STATE OF NEW YORK
SUPREME COURT : COUNTY OF STEUBEN

In the Matter of the Application of the SIERRA CLUB; PEOPLE FOR A HEALTHY ENVIRONMENT, INC.; COALITION TO PROTECT NEW YORK; JOHN MARVIN; THERESE FINNERAN; MICHAEL FINNERAN; VIRGINIA HAUFF; and JEAN WOSINSKI,

Petitioners,

For a Judgment Pursuant to Article 78 of the Civil Practice Laws and Rules

-against-

THE VILLAGE OF PAINTED POST; PAINTED POST DEVELOPMENT, LLC; SWEPI, LP; and WELLSBORO AND CORNING RAILROAD, LLC,

Respondents.

AFFIDAVIT IN OPPOSITION TO RESPONDENTS' MOTION TO DISMISS AND/OR FOR SUMMARY JUDGMENT

Index No. 2012-0810CV

State of New York,
County of Ulster, ss.:

PAUL RUBIN, being duly sworn, deposes and says:

1. I am a hydrogeologist and hydrologist with thirty years of professional experience. I earned a B.A. degree from the State University of New York at Albany in 1977 and an M.A. degree in geology with a specialty in hydrogeology from the State University of New York at New Paltz in May, 1983. My professional experience includes work conducted for the New York State Attorney General's Office (Environmental Protection Bureau), Oak Ridge National Laboratory (Environmental Sciences Division), the New York City Department of Environmental Protection, and as an independent environmental consultant as President of HydroQuest. My educational background and professional experience are more fully set forth in my Curriculum Vitae, attached as Exhibit A.

2. Within the broad field of hydrology, I have specialized expertise in both surface water and groundwater hydrology. I have conducted detailed assessments of streams, wetlands, watersheds, and aquifers for professional characterizations, for clients and as part of my own personal research. I have authored numerous reports and affidavits related to this work and have made presentations to judges, juries, the assembly, the senate, and others. In addition, I have published papers and led all-day field trips relating to this work at professional conferences.

3. More recently, I have been called upon by a number of environmental groups to address hydrogeologic and environmental issues associated with hydraulic fracturing. A synopsis of this work is attached as Exhibit B. The content and conclusions of this affidavit are based upon generally accepted scientific principles. Issues that are raised are based upon significant research and my geologic and hydrogeologic expertise.

4. This affidavit addresses the need to conduct a cumulative impact analysis of the Corning aquifer before considering selling groundwater to any new large-scale users, inclusive of the gas industry. This necessary analysis has not been conducted. Failure to do so may result in episodic dewatering of the unconsolidated aquifer such that the water demand of existing users is not able to be met. The potential withdrawal of large water quantities significantly beyond current demand should be approached from the same hydrogeologic testing standpoint as is required for approval of any major water supply for a proposed development project. This affidavit supplements my affidavit dated December 19, 2012.

5. Approval of a new or significantly expanded groundwater supply for a proposed new development project must comprehensively assess current water demand, projected future water demand, and provide rigorous hydrogeological proof of the safe yield of the target aquifer. Similarly, significant expansion of water withdrawal from the Corning aquifer should have no

less stringent approval criteria. The determination of the safe yield of an aquifer is made through the analysis of aquifer water level drawdown and recovery data collected from one or more production and monitoring wells. When assessing the hydrogeologic characteristics of an areally expansive aquifer, it is necessary to conduct a number of 72-hour pumping tests simultaneously within the aquifer to learn of its ability, or not, to provide large water withdrawals continuously for long periods of time. To date, this has not been conducted.

6. Information available to me does not contain the detailed pumping drawdown and recovery data needed to characterize important aquifer parameters and make 180-day drawdown projections. Neither the Stearns & Wheler, LLC 2002 Chemung River Valley Water report nor the 1988 Susquehanna River Basin Commission study (Ground-Water Flow Model of the Corning Area, New York by Paula Ballaron) provide the hydrogeologic aquifer test data and graphs needed to assess the safe yield of the Corning aquifer in individual locations or comprehensively throughout its areal and vertical extent. Ballaron states:

> "*Although these aquifers are very productive, this heavy reliance on ground water has created depressed ground-water levels in the aquifers underlying the City of Corning and raises concern for the availability of the resource during an extreme drought.*"

The SRBC study references pumping tests conducted by SRBC, Hydro Group, Inc., and Stearns & Wheler which, if available, and if of sufficient quality and duration might shed some light on aquifer parameters.

