RESOURCE	IMPACT	dSGEIS section	dSGEIS pp.	GEIS sec.	GEIS pp.	MITIGATING MEASURE	dSGEIS section	dSGEIS pp.	GEIS sec.	GEIS pp.
						Requires submission of a fluid disposal plan for flowback water which specifies quality, maintenance, and monitoring of piping and conveyances.	*7.1.6.3*			
						Requires application and pre-approval of POTWs proposing to dispose of flowback and production waters. Specifies application contents (e.g. headworks analysis, waste fluid characterization, regulatory limits) and demonstration that final discharges will fall within regulatory limits.	*7.1.8.1*			
						Requires SPDES coverage of any private wastewater treatment facility proposed to accept waste fluid.	*7.1.8.1*			
						Restates governance of EPA UIC permit over proposed injection well disposal. Notes site-specific SEQRA review for each injection well.	*7.1.8.2*			
Water resources (cont.)	Degradation/contamination of the NYC/unfiltered water supplies.					No well pads for high-volume hydraulic fracturing in the New York City or Syracuse watersheds or within a 4000' buffer of the watersheds.	*7.1.10*			
Floodplains	Contamination of surface waters from the release into the environment of chemical pollutants in a flood event.	*6.2*				No well pads or access roads for high-volume hydraulic fracturing permitted within 100-year floodplains.	*7.2*			
Freshwater Wetlands	Contamination of freshwater wetlands from accidental release of drilling or HF fluids, chemicals, or fuel.	*6.3*		*16.B.2.d*	*16-7..8*	For Department-regulated wetlands, makes permit approval dependent on site-specific SEQRA review and coverage under any necessary wetlands permits.	*7.3*			
						Specifies setbacks between fuel tanks and wetlands at a mandatory 500 feet.	*7.3*			
						Requires SPOTS 10 secondary containment for any fuel tank.	*7.3*			
						Requires a Wetlands Permit when project is w/in 100' of a freshwater wetland > 12.4 ac. in size or of unique local significance. Authorizes permit conditions on a case-by-case basis regarding location and timing of activities/facilities and replacement of lost wetland acreage.			*17.B.1.f*	*17-5*
Ecosystems and Wildlife	Degradation of local ecosystem from fragmentation of habitat	*6.4.1*				Requires operator to develop and employ Best Management Practices for surface disturbance to reduce habitat impacts.	*7.4.1*			
						Restricts operations during mating and migration seasons in certain habitats	*7.4.1*			

RESOURCE	IMPACT	dSGEIS section	dSGEIS pp.	GEIS sec.	GEIS pp.	MITIGATING MEASURE	dSGEIS section	dSGEIS pp.	GEIS sec.	GEIS pp.
						Requires pre-drilling and post-completion animal and plant surveys when well pads are located in 150-acre or larger forest patches within Forest Focus Areas or 30-acre or larger grassland patches within Grassland Focus Areas.	*7.4.1*			
	Degradation of local ecosystem functions and native biological communities from the introduction of invasive species.	*6.4.1*				Requires operator diligence in exploiting accepted BMPs for removal and preventing introduction of invasive species.	*7.4.2.1*			
						Requires baseline surveying and reporting of project site for existence of invasive species.	*7.4.2.1*			
						Affords DEC the right to apply permit conditions for invasive species management when outside of the DRB and SRB.	*7.4.2.2*			
						Relies upon DRBC and SRBC protocols for aquatic invasive species management in their respective jurisdictions.	*7.4.2.2*			
Ecosystems and Wildlife (cont.)	Harm to local wildlife populations from the loss of habitat	*6.4.3*		*16.B.2.b*	*16-6..7*	Requires partial and final well pad reclamation.	*7.4.1*			
	Impacts to State-Owned Lands	*6.4.4*				No surface drilling allowed on specified State-owned lands.	*7.4.4*			
Air Quality	Degradation of Air Quality	*6.5*		*16.B.2.f*	*16-9..10*	Specifies minimum exhaust-stack heights, restrictions on public access, and sulfur content of fuel-oil.	*7.5.3.1*			
						Prohibits use of the BTEX class of compounds as additives in HVHF fluid surface impoundments.	*7.5.3.2*			
						Requires reporting of fracturing additives and public access restrictions.	*7.5.3.2*			
						Requires catalytic technology for production equipment.	*7.5.3.3*			
Greenhouse Gas Emissions	Emission of gases with Global Warming Potential due to natural gas well drilling and production.	*6.6*				Requires development of a GHG emissions impacts mitigation plan, requires development of a leak detection and repair program, and encourages participation in the USEPA's Natural Gas STAR program. Requires reduced emission completions where a pipeline is available.	*7.6.8*			
Naturally Occuring Radioactive Material (NORM)	Exposure of workers, the public, and the environment to harmful levels of radiation.	*6.8*				Outlines necessary monitoring work.	*7.8.2*			
						Requires NORM testing of discharged waste fluids and material in production tanks.	*7.8.2*			

RESOURCE	IMPACT	dSGEIS section	dSGEIS pp.	GEIS sec.	GEIS pp.	MITIGATING MEASURE	dSGEIS section	dSGEIS pp.	GEIS sec.	GEIS pp.
Visual Impacts	Temporary new landscape features at well pads, new offsite facilities, congested appearance of campsites and staging areas, increase in specialized traffic.	*6.9*		*16.B.2.e*	*16-8*	Permit conditions would require operation consistent with a visual impacts mitigation plan. Site-specifc assessment could result in additional design and siting requirements.	*7.9*			
Noise	Temporary impacts but could occur on 24-hour basis. Potential 37-42 dB increase over quietest background at 2,000 feet during drilling and hydraulic fracturing. Increased traffic noise near well pad. Noise along approach and departure corridors from increased airplan service.	*6.10*		*16.B*	*16-2*	Operator must submit and adhere to a noise impacts mitigation plan. Site-specific assessment could result in specific mitigating permit conditions.	*7.10*		*17.B.1.b*	*17-4*
Transportation	Increased traffic on roadways; damage to local roads, bridges and other infrastructure; damage to state roads, bridges and other infrastructure; increased number of breakdowns and other accidents; risk of potentially hazardous spills; traffic impacts near rail centers.	*6.11*				Potential for road use agreements between operators and municipalities. Requirement to file a transportation plan that includes prposed routes and a road condition assessment. Site-specific assessment could result in additional traffic safety requirements, first responder emergency response training or avoidance of sensitive locations for trucks carrying hazardous materials.	*7.11*			
Socioeconomic & Community Character	Positive impacts on employment and income; increased economic activity; potential localized housing shortages; positive and negative impacts on state and government spending; increased tax revenues and production royalties; increased demand for local services; potential changes in the economic, demographic and social characteristics of affected communities that could be viewed as negative by some and positive by others.	*6.8 & 6.12*		*16.B.2.h*	*16-10..11*	This section will be updated after July 31, 2011.	*7.8 & 7.12*			

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New York State

DEC

Glossary

Updated August 2011

Revised Draft
Supplemental Generic Environmental Impact Statement

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Term	Definition
Access Road:	A road constructed to the wellsite that provides access during the drilling and operation of the well.
Accumulator:	The storage device for nitrogen pressurized hydraulic fluid, which is used in operating the blowout preventers.
AERMOD:	American Meteorological Society's and USEPA's Regulatory Model recommended by EPA for regulatory dispersion modeling.
AGC/SGC:	Annual Guideline Concentrations and Short-term Guideline Concentration defined in DAR-1 (Air Guide 1) procedures.
ALJ:	Administrative Law Judge.
Anaerobic:	Living or active in the absence of free oxygen.
Annular Space or Annulus:	Space between casing and the wellbore, or between the tubing and casing or wellbore, or between two strings of casing.
ANSS:	USGS's Advanced National Seismic System.
Anticline:	A fold with strata sloping downward on both sides from a common crest.
API:	American Petroleum Institute.
API Number:	A number referencing system designed by the American Petroleum Institute to identify wells; each state and county has a specific number code.
Aquifer:	A zone of permeable, water saturated rock material below the surface of the earth capable of producing significant quantities of water.
ARD (Acid Rock Drainage):	Refers to the outflow of acidic water from (usually abandoned) metal mines or coal mines. Acid rock drainage occurs naturally within some environments as part of the rock weathering process, usually within rocks containing an abundance of sulfide minerals.
AST:	Above-ground storage tank.
Bactericides:	Also known as a "Biocide." An additive that kills bacteria.
Barrel:	A volumetric unit of measurement equivalent to 42 U.S. gallons.
bbl:	Barrel.
bbl/yr:	Barrels per year.
Bcf:	Billion cubic feet. A unit of measurement for large volumes of gas.
Bentonite:	A natural clay, used as a cement or mud additive for its expansive characteristics and/or its tendency to not separate from water.
Berm:	A mound or wall of earth or sand.
Biocides:	See definition for "Bactericides".
Blending Unit or Blender:	The equipment used to prepare the slurries and gels commonly used in stimulation treatments.
Blooie Line:	Pipe that diverts fluids from the wellbore to a reserve pit.
Blowout:	An uncontrolled flow of gas, oil or water from a well, during drilling when high formation pressure is encountered.
BMP:	Best Management Practices.
BOD:	Biochemical (or biological) oxygen demand.

Term	Definition
BOP:	Blowout Preventer. A device attached immediately above the casing which can be closed and shut off the hole should a blowout occur.
Borehole:	See wellbore.
Breaker:	A chemical used to reduce the viscosity of a fluid (break it down) after the thickened fluid has finished the job it was designed for.
Brine Disposal Well:	A well (Class IID) for subsurface injection of associated produced brines from oil, gas and underground gas storage operations, or a well (Class V) for disposal of spent brine from geothermal and solution mining operations.
Brine:	A solution containing appreciable amounts of NaCl and/or other salts. Synonymous with salt water.
BTEX:	Benzene, Toluene, Ethylbenzene, and Xylene. These are all aromatic hydrocarbons.
BUD:	Beneficial Use Determination issued by NYSDEC's Division of Materials Management.
Buffer Zone:	An area designed to protect and separate an activity from things around it.
C&D:	Construction and demolition.
CAA:	Clean Air Act.
Cable Tool:	Equipment (rig) for cable-tool drilling consisting of a heavy metal bar sharpened to a chisel-like point and attached to a cable. The gravity impact of the heavy metal bar (bit) pulverizes the rock which is removed with a bailer.
Caliper Log:	A log that is used to check for any wellbore irregularities. It is run prior to primary cementing as a means of calculating the amount of cement needed. Also run in conjunction with other open-hole logs for log corrections.
Carbonate:	A salt of carbonic acid, CO_3^{-2}.
Carcinogen:	Cancer causing substance.
CAS Number:	Chemicals Abstract Service number, assigned by Chemical Abstracts Service, which is part of the American Chemical Society. The CAS registry is the most authoritative collection of disclosed chemical substance information, containing more than 48 million organic and inorganic substances and 61 million sequences.
Casing:	Steel pipe placed in a well.
Casing Shoe:	Reinforcing collar screwed onto the bottom of surface casing that guides the casing through the hole while absorbing the brunt of the shock.
Cation:	A positively charged ion.
CBS:	Chemical Bulk Storage.
CEA:	Critical Environmental Area.
Cement Bond Log:	A log used to evaluate the effectiveness of a primary cement job based on the different responses of sound waves in metal pipe and cement. It can also be used to locate channels in the cement.
Cement Sheath:	A protective covering around the casing, segregates the producing formation and prevents undesirable migration of fluid.
CFR:	Code of Federal Regulations.
cfs:	Cubic feet per second.

Term	Definition
CH_4:	Methane.
Chemical Additive:	A product composed of one or more chemical constituents that is added to a primary carrier fluid to modify its properties in order to form hydraulic fracturing fluid.
Chemical Constituent:	A discrete chemical with its own specific name or identity, such as a CAS Number, which is contained within an additive product.
Choke:	A device with an orifice installed in a line to restrict the flow of fluids.
Choke Manifold:	The arrangement of piping and special valves, called chokes, through which drilling mud is circulated when the blowout preventers are closed to control the pressures encountered during a kick.
Circulation:	The round trip made by the well fluids from the surface down the tubing, wellbore or casing, and then back to the surface.
Class GSB Water:	The best usage of Class GSB waters is as a receiving water for disposal of wastes. Class GSB waters are saline groundwaters that have a chloride concentration in excess of 1,000 milligrams per liter or a total dissolved solids concentration in excess of 2,000 milligrams per liter.
Clastic:	Rock consisting of fragments of rocks that have been transported from other places.
Clay Stabilizer/Clay Inhibitor:	A chemical additive used in stimulation treatments to prevent the migration and/or swelling of clay particles.
Closed Loop Drilling System:	A pitless drilling system where all drilling fluids and cuttings are contained at the surface within piping, separation equipment and tanks.
CO:	Carbon monoxide.
CO_2:	Carbon Dioxide.
CO_2e:	Carbon Dioxide equivalents.
COGCC:	Colorado Oil and Gas Conservation Commission.
Completion:	Preparation of a well for production after it has been drilled to the objective formation and in the case of a dry hole, preparation of a well for plugging and abandonment.
Compressive Strength:	Measure of the ability of a substance to withstand compression.
Compressor Stations:	Facilities which increase the pressure on natural gas to move it in pipelines or into storage.
Compulsory Integration:	New York's Environmental Conservation Law (Article 23, Titles 5 and 9 as amended by Chapter 386 of the Laws of 2005) gives all property owners the opportunity to recover or receive the gas beneath their property. To protect these "correlative rights," the Department of Environmental Conservation may establish spacing units whenever necessary. Compulsory integration is required when any owner in a spacing unit does not voluntarily integrate their interests with those of the unit operator. Compensation to the compulsory integrated interests will be established by a DEC Commissioner's Order after a public hearing.
Condensate:	Liquid hydrocarbons that were originally in the reservoir gas and are recovered by surface separation.
Conductor Hole:	The hole for conductor pipe or casing.
Conductor Pipe or Casing:	Large diameter casing that is usually the first string of casing in a well. Set or driven into the unconsolidated material where the well will be drilled to keep loose material from caving in. Usually relatively short in length.
Correlative Rights:	Rights of any mineral owner to recover resources that underlay their property.

Term	Definition
Corrosion Inhibitor:	A chemical substance that minimizes or prevents corrosion in metal equipment.
CRDPF:	Continuously Regenerating Diesel Particulate Filter.
Crosslinkers:	A compound, typically a metallic salt, mixed with a base-gel fluid, such as a guar-gel system, to create a viscous gel used in some stimulation or pipeline cleaning treatments. The crosslinker reacts with the multiple-strand polymer to couple the molecules, creating a fluid of high viscosity.
CT:	coiled tubing.
Cubic Foot:	Unit of measurement of the volume of gas contained in one cubic foot of space at a standard pressure (14.73 psi) and standard temperature (60° F).
Cuttings or Samples:	Chips of rock cut by the drill bit and brought to the surface by the drilling fluid. They indicate to the wellsite workers what kind of rocks are being penetrated and can also indicate the presence of oil or gas.
CWA:	Clean Water Act.
CWF:	Cold-Water Fishery (waters).
CWS:	Community water systems.
CZM:	Coastal Zone Management.
DAR:	Division of Air Resources in the NYS Department of Environmental Conservation.
DAR-1 (Air Guide-1):	Division of Air Resources program policy guidelines for the control of toxic air contaminants.
Dehydrator:	A device used to remove water and water vapors from gas.
Department:	New York State Department of Environmental Conservation.
De-sander:	A centrifugal device for removing sand from drilling fluid to prevent abrasion of the pumps. It may be operated mechanically or by a fast-moving stream of fluid inside a special cone-shaped vessel, in which case it is sometimes called a hydrocyclone.
De-silter:	A centrifugal device used to remove very fine particles, or silt, from drilling fluid.
Devonian Period:	Period of geologic time from 415 to 360 million years ago.
Diesel-Based Hydraulic Fracturing:	Hydraulic fracturing using diesel as the primary carrier.
Dip:	Angle of inclination from the horizontal.
Dipole Sonic Log:	A type of acoustic log that displays travel time of P-waves versus depth.
Disconformity:	A surface of erosion between parallel rock strata or a contact between two discordant structures (e.g., a dike emplaced within a layered sedimentary rock unit).
Disposal Well:	A well into which waste fluids can be injected deep underground for safe disposal.
DMM:	Division of Materials Management in the NYS Department of Environmental Conservation.
DMN:	Division of Mineral Resources in the NYS Department of Environmental Conservation.
DMR:	Division of Marine Resources in the NYS Department of Environmental Conservation.
Doghouse:	A small enclosure on the rig floor used as an office and/or as a storehouse for small objects. Also, any small building used as an office or for storage.
DOH:	(New York State) Department of Health.
DOW:	Division of Water in the NYS Department of Environmental Conservation.
DMV:	(New York State) Department of Motor Vehicles.

Term	Definition
DPS:	(New York State) Department of Public Service.
DRA:	Division of Regulatory Affairs in the NYS Department of Environmental Conservation.
DRBC:	Delaware River Basin Commission.
Drilling Fluid:	Mud, water, or air pumped down the drill string which acts as a lubricant for the bit and is used to carry rock cuttings back up the wellbore. It is also used for pressure control in the wellbore.
Drive Pipe:	See definition for "Conductor Casing".
Dry Hole:	Any well that does not produce oil or gas in commercial quantities.
DSHM:	Division of Solid and Hazardous Materials in the NYS Department of Environmental Conservation.
E&P:	Exploration and Production.
EAF:	Environmental Assessment Form.
ECL:	Environmental Conservation Law.
Ecosystem:	The system composed of interacting organisms and their environments.
EDR:	Electrodialysis Reversal.
Effluent:	Something that flows out, in particular a waste material such as an industrial discharge.
EIS:	Environmental Impact Statement.
EM&CP:	Environmental Management and Construction Plan.
EM&CS&P:	Environmental Management and Construction Standards and Practices.
Entrainment:	The condition of being drawn into something and transported with it, for example, gas bubbles in cement.
EO 41:	Executive Order 41.
EPA:	(U.S.) Environmental Protection Agency.
EPCRA:	Emergency Planning and Community Right to Know Act of 1986.
ERP:	Emergency Response Plan.
EUR:	Estimated ultimate recovery.
EV:	Exceptional Value (waters).
Evaporite:	Sedimentary rock or mineral deposits formed from the extensive or total evaporation of seawater.
FAA:	(U.S.) Federal Aviation Administration.
FAD:	Filtration Avoidance Determination.
Fault:	A fracture or fracture zone along which there has been displacement of the sides relative to each other.
Field:	The general area underlain by one or more pools.
Flare:	The burning of unwanted gas through a pipe.
Flocculant:	A chemical added to a fluid to cause unwanted particles, such as clay, to clump together for easier removal.
Floodplain:	Level land built up by stream deposition (past floods) that may be subject to future flooding.
Flowback Fluids:	Liquids produced following drilling and initial completion and clean-up of the well.
Flowmeter:	An instrument that measures fluid flow rates.
Flue Gas:	An exhaust gas coming out of a pipe or stack.
FMCSA:	Federal Motor Carrier Safety Administration.

Term	Definition
Foaming Agents:	An additive used to make foam in a drilling fluid.
Fold:	A bend in rock strata.
Footwall:	The mass of rock beneath a fault plane.
Formation:	A rock body distinguishable from other rock bodies and useful for mapping or description. Formations may be combined into groups or subdivided into members.
Fossil:	A record of ancient life.
Fracing (pronounced “fracking”):	See definition for "Hydraulic Fracturing".
Freeboard:	The height above the recorded high-water mark of a structure associated with the water. In the case of pits, the extra depth left unused to prevent any chance of overflow.
Friction Reducers/Friction Reducing Agent:	Chemical additives which alter the hydraulic fracturing fluid allowing it to be pumped into the target formation at a higher rate & reduced pressure.
FTIR:	Fourier-transform Infrared.
Gamma Ray Log:	Log that records natural gamma radiation of the formations. Shales can be identified because of their high natural gamma radiation content.
Gas Gathering:	The collection and movement of raw gas from the wellhead to an acceptance point of a transportation pipeline.
Gas Meter:	An instrument for measuring and indicating, or recording, the volume of natural gas that has passed through it.
Gas-Water Separator:	A device used to separate undesirable water from gas produced from a well.
GEIS:	Generic Environmental Impact Statement.
Gelling Agents:	Polymers used to thicken fluid so that it can carry a significant amount of proppants into the formation.
Geomembrane:	Man-made polymeric membrane (flexible membrane) that is manufactured to be essentially impermeable and is used to build containment pits.
Geothermal Well:	A well drilled to explore for or produce heat from the subsurface.
GHG:	Greenhouse gas.
gpd:	Gallons per day.
gpm:	Gallons per minute.
GRI:	Gas Research Institute.
Groundwater:	Water in the subsurface below the water table. Groundwater is held in the pores of rocks, and can be connate, from meteoric sources, or associated with igneous intrusions.
Groundwater Hydrology:	The science of the occurrence, distribution, and movement of water below the surface of the earth.
Grout:	A concrete mixture placed into a well annulus from the surface; also, the process of emplacing such mixture.
GWP:	Global warming potential.
GWPC:	Ground Water Protection Council.
H_2SO_4:	Sulfuric acid.
HAPS:	Hazardous Air Pollutants as defined under the Clean Air Act.
Hardpan:	A hard impervious layer of soil composed chiefly of clay cemented by relatively insoluble materials.
HDPE:	High-density polyethylene. This plastic is resistant to most chemicals, insoluble in organic solvents, and has high impact and tensile strength.

Term	Definition
High-Volume Hydraulic Fracturing:	The stimulation of a well using 300,000 gallons or more of water as the base fluid in fracturing fluid.
HMTA:	Hazardous Material Transportation Act.
HMTUSA:	Hazardous Materials Transportation Uniform Safety Act.
Horizontal Drilling:	Deviation of the borehole from vertical so that the borehole penetrates a productive formation in a manner parallel to the formation.
Horizontal Leg:	The part of the wellbore that deviates significantly from the vertical; it may or may not be perfectly parallel with formational layering.
HQ:	High Quality (waters).
Hydraulic Conductivity:	A property of a soil or rock, that describes the ease with which water can move through pore spaces or fractures. It is dependent upon the intrinsic permeability of the material and on the degree of saturation.
Hydraulic Fracturing:	The act of pumping hydraulic fracturing fluid into a formation to increase its permeability.
Hydraulic Fracturing Fluid:	Fluid used to perform hydraulic fracturing; includes the primary carrier fluid and all applicable additives.
Hydrocarbons:	Organic compounds of hydrogen and carbon whose densities, boiling points, and freezing points increase as their molecular weights increase. Although composed of only two elements, hydrocarbons exist in a variety of compounds, because of the strong affinity of the carbon atom for other atoms and for itself. The smallest molecules of hydrocarbons are gaseous; the largest are solids. Petroleum is a mixture of many different hydrocarbons.
Hydrocyclone:	A device to classify, separate or sort particles in a liquid suspension based on the densities of the particles. A hydrocyclone may be used to separate solids from liquids or to separate liquids from different density.
Hydrogen Sulfide or H_2S:	A malodorous, toxic gas with the characteristic odor of rotten eggs.
ICE:	Internal Combustion Engines.
ICF:	ICF International, a consulting firm.
Igneous Rock:	Rock formed by solidification from a molten or partially molten state (magma).
Infill Wells:	Wells drilled between known producing wells to better exploit the reservoir.
Infrastructure:	The system of public works of a country, state, or region. It can also refer to the resources (as personnel, buildings, or equipment) required for an activity.
Injectate:	Injectate is any substance injected down a well.
Injection Well:	A well through which fluids are injected into an underground stratum to increase reservoir pressure and to displace oil. Also called an input well.
Injection Zone:	A geological formation, group of formations, or part of a formation that receives fluids through a well.
Intermediate Casing or String:	Casing set below the surface casing in deep holes where added support or control of the wellbore is needed. It goes between the surface casing and the conductor casing. In very deep wells, more than one string of intermediate casing may be used.
IOGA-NY:	Independent Oil and Gas Association of New York.
IOGCC:	Interstate Oil and Gas Compact Commission.
Iron Inhibitors:	Chemicals used to bind the metal ions and prevent a number of different types of problems that the metal can cause (for example, scaling problems in pipe).

Term	Definition
ITR:	Injection Timing Retard.
Joule-Thompson Effect:	Referring to the change in temperature observed when a gas expands while flowing through a restriction without any heat entering or leaving the system. The change may be positive or negative. The Joule-Thomson effect often causes a temperature decrease as gas flows through pores of a reservoir to the wellbore.
km:	Kilometer.
KML:	Keyhole Markup Language.
LCSN:	Lamont-Doherty Cooperative Seismographic Network.
LDAR:	Leak detection and repair.
LDCs:	Local Distribution Companies.
Limestone:	A sedimentary rock consisting chiefly of calcium carbonate ($CaCO_3$).
Lithologic:	Referring to the physical characteristics of rocks or sediment that can be determined with the human eye.
Log:	A systematic recording of data, such as a driller's log, mud log, electrical well log, or radioactivity log. Many different logs are run in wells to discern various characteristics of rock formations that the wellbore passes through.
Lost Circulation:	The quantities of drilling fluid lost to a formation, usually in cavernous, pressured, or coarsely permeable beds, evidenced by complete or partial failure of the mud to return to the surface as it is being circulated in the hole.
Lost Circulation Material:	Material put into fluids to block off the permeability of a lost circulation zone.
Lost Circulation Zone:	Formation that is so permeable or soluble that it diverts the flow of fluids from the well.
Low-Permeability Gas Reservoirs:	Gas bearing rocks (which may or may not contain natural fractures) which exhibit in-situ gas permeability of less than 0.10 milidarcies.
LPG:	Liquefied Petroleum Gas.
LWRP:	Local Waterfront Revitalization Program.
Manifold:	An arrangement of piping or valves designed to control, distribute and often monitor fluid flow.
Marcellus Well:	A well for which the operator designates the Marcellus Shale as the objective formation.
Mcf:	Thousand cubic feet.
MCL, MCLG:	Maximum Contaminant Level, Maximum Contaminant Level Goal.
md:	Millidarcy.
Methane:	Methane (CH_4) is a greenhouse gas that remains in the atmosphere for approximately 9-15 years. Methane is also a primary constituent of natural gas and an important energy source.
Microseisms (or microseismic events):	Small bursts of seismic energy generated by shear slippages along planes of weakness in the reservoir and surrounding layers which are induced by changes in stress and pore pressure around the hydraulic fracture. These microseisms are extremely small, and sensitive receiver systems are required.
Micro-annulus (plural is micro-annuli):	A small gap that can form between the casing or liner and the surrounding cement sheath, most commonly formed by variations in temperature or pressure during or after the cementing process.
mg/L:	milligrams per liter.

Term	Definition
Mineral Rights:	The ownership of the minerals under a given surface, with the right to enter and remove them. It may be separated from the surface ownership.
MMcf:	Million cubic feet.
MMcf/d:	Million cubic feet per day.
MOVES:	Motor Vehicle Emission Simulator.
mR/hr:	Milliroentgens per hour.
MSC:	Marcellus Shale Coalition.
MSDS:	Material Safety Data Sheet. A written or printed document which is prepared in accordance with 29 CFR 1910.1200(g).
MSGP:	Multi-Sector General Permit.
MSW:	Municipal solid waste.
Mudlogging (Unit):	Trailer located at the wellsite housing equipment and personnel to progressively analyze wellbore cuttings washed up from the borehole. A portion of the mud is diverted through a gas-detecting device.
NAAQS and AAQS:	National or State Ambient Air Quality Standards for criteria pollutants.
Native Gas:	Gas originally in place in an underground formation. Term is usually associated with gas storage.
NCWS:	Non-community water systems.
NESHAPs:	National Emission Standards for Hazardous Air Pollutants.
NFRM:	Natural Flow Regime Method.
NGPA:	Natural Gas Policy Act of 1978.
NH_3:	Ammonia.
NMHC:	Non-methane hydrocarbons.
NNSR:	Nonattainment New Source Review.
NOI:	Notice of Intent.
Noise Log:	A record of the sound vibrations in the wellbore caused by flowing liquid or gas. Used to determine fluid entry points or flow behind casing.
Non-Darcy Flow:	Fluid flow that deviates from Darcy's law, which assumes laminar flow in the formation. Non-Darcy flow is typically observed in high-rate gas wells when the flow converging to the wellbore reaches flow velocities exceeding the Reynolds number for laminar or Darcy flow, and results in turbulent flow.
Nonwetting Phase:	The pore space fluid which is not attached to the reservoir rock and thus has the greatest mobility.
N_2O:	Nitrous Oxide.
NO_2:	Nitrogen Dioxide.
NORM - Naturally Occurring Radioactive Materials:	Low-level radioactivity that can exist naturally in native materials, like some shales and may be present in drill cuttings and other wastes from a well.
Non-Indigenous:	Not having originated in and being produced, growing, living, or occurring naturally in a particular region or environment.
Normalized Pressure Integral Curve Analysis:	Another type of Decline or Type Curve Analysis (see).
NPDES:	National Pollutant Discharge Elimination System.

Term	Definition
NSCR:	Non-Selective Catalytic Reduction.
NSPS:	New Source Performance Standards.
NTNC:	Non- transient non-community.
NWS:	National Weather Service.
NYCDEP:	New York City Department of Environmental Protection.
NYCRR:	New York Codes of Rules and Regulations.
NYSDAM:	New York State Department of Agriculture and Markets.
NYSDOH:	New York State Department of Health.
NYSDOT:	New York State Department of Transportation.
NYSERDA:	New York State Energy Research and Development Authority.
O_3:	Ozone.
Operator:	Any person or organization in charge of the development of a lease or drilling and operation of a producing well.
OPRHP:	(NY State) Office of Parks, Recreation and Historic Preservation.
Ordovician Period:	Period of geologic time from 520 to 465 million years ago.
PADEP:	Pennsylvania Department of Environmental Protection.
Paleozoic Era:	Large block of geologic time from 570 to 225 million years ago; beginning marked by the appearance of abundant fossils. Most of the bedrock in New York State was formed (deposited) during the Paleozoic.
Parameter:	A characteristic of a model of a reservoir that may or may not vary with respect to position or with time. (e.g., porosity is a petrophysical parameter (or characteristic) that varies with position).
Partial Reclamation:	The reclamation of a well site following completion of a well and in the case of multi-well pad, completion of the last well on the multi-well pad. This includes the reclamation of pits, regarding of lands and the revegetation of lands outside the well pad.
Passby Flow Requirement:	A prescribed quantity of flow that must be allowed to pass an intake when withdrawal is occurring. Passby requirements also specify low- flow conditions during which no water can be withdrawn.
Pathogens:	A specific causative agent (as a virus or bacterium).
PBS:	Petroleum Bulk Storage.
PCC:	Pre-ignition Chamber Combustion.
Pennsylvanian Period:	Period of geologic time from 310 to 280 million years ago.
Percolation Test:	Test to determine at what rate fluids will pass through soil.
Perennial Stream:	A stream channel that has continuous flow in parts of its bed all year round during years of normal rainfall.
Perforate:	To make holes through the casing to allow the oil or gas to flow into the well or to squeeze cement behind the casing.
Perforation:	A hole created in the casing to achieve efficient communication between the reservoir and the wellbore.
Permeability:	A measure of a material's ability to allow passage of gas or liquid through pores, fractures, or other openings. The unit of measurement is the millidarcy.
Permeable:	Able to transmit gas or liquid through interconnected pores, fractures, or other openings.

Term	Definition
Petroleum:	In the broadest sense the term embraces the full spectrum of hydrocarbons (gaseous, liquid, and solid).
PHMSA:	Pipeline and Hazardous Materials Safety Administration.
PID:	Perforation Inflow Diagnostic.
Pipe Racks:	Horizontal supports for storing tubular goods.
Plat:	A map of land parcels; a drafted map of a site's location showing boundaries of adjoining parcels.
Plug Back:	To place cement in or near the bottom of a well to exclude bottom water, to sidetrack, or to produce from a formation higher in the well. Plugging back can also be accomplished with a mechanical plug set by wireline, tubing, or drill pipe.
Plugged and Abandoned:	(plug and abandon) To prepare a well to be closed permanently with cement plugs, usually after either logs determine there is insufficient hydrocarbon potential to complete the well, or after production operations have drained the reservoir.
PM10 and PM2.5:	Particulate matter with sizes of less than 10 and 2.5 microns, respectively.
Pneumatic:	Run by or using compressed air.
POC:	Principal Organic Contaminant.
Poisson's ratio:	An elastic constant that is a measure of the compressibility of material perpendicular to applied stress, or the ratio of latitudinal to longitudinal strain. Named for French mathematician Simeon Poisson (1781 to 1840).
Polymer:	Chemical compound of unusually high molecular weight composed of numerous repeated, linked molecular units.
Pool:	An underground reservoir containing a common accumulation of oil and/or gas. Each zone of a structure which is completely separated from any other zone in the same structure is a pool.
Porosity:	Volume of pore space expressed as a percent of the total bulk volume of the rock.
Potable Fresh Water:	Suitable for drinking by humans and containing less than 250 ppm of sodium chloride or 1,000 ppm TDS.
POTW:	Publicly Owned Treatment Works.
ppb:	Parts per billion.
ppm:	Parts per million.
Precambrian Era:	Very large block of geologic time spanning from Earth's formation to the 4,500 to 570 million years ago.
Pressure Buildup Test:	An analysis of data obtained from measurements of the bottomhole pressure in a well that is shut-in after a flow period. The profile created on a plot of pressure against time is used with mathematical reservoir models to assess the extent and characteristics of the reservoir and the near-wellbore area.
Primary Aquifer:	A highly productive aquifer presently being utilized as a source of water supply by a major municipal supply system.
Primary Carrier Fluid:	The base fluid, such as water, into which additives are mixed to form the hydraulic fracturing fluid which transports proppant.
Primary Production:	Production of a reservoir by natural energy in the reservoir.
Principal Aquifer:	An aquifer known to be highly productive or whose geology suggests abundant potential water supply, but which is not intensively used as a source of water supply by a major municipal system.

