Transco's major permit modification request (File Numbers: 0000-13-0012.3 FHA 150002 and 0000-13-0012.3 FWW 150001) for a portion of the Leidy Southeast Expansion ("Roy Letter"). Determined that Transco did not prove that less harmful practicable alternative exists, including a number of trenchless alternatives (e.g., Direct Pipe). Prepared for Eastern Environmental Law Center on behalf of NJ Conservation Foundation, Stony Brook-Millstone Watershed Association and Friends of Princeton Open Space; 4 p.

August 10, 2016 - Fact Sheet Development: *Key Points to Consider When Purchasing a Home or Business Proximal to a Pipeline* (Reasons why it is not wise to purchase a home or business within 2,000 feet of a combustible gas pipeline).

July 19, 2016: Comment report on consistency of the US Army Corps of Engineers project for flood remediation in the Mamaroneck and Sheldrake river basins in the Village of Mamaroneck with policies of the Local Waterfront Revitalization Program. Report details an alternate flood control option that would utilize tunneling, microtunneling or Direct Pipe technology for construction of a large-diameter borehole vs. a proposed “old-school” hard engineering approach destructive of water quality & river ecology; 18 p.

June 29, 2016 - Review of Failed HDD Bores: Geotechnical evaluation of data and analyses provided in the record of Transco’s application to the New Jersey Department of Environmental Protection for major permit modification for a portion of the Leidy Southeast Expansion pipeline. Analysis documented data deficiencies (e.g., geological information), failure to address HDD alternatives to open cut trenching, including tunneling, microtunneling, direct pipe and other subsurface tunneling techniques. Prepared for Eastern Environmental Law Center on behalf of the New Jersey Conservation Foundation, Stony Brook-Millstone Watershed Association and Friends of Princeton Open Space; 9 pages.

May 17, 2016 - Expert Report: *Planned Excavation, Dewatering, Hydrologic Alteration and Degradation of a Wetland Complex in Burlington County, New Jersey to Accommodate a Gas Company’s Compressor Station.* Geotechnical and hydrogeologic evaluation of Transco’s plan to construct a Compressor Station, Chesterfield Meter Station and electrical substation within and adjacent to a headwater wetland complex in Burlington County, New Jersey. Report addresses hydrologic factors that apply to a Water Allocation Permit Application - Temporary Dewatering Application for the proposed Garden State Expansion Project. Report concluded that groundwater dewatering will impact expansive areas beneath wetlands and a 50-foot buffer zone. Prepared for Eastern Environmental Law Center; 10 pages with GIS maps.

April 11, 2016 – Expert Report: Evaluation of a flawed plan to abandon HDD as a feasible method of installing a 42-inch HDD natural gas pipeline to complete a 1,200-foot portion of the Skillman Loop in Montgomery Township, New Jersey, as part of Transco’s Leidy Southeast Expansion Project, vs. open cut trench installation. Work included geotechnical assessment of various bedrock formations, lithologic contacts, unconfined compressive strength, structural geology, hydrology, pipeline failure mechanisms, and feasibility of HDD vs. other trenchless technology options that were not considered. Prepared for Eastern Environmental Law Center; 14 pages.

February 16, 2016 - Expert Report: *Environmental and Geotechnical Considerations Regarding the Proposed Paulsboro Natural Gas Pipeline Crossing Beneath the Delaware River.* Report details potential adverse impacts that should be addressed by FERC in an EIS as related to the construction of the proposed Delaware River Pipeline Relocation Project by Paulsboro Natural Gas Pipeline Company, LLC in Delaware County, Pennsylvania and Gloucester County, New Jersey. Prepared on behalf of Delaware Riverkeeper Network; 9 pages.

January 29, 2016 - Expert Evaluation: Dominion Pipeline Preferred and Alternate Routes: Calhoun and Richland Counties, South Carolina. GIS map depicting analysis of preferred and alternate pipeline routes.

November 9, 2015 - Expert Report: Sunoco Pipeline, L.P. (SPLP) Pennsylvania Pipeline Project. Geotechnical report funded through a grant with the Pipeline Safety Coalition to assess and analyze the proposed Sunoco Logistics LP Mariner East pipeline in Chester County, PA as affects community and environmental safety. Submitted to the DRBC; 22 p.