7. Similarly, monthly water use data for Painted Post provides no hydrogeologic means or data that can be used to assess the safe yield of the Corning aquifer in Painted Post or elsewhere. A graph of 1946 to 1962 water levels in observation well Sb 240 in Corning, New York shows water level fluctuations within about a 15 foot vertical range (2012 Town of Corning Master Plan, Chapter 7, Water Resources page 6). Apparently, this observation well name refers to a well where water levels were regularly taken vs. an observation well used to

monitor drawdown effects from a production well actively being pumped. The aquifer thickness is reported to be between 20 and 40 feet (Master Plan). It is entirely feasible that, at times of low aquifer levels, production wells in the Corning aquifer, perhaps on or near Sb 240, may have had little remaining thickness of the saturated aquifer. This concept is bolstered when viewing this graph because the water level in the aquifer remains depressed for long periods of time seasonally with no daily recovery to higher water table levels seen at other times. For example, the depressed water level in the aquifer stayed significantly lowered for months in the late 1960 to early 1961 time period. Clearly, then, there is some aquifer discharge value above which the entire saturated thickness of the aquifer would become dewatered. To approve additional large-scale water withdrawals from the Corning aquifer without conducting rigorous, reproducible, hydrogeologic testing with accompanying detailed mapping of aquifer thickness would potentially jeopardize water availability to other users and even other municipalities.

8. A map of estimated Corning aquifer well yields was produced by Todd Miller (1982; New York State Department of Health. Well Yield Survey Map; http://pubs.usgs.gov/of/1982/0085/plate-5.pdf). The note on the map points out that the well yield values are estimates of the maximum long-term yields of individual wells completed in the aquifers. Detailed analysis of material addressed in map references cited (Randall, 1972; Reisenauer, 1977; engineering consultants pumping tests) might provide hydrogeologic data that could be analyzed if it could be obtained. At this time, no substantive hydrogeologic data is available that can be used to determine the safe yield of the Corning aquifer or the cumulative impact of increased water withdrawal from the aquifer.

9. The New State Department of Environmental Conservation provides guidance on Pump Test Requirements, inclusive of simultaneous well testing. To approve any water supply application, the NYS Department of Environmental Conservation "*must determine that the proposed well or wells will adequately meet the needs of the applicant without adversely*

affecting others who may rely on the same aquifer." To advance this, NYSDEC has developed Recommended Pump Test Procedures for Water Supply Applications (Public Water Supply Permit Program Application Processing [Appendix 10, TOGS 3.2.1]).

10. Comprehensive pumping or aquifer testing of the Corning aquifer must be conducted in accord with a number of key NYSDEC TOGS 3.2.1 recommendations. They state that *"[t]he pump test must be performed at or above the pumping rate for which approval will be sought in the water supply application. If multiple wells are to be pumped simultaneously to achieve the necessary yield, the pump test should incorporate such a pumping plan.*" Approval of the extraction of new large-scale water withdrawals from the Corning aquifer should follow NYSDEC guidelines. This includes simultaneous pumping of existing or new production wells at maximum design capacity for at least 72 hours. Drawdown and recovery data collected during these tests is then analyzed to determine such things as A) whether the anticipated pumping rates will dewater production wells and the aquifer, and 2) the safe yield of the aquifer. If high pumping rates were ultimately required to meet projected water demand, it is possible that these production wells would be dewatered. Should that occur, the water availability in the Corning aquifer might drop precipitously, thereby jeopardizing the availability of groundwater for existing users. It is critical to know the safe yield of the Corning aquifer so that it can be compared with both existing and future water demands when assessing potential cumulative impacts to the aquifer.

11. A critical task required for completion of a cumulative impact analysis is a hydrogeological analysis to collect data needed to project the long-term availability of Corning aquifer water. This long term projection is an essential component of the environmental analysis of any development proposal or, in this case, for expanded development of the Corning aquifer. This is especially necessary under SEQRA which, here, should be considered to apply because a number of municipalities and independent users may potentially be adversely

impacted. The "hard look" contemplated by SEQRA should apply here and full environmental assessment should be conducted. The DEC T.O.G.S. require 180-day semi-log plots to assess long term water supply adequacy. To the best of my knowledge, neither pumping test data nor these semi-log plots exist for any portions of the Corning aquifer. Similarly, NYSDOH Part 5, Subpart 5-1 Standards for Water Wells – Appendix 5B (Section 5-B.4 Well Yield and Water Flow) requires applicants to provide evidence that a water well will produce a sustainable flow rate for an extended period of time. Again, to the best of my knowledge, no such hydrogeologic evidence exists (i.e., no raw hydrogeologic data as is needed by Planning Boards, NYSDEC or by independent hydrogeologists to plot and analyze as the basis of extraction approvals) and no appropriate hydrogeologic testing and monitoring were conducted to assess Corning aquifer water availability (i.e. safe yield). To approve large-scale aquifer water withdrawal without a cumulative impact analysis that assesses the safe yield of the aquifer at multiple locations within it, as well as existing and future water demands would be ill-advised.

12. Before approvals for large-scale aquifer withdrawals are approved for public, private or gas industry purposes, the cumulative impact of these withdrawals on the aquifer and existing users must be fully assessed. This assessment must include all existing users (metered and unmetered), including municipal, government, private, agricultural, fire, industrial and other users. This information must be comprehensively gathered for all areas overlying the Corning aquifer. It must also include the projected water demand for projects known to be advancing toward approval or in the early phases of consideration (e.g., new hotels; I-86 corridor development).