Term	Definition
Principal Stresses:	Forces per unit area acting on the external surface of a solid body.
Product:	A hydraulic fracturing fluid additive that is manufactured using precise amounts of specific chemical constituents and is assigned a commercial name under which the substance is sold or utilized.
Production Casing:	Casing set above or through the producing zone through which the well produces.
Production Brine:	Liquids co-produced during oil and gas wells production.
Proppant or Propping Agent:	A granular substance (sand grains, aluminum pellets, or other material) that is carried in suspension by the fracturing fluid and that serves to keep the cracks open when fracturing fluid is withdrawn after a fracture treatment.
PSC:	Public Service Commission.
PSD:	Prevention of Significant Deterioration defined in the Clean Air Act.
PSI:	Pounds per square inch.
PSIG:	Pounds per Square Inch Gauge.
PSL:	Public Service Law.
Public Water Supply:	Either a community or non-community well system which provides piped water to the public for human consumption if the system has a minimum of five (5) service connections, or regularly serves a minimum average of 25 individuals per day at least 60 days per year.
PTE:	Potential to Emit.
Pump and Plug Method:	A technique for placing cement plugs at appropriate intervals.
PVC:	Polyvinylchloride; a durable petroleum derived plastic.
RACT:	Reasonably Available Control Technology.
Radial Cement Bond Log:	A record of sonic amplitudes derived from acoustic signals passing along the well casing. Used to evaluate cement-to-pipe and cement-to-formation bonding.
RCRA:	Resource Conservation and Recovery Act.
Real Property:	Includes mineral claims, surface and water rights.
REC:	Reduced Emissions Completion.
Reclaimed:	(Reclamation) Rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves regrading, replacement of topsoil, re-vegetation, and other work necessary to restore it.
Remediation:	The removal of pollution or contaminants from the environmental media such as soil, groundwater, or surface water.
Reserve pit:	A mud pit in which a supply of drilling fluid has been stored. Also, a waste pit, usually an excavated, earthen-walled pit. In NY it is required to be lined with plastic to prevent soil contamination.
Reservoir (oil or gas):	A subsurface, porous, permeable or naturally fractured rock body in which oil or gas has accumulated. A gas and production is only gas plus fresh water that condenses from the flow stream reservoir. In a gas condensate reservoir, the hydrocarbons may exist as a gas, but, when brought to the surface, some of the heavier hydrocarbons condense and become a liquid.
Reservoir (water):	Any man-made structure used to supply fresh water to the public.
Reservoir Rock:	A rock that may contain oil or gas in appreciable quantity and through which petroleum may migrate.

Term	Definition
RO:	Reverse Osmosis.
Rotary Rig:	A derrick equipped with rotary equipment where a well is drilled using rotational movement.
Royalty:	The landowner's share of the value of oil and gas produced.
Run-Off:	The portion of precipitation on land that ultimately reaches streams sometimes with dissolved or suspended material.
Sandstone:	A variously colored sedimentary rock composed chiefly of sandlike quartz grains cemented by lime, silica or other materials.
SAPA:	State Administrative Procedures Act.
Scale Inhibitor:	A chemical substance which prevents the accumulation of a mineral deposit (for example, calcium carbonate) that precipitates out of water and adheres to the inside of pipes, heaters, and other equipment.
SCR:	Selective Catalytic Reduction.
SDWA:	Safe Drinking Water Act.
SDWIS:	Safe Drinking Water Information System.
Sedimentary:	Rocks formed from sediment transported from their source and deposited in water or by precipitation from solution or from secretions of organisms.
Sedimentation Control:	(sedimentation) The process of separation of the components of a cement slurry during which the solids settle. Sedimentation is one of the characterizations used to define slurry stability.
Seep:	Natural leakage of gas or oil at the earth's surface.
SEIS:	Supplemental Environmental Impact Statement.
Seismic:	Related to earth vibrations produced naturally or artificially.
Separator:	Tank used to physically separate the oil, gas, and water produced simultaneously from a well.
SEQR:	Reference to the regulatory program or type of review done under SEQRA.
SEQRA:	State Environmental Quality Review Act.
Setback:	Minimum distance required between a well operation and other zones, boundaries, or objects such as highways, wetlands, streams, or houses.
SGC/AGC:	Short-term Guideline Concentration and Annual Guideline Concentrations defined in DAR-1 (Air Guide 1) procedures.
SGEIS:	Supplemental Generic Environmental Impact Statement.
Shale:	A thinly laminated claystone, siltstone or mud stone.
Shale Shaker:	A series of trays with sieves or screens that vibrate to remove cuttings from circulating fluid in rotary drilling operations. The size of the openings in the sieve is selected to match the size of the solids in the drilling fluid and the anticipated size of cuttings. Also called a shaker.
Shear Wave (S-wave):	Elastic body wave in which particles oscillate perpendicular to the direction in which the wave propagates. S-waves, or shear waves, travel more slowly than P-waves and cannot travel through fluids. Interpretation of S-waves can help determine rock properties.
Short Ton:	20 short hundred weight, 2,000 pounds.

Term	Definition
Show:	Small quantity of oil or gas, not enough for commercial production.
Shut In (Verb):	To close the valves at the wellhead to keep the well from flowing or to stop producing a well.
Shut-In (Adjective):	The state of a well which has been shut-in.
SI:	Spark Ignition.
Significant Habitats:	Areas which provide one or more of the key factors required for survival, variety or abundance of wildlife, and/or for human recreation associated with such wildlife.
SILs:	Significant Impact Levels for criteria pollutants.
Siltation:	The build-up of silt in a stream or lake as a result of activity that disturbs the streambed, bank, or surrounding land.
Siltstone:	Rock in which the constituent particles are predominantly silt size.
Silurian Period:	Period of geologic time from 405 to 415 million years ago.
SIP	State Implementation Plan
Slickwater Fracturing (or slick-water):	A type of hydraulic fracturing which utilizes water-based fracturing fluid mixed with a friction reducing agent & other chemical additives. The fluid is typically 98% fresh water & sand (proppant) & 2% or less chemical additives.
Slippage:	The phenomenon in multiphase flow when one phase flows faster than another phase, in other words slips past it. Because of this phenomenon, there is a difference between the holdups and cuts of the phases.
SO_2:	Sulfur dioxide.
SO_3	Sulfur trioxide.
Sonic Log:	See "Dipole Sonic Log".
Spacing Unit:	A surface area allotted to a well by regulations or field rules issued by a governmental authority having jurisdiction for the drilling and production of a well.
Spacing:	Distance separating wells in a field to optimize recovery of oil and gas.
SPDES:	State Pollutant Discharge Elimination System.
Spring:	A place where groundwater naturally flows from underground onto land or into a body of surface water.
Spudding:	The breaking of the earth's surface in the initial stage of drilling a well.
Squeeze:	Technique where cement is forced under pressure into the annular space between casing and the wellbore, between two strings of pipe, or into the casing-hole annulus.
SRBC:	Susquehanna River Basin Commission.
Stage:	Isolation of a specific interval of the wellbore and the associated interval of the formation for the purpose of maintaining sufficient fracturing pressure.
Stage Plug:	A device used to mechanically isolate a specific interval of the wellbore and the formation for the purpose of maintaining sufficient fracturing pressure.
Standpipe:	A vertical pipe rising along the side of the derrick or mast. It joins the discharge line leading from the mud pump to the rotary hose and through which mud is pumped going into the hole.
Stimulation:	The act of increasing a well's productivity by artificial means such as hydraulic fracturing, acidizing, and shooting.

Term	Definition
Stratigraphic Test Well:	A hole drilled to gather engineering, geologic or hydrological information including but not limited to lithology, structural, porosity, permeability and geophysical data.
Stratigraphy:	The study of rock layering, including the history, composition, relative ages and distribution of different rock units.
Stratum (plural strata):	Sedimentary rock layer, typically referred to as a formation, member, or bed.
Stream's Designated Best Use:	Each waterbody in NYS has been assigned a classification, which reflects the designated "best uses" of the waterbody. These best uses typically include the ability to support fish and aquatic wildlife, recreational uses (fishing, boating) and, for some waters, public bathing, drinking water use or shellfishing. Water quality is considered to be good if the waters support their best uses.
Substructure:	The foundation on which the derrick and drawworks sit. It contains space for storage and well-control equipment.
Surface Casing:	Casing extending from the surface through the potable fresh water zone.
Surface Impoundment:	A liquid containment facility that can be installed in a natural topographical depression, excavation, or bermed area formed primarily of earthen materials, then lined with a geomembrane or a combination of other geosynthetic materials.
Surfactants:	Chemical additives that reduce surface tension; or a surface active substance. Detergent is a surfactant.
SWPPP:	Stormwater Pollution Prevention Plan.
SWTR:	Surface Water Treatment Rule.
Target Formation:	The reservoir that the driller is trying to reach when drilling the well.
TCEQ:	Texas Commission on Environmental Quality.
Tcf:	Trillion cubic feet.
TD:	Total depth.
TDS:	Total Dissolved Solids. The dry weight of dissolved material, organic and inorganic, contained in water and usually expressed in mg/L or ppm.
TEG:	Triethylene Glycol.
Tensile Strength:	The force per unit cross-sectional area required to pull a substance apart.
Tight Formation:	Formation with very low permeability.
TMD:	Total measured depth.
TNC:	Transient non-community (in the context of water systems) or The Nature Conservancy.
TOC:	Total Organic Carbon.
Total Kjeldahl Nitrogen:	The sum of organic nitrogen; ammonium NH_3 and ammonia NH_4+ in water and soil analyses.
Tote:	A container used in the storage of various solid powder or liquid bulk products.
Trap:	Any geological barrier which restricts the migration of oil & gas.
TVD:	True vertical depth.
Turbidity:	Amount of suspended solids in a liquid.

Term	Definition
UA:	Urbanized areas.
UC:	Urban clusters.
UIC – Underground Injection Control:	A program administered by the Environmental Protection Agency, primacy state, or Indian tribe under the Safe Drinking Water Act to ensure that subsurface emplacement of fluids does not endanger underground sources of drinking water.
ULSF:	Ultra-Low Sulfur (Diesel) Fuel.
UN:	United Nations.
Unfiltered Surface Water Supplies:	Those that the U.S. EPA and NYSDOH have determined meet the requirements of the "Interim Enhanced Surface Water Treatment Rule" (IESWT Rule) for unfiltered water supply systems. The IESWT Rule is a December 16, 1998 amendment to the Surface Water Treatment Rule that was originally promulgated by EPA on June 29, 1989. In New York State, this includes the NYC Drinking Water Supply Watershed and the Skaneateles Drinking Water Supply Watershed.
UOC:	Unspecified Organic Contaminant.
USCG:	United States Coast Guard.
USDOT:	United States Department of Transportation.
USDW - Underground Source of Drinking Water:	An aquifer or portion of an aquifer that supplies any public water system or that contains a sufficient quantity of ground water to supply a public water system, and currently supplies drinking water for human consumption, or that contains fewer than 10,000 mg/L total dissolved solids and is not an exempted aquifer.
Water Well:	Any residential well used to supply potable water.
USEPA:	United States Environmental Protection Agency.
USGS:	United States Geological Survey.
Viscosity:	A measure of the degree to which a fluid resists flow under an applied force.
Vitrinite Reflectance:	A measurement of the maturity of organic matter with respect to whether it has generated hydrocarbons or could be an effective source rock.
VMT:	Vehicle Miles per Trip.
VOC:	Volatile Organic Compound.
Watershed:	The region drained by, or contributing water to, a stream, lake, or other body of water.
Well Location Plat:	A map of parcels of land with the proposed well and other features, particularly adjoining parcel boundaries.
Well Pad:	The area directly disturbed during drilling and operation of a gas well.
Wellbore:	A borehole; the hole drilled by the bit. A wellbore may have casing in it or it may be open (uncased); or part of it may be cased, and part of it may be open.
Wellhead:	The equipment installed at the surface of the wellbore. A wellhead includes such equipment as the casinghead and tubing head.
Well site:	Includes the well pad and access roads, equipment storage and staging areas, vehicle turnarounds, and any other areas directly or indirectly impacted by activities involving a well.
Wetland:	Any area regulated pursuant to Part 663.
Wildcat:	Well drilled to discover a previously unknown oil or gas pool or a well drilled one mile or more from a producing

Term	Definition
	well.
Wireline:	A general term used to describe well-intervention operations conducted using single-strand or multistrand wire or cable for intervention in oil or gas wells. Although applied inconsistently, the term commonly is used in association with electric logging and cables incorporating electrical conductors.
WMA:	Wildlife Management Area.
WOC Time:	"Waiting on cement" time. Pertaining to the time when drilling or completion operations are suspended so that the cement in a well can harden sufficiently.
Workover:	Repair operations on a producing well to restore or increase production.
ZLD:	Zero liquid discharge.
Zonal Isolation:	The state of keeping fluids in one zone separate from the fluids in another zone. In the case of a well, isolation is maintained by appropriate use of casing, cement, plugs and packers.
Zone:	A rock stratum of different character or fluid content from other strata.

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SGEIS Bibliography

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Supplemental Generic Environmental Impact Statement

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Appendices

REVISED DRAFT
Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program

Well Permit Issuance for Horizontal Drilling and
High-Volume Hydraulic Fracturing to
Develop the Marcellus Shale and Other
Low-Permeability Gas Reservoirs

New York State Department of Environmental Conservation

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[1] Updated/revised July 2011
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Appendix 1

FEMA
Flood Insurance Rate Map
Availability

Excerpted from Alpha Environmental, 2009
Updated by NYSDEC

Updated July 2011

Revised Draft
Supplemental Generic Environmental Impact Statement

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TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
ALBANY COUNTY	ALBANY, CITY OF	04/15/1980
ALBANY COUNTY	ALTAMONT, VILLAGE OF	08/15/1983
ALBANY COUNTY	BERNE,TOWN OF	08/01/1987 (L)
ALBANY COUNTY	BETHLEHEM, TOWN OF	04/17/1984
ALBANY COUNTY	COEYMANS, TOWN OF	08/03/1989
ALBANY COUNTY	COHOES, CITY OF	12/4/1979
ALBANY COUNTY	COLONIE, TOWN OF	09/05/1979
ALBANY COUNTY	GREEN ISLAND, VILLAGE OF	06/04/1980
ALBANY COUNTY	GUILDERLAND, TOWN OF	01/06/1983
ALBANY COUNTY	KNOX, TOWNSHIP OF	08/13/1982 (M)
ALBANY COUNTY	MENANDS, VILLAGE OF	03/18/1980
ALBANY COUNTY	NEW SCOTLAND, TOWN OF	12/1/1982
ALBANY COUNTY	RAVENA, VILLAGE OF	04/02/1982 (M)
ALBANY COUNTY	RENSSELAERVILLE, TOWN OF	08/27/1982 (M)
ALBANY COUNTY	VOORHEESVILLE, VILLAGE OF	12/1/1982
ALBANY COUNTY	WATERVLIET, CITY OF	01/02/1980
ALBANY COUNTY	WESTERLO, TOWN OF	08/03/1989
ALLEGANY COUNTY	ALFRED, TOWN OF	10/07/1983 (M)
ALLEGANY COUNTY	ALFRED, VILLAGE OF	02/15/1980
ALLEGANY COUNTY	ALLEN, TOWN OF	07/16/1982 (M)
ALLEGANY COUNTY	ALMA, TOWN OF	10/07/1983 (M)
ALLEGANY COUNTY	ALMOND, VILLAGE OF	02/15/1980
ALLEGANY COUNTY	AMITY, TOWN OF	12/18/1984
ALLEGANY COUNTY	ANDOVER, TOWN OF	03/02/1998
ALLEGANY COUNTY	ANDOVER, VILLAGE OF	04/02/1979
ALLEGANY COUNTY	ANGELICA, TOWN OF	12/31/1982 (M)
ALLEGANY COUNTY	ANGELICA, VILLAGE OF	02/01/1984
ALLEGANY COUNTY	BELFAST, TOWN OF	08/06/1982 (M)
ALLEGANY COUNTY	BELMONT, VILLAGE OF	12/18/1984
ALLEGANY COUNTY	BIRDSALL, TOWN OF	07/16/1982 (M)
ALLEGANY COUNTY	BOLIVAR, TOWN OF	07/30/1982 (M)
ALLEGANY COUNTY	BOLIVAR, VILLAGE OF	01/19/1996
ALLEGANY COUNTY	BURNS, TOWN OF	07/16/1982 (M)
ALLEGANY COUNTY	CANASERAGA, VILLAGE OF	12/02/1983 (M)
ALLEGANY COUNTY	CANEADEA, TOWN OF	08/20/1982 (M)
ALLEGANY COUNTY	CLARKSVILLE, TOWN OF	11/12/1982 (M)
ALLEGANY COUNTY	CUBA, TOWN OF	07/30/1982 (M)
ALLEGANY COUNTY	CUBA, VILLAGE OF	04/17/1978
ALLEGANY COUNTY	FRIENDSHIP, TOWN OF	12/18/1984
ALLEGANY COUNTY	GENESEE, TOWN OF	07/30/1982 (M)
ALLEGANY COUNTY	GRANGER, TOWN OF	10/07/1983 (M)
ALLEGANY COUNTY	GROVE, TOWN OF	11/6/1991

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
ALLEGANY COUNTY	HUME, TOWN OF	10/2/1997
ALLEGANY COUNTY	INDEPENDENCE, TOWN OF	07/09/1982 (M)
ALLEGANY COUNTY	NEW HUDSON, TOWN OF	08/20/1982 (M)
ALLEGANY COUNTY	RICHBURG, VILLAGE OF	01/05/1978
ALLEGANY COUNTY	RUSHFORD, TOWN OF	12/23/1983 (M)
ALLEGANY COUNTY	SCIO, TOWN OF	03/18/1985
ALLEGANY COUNTY	WARD,TOWN OF	(NSFHA)
ALLEGANY COUNTY	WELLSVILLE, TOWN OF	03/18/1985
ALLEGANY COUNTY	WELLSVILLE, VILLAGE OF	07/17/1978
ALLEGANY COUNTY	WEST ALMOND, TOWN OF	(NSFHA)
ALLEGANY COUNTY	WILLING, TOWN OF	12/24/1982 (M)
ALLEGANY COUNTY	WIRT, TOWN OF	06/25/1982 (M)
BROOME COUNTY	BARKER, TOWN OF	02/05/1992
BROOME COUNTY	BINGHAMTON, CITY OF	06/01/1977
BROOME COUNTY	BINGHAMTON, TOWN OF	01/06/1984 (M)
BROOME COUNTY	CHENANGO, TOWN OF	08/17/1981
BROOME COUNTY	COLESVILLE, TOWN OF	01/20/1993
BROOME COUNTY	CONKLIN, TOWN OF	07/17/1981
BROOME COUNTY	DICKINSON, TOWN OF	04/15/1977
BROOME COUNTY	ENDICOTT, VILLAGE OF	09/07/1998
BROOME COUNTY	FENTON, TOWN OF	08/03/1981
BROOME COUNTY	JOHNSON CITY, VILLAGE OF	09/30/1977
BROOME COUNTY	KIRKWOOD, TOWN OF	06/01/1977
BROOME COUNTY	LISLE, TOWN OF	08/20/2002
BROOME COUNTY	LISLE, VILLAGE OF	01/06/1984 (M)
BROOME COUNTY	MAINE, TOWN OF	02/05/1992
BROOME COUNTY	NANTICOKE, TOWN OF	12/18/1985
BROOME COUNTY	PORT DICKINSON, VILLAGE OF	05/02/1977
BROOME COUNTY	SANFORD, TOWN OF	06/04/1980
BROOME COUNTY	TRIANGLE, TOWN OF	07/20/1984 (M)
BROOME COUNTY	UNION, TOWN OF	09/30/1988
BROOME COUNTY	VESTAL, TOWN OF	03/02/1998
BROOME COUNTY	WHITNEY POINT, VILLAGE OF	01/06/1984 (M)
BROOME COUNTY	WINDSOR, TOWN OF	09/30/1992
BROOME COUNTY	WINDSOR, VILLAGE OF	05/18/1992
CATTARAUGUS COUNTY	ALLEGANY, TOWN OF	11/15/1978
CATTARAUGUS COUNTY	ALLEGANY, VILLAGE OF	12/17/1991
CATTARAUGUS COUNTY	ASHFORD, TOWNSHIP OF	05/25/1984
CATTARAUGUS COUNTY	CARROLLTON, TOWN OF	03/18/1983 (M)
CATTARAUGUS COUNTY	CATTARAUGUS, VILLAGE OF	04/20/1984 (M)
CATTARAUGUS COUNTY	COLD SPRING, TOWN OF	03/01/1978
CATTARAUGUS COUNTY	CONEWANGO, TOWN OF	07/30/1982 (M)

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
CATTARAUGUS COUNTY	DAYTON, TOWN OF	05/25/1984 (M)
CATTARAUGUS COUNTY	DELEVAN, VILLAGE OF	01/20/1984 (M)
CATTARAUGUS COUNTY	EAST OTTO, TOWN OF	04/20/1984 (M)
CATTARAUGUS COUNTY	EAST RANDOLPH, VILLAGE OF	02/01/1978
CATTARAUGUS COUNTY	ELLICOTTVILLE, TOWN OF	01/19/2000
CATTARAUGUS COUNTY	ELLICOTTVILLE, VILLAGE OF	05/02/1994
CATTARAUGUS COUNTY	FARMERSVILLE, TOWN OF	07/23/1982 (M)
CATTARAUGUS COUNTY	FRANKLINVILLE, TOWN OF	07/17/1978
CATTARAUGUS COUNTY	FRANKLINVILLE, VILLAGE OF	07/03/1978
CATTARAUGUS COUNTY	FREEDOM, TOWN OF	08/19/1991
CATTARAUGUS COUNTY	GREAT VALLEY, TOWN OF	07/17/1978
CATTARAUGUS COUNTY	HINSDALE, TOWN OF	01/17/1979
CATTARAUGUS COUNTY	HUMPHREY, TOWN OF	08/13/1982 (M)
CATTARAUGUS COUNTY	ISCHUA, TOWN OF	08/15/1978
CATTARAUGUS COUNTY	LEON, TOWN OF	08/13/1982 (M)
CATTARAUGUS COUNTY	LIMESTONE, VILLAGE OF	04/17/1978
CATTARAUGUS COUNTY	LITTLE VALLEY, TOWN OF	06/22/1984 (M)
CATTARAUGUS COUNTY	LITTLE VALLEY, VILLAGE OF	02/01/1978
CATTARAUGUS COUNTY	LYNDON, TOWN OF	07/16/1982 (M)
CATTARAUGUS COUNTY	MACHIAS, TOWN OF	08/20/1982 (M)
CATTARAUGUS COUNTY	MANSFIELD, TOWN OF	05/25/1984 (M)
CATTARAUGUS COUNTY	NAPOLI, TOWN OF	07/02/1982 (M)
CATTARAUGUS COUNTY	NEW ALBION, TOWN OF	12/03/1982 (M)
CATTARAUGUS COUNTY	OLEAN, CITY OF	05/09/1980
CATTARAUGUS COUNTY	OLEAN, TOWN OF	02/01/1979
CATTARAUGUS COUNTY	OTTO, TOWN OF	04/20/1984 (M)
CATTARAUGUS COUNTY	PERRYSBURG, TOWN OF	04/20/1984 (M)
CATTARAUGUS COUNTY	PERSIA, TOWN OF	04/20/1984 (M)
CATTARAUGUS COUNTY	PORTVILLE, TOWN OF	07/18/1983
CATTARAUGUS COUNTY	PORTVILLE, VILLAGE OF	04/17/1978
CATTARAUGUS COUNTY	RANDOLPH, TOWN OF	11/05/1982 (M)
CATTARAUGUS COUNTY	RANDOLPH, VILLAGE OF	08/01/1978
CATTARAUGUS COUNTY	SALAMANCA, CITY OF	04/17/1978
CATTARAUGUS COUNTY	SALAMANCA, TOWN OF	11/1/1979
CATTARAUGUS COUNTY	SOUTH DAYTON, VILLAGE OF	01/05/1978
CATTARAUGUS COUNTY	SOUTH VALLEY, TOWN OF	12/02/1983 (M)
CATTARAUGUS COUNTY	YORKSHIRE, TOWN OF	05/25/1984 (M)
CATTARAUGUS COUNTY/ERIE COUNTY/CHAUTAUQUA COUNTY/ALLEGANY COUNTY	SENECA NATION OF INDIANS	09/30/1988
CAYUGA COUNTY	AUBURN, CITY OF	08/02/2007
CAYUGA COUNTY	AURELIUS, TOWN OF	08/02/2007

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
CAYUGA COUNTY	AURORA, VILLAGE OF	08/02/2007
CAYUGA COUNTY	BRUTUS, TOWN OF	08/02/2007
CAYUGA COUNTY	CATO, TOWN OF	08/02/2007
CAYUGA COUNTY	CATO, VILLAGE OF	08/02/2007
CAYUGA COUNTY	CAYUGA, VILLAGE OF	08/02/2007
CAYUGA COUNTY	CONQUEST, TOWN OF	08/02/2007
CAYUGA COUNTY	FAIR HAVEN, VILLAGE OF	08/02/2007
CAYUGA COUNTY	FLEMING, TOWN OF	08/02/2007
CAYUGA COUNTY	GENOA,TOWN OF	08/02/2007
CAYUGA COUNTY	IRA, TOWN OF	08/02/2007
CAYUGA COUNTY	LEDYARD, TOWN OF	08/02/2007
CAYUGA COUNTY	LOCKE, TOWN OF	08/02/2007
CAYUGA COUNTY	MENTZ, TOWN OF	08/02/2007
CAYUGA COUNTY	MERIDIAN, VILLAGE OF	08/02/2007
CAYUGA COUNTY	MONTEZUMA, TOWN OF	08/02/2007
CAYUGA COUNTY	MORAVIA, TOWN OF	08/02/2007
CAYUGA COUNTY	MORAVIA, VILLAGE OF	08/02/2007
CAYUGA COUNTY	NILES, TOWN OF	08/02/2007
CAYUGA COUNTY	OWASCO, TOWN OF	08/02/2007
CAYUGA COUNTY	PORT BYRON, VILLAGE OF	08/02/2007
CAYUGA COUNTY	SCIPIO, TOWN OF	08/02/2007
CAYUGA COUNTY	SEMPRONIUS, TOWN OF	08/02/2007
CAYUGA COUNTY	SENNETT, TOWN OF	08/02/2007
CAYUGA COUNTY	SPRINGPORT, TOWN OF	08/02/2007
CAYUGA COUNTY	STERLING, TOWN OF	08/02/2007
CAYUGA COUNTY	SUMMER HILL, TOWN OF	08/02/2007
CAYUGA COUNTY	THROOP, TOWN OF	08/02/2007
CAYUGA COUNTY	UNION SPRINGS, VILLAGE OF	08/02/2007
CAYUGA COUNTY	VENICE, TOWN OF	08/02/2007
CAYUGA COUNTY	VICTORY, TOWN OF	08/02/2007
CAYUGA COUNTY	WEEDSPORT, VILLAGE OF	08/02/2007
CHAUTAUQUA COUNTY	ARKWRIGHT, TOWN OF	04/08/1983 (M)
CHAUTAUQUA COUNTY	BEMUS POINT, VILLAGE OF	11/2/1977
CHAUTAUQUA COUNTY	BROCTON, VILLAGE OF	(NSFHA)
CHAUTAUQUA COUNTY	BUSTI, TOWN OF	01/20/1993
CHAUTAUQUA COUNTY	CARROLL, TOWN OF	10/29/1982 (M)
CHAUTAUQUA COUNTY	CASSADAGA, VILLAGE OF	12/1/1977
CHAUTAUQUA COUNTY	CELORON, VILLAGE OF	03/18/1980
CHAUTAUQUA COUNTY	CHARLOTTE, TOWN OF	03/23/1984 (M)
CHAUTAUQUA COUNTY	CHAUTAUQUA, TOWN OF	06/15/1984
CHAUTAUQUA COUNTY	CHERRY CREEK, TOWN OF	07/02/1982 (M)
CHAUTAUQUA COUNTY	CHERRY CREEK, VILLAGE OF	02/15/1978

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
CHAUTAUQUA COUNTY	CLYMER, TOWN OF	10/07/1983 (M)
CHAUTAUQUA COUNTY	DUNKIRK, CITY OF	02/04/1981
CHAUTAUQUA COUNTY	DUNKIRK, TOWN OF	08/06/1982 (M)
CHAUTAUQUA COUNTY	ELLERY, TOWN OF	03/18/1980
CHAUTAUQUA COUNTY	ELLICOTT, TOWN OF	08/01/1984
CHAUTAUQUA COUNTY	ELLINGTON, TOWN OF	10/07/1983(M)
CHAUTAUQUA COUNTY	FALCONER, VILLAGE OF	01/05/1978
CHAUTAUQUA COUNTY	FORESTVILLE, VILLAGE OF	03/18/1983(M)
CHAUTAUQUA COUNTY	FREDONIA, VILLAGE OF	11/15/1989
CHAUTAUQUA COUNTY	FRENCH CREEK, TOWN OF	06/08/1984 (M)
CHAUTAUQUA COUNTY	GERRY, TOWN OF	01/06/1984 (M)
CHAUTAUQUA COUNTY	HANOVER, TOWN OF	12/18/1984
CHAUTAUQUA COUNTY	HARMONY, TOWNSHIP OF	12/01/1986 (L)
CHAUTAUQUA COUNTY	JAMESTOWN, CITY OF	06/01/1978
CHAUTAUQUA COUNTY	KIANTONE, TOWN OF	02/02/1996
CHAUTAUQUA COUNTY	LAKEWOOD, VILLAGE OF	11/2/1977
CHAUTAUQUA COUNTY	MAYVILLE, VILLAGE OF	01/05/1978
CHAUTAUQUA COUNTY	MINA, TOWN OF	01/02/2003
CHAUTAUQUA COUNTY	NORTH HARMONY, TOWN OF	02/15/1980
CHAUTAUQUA COUNTY	PANAMA, VILLAGE OF	03/01/1978
CHAUTAUQUA COUNTY	POLAND, TOWN OF	03/11/1983 (M)
CHAUTAUQUA COUNTY	POMFRET, TOWN OF	12/18/1984
CHAUTAUQUA COUNTY	PORTLAND, TOWN OF	10/07/1983 (M)
CHAUTAUQUA COUNTY	RIPLEY,TOWN OF	(NSFHA)
CHAUTAUQUA COUNTY	SHERIDAN, TOWN OF	10/07/1983 (M)
CHAUTAUQUA COUNTY	SHERMAN, VILLAGE OF	03/01/1978
CHAUTAUQUA COUNTY	SHERMAN,TOWN OF	01/06/1984 (M)
CHAUTAUQUA COUNTY	SILVER CREEK, VILLAGE OF	08/01/1983
CHAUTAUQUA COUNTY	SINCLAIRVILLE, VILLAGE OF	12/1/1977
CHAUTAUQUA COUNTY	STOCKTON, TOWN OF	10/21/1983 (M)
CHAUTAUQUA COUNTY	VILLENOVA, TOWN OF	05/21/1982 (M)
CHAUTAUQUA COUNTY	WESTFIELD, TOWN OF	06/08/1984 (M)
CHAUTAUQUA COUNTY	WESTFIELD, VILLAGE OF	10/07/1983 (M)
CHEMUNG COUNTY	ASHLAND, TOWN OF	01/16/1980
CHEMUNG COUNTY	BALDWIN, TOWN OF	07/23/1982 (M)
CHEMUNG COUNTY	BIG FLATS, TOWN OF	08/18/1992
CHEMUNG COUNTY	CATLIN, TOWN OF	06/22/1984 (M)
CHEMUNG COUNTY	CHEMUNG, TOWN OF	09/03/1980
CHEMUNG COUNTY	ELMIRA HEIGHTS, VILLAGE OF	09/29/1996
CHEMUNG COUNTY	ELMIRA, CITY OF	04/02/1997
CHEMUNG COUNTY	ELMIRA, TOWN OF	09/29/1996
CHEMUNG COUNTY	ERIN, TOWN OF	08/13/1982 (M)

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
CHEMUNG COUNTY	HORSEHEADS, TOWN OF	09/29/1996
CHEMUNG COUNTY	HORSEHEADS, VILLAGE OF	09/29/1996
CHEMUNG COUNTY	MILLPORT, VILLAGE OF	06/15/1988 (M)
CHEMUNG COUNTY	SOUTHPORT, TOWN OF	08/05/1991
CHEMUNG COUNTY	VAN ETTEN, TOWN OF	09/28/1979 (M)
CHEMUNG COUNTY	VAN ETTEN, VILLAGE OF	07/01/1988 (L)
CHEMUNG COUNTY	VETERAN, TOWN OF	02/18/1983 (M)
CHEMUNG COUNTY	WELLSBURG, VILLAGE OF	06/15/1981
CHENANGO COUNTY	AFTON, TOWN OF	11/26/2010
CHENANGO COUNTY	AFTON, VILLAGE OF	11/26/2010
CHENANGO COUNTY	BAINBRIDGE, TOWN OF	11/26/2010
CHENANGO COUNTY	BAINBRIDGE, VILLAGE OF	11/26/2010
CHENANGO COUNTY	COLUMBUS, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	COVENTRY, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	EARLVILLE, VILLAGE OF	11/26/2010 (M)
CHENANGO COUNTY	GERMAN, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	GREENE, TOWN OF	11/26/2010
CHENANGO COUNTY	GREENE, VILLAGE OF	11/26/2010
CHENANGO COUNTY	GUILFORD, TOWN OF	11/26/2010
CHENANGO COUNTY	LINCKLAEN, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	MC DONOUGH, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	NEW BERLIN, TOWN OF	11/26/2010
CHENANGO COUNTY	NEW BERLIN, VILLAGE OF	11/26/2010
CHENANGO COUNTY	NORTH NORWICH, TOWN OF	11/26/2010
CHENANGO COUNTY	NORWICH, CITY OF	11/26/2010
CHENANGO COUNTY	NORWICH, TOWN OF	11/26/2010
CHENANGO COUNTY	OTSELIC, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	OXFORD, TOWN OF	11/26/2010
CHENANGO COUNTY	OXFORD, VILLAGE OF	11/26/2010
CHENANGO COUNTY	PHARSALIA, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	PITCHER, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	PLYMOUTH, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	PRESTON, TOWN OF	11/26/2010
CHENANGO COUNTY	SHERBURNE, TOWN OF	11/26/2010
CHENANGO COUNTY	SHERBURNE, VILLAGE OF	11/26/2010
CHENANGO COUNTY	SMITHVILLE, TOWN OF	11/26/2010 (M)
CHENANGO COUNTY	SMYRNA, TOWN OF	11/26/2010
CHENANGO COUNTY	SMYRNA, VILLAGE OF	11/26/2010 (M)
CLINTON COUNTY	ALTONA, TOWN OF	09/28/2007 (M)
CLINTON COUNTY	AUSABLE, TOWN OF	09/28/2007 (M)
CLINTON COUNTY	BEEKMANTOWN, TOWN OF	09/28/2007
CLINTON COUNTY	BLACK BROOK, TOWN OF	09/28/2007