September 29, 2015 - Power Point Presentation: Independent Research & Assessment of the Sunoco Mariner Proposals as Affects the Chester County Community and Environmental Safety. Highlights of the TAG study with emphasis on public health and safety. *Gas Arrival Time Assessment of the Sunoco Logistics LP Mariner East Pipeline Proposal as Affects a Chester County, PA Community.* Presentation included GIS map graphics developed to assess public health and safety, including through a karst area. Prepared on behalf of the Pipeline Safety Coalition. Updated: Oct. 28, 2015.

February 2015 - Sept. 2016: Review and assessment of Sunoco Logistics LP Mariner East pipeline and pumping stations for the Pipeline Safety Coalition. Evaluation of geology, hydrogeology, karst hydrology, contaminant transport, and environmental risk to evaluate proposed pipeline routes as affects community and environmental safety.

April 21, 2014 - Sabal Trail Gas Pipeline Suitability Analysis: Conducted natural gas pipeline routing and alternate routing assessment for the 460-mile Sabal Trail route proposed **through Alabama, Georgia, and Florida** (part of the Southeast Market Pipelines Project). GIS map was constructed that recommend four preferred pipeline routes that minimize adverse environmental impacts and taking of residential properties via eminent domain. Use of pre-existing easements was maximized in route selection. Technical review of hydrologic, **karst hazards**, wetland, forest fragmentation, pipe rupture and other environmental considerations was provided. Work conducted for the Kiokee-Flint Group, Flint Riverkeeper, Georgia Chapter of the Sierra Club, and Chattahoochee Riverkeeper; 13 page report.

April 7, 2014 - Constitution Pipeline Alternate Routing Analysis: Provided technical comments to FERC and US Army Corps of Engineers on the 124-mile Constitution Pipeline planned in PA and NYS. DEIS comments included preparation of a GIS map depicting a preferred pipeline route limiting potential property taking via eminent domain.

Dec. 4 & 5, 2013 - Provided technical comments with Hudson Highlands Environmental Consulting to NYSDEC on a proposed addition of Part 570 to 6 NYCRR regulations that lack **criteria for siting Liquefied Natural Gas (LNG) pipeline transportation routes**. The siting and construction of a 124-mile proposed Constitution Pipeline routing for LNG from Dimock, PA to Schoharie Co., NY was used as an example to accent unnecessary habitat fragmentation vs. locating pipelines along existing easements. GIS maps were prepared and used as part of an alternate routing analysis relative to transportation of LNG in pipelines.

March 13, 2013 - Expert panelist at conference: Corporate Interference with Science & Health. Presentation title: *Contaminant flow paths from gas wells to homeowner wells, aquifers, rivers and reservoirs. Can regulations adequately protect freshwater resources?* Conference location – New York City.

June 12, 2012 - Report preparation: *Hydrologic and Environmental Rationale to Bury Gas Pipelines using Horizontal Directional Drilling Technology at Stream and River Crossings* for the Delaware Riverkeeper Network; Transcontinental Gas Pipeline Company, LLC - Brandywine Creek case example used; 14 pages plus 2 figures and flood return analysis.

January 10, 2012 - Aquifer & Karst Protection Considerations in Schoharie and Other New York State Counties (Comments on the NYS High-Volume Hydraulic Fracturing 2011 revised draft SGEIS). Technical report that addresses the need for tracer addition to fracking fluids, vulnerability of karst terrains, limitations of well bore sealant materials, aquifer protection and other issues. In addition, analyses are provided in support of an empirically-based 2,100-foot setback distance from well arrays, the high

probability of well bore sealant material failure from earthquake events, and a flood return analysis supporting no well pads within 500-year floodplains. Documentation was provided in support of NYSDEC withdrawing their revised draft SGEIS on gas drilling regulations. Portions of this and other HydroQuest work contributed to New York State's 12-17-14 Ban on High Volume Hydraulic Fracturing.

November 17, 2011 - Presented a Power Point presentation in West Virginia at a Special Meeting of the County Commission before commissioners, town and planning board members, the public, and the press titled: *Hydrofracking, Karst Vulnerability and Degradation of Water Resources*. The final recommendation provided was to enact a temporary moratorium to be followed by a permanent statewide ban on hydraulic fracturing.