13. Determination that expanded extraction of Corning aquifer water would, or would not, deplete the aquifer requires full simultaneous pumping of production wells constructed within several locations within the aquifer to assess well interference and potential aquifer dewatering and proper hydrogeologic analysis of actual well-specific drawdown and recovery

data, each correctly plotted on semi-logarithmic graph paper. Simultaneous well testing or, apparently any individual pumping tests with publically available data, have not been conducted. Also, standard constant rate testing, accepted as industry practice, has either not been conducted or is not available for analysis. Finally, the hard data required by hydrogeologists (and approving agencies) to properly assess potential project water availability either does not exist or has not been provided, despite numerous FOI requests.

14. The hydrogeologic data, assessment of hydrologic boundary conditions, hydrologic analysis, graphics and interpretation needed to determine the long-term safe yield of the Corning aquifer does not exist. Expanded extraction of Corning aquifer water should not be approved in the absence of completion of an up-to-date 2013 cumulative impact analysis that provides a detailed and accurate breakout of Corning aquifer water demand and hydrogeologic analysis of long-term water availability.

15. Hydrogeologic testing, graph construction, aquifer analysis of drawdown and recovery data from simultaneous pumping of multiple production wells, and interpretation are required before there is a sound basis for potential approval of increased withdrawal of Corning aquifer water based on the adequacy of the groundwater supply. Absent such data, it is possible that long-term pumping at increased project water demand will dewater the aquifer, may dewater any nearby homeowner wells, and will not support significantly increased water withdrawals. At present, there is no valid hydrogeologic/scientific basis for approving increased withdrawal of Corning aquifer water or basis upon which to believe increased groundwater withdrawal will not deplete the available water supply or neighboring wells, or that adverse environmental impacts will not result.

16. Increased groundwater withdrawal from the Corning aquifer may dewater portions of the aquifer where the saturated thickness between the top and base of the aquifer is, at

times, small. An important concern that needs to be thoroughly addressed as part of the cumulative impact assessment is the thickness of the saturated aquifer present during dry periods, the duration of the lowered water table (both naturally occurring and resulting from groundwater withdrawal), and the ability of the water table/aquifer to recover sufficiently should additional stress be placed on it (i.e., from increased water withdrawals). An example is used here to illustrate this concept. While sand and gravel aquifers (e.g., Corning aquifer) have high hydraulic conductivity (the capacity of a porous medium to transmit water; e.g., how much water will move through the formation) and coefficient of transmissivity (generally, rate at which water flows through the full saturated thickness of an aquifer) values, if the vertical and lateral extent of the aquifer are limited (i.e., by geologic and hydrologic boundary conditions) increased water withdrawal may, at times, dewater the aquifer. An example of significant natural seasonal fluctuation in the water table elevation of a sand and gravel is present within USGS groundwater well data that has been recorded in a sand and gravel well near Kanona, New York in Steuben County (USGS well 422445077203301 local number Sb-472; see: (http://nwis.waterdata.usgs.gov/nwis/dv/?site_no=422445077203301&agency_cd=USGS&referred_module=sw). Here, the aquifer is reported to be 17.4 feet thick (USGS Water Report 2011), presumably penetrating the full thickness of the aquifer. The reported range in the depth to the water table below the ground surface spans from a high of 3.55 feet (4-04-05) to a low of 10.84 feet (9-22-66), some 7.29 feet. The period of record extends from November 1965 to the present. Exhibit C depicts the mean daily groundwater levels from 12-10-97 to 1-25-13. It clearly shows that aquifer water levels are commonly depressed for long periods of time and, thus, that aquifer recharge is not sufficient to maintain groundwater levels throughout much of the saturated thickness of the aquifer. Using USGS well Sb-472 as a local example, the lowest mean daily water groundwater level recorded in 2012 was 10.39 feet below the ground surface on 9-28-12 (provisional data). This data shows that the water table in this sand and gravel aquifer, which is subject to similar climatic conditions as the Corning aquifer, is seasonally depressed for many months. Furthermore, only 6.6 feet of saturated aquifer thickness is present

during dry periods. Properly conducted high-discharge pumping tests, designed to assess overlapping cones of depression, are needed to assess whether continuous high water demand will dewater the aquifer. Significant water withdrawal at such times may dewater this aquifer and others with little saturated thickness. This points out the importance of determining aquifer thickness throughout the Corning aquifer as part of pumping test based aquifer safe yield determinations. Without a detailed map in hand that portrays aquifer thickness throughout the Corning aquifer, comparison cannot be made between the DEC required 180-day drawdown projection and the presence or absence of sufficient aquifer thickness needed to meet increased water demand. This is another reason why a cumulative impact analysis that includes rigorous determination of safe yield along with existing and projected future water demand must be completed prior to approval of any additional large-scale water withdrawals from the Corning aquifer.

17. It is also imperative that the cumulative impact study discussed in this affidavit address the known presence of contaminants that may adversely affect the quality of groundwater used by those tapping the Corning aquifer. As groundwater extraction rates (i.e., aquifer discharge) are increased to meet new system demands, the cone of depression expands outward away from production wells. If contaminant sources or threats are reached by pumping-induced cones of depression, inward and steepened hydraulic gradients will pull in contaminants. Thus, another critical step that must be completed as part of a cumulative impact analysis is a full assessment of contaminant threats. Such as assessment needs to include a GIS map showing all contaminant threats and a map depicting groundwater flow directions (based on field-based water well elevational data) within and adjacent to the Corning aquifer (i.e., a groundwater contour map).