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
CLINTON COUNTY	CHAMPLAIN, TOWN OF	09/28/2007
CLINTON COUNTY	CHAMPLAIN, VILLAGE OF	09/28/2007
CLINTON COUNTY	CHAZY, TOWN OF	09/28/2007
CLINTON COUNTY	CLINTON, TOWN OF	09/28/2007 (M)
CLINTON COUNTY	ELLENBURG, TOWN OF	09/28/2007 (M)
CLINTON COUNTY	MOOERS, TOWN OF	09/28/2007 (M)
CLINTON COUNTY	PERU,TOWN OF	09/28/2007
CLINTON COUNTY	PLATTSBURGH, CITY OF	09/28/2007
CLINTON COUNTY	PLATTSBURGH, TOWN OF	09/28/2007
CLINTON COUNTY	ROUSES POINT, VILLAGE OF	09/28/2007
CLINTON COUNTY	SARANAC, TOWN OF	09/28/2007
CLINTON COUNTY	SCHUYLER FALLS, TOWN OF	09/28/2007
COLUMBIA COUNTY	ANCRAM, TOWN OF	06/05/1985 (M)
COLUMBIA COUNTY	AUSTERLITZ, TOWN OF	06/05/1985 (M)
COLUMBIA COUNTY	CANAAN, TOWN OF	07/03/1985 (M)
COLUMBIA COUNTY	CHATHAM, TOWN OF	09/15/1993
COLUMBIA COUNTY	CHATHAM, VILLAGE OF	12/15/1982
COLUMBIA COUNTY	CLAVERACK, TOWN OF	09/06/1989
COLUMBIA COUNTY	CLERMONT, TOWNSHIP OF	09/05/1984
COLUMBIA COUNTY	COPAKE, TOWN OF	06/19/1985 (M)
COLUMBIA COUNTY	GALLATIN, TOWN OF	10/16/1984
COLUMBIA COUNTY	GERMANTOWN, TOWN OF	05/11/1979 (M)
COLUMBIA COUNTY	GHENT, TOWN OF	01/01/1988 (L)
COLUMBIA COUNTY	GREENPORT, TOWN OF	11/15/1989
COLUMBIA COUNTY	HILLSDALE, TOWN OF	05/15/1985 (M)
COLUMBIA COUNTY	HUDSON, CITY OF	09/29/1989
COLUMBIA COUNTY	KINDERHOOK, TOWN OF	12/1/1982
COLUMBIA COUNTY	KINDERHOOK, VILLAGE OF	12/1/1982
COLUMBIA COUNTY	LIVINGSTON, TOWN OF	05/11/1979 (M)
COLUMBIA COUNTY	NEW LEBANON, TOWN OF	06/05/1985 (M)
COLUMBIA COUNTY	STOCKPORT, TOWN OF	01/19/1983
COLUMBIA COUNTY	STUYVESANT, TOWN OF	09/14/1979 (M)
COLUMBIA COUNTY	TAGHKANIC, TOWN OF	01/03/1986 (M)
COLUMBIA COUNTY	VALATIE, VILLAGE OF	12/1/1982
CORTLAND COUNTY	CINCINNATUS, TOWN OF	03/02/2010
CORTLAND COUNTY	CORTLAND, CITY OF	03/02/2010
CORTLAND COUNTY	CORTLANDVILLE, TOWN OF	03/02/2010
CORTLAND COUNTY	CUYLER, TOWN OF	03/02/2010 (M)
CORTLAND COUNTY	FREETOWN, TOWN OF	03/02/2010 (M)
CORTLAND COUNTY	HARFORD, TOWN OF	03/02/2010 (M)
CORTLAND COUNTY	HOMER, TOWN OF	03/02/2010
CORTLAND COUNTY	HOMER, VILLAGE OF	03/02/2010

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
CORTLAND COUNTY	LAPEER, TOWN OF	03/02/2010 (M)
CORTLAND COUNTY	MARATHON, TOWN OF	03/02/2010
CORTLAND COUNTY	MARATHON, VILLAGE OF	03/02/2010
CORTLAND COUNTY	MCGRAW, VILLAGE OF	03/02/2010
CORTLAND COUNTY	PREBLE, TOWN OF	03/02/2010
CORTLAND COUNTY	SCOTT, TOWN OF	03/02/2010
CORTLAND COUNTY	SOLON, TOWN OF	03/02/2010
CORTLAND COUNTY	TAYLOR, TOWN OF	03/02/2010 (M)
CORTLAND COUNTY	TRUXTON, TOWN OF	03/02/2010 (M)
CORTLAND COUNTY	VIRGIL, TOWN OF	03/02/2010
CORTLAND COUNTY	WILLET, TOWN OF	03/02/2010 (M)
DELAWARE COUNTY	ANDES, TOWN OF	05/01/1985 (M)
DELAWARE COUNTY	ANDES, VILLAGE OF	04/01/1986 (L)
DELAWARE COUNTY	BOVINA, TOWN OF	05/01/1985 (M)
DELAWARE COUNTY	COLCHESTER,TOWN OF	02/04/1987
DELAWARE COUNTY	DAVENPORT, TOWN OF	02/02/2002
DELAWARE COUNTY	DELHI, TOWN OF	07/18/1985
DELAWARE COUNTY	DELHI, VILLAGE OF	07/18/1985
DELAWARE COUNTY	DEPOSIT, TOWN OF	03/18/1986 (M)
DELAWARE COUNTY	FLEISCHMANNS, VILLAGE OF	01/17/1986 (M)
DELAWARE COUNTY	FRANKLIN, TOWN OF	04/01/1988 (L)
DELAWARE COUNTY	FRANKLIN, VILLAGE OF	08/01/1987 (L)
DELAWARE COUNTY	HAMDEN,TOWN OF	03/04/1986 (M)
DELAWARE COUNTY	HANCOCK, TOWN OF	09/28/1990
DELAWARE COUNTY	HANCOCK, VILLAGE OF	09/28/1990
DELAWARE COUNTY	HARPERSFIELD, TOWN OF	06/05/1985 (M)
DELAWARE COUNTY	HOBART, VILLAGE OF	05/15/1985 (M)
DELAWARE COUNTY	KORTRIGHT, TOWN OF	05/15/1985 (M)
DELAWARE COUNTY	MARGARETVILLE, VILLAGE OF	06/04/1990
DELAWARE COUNTY	MASONVILLE, TOWN OF	11/01/1985 (M)
DELAWARE COUNTY	MEREDITH, TOWN OF	05/15/1985 (M)
DELAWARE COUNTY	MIDDLETOWN, TOWN OF	08/02/1993
DELAWARE COUNTY	ROXBURY, TOWN OF	05/15/1985 (M)
DELAWARE COUNTY	SIDNEY, TOWN OF	09/30/1987
DELAWARE COUNTY	SIDNEY, VILLAGE OF	09/30/1987
DELAWARE COUNTY	STAMFORD, TOWN OF	10/01/1986 (L)
DELAWARE COUNTY	STAMFORD, VILLAGE OF	08/01/1987 (L)
DELAWARE COUNTY	TOMPKINS, TOWN OF	11/15/1985 (M)
DELAWARE COUNTY	WALTON, TOWN OF	09/02/1988
DELAWARE COUNTY	WALTON, VILLAGE OF	04/02/1991
DELAWARE COUNTY/BROOME COUNTY	DEPOSIT, VILLAGE OF	02/01/1979

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
DUTCHESS COUNTY	AMENIA, TOWN OF	11/15/1989
DUTCHESS COUNTY	BEACON, CITY OF	03/01/1984
DUTCHESS COUNTY	BEEKMAN, TOWN OF	09/05/1984
DUTCHESS COUNTY	CLINTON, TOWN OF	07/05/1984
DUTCHESS COUNTY	DOVER, TOWN OF	07/04/1988
DUTCHESS COUNTY	EAST FISHKILL, TOWN OF	06/15/1984
DUTCHESS COUNTY	FISHKILL, TOWN OF	06/01/1984
DUTCHESS COUNTY	FISHKILL, VILLAGE OF	03/15/1984
DUTCHESS COUNTY	HYDE PARK, TOWN OF	06/15/1984
DUTCHESS COUNTY	LAGRANGE, TOWN OF	09/08/1999
DUTCHESS COUNTY	MILAN, TOWN OF	08/10/1979 (M)
DUTCHESS COUNTY	MILLBROOK, VILLAGE OF	02/27/1984 (M)
DUTCHESS COUNTY	MILLERTON, VILLAGE OF	01/03/1985
DUTCHESS COUNTY	NORTH EAST, TOWN OF	09/05/1984
DUTCHESS COUNTY	PAWLING, TOWN OF	01/03/1985
DUTCHESS COUNTY	PAWLING, VILLAGE OF	08/01/1984
DUTCHESS COUNTY	PINE PLAINS, TOWN OF	10/05/1984 (M)
DUTCHESS COUNTY	PLEASANT VALLEY, TOWN OF	01/16/1980
DUTCHESS COUNTY	POUGHKEEPSIE, CITY OF	01/05/1984
DUTCHESS COUNTY	POUGHKEEPSIE, TOWN OF	09/08/1999
DUTCHESS COUNTY	RED HOOK, TOWN OF	10/16/1984
DUTCHESS COUNTY	RED HOOK, VILLAGE OF	(NSFHA)
DUTCHESS COUNTY	RHINEBECK, TOWN OF	09/05/1984
DUTCHESS COUNTY	RHINEBECK, VILLAGE OF	02/01/1985
DUTCHESS COUNTY	STANFORD, TOWN OF	12/17/1991
DUTCHESS COUNTY	TIVOLI, VILLAGE OF	08/01/1984
DUTCHESS COUNTY	UNION VALE, TOWN OF	09/02/1988
DUTCHESS COUNTY	WAPPINGER, TOWN OF	09/22/1999
DUTCHESS COUNTY	WAPPINGERS FALLS, VILLAGE OF	09/22/1999
DUTCHESS COUNTY	WASHINGTON, TOWN OF	08/17/1979 (M)
ERIE COUNTY	AKRON, VILLAGE OF	11/19/1980
ERIE COUNTY	ALDEN, TOWN OF	02/06/1991
ERIE COUNTY	ALDEN, VILLAGE OF	01/06/1984 (M)
ERIE COUNTY	AMHERST, TOWN OF	10/16/1992
ERIE COUNTY	ANGOLA, VILLAGE OF	08/06/2002
ERIE COUNTY	AURORA, TOWN OF	04/16/1979
ERIE COUNTY	BLASDELL, VILLAGE OF	06/25/1976 (M)
ERIE COUNTY	BOSTON, TOWN OF	09/30/1981
ERIE COUNTY	BRANT, TOWN OF	01/06/1984 (M)
ERIE COUNTY	BUFFALO, CITY OF	09/26/2008
ERIE COUNTY	CHEEKTOWAGA, TOWN OF	03/15/1984
ERIE COUNTY	CLARENCE, TOWN OF	03/05/1996

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
ERIE COUNTY	COLDEN, TOWN OF	07/02/1979
ERIE COUNTY	COLLINS,TOWN OF	09/26/2008
ERIE COUNTY	CONCORD, TOWN OF	09/04/1986
ERIE COUNTY	DEPEW, VILLAGE OF	08/03/1981
ERIE COUNTY	EAST AURORA, VILLAGE OF	08/06/2002
ERIE COUNTY	EDEN, TOWN OF	08/24/1979 (M)
ERIE COUNTY	ELMA,TOWN OF	06/22/1998
ERIE COUNTY	EVANS, TOWN OF	02/02/2002
ERIE COUNTY	FARNHAM, VILLAGE OF	(NSFHA)
ERIE COUNTY	GRAND ISLAND, TOWN OF	09/26/2008
ERIE COUNTY	HAMBURG, TOWN OF	12/20/2001
ERIE COUNTY	HAMBURG, VILLAGE OF	01/20/1982
ERIE COUNTY	HOLLAND, TOWN OF	09/26/2008
ERIE COUNTY	KENMORE,VILLAGE OF	(NSFHA)
ERIE COUNTY	LACKAWANNA, CITY OF	07/02/1980
ERIE COUNTY	LANCASTER, TOWN OF	02/23/2001
ERIE COUNTY	LANCASTER, VILLAGE OF	07/02/1979
ERIE COUNTY	MARILLA, TOWN OF	09/29/1978
ERIE COUNTY	NEWSTEAD, TOWN OF	05/04/1992
ERIE COUNTY	ORCHARD PARK, TOWN OF	03/16/1983
ERIE COUNTY	ORCHARD PARK, VILLAGE OF	(NSFHA)
ERIE COUNTY	SARDINIA, TOWN OF	01/16/2003
ERIE COUNTY	SLOAN, VILLAGE OF	(NSFHA)
ERIE COUNTY	SPRINGVILLE, VILLAGE OF	07/17/1986
ERIE COUNTY	TONAWANDA, CITY OF	09/26/2008
ERIE COUNTY	TONAWANDA, TOWN OF	11/12/1982
ERIE COUNTY	WALES, TOWN OF	09/26/2008
ERIE COUNTY	WEST SENECA, TOWN OF	09/30/1992
ERIE COUNTY	WILLIAMSVILLE, VILLAGE OF	09/26/2008
ERIE COUNTY/CATTARAUGUS COUNTY	GOWANDA, VILLAGE OF	09/26/2008
ESSEX COUNTY	CHESTERFIELD, TOWN OF	05/04/1987
ESSEX COUNTY	CROWN POINT,TOWN OF	07/16/1987
ESSEX COUNTY	ELIZABETHTOWN, TOWN OF	01/20/1993
ESSEX COUNTY	ESSEX, TOWN OF	04/03/1987
ESSEX COUNTY	JAY, TOWN OF	06/17/2002
ESSEX COUNTY	KEENE, TOWN OF	06/05/1985 (M)
ESSEX COUNTY	KEESEVILLE, VILLAGE OF	09/28/2007 (M)
ESSEX COUNTY	LAKE PLACID, VILLAGE OF	(NSFHA)
ESSEX COUNTY	LEWIS, TOWN OF	05/15/1985 (M)
ESSEX COUNTY	MINERVA, TOWN OF	10/05/1984 (M)
ESSEX COUNTY	MORIAH, TOWN OF	09/24/1984 (M)

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
ESSEX COUNTY	NEWCOMB, TOWN OF	06/05/1985 (M)
ESSEX COUNTY	NORTH ELBA, TOWN OF	08/23/2001
ESSEX COUNTY	NORTH HUDSON, TOWN OF	05/15/1985 (M)
ESSEX COUNTY	PORT HENRY, VILLAGE OF	07/16/1987
ESSEX COUNTY	SCHROON, TOWN OF	11/16/1995
ESSEX COUNTY	ST. ARMAND, TOWN OF	02/05/1986
ESSEX COUNTY	TICONDEROGA, TOWN OF	09/06/1996
ESSEX COUNTY	WESTPORT, TOWN OF	09/04/1987
ESSEX COUNTY	WILLSBORO, TOWN OF	05/18/1992
ESSEX COUNTY	WILMINGTON, TOWN OF	11/16/1995
FRANKLIN COUNTY	BANGOR, TOWN OF	(NSFHA)
FRANKLIN COUNTY	BELLMONT, TOWN OF	08/05/1985 (M)
FRANKLIN COUNTY	BOMBAY, TOWN OF	02/15/1985 (M)
FRANKLIN COUNTY	BRANDON, TOWN OF	(NSFHA)
FRANKLIN COUNTY	BRIGHTON, TOWN OF	(NSFHA)
FRANKLIN COUNTY	BRUSHTON, VILLAGE OF	02/19/1986 (M)
FRANKLIN COUNTY	BURKE, TOWN OF	02/19/1986 (M)
FRANKLIN COUNTY	BURKE, VILLAGE OF	(NSFHA)
FRANKLIN COUNTY	CHATEAUGAY, VILLAGE OF	(NSFHA)
FRANKLIN COUNTY	CONSTABLE, TOWN OF	(NSFHA)
FRANKLIN COUNTY	DICKINSON, TOWN OF	03/18/1986 (M)
FRANKLIN COUNTY	DUANE, TOWN OF	(NSFHA)
FRANKLIN COUNTY	FORT COVINGTON, TOWN OF	12/23/1983 (M)
FRANKLIN COUNTY	FRANKLIN, TOWN OF	09/24/1984 (M)
FRANKLIN COUNTY	HARRIETSTOWN, TOWN OF	01/03/1985
FRANKLIN COUNTY	MALONE, TOWN OF	09/04/1985 (M)
FRANKLIN COUNTY	MALONE, VILLAGE OF	04/03/1978
FRANKLIN COUNTY	MOIRA, TOWN OF	04/15/1986 (M)
FRANKLIN COUNTY	SANTA CLARA, TOWN OF	(NSFHA)
FRANKLIN COUNTY	SARANAC LAKE, VILLAGE OF	01/02/1992
FRANKLIN COUNTY	TUPPER LAKE, TOWN OF	(NSFHA)
FRANKLIN COUNTY	TUPPER LAKE,VILLAGE OF	03/01/1987 (L)
FRANKLIN COUNTY	WAVERLY, TOWN OF	(NSFHA)
FRANKLIN COUNTY	WESTVILLE, TOWN OF	02/15/1985 (M)
FULTON COUNTY	BLEECKER,TOWN OF	07/18/1985 (M)
FULTON COUNTY	BROADALBIN, TOWN OF	01/03/1985 (M)
FULTON COUNTY	BROADALBIN, VILLAGE OF	04/15/1986 (M)
FULTON COUNTY	CAROGA, TOWN OF	07/18/1985 (M)
FULTON COUNTY	EPHRATAH, TOWN OF	07/03/1985 (M)
FULTON COUNTY	GLOVERSVILLE, CITY OF	09/30/1983
FULTON COUNTY	JOHNSTOWN, CITY OF	07/18/1983
FULTON COUNTY	JOHNSTOWN, TOWN OF	07/03/1985 (M)

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
FULTON COUNTY	MAYFIELD, TOWN OF	08/05/1985 (M)
FULTON COUNTY	NORTHAMPTON, TOWN OF	08/19/1985 (M)
FULTON COUNTY	NORTHVILLE, VILLAGE OF	(NSFHA)
FULTON COUNTY	OPPENHEIM, TOWN OF	06/18/1976
FULTON COUNTY	PERTH, TOWN OF	02/15/1985 (M)
FULTON COUNTY	STRATFORD, TOWN OF	01/03/1985 (M)
GENESEE COUNTY	ALABAMA, TOWN OF	11/18/1983 (M)
GENESEE COUNTY	ALEXANDER, VILLAGE OF	05/04/1987
GENESEE COUNTY	ALEXANDER,TOWN OF	05/04/1987
GENESEE COUNTY	BATAVIA, CITY OF	09/16/1982
GENESEE COUNTY	BATAVIA, TOWN OF	01/17/1985
GENESEE COUNTY	BERGEN, TOWN OF	07/06/1984 (M)
GENESEE COUNTY	BERGEN, VILLAGE OF	06/08/1979 (M)
GENESEE COUNTY	BETHANY, TOWN OF	09/24/1984 (M)
GENESEE COUNTY	BYRON, TOWN OF	02/01/1988 (L)
GENESEE COUNTY	CORFU, VILLAGE OF	10/15/1985 (M)
GENESEE COUNTY	DARIEN, TOWN OF	07/06/1984 (M)
GENESEE COUNTY	ELBA, TOWN OF	10/05/1984 (M)
GENESEE COUNTY	ELBA, VILLAGE OF	01/20/1984 (M)
GENESEE COUNTY	LE ROY, TOWN OF	09/14/1979 (M)
GENESEE COUNTY	LE ROY, VILLAGE OF	08/03/1981
GENESEE COUNTY	OAKFIELD, TOWN OF	05/25/1984 (M)
GENESEE COUNTY	OAKFIELD, VILLAGE OF	03/23/1984 (M)
GENESEE COUNTY	PAVILION, TOWN OF	02/27/1984 (M)
GENESEE COUNTY	PEMBROKE, TOWN OF	01/20/1984 (M)
GENESEE COUNTY	STAFFORD,TOWN OF	07/16/1982
GENESEE COUNTY/WYOMING COUNTY	ATTICA, VILLAGE OF	07/03/1986
GREENE COUNTY	ASHLAND, TOWN OF	05/16/2008
GREENE COUNTY	ATHENS, TOWN OF	05/16/2008
GREENE COUNTY	ATHENS, VILLAGE OF	05/16/2008
GREENE COUNTY	CAIRO, TOWN OF	05/16/2008
GREENE COUNTY	CATSKILL, TOWN OF	05/16/2008
GREENE COUNTY	CATSKILL, VILLAGE OF	05/16/2008
GREENE COUNTY	COXSACKIE, TOWN OF	05/16/2008
GREENE COUNTY	COXSACKIE, VILLAGE OF	05/16/2008
GREENE COUNTY	DURHAM, TOWN OF	05/16/2008 (M)
GREENE COUNTY	GREENVILLE, TOWN OF	05/16/2008 (M)
GREENE COUNTY	HALCOTT, TOWN OF	05/16/2008 (M)
GREENE COUNTY	HUNTER, TOWN OF	05/16/2008
GREENE COUNTY	HUNTER, VILLAGE OF	05/16/2008
GREENE COUNTY	JEWETT, TOWN OF	05/16/2008

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
GREENE COUNTY	LEXINGTON, TOWN OF	05/16/2008
GREENE COUNTY	NEW BALTIMORE, TOWN OF	05/16/2008 (M)
GREENE COUNTY	PRATTSVILLE, TOWN OF	05/16/2008
GREENE COUNTY	TANNERSVILLE, VILLAGE OF	05/16/2008
GREENE COUNTY	WINDHAM, TOWN OF	05/16/2008
HAMILTON COUNTY	ARIETTA, TOWN OF	(NSFHA)
HAMILTON COUNTY	BENSON, TOWN OF	(NSFHA)
HAMILTON COUNTY	HOPE, TOWN OF	04/30/86(M)
HAMILTON COUNTY	INDIAN LAKE, TOWN OF	12/04/85(M)
HAMILTON COUNTY	INLET, TOWN OF	(NSFHA)
HAMILTON COUNTY	LAKE PLEASANT, TOWN OF	(NSFHA)
HAMILTON COUNTY	LONG LAKE, TOWN OF	09/24/1984 (M)
HAMILTON COUNTY	MOREHOUSE, TOWN OF	(NSFHA)
HAMILTON COUNTY	SPECULATOR, VILLAGE OF	02/06/1984 (M)
HAMILTON COUNTY	WELLS, TOWN OF	06/03/1986 (M)
HERKIMER COUNTY	COLD BROOK, VILLAGE OF	12/20/2000
HERKIMER COUNTY	COLUMBIA, TOWN OF	07/16/1982 (M)
HERKIMER COUNTY	DANUBE, TOWN OF	05/12/1999 (M)
HERKIMER COUNTY	DOLGEVILLE, VILLAGE OF	03/16/1983
HERKIMER COUNTY	FAIRFIELD, TOWN OF	10/18/1988
HERKIMER COUNTY	FRANKFORT, TOWN OF	12/20/2000
HERKIMER COUNTY	FRANKFORT, VILLAGE OF	03/07/2001
HERKIMER COUNTY	GERMAN FLATTS, TOWN OF	05/15/1985 (M)
HERKIMER COUNTY	HERKIMER, TOWN OF	04/17/1985 (M)
HERKIMER COUNTY	HERKIMER, VILLAGE OF	06/17/2002
HERKIMER COUNTY	ILION, VILLAGE OF	09/08/1999
HERKIMER COUNTY	LITCHFIELD, TOWN OF	05/07/2001
HERKIMER COUNTY	LITTLE FALLS, CITY OF	04/04/1983
HERKIMER COUNTY	LITTLE FALLS, TOWN OF	03/28/1980 (M)
HERKIMER COUNTY	MANHEIM, TOWN OF	05/01/1985 (M)
HERKIMER COUNTY	MIDDLEVILLE, VILLAGE OF	07/03/1985 (M)
HERKIMER COUNTY	MOHAWK, VILLAGE OF	09/08/1999
HERKIMER COUNTY	NEWPORT, TOWN OF	06/02/1999
HERKIMER COUNTY	NEWPORT, VILLAGE OF	04/02/1991
HERKIMER COUNTY	NORWAY, TOWN OF	07/03/1985 (M)
HERKIMER COUNTY	OHIO, TOWN OF	09/24/1984 (M)
HERKIMER COUNTY	POLAND, VILLAGE OF	06/02/1999 (M)
HERKIMER COUNTY	RUSSIA, TOWN OF	06/02/1999
HERKIMER COUNTY	SALISBURY, TOWN OF	07/03/1985 (M)
HERKIMER COUNTY	SCHUYLER, TOWN OF	06/20/2001
HERKIMER COUNTY	STARK, TOWN OF	05/15/1985 (M)
HERKIMER COUNTY	WARREN, TOWN OF	(NSFHA)

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
HERKIMER COUNTY	WEBB, TOWN OF	07/30/1982 (M)
HERKIMER COUNTY	WEST WINFIELD, VILLAGE OF	07/30/1982 (M)
HERKIMER COUNTY	WINFIELD, TOWN OF	07/30/1982 (M)
JEFFERSON COUNTY	ADAMS, TOWN OF	06/05/1985 (M)
JEFFERSON COUNTY	ADAMS, VILLAGE OF	06/19/1985 (M)
JEFFERSON COUNTY	ALEXANDRIA BAY, VILLAGE OF	04/03/1978
JEFFERSON COUNTY	ALEXANDRIA, TOWN OF	10/15/1985 (M)
JEFFERSON COUNTY	ANTWERP, TOWN OF	04/15/1986 (M)
JEFFERSON COUNTY	ANTWERP, VILLAGE OF	(NSFHA)
JEFFERSON COUNTY	BLACK RIVER, VILLAGE OF	06/05/1989 (M)
JEFFERSON COUNTY	BROWNVILLE, TOWN OF	06/02/1992
JEFFERSON COUNTY	BROWNVILLE, VILLAGE OF	03/18/1986 (M)
JEFFERSON COUNTY	CAPE VINCENT, TOWN OF	06/02/1992
JEFFERSON COUNTY	CAPE VINCENT, VILLAGE OF	04/17/1985 (M)
JEFFERSON COUNTY	CARTHAGE, VILLAGE OF	06/17/1991
JEFFERSON COUNTY	CHAMPION, TOWN OF	06/02/1993
JEFFERSON COUNTY	CHAUMONT, VILLAGE OF	09/08/1999
JEFFERSON COUNTY	CLAYTON, TOWN OF	04/02/1986
JEFFERSON COUNTY	CLAYTON, VILLAGE OF	12/1/1977
JEFFERSON COUNTY	DEFERIET, VILLAGE OF	(NSFHA)
JEFFERSON COUNTY	DEXTER, VILLAGE OF	06/15/1994
JEFFERSON COUNTY	ELLISBURG, TOWN OF	05/18/1992
JEFFERSON COUNTY	ELLISBURG, VILLAGE OF	06/19/1985 (M)
JEFFERSON COUNTY	EVANS MILLS, VILLAGE OF	01/02/1992
JEFFERSON COUNTY	GLEN PARK, VILLAGE OF	(NSFHA)
JEFFERSON COUNTY	HENDERSON, TOWN OF	05/18/1992
JEFFERSON COUNTY	HERRINGS, VILLAGE OF	12/18/1985
JEFFERSON COUNTY	HOUNSFIELD, TOWN OF	05/18/1992
JEFFERSON COUNTY	LERAY, TOWN OF	02/02/1902
JEFFERSON COUNTY	LYME, TOWN OF	09/02/1993
JEFFERSON COUNTY	ORLEANS, TOWN OF	03/01/1978
JEFFERSON COUNTY	PAMELIA, TOWN OF	01/02/1992
JEFFERSON COUNTY	PHILADELPHIA, TOWN OF	06/05/89(M)
JEFFERSON COUNTY	PHILADELPHIA, VILLAGE OF	09/15/1993
JEFFERSON COUNTY	RODMAN, TOWN OF	07/03/1985 (M)
JEFFERSON COUNTY	RUTLAND, TOWN OF	08/18/1992
JEFFERSON COUNTY	SACKETS HARBOR, VILLAGE OF	05/02/1994
JEFFERSON COUNTY	THERESA, TOWN OF	10/15/1985 (M)
JEFFERSON COUNTY	THERESA, VILLAGE OF	10/15/1985 (M)
JEFFERSON COUNTY	WATERTOWN, CITY OF	08/02/1993
JEFFERSON COUNTY	WATERTOWN, TOWN OF	08/02/1993
JEFFERSON COUNTY	WEST CARTHAGE, VILLAGE OF	09/28/1990

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
JEFFERSON COUNTY	WILNA, TOWN OF	01/16/1992
JEFFERSON COUNTY	WORTH, TOWN OF	(NSFHA)
LEWIS COUNTY	CASTORLAND, VILLAGE OF	(NSFHA)
LEWIS COUNTY	CONSTABLEVILLE, VILLAGE OF	07/16/1982 (M)
LEWIS COUNTY	COPENHAGEN, VILLAGE OF	(NSFHA)
LEWIS COUNTY	CROGHAM, VILLAGE OF	05/15/1985 (M)
LEWIS COUNTY	CROGHAN, TOWN OF	05/15/1985 (M)
LEWIS COUNTY	DENMARK, TOWN OF	05/15/1985 (M)
LEWIS COUNTY	DIANA, TOWN OF	09/24/1984 (M)
LEWIS COUNTY	GREIG, TOWN OF	05/15/1985 (M)
LEWIS COUNTY	HARRISBURG, TOWN OF	(NSFHA)
LEWIS COUNTY	HARRISVILLE, VILLAGE OF	09/24/1984 (M)
LEWIS COUNTY	LEWIS, TOWN OF	09/29/1996
LEWIS COUNTY	LEYDEN, TOWN OF	06/19/1985 (M)
LEWIS COUNTY	LOWVILLE, TOWN OF	06/20/2000
LEWIS COUNTY	LOWVILLE, VILLAGE OF	06/20/2000
LEWIS COUNTY	LYONS FALLS, VILLAGE OF	06/19/1985 (M)
LEWIS COUNTY	LYONSDALE, TOWN OF	06/19/1985 (M)
LEWIS COUNTY	MARTINSBURG, TOWN OF	06/19/1985 (M)
LEWIS COUNTY	NEW BREMEN, TOWN OF	05/04/2000
LEWIS COUNTY	OSCEOLA, TOWN OF	06/30/1976 (M)
LEWIS COUNTY	PINCKNEY, TOWN OF	(NSFHA)
LEWIS COUNTY	PORT LEYDEN, VILLAGE OF	06/19/1985 (M)
LEWIS COUNTY	TURIN, TOWN OF	08/02/1994
LEWIS COUNTY	TURIN, VILLAGE OF	07/01/1977 (M)
LEWIS COUNTY	WATSON, TOWN OF	07/19/2000
LEWIS COUNTY	WEST TURIN, TOWN OF	(NSFHA)
LIVINGSTON COUNTY	AVON, TOWN OF	08/15/1978
LIVINGSTON COUNTY	AVON, VILLAGE OF	08/01/1978
LIVINGSTON COUNTY	CALEDONIA, TOWN OF	06/01/1981
LIVINGSTON COUNTY	CALEDONIA, VILLAGE OF	06/01/1981
LIVINGSTON COUNTY	CONESUS, TOWN OF	02/15/1991
LIVINGSTON COUNTY	DANSVILLE, VILLAGE OF	04/05/2010
LIVINGSTON COUNTY	GENESEO, TOWN OF	09/29/1996
LIVINGSTON COUNTY	GENESEO, VILLAGE OF	09/29/1996
LIVINGSTON COUNTY	GROVELAND, TOWN OF	02/15/1991
LIVINGSTON COUNTY	LEICESTER, TOWN OF	01/20/1982
LIVINGSTON COUNTY	LEICESTER, VILLAGE OF	08/27/1982 (M)
LIVINGSTON COUNTY	LIMA, TOWN OF	12/23/1983 (M)
LIVINGSTON COUNTY	LIMA, VILLAGE OF	07/23/1982 (M)
LIVINGSTON COUNTY	LIVONIA, TOWN OF	02/19/1992
LIVINGSTON COUNTY	LIVONIA, VILLAGE OF	06/01/1988 (L)

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
LIVINGSTON COUNTY	MOUNT MORRIS, TOWN OF	(NSFHA)
LIVINGSTON COUNTY	MOUNT MORRIS, VILLAGE OF	08/01/1978
LIVINGSTON COUNTY	NORTH DANSVILLE, TOWN OF	04/05/2010
LIVINGSTON COUNTY	NUNDA, TOWN OF	07/03/1985 (M)
LIVINGSTON COUNTY	NUNDA, VILLAGE OF	03/23/1984 (M)
LIVINGSTON COUNTY	OSSIAN, TOWN OF	06/08/1984 (M)
LIVINGSTON COUNTY	PORTAGE,TOWN OF	12/18/1984
LIVINGSTON COUNTY	SPARTA, TOWN OF	04/05/2010
LIVINGSTON COUNTY	SPRINGWATER, TOWN OF	08/24/1984 (M)
LIVINGSTON COUNTY	WEST SPARTA, TOWN OF	04/05/2010
LIVINGSTON COUNTY	YORK, TOWN OF	01/20/1982
MADISON COUNTY	BROOKFIELD, TOWN OF	04/17/1985 (M)
MADISON COUNTY	CANASTOTA , VILLAGE OF	04/15/1988
MADISON COUNTY	CAZENOVIA, TOWN OF	06/19/1985
MADISON COUNTY	CAZENOVIA, VILLAGE OF	06/19/1985
MADISON COUNTY	CHITTENANGO, VILLAGE OF	02/01/1985 (M)
MADISON COUNTY	DE RUYTER, TOWN OF	06/08/1984
MADISON COUNTY	DE RUYTER, VILLAGE OF	08/24/1984 (M)
MADISON COUNTY	EATON, TOWN OF	09/10/1984 (M)
MADISON COUNTY	FENNER, TOWNSHIP OF	02/05/1986
MADISON COUNTY	GEORGETOWN, TOWN OF	11/02/1984 (M)
MADISON COUNTY	HAMILTON, TOWN OF	09/27/2002
MADISON COUNTY	HAMILTON,VILLAGE	09/27/2002
MADISON COUNTY	LEBANON, TOWN OF	04/17/1985 (M)
MADISON COUNTY	LENOX, TOWN OF	06/03/1988
MADISON COUNTY	LINCOLN, TOWN OF	09/04/1985 (M)
MADISON COUNTY	MADISON, TOWN OF	01/19/1983
MADISON COUNTY	MORRISVILLE, VILLAGE OF	04/15/1982
MADISON COUNTY	MUNNSVILLE, VILLAGE OF	09/15/1983
MADISON COUNTY	NELSON, TOWN OF	10/05/1984 (M)
MADISON COUNTY	ONEIDA, CITY OF	02/23/2001
MADISON COUNTY	SMITHFIELD, TOWN OF	04/17/1985 (M)
MADISON COUNTY	STOCKBRIDGE, TOWN OF	(NSFHA)
MADISON COUNTY	SULLIVAN, TOWN OF	05/15/1986
MADISON COUNTY	WAMPSVILLE, VILLAGE OF	(NSFHA)
MONROE COUNTY	BRIGHTON, TOWN OF	08/28/2008
MONROE COUNTY	BROCKPORT, VILLAGE OF	08/28/2008 (M)
MONROE COUNTY	CHILI, TOWN OF	08/28/2008
MONROE COUNTY	CHURCHVILLE, VILLAGE OF	08/28/2008
MONROE COUNTY	CLARKSON, TOWN OF	08/28/2008
MONROE COUNTY	EAST ROCHESTER, VILLAGE OF	08/28/2008 (M)
MONROE COUNTY	FAIRPORT, VILLAGE OF	08/28/2008