18. Increased water withdrawal near known contaminant sites will outwardly expand the cones of depression and, as such, pose a real water quality risk as contaminants are drawn

into production wells. An example of a potential contaminant threat to a production well within the Corning aquifer is the former Ingersoll Rand Foundry Site in Painted Post, New York. This site is situated roughly 500 feet southwest of Painted Post municipal supply well # 4. Here, poor industrial practices resulted in soil and groundwater contamination. Figure 2-1 of the August 2005 Malcolm Pirnie, Inc. Remedial Work Plan illustrates boring and monitoring well locations. Contaminants of concern included PCBs, Linocure AW, Linoil 742, kerosene, gasoline, benzene, toluene, PAHs, diesel fuel, oil and grease, and lead and assorted metals. While extensive remedial clean-up work was conducted, the recent finding of 1,1,1-trichloroethane in Painted Post well # 4 at a concentration of 0.6 ug/l (Treichler, pers. comm.) shows that 1) this contaminant and perhaps many others remain within the Corning aquifer (as reported A) in 10-03-12 lab results, B) on 2-23-10 [0.6 ug/l], C) 8-24-04 [0.8 ug/l], 1995 [0.6 ug/l], 8-30-93 [0.6 ug/l]), and 2) there is a direct hydraulic connection through permeable unconsolidated aquifer material. Alternately, and less likely, there is another contaminant source that requires detailed groundwater investigation work, inclusive of monitoring wells and water sampling for numerous chemical parameters. Regardless of the contaminant source, 1,1,1-trichloroethane values exceed the NYS MCL of 0.5 ug/l, and requires full investigation. Until such time as much hydrogeologic testing, chemical analytical work, and assessment are completed it is not advisable to distribute and use this groundwater. Consideration should be given to discontinuing any planned withdrawals from any production well situated near the former Ingersoll Rand Foundry Site until it can be ascertained that this will not exacerbate the outward spread of the contaminant plume – possibly drawing in elevated chemical concentrations and additional contaminants. Importantly, it would be irresponsible to prematurely approve significant additional water withdrawals from production wells near contaminant sources prior to the completion of a comprehensive groundwater investigation and a cumulative impact assessment.

19. Clearly, the full breadth of potential adverse environmental impacts associated with the sale and distribution of Corning aquifer water need to be considered when evaluating the potential sale of groundwater. Any sale of Corning aquifer groundwater must be based on completion of a cumulative impact analysis.

20. The safe yield of the aquifer is not known, the cumulative quantity of water withdrawals from throughout the aquifer from all users is not known, and projected future water demand has not been rigorously assessed. Characterization of each of these factors is needed to assess current and future water availability.

21. For the reasons described above, and in my affidavit dated December 19, 2012, I am of the opinion that, before individual municipalities drawing on the Corning aquifer for their municipal water systems are permitted to engage in water exports from the aquifer, hydrogeologic testing needs to be conducted on production wells in the aquifer to determine the safe yield of the aquifer and an inter-municipal drought management plan needs to be adopted by the municipalities drawing on the aquifer so that there is agreement about how withdrawals will be restricted in a time of drought. In addition, the issues of water quality as related to large scale pumping and Groundwater Under the Direct Influence of Surface Water (GWUDI) need to be comprehensively addressed.

22. This report is based on information available to me at this time. Should additional information become available, I reserve the right to determine the impact, if any, of the new information on my opinions and conclusions and to modify or supplement this report if necessary.

I state all of the foregoing with a reasonable degree of scientific certainty.

Paul G. Rubin

Sworn to before me this 25th day of January 2013.

SANDRA J. GIRARD
Notary Public in State of NY
Ulster County 01GI5038549
Commission Expires Nov. 17, 2013

Sandra J. Girard
Notary Public, State of New York

Exhibit List

Exhibit A - Paul Rubin Resume

Exhibit B - HydroQuest Gas Drilling Related Work

Exhibit C - USGS Mean Daily Groundwater Levels in Well Sb-472, Steuben Co., NY

Exhibit A

Paul A. Rubin
909 County Rt. 2; Accord, New York 12404 (845-657-8111)
E-mail contact: hydroquest@yahoo.com

EDUCATION:

M.A. - Geology, May 1983, State University of New York at New Paltz. Major fields of study: Hydrogeology, Water Quality and Pollution, Structural Geology, Photogeologic Interpretation. Thesis topic: *Hydrogeology and Structure of the Shawangunk Mountains, Ulster County, NY.*
B.A. - Anthropology, minor Geology, May 1977. State University of New York at Albany.

SPECIAL SKILLS:

Environmental Protection; Hydrologic and Geologic Characterizations; Land Use Planning & Characterizations; SEQRA reviews; Expert Testimony and Litigation Background; Surface Water and Groundwater Quality Evaluations; Sediment Transport; Evaluation of Remedial Technologies; Geotechnical Assessments; Hydrologic Investigations; Aquifer Testing and Analysis; Karst Hydrology; Rosgen Stream Analyses; Flood Return Analyses; GIS Map Making and Analyses; Photogrammetric Analyses; Affidavit and Report Preparation; Land Protection; Educator; Public Speaking; Public Relations; Research Skills; Strategy Development; Leadership.

EXPERIENCE:

HYDROLOGIST/ HYDROGEOLOGIST:

1993 - Present

Independent Consultant. Stone Ridge, New York. Consulting firm: *HydroQuest.*
Provide hydrologic, geologic and land use technical consulting services to environmental groups, Towns, business associations, law firms, and individuals. Assist groups in identifying issues and developing strategies designed to protect groundwater and surface water resources, community character, and wildlife habitat.

***HydroQuest* work includes SEQRA reviews, review and fatal flaw analyses of consultant reports and environmental impact statements (EISs); environmental scoping report preparation; direction and oversight of heavy equipment operators for field excavation work for well placements, contaminant characterization, and geologic investigations; technical coordination of scientific case development for environmental groups and attorneys; field characterizations; stream and wetland evaluations; geotechnical analyses; hydrologic and geologic mapping; water quality assessments; watershed delineations; viewshed analyses; slope analyses; aquifer analyses; hydrogeologic analyses; regulatory assessments; GIS map preparation; public presentations; technical presentations to judges; coordination work with attorneys and Technical Committees; direction and coordination of sub-contract work as needed; strategy development; panel member at Town meetings with legislators; press interactions; report and affidavit preparation. Recently authored many major reports and affidavits on gas drilling & hydraulic fracturing (see supplemental resume).**

Recent project work examples include oversight and analysis of well field pumping tests (for multiple groups including NRDC, NYPIRG, Riverkeeper, and Trout Unlimited) designed to assess impacts on groundwater and surface water stemming from a planned large-scale Catskill Mountain resort; assessment of a town's water quality problem with corrective recommendations; initial hydrogeologic assessment of a spring water source being considered for bottled water use; hydrogeologic-aquifer analysis of a groundwater supply proposed for a Shawangunk Ridge retreat center; SEQRA assessments; and technical presentations and testimony before administrative law judges.

KARST HYDROLOGIST

Howe Caverns, Inc. Cobleskill, New York. 2nd largest natural tourist attraction in NYS

2004 - April 2007 **Conducted hydrologic and geologic research, produced professional GIS maps and figures, developed educational programs and materials, developed new tourist route, trained guides, provided land use assessments and recommendations, advised the Board of Directors on land use concerns including potential water quality degradation and potential blast-related impacts to cave. Developed and proposed revenue generating strategies. Coordinated with outside educational institutions, professional geologists, learning institutions, and scout groups. Formerly worked in this position half-time prior to change in ownership.**

INSTRUCTOR:

Jan. 2001- Dec. 2004 **SUNY Ulster, Stone Ridge, New York.**
Taught ArcGIS, Environmental Geology, Geology, Hydrology, Geography, and Crime Analysis. Coordinator of a Geographic Information Systems certificate program. Developed, obtained, and completed a NYSDEC grant to assess assorted hydrologic and environmental aspects of the Black Creek watershed in Ulster County. Supervision and oversight of numerous professional adult "students", directed GIS-based technical presentations, and coordinated and produced grant products.

College of the Atlantic, Bar Harbor, Maine.
Taught a two week graduate level summer field hydrology and environmental science course for several years, including Rosgen stream assessment.

HYDROLOGIST:

New York City Department of Environmental Protection (NYC DEP), Division of Drinking Water Quality Control, Shokan, New York.

April 1993- Jan. 2001 **Conducted research and field studies designed to assess the water quality of watersheds. Responsible for directing geologic research designed to assess the sources, geomorphic context and best management practices (BMPs) related to sediments causing turbidity water pollution problems. Hydrologic and geologic work included geologic mapping of glacial sediments, field evaluation of stream channel armoring, morphologic characterization of stream channels (including Rosgen analyses), bedload transport studies, assessment of critical shear stresses, particle size analysis, stream gauging, water quality sampling and trend analysis, chemical and sediment loading calculations, graphic production, report preparation and technical presentations. Assisted other governmental divisions in evaluating lands for possible purchase, conducted geotechnical assessments of structurally unstable stream reaches, evaluated BMP designs. Supervised several Research Assistants.**

RESEARCH SCIENTIST:

Martin Marietta Energy Systems, Inc. April 1993 under contract with the U.S. Dept. of Energy; Oak Ridge National Lab; Environmental Sciences Division, Oak Ridge, TN.

Aug. 1991- April 1993 **Responsible for hydrogeologic evaluation of groundwater issues (e.g., characterization, monitoring network setup, data analysis, remedial design evaluation) at multiple Oak Ridge Reservation hazardous waste sites. Developed and documented conceptual model of carbonate and shallow storm flow systems comprising pathways of rapid contaminant transport. Work also involved characterization of hydrologic and geochemical trends**

RESEARCH SCIENTIST continued:

and thermal infrared photo analysis. Presented results of research at conferences, as well as to DOE management and State and Federal officials. *Served in a Resource Management Organization as the hydrologic lead for the Environmental Sciences Division.*

HYDROGEOLOGIST:

New York State Attorney General's Office; Environmental Protection Bureau, Albany, New York.