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
MONROE COUNTY	GATES, TOWN OF	08/28/2008
MONROE COUNTY	GREECE, TOWN OF	08/28/2008
MONROE COUNTY	HAMLIN, TOWN OF	08/28/2008
MONROE COUNTY	HENRIETTA, TOWN OF	08/28/2008
MONROE COUNTY	HILTON, VILLAGE OF	08/28/2008
MONROE COUNTY	HONEOYE FALLS, VILLAGE OF	08/28/2008
MONROE COUNTY	IRONDEQUOIT, TOWN OF	08/28/2008
MONROE COUNTY	MENDON, TOWN OF	08/28/2008
MONROE COUNTY	OGDEN, TOWN OF	08/28/2008
MONROE COUNTY	PARMA, TOWN OF	08/28/2008
MONROE COUNTY	PENFIELD, TOWN OF	08/28/2008
MONROE COUNTY	PERINTON, TOWN OF	08/28/2008
MONROE COUNTY	PITTSFORD, TOWN OF	08/28/2008
MONROE COUNTY	PITTSFORD, VILLAGE OF	08/28/2008 (M)
MONROE COUNTY	RIGA, TOWN OF	08/28/2008
MONROE COUNTY	ROCHESTER, CITY OF	08/28/2008
MONROE COUNTY	RUSH, TOWN OF	08/28/2008
MONROE COUNTY	SCOTTSVILLE, VILLAGE OF	08/28/2008
MONROE COUNTY	SPENCERPORT, VILLAGE OF	08/28/2008
MONROE COUNTY	SWEDEN, TOWN OF	08/28/2008 (M)
MONROE COUNTY	WEBSTER, TOWN OF	08/28/2008
MONROE COUNTY	WEBSTER, VILLAGE OF	08/28/2008
MONROE COUNTY	WHEATLAND, TOWN OF	08/28/2008
MONTGOMERY COUNTY	AMES, VILLAGE OF	12/4/1985
MONTGOMERY COUNTY	AMSTERDAM, CITY OF	06/19/1985
MONTGOMERY COUNTY	AMSTERDAM, TOWN OF	12/01/1987 (L)
MONTGOMERY COUNTY	CANAJOHARIE, TOWN OF	01/06/1983
MONTGOMERY COUNTY	CANAJOHARIE, VILLAGE OF	11/3/1982
MONTGOMERY COUNTY	CHARLESTON, TOWN OF	10/15/1985 (M)
MONTGOMERY COUNTY	FLORIDA, TOWN OF	12/01/1987 (L)
MONTGOMERY COUNTY	FONDA, VILLAGE OF	07/06/1983
MONTGOMERY COUNTY	FORT JOHNSON, VILLAGE OF	01/19/1983
MONTGOMERY COUNTY	FORT PLAIN, VILLAGE OF	06/17/2002
MONTGOMERY COUNTY	FULTONVILLE, VILLAGE OF	10/15/1982
MONTGOMERY COUNTY	GLEN, TOWN OF	02/19/1986 (M)
MONTGOMERY COUNTY	HAGAMAN, VILLAGE OF	03/18/1986 (M)
MONTGOMERY COUNTY	MINDEN, TOWN OF	01/19/1983
MONTGOMERY COUNTY	MOHAWK, TOWN OF	08/05/1985 (M)
MONTGOMERY COUNTY	NELLISTON, VILLAGE OF	11/3/1982
MONTGOMERY COUNTY	PALATINE BRIDGE, VILLAGE OF	11/17/1982
MONTGOMERY COUNTY	PALATINE, TOWN OF	05/04/1987
MONTGOMERY COUNTY	ROOT, TOWN OF	04/01/1988 (L)

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
MONTGOMERY COUNTY	ST. JOHNSVILLE, TOWN OF	03/16/1983
MONTGOMERY COUNTY	ST. JOHNSVILLE, VILLAGE OF	09/29/1989
NASSAU COUNTY	ATLANTIC BEACH, VILLAGE OF	09/11/2009
NASSAU COUNTY	BAXTER ESTATES, VILLAGE OF	09/11/2009
NASSAU COUNTY	BAYVILLE, VILLAGE OF	09/11/2009
NASSAU COUNTY	CEDARHURST, VILLAGE OF	09/11/2009
NASSAU COUNTY	CENTRE ISLAND, VILLAGE OF	09/11/2009
NASSAU COUNTY	COVE NECK, VILLAGE OF	09/11/2009
NASSAU COUNTY	EAST HILLS, VILLAGE OF	(NSFHA)
NASSAU COUNTY	EAST ROCKAWAY, VILLAGE OF	09/11/2009
NASSAU COUNTY	EAST WILLISTON, VILLAGE OF	(NSFHA)
NASSAU COUNTY	FLORAL PARK, VILLAGE OF	(NSFHA)
NASSAU COUNTY	FLOWER HILL, VILLAGE OF	09/11/2009
NASSAU COUNTY	FREEPORT, VILLAGE OF	09/11/2009
NASSAU COUNTY	GARDEN CITY, VILLAGE OF	(NSFHA)
NASSAU COUNTY	GLEN COVE, CITY OF	09/11/2009
NASSAU COUNTY	GREAT NECK ESTATES, VILLAGE OF	09/11/2009
NASSAU COUNTY	GREAT NECK PLAZA, VILLAGE OF	09/11/2009
NASSAU COUNTY	GREAT NECK, VILLAGE OF	09/11/2009
NASSAU COUNTY	HEMPSTEAD, TOWN OF	09/11/2009
NASSAU COUNTY	HEMPSTEAD, VILLAGE OF	(NSFHA)
NASSAU COUNTY	HEWLETT BAY PARK, VILLAGE OF	09/11/2009
NASSAU COUNTY	HEWLETT HARBOR, VILLAGE OF	09/11/2009
NASSAU COUNTY	HEWLETT NECK, VILLAGE OF	09/11/2009
NASSAU COUNTY	ISLAND PARK, VILLAGE OF	09/11/2009
NASSAU COUNTY	KENSINGTON, VILLAGE OF	09/11/2009
NASSAU COUNTY	KINGS POINT, VILLAGE OF	09/11/2009
NASSAU COUNTY	LAKE SUCCESS, VILLAGE OF	(NSFHA)
NASSAU COUNTY	LATTINGTOWN, VILLAGE OF	09/11/2009
NASSAU COUNTY	LAUREL HOLLOW, VILLAGE OF	09/11/2009
NASSAU COUNTY	LAWRENCE, VILLAGE OF	09/11/2009
NASSAU COUNTY	LONG BEACH, CITY OF	09/11/2009
NASSAU COUNTY	LYNBROOK, VILLAGE OF	09/11/2009
NASSAU COUNTY	MALVERNE, VILLAGE OF	09/11/2009
NASSAU COUNTY	MANORHAVEN, VILLAGE OF	09/11/2009
NASSAU COUNTY	MASSAPEQUA PARK, VILLAGE OF	09/11/2009
NASSAU COUNTY	MILL NECK, VILLAGE OF	09/11/2009
NASSAU COUNTY	MINEOLA, VILLAGE OF	(NSFHA)
NASSAU COUNTY	MUNSEY PARK, VILLAGE OF	(NSFHA)
NASSAU COUNTY	NEW HYDE PARK, VILLAGE OF	(NSFHA)
NASSAU COUNTY	NORTH HEMPSTEAD, TOWN OF	09/11/2009
NASSAU COUNTY	NORTH HILLS, VILLAGE OF	(NSFHA)

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
NASSAU COUNTY	OYSTER BAY COVE, VILLAGE OF	09/11/2009
NASSAU COUNTY	OYSTER BAY, TOWN OF	09/11/2009
NASSAU COUNTY	PLANDOME HEIGHTS, VILLAGE OF	09/11/2009
NASSAU COUNTY	PLANDOME MANOR, VILLAGE OF	09/11/2009
NASSAU COUNTY	PLANDOME, VILLAGE OF	09/11/2009
NASSAU COUNTY	PORT WASHINGTON NORTH, VILLAG	09/11/2009
NASSAU COUNTY	ROCKVILLE CENTRE, VILLAGE OF	09/11/2009
NASSAU COUNTY	ROSLYN ESTATES, VILLAGE OF	(NSFHA)
NASSAU COUNTY	ROSLYN HARBOR, VILLAGE OF	09/11/2009
NASSAU COUNTY	ROSLYN, VILLAGE OF	09/11/2009
NASSAU COUNTY	RUSSELL GARDENS, VILLAGE OF	09/11/2009
NASSAU COUNTY	SADDLE ROCK, VILLAGE OF	09/11/2009
NASSAU COUNTY	SANDS POINT, VILLAGE OF	09/11/2009
NASSAU COUNTY	SEA CLIFF, VILLAGE OF	09/11/2009
NASSAU COUNTY	STEWART MANOR, VILLAGE OF	(NSFHA)
NASSAU COUNTY	THOMASTON, VILLAGE OF	09/11/2009
NASSAU COUNTY	VALLEY STREAM, VILLAGE OF	09/11/2009
NASSAU COUNTY	WESTBURY, VILLAGE OF	(NSFHA)
NASSAU COUNTY	WOODSBURGH, VILLAGE OF	09/11/2009
NIAGARA COUNTY	BARKER, VILLAGE OF	09/17/2010
NIAGARA COUNTY	CAMBRIA, TOWN OF	09/17/2010
NIAGARA COUNTY	HARTLAND, TOWN OF	09/17/2010 (M)
NIAGARA COUNTY	LEWISTON, TOWN OF	09/17/2010
NIAGARA COUNTY	LEWISTON, VILLAGE OF	(NSFHA)
NIAGARA COUNTY	LOCKPORT, CITY OF	09/17/2010
NIAGARA COUNTY	LOCKPORT, TOWN OF	09/17/2010
NIAGARA COUNTY	MIDDLEPORT, VILLAGE OF	09/17/2010
NIAGARA COUNTY	NEWFANE, TOWN OF	09/17/2010
NIAGARA COUNTY	NIAGARA FALLS, CITY OF	09/17/2010
NIAGARA COUNTY	NIAGARA, TOWN OF	09/17/2010
NIAGARA COUNTY	NORTH TONAWANDA, CITY OF	09/17/2010
NIAGARA COUNTY	PENDLETON, TOWN OF	09/17/2010
NIAGARA COUNTY	PORTER, TOWN OF	09/17/2010
NIAGARA COUNTY	ROYALTON, TOWN OF	09/17/2010
NIAGARA COUNTY	SOMERSET, TOWN OF	09/17/2010
NIAGARA COUNTY	WHEATFIELD, TOWN OF	09/17/2010
NIAGARA COUNTY	WILSON, TOWN OF	09/17/2010
NIAGARA COUNTY	WILSON, VILLAGE OF	09/17/2010
NIAGARA COUNTY	YOUNGSTOWN, VILLAGE OF	09/17/2010
ONEIDA COUNTY	ANNSVILLE, TOWN OF	04/05/1988
ONEIDA COUNTY	AUGUSTA, TOWN OF	05/01/1985 (M)
ONEIDA COUNTY	AVA, TOWN OF	02/01/1985 (M)

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
ONEIDA COUNTY	BARNEVELD, VILLAGE OF	03/23/1999
ONEIDA COUNTY	BOONVILLE, TOWN OF	07/03/1985 (M)
ONEIDA COUNTY	BOONVILLE, VILLAGE OF	04/17/1985 (M)
ONEIDA COUNTY	BRIDGEWATER, TOWN OF	(NSFHA)
ONEIDA COUNTY	BRIDGEWATER, VILLAGE OF	04/15/1982
ONEIDA COUNTY	CAMDEN, TOWN OF	09/07/1998
ONEIDA COUNTY	CAMDEN, VILLAGE OF	08/16/1988
ONEIDA COUNTY	CLAYVILLE, VILLAGE OF	07/05/1983
ONEIDA COUNTY	CLINTON, VILLAGE OF	05/01/1985
ONEIDA COUNTY	DEERFIELD, TOWN OF	06/02/1999
ONEIDA COUNTY	FLORENCE, TOWN OF	04/17/1985 (M)
ONEIDA COUNTY	FLOYD, TOWN OF	03/15/1984
ONEIDA COUNTY	FORESTPORT, TOWN OF	04/17/1985 (M)
ONEIDA COUNTY	HOLLAND PATENT, VILLAGE OF	05/21/2001
ONEIDA COUNTY	KIRKLAND, TOWN OF	04/03/1985
ONEIDA COUNTY	LEE, TOWN OF	08/03/1998
ONEIDA COUNTY	MARCY, TOWN OF	06/01/1984
ONEIDA COUNTY	MARSHALL, TOWN OF	09/30/1982
ONEIDA COUNTY	NEW HARTFORD, TOWN OF	04/18/1983
ONEIDA COUNTY	NEW HARTFORD, VILLAGE OF	07/05/1983
ONEIDA COUNTY	NEW YORK MILLS, VILLAGE OF	05/04/2000
ONEIDA COUNTY	ONEIDA CASTLE, VILLAGE OF	07/04/1989
ONEIDA COUNTY	ORISKANY FALLS, VILLAGE OF	01/19/1983
ONEIDA COUNTY	ORISKANY, VILLAGE OF	09/15/1983
ONEIDA COUNTY	PARIS, TOWN OF	09/15/1983
ONEIDA COUNTY	PROSPECT, VILLAGE OF	11/20/2000
ONEIDA COUNTY	REMSEN, TOWN OF	05/01/1985 (M)
ONEIDA COUNTY	REMSEN, VILLAGE OF	09/24/1984 (M)
ONEIDA COUNTY	ROME, CITY OF	09/21/1998
ONEIDA COUNTY	SANGERFIELD, TOWN OF	06/05/1985
ONEIDA COUNTY	SHERRILL, CITY OF	09/15/1983
ONEIDA COUNTY	STEUBEN, TOWN OF	09/24/1984 (M)
ONEIDA COUNTY	SYLVAN BEACH, VILLAGE OF	06/02/1999
ONEIDA COUNTY	TRENTON, TOWN OF	09/07/1998
ONEIDA COUNTY	UTICA, CITY OF	02/01/1984
ONEIDA COUNTY	VERNON, TOWN OF	08/16/1988
ONEIDA COUNTY	VERNON, VILLAGE OF	04/15/1988
ONEIDA COUNTY	VERONA, TOWN OF	10/20/1999
ONEIDA COUNTY	VIENNA, TOWN OF	10/20/1999
ONEIDA COUNTY	WATERVILLE, VILLAGE OF	08/02/1982
ONEIDA COUNTY	WESTERN, TOWN OF	05/04/1989
ONEIDA COUNTY	WESTMORELAND, TOWN OF	03/02/1983

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
ONEIDA COUNTY	WHITESBORO, VILLAGE OF	05/04/2000
ONEIDA COUNTY	WHITESTOWN, TOWN OF	05/04/2000
ONEIDA COUNTY	YORKVILLE, VILLAGE OF	05/04/2000
ONONDAGA COUNTY	BALDWINSVILLE, VILLAGE OF	03/01/1984
ONONDAGA COUNTY	CAMILLUS, TOWN OF	05/18/1999
ONONDAGA COUNTY	CAMILLUS, VILLAGE OF	05/18/1999
ONONDAGA COUNTY	CICERO, TOWN OF	09/15/1994
ONONDAGA COUNTY	CLAY, TOWN OF	03/16/1992
ONONDAGA COUNTY	DEWITT, TOWN OF	03/01/1979
ONONDAGA COUNTY	EAST SYRACUSE, VILLAGE OF	08/03/1981
ONONDAGA COUNTY	ELBRIDGE, TOWN OF	08/16/1982
ONONDAGA COUNTY	ELBRIDGE, VILLAGE OF	08/16/1982
ONONDAGA COUNTY	FABIUS, TOWN OF	04/30/1986 (M)
ONONDAGA COUNTY	FAYETTEVILLE, VILLAGE OF	04/17/1985
ONONDAGA COUNTY	GEDDES, TOWN OF	02/17/1982
ONONDAGA COUNTY	JORDAN, VILLAGE OF	08/16/1982
ONONDAGA COUNTY	LAFAYETTE, TOWN OF	04/03/1985
ONONDAGA COUNTY	LIVERPOOL, VILLAGE OF	02/04/1981
ONONDAGA COUNTY	LYSANDER, TOWN OF	02/04/1983
ONONDAGA COUNTY	MANLIUS, TOWN OF	09/17/1992
ONONDAGA COUNTY	MANLIUS, VILLAGE OF	08/01/1984
ONONDAGA COUNTY	MARCELLUS, TOWN OF	08/16/1982
ONONDAGA COUNTY	MARCELLUS, VILLAGE OF	06/01/1982
ONONDAGA COUNTY	MINOA, VILLAGE OF	09/02/1982
ONONDAGA COUNTY	NORTH SYRACUSE, VILLAGE OF	(NSFHA)
ONONDAGA COUNTY	ONONDAGA, TOWN OF	06/17/1991
ONONDAGA COUNTY	OTISCO, TOWN OF	06/03/1986 (M)
ONONDAGA COUNTY	POMPEY, TOWN OF	10/8/1982
ONONDAGA COUNTY	SALINA, TOWN OF	08/16/1982
ONONDAGA COUNTY	SKANEATELES, TOWN OF	06/01/1982
ONONDAGA COUNTY	SKANEATELES, VILLAGE OF	02/17/1982
ONONDAGA COUNTY	SOLVAY, VILLAGE OF	(NSFHA)
ONONDAGA COUNTY	SPAFFORD, TOWN OF	04/30/1986 (M)
ONONDAGA COUNTY	SYRACUSE, CITY OF	05/15/1986
ONONDAGA COUNTY	TULLY, TOWN OF	04/30/1986 (M)
ONONDAGA COUNTY	TULLY, VILLAGE OF	01/19/1983
ONONDAGA COUNTY	VAN BUREN, TOWN OF	03/01/1984
ONTARIO COUNTY	BLOOMFIELD, VILLAGE OF	8/15/1983
ONTARIO COUNTY	BRISTOL, TOWN OF	01/20/1984 (M)
ONTARIO COUNTY	CANADICE, TOWN OF	05/15/1984
ONTARIO COUNTY	CANANDAIGUA, CITY OF	09/24/1982
ONTARIO COUNTY	CANANDAIGUA, TOWN OF	03/03/1997

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
ONTARIO COUNTY	CLIFTON SPRINGS, VILLAGE OF	07/23/1982 (M)
ONTARIO COUNTY	EAST BLOOMFIELD, TOWN OF	08/15/1983
ONTARIO COUNTY	FARMINGTON, TOWN OF	09/30/1983
ONTARIO COUNTY	GENEVA, CITY OF	04/15/1982
ONTARIO COUNTY	GENEVA, TOWN OF	02/15/1978
ONTARIO COUNTY	GORHAM, TOWN OF	12/5/1996
ONTARIO COUNTY	HOPEWELL, TOWN OF	02/27/1984 (M)
ONTARIO COUNTY	MANCHESTER, TOWN OF	03/09/1984 (M)
ONTARIO COUNTY	MANCHESTER, VILLAGE OF	01/20/1984 (M)
ONTARIO COUNTY	NAPLES, TOWN OF	06/08/1984 (M)
ONTARIO COUNTY	NAPLES, VILLAGE OF	09/30/1977
ONTARIO COUNTY	PHELPS, TOWN OF	12/03/1982 (M)
ONTARIO COUNTY	PHELPS, VILLAGE OF	01/20/1984 (M)
ONTARIO COUNTY	RICHMOND, TOWN OF	12/18/1984
ONTARIO COUNTY	SENECA, TOWN OF	06/22/1984(M)
ONTARIO COUNTY	SHORTSVILLE, VILLAGE OF	09/24/1984 (M)
ONTARIO COUNTY	SOUTH BRISTOL, TOWN OF	05/18/1998
ONTARIO COUNTY	VICTOR, TOWN OF	09/30/1983
ONTARIO COUNTY	VICTOR, VILLAGE OF	05/17/2004
ONTARIO COUNTY	WEST BLOOMFIELD, TOWN OF	06/01/1978
ORANGE COUNTY	BLOOMING GROVE, TOWN OF	08/03/2009
ORANGE COUNTY	CHESTER, TOWN OF	08/03/2009
ORANGE COUNTY	CHESTER, VILLAGE OF	08/03/2009
ORANGE COUNTY	CORNWALL ON THE HUDSON, VILLA	08/03/2009
ORANGE COUNTY	CORNWALL, TOWN OF	08/03/2009
ORANGE COUNTY	CRAWFORD, TOWN OF	08/03/2009
ORANGE COUNTY	DEER PARK, TOWN OF	08/03/2009
ORANGE COUNTY	FLORIDA, VILLAGE OF	08/03/2009
ORANGE COUNTY	GOSHEN, TOWN OF	08/03/2009
ORANGE COUNTY	GOSHEN, VILLAGE OF	08/03/2009
ORANGE COUNTY	GREENVILLE, TOWN OF	08/03/2009
ORANGE COUNTY	GREENWOOD LAKE, VILLAGE OF	08/03/2009
ORANGE COUNTY	HAMPTONBURGH, TOWN OF	08/03/2009
ORANGE COUNTY	HARRIMAN, VILLAGE OF	08/03/2009
ORANGE COUNTY	HIGHLAND FALLS, VILLAGE OF	08/03/2009
ORANGE COUNTY	HIGHLANDS, TOWNSHIP OF	08/03/2009
ORANGE COUNTY	KIRYAS JOEL, VILLAGE OF	08/03/2009
ORANGE COUNTY	MAYBROOK, VILLAGE OF	08/03/2009 (M)
ORANGE COUNTY	MIDDLETOWN, CITY OF	08/03/2009
ORANGE COUNTY	MINISINK, TOWN OF	08/03/2009
ORANGE COUNTY	MONROE, TOWN OF	08/03/2009
ORANGE COUNTY	MONROE, VILLAGE OF	08/03/2009

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
ORANGE COUNTY	MONTGOMERY, TOWN OF	08/03/2009
ORANGE COUNTY	MONTGOMERY, VILLAGE OF	08/03/2009
ORANGE COUNTY	MOUNT HOPE, TOWN OF	08/03/2009 (M)
ORANGE COUNTY	NEW WINDSOR, TOWN OF	08/03/2009
ORANGE COUNTY	NEWBURGH, CITY OF	08/03/2009
ORANGE COUNTY	NEWBURGH, TOWN OF	08/03/2009
ORANGE COUNTY	PORT JERVIS, CITY OF	08/03/2009
ORANGE COUNTY	SOUTH BLOOMING GROVE, VILLAGE	08/03/2009
ORANGE COUNTY	TUXEDO PARK, VILLAGE OF	08/03/2009
ORANGE COUNTY	TUXEDO, TOWN OF	08/03/2009
ORANGE COUNTY	UNIONVILLE, VILLAGE OF	08/03/2009 (M)
ORANGE COUNTY	WALDEN, VILLAGE OF	08/03/2009
ORANGE COUNTY	WALLKILL, TOWN OF	08/03/2009
ORANGE COUNTY	WARWICK, TOWN OF	08/03/2009
ORANGE COUNTY	WARWICK, VILLAGE OF	08/03/2009
ORANGE COUNTY	WASHINGTONVILLE, VILLAGE OF	08/03/2009
ORANGE COUNTY	WAWAYANDA, TOWN OF	08/03/2009
ORANGE COUNTY	WOODBURY, VILLAGE OF	08/03/2009
ORLEANS COUNTY	ALBION, TOWN OF	08/08/1980 (M)
ORLEANS COUNTY	ALBION, VILLAGE OF	11/30/1979 (M)
ORLEANS COUNTY	BARRE, TOWN OF	10/15/1981 (M)
ORLEANS COUNTY	CARLTON, TOWN OF	11/1/1978
ORLEANS COUNTY	CLARENDON,TOWN OF	(NSFHA)
ORLEANS COUNTY	GAINES, TOWN OF	06/08/1984 (M)
ORLEANS COUNTY	HOLLEY, VILLAGE OF	11/30/1979 (M)
ORLEANS COUNTY	KENDALL, TOWN OF	05/01/1978
ORLEANS COUNTY	LYNDONVILLE, VILLAGE OF	09/16/1981
ORLEANS COUNTY	MEDINA, VILLAGE OF	03/28/1980 (M)
ORLEANS COUNTY	MURRAY, TOWN OF	03/21/1980 (M)
ORLEANS COUNTY	RIDGEWAY,TOWN OF	09/14/1979 (M)
ORLEANS COUNTY	SHELBY,TOWN OF	12/23/1983 (M)
ORLEANS COUNTY	YATES, TOWN OF	09/29/1978
OSWEGO COUNTY	ALBION, TOWN OF	04/15/1986 (M)
OSWEGO COUNTY	ALTMAR, VILLAGE OF	02/05/1986 (M)
OSWEGO COUNTY	AMBOY, TOWN OF	03/01/1988 (L)
OSWEGO COUNTY	BOYLSTON, TOWN OF	(NSFHA)
OSWEGO COUNTY	CENTRAL SQUARE,VILLAGE OF	(NSFHA)
OSWEGO COUNTY	CLEVELAND, VILLAGE OF	06/01/1982
OSWEGO COUNTY	CONSTANTIA, TOWN OF	11/3/1982
OSWEGO COUNTY	FULTON, CITY OF	04/15/1982
OSWEGO COUNTY	GRANBY, TOWN OF	09/16/1982
OSWEGO COUNTY	HANNIBAL, TOWN OF	02/01/1988 (L)

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
OSWEGO COUNTY	HANNIBAL, VILLAGE OF	04/01/1987 (L)
OSWEGO COUNTY	HASTINGS, TOWN OF	01/19/1983
OSWEGO COUNTY	LACONA, VILLAGE OF	05/11/1979 (M)
OSWEGO COUNTY	MEXICO, TOWN OF	10/15/1981
OSWEGO COUNTY	MEXICO, VILLAGE OF	10/15/1981
OSWEGO COUNTY	MINETTO, TOWN OF	09/30/1981
OSWEGO COUNTY	NEW HAVEN, TOWN OF	11/2/1995
OSWEGO COUNTY	ORWELL, TOWN OF	02/19/1986
OSWEGO COUNTY	OSWEGO, CITY OF	11/22/1999
OSWEGO COUNTY	OSWEGO, TOWN OF	06/20/2001
OSWEGO COUNTY	PALERMO, TOWN OF	03/01/1988
OSWEGO COUNTY	PARISH, TOWN OF	04/15/1986 (M)
OSWEGO COUNTY	PARISH, VILLAGE OF	02/19/1986 (M)
OSWEGO COUNTY	PHOENIX, VILLAGE OF	02/17/1982
OSWEGO COUNTY	PULASKI, VILLAGE OF	09/02/1982
OSWEGO COUNTY	REDFIELD, TOWN OF	04/01/1991 (L)
OSWEGO COUNTY	RICHLAND, TOWN OF	07/17/1995
OSWEGO COUNTY	SANDY CREEK, TOWN OF	07/17/1995
OSWEGO COUNTY	SANDY CREEK, VILLAGE OF	05/11/1979 (M)
OSWEGO COUNTY	SCHROEPPEL, TOWN OF	08/02/1982
OSWEGO COUNTY	SCRIBA, TOWN OF	06/06/2001
OSWEGO COUNTY	VOLNEY, TOWN OF	04/15/1982
OSWEGO COUNTY	WEST MONROE, TOWN OF	01/20/1982
OSWEGO COUNTY	WILLIAMSTOWN, TOWN OF	03/01/1988
OTSEGO COUNTY	BURLINGTON, TOWN OF	10/21/1983 (M)
OTSEGO COUNTY	BUTTERNUTS, TOWN OF	12/23/1983 (M)
OTSEGO COUNTY	CHERRY VALLEY, TOWN OF	02/01/1988 (L)
OTSEGO COUNTY	CHERRY VALLEY, VILLAGE OF	01/03/1986 (M)
OTSEGO COUNTY	COOPERSTOWN, VILLAGE OF	05/04/2000
OTSEGO COUNTY	DECATUR, TOWN OF	06/18/1987
OTSEGO COUNTY	EDMESTON, TOWN OF	06/01/1987 (L)
OTSEGO COUNTY	EXETER, TOWN OF	11/18/1983 (M)
OTSEGO COUNTY	GILBERTSVILLE, VILLAGE OF	11/01/1985 (M)
OTSEGO COUNTY	HARTWICK, TOWN OF	11/04/1983 (M)
OTSEGO COUNTY	LAURENS, TOWN OF	05/15/1985 (M)
OTSEGO COUNTY	LAURENS, VILLAGE OF	04/17/1987 (M)
OTSEGO COUNTY	MARYLAND, TOWN OF	06/03/1986 (M)
OTSEGO COUNTY	MIDDLEFIELD, TOWN OF	06/01/1988 (L)
OTSEGO COUNTY	MILFORD, TOWN OF	05/19/1987 (M)
OTSEGO COUNTY	MILFORD, VILLAGE OF	11/18/1983
OTSEGO COUNTY	MORRIS, TOWN OF	01/03/1986 (M)
OTSEGO COUNTY	MORRIS, VILLAGE OF	12/04/1985 (M)

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
OTSEGO COUNTY	NEW LISBON, TOWN OF	11/18/1983 (M)
OTSEGO COUNTY	ONEONTA, CITY OF	09/29/1978
OTSEGO COUNTY	ONEONTA, TOWN OF	10/17/1986
OTSEGO COUNTY	OTEGO, TOWN OF	02/04/1987
OTSEGO COUNTY	OTEGO, VILLAGE OF	11/5/1986
OTSEGO COUNTY	OTSEGO, TOWN OF	06/01/1987 (L)
OTSEGO COUNTY	PITTSFIELD, TOWN OF	11/04/1983 (M)
OTSEGO COUNTY	PLAINFIELD, TOWN OF	11/04/1983 (M)
OTSEGO COUNTY	RICHFIELD SPRINGS, VILLAGE OF	01/03/1986 (M)
OTSEGO COUNTY	RICHFIELD, TOWN OF	04/15/1986 (M)
OTSEGO COUNTY	ROSEBOOM, TOWN OF	06/01/1988
OTSEGO COUNTY	SPRINGFIELD, TOWN OF	06/01/1987 (L)
OTSEGO COUNTY	UNADILLA, TOWN OF	09/30/1987
OTSEGO COUNTY	UNADILLA, VILLAGE OF	09/30/1987
OTSEGO COUNTY	WESTFORD, TOWN OF	06/01/1987 (L)
OTSEGO COUNTY	WORCESTER, TOWN OF	06/01/1987 (L)
PUTNAM COUNTY	BREWSTER, VILLAGE OF	09/18/1986
PUTNAM COUNTY	CARMEL,TOWN OF	10/19/2001
PUTNAM COUNTY	COLD SPRING, VILLAGE OF	03/15/1984
PUTNAM COUNTY	KENT, TOWN OF	09/04/1986
PUTNAM COUNTY	NELSONVILLE, VILLAGE OF	09/10/1984 (M)
PUTNAM COUNTY	PATTERSON, TOWN OF	07/03/1986
PUTNAM COUNTY	PHILIPSTOWN,TOWN OF	06/18/1987
PUTNAM COUNTY	PUTNAM VALLEY, TOWN OF	06/20/2001
PUTNAM COUNTY	SOUTHEAST, TOWN OF	09/04/1986
RENSSELAER COUNTY	BERLIN, TOWN OF	08/17/1979 (M)
RENSSELAER COUNTY	BRUNSWICK, TOWN OF	12/6/2000
RENSSELAER COUNTY	CASTLETON-ON-HUDSON, VILLAGE O	11/15/1984
RENSSELAER COUNTY	EAST GREENBUSH, TOWN OF	03/18/1980
RENSSELAER COUNTY	EAST NASSAU, VILLAGE OF	09/05/1984
RENSSELAER COUNTY	GRAFTON, TOWN OF	10/13/1978 (M)
RENSSELAER COUNTY	HOOSICK FALLS, VILLAGE OF	02/04/2005
RENSSELAER COUNTY	HOOSICK, TOWN OF	08/01/1987 (L)
RENSSELAER COUNTY	NASSAU, TOWN OF	09/05/1984
RENSSELAER COUNTY	NASSAU, VILLAGE OF	05/18/1979 (M)
RENSSELAER COUNTY	NORTH GREENBUSH,TOWN OF	06/18/1980
RENSSELAER COUNTY	PETERSBURG, TOWN OF	09/01/1978 (M)
RENSSELAER COUNTY	PITTSTOWN, TOWN OF	09/05/1990
RENSSELAER COUNTY	POESTENKILL, TOWN OF	09/02/1981
RENSSELAER COUNTY	RENSSELAER, CITY OF	03/18/1980
RENSSELAER COUNTY	SAND LAKE, TOWN OF	05/15/1980
RENSSELAER COUNTY	SCHAGHTICOKE, TOWN OF	07/16/1984