Feb. 1983-Aug. 1991 **Responsible for the design, protocols, coordination, implementation, evaluation, characterization and remediation of many major water and soil contamination sites throughout New York State (e.g., Love Canal, Superfund sites). Designed, performed and supervised chemical field sampling at hazardous waste sites. Evaluated geotechnical and chemical data sets.**

Primary responsibilities included coordination of multiple companies along with their respective legal and scientific consultants. Worked with all parties involved to produce test plans and consent decrees to facilitate site remediation. Responsible for the management of the testing, site characterization and technical assessment. Worked with attorneys on summary judgment motions, complaints, trial preparation and depositions. Attorney General's spokesperson at public meetings. Expert witness at SEQRA hearings. Testimony given before the Assembly Standing Committee on Environmental Conservation and Grand Jury. Worked with DOL staff and attorneys to develop office initiatives (e.g., Racketeering; bottled water contaminants). Initiation, development and drafting of legislation.

Supervision of personnel: expert witnesses, consultants, research assistants, interns. Responsible for selection, job descriptions, work schedules, and products.

HYDROGEOLOGIST:

Stone & Webster Engineering Corp., Geotechnical Division, Boston, Massachusetts.

Oct. 1981-Feb. 1983 **Directly responsible for the planning, preparation, execution, and analysis of pumping tests and a fluid sampling program designed to investigate deep basin groundwater characteristics for the siting of a nuclear waste repository within the Permian Basin of the Texas panhandle. Planned, managed, coordinated, directed, and provided oversight of field operations of a multi-million dollar project. Sub-contractors included Halliburton, Schlumberger, and others.**

ACTIVITIES:

Hiking, geologic and hydrologic research, and exploration. Former Captain: Albany-Schoharie County Cave Rescue Team. Made a Fellow of the National Speleological Society in recognition of karst research and water resource protection.

PUBLICATIONS & REPORTS **Over 50 technical publications and over 100 reports and affidavits, many for private clients, environmental groups, towns, and law firms. Projects include land, wetland, water quality, and species protection; aquifer and watershed characterization; mine proposals; development proposals; contaminant assessments; stream hydrology grant work; and flood risk. Some reports are confidential. Leader of geology conference field trips for groups including the New York State Geological Association, the American Institute of Professional Geologists, the Hudson-Mohawk Professional Geologists' Association, the National Ground Water Association, the National Speleological Society, and the International Association of Geochemists and Cosmochemists.**

SELECTED PUBLICATIONS FROM PROFESSIONAL AND PERSONAL RESEARCH

Rubin, P.A., 2009, ***Geological Evolution of the Cobleskill Plateau; New York State, USA,*** in Veni et al. (eds), Proceedings of the Speleogenesis Symposium of the 15th International Congress of Speleology (joint National Speleological Society & Union Internationale de Speleologie); Symposium: Speleogenesis in Regional Geological Evolution and its Role in Karst Hydrogeology and Geomorphology, Kerrville, Texas. Proceedings, Volume 2, Symposia Part 2, pages 972-978 (published July 2009).

Palmer, A.N. and Rubin, P.A., 2007, ***Karst of the Silurian-Devonian Carbonates in Eastern New York State, with emphasis on the Cobleskill Plateau.*** Guidebook for the Hudson-Mohawk Professional Geologists' Association Spring 2007 Field Trip, *"Carbonate Geology of the Howes Cave Area, Schoharie County, New York"*, p. 17-35, Trip coleader with Arthur Palmer (April 28, 2007).

Rubin, P.A., Burmeister, K.C. and Folsom, M., 2006, ***Karst Resource Management: groundwater protection and developmental considerations in the Kingston-Rosendale aquifer system***; Ulster County, N.Y., Poster Presentation at the 2005 National Cave and Karst Management Symposium. Report prepared for Scenic Hudson.

Stokowski, S., Rubin, P.A. and Guenther, B., 2006, ***History of resource management: conflict and resolution, Howes Cave, N.Y.***, in Rea, G.T., (ed), Proceedings of the 2005 National Cave and Karst Management Symposium.

Rubin, P.A and Stokowski, S., 2004, ***Karst, Caves, and Quarries***. Guidebook paper for ***the*** American Institute of Professional Geologists (AIPG), Annual Meeting. Field trip co-leader.

Rubin, P.A. and Washington, G., 2004, ***Water quantity and quality considerations specific to development on the flank of the Shawangunk Mountain Ridge, Southeastern NYS.*** Abstracts Northeast Natural History Conference VIII. N.Y. State Museum Circular 66: p. 53.

Rubin, P.A., Adickes, D.M., Cunningham, T., Davidson, D., Hurld, J. Kiyan, J.R., Preuss, P., Ramsay, W., Schultz, B. and Washington, George, 2004, ***Application of GIS technology to assess visual impacts of development: Shawangunk Ridge case study, southeastern NYS***. Abstracts Northeast Natural History Conference VIII. N.Y. State Museum Circular 66: p. 52-53.

Adickes, D.M., Preuss, P., Rubin, P.A., and Thompson, J., 2004, ***GIS assessment and study of rare and threatened avian species living in the Shawangunk Mountains in Southeastern NYS***. Abstracts Northeast Natural History Conference VIII. N.Y. State Museum Circular 66: p. 38.

Kiyan, J.R., Washington, G., and Rubin, P.A., 2004, ***GIS visual impact analysis of a proposed housing development below Minnewaska State Park Preserve in the Shawangunk Mountains of the Mid-Hudson Valley in New York State.*** Abstracts Northeast Natural History Conference VIII. N.Y. State Museum Circular 66: p. 47.

Cunningham, T., Davidson, D., Hurld, Rubin, P.A., and Ehrensaft, P., 2004, ***Using GIS technology to project various land-use and economic scenarios for the northern Shawangunk Ridge area; Southeastern NYS***. Abstracts Northeast Natural History Conference VIII. N.Y. State Museum Circular 66: p. 41-42.

Palmer, A.N., Rubin, P.A., Palmer, M.V., Engel, T.D., and Morgan, B., 2003, ***Karst of the Schoharie Valley, New York.*** Guidebook for the New York State Geological Association Diamond Jubilee Field Conference (75th Annual Meeting), p. 141-176, Trip coleader.

Rubin, P.A., Morgan, B., and Palmer, A.N., 2003, ***Howe Caverns resource protection: hydrology and land-use analysis; Schoharie County***, New York State. Abs. Northeastern Science Foundation Silver Jubilee Anniversary Symposium, Proceedings volume, p. 25-26.

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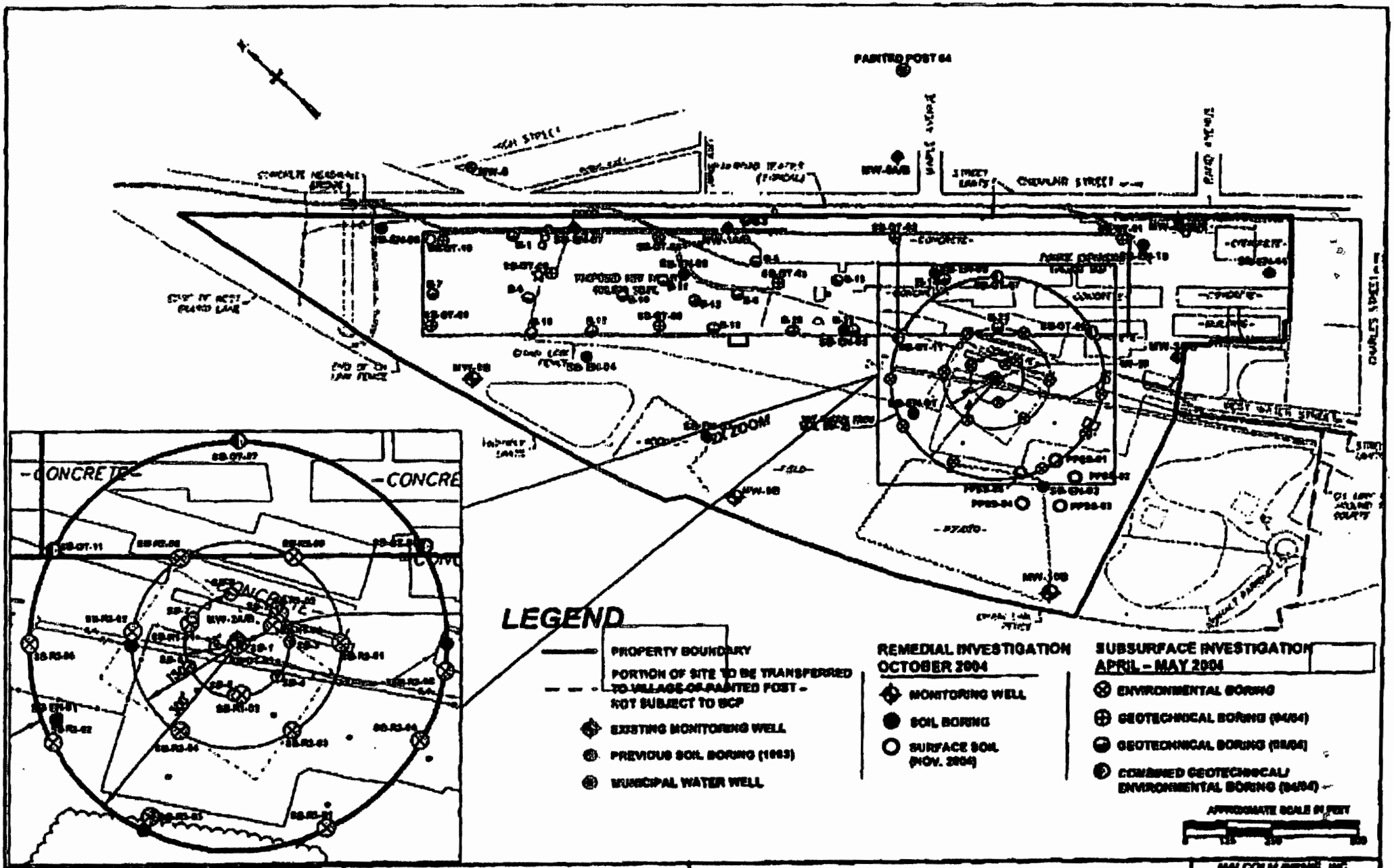
Exhibit B