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
RENSSELAER COUNTY	SCHAGHTICOKE, VILLAGE OF	06/05/1985
RENSSELAER COUNTY	SCHODACK, TOWN OF	08/15/1984
RENSSELAER COUNTY	STEPHENTOWN, TOWN OF	08/03/1981
RENSSELAER COUNTY	TROY, CITY OF	03/18/1980
RENSSELAER COUNTY	VALLEY FALLS, VILLAGE OF	06/05/1985
RICHMOND COUNTY/QUEENS COUNTY/NEW YORK COUNTY/KINGS COUNTY/BRONX COUNTY	NEW YORK, CITY OF	09/05/2007
ROCKLAND COUNTY	CHESTNUT RIDGE, VILLAGE OF	09/16/1988
ROCKLAND COUNTY	CLARKSTOWN, TOWN OF	05/21/2001
ROCKLAND COUNTY	GRAND VIEW-ON-HUDSON, VILLAGE	10/15/1981
ROCKLAND COUNTY	HAVERSTRAW, TOWN OF	01/06/1982
ROCKLAND COUNTY	HAVERSTRAW, VILLAGE OF	09/02/1981
ROCKLAND COUNTY	HILLBURN, VILLAGE OF	09/20/1996
ROCKLAND COUNTY	KASER, VILLAGE OF	01/01/2050
ROCKLAND COUNTY	MONTEBELLO, VILLAGE OF	01/18/1989
ROCKLAND COUNTY	NEW HEMPSTEAD, VILLAGE OF	12/16/1988
ROCKLAND COUNTY	NEW SQUARE, VILLAGE OF	(NSFHA)
ROCKLAND COUNTY	NYACK, VILLAGE OF	12/4/1985
ROCKLAND COUNTY	ORANGETOWN, TOWN OF	08/02/1982
ROCKLAND COUNTY	PIERMONT, VILLAGE OF	11/17/1982
ROCKLAND COUNTY	POMONA, VILLAGE OF	04/15/1982
ROCKLAND COUNTY	RAMAPO, TOWN OF	02/02/1989
ROCKLAND COUNTY	SLOATSBURG, VILLAGE OF	01/06/1982
ROCKLAND COUNTY	SOUTH NYACK, VILLAGE OF	11/4/1981
ROCKLAND COUNTY	SPRING VALLEY, VILLAGE OF	08/16/1988
ROCKLAND COUNTY	STONY POINT, TOWN OF	09/30/1981
ROCKLAND COUNTY	SUFFERN, VILLAGE OF	03/28/1980
ROCKLAND COUNTY	UPPER NYACK, VILLAGE OF	(NSFHA)
ROCKLAND COUNTY	WESLEY HILLS, VILLAGE OF	09/16/1988
ROCKLAND COUNTY	WEST HAVERSTRAW, VILLAGE OF	09/30/1981
SARATOGA COUNTY	BALLSTON SPA, VILLAGE OF	08/16/1995
SARATOGA COUNTY	BALLSTON, TOWN OF	08/16/1995
SARATOGA COUNTY	CHARLTON, TOWN OF	08/16/1995
SARATOGA COUNTY	CLIFTON PARK, TOWN OF	08/16/1995
SARATOGA COUNTY	CORINTH, TOWN OF	08/16/1995
SARATOGA COUNTY	CORINTH, VILLAGE OF	08/16/1995
SARATOGA COUNTY	DAY, TOWN OF	(NSFHA)
SARATOGA COUNTY	GALWAY, TOWN OF	08/16/1995
SARATOGA COUNTY	GREENFIELD, TOWN OF	08/16/1995
SARATOGA COUNTY	HADLEY, TOWN OF	08/16/1995

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
SARATOGA COUNTY	HALFMOON, TOWN OF	08/16/1995
SARATOGA COUNTY	MALTA, TOWN OF	08/16/1995
SARATOGA COUNTY	MECHANICVILLE, CITY OF	08/16/1995
SARATOGA COUNTY	MILTON, TOWN OF	08/16/1995
SARATOGA COUNTY	MOREAU, TOWN OF	08/16/1995
SARATOGA COUNTY	NORTHUMBERLAND, TOWN OF	08/16/1995
SARATOGA COUNTY	PROVIDENCE, TOWN OF	08/16/1995
SARATOGA COUNTY	ROUND LAKE, VILLAGE OF	08/16/1995
SARATOGA COUNTY	SARATOGA SPRINGS, CITY OF	08/16/1995
SARATOGA COUNTY	SARATOGA, TOWN OF	08/16/1995
SARATOGA COUNTY	SCHUYLERVILLE, VILLAGE OF	08/16/1995
SARATOGA COUNTY	SOUTH GLENS FALLS, VILLAGE OF	08/16/1995
SARATOGA COUNTY	STILLWATER, TOWN OF	08/16/1995
SARATOGA COUNTY	STILLWATER, VILLAGE OF	08/16/1995
SARATOGA COUNTY	VICTORY, VILLAGE OF	08/16/1995
SARATOGA COUNTY	WATERFORD, TOWN OF	08/16/1995
SARATOGA COUNTY	WATERFORD, VILLAGE OF	08/16/1995
SARATOGA COUNTY	WILTON,TOWN OF	(NSFHA)
SCHENECTADY COUNTY	DELANSON, VILLAGE OF	05/25/1984 (M)
SCHENECTADY COUNTY	DUANESBURG, TOWN OF	02/17/1989
SCHENECTADY COUNTY	GLENVILLE,TOWN OF	05/04/1987
SCHENECTADY COUNTY	NISKAYUNA, TOWN OF	03/01/1978
SCHENECTADY COUNTY	PRINCETOWN, TOWN OF	07/01/1988 (L)
SCHENECTADY COUNTY	ROTTERDAM, TOWN OF	06/15/1984
SCHENECTADY COUNTY	SCHENECTADY, CITY OF	09/30/1983
SCHENECTADY COUNTY	SCOTIA, VILLAGE OF	06/01/1984
SCHOHARIE COUNTY	BLENHEIM, TOWN OF	04/02/2004
SCHOHARIE COUNTY	BROOME, TOWN OF	04/02/2004
SCHOHARIE COUNTY	CARLISLE, TOWN OF	04/02/2004
SCHOHARIE COUNTY	COBLESKILL, TOWN OF	04/02/2004
SCHOHARIE COUNTY	COBLESKILL, VILLAGE OF	04/02/2004
SCHOHARIE COUNTY	CONESVILLE, TOWN OF	04/02/2004
SCHOHARIE COUNTY	ESPERANCE, TOWN OF	04/02/2004
SCHOHARIE COUNTY	ESPERANCE, VILLAGE OF	04/02/2004
SCHOHARIE COUNTY	FULTON, TOWN OF	04/02/2004
SCHOHARIE COUNTY	GILBOA, TOWN OF	04/02/2004
SCHOHARIE COUNTY	JEFFERSON, TOWN OF	04/02/2004
SCHOHARIE COUNTY	MIDDLEBURGH, TOWN OF	04/02/2004
SCHOHARIE COUNTY	MIDDLEBURGH, VILLAGE OF	04/02/2004
SCHOHARIE COUNTY	RICHMONDVILLE, TOWN OF	04/02/2004
SCHOHARIE COUNTY	RICHMONDVILLE, VILLAGE OF	04/02/2004
SCHOHARIE COUNTY	SCHOHARIE, TOWN OF	04/02/2004

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Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
SCHOHARIE COUNTY	SCHOHARIE, VILLAGE OF	04/02/2004
SCHOHARIE COUNTY	SEWARD, TOWN OF	04/02/2004
SCHOHARIE COUNTY	SHARON SPRING, VILLAGE OF	04/02/2004 (M)
SCHOHARIE COUNTY	SHARON, TOWN OF	04/02/2004
SCHOHARIE COUNTY	SUMMIT, TOWN OF	04/02/2004
SCHOHARIE COUNTY	WRIGHT, TOWN OF	04/02/2004
SCHUYLER COUNTY	BURDETT, VILLAGE OF	06/01/1988 (L)
SCHUYLER COUNTY	CATHARINE, TOWN OF	04/20/1984 (M)
SCHUYLER COUNTY	CAYUTA, TOWN OF	09/24/1984 (M)
SCHUYLER COUNTY	DIX, TOWN OF	10/29/1982 (M)
SCHUYLER COUNTY	HECTOR, TOWN OF	07/20/1984 (M)
SCHUYLER COUNTY	MONTOUR FALLS, VILLAGE OF	09/15/1983
SCHUYLER COUNTY	MONTOUR, TOWN OF	03/01/1988 (L)
SCHUYLER COUNTY	ODESSA, VILLAGE OF	04/20/1984 (M)
SCHUYLER COUNTY	ORANGE, TOWN OF	04/20/1984 (M)
SCHUYLER COUNTY	READING, TOWN OF	(NSFHA)
SCHUYLER COUNTY	TYRONE, TOWN OF	07/06/1984 (M)
SCHUYLER COUNTY	WATKINS GLEN, VILLAGE OF	07/17/1978
SENECA COUNTY	COVERT, TOWN OF	06/08/1984 (M)
SENECA COUNTY	FAYETTE, TOWN OF	01/15/1988
SENECA COUNTY	LODI, TOWN OF	01/15/1988
SENECA COUNTY	LODI, VILLAGE OF	(NSFHA)
SENECA COUNTY	OVID, TOWN OF	01/15/1988
SENECA COUNTY	ROMULUS, TOWN OF	06/05/1985 (M)
SENECA COUNTY	SENECA FALLS, TOWN OF	08/03/1981
SENECA COUNTY	SENECA FALLS, VILLAGE OF	08/03/1981
SENECA COUNTY	TYRE, TOWN OF	08/31/1979 (M)
SENECA COUNTY	VARICK, TOWN OF	12/17/1987
SENECA COUNTY	WATERLOO, TOWN OF	09/16/1981
SENECA COUNTY	WATERLOO, VILLAGE OF	08/03/1981
ST. LAWRENCE COUNTY	BRASHER, TOWN OF	01/03/1986 (M)
ST. LAWRENCE COUNTY	CANTON, TOWN OF	08/17/1998
ST. LAWRENCE COUNTY	CANTON, VILLAGE OF	05/02/1994
ST. LAWRENCE COUNTY	CLARE, TOWN OF	07/16/1982 (M)
ST. LAWRENCE COUNTY	CLIFTON, CITY OF	05/15/1986 (M)
ST. LAWRENCE COUNTY	COLTON, TOWN OF	05/01/1985 (M)
ST. LAWRENCE COUNTY	DE KALB, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	DE PEYSTER, TOWN OF	07/23/1982 (M)
ST. LAWRENCE COUNTY	EDWARDS, TOWN OF	07/30/1982 (M)
ST. LAWRENCE COUNTY	EDWARDS, VILLAGE OF	07/23/1982 (M)
ST. LAWRENCE COUNTY	FINE, TOWN OF	05/01/1985 (M)
ST. LAWRENCE COUNTY	FOWLER, TOWN OF	06/05/1989 (M)

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
ST. LAWRENCE COUNTY	GOUVERNEUR, TOWN OF	08/06/1982 (M)
ST. LAWRENCE COUNTY	GOUVERNEUR, VILLAGE OF	03/03/1997
ST. LAWRENCE COUNTY	HAMMOND, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	HERMON, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	HERMON, VILLAGE OF	08/03/1998
ST. LAWRENCE COUNTY	HEUVELTON, VILLAGE OF	04/30/1986 (M)
ST. LAWRENCE COUNTY	HOPKINTON, TOWN OF	11/12/1982 (M)
ST. LAWRENCE COUNTY	LAWRENCE, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	LISBON, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	LOUISVILLE, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	MACOMB, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	MADRID, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	MASSENA, TOWN OF	06/17/1986 (M)
ST. LAWRENCE COUNTY	MASSENA, VILLAGE OF	11/5/1980
ST. LAWRENCE COUNTY	MORRISTOWN, TOWN OF	08/06/1982 (M)
ST. LAWRENCE COUNTY	MORRISTOWN, VILLAGE OF	12/02/1980 (M)
ST. LAWRENCE COUNTY	NORFOLK, TOWN OF	04/15/1986 (M)
ST. LAWRENCE COUNTY	NORWOOD, VILLAGE OF	04/30/1986 (M)
ST. LAWRENCE COUNTY	OGDENSBURG, CITY OF	11/5/1980
ST. LAWRENCE COUNTY	OSWEGATCHIE, TOWN OF	05/01/1985 (M)
ST. LAWRENCE COUNTY	PARISHVILLE, TOWN OF	07/30/1982 (M)
ST. LAWRENCE COUNTY	PIERCEFIELD, TOWN OF	01/06/1984 (M)
ST. LAWRENCE COUNTY	PIERREPONT, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	PITCAIRN, TOWN OF	08/13/1982 (M)
ST. LAWRENCE COUNTY	POTSDAM, VILLAGE OF	01/05/1996
ST. LAWRENCE COUNTY	POTSDAM,TOWN OF	03/04/1986 (M)
ST. LAWRENCE COUNTY	RENSSELAER FALLS, VILLAGE OF	01/06/1984 (M)
ST. LAWRENCE COUNTY	RICHVILLE, VILLAGE OF	01/06/1984 (M)
ST. LAWRENCE COUNTY	ROSSIE, TOWN OF	07/30/1982 (M)
ST. LAWRENCE COUNTY	RUSSELL, TOWN OF	(NSFHA)
ST. LAWRENCE COUNTY	STOCKHOLM, TOWN OF	04/15/1986 (M)
ST. LAWRENCE COUNTY	WADDINGTON, TOWN OF	04/15/1986 (M)
ST. LAWRENCE COUNTY	WADDINGTON, VILLAGE OF	05/11/1979 (M)
STEUBEN COUNTY	ADDISON, TOWN OF	12/18/1984
STEUBEN COUNTY	ADDISON, VILLAGE OF	06/15/1981
STEUBEN COUNTY	ARKPORT, VILLAGE OF	03/04/1980
STEUBEN COUNTY	AVOCA, TOWN OF	02/05/1992
STEUBEN COUNTY	AVOCA, VILLAGE OF	05/16/1983
STEUBEN COUNTY	BATH, TOWN OF	05/02/1983
STEUBEN COUNTY	BATH, VILLAGE OF	03/16/1983
STEUBEN COUNTY	BRADFORD, TOWN OF	09/24/1984 (M)
STEUBEN COUNTY	CAMERON, TOWN OF	05/15/1991

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
STEUBEN COUNTY	CAMPBELL, TOWN OF	06/11/1982
STEUBEN COUNTY	CANISTEO, TOWN OF	12/18/1984
STEUBEN COUNTY	CANISTEO, VILLAGE OF	05/18/1979 (M)
STEUBEN COUNTY	CATON, TOWN OF	03/23/1984 (M)
STEUBEN COUNTY	COHOCTON, TOWN OF	05/16/1983
STEUBEN COUNTY	COHOCTON, VILLAGE OF	05/16/1983
STEUBEN COUNTY	CORNING, CITY OF	09/27/2002
STEUBEN COUNTY	CORNING, TOWN OF	09/27/2002
STEUBEN COUNTY	DANSVILLE, TOWN OF	03/09/84(M)
STEUBEN COUNTY	ERWIN, TOWN OF	07/02/1980
STEUBEN COUNTY	FREMONT, TOWN OF	10/29/1982 (M)
STEUBEN COUNTY	GREENWOOD, TOWN OF	09/03/1982 (M)
STEUBEN COUNTY	HAMMONDSPORT, VILLAGE OF	04/17/1978
STEUBEN COUNTY	HARTSVILLE, TOWN OF	09/17/1982 (M)
STEUBEN COUNTY	HORNBY, TOWN OF	04/15/1986
STEUBEN COUNTY	HORNELL, CITY OF	03/18/1980
STEUBEN COUNTY	HORNELLSVILLE, TOWN OF	07/16/1980
STEUBEN COUNTY	HOWARD, TOWN OF	09/03/1982 (M)
STEUBEN COUNTY	JASPER, TOWN OF	07/23/1982 (M)
STEUBEN COUNTY	LINDLEY, TOWN OF	08/01/1980
STEUBEN COUNTY	NORTH HORNELL, VILLAGE OF	01/17/1986
STEUBEN COUNTY	PAINTED POST, VILLAGE OF	05/18/2000
STEUBEN COUNTY	PRATTSBURG, TOWN OF	01/20/1984 (M)
STEUBEN COUNTY	PULTENEY, TOWN OF	09/30/1977
STEUBEN COUNTY	RATHBONE, TOWN OF	12/03/1982 (M)
STEUBEN COUNTY	RIVERSIDE, VILLAGE OF	05/15/1980
STEUBEN COUNTY	SAVONA, VILLAGE OF	08/15/1980
STEUBEN COUNTY	SOUTH CORNING, VILLAGE OF	10/15/1981
STEUBEN COUNTY	THURSTON, TOWN OF	02/11/1983 (M)
STEUBEN COUNTY	TROUPSBURG, TOWN OF	09/24/1982 (M)
STEUBEN COUNTY	TUSCARORA, TOWN OF	03/01/1988 (L)
STEUBEN COUNTY	URBANA, TOWN OF	01/19/1978
STEUBEN COUNTY	WAYLAND, TOWN OF	06/08/1984 (M)
STEUBEN COUNTY	WAYLAND, VILLAGE OF	08/01/1988 (L)
STEUBEN COUNTY	WAYNE, TOWN OF	11/2/1977
STEUBEN COUNTY	WEST UNION, TOWN OF	07/01/1988 (L)
STEUBEN COUNTY	WHEELER, TOWN OF	07/25/1980 (M)
STEUBEN COUNTY	WOODHULL, TOWN OF	04/02/1991
STEUBEN COUNTY/ALLEGANY COUNTY	ALMOND, TOWN OF	03/04/1980
SUFFOLK COUNTY	AMITYVILLE, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	ASHAROKEN, VILLAGE OF	09/25/2009

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
SUFFOLK COUNTY	BABYLON, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	BABYLON,TOWN OF	09/25/2009
SUFFOLK COUNTY	BELLE TERRE, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	BELLPORT, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	BRIGHTWATERS, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	BROOKHAVEN,TOWN OF	09/25/2009
SUFFOLK COUNTY	DERING HARBOR, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	EAST HAMPTON,TOWN OF	09/25/2009
SUFFOLK COUNTY	EAST HAMPTON,VILLAGE OF	09/25/2009
SUFFOLK COUNTY	GREENPORT, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	HEAD OF THE HARBOR, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	HUNTINGTON BAY, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	HUNTINGTON, TOWN OF	09/25/2009
SUFFOLK COUNTY	ISLANDIA, VILLAGE OF	09/25/2009 (M)
SUFFOLK COUNTY	ISLIP,TOWN OF	09/25/2009
SUFFOLK COUNTY	LAKE GROVE, VILLAGE OF	(NSFHA)
SUFFOLK COUNTY	LINDENHURST, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	LLOYD HARBOR, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	NISSEQUOGUE, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	NORTH HAVEN, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	NORTHPORT, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	OCEAN BEACH, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	OLD FIELD, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	PATCHOGUE, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	POQUOTT, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	PORT JEFFERSON, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	QUOGUE, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	RIVERHEAD, TOWN OF	09/25/2009
SUFFOLK COUNTY	SAG HARBOR, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	SAGAPONACK, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	SALTAIRE,VILLAGE OF	09/25/2009
SUFFOLK COUNTY	SHELTER ISLAND, TOWN OF	09/25/2009
SUFFOLK COUNTY	SHOREHAM, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	SMITHTOWN, TOWN OF	09/25/2009
SUFFOLK COUNTY	SOUTHAMPTON, TOWN OF	09/25/2009
SUFFOLK COUNTY	SOUTHAMPTON, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	SOUTHOLD,TOWN OF	09/25/2009
SUFFOLK COUNTY	THE BRANCH, VILLAGE OF	09/25/2009
SUFFOLK COUNTY	WEST HAMPTON DUNES, VILLAGE O	09/25/2009
SUFFOLK COUNTY	WESTHAMPTON BEACH, VILLAGE OF	09/25/2009
SULLIVAN COUNTY	BETHEL, TOWN OF	02/18/2011
SULLIVAN COUNTY	BLOOMINGBURG, VILLAGE OF	02/18/2011

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
SULLIVAN COUNTY	CALLICOON, TOWN OF	02/18/2011
SULLIVAN COUNTY	COCHECTON, TOWN OF	02/18/2011
SULLIVAN COUNTY	DELAWARE, TOWN OF	02/18/2011
SULLIVAN COUNTY	FALLSBURG, TOWN OF	02/18/2011
SULLIVAN COUNTY	FORESTBURGH, TOWN OF	02/18/2011
SULLIVAN COUNTY	FREMONT, TOWN OF	02/18/2011
SULLIVAN COUNTY	HIGHLAND, TOWN OF	02/18/2011
SULLIVAN COUNTY	JEFFERSONVILLE, VILLAGE OF	02/18/2011
SULLIVAN COUNTY	LIBERTY, TOWN OF	02/18/2011
SULLIVAN COUNTY	LIBERTY, VILLAGE OF	02/18/2011
SULLIVAN COUNTY	LUMBERLAND, TOWN OF	02/18/2011
SULLIVAN COUNTY	MAMAKATING, TOWN OF	02/18/2011
SULLIVAN COUNTY	MONTICELLO, VILLAGE OF	02/18/2011
SULLIVAN COUNTY	NEVERSINK, TOWN OF	02/18/2011 (M)
SULLIVAN COUNTY	ROCKLAND, TOWN OF	02/18/2011
SULLIVAN COUNTY	THOMPSON, TOWN OF	02/18/2011
SULLIVAN COUNTY	TUSTEN, TOWN OF	02/18/2011
SULLIVAN COUNTY	WOODRIDGE, VILLAGE OF	02/18/2011 (M)
SULLIVAN COUNTY	WURTSBORO, VILLAGE OF	02/18/2011
TIOGA COUNTY	BARTON, TOWN OF	05/15/1991
TIOGA COUNTY	BERKSHIRE, TOWN OF	05/15/1985 (M)
TIOGA COUNTY	CANDOR, TOWN OF	08/19/1986
TIOGA COUNTY	CANDOR, VILLAGE OF	10/01/1991 (L)
TIOGA COUNTY	NEWARK VALLEY, TOWN OF	02/03/1982
TIOGA COUNTY	NEWARK VALLEY, VILLAGE OF	02/03/1982
TIOGA COUNTY	NICHOLS, TOWN OF	02/17/1982
TIOGA COUNTY	NICHOLS, VILLAGE OF	09/29/1986
TIOGA COUNTY	OWEGO, TOWN OF	01/17/1997
TIOGA COUNTY	OWEGO, VILLAGE OF	04/02/1982
TIOGA COUNTY	RICHFORD, TOWN OF	05/15/1985 (M)
TIOGA COUNTY	SPENCER, TOWN OF	05/15/1985 (M)
TIOGA COUNTY	SPENCER, VILLAGE OF	05/15/1985 (M)
TIOGA COUNTY	TIOGA, TOWN OF	05/17/1982
TIOGA COUNTY	WAVERLY, VILLAGE OF	03/16/1983
TOMPKINS COUNTY	CAROLINE, TOWN OF	06/19/1985 (M)
TOMPKINS COUNTY	CAYUGA HEIGHTS, VILLAGE OF	(NSFHA)
TOMPKINS COUNTY	DANBY, TOWN OF	05/15/1985 (M)
TOMPKINS COUNTY	DRYDEN, TOWN OF	05/15/1985 (M)
TOMPKINS COUNTY	DRYDEN, VILLAGE OF	01/03/1979
TOMPKINS COUNTY	FREEVILLE, VILLAGE OF	05/01/88(L)
TOMPKINS COUNTY	GROTON, TOWN OF	10/05/1984 (M)
TOMPKINS COUNTY	GROTON, VILLAGE OF	11/5/1986

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
TOMPKINS COUNTY	ITHACA, CITY OF	09/30/1981
TOMPKINS COUNTY	ITHACA, TOWN OF	06/19/1985
TOMPKINS COUNTY	LANSING, TOWN OF	10/15/1985
TOMPKINS COUNTY	LANSING, VILLAGE OF	11/19/1987
TOMPKINS COUNTY	NEWFIELD, TOWN OF	10/15/1985 (M)
TOMPKINS COUNTY	TRUMANSBURG, VILLAGE OF	04/01/1988 (L)
TOMPKINS COUNTY	ULYSSES, TOWN OF	02/19/1987
ULSTER COUNTY	DENNING, TOWN OF	05/25/1984 (M)
ULSTER COUNTY	ELLENVILLE, VILLAGE OF	09/25/2009
ULSTER COUNTY	ESOPUS, TOWN OF	09/25/2009
ULSTER COUNTY	GARDINER, TOWN OF	09/25/2009
ULSTER COUNTY	HARDENBURGH, TOWN OF	03/16/2089
ULSTER COUNTY	HURLEY, TOWN OF	08/18/2092
ULSTER COUNTY	KINGSTON, CITY OF	09/25/2009
ULSTER COUNTY	KINGSTON,TOWN OF	09/25/2009
ULSTER COUNTY	LLOYD, TOWN OF	09/25/2009
ULSTER COUNTY	MARBLETOWN, TOWN OF	09/25/2009
ULSTER COUNTY	MARLBOROUGH, TOWN OF	09/25/2009
ULSTER COUNTY	NEW PALTZ, TOWN OF	09/25/2009
ULSTER COUNTY	NEW PALTZ, VILLAGE OF	09/25/2009
ULSTER COUNTY	OLIVE, TOWN OF	11/1/1984
ULSTER COUNTY	PLATTEKILL, TOWN OF	(NSFHA)
ULSTER COUNTY	ROCHESTER, TOWN OF	09/25/2009
ULSTER COUNTY	ROSENDALE, TOWN OF	09/25/2009
ULSTER COUNTY	SAUGERTIES, TOWN OF	09/25/2009
ULSTER COUNTY	SAUGERTIES, VILLAGE OF	09/25/2009 (M)
ULSTER COUNTY	SHANDAKEN, TOWN OF	02/17/1989
ULSTER COUNTY	SHAWANGUNK, TOWN OF	09/25/2009
ULSTER COUNTY	ULSTER, TOWN OF	09/25/2009
ULSTER COUNTY	WAWARSING, TOWN OF	09/15/1983
ULSTER COUNTY	WOODSTOCK, TOWN OF	09/27/1991
WARREN COUNTY	BOLTON, TOWN OF	08/16/1996
WARREN COUNTY	CHESTER, TOWN OF	06/05/1985 (M)
WARREN COUNTY	GLENS FALLS, CITY OF	06/05/1985
WARREN COUNTY	HAGUE, TOWN OF	09/29/1996
WARREN COUNTY	HORICON, TOWN OF	02/15/1985 (M)
WARREN COUNTY	JOHNSBURG, TOWN OF	05/01/1985 (M)
WARREN COUNTY	LAKE GEORGE, TOWN OF	08/16/1996
WARREN COUNTY	LAKE GEORGE, VILLAGE OF	09/29/1996
WARREN COUNTY	LAKE LUZERNE, TOWN OF	05/01/1984
WARREN COUNTY	QUEENSBURY, TOWN OF	08/16/1996
WARREN COUNTY	STONY CREEK, TOWN OF	08/24/1984 (M)

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
WARREN COUNTY	THURMAN, TOWN OF	08/19/1986
WARREN COUNTY	WARRENSBURG, TOWN OF	03/01/1984
WASHINGTON COUNTY	ARGYLE, TOWN OF	08/24/1984 (M)
WASHINGTON COUNTY	ARGYLE, VILLAGE OF	05/18/1979 (M)
WASHINGTON COUNTY	CAMBRIDGE, TOWN OF	09/04/1985 (M)
WASHINGTON COUNTY	CAMBRIDGE, VILLAGE OF	01/02/2008
WASHINGTON COUNTY	DRESDEN, TOWN OF	09/20/1996
WASHINGTON COUNTY	EASTON, TOWN OF	11/20/1991
WASHINGTON COUNTY	FORT ANN, TOWN OF	11/5/1997
WASHINGTON COUNTY	FORT ANN, VILLAGE OF	(NSFHA)
WASHINGTON COUNTY	FORT EDWARD, TOWN OF	12/15/1982
WASHINGTON COUNTY	FORT EDWARD, VILLAGE OF	02/15/1984
WASHINGTON COUNTY	GRANVILLE, TOWN OF	08/05/1985 (M)
WASHINGTON COUNTY	GRANVILLE, VILLAGE OF	04/17/1985 (M)
WASHINGTON COUNTY	GREENWICH, VILLAGE OF	05/04/2000
WASHINGTON COUNTY	GREENWICH,TOWN OF	03/16/1992
WASHINGTON COUNTY	HAMPTON, TOWN OF	04/17/1985 (M)
WASHINGTON COUNTY	HARTFORD, TOWN OF	11/01/1985 (M)
WASHINGTON COUNTY	HEBRON, TOWN OF	06/15/1994
WASHINGTON COUNTY	HUDSON FALLS, VILLAGE OF	(NSFHA)
WASHINGTON COUNTY	JACKSON, TOWN OF	03/16/1992
WASHINGTON COUNTY	KINGSBURY, TOWN OF	09/07/1979 (M)
WASHINGTON COUNTY	PUTNAM, TOWN OF	11/20/1996
WASHINGTON COUNTY	SALEM, VILLAGE OF	04/17/1985 (M)
WASHINGTON COUNTY	SALEM,TOWN OF	04/17/1985 (M)
WASHINGTON COUNTY	WHITE CREEK, TOWN OF	04/17/1985 (M)
WASHINGTON COUNTY	WHITEHALL, TOWN OF	07/03/1986
WASHINGTON COUNTY	WHITEHALL, VILLAGE OF	06/03/1985 (M)
WAYNE COUNTY	ARCADIA, TOWN OF	11/2/1977
WAYNE COUNTY	BUTLER, TOWN OF	07/09/1982 (M)
WAYNE COUNTY	CLYDE, VILLAGE OF	12/18/1984
WAYNE COUNTY	GALEN, TOWN OF	05/16/1983
WAYNE COUNTY	HURON, TOWN OF	01/19/1996
WAYNE COUNTY	LYONS, TOWN OF	09/07/1979 (M)
WAYNE COUNTY	LYONS, VILLAGE OF	03/16/1983
WAYNE COUNTY	MACEDON, TOWN OF	01/05/1984
WAYNE COUNTY	MACEDON, VILLAGE OF	09/30/1983
WAYNE COUNTY	MARION, TOWN OF	07/01/1988 (L)
WAYNE COUNTY	NEWARK, VILLAGE OF	07/15/1988
WAYNE COUNTY	ONTARIO, TOWN OF	06/01/1978
WAYNE COUNTY	PALMYRA, TOWN OF	03/01/1978
WAYNE COUNTY	PALMYRA, VILLAGE OF	07/15/1988

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
WAYNE COUNTY	RED CREEK, VILLAGE OF	04/08/1983 (M)
WAYNE COUNTY	ROSE, TOWN OF	03/09/1984 (M)
WAYNE COUNTY	SAVANNAH, TOWN OF	08/06/1982 (M)
WAYNE COUNTY	SODUS POINT, VILLAGE OF	11/2/1977
WAYNE COUNTY	SODUS, TOWN OF	06/02/1992
WAYNE COUNTY	WALWORTH, TOWN OF	03/16/1983
WAYNE COUNTY	WILLIAMSON TOWN	10/17/1978
WAYNE COUNTY	WOLCOTT, TOWN OF	06/02/1992
WAYNE COUNTY	WOLCOTT, VILLAGE OF	07/06/1984 (M)
WESTCHESTER COUNTY	ARDSLEY, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	BEDFORD, TOWN OF	09/28/2007
WESTCHESTER COUNTY	BRIARCLIFF MANOR, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	BRONXVILLE, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	BUCHANAN, VILLAGE OF	09/28/2007 (M)
WESTCHESTER COUNTY	CORTLANDT, TOWN OF	09/28/2007
WESTCHESTER COUNTY	CROTON-ON-HUDSON, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	DOBBS FERRY, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	EASTCHESTER, TOWN OF	09/28/2007
WESTCHESTER COUNTY	ELMSFORD, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	GREENBURGH,TOWN OF	09/28/2007
WESTCHESTER COUNTY	HARRISON, TOWN OF	09/28/2007
WESTCHESTER COUNTY	HASTINGS-ON-HUDSON, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	IRVINGTON, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	LARCHMONT, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	LEWISBORO, TOWN OF	09/28/2007 (M)
WESTCHESTER COUNTY	MAMARONECK, TOWN OF	09/28/2007
WESTCHESTER COUNTY	MAMARONECK, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	MOUNT KISCO, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	MOUNT PLEASANT, TOWN OF	09/28/2007
WESTCHESTER COUNTY	MOUNT VERNON, CITY OF	09/28/2007
WESTCHESTER COUNTY	NEW CASTLE, TOWN OF	09/28/2007
WESTCHESTER COUNTY	NEW ROCHELLE, CITY OF	09/28/2007
WESTCHESTER COUNTY	NORTH CASTLE, TOWN OF	09/28/2007
WESTCHESTER COUNTY	NORTH SALEM, TOWN OF	09/28/2007
WESTCHESTER COUNTY	OSSINING, TOWN OF	09/28/2007
WESTCHESTER COUNTY	OSSINING, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	PEEKSKILL, CITY OF	09/28/2007
WESTCHESTER COUNTY	PELHAM MANOR, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	PELHAM, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	PLEASANTVILLE, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	PORT CHESTER, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	POUND RIDGE, TOWN OF	09/28/2007

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
WESTCHESTER COUNTY	RYE BROOK, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	RYE, CITY OF	09/28/2007
WESTCHESTER COUNTY	SCARSDALE, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	SLEEPY HOLLOW, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	SOMERS, TOWN OF	09/28/2007
WESTCHESTER COUNTY	TARRYTOWN, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	TUCKAHOE, VILLAGE OF	09/28/2007
WESTCHESTER COUNTY	WHITE PLAINS, CITY OF	09/28/2007
WESTCHESTER COUNTY	YONKERS, CITY OF	09/28/2007
WESTCHESTER COUNTY	YORKTOWN, TOWN OF	09/28/2007
WYOMING COUNTY	ARCADE, TOWN OF	03/03/1992
WYOMING COUNTY	ARCADE, VILLAGE OF	03/03/1992
WYOMING COUNTY	ATTICA, TOWN OF	04/30/1986
WYOMING COUNTY	BENNINGTON, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	CASTILE, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	CASTILE, VILLAGE OF	05/28/1982 (M)
WYOMING COUNTY	COVINGTON, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	EAGLE, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	GAINESVILLE, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	GAINESVILLE, VILLAGE OF	02/15/1985 (M)
WYOMING COUNTY	GENESEE FALLS, TOWN OF	05/01/1984
WYOMING COUNTY	JAVA, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	ORANGEVILLE, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	PERRY, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	PERRY, VILLAGE OF	07/29/1977 (M)
WYOMING COUNTY	PIKE, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	PIKE, VILLAGE OF	06/18/1982 (M)
WYOMING COUNTY	SHELDON, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	SILVER SPRINGS, VILLAGE OF	01/20/1984 (M)
WYOMING COUNTY	WARSAW, TOWN OF	12/23/1983 (M)
WYOMING COUNTY	WARSAW, VILLAGE OF	11/18/1981
WYOMING COUNTY	WETHERSFIELD, TOWN OF	07/16/1982
WYOMING COUNTY	WYOMING, VILLAGE OF	08/03/1981
YATES COUNTY	BARRINGTON, TOWN OF	03/09/1984 (M)
YATES COUNTY	BENTON, TOWN OF	01/20/1984 (M)
YATES COUNTY	DRESDEN, VILLAGE OF	06/15/1981
YATES COUNTY	DUNDEE, VILLAGE OF	03/01/1988 (L)
YATES COUNTY	ITALY, TOWN OF	03/07/2001
YATES COUNTY	JERUSALEM, TOWN OF	01/20/1984 (M)
YATES COUNTY	MIDDLESEX, TOWN OF	09/29/1989
YATES COUNTY	MILO, TOWN OF	07/18/1985 (M)
YATES COUNTY	PENN YAN, VILLAGE OF	06/15/1981

TABLE 3.4

Summary of FEMA Flood Insurance Rate Map (FIRM) Availability

County	Community Name	Current FIRM Effective Date
YATES COUNTY	POTTER, TOWN OF	03/23/1984 (M)
YATES COUNTY	RUSHVILLE, VILLAGE OF	06/05/1985 (M)
YATES COUNTY	STARKEY, TOWN OF	12/3/1987
YATES COUNTY	TORREY, TOWN OF	12/3/1987

Notes:
(NSFHA) - No special flood hazard area - All Zone "C"
(M) No elevation determined - All Zone "A", "C", and "X"
(L) Original FIRM by letter - All Zone "A", "C", and "X"
(S) Suspended community, not in the National Flood Program.
(X) Community not in National Flood Program
(>) Date of current effective map is after the date of this report.
Source: FEMA "Community Status Book Report – June 29, 2011."
(http://www.fema.gov/fema/csb.shtm)

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New York State

DEC

Appendix 2

1992 SEQRA Findings Statement on the GEIS on the Oil, Gas and Solution Mining Regulatory Program

Revised Draft
Supplemental Generic Environmental Impact Statement

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September 1, 1992

Findings Statement

Pursuant to the State Environmental Quality Review Act (SEQR) of the Environmental Conservation Law (ECL) and the SEQR Regulations 6NYCRR Part 617, the New York State Department of Environmental Conservation makes the following findings.

Name of Action

Adoption of the Final Generic Environmental Impact Statement (GEIS) on the Oil, Gas and Solution Mining Regulatory Program.

Description and Background

In early 1988, the Department of Environmental Conservation released the Draft GEIS on the Oil, Gas and Solution Mining Regulatory Program. The Draft GEIS comprehensively reviewed the environmental impacts of the Department's program for regulating the siting, drilling, production and plugging and abandonment of oil, gas, underground gas storage, solution mining, brine disposal, geothermal and stratigraphic test wells. Six public hearings were held on the Draft GEIS in June 1988.

The Final GEIS was released in July 1992. It contains individual responses to the hundreds of comments received on the Draft GEIS. The Final GEIS also includes more detailed topical responses addressing several controversial issues that frequently appeared in the comments on the draft document.

Together, the Draft and Final GEIS and this Findings Statement will provide the groundwork for revisions to the Oil, Gas and Solution Mining Regulations (6NYCRR Parts 550-559). These regulations are being updated to more accurately reflect and effectively implement the current Oil, Gas and Solution Mining Law (ECL Article 23).

The Draft GEIS included suggested changes to the regulations in bold print throughout the document. In the interests of environmental protection and public safety, a significant

number of the suggested regulatory changes are already put in effect as standard conditions routinely applied to permits. All formal regulation changes, however, must be promulgated in accordance with the State Administrative Procedure Act (SAPA) requiring separate review, public hearings and approval. Further public input during the rulemaking process may cause some of the new regulations, when they are eventually adopted, to differ from those discussed in the GEIS. Any regulations adopted that differ significantly from those discussed in the GEIS will undergo an additional SEQR Review and Determination.

Location

Statewide.

DEC Jurisdiction

Jurisdiction is provided by the Oil, Gas and Solution Mining Law (ECL Article 23).

Date Final GEIS Filed

The Final GEIS was filed June 25, 1992/#PO-009900-00046. The Notice of Completion was published in the Environmental Notice Bulletin July 8, 1992.

Facts and Conclusions Relied Upon to Support the SEQR Findings

The record of facts established in the Draft and Final GEIS upholds the following conclusions:

1. The **unregulated** siting, drilling, production, and plugging and abandonment of oil, gas, solution mining, underground gas storage, brine disposal, geothermal and stratigraphic test wells could have potential negative impacts on every aspect of the environment. The potential negative impacts range from very minor to significant. Potential impacts of **unregulated** activities on ground and surface waters are a particularly serious concern. The potential negative impacts on all environmental resources are described in detail in Chapters 8 through 14 and summarized in Chapter 16 of the Draft GEIS.

2. Under **existing regulations and permit conditions**, the potential environmental impacts of the above wells are **greatly reduced** and most are reduced to non-significant levels. The extensive mitigation measures required under the existing regulatory program are described in detail in Chapters 8 through 14 and summarized in Chapter 17 of the Draft GEIS.

3. The potential environmental impacts associated with the activities covered by the Oil, Gas and Solution Mining Regulatory Program also have economic and social implications. For example, it is less expensive to prevent pollution than pay for remediation of environmental problems, health care costs, and lawsuit expenses. The State also receives significant economic benefits from the activities covered by the regulatory program. The regulated industries provide jobs and economic stimulus through the purchase of goods and services, and the payment of taxes, royalties and leasing bonuses. Additional information on the potential economic impacts associated with the activities covered by the regulatory program is provided in Chapter 18 of the Draft GEIS.

4. The Department's routine requirement of: 1) a program-specific Environmental Assessment Form (EAF) with <u>every</u> well drilling permit application, 2) a plat (map) showing the proposed well location, and 3) a pre-drilling site inspection, allows the Department to:

   - reliably determine potential environmental problems, and
   - select appropriate permit conditions for mitigating potential environmental impacts.

   The EAF is printed in its entirety and discussed in detail on pages FGEIS 30-34 of the Final GEIS. Information on the permit application review process is summarized in Chapter 7 of the Draft GEIS.

5. The majority of the industry's activity centers on drilling individual oil and gas wells for primary production. For purposes of this Findings Statement, standard oil and gas operations are defined as:

   - any procedure relevant to rotary or cable tool drilling procedures, and
   - production operations which do not utilize any type of artificial means to facilitate the recovery of hydrocarbons.

   The basic features of standard oil and gas operations are described in detail in Chapters 9 through 11 of the Draft GEIS.

6. The diverse types of wells covered by the regulatory program have enough design and operational characteristics in common to group them according to their potential environmental impacts. Design and operational aspects of these wells are described in detail in Chapters 9 through 14 of the Draft GEIS.

7. The magnitude of potential environmental impacts associated with any proposed well covered by the regulatory program is strongly influenced by the types of natural and cultural resources in the well's vicinity. New York State's environmental resources are described in Chapter 6 of the Draft GEIS. Most of the information on the potential environmental impacts of the regulated activities on these environmental resources can be found in Chapter 8 of the Draft GEIS, which deals with siting issues. Additional information on potential impacts related to specific stages (drilling, completion, production, plugging and abandonment) of well operation can be found in Chapters 9 through 11 of the Draft GEIS. Additional information on potential environmental impacts related specifically to enhanced oil recovery, solution salt mining, underground gas storage and waste brine disposal can be found in Chapters 12 through 15 of the Draft GEIS.

8. The range of future alternatives concerning the activities covered by the Oil, Gas and Solution Mining Regulatory Program can be divided into three basic categories: 1) prohibition on regulated activities, 2) removal of regulation, and 3) maintenance of status quo versus revision of existing regulations. A prohibition on these regulated activities would deprive the State of substantial economic and natural resource benefits. Complete removal of regulation would lead to severe environmental problems. While the existing regulations and permit conditions provide significant environmental protection, there is still room to improve the efficiency and effectiveness of the program. Revision of the existing regulations is the best alternative. Chapter 21 of the Draft GEIS contains a more detailed assessment of the environmental, economic, and social aspects of each alternative.

SEQR Determinations of Significance

The SEQR determinations on the significance of the environmental impacts associated with the activities covered by this regulatory program are presented in the following table. The determinations are supported by the conclusions listed above, which in turn are supported by the referenced sections of the Draft and Final GEIS.

SEQR DETERMINATIONS

Agency Action	Environmental Impact	Explanation
a. Standard individual oil, gas, solution mining, stratigraphic, geothermal, or gas storage well drilling permits (no other permits involved).	not significant	Rules and regulations and conditions are adequate to protect the environment. The Draft and Final GEIS satisfy SEQR for these actions. A site-specific EAF is required with the permit application.
b. Oil and gas drilling permits in State Parklands.	may be significant	Site-specific conditions of State Parklands are not discussed in the Draft and Final GEIS. Further determination of significant environmental impacts is needed for State Parklands. A site-specific EAF is required with the permit application.
c. Oil and gas drilling permits in Agricultural Districts.	may be significant	Rules and regulations and conditions are adequate to protect the environment. For most oil and gas operations in Agricultural Districts which utilize less than 2½ acres the GEIS satisfies SEQR. If more than 2½ acres are disturbed, this is a Type I action under 6NYCRR Part 617 and an additional determination of significance is required. A site-specific EAF is required with the permit application.
d. Oil and gas drilling permits in the "Bass Island" fields.	not significant	Special conditions and regulations under Part 559 are adequate to protect the environment. The Draft and Final GEIS satisfy SEQR for these actions. A site-specific EAF is required with the permit application.

e. Oil and gas drilling permits for locations above aquifers.	not significant	Rules and regulations and special aquifer conditions employed by DEC have been developed specifically to protect the groundwater resources of the State. The Draft and Final GEIS satisfy SEQR for these actions. A site-specific EAF is required with the permit application.
f. Oil and gas drilling permits in close proximity (less than 1,000 feet) to municipal water supply wells.	always significant	A supplemental EIS is required dealing with the groundwater hydrology, potential impacts and mitigation measures. A site-specific EAF is required with the permit application.
g. Oil and gas drilling permits in proximity (between 1,000 and 2,000 feet) to municipal water supply wells.	may be significant	A supplemental EIS may be required dealing with the groundwater hydrology, potential impacts and mitigation measures. A site-specific assessment and SEQR determination are required. A site-specific EAF is required with the permit application.
h. Oil and gas drilling permits when other DEC permits required.	may be significant	A site-specific SEQR assessment and determination are needed based on the environmental conditions requiring additional DEC permits. A site-specific EAF is required with the permit application.
i. Plugging permits for oil, gas, solution mining, stratigraphic, geothermal, gas storage and brine disposal wells.	Type II *	By law all wells drilled must be plugged before abandonment. Proper well plugging is a beneficial action with the sole purpose of environmental protection, and constitutes a routine agency action.
* Under 6NYCRR 617.13, a Type II action is one which has been determined not to have a significant effect on the environment and does not require any other SEQR determination or procedure.		

j. New waterflood or tertiary recovery projects.	may be significant	For major new waterfloods and new tertiary recovery projects, a site specific environmental assessment and SEQR determination are required. A supplemental EIS may be required for new waterfloods to ensure integrity of the flood. Also, a supplemental EIS may be required for new tertiary recovery projects depending on the scope of operations and methods used. A site-specific EAF is required with the permit application.
k. New underground gas storage projects or major modifications.	may be significant	A site-specific environmental assessment and SEQR determination are required. May require a supplemental EIS depending on the scope of the project. A site-specific EAF is required with the permit application.
l. New solution mining projects or major modifications.	may be significant	A site-specific environmental assessment and SEQR determination are required. May require a supplemental EIS depending on the scope of the project. A site-specific EAF is required with the permit application.
m. Spacing hearing.	not significant	Action to hold hearing is non-significant. A review and SEQR determination with respect to all other issues must be made before the hearing. Any permit issued subsequently will be reviewed on issues raised at hearing. A site-specific EAF is required with the permit application.
n. Variance hearing.	not significant	Action to hold hearing is non-significant. A review and SEQR determination with respect to all other issues must be made before the hearing. Any permit issued subsequently will be reviewed on issues raised at hearing. A site-specific EAF is required with the permit application.

o. Compulsory unitization hearing.	not significant	Action to hold hearing is non-significant. A review and SEQR determination with respect to all other issues must be made before the hearing. Any permit issued subsequently will be reviewed on issues raised at hearing. A site-specific EAF is required with the permit application.
p. Natural Gas Policy Act pricing recommendations.	none	Action only results in recommendations to Federal Energy Regulatory Commission; therefore, action is not subject to SEQR.
q. Brine disposal well drilling or conversion permit.	may be significant	The brine disposal well permitting guidelines require an extensive surface and subsurface evaluation which is in effect a supplemental EIS addressing technical issues. An additional site specific environmental assessment and SEQR determination are required. A site-specific EAF is required with the permit application.

SEQR Review Procedures

Upon filing of this Findings Statement, the following SEQR Review procedures will be adopted for the Oil, Gas and Solution Mining Regulatory Program:

1. A shortened program-specific Environmental Assessment Form (EAF) will continue to be required with every well drilling permit application, regardless of the SEQR determination listed in the previous table. Information required by the EAF is considered to be an essential part of the permit application. It contains vital site-specific information necessary to evaluate the need for individual permit conditions.

2. In the following cases where the GEIS satisfies SEQR, Department staff will no longer make Determinations of Significance and a Negative or Positive Declaration under SEQR will no longer be required so long as projects conform to the descriptions in the Draft and Final GEIS:

   - Standard individual oil, gas, solution mining, stratigraphic test, geothermal or gas storage well drilling permits,
   - Oil and gas drilling permits in the "Bass Islands" field, and
   - Oil and gas drilling permits for locations above aquifers.

3. In addition to the short program-specific EAF, permits for the following projects will also require detailed site-specific environmental assessments using the Long-Form EAF published in Appendix A of 6NYCRR Part 617. A site or project-specific EIS may also be required for the following projects depending upon the information revealed in the permit application and accompanying EAF's:

   - Oil and gas drilling permits in Agricultural Districts if more than two and one-half acres will be altered by construction of the well site and access road.
   - Oil and gas drilling permits in State Parklands.
   - Oil and gas drilling permits when other DEC permits are required.

- Oil and gas drilling permits less than 2,000 feet from a municipal water supply well.
- New major waterflood or tertiary recovery projects.
- New underground gas storage projects or major modifications.
- New solution mining projects or major modifications.
- Brine disposal well drilling or conversion permits.
- Any other project not conforming to the standards, criteria or thresholds required by the Draft and Final GEIS.

Other SEQR Considerations

In conducting SEQR reviews, the Department will handle the topics of individual project scope, project size, lead agency, and coastal resources as described below.

1. Project scope - Each application to drill a well will continue to be considered as an individual project. An applicant applying for five wells will continue to be treated the same as five applicants applying to the Department individually, since the wells may not be drilled at the same time or in the same area. Planned future wells might not be drilled at all depending on the results of the first well drilled.

   The exceptions to this are proposed new or major expansions of solution mining, enhanced recovery or underground gas storage operations which require that several wells be drilled and operated for an extended period of time within a limited area.

2. Size of Project - The size of the project will continue to be defined as the surface acreage affected by development.

3. Lead Agency - In 1981, the Legislature gave exclusive authority to the Department to regulate the oil, gas and solution mining industries under ECL Section 23-0303(2). Thus, only the Department has jurisdiction to grant drilling permits for wells subject to Article 23, except within State parklands. To the extent practicable, the Department will actively seek lead agency designation consistent

with the general intent of Chapter 846 of the Laws of 1981.

4. Coastal Resources - On the program specific EAF that must accompany every drilling permit application, the applicant must indicate whether the proposed well is in a legally designated New York State Coastal Zone Management (CZM) Area. Neither the policies in the New York State CZM Plan, nor the provisions of individual Local Waterfront Revitalization Plans (LWRP's) are covered in the GEIS. Once an LWRP is adopted by a community, it is a legally binding part of the New York State CZM Plan. The Department cannot issue any drilling permit unless it is consistent with the New York State CZM Plan to the "maximum extent practicable."

CERTIFICATION OF FINDINGS TO ADOPT THE FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM

Having considered the Draft and Final GEIS, and having considered the preceding written facts and conclusions relied upon to meet the requirements of 6NYCRR Part 617.9, this Statement of Findings certifies that:

1. The requirements of 6NYCRR Part 617 have been met;

2. Consistent with the social, economic and other essential considerations from among the reasonable alternatives thereto, the action approved is one which minimizes or avoids adverse environmental effects to the maximum extent practicable; including the effects disclosed in the environmental impact statement, and

3. Consistent with social, economic and other essential considerations, to the maximum extent practicable, adverse environmental effects revealed in the environmental impact statement process will be minimized or avoided by incorporating as conditions to the decision those mitigative measures which were identified as practicable.

4. Consistent with the applicable policies of Article 42 of the Executive Law, as implemented by 19 NYCRR 600.5, this action will achieve a balance between the protection of the environment and the need to accommodate social and economic considerations.

Gary A. Amos — Director, Division of Mineral Resources

Sept. 29, 1992 — Date

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New York State

DEC

Appendix 3

Supplemental SEQRA Findings Statement on Leasing of State Lands for Activities Regulated Under the Oil, Gas and Solution Mining Law

Revised Draft
Supplemental Generic Environmental Impact Statement

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SEQR File No.

P0-009900-00046

Supplemental
Findings Statement

Pursuant to the State Environmental Quality Review Act (SEQR) of the Environmental Conservation Law (ECL) and the SEQR Regulations 6NYCRR Part 617, the New York State Department of Environmental Conservation makes the following supplemental findings on the Final Generic Environmental Impact Statement (GEIS) on the Oil, Gas and Solution Mining Regulatory Program.

Name of Action

Adoption of supplemental findings on leasing of state lands for activities regulated under the Oil, Gas and Solution Mining Law (ECL Article 23).

Description and Background

In early 1988, the Department of Environmental Conservation released the Draft GEIS on the Oil, Gas and Solution Mining Regulatory Program. The Draft GEIS comprehensively reviewed the environmental impacts of the Department's program for regulating the siting, drilling, production and plugging and abandonment of oil, gas, underground gas storage, solution mining, brine disposal, geothermal and stratigraphic test wells. The findings statement issued on the Draft and Final GEIS in September, 1992 neglected to specifically mention DEC's program for leasing of State lands for these resource development activities.

Prior to adoption of the GEIS, proposed lease sales underwent a segmented review. Segmented reviews are permitted under certain circumstances if they are no less protective of the environment. This is true given the highly speculative nature of oil and gas leasing practices:

- It is impractical to review the potential environmental impacts of development activities at the leasing stage. Information on the placement of well sites is not generally known, even by the lessee. Not until a company successfully obtains a lease does it invest time and money in preparing the exploration and development plans that will be submitted to the Department for approval if the lessee wishes to commence operations.

- Most of the land leased will never be directly affected by development activities. Based on a 15 year record of the State's leasing program, less than one percent of all the State land leased has been subject to any direct impact.

- When the lessee does decide on a proposed well site on a State lease, the lessee must obtain a site-specific drilling permit from the Department. With eve well drilling permit application the Department requires: 1) a program-specific Environmental Assessment Form, 2) a plat (map) showing the proposed well location and support facilities, and 3) a pre-drilling site inspection that allows the Department to :
  - reliably determine potential environmental problems; and

- select appropriate permit conditions for mitigating potential environmental impacts.

- Possession of a lease does not a priori grant the right to drill on a lease. Nor is the lessee in any way guaranteed approval for their first-choice drilling location. Clauses included in the lease inform the lessee that any surface disturbing activities must receive Department review and approval prior. to their commencement. Leases also contain clauses recommended by other State agency staff that are necessary for protection of fish, wildlife, plant, land, air, wetlands, water and cultural resources on the leased parcels.

SEOR Determination of Significance

The Department has determined that the act of leasing State lands for activities regulated under ECL Article 23 does not have a significant environmental impact. This determination is supported by the facts listed above.

SEOR Review Procedures

Department staff will no longer make Determinations of Significance and Negative or Positive Declarations under SEQR for leases on State lands for activities regulated under ECL Article 23 at the time that the lease is granted; SEQR reviews will continue to be done as needed for site-specific development.

CERTIFICATION OF SUPPLEMENTAL FINDINGS ON THE FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM

Having considered the Draft and Final GEIS, and having considered the preceding written facts and conclusions relied upon to meet the requirements of 6NYCRR Part 617.9, this Supplemental Statement of Findings certifies that:

1. The requirements of 6NYCRR Part 617 have been met.

2. Consistent with the social, economic, and other essential considerations from among the reasonable alternatives thereto, the action approved is one which minimizes or avoids adverse environmental effects to the maximum extent practicable; including the effects disclosed in the environmental impact statement.

3. Consistent with the social, economic, and other essential considerations, to the maximum extent practicable, adverse environmental effects revealed in the environmental impact statement process will be minimized or avoided by incorporating as conditions to the decision those mitigative measures which were identified as practicable.

4. Consistent with the applicable policies of Article 42 of the Executive Law, as implemented by 19 NYCRR 600.5, this action will achieve a balance between the protection of the environment and the need to accommodate social and economic considerations.

/S/ April 19, 1993

Gregory H. Sovas, Director
Division of Mineral Resources

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New York State

DEC

Appendix 4

Application Form for Permit to Drill, Deepen, Plug Back or Convert A Well Subject to the Oil, Gas and Solution Mining Regulatory Program

Revised Draft
Supplemental Generic Environmental Impact Statement

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF MINERAL RESOURCES

PRINT OR TYPE IN BLACK INK

APPLICATION FOR PERMIT TO DRILL, DEEPEN, PLUG BACK OR CONVERT A WELL SUBJECT TO THE OIL, GAS AND SOLUTION MINING LAW

THIS APPLICATION IS A LEGAL DOCUMENT. READ THE APPLICABLE AFFIRMATION AND ACKNOWLEDGMENT CAREFULLY BEFORE SIGNING.

For instructions on completing this form, visit the Division's website at www.dec.ny.gov/energy/205.html or contact your local Regional office.

PLANNED OPERATION: (Check one)

☐ Drill ☐ Deepen ☐ Plug Back ☐ Convert

TYPE OF WELL: (Check one)

☐ New ☐ Existing

Existing API Well Identification Number

31- | | | | - | | | | | - | | - | | |

TYPE OF WELL BORE: (Check one)

☐ Vertical ☐ Directional ☐ Horizontal

NAME OF OWNER (Full Name of Organization or Individual as registered with the Division)	TELEPHONE NUMBER (include area code)

ADDRESS (P.O. Box or Street Address, City, State, Zip Code)

NAME AND TITLE OF LOCAL REPRESENTATIVE WHO CAN BE CONTACTED WHILE OPERATIONS ARE IN PROGRESS

ADDRESS–Business (P.O. Box or Street Address, City, State, Zip Code)	TELEPHONE NUMBER (include area code)
ADDRESS–Night, Weekend and Holiday (P.O. Box or Street Address, City, State, Zip Code)	TELEPHONE NUMBER (include area code)

WELL LOCATION DATA (attach plat)

COUNTY	TOWN	FIELD/POOL NAME (or "Wildcat")

WELL NAME	WELL NUMBER	NUMBER OF ACRES IN UNIT

7½ MINUTE QUAD NAME	QUAD SECTION	PROPOSED TARGET FORMATION

LOCATION DESCRIPTION

		TVD	TMD
Surface	0'	0	
Top of Target Interval			
Bottom of Target Interval			
Bottom Hole			

Decimal Latitude (NAD83) ☐☐.☐☐☐☐☐☐

Decimal Longitude (NAD83) ☐☐.☐☐☐☐☐☐

PROPOSED WELL DATA

WELL TYPE (check one)

☐ Oil Production ☐ Gas Production ☐ Brine ☐ Storage
☐ Injection ☐ Brine Disposal ☐ Geothermal ☐ Stratigraphic
☐ Other _____

PLANNED TOTAL DEPTH

TVD _____ ft.
TMD _____ ft.
Kickoff _____ TMD

PLANNED DATE OF COMMENCEMENT OF OPERATIONS

SURFACE ELEVATION (check how obtained)

_____ ft. ☐ Surveyed ☐ Topo Map ☐ Other _____

TYPE TOOLS

☐ Cable ☐ Rotary

PLANNED DRILLING FLUID

☐ Air ☐ Water ☐ Mud

NAME OF PLANNED DRILLING CONTRACTOR (as registered with the Division)	TELEPHONE NUMBER (include area code)

ON ATTACHED SHEET GIVE DETAILS FOR EACH PROPOSED CASING STRING AND CEMENT JOB INCLUDING BUT NOT LIMITED TO: Bit size, casing size, casing weight and grade, TVD and TMD of casing set, scratchers, centralizers, cement baskets, sacks of cement, class of cement, cement additives with percentages or pounds per sack, estimated TVD and TMD of the top of cement, estimated amount of excess cement and waiting-on-cement time.

FOR DIRECTIONAL OR SIDETRACK WELLS ALSO INCLUDE A WELL BORE DIAGRAM SHOWING THE LOCATION OF THE ITEMS INCLUDED IN THE ABOVE REFERENCED DETAILS.

DEPARTMENT USE ONLY

BOND NUMBER	
API WELL IDENTIFICATION NUMBER 31-	
RECEIPT NUMBER	
DATE ISSUED	

WELL NAME	WELL NUMBER	NAME OF OWNER

COMMENTS:

AFFIRMATION AND ACKNOWLEDGMENT

A. For use by individual:

By the act of signing this application:

(1) I affirm under penalty that the information provided in this application is true to the best of my knowledge and belief; and that I possess the right to access property, and drill and/or extract oil, gas, or salt, by deed or lease, from the lands and site described in the well location data section of this application. I am aware that any false statement made in this application is punishable as a Class A Misdemeanor under Section 210.45 of the Penal Law.

(2) I acknowledge that if the permit requested to be issued in consideration of the information and affirmations contained in this application is issued, as a condition to the issuance of that permit, I accept full legal responsibility for all damage, direct or indirect, of whatever nature and by whomever suffered, arising out of the activity conducted under authority of that permit; and agree to indemnify and hold harmless the State, its representatives, employees, agents, and assigns for all claims, suits, actions, damages, and costs of every name and description, arising out of or resulting from the permittee's undertaking of activities or operation and maintenance of the facility or facilities authorized by the permit in compliance or non-compliance with the terms and conditions of the permit.

_____
Printed or Typed Name of Individual

_____ _____
Signature of Individual Date

B. For use by organizations other than an individual:

By the act of signing this application:

(1) I affirm under penalty of perjury that I am _____ (title) of _____ (organization); that I am authorized by that organization to make this application; that this application was prepared by me or under my supervision and direction; and that the aforenamed organization possesses the right to access property, and drill and/or extract oil, gas, or salt by deed or lease, from the lands and site described in the well location data section of this application. I am aware that any false statement made in this application is punishable as a Class A Misdemeanor under Section 210.45 of the Penal Law.

(2) _____ (organization); acknowledges that if the permit requested to be issued in consideration of the information and affirmations contained in this application is issued, as a condition to the issuance of that permit, it accepts full legal responsibility for all damage, direct or indirect, of whatever nature and by whomever suffered, arising out of the activity conducted under authority of that permit; and agrees to indemnify and hold harmless the State, its representatives, employees, agents, and assigns for all claims, from suits, actions, damages, and costs of every name and description, arising out of or resulting from the permittee's undertaking of activities or operation and maintenance of the facility or facilities authorized by the permit in compliance or non-compliance with the terms and conditions of the permit.

_____
Printed or Typed Name of Authorized Representative

_____ _____
Signature of Authorized Representative Date

New York State

DEC

Appendix 5

Environmental Assessment Form (EAF)
For Well Permitting

Revised Draft
Supplemental Generic Environmental Impact Statement

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85-16-5 (1/07)--10b

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF MINERAL RESOURCES

ENVIRONMENTAL ASSESSMENT FORM

Attachment to Drilling Permit Application

WELL NAME AND NUMBER

NAME OF APPLICANT | BUSINESS TELEPHONE NUMBER ( )

ADDRESS OF APPLICANT

CITY/P.O. | STATE | ZIP CODE

DESCRIPTION OF PROJECT (Briefly describe type of project or action)

PROJECT SITE IS THE WELL SITE AND SURROUNDING AREA WHICH WILL BE DISTURBED DURING CONSTRUCTION OF SITE, ACCESS ROAD, and PIT AND ACTIVITIES DURING DRILLING AND COMPLETION AT WELLHEAD.

(PLEASE COMPLETE EACH QUESTION--Indicate N.A., if not applicable)

LAND USE AND PROJECT SITE

1. Project Dimensions. Total Area of Project Site _____ sq. ft.
   Approximate square footage for items below:

	During Construction (sq. ft.)	After Construction (sq. ft.)
a. Access Road (length x width)		
b. Well Site (length x width)		

2. Characterize Project Site Vegetation and Estimate Percentage of Each Type Before Construction:

_____ % Agricultural (cropland, hayland, pasture, vineyard, etc.) _____ % Forested _____ % Wetlands

_____ % Meadow or Brushland (non agricultural) _____ % Non vegetated (rock, soil, fill)

3. Present Land Use(s) Within ¼ Mile of Project (Check all that apply)

☐ Rural ☐ Suburban ☐ Forest ☐ Urban ☐ Agricultural ☐ Commercial ☐ Park/Recreation
☐ Industrial ☐ Other _____

4. How close is the nearest residence, building, or outdoor facility of any type routinely occupied by people at least part of the day? _____ ft.
   Describe _____

ENVIRONMENTAL RESOURCES ON/NEAR PROJECT SITE

5. The presence of certain environmental resources on or near the project site may require additional permits, approvals or mitigation measures--Is any part of the well site or access road located:

a. Over a primary or principal aquifer?	☐ Yes	☐ No	☐ Not Known
b. Within 2,640 feet of a public water supply well?	☐ Yes	☐ No	☐ Not Known
c. Within 150 feet of a surface municipal water supply?	☐ Yes	☐ No	☐ Not Known
d. Within 150 feet of a lake, stream, or other public surface water body?	☐ Yes	☐ No	☐ Not Known
e. Within an Agricultural District?	☐ Yes	☐ No	☐ Not Known
f. Within a land parcel having a Soil and Water Conservation Plan?	☐ Yes	☐ No	☐ Not Known
g. In a 100 year flood plain?	☐ Yes	☐ No	☐ Not Known
h. In a regulated wetland or its 100 foot buffer zone?	☐ Yes	☐ No	☐ Not Known
i. In a coastal zone management area?	☐ Yes	☐ No	☐ Not Known
j. In a Critical Environmental Area?	☐ Yes	☐ No	☐ Not Known
k. Does the project site contain any species of animal life that are listed as threatened or endangered?	☐ Yes	☐ No	☐ Not Known
If yes, identify the species and source of information _____			
l. Will proposed project significantly impact visual resources of statewide significance?	☐ Yes	☐ No	☐ Not Known
If yes, identify the visual resource and source of information _____			

CULTURAL RESOURCES

6. Are there any known archeological and/or historical resources which will be affected by drilling operations? ☐ Yes ☐ No ☐ Not Known

7. Has the land within the project area been previously disturbed or altered (excavated, landscaped, filled, utilities installed)? ☐ Yes ☐ No ☐ Not Known

If answer to Number 6 or 7 is yes, briefly descrbe _____

EROSION AND RECLAMATION PLANS

8. Indicate percentage of project site within: 0-10% slope _____ % 10-15% slope _____ % greater than 15% slope _____ %

9. Are erosion control measures needed during construction of the access road and well site? ☐ Yes ☐ No ☐ Not Known

If yes, describe and/or sketch on attached photocopy of plat _____

10. Will the topsoil which is disturbed be stockpiled for reclamation use? ☐ Yes ☐ No

11. Does the reclamation plan include revegetation? ☐ Yes ☐ No

If yes, what plant materials will be used? _____

12. Does the reclamation plan include restoration or installation of surface or subsurface drainage features to prevent erosion or conform to a Soil and Water Conservation Plan? ☐ Yes ☐ No

If yes, describe _____

ACCESS ROAD SITING AND CONSTRUCTION

13. Are you going to use existing or common corridors when building the access road? ☐ Yes ☐ No
Locate access road on attached photocopy of plat.