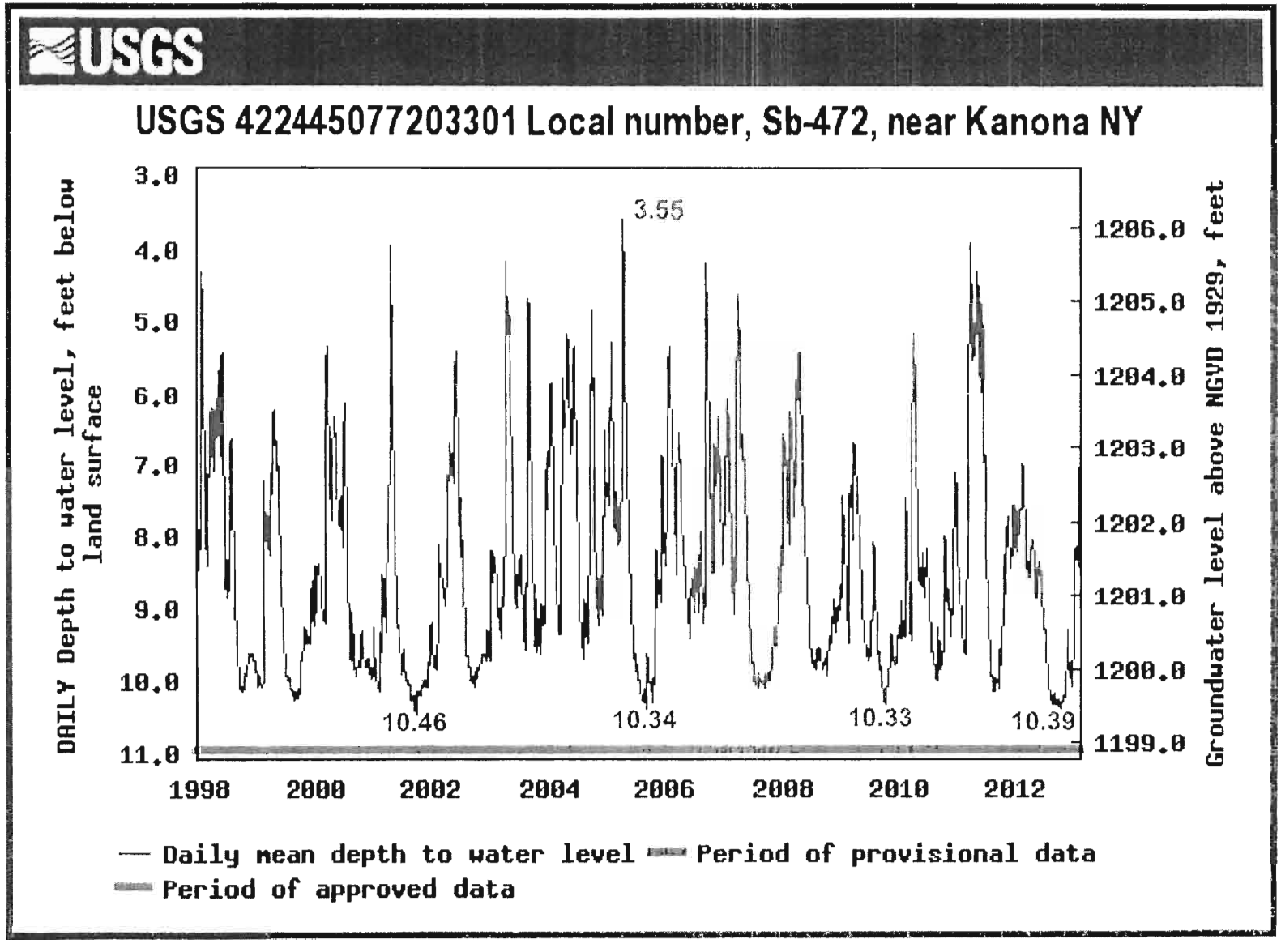
MALCOLM PIRNIE

FORMER INGERSOLL RAND FACILITY
PAINTED POST, NEW YORK

Boring and Monitoring Well Locations

MALCOLM PIRNIE, INC.
October 2004
FIGURE 2-1

Exhibit C


USGS
USGS 422445077203301 Local number, Sb-472, near Kanona NY
DAILY Depth to water level, feet below land surface
Groundwater level above NGVD 1929, feet
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
1206.0
1205.0
1204.0
1203.0
1202.0
1201.0
1200.0
1199.0
3.55
10.46
10.34
10.33
10.39
1998
2000
2002
2004
2006
2008
2010
2012
Daily mean depth to water level
Period of provisional data
Period of approved data