DRILLING

14. Anticipated length of drilling operations? _____ days.

WASTE STORAGE AND DISPOSAL

15. How will drilling fluids and stimulation fluids:

a. Be contained? _____

b. Be disposed of? _____

16. Will production brine be stored on site? ☐ Yes ☐ No

If yes:
How will it be stored? _____

How will it be disposed of? _____

17. Will the drill cuttings and pit liner be disposed of on site? ☐ Yes ☐ No

If yes, expected burial depth? _____ feet

ADDITIONAL PERMITS

18. Are any additional State, Local or Federal permits or approvals required for this project? ☐ Yes ☐ No

	Date Application Submitted	Date Application Received
Stream Disturbance Permit (DEC)		
Wetlands Permit (DEC or Local)		
Floodplain Permit (DEC or Local)		
Other _____		

PREPARER'S SIGNATURE | DATE

NAME/TITLE (Please print)

REPRESENTING

Suggested Sources of Information for Division of Mineral Resources Environmental Assessment Form

3. LAND USE
Sources: Local Planning Office
Town Supervisor's Office
Town Clerk's Office

5a. PRIMARY OR PRINCIPAL AQUIFER
Sources: Local unit of government
NYS Department of Health
NYSDEC, Division of Water--Regional Office
Availability of Water from Aquifers in New York State--United States Geological Survey
Availability of Water from Unconsolidated Deposits in Upstate New York--United States Geological Survey

5b. PUBLIC WATER SUPPLY
Sources: Local unit of government
NYS Department of Health
NYS Atlas of Community Water Systems Sources, NYS Department of Health, 1982
Atlas of Eleven Selected Aquifers in New York State, United States Geological Survey, 1982

5c. AGRICULTURAL DISTRICT INFORMATION
Sources: Cooperative Extension
DEC, Division of Lands and Forests
NYS Department of Agriculture and Markets
DEC, Division of Environmental Permits--Regional Office
DEC, Division of Mineral Resources--Regional Office

5f. SOIL AND WATER CONSERVATION PLAN
Sources: Landowner
County Soil and Water Conservation District Office

5g. 100 YEAR FLOOD PLAIN
Sources: DEC Division of Water
DEC, Division of Environmental Permits--Regional Office
DEC, Division of Mineral Resources--Regional Office

5h. WETLANDS
Sources: DEC, Division of Fish and Wildlife--Regional Office
DEC, Division of Mineral Resources--Regional Office

5i. COASTAL ZONE MANAGEMENT AREAS
Sources: Local unit of government
NYS Department of State, Coastal Management Program
DEC, Division of Water (maps)
DEC, Division of Environmental Permits--Regional Office

5k. THREATENED OR ENDANGERED SPECIES
Sources: DEC, Natural Heritage Program--Albany
DEC, Division of Environmental Permits--Regional Office

6. ARCHEOLOGICAL OR HISTORIC RESOURCES
Sources: NYS Office of Parks, Recreation and Historic Preservation circles and squares map
DEC, Division of Environmental Permits--Regional Office

18. ADDITIONAL PERMITS NEEDED
Sources: DEC, Division of Environmental Permits--Regional Office
DEC, Division of Mineral Resources--Regional Office
NYS Office of Business Permits

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New York State

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Appendix 6

PROPOSED
Environmental Assessment Form
Addendum

Updated August 2011

Revised Draft
Supplemental Generic Environmental Impact Statement

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PROPOSED EAF ADDENDUM REQUIREMENTS
FOR HIGH-VOLUME HYDRAULIC FRACTURING

REQUIRED INFORMATION

- Minimum depth and elevation of top of objective formation or zone for entire length of wellbore
- Estimated maximum depth and elevation of bottom of potential fresh water, and basis for estimate (water well information, other well information, previous drilling at pad, published or private reports, etc.)
- Identification of proposed fracturing service company and additive products, by product name and purpose/type
    - Documentation of the applicant's evaluation of available alternatives for the proposed additive products that are efficacious but which exhibit reduced aquatic toxicity and pose less risk to water resources and the environment
- Proposed volume of water and each additive product to be used in hydraulic fracturing
- Proposed % by weight of water, proppants and each additive
- Water source for hydraulic fracturing
    - If a newly proposed surface water source (not previously approved by the Department as part of a well permit application):
        - Type of withdrawal (stream, lake, pond, groundwater, etc.)
        - Location of water withdrawal point, status of RBC approval if applicable
        - List and location of all private water wells within 500 feet of the proposed water withdrawal point
        - For proposed withdrawals from lakes and ponds:
            - Estimates of the maximum change in storage resulting from the proposed withdrawals, including estimates of inflow into the water body, precipitation onto water surface, existing and proposed water withdrawals, evaporation from water surface, and releases from water body
        - For proposed groundwater withdrawals:
            - Identification of and shortest distance to any wetland within 500 feet of the proposed withdrawal point
            - Results of pump testing as referenced in the SGEIS, including evaluation of any potential influence on wetland(s) within 500 feet
        - Indicate if an Article 15 permit is required and status
        - Size of drainage area above withdrawal point (in mi^2)
        - Indicate whether there is a USGS gage on the stream; if yes:
            - Distance to stream gage
            - Upstream or downstream of stream gage
            - Changes in stream flow (e.g., other withdrawals, diversions, tributary input) between gage and withdrawal point
            - Years of stream gage data available and period of record
    - If a previously proposed or Department-approved surface water source:
        - API # of well permit application associated with previous proposal or approval

- Scaled distance from surface location of well and closest edge of well pad to:
  - Any known water supply reservoir, river or stream intake, water well or domestic-supply spring within 2,640 feet, including public or private wells, community or non-community systems
  - Any primary or principal aquifer boundary, perennial or intermittent stream, wetland, storm drain, lake or pond within 660 feet
  - All residences, occupied structures or places of assembly within 1,320 feet
- Capacity of rig fueling tank(s) and distance to:
  - Any public or private water well, domestic-supply spring, reservoir, perennial or intermittent stream, storm drain, wetland, lake or pond within 500 feet of the planned location(s) of the fueling tank(s)
- Available information about water wells and domestic-supply springs within 2,640 feet
  - Well name and location
  - Distance from proposed surface location of well
  - Shortest distance from proposed well pad
  - Shortest distance from proposed centralized flowback water impoundment
  - Well depth
  - Well's completed interval
  - Public or private supply
  - Community or non-community system (see NYSDOH definitions)
  - Type of facility or establishment if not a residence
- Identification of any well listed in Department's Oil & Gas Database, or any other abandoned well identified by property owners or tenants, within the spacing unit of the proposed well and/or within 1 mile (5,280 feet) of the proposed well location. For each well identified, provide the following information:
  - Well name and API Number
  - Distance from proposed surface location of well to surface location of existing well
  - Well Type
  - Well Status
  - Well Orientation
  - Quantity and type of any freshwater, brine, oil or gas encountered during drilling, as recorded on the Department's Well Drilling and Completion Report
- Information about the planned construction and capacity of the reserve pit, if any, and an indication of the timing of the use of a closed-loop tank system (e.g., surface, intermediate and/or production hole)
- Information about the number and individual and total capacity of receiving tanks for flowback water
- If proposed flowback vent/flare stack height is less than 30 feet, then documentation that previous drilling at the pad did not encounter H_2S is required
- Description of planned public access restrictions, including physical barriers and distance to edge of well pad
- Identify the EPA Tiers of the drilling and hydraulic fracturing engines used, if these use gasoline or diesel fuel. If particulate traps or Selective Catalytic Reduction (SCR) are not used, provide a description of other control measures planned to reduce particulate matter and NO_x emissions during the drilling and hydraulic fracturing processes

- If condensate tanks are to be used, provide their capacity and the vapor recovery system to be used
- If a wellhead compressor is used, provide its size in horsepower. Describe the control equipment used for NO_x
- If a glycol dehydrator is to be used at the well pad, provide its stack height and the capacity of glycol to be used on an annual basis
- Information on the status of a sales line and interconnecting gathering line to the well or multi-well pad (i.e., is there currently a line in place or is one expected to be in place prior to conducting hydraulic fracturing operations to facilitate a Reduced Emissions Completion [REC])
    - If REC will not be used, the following must be provided
        - an estimate of how much total gas (MMcf) will be vented and flared during flowback
        - an estimate of how much total gas (MMcf) was previously vented and flared during flowback on the same well pad in the previous 12 months
- Well information with respect to local planning documents
    - Identify whether the location of the well pad, or any other activity under the jurisdiction of the Department, conflicts with local land use laws or regulations, plans or policies
    - Identify whether the well pad is located in an area where the affected community has adopted a comprehensive plan or other local land use plan and whether the proposed action is inconsistent with such plan(s)

REQUIRED ATTACHMENTS

- Scaled, stamped well plat showing the following:
    - Plan view of wellbore including surface and bottom-hole locations
    - Well pad close-up showing placement of fueling tank(s), reserve pit and receiving tanks for flowback water
    - Vertical section of wellbore showing the land surface elevation and wellbore elevation with an indication of the minimum depth of the wellbore within the objective formation or zone as required above
- A Material Safety Data Sheet (MSDS) for each additive product proposed for use in hydraulic fracturing, if not already on file with the Department
- Topographic map of area within at least 2,640 feet of surface location showing:
    - above features and scaled distances
    - location and orientation of well pad
    - location of access road
    - location of any flowback water pipelines or conveyances
- Evidence of diligent efforts by the well operator to determine the existence of public or private water wells and domestic-supply springs within one half-mile (2,640 feet) of any proposed drilling location or centralized flowback water impoundment if proposed
    - List of municipal officials contacted for water well information and printed copies of responses
    - List of property owners and tenants contacted for water well information
    - List of adjacent lessees contacted for water well information

  - Printed results of EPA SDWIS search (http://oaspub.epa.gov/enviro/sdw_form_v2.create_page?state_abbr=NY)
  - Printed results of Department Water Well search (http://www.dec.ny.gov/cfmx/extapps/WaterWell/index.cfm?view=searchByCounty)
- Evidence of diligent efforts by the well operator to determine the existence and condition of abandoned wells within the proposed spacing unit and/or within one mile of the proposed well location
  - Printed results of Department Oil & Gas database search
  - List of property owners and tenants contacted for abandoned well information
- For a newly proposed water withdrawal, topographic map showing:
  - The location of the proposed withdrawal
  - All private water wells within 500 feet of the proposed water withdrawal point
  - For proposed surface water withdrawals:
    - Drainage area above the withdrawal point
  - For proposed groundwater withdrawals:
    - Identification of and shortest distance to any Department-regulated wetland within 500 feet of the proposed withdrawal point
- Invasive Species Management Plan that includes:
  - Survey of the entire well site, documenting the presence, location, and identity of any invasive plant species;
  - Specific protocols or best management practices for preventing the spread or introduction of invasive species at the site;
  - Specific protocols for the restoration of native plant cover on the site; and
  - Identification of any Certified Pesticide Applicator, if applicable.
- A Partial Site Reclamation Plan that describes the methods for partially reclaiming the site after well completion. Partial reclamation shall be compatible with sound environmental management practices and minimize negative environmental impacts.
- A description of methods for final reclamation of the well site following plugging of all the wells on the well pad. Reclamation methods shall be compatible with sound environmental management practices and minimize negative environmental impacts from the well pad.
- Proposed fluid disposal plan, pursuant to 6 NYCRR 554.1(c)(1)
  - Planned transport of flowback water and production brine off of well pad – trucking or piping
    - If piping, describe construction including size, materials, leak prevention and spill control measures
  - Planned disposition of flowback water and production brine – treatment facility, disposal well, reuse on same well pad, reuse on another well pad, centralized flowback surface water impoundment, centralized tank facility, or other (describe)
    - If a treatment facility in NY:
      - Name, owner/operator, location
      - SPDES permit # and date if applicable
      - If a POTW, date of Department approval to receive flowback water (attach a copy of approval notification)
      - Brief description of facility and treatment if not a POTW

        - If a disposal well in NY:
            - SPDES permit # and date
            - EPA UIC permit # and date
        - If a centralized tank facility in New York:
            - Location, affirmation of ownership or permission
            - Certification of compliance with 360-6.3
- Proposed cuttings disposal plan for any drilling requiring cuttings to be disposed of off-site including at a landfill.
    - Planned disposition of cuttings – landfill or other (describe)
        - If a landfill in NY:
            - Name, owner/operator, location
            - Part 360 permit # and date if applicable
- Proposed blow-out preventer (BOP) use and test plan for all drilling and completion operations including:
    - Pressure rating of any:
        - Annular preventer
        - Rams including a description of type and number of rams
        - Choke manifold and connecting line (from BOP to choke manifold)
    - Timing and frequency of testing and/or visual inspection of BOP and related equipment including any scheduled retesting of equipment. Test pressure(s) and duration of test(s) including an explanation as to how the test pressure was determined
    - Test pressure(s) and timing for any internal pressure testing of surface, intermediate and production casing strings, and duration of test including an explanation as to how the test pressure was determined
    - Test pressure (psi/ft) and anticipated depth (TVD-ft) of any surface and/or intermediate casing seat integrity tests
        - If a casing seat integrity test will not be conducted on a casing string with a BOP installed on it, an explanation must be provided why such a test is not required and how any flow will be managed
    - System for recording, documenting and retaining the results of all pressure tests and inspections, and making such available to the Department
    - Copy of the operator's well control barrier policythat identifies acceptable barriers to be used during identified operations
    - Minimum distance from well for remote actuator (powered by a source other than rig hydraulics)
- Transportation plan developed by a NYS-licensed Professional Engineer, that specifies proposed routes and includes a road condition assessment.
- Noise mitigation plan, including any proposed mitigation measures for any occupied structure within 1,000 feet.
- If a new well pad is proposed in a Forest or Grassland Focus Area and involves disturbance in a contiguous forest patch of 150 acres or more in size or a contiguous grassland patch of 30 acres or more in size, then the Applicant should not submit this EAF or a well permit application prior to conducting a site-specific ecological assessment in accordance with a

detailed study plan that has been approved by the Department. The need and plan for an ecological assessment should be determined in consultation with the Department and will consider information such as existing site conditions, existing covertype and ongoing and historical land management activities. The completed ecological assessment must be attached to this EAF and must include, at a minimum:

- a compilation of historical information on use of the area by forest interior birds or grassland birds;
- results of pre-disturbance biological studies, including a minimum of one year of field surveys at the site to determine the current extent, if any, of use of the site by forest interior birds or grassland birds;
- an evaluation of potential impacts on forest interior or grassland birds from the project;
- additional mitigation measures proposed by the applicant; and
- protocols for monitoring of forest interior or grassland birds during the construction phase of the project and for a minimum of two years following well completion.

REQUIRED AFFIRMATIONS

- Any surface water withdrawal associated with this well pad will only occur when flow is above the appropriate threshold as described in the SGEIS
- Applicable FIRM and Flood Boundary and Floodway maps consulted, and proposed well pad and access road are not within a mapped100-year floodplain
- Baseline residential well sampling, analysis and ongoing monitoring will be conducted and results shared with property owner as described in SGEIS and permit conditions
- Unless otherwise required by private lease agreement, the access road will be located as far as practical from occupied structures, places of assembly and unleased property
- HVHF GP authorization for stormwater discharges will be obtained prior to site disturbance
- Operator will prepare and adhere to the following site plans, which will be available to the Department upon request and available on-site to Department inspector while activities addressed by the plan are occurring:
  - a visual impacts mitigation plan consistent with the SGEIS
  - a noise impacts mitigation plan consistent with the SGEIS
  - a greenhouse gas impacts mitigation plan consistent with the SGEIS
  - an invasive species mitigation plan which includes:
    - -the best management practices listed in the SGEIS and
    - seasonally appropriate site-specific and species-specific physical and chemical control methods (e.g., digging to remove all roots, cutting to the ground, applying herbicides to specific plant parts such as stems or foliage, etc.) based on the invasive species survey submitted with the EAF Addendum
  - an acid rock drainage (ARD) mitigation plan consistent with the SGEIS for on-site burial of Marcellus Shale cuttings from horizontal drilling in the Marcellus Shale if the operator elects to bury these cuttings
- Operator will utilize alternative hydraulic fracturing additive products that exhibit reduced aquatic toxicity and pose less risk to water resources and the environment, unless demonstrated to DMN's satisfaction that they are not equally effective or feasible

- Operator will prepare and adhere to an emergency response plan (ERP) consistent with the SGEIS that will be available on-site during any operation from well spud (i.e., first instance of driving pipe or drilling) through well completion. -A list of emergency contact numbers for the area in which the well site is located must be included in the ERP and the list must be prominently displayed at the well site during operations conducted under this permit
- Operator will adhere to all well permit conditions and approved plans, including requirement for Department approval prior to making any change
- Operator will adhere to best management practices for reducing direct impacts to terrestrial habitats and wildlife consistent with the SGEIS (see Section 7.4.1.1)

ADDITIONAL SUBMISSION REQUIRED PRIOR TO SITE DISTURBANCE

- Copy of any road use agreement between the operator and local municipality

ADDITIONAL SUBMISSION REQUIRED AT LEAST 48 HOURS PRIOR TO WELL SPUD

- Copy of the ERP in electronic form

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Appendix 7

Sample Drilling Rig Specifications

Provided by Chesapeake Energy

Revised Draft
Supplemental Generic Environmental Impact Statement

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ATTACHMENT A
RIG SPECIFICATIONS
Example #1

National Cabot 900
Working Depth: 12,000'

DRAWWORKS:	National Model 2346 – Mechanical – Grooved for 1 1/8'' drilling line. Air operated, water cooled Eaton Assist Brake
ENGINES:	2 - Cat C-15 (475HP ea.) with Allison Transmissions
MAST:	NOV - 117' - 350,000 SHL on 8 lines
SUBSTRUCTURE:	NOV - 18' Floor Height /15' Working Height
TRAVELING EQUIPMENT:	IDECO UTB – 265 Ton Block and Hook
ROTARY TABLE:	27 ½'' with 440,000# capacity
TUBULARS:	12,000' - S-135 - 4 1/2''x 16.60# per foot w/ XH connections 18 - 6 ½'' collars with NC46 connections
MUD PUMPS:	2 – National 9-P-100 with Cat 3508 Mechanicals (935HP ea.)
MUD SYSTEM:	3 - Tank, 900 BBL total
SOLIDS CONTROL EQUIPMENT:	Shakers: 2 – NOV D285P-LP Desander: Brandt - 2 - 10" Cones Desilter: Brandt - 12 - 4" Cones Agitators: 6 – Brandt with 36'' Impellers
BOP EQUIPMENT:	1 - Shaffer LXT - 11" 5M - Double Ram 1 – Shaffer Spherical - 11" 5M - Annular
CLOSING UNIT:	Koomey - 6 Station - 160 Gallon; 3000 psi
CHOKE MANIFOLD:	3'' x 4'' - 5M, 1 Hydraulic Choke and 1 Manual Choke
GENERATORS:	2 - Caterpillar 545 kW, Powered by 2 Cat C-18's
AUXILARY EQUIPMENT:	Water Tank: 400 BBL Fuel Tank: 10,000 Gallons
SPECIAL TOOLS:	2 - Braden PD12C Hydraulic Hoist Hydraulic Pipe Spinner Oil Works OWI-1000 Wire line with 12,000' of wire

Rig Specifications
Example #2

---

610 Mechanical 750 HP
Working Depth: 14,000'

DRAWWORKS: National 610 Mechanical
Wichita 325 Air Brake

ENGINES: 2 – Caterpillar C-18's, 600 HP Each

MAST: Dreco 142' 550,000 SHL on 10 Lines

SUBSTRUCTURE: Dreco 20' Box on Box

TRAVELING EQUIPMENT: Block-Hook: Ideco UTB-265-5-36

ROTARY TABLE: National C-275

COMPOUND: National 2 Engines

TORQUE CONVERTERS: 2 – National C195

MUD PUMPS: 2 – National 9-P-100, Independent Drive Cummins QSK38, 920 HP

MUD SYSTEM: 2 – Tank, 750 BBL total w/100 BBL Premix

SOLIDS CONTROL EQUIPMENT:
Shakers: 2 – National Model DLMS-285P
Desander: National with 2 - 10" Cones
Desilter: National with 16 - 4" Cones

BOP EQUIPMENT: 1 – Shaffer LWS Type 11" 5M
1 – Shaffer Spherical Type 11: 5M

CLOSING UNIT: Koomey 6 Station 180 Gallon; 1 Air and 1 Electrical Pump

CHOKE MANIFOLD: 4'' x 3'' 5M, 2 Adjustable Chokes

GENERATORS: 2 – Cat 545 kW, Powered by 2 Cat C-18's

AUXILARY EQUIPMENT:
Water Tank: 500 BBL
Fuel Tank: 12,000 Gallons

SPECIAL TOOLS:
ST-80 Iron Roughneck
Pipe Spinner: Hydraulic
Auto Driller: Satellite
Totco EDR (Rental)
Separator/Trip Tank Combo (Rental)
Hoists: 1 – Thern 2.5A Air Hoist
1 - Braden PD12C Hydraulic Hoist

Rig Specifications
Example #3

SpeedStar 185K -- 515 HP
Working Depth: 8,000'

ENGINE: 1 – Caterpillar C-15 with Allison Transmission

MAST: SpeedStar – 61' – 185,000 LB SHL
Setback Capacity of 7,000' – 3.5" Drill Pipe

SUBSTRUCTURE: Box Type – 7'6" Working Height

MUD PUMP: 1 – MP5

MUD SYSTEM: 2 – Tank, 600 BBL

BOP EQUIPMENT: 11" x 3M Annular

CLOSING UNIT: Townsend 4 Station, 80 Gallon

CHOKE MANIFOLD: 3'' x 3'' 5K with 1 Hydraulic Choke

GENERATORS: 2 – Onan 320 kW with Cummins Engines

DRILL PIPE: 7,500' OF 3.5" 13.30 LB/FT with IF Connections

DRILL COLLARS: 12 – 6 ½"

AIR SYSTEM: 3 – Ingersoll Rand 1170/350 Air Compressors
2 – Single Stage Boosters

AUXILARY EQUIPMENT: Water Tank: 250 BBL
Fuel Tank: 3,500 Gallons

SPECIAL TOOLS: 2 – Braden PD12C Hydraulic Tub Winches
Myers 35GPM Soap Pump
Martin Decker Geolograph
Wireline Unit with 10,000' of Line

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Appendix 8

Casing & Cementing Practices Required for All Wells in NY

Revised Draft
Supplemental Generic Environmental Impact Statement

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New York State Department of Environmental Conservation
Casing and Cementing Practices

SURFACE CASING

1. The diameter of the drilled surface casing hole shall be large enough to allow the running of centralizers in recommended hole sizes.

RECOMMENDED CENTRALIZER-HOLE SIZE COMBINATIONS

Centralizer Size Inches	Minimum Hole Sizes Inches	Minimum Clearance Inches
4-1/2	6-1/8	1-5/8
5-1/2	7-3/8	1-7/8
6-5/8	8-1/2	1-7/8
7	8-3/4	1-3/4
8-5/8	10-5/8	2
9-5/8	12-1/4	2-5/8
13-3/8	17-1/2	4-1/8

NOTE: (1) If a manufacturer's specifications call for a larger hole size than indicated in the above table, then the manufacturer's specs take precedence.

(2) Check with the appropriate regional office for sizes not listed above.

2. Surface casing shall extend at least 75 feet beyond the deepest fresh water zone encountered or 75 feet into competent rock (bedrock), whichever is deeper, unless otherwise approved by the Department. However, the surface pipe must be set deeply enough to allow the BOP stack to contain any formation pressures that may be encountered before the next casing is run.

3. Surface casing shall not extend into zones known to contain measurable quantities of shallow gas. In the event that such a zone is encountered before the fresh water is cased off, the operator shall notify the Department and, with the Department's approval, take whatever actions are necessary to protect the fresh water zone(s).

4. All surface casing shall be a string of new pipe with a mill test of at least 1,100 pounds per square inch (psi), unless otherwise approved. Used casing may be approved for use, but must be pressure tested before drilling out the casing shoe or, if there is no casing shoe, before drilling out the cement in the bottom joint of casing. If plain end pipe is welded together for use, it too must be pressure tested. The minimum pressure for testing used casing or casing joined together by welding, shall be determined by the Department at the time of permit application. The appropriate Regional Mineral Resources office staff will be notified six hours prior to making the test. The results will be entered on the drilling log.

5. Centralizers shall be spaced at least one per every 120 feet; a minimum of two centralizers shall be run on surface casing. Cement baskets shall be installed appropriately above major lost circulation zones.

6. Prior to cementing any casing strings, all gas flows shall be killed and the operator shall attempt to establish circulation by pumping the calculated volume necessary to circulate. If the hole is dry, the calculated volume would include the pipe volume and 125% of the annular volume. Circulation is deemed to have been established once fluid reaches the surface. A flush, spacer or extra cement shall be used to separate the cement from the bore hole spacer or extra cement shall be used to separate the cement from the bore hole fluids to prevent dilution. If cement returns are not present at the surface, the operator may be required to run a log to determine the top of the cement.

7. The pump and plug method shall be used to cement surface casing, unless approved otherwise by the Department. The amount of cement will be determined on a site-specific basis and a minimum of 25% excess cement shall be used, with appropriate lost circulation materials, unless other amounts of excesses are approved or specified by the Department.

8. The operator shall test or require the cementing contractor to test the mixing water for pH and temperature prior to mixing the cement and to record the results on the cementing ticket.

9. The cement slurry shall be prepared according to the manufacturer's or contractor's specifications to minimize free water content in the cement.

10. After the cement is placed and the cementing equipment is disconnected, the operator shall wait until the cement achieves a calculated compressive strength of 500 psi before the casing is disturbed in any way. The waiting-on-cement (WOC) time shall be recorded on the drilling log.

11. When drive pipe (conductor casing) is left in the ground, a pad of cement shall be placed around the well bore to block the downward migration of surface pollutants. The pad shall be three feet square or, if circular, three feet in diameter and shall be crowned up to the drive pipe (conductor casing), unless otherwise approved by the Department.

WHEN REQUESTED BY THE DEPARTMENT IN WRITING, EACH OPERATOR MUST SUBMIT CEMENT TICKETS AND/OR OTHER DOCUMENTS THAT INDICATE THE ABOVE SPECIFICATIONS HAVE BEEN FOLLOWED.

THE CASING AND CEMENTING PRACTICES ABOVE ARE DESIGNED FOR TYPICAL SURFACE CASING CEMENTING. THE DEPARTMENT WILL REQUIRE ADDITIONAL MEASURES FOR WELLS DRILLED IN ENVIRONMENTALLY OR TECHNICALLY SENSITIVE AREAS (i.e., PRIMARY OR PRINCIPAL AQUIFERS).

THE DEPARTMENT RECOGNIZES THAT VARIATIONS TO THE ABOVE PROCEDURES MAY BE INDICATED IN SITE SPECIFIC INSTANCES. SUCH VARIATIONS WILL REQUIRE THE PRIOR APPROVAL OF THE REGIONAL MINERAL RESOURCES OFFICE STAFF.

INTERMEDIATE CASING

Intermediate casing string(s) and the cementing requirements for that casing string(s) will be reviewed and approved by Regional Mineral Resources office staff on an individual well basis.

PRODUCTION CASING

12. The production casing cement shall extend at least 500 feet above the casing shoe or tie into the previous casing string, whichever is less. If any oil or gas shows are encountered or known to be present in the area, as determined by the Department at the time of permit application, or subsequently encountered during drilling, the production casing cement shall extend at least 100 feet above any such shows. The Department may allow the use of a weighted fluid in the annulus to prevent gas migration in specific instances when the weight of the cement column could be a problem.

13. Centralizers shall be placed at the base and at the top of the production interval if casing is run and extends through that interval, with one additional centralizer every 300 feet of the cemented interval. A minimum of 25% excess cement shall be used. When caliper logs are run, a 10% excess will suffice. Additional excesses may be required by the Department in certain areas.

14. The pump and plug method shall be used for all production casing cement jobs deeper than 1500 feet. If the pump and plug technique is not used (less than 1500 feet), the operator shall not displace the cement closer than 35 feet above the bottom of the casing. If plugs are used, the plug catcher shall be placed at the top of the

lowest (deepest) full joint of casing.

15. The casing shall be of sufficient strength to contain any expected formation or stimulation pressures.

16. Following cementing and removal of cementing equipment, the operator shall wait until a compressive strength of 500 psi is achieved before the casing is disturbed in any way. The operator shall test or require the cementing contractor to test the mixing water for pH and temperature prior to mixing the cement and to record the results on the cementing tickets and/or the drilling log. WOC time shall be adjusted based on the results of the test.

17. The annular space between the surface casing and the production string shall be vented at all times. If the annular gas is to be produced, a pressure relief valve shall be installed in an appropriate manner and set at a pressure approved by the Regional Mineral Resources office.

WHEN REQUESTED BY THE DEPARTMENT IN WRITING, EACH OPERATOR MUST SUBMIT CEMENT TICKETS AND/OR OTHER DOCUMENTS THAT INDICATE THE ABOVE SPECIFICATIONS HAVE BEEN FOLLOWED.

THE CASING AND CEMENTING PRACTICES ABOVE ARE DESIGNED FOR TYPICAL PRODUCTION CASING/ CEMENTING. THE DEPARTMENT WILL REQUIRE ADDITIONAL MEASURES FOR WELLS DRILLED IN ENVIRONMENTALLY OR TECHNICALLY SENSITIVE AREAS (i.e., PRIMARY OR PRINCIPAL AQUIFERS).

THE DEPARTMENT RECOGNIZES THAT VARIATIONS TO THE ABOVE PROCEDURES MAY BE INDICATED IN SITE SPECIFIC INSTANCES. SUCH VARIATIONS WILL REQUIRE THE PRIOR APPROVAL OF THE REGIONAL MINERAL RESOURCES OFFICE.

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New York State

DEC

Appendix 9

EXISTING
Fresh Water Aquifer Supplementary Permit Conditions Required for Wells Drilled in Primary and Principal Aquifers

Revised Draft
Supplemental Generic Environmental Impact Statement

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FRESH WATER AQUIFER SUPPLEMENTARY PERMIT CONDITIONS

Operator: Well Name:
API Number:

1. All pits must be lined and sized to fully contain all drilling, cementing and stimulation fluids plus any fluids as a result of natural precipitation. Use of these pits for any other purpose is prohibited.

2. All fluids must be contained on the site and properly disposed. If operations are suspended and the site is left unattended at any time, pit fluids must be removed from the site immediately. After the cessation of drilling and/or stimulation operations, pit fluids must be removed within 7 days. Disposal of fluids must be undertaken by a waste transporter with an approved 6 NYCRR Part 364 permit.

3. Any hole drilled for conductor or surface casing (i.e., "water string") must be drilled on air, fresh water, or fresh water mud. For any holes drilled with mud, techniques for removal of filter cake (e.g., spacers, additional cement, appropriate flow regimes) must be considered when designing any primary cement job on conductor and surface casing.

4. If conductor pipe is used, it must be run in a drilled hole and it must be cemented back to surface by circulation down the inside of the pipe and up the annulus, or installed by another procedure approved by this office. Lost circulation materials must be added to the cement to ensure satisfactory results. Additionally, at least two centralizers must be run with one each at the shoe and at the middle of the string. In the event that cement circulation is not achieved, cement must be grouted (or squeezed) down from the surface to ensure a complete cement bond. In lieu of or in combination with such grouting or squeezing from the surface, this office may require perforation of the conductor casing and squeeze cementing of perforations. This office must be notified _____ hours prior to cementing operations and cementing cannot commence until a state inspector is present.

5. A surface casing string must be set at least 100' below the deepest fresh water zone and at least 100' into bedrock. If shallow gas is known to exist or is anticipated in this bedrock interval, the casing setting depth may be adjusted based on site-specific conditions provided it is approved by this office. There must be at least a 2½" difference between the diameters of the hole and the casing (excluding couplings) or the clearance specified in the Department's Casing and Cementing Practices, whichever is greater. Cement must be circulated back to the surface with a minimum calculated 50% excess. Lost circulation materials must be added to the cement to ensure satisfactory results. Additionally, cement baskets and centralizers must be run at appropriate intervals with centralizers run at least every 120'. Pipe must be either new API graded pipe with a minimum internal yield pressure of 1,800 psi or reconditioned pipe that has been tested internally to a minimum of 2,700 psi. If reconditioned pipe is used, an affidavit that the pipe has been tested must be submitted to this office before the pipe is run. This office must be notified _____ hours prior to cementing operations and cementing cannot commence until a state inspector is present.

6. If multiple fresh water zones are known to exist or are found or if shallow gas is present, this office may require multiple strings of surface casing to prevent gas intrusion and/or preserve the hydraulic characteristics and water quality of each fresh water zone. The permittee must immediately inform this office of the occurrence of any fresh water or shallow gas zones not noted on the permittee's drilling application and prognosis. This office may require changes to the casing and cementing plan in response to unexpected occurrences of fresh water or shallow gas, and may also require the immediate, temporary cessation of operations while such alterations are developed by the permittee and evaluated by the Department for approval.

7. In the event that cement circulation is not achieved on any surface casing cement job, cement must be grouted (or squeezed) down from the surface to ensure a complete cement bond. This office must be notified _____ hours prior to cementing operations and cementing cannot commence until a state inspector is present. In lieu of or in combination with such grouting or squeezing from the surface, this office may require perforation of the surface casing and squeeze cementing of perforations. This office may also require that a cement bond log and/or other logs be run for evaluation purposes. In addition, drilling out of and below surface casing cannot commence if there is any evidence or indication of flow behind the surface casing until remedial action has occurred. Alternative remedial actions from those described above may be approved by this office on a case-by-case basis provided site-specific conditions form the basis for such proposals.

8. This office must be notified _____ hours prior to any stimulation operation. Stimulation may commence without the state inspector if the inspector is not on location at the time specified during the notification.

9. The operator must complete the "Record of Formations Penetrated" on the Well Drilling and Completion Report providing a log of formations, both unconsolidated and consolidated, and all water and gas producing zones.

10. If the well is a producer, holding tanks with water-tight diking capable of retaining 1½ times the capacity of the tank must be installed for the containment of oil, brine and other production fluids. Disposal of fluids must only be undertaken by a waste transporter with an approved 6 NYCRR Part 364 permit.

11. **Any deviation from the above conditions must be approved by the Department prior to making a change.**

New York State

DEC

Appendix 10

PROPOSED
Supplementary Permit Conditions
For High-Volume Hydraulic Fracturing

Updated August 2011

Revised Draft
Supplemental Generic Environmental Impact Statement

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PROPOSED Supplementary Permit Conditions for High-Volume Hydraulic Fracturing

Note: The operator must comply with all provisions of Attachment A and Attachment B as noted at the end of this document, along with Attachment C when applicable.

Planning and Local Coordination

1) All operations authorized by this permit must be conducted in accordance with the following site-specific plans prepared by the operator, available to the Department upon request, and available on-site to a Department inspector while activities addressed by the plan are taking place:

   a) a visual impacts mitigation plan consistent with the SGEIS; and

   b) a greenhouse gas emissions impacts mitigation plan consistent with the SGEIS.

2) An emergency response plan (ERP) consistent with the SGEIS must be prepared by the well operator and be available on-site during any operation from well spud (i.e., first instance of driving pipe or drilling) through well completion. A list of emergency contact numbers for the area in which the well site is located must be included in the ERP and the list must be prominently displayed at the well site during operations conducted under this permit. Further, a copy of the ERP in electronic form must be provided to this office at least 3 days prior to well spud.

3) The county emergency management office (EMO) must be notified of the well's location including latitude and longitude (NAD 83) as follows:

   a) prior to spudding the well;

   b) first occurrence of flaring while drilling;

   c) prior to high-volume hydraulic fracturing, and;

   d) prior to flaring for well clean-up, treatment or testing. A flare permit from the Department is required prior to any flaring operation for well clean-up, treatment or testing.

   A record of the type, date and time of any notification provided to the EMO must be maintained by the operator and made available to the Department upon request. In counties without an EMO, the local fire department must be notified as described above.

4) The operator shall adhere to the Department-approved transportation plan which shall be incorporated by reference into this permit. In addition, issuance of this permit does not provide relief from any local requirements authorized by or enacted pursuant to the New York State Vehicle and Traffic Law. Prior to site disturbance, the operator shall submit to the Department a copy of any road use agreement between the operator and municipality.

5) Prior to site disturbance (for a new well pad) or spud (for an existing pad), the operator must sample and test residential water wells within 1,000 feet of the well pad as described by the SGEIS, and provide results to the property owner within 30 days of the operator's receipt of

laboratory results. If no residential water wells are available for sampling within 1,000 feet, either because there are none of record or because the property owner denies permission, then wells within 2,000 feet must be sampled and tested with the property owner's permission.

6) Ongoing water well monitoring and testing must continue as described by the SGEIS until one year after hydraulic fracturing at the last well on the pad. More frequent or additional monitoring and testing may be required by the Department in response to complaints or for other reasonable cause.

7) Water well analysis must be performed by an ELAP-certified laboratory. Analyses and documentation that all test results were provided to the property owner must be maintained by the operator. The results of the analyses (data) and delivery documentation must be made available to the Department and local health department upon Department request at any time during the period up to and including five years after the permitted hydrocarbon well is permanently plugged and abandoned under a Department permit. If the permitted hydrocarbon well is located on a multi-well pad, all residential water well data and delivery documentation must be maintained and made available during the period up to and including five years after the last permitted hydrocarbon well on the pad is permanently plugged and abandoned under a Department permit.

Site Preparation

8) Unless otherwise required by private lease agreement and in consideration of avoiding bisection of agricultural fields, to the extent practical the access road must be located as far away as possible from occupied structures, places of assembly and unleased property.

9) Unless otherwise approved or directed by the Department, all of the topsoil in the project area stripped to facilitate the construction of well pads and access roads must be stockpiled, stabilized and remain on site for use in final reclamation.

10) Authorization under the Department's General Permit for Stormwater Discharges Associated with High-Volume Hydraulic Fracturing (HVHF GP) must be obtained prior to any disturbance at the site.

11) Piping, conveyances, valves and tanks in contact with flowback water must be constructed of materials compatible with flowback water composition, and in accordance with the fluid disposal plan approved by the Department pursuant to 6 NYCRR 554.1(c)(1).

12) Any reserve pit, drilling pit or mud pit on the well pad which will be used for more than one well must be constructed as follows:

    a) Surface water and stormwater runoff must be diverted away from the pit;

    b) Pit volume may not exceed 250,000 gallons, or 500,000 gallons for multiple pits on one tract or related tracts of land;

    c) Pit sidewalls and bottoms must adequately cushioned and free of objects capable of puncturing and ripping the liner;

    d) Pits constructed in unconsolidated sediments must have beveled walls (45 degrees or less);

e) The pit liner must be sized and placed with sufficient slack to accommodate stretching;

f) Liner thickness must be at least 30 mils, and;

g) Seams must be factory installed or field seamed in accordance with the manufacturer's recommendations.

Site Maintenance

13) Secondary containment consistent with the Department's Spill Prevention Operations Technology Series 10, Secondary Containment Systems for Aboveground Storage Tanks, (SPOTS 10) is required for all fueling tanks;

14) To the extent practical, fueling tanks must not be placed within 500 feet of a public or private water-well, a domestic-supply spring, a reservoir, a perennial or intermittent stream, a storm drain, a wetland, a lake or a pond;

15) Fueling tank filling operations must be manned at the fueling truck and at the tank if the tank is not visible to the fueling operator from the truck, and;

16)Troughs, drip pads or drip pans are required beneath the fill port of a fueling tank during filling operations if the fill port is not within the secondary containment.

17) A copy of the SWPPP must be available on-site and available to Department inspectors while HVHF GP coverage is in effect. HVHF GP coverage may be terminated upon the plugging and abandonment of all wells on the well pad in accordance with Department-issued permits.

18) Two feet of freeboard must be maintained at all times for any on-site pit.

19) Except for freshwater storage pits, fluids must be removed from an on-site pit prior to any 45-day gap in use (i.e., from the completion date of the well) and the pit must be inspected by a Department inspector prior to resumed use.

Drilling, Stimulation and Flowback

NOTE: Wildcat Supplementary Conditions may be separately imposed in addition to these. Unless superseded by more stringent conditions below, the Department's Casing and Cementing Practices also remain in effect.

20) Lighting and noise mitigation measures as deemed necessary by the Department may be required at any time.

21) The operator must provide the drilling company with a well prognosis indicating anticipated formation top depths with appropriate warning comments prior to spud. The prognosis must be reviewed by all crew members and posted in a prominent location in the doghouse. The operator must revise the prognosis and inform the drilling company in a timely manner if

drilling reveals significant variation between the anticipated and actual geology and/or formation pressures.

22) Individual crew member's responsibilities for blowout control must be posted in the doghouse or other appropriate location and each crew member must be made aware of such responsibilities prior to spud of any well being drilled or when another rig is moved on a previously spudded well and/or prior to the commencement of any rig, snubbing unit or coiled tubing unit performing completion work. During all drilling and/or completion operations when a BOP is installed, tested or in use, the operator or operator's designated representative must be present at the wellsite and such person or personnel must have a current well control certification from an accredited training program that is acceptable to the Department (e.g., International Association of Drilling Contractors). Such certification must be available at the wellsite and provided to the Department upon request.

23) Appropriate pressure control procedures and equipment in proper working order must be properly installed and employed while conducting drilling and/or completion operations including tripping, logging, running casing into the well, and drilling out solid-core stage plugs. Unless otherwise approved by the Department, a snubbing unit and/or coiled tubing unit with a BOP must be used to enter any well with pressure and/or to drill out one or more solid-core stage plugs.

24) Pressure testing of the blow-out preventer (BOP) and related equipment for any drilling and/or completion operation must be performed in accordance with the approved BOP use and test plan, and any deviation from the approved plan must be approved by the Department. Testing must be conducted in accordance with American Petroleum Institute (API) Recommended Practice (RP) 53, RP for Blowout Prevention Systems for Drilling Wells, or other procedures approved by the Department. Unless otherwise approved by the Department, the BOP use and test plan must include the following provisions:

    a) A system for recording, documenting and retaining the results of all pressure tests and inspections conducted during drilling and/or completion operations. The results must be available to the Department at the wellsite during the corresponding operation, and to the Department upon request at any time during the period up to and including five years after the well is permanently plugged and abandoned under a Department permit. If the well is located on a multi-well pad, all pressure testing records must be maintained and made available during the period up to and including five years after the last well on the pad is permanently plugged and abandoned under a Department permit. The record for each pressure test, at a minimum, must identify the equipment or casing being tested, the date of the test, the minimum and maximum test pressures in psig, the test medium (e.g., water, brine, mud, air, nitrogen) including its density, test duration, and the results of the test including any pressure drop;

    b) A well control barrier policy developed by the operator that identifies acceptable barriers to be used during identified operations. Such policy must employ, at a minimum, two mechanical barriers capable of being tested when conducting any drilling and/or completion operation below the surface casing. In no event shall a stripper rubber or a stripper head be considered an acceptable barrier;

    c) BOP testing prior to being put into service. Such testing must include testing after the BOP is installed on the well but prior to use. Pressure control equipment,

including the BOP, that fails any pressure test must not be used until it is repaired and passes the pressure test, and;

d) A remote BOP actuator which is powered by a source other than rig hydraulics that is located at least 50 feet from the wellhead. All lines, valves and fittings between the BOP and the remote actuator and any other actuator must be flame resistant and have an appropriate rated working pressure.

25) The operator must detect, if practical, and document all naturally occurring methane in the conductor hole, if drilled, and the surface hole. Further, in accordance with 6 NYCRR 554.7(b), all freshwater, brine, oil and gas shows must be documented on the Department's *Well Drilling and Completion Report*. In the event H_2S is encountered in any portion of the well, all regulated activities must be conducted by the operator in conformance with American Petroleum Institute Publication API RP49, "Recommended Practices For Safe Drilling of Wells Containing Hydrogen Sulfide."

26) Annular disposal of drill cuttings or fluid is prohibited.

27) All fluids must be contained on the site until properly removed in compliance with the fluid disposal plan approved in accordance with 6 NYCRR 554.1(c)(1) and applicable conditions of this permit.

28) A closed-loop tank system must be used instead of a reserve pit to manage and contain drilling fluids and cuttings for any of the following:

a) horizontal drilling in the Marcellus Shale without an acid rock drainage mitigation plan for on-site burial of such cuttings, and;

b) any drilling requiring cuttings to be disposed of off-site including at a landfill.

29) With respect to the closed-loop tank system, cuttings may be removed from the site in the primary capture container (e.g., tank or bin) or transferred onsite via a transfer area to a secondary container or truck for offsite disposal. If a cuttings transfer area is employed, it must be lined with a material acceptable to the department. Transfer of cuttings to an onsite stock pile is prohibited, regardless of any liner under the stock pile. Offsite transport of all cuttings must be undertaken by a waste transporter with an approved 6 NYCRR Part 364 permit. The *Drilling and Production Waste Tracking Form* must be completed and retained for three years by the generator, transporter and destination facility, and made available to the Department upon request during this period. If requested, the generator is responsible for producing its originating copy of the *Drilling and Production Waste Tracking Form* and the completed form with the original signatures of the generator, transporter and destination facility.

30) Only biocides with current registration for use in New York may be used for any operation at the wellsite. Products must be properly labeled, and the label must be kept on-site during application and storage.

31) With respect to all surface, intermediate and production casing run in the well, and in addition to the requirements of the Department's "Casing and Cementing Practices" and any approved centralizer plan for intermediate casing, the following shall apply:

a) Casing must be new and conform to American Petroleum Institute (API) Specification 5CT, Specifications for Casing and Tubing (April 2002), and welded connections are prohibited;

b) casing thread compound and its use must conform to API Recommended Practice (RP) 5A3, RP on Thread Compounds for Casing, Tubing, Line Pipe, and Drill Stem Elements (November 2009);

c) at least two centralizers (one in the middle and one at the top) must be installed on the first joint of casing (except production casing) and all bow-spring style centralizers must conform to API Specification 10D for Bow-Spring Casing Centralizers (March 2002);

d) cement must conform to API Specification 10A, Specifications for Cement and Material for Well Cementing (April 2002 and January 2005 Addendum). Further, the cement slurry must be prepared to minimize its free water content in accordance with the same API specification and it must contain a gas-block additive;

e) prior to cementing any casing string, the borehole must be circulated and conditioned to ensure an adequate cement bond;

f) a spacer of adequate volume, makeup and consistency must be pumped ahead of the cement;

g) the cement must be pumped at a rate and in a flow regime that inhibits channeling of the cement in the annulus;

h) after the cement is pumped, the operator must wait on cement (WOC):
   1. until the cement achieves a calculated (e.g., performance chart) compressive strength of at least 500 psig, and
   2. a minimum WOC time of 8 hours before the casing is disturbed in any way, including installation of a blow-out preventer (BOP). The operator may request a waiver from the Department from the required WOC time if the operator has bench tested the actual cement batch and blend using mix water from the actual source for the job, and determined that 8 hours is not required to reach a compressive strength of 500 psig, and;

i) A copy of the cement job log for any cemented casing in the well must be available to the Department at the wellsite during drilling operations, and thereafter available to the Department upon request. The operator must provide such to the Department upon request at any time during the period up to and including five years after the well is permanently plugged and abandoned under a Department permit. If the well is located on a multi-well pad, all cementing records must be maintained and made available during the period up to and including five years after the last well on the pad is permanently plugged and abandoned under a Department permit.

32) The surface casing must be run and cemented immediately after the hole has been adequately circulated and conditioned. This office must be notified _____ hours prior to surface

casing cementing operations. *(Blank to be filled in based on well's location and Regional Minerals Manager's direction.)*

33) Intermediate casing must be installed in the well. The setting depth and design of the casing must consider all applicable drilling, geologic and well control factors. Additionally, the setting depth must consider the cementing requirements for the intermediate casing and the production casing as noted below. Any request to waive the intermediate casing requirement must be made in writing with supporting documentation and is subject to the Department's approval. Information gathered from operations conducted on any single well or the first well drilled on a multi-well pad may serve to form the basis for the Department waiving the intermediate casing requirement on subsequent wells in the vicinity of the single well or subsequent wells on the same multi-well pad.

34) This office must be notified _____ hours prior to intermediate casing cementing operations. Intermediate casing must be fully cemented to surface with excess cement. Cementing must be by the pump and plug method with a minimum of 25% excess cement unless caliper logs are run, in which case 10% excess will suffice. *(Blank to be filled in based on well's location and Regional Minerals Manager's direction.)*

35) The operator must run a radial cement bond evaluation log or other evaluation approved by the Department to verify the cement bond on the intermediate casing. The quality and effectiveness of the cement job shall be evaluated by the operator using the above required evaluation in conjunction with appropriate supporting data per Section 6.4 "Other Testing and Information" under the heading of "Well Logging and Other Testing" of American Petroleum Institute (API) Guidance Document HF1 (First Edition, October 2009). Remedial cementing is required if the cement bond is not adequate for drilling ahead (i.e., diversion or shut-in for well control).

36) Production casing must be run to the surface. This office must be notified _____ hours prior to production casing cementing operations. If installation of the intermediate casing is waived by the Department, then production casing must be fully cemented to surface. If intermediate casing is installed, the production casing cement must be tied into the intermediate casing string with at least 500 feet of cement measured using True Vertical Depth (TVD). Any request to waive any of the preceding cementing requirements must be made in writing with supporting documentation and is subject to the Department's approval. The Department will only consider a request for a waiver if the open-hole wireline logs including a narrative analysis of such and all other information collected during drilling from the same well pad or offsetting wells verify that migration of oil, gas or other fluids from one pool or stratum to another will be prevented. *(Blank to be filled in based on well's location and Regional Minerals Manager's direction.)*

37) The operator must run a radial cement bond evaluation log or other evaluation approved by the Department to verify the cement bond on the production casing. The quality and effectiveness of the cement job shall be evaluated by the operator using the above required evaluation in conjunction with appropriate supporting data per Section 6.4 "Other Testing and Information" under the heading of "Well Logging and Other Testing" of American Petroleum Institute (API) Guidance Document HF1 (First Edition, October 2009). Remedial cementing is required if the cement bond is not adequate to effectively isolate hydraulic fracturing operations.

38) The installation of an additional cemented casing string or strings in the well as deemed necessary by the Department for environmental and/or public safety reasons may be required at any time.

39) Under no circumstances should the annulus between the surface casing and the next casing string be shut-in, except during a pressure test.

40) If hydraulic fracturing operations are performed down casing, prior to introducing hydraulic fracturing fluid into the well the casing extending from the surface of the well to the top of the treatment interval must be tested with fresh water, mud or brine to at least the maximum anticipated treatment pressure for at least 30 minutes with less than a 5% pressure loss. This pressure test may not commence for at least 7 days after the primary cementing operations are completed on this casing string. A record of the pressure test must be maintained by the operator and made available to the Department upon request. The actual hydraulic fracturing treatment pressure must not exceed the test pressure at any time during hydraulic fracturing operations.

41) Prior to commencing hydraulic fracturing and pumping of hydraulic fracturing fluid, the injection lines and manifold, associated valves, frac head or tree and any other wellhead component or connection not previously tested must be tested with fresh water, mud or brine to at least the maximum anticipated treatment pressure for at least 30 minutes with less than a 5% pressure loss. A record of the pressure test must be maintained by the operator and made available to the Department upon request. The actual hydraulic fracturing treatment pressure must not exceed the test pressure at any time during hydraulic fracturing operations.

42) The operator must record the depths and estimated flow rates where fresh water, brine, oil and/or gas were encountered or circulation was lost during drilling operations. This information and the Department's *Pre-Frac Checklist and Certification* form including a treatment plan, must be submitted to and received by the regional office at least 3 days prior to commencement of high-volume hydraulic fracturing operations. The treatment plan must include a profile showing anticipated pressures and volumes of fluid for pumping the first stage. It must also include a description of the planned treatment interval for the well [i.e., top and bottom of perforations expressed in both True Vertical Depth (TVD) and True Measured Depth (TMD)].

43) Fracturing products other than those identified in the well permit application materials may not be used without specific approval from this office.

44) This permit does not authorize the use of diesel as the primary carrier fluid (i.e., diesel-based hydraulic fracturing).

45) The operator may conduct hydraulic fracturing operations provided 1) all items on the checklist are affirmed by a response of "Yes," 2) the *Pre-Frac Checklist And Certification* and treatment plan are received by the Department at least 3 days prior to hydraulic fracturing, and 3) all other pre-frac notification requirements are met as specified elsewhere. The operator is prohibited from conducting hydraulic fracturing operations on the well without additional Department review and approval if a response of "No" is provided to any of the items in the *Pre-Frac Checklist and Certification*.

46) Hydraulic fracturing operations must be conducted as follows:

a) Secondary containment for fracturing additive containers and additive staging areas, and flowback tanks is required. Secondary containment measures may include, as deemed appropriate by the Department, one or a combination of the following; dikes, liners, pads, impoundments, curbs, sumps or other structures or equipment capable of containing the substance. Any such secondary containment must be sufficient to contain 110% of the total capacity of the single largest container or tank within a common containment area. No more than one hour before initiating any hydraulic fracturing stage, all secondary containment must be visually inspected to ensure all structures and equipment are in place and in proper working order. The results of this inspection must be recorded and documented by the operator, and available to the Department upon request;

b) At least two vacuum trucks must be on standby at the wellsite during the pumping of hydraulic fracturing fluid and during any subsequent flowback phases;

c) Hydraulic fracturing additives must be removed from the site if the site will be unattended;

d) Any hydraulic fracturing string, if used, must be either stung into a production liner or run with a packer set at least 100 feet below the deepest cement top. An adequately sized, function tested relief valve and an adequately sized diversion line must be installed and used to divert flow from the hydraulic fracturing string-casing annulus to a covered watertight steel tank or covered watertight tank made of another material approved by the Department in case of hydraulic fracturing string failure. The relief valve must be set to limit the annular pressure to no more than 95% of the working pressure rating of the casings forming the annulus. The annulus between the hydraulic fracturing string and casing must be pressurized to at least 250 psig and monitored;

e) The pressure exerted on treating equipment including valves, lines, manifolds, hydraulic fracturing head or tree, casing and hydraulic fracturing string, if used, must not exceed 95% of the working pressure rating of the weakest component;

f) The hydraulic fracturing treatment pressure must not exceed the test pressure of any given component at any time during hydraulic fracturing operations;

g) All annuli available at the surface must be continuously observed or monitored in order to detect pressure or flow, and the records of such maintained by the operator and made available to the Department upon request, and;

h) Hydraulic fracturing pumping operations must be immediately suspended if any anomalous pressure and/or flow condition is indicated or occurring including a significant deviation from the treatment plan (i.e., profile showing anticipated pressures and volume of fluid for pumping the first stage) provided to the Department with the *Pre-Frac Checklist and Certification* or any other anticipated pressure and/or flow condition. Suspension of operations due to an anomalous pressure and/or flow condition is considered a non-routine incident which must be reported in accordance with the General Provisions of these supplementary permit conditions. In the case of suspended hydraulic fracturing pumping operations and non-routine incident reporting of such, the operator must receive Department approval prior to recommencing hydraulic fracturing activities in the same well.

47) The operator must make and maintain a complete record of its hydraulic fracturing operation including the flowback phase, and provide such to the Department upon request at any time during the period up to and including five years after the well is permanently plugged and abandoned under a Department permit. If the well is located on a multi-well pad, all hydraulic fracturing records must be maintained and made available during the period up to and including five years after the last well on the pad is permanently plugged and abandoned under a Department permit. The record for each well must include all types and volumes of materials, including additives, pumped into the well, flowback rates, and the daily and total volumes of fluid recovered during the first 30 days of flow from well. The record must also include a complete description of pressures exhibited throughout the hydraulic fracturing operation and must include pressure recordings, charts and/or a pressure profile. A synopsis of the hydraulic fracturing operation must be provided in the appropriate section of the Department's *Well Drilling and Completion Report* which must be provided to the Department within 30 days after completing the well in accordance with 6 NYCRR 554.7.

48) Flowback water is prohibited from being directed to or stored in any on-site pit. Covered watertight steel tanks or covered watertight tanks constructed of another material approved by the Department are required for flowback handling and containment on the well pad. Flowback water tanks, piping and conveyances, including valves, must be constructed of suitable materials, be of sufficient pressure rating and be maintained in a leak-free condition. Fluid transfer operations from tanks to tanker trucks must be manned at the truck and at the tank if the tank is not visible to the truck operator from the truck. Additionally, during transfer operations, all interconnecting piping must be manned if not visible to transfer personnel at the truck and tank.

49) The venting of any gas originating from the target formation during the flowback phase must be through a flare stack at least 30 feet in height, unless the absence of H_2S has been demonstrated at a previous well on the same pad. Gas vented through the flare stack must be ignited whenever possible. The stack must be equipped with a self-ignition device.

50) A reduced emissions completion, with minimal flaring (if any), must be performed whenever a sales line and interconnecting gathering line are available during completion at any individual well or a multi-well pad.

51) This permit authorizes a one-time single-stage or multi-stage high-volume hydraulic fracturing operation as described in the well permit application materials, subject to the *Pre-Frac Checklist and Certification* and any modifications required by the Department. Any subsequent high-volume re-fracturing operations are subject to the Department's approval after:

a) review of the planned fracturing procedures and products, water source, proposed site disturbance and layout, and fluid disposal plans;

b) a site inspection by Department staff, and;

c) a determination of whether any other Department permits are required.

Reclamation

52) Fluids must be removed from any on-site pit and the pit reclaimed no later than 45 days after completion of drilling and stimulation operations at the last well on the pad, unless the

Department grants an extension pursuant to 6 NYCRR 554.1(c)(3). Flowback water must be removed from on-site tanks within the same time frame.

53) Removed pit fluids must be disposed, recycled or reused as described in the approved fluid disposal plan submitted pursuant to 6 NYCRR 554.1(c)(1). Transport of all waste fluids by vehicle must be undertaken by a waste transporter with an approved 6 NYCRR Part 364 permit. The *Drilling and Production Waste Tracking Form* must be completed and retained for three years by the generator, transporter and destination facility, and made available to the Department upon request during this period. If requested, the generator is responsible for producing its originating copy of the *Drilling and Production Waste Tracking Form* and the completed form with the original signatures of the generator, transporter and destination facility.

54) If any fluid or other waste material is moved off site by pipeline or other piping, the operator must maintain a record of the date and time the fluid or other material left the site, the quantity of fluid or other material, and its intended disposition and use at that destination or receiving facility.

55) Cuttings contaminated with oil-based mud and polymer-based muds must be contained and managed in a closed-loop tank system and not be buried on site, and must be removed from the site for disposal in a 6 NYCRR Part 360 solid waste facility. Consultation with the Department's Division of Materials Management (DMM) is required prior to disposal of any cuttings associated with water-based mud-drilling and pit liner associated with water-based mud-drilling where the water-based mud contains chemical additives. Any sampling and analysis directed by DMM must be by an ELAP-certified laboratory. Disposal must conform to all applicable Department regulations. The pit liner must be ripped and perforated prior to any permitted burial on-site and to the extent practical, excess pit liner material must be removed and disposed of properly. Permission of the surface owner is required for any on-site burial of cuttings and pit liner, regardless of type of drilling and fluids used. Burial of any other trash on-site is specifically prohibited and all such trash must be removed from the site and properly disposed. Transport of all cuttings and pit liner off-site, if required by the Department or otherwise performed, must be undertaken by a waste transporter with an approved 6 NYCRR Part 364 permit. The *Drilling and Production Waste Tracking Form* must be completed and retained for three years by the generator, transporter and destination facility, and made available to the Department upon request during this period. If requested, the generator is responsible for producing its originating copy of the *Drilling and Production Waste Tracking Form* and the completed form with the original signatures of the generator, transporter and destination facility.

56) A site-specific acid rock drainage (ARD) mitigation plan consistent with the SGEIS must be prepared by the operator and followed for on-site burial of Marcellus Shale cuttings from horizontal drilling in the Marcellus Shale if the operator elects to bury these cuttings. The plan must be available to the Department upon request, and available on-site to a Department inspector while activities addressed by the plan are taking place.

57) The operator must fully implement the Partial Site Reclamation Plan described in the approved application materials.

58) Final reclamation of the wellsite must be approved by the Department. Unless otherwise approved by this office, well pads and access roads constructed for drilling and production operations must be scarified or ripped to alleviate compaction prior to replacement of topsoil.

Reclaimed areas must be seeded and mulched after topsoil replacement. Any proposal by the operator to waive these reclamation requirements must be accompanied by documentation of the landowner's written request to keep the access road and/or well pad.

General

59) The operator must follow applicable best management practices (BMPs) for reducing direct impacts at individual well pads described in Section 7.4.1.1 of the SGEIS.

60) The operator must fully implement the Invasive Species Management Plan described in the approved application materials.

61) The operator must follow applicable best management practices (BMPs) for reducing the potential for transfer and introduction of invasive species described in Section 7.4.2.2 of the SGEIS.

62) The operator must complete the "Record of Formations Penetrated" on the *Well Drilling and Completion Report* providing a log of formations, both unconsolidated and consolidated, and depths and estimated flow rates of any fresh water, brine, oil and/or gas. In accordance with 6 NYCRR 554.7, the well operator must provide the Department with the *Well Drilling and Completion Report* within 30 days after completing the well.

63) Any non-routine incident of potential environmental and/or public safety significance must be verbally reported to the Department within two hours of the incident's known occurrence or discovery, with a written report detailing the non-routine incident to follow within twenty-four hours of the incident's known occurrence or discovery. Non-routine incidents may include, but are not limited to: -casing, drill pipe or hydraulic fracturing equipment failures, cement failures, fishing jobs, fires, seepages, blowouts, surface chemical spills, observed leaks in surface equipment, observed pit liner failure, surface effects at previously plugged or other wells, observed effects at water wells or at the surface, complaints of water well contamination, anomalous pressure and/or flow conditions indicated or occurring during hydraulic fracturing operations, or other potentially polluting non-routine incident or incident that may affect the health, safety, welfare, or property of any person. Provided the environment and public safety would not be further endangered, any action and/or condition known or suspected of causing and/or contributing to a non-routine incident must cease immediately upon known occurrence or discovery of the incident, and appropriate initial remedial actions commenced. The required written non-routine incident report noted above must provide details of the incident and include, as necessary, a proposed remedial plan for Department review and approval. In the case of suspended hydraulic fracturing pumping operations and non-routine incident reporting of such, the operator must receive Department approval prior to recommencing hydraulic fracturing activities in the same well.

64) Flowback water recovered after high-volume hydraulic fracturing operations must be tested for NORM prior to removal from the site. Fluids recovered during the production phase (i.e., production brine) must be tested for NORM prior to removal.

65) Periodic radiation surveys must be conducted at specified time intervals during the production phase for Marcellus wells developed by high-volume hydraulic fracturing completion methods. Such surveys must be performed on all accessible well piping, tanks, or equipment that could contain NORM scale buildup. The surveys must be conducted for as long as the facility remains in active use. If piping, tanks, or equipment is to be removed,

radiation surveys must be performed to ensure their appropriate disposal. All surveys must be conducted in accordance with NYSDOH protocols.

66) Production brine is prohibited from being directed to or stored in any on-site pit. Covered watertight steel, fiberglass or plastic tanks, or covered watertight tanks constructed of another material approved by the Department, are required for production brine handling and containment on the well pad. Production brine tanks, piping and conveyances, including valves, must be constructed of suitable materials, be of sufficient pressure rating and be maintained in a leak-free condition.

67) Production brine which is removed from the site must be disposed, recycled or reused as described by the well permit application materials. Transport of all waste fluids must be undertaken by a waste transporter with an approved 6 NYCRR Part 364 permit. The *Drilling and Production Waste Tracking Form* must be completed and retained for three years by the generator, transporter and destination facility, and made available to the Department upon request during this period. If requested, the generator is responsible for producing its originating copy of the *Drilling and Production Waste Tracking Form* and the completed form with the original signatures of the generator, transporter and destination facility.

Any deviation from the above conditions must be approved by the Department prior to making a change.

ATTACHMENT A

To avoid or mitigate adverse air quality impacts from the well drilling, completion and production operations, the following restrictions are imposed:

1. The diesel fuel used in drilling and completion equipment engines will be limited to Ultra Low Sulfur Fuel (ULSF) with a maximum sulfur content of 15 ppm.

2. There will not be any simultaneous operations of the drilling and completion equipment engines at the single well pad.

3. The maximum number of wells to be drilled and completed annually or during any consecutive 12--month period at a single pad will be limited to four.

4. The emissions of benzene at any glycol dehydrator to be used at the well pad will be limited to one ton/year as determined by calculations with the GRI-GlyCalc program. If wet gas is encountered, then the dehydrator will have a minimum stack height of 30 feet (9.1m) and will be equipped with a control devise to limit the benzene emissions to 1 Tpy.

5. Condensate tanks used at the well pad shall be equipped with vapor recovery systems to minimize fugitive VOC emissions.

6. During the flowback phase, the venting of gas from each well pad will be limited to a maximum of 5 MMscf during any consecutive 12--month period. If "sour" gas is encountered with detected H_2S emissions, the height at which the gas will be vented will be a minimum of 30 feet (9.1m).

7. During the flowback phase, flaring of gas at each well pad will be limited to a maximum of 120 MMscf during any consecutive 12--month period.

8. Wellhead compressor will be equipped with NSCR controls.

9. No uncertified (i.e., EPA Tier 0) drilling or completion equipment engines will be used for any activity at the well sites.

10. The drilling engines and drilling air compressors will be limited to EPA Tier 2 or newer equipment. If Tier 1 drilling equipment is to be used, these will be equipped with both

particulate traps (CRDPF) and SCR controls. During operations, this equipment will be positioned as close to the center of the well pad as practicable. If industry deviates from the control requirements or proposes alternate mitigation and/or control measures to demonstrate ambient standard compliance, site specific information will be provided to the Department for review and concurrence.

11. The completion equipment engines will be limited to EPA Tier 2 or newer equipment. Particulate traps will be required for all Tier 2 engines. SCR control will be required on all completion equipment engines regardless of the emission Tier. During operations, this equipment will be positioned as close to the center of the well pad as practicable. If industry deviates from this requirement or proposes mitigation and/or alternate control measures to demonstrate ambient standard compliance, site specific information will be provided to the Department for review and concurrence.

ATTACHMENT B

PASSBY FLOW IMPLEMENTATION AND ENFORCEMENT

1. Monitoring and Reporting. Passby flows must be maintained instantaneously. Determinations of allowable removal rates will be made based on comparisons with instantaneous flow data.

2. Description of Gage Types

Tier I- Gage data in this category is collected by the permitee immediately downstream of the water withdrawal location using streamflow gage equipment capable of accurately measuring instantaneous flow rates as approved at the discretion of the Department.

Tier II- Gage data in this category is obtained from acceptable USGS gages that must be located at a point in the same watershed where the drainage area at the gage is from 0.5x to 2.0x the size of the drainage area as measured at the withdrawal point. The catchment area must not have altered flows unless the instantaneous flow measurements can take into account the alterations.

Tier III- Gage data in this category is obtained from USGS gages that are either outside the acceptable distance within the same watershed or are in adjacent watersheds that possess similar basin characteristics. The use of these "surrogate" watersheds are the most inaccurate account of stream flow and should be used only as approved at the discretion of the Department.

3. All streamflow records used in determining the instantaneous passby flow rates should be measured to the nearest 0.1 cfs at 15-minute increments. Water withdrawal rates must be reported as instantaneous measurements to the nearest 0.1 cfs at 5-minute increments. Reporting is required annually to Department in Microsoft Excel or similar electronic spreadsheet/database formats.

4. Violations and Suspension of Operations. Water withdrawal operations will be suspended immediately upon determination that the required passby flow has not been maintained. The Department has the right to modify passby flow requirements if water quality standards are not being met within a watercourse as the result of a water withdrawal. Failure to submit annual reports, filing of inaccurate reports on water withdrawals, and continuing to withdraw water after a determination that the required passby flow has not been maintained, are all considered separate violations of this permit and the Environmental Conservation Law Article 71-1305(2).

ATTACHMENT C

FOREST AND GRASSLAND FOCUS AREAS

Operators developing well sites in Forest and Grassland Focus Areas that involve disturbance in a contiguous forest patch of 150 acres or more in size or in a contiguous grassland patch of 30 acres or more in size must:

1) Implement mitigation measures identified as part of the Department-approved ecological assessment;

2) Monitor the effects of disturbance as active development proceeds and for a minimum of two years following well completion; and

3) Practice adaptive management as previously unknown effects are documented.

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New York State

DEC

Appendix 11

Analysis of Subsurface Mobility of Fracturing Fluids

Excerpted from ICF International, Task 1, 2009

Revised Draft
Supplemental Generic Environmental Impact Statement

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1.2.4 Principles governing fracturing fluid flow

The mobility of hydraulic fracturing fluid depends on the same physical and chemical principles that dictate all fluid transport phenomena. Frac fluid will flow through the well, the fractures, and the porous media based on pressure differentials and hydraulic conductivities. In addition to the overall flow of the frac fluids, additives may experience greater or lesser movement due to diffusion and adsorption. The concentrations of the fluids and additives may change due to dilution in formation waters and possibly by biological or chemical degradation.

1.2.4.1 Limiting conditions

The analyses below present flow calculations for a range of parameters, with the intent to define reasonable bounds for the conditions likely to be encountered in New York State. Although one or more conditions at some future well sites may lie outside of the ranges analyzed, it is considered unlikely that the combination of conditions at any site would produce environmental impacts that are significantly more adverse than the worst case scenarios analyzed. The equations used in the analyses are presented below to facilitate the assessment of additional scenarios.

The analyses consider potentially useful aquifers with lower limits at depths up to 1,000 feet, somewhat deeper than the maximum aquifer depth reported in Table 3 for the Marcellus Shale. Similarly, the minimum depth to the top of the shale is taken as 2,000 ft, well above the minimum depth reported in Table 3 for the Marcellus Shale. The 2,000 ft. depth has been postulated as the probable upper limit for economic development of the New York shales.

The analyses include an additional conservative assumption. Even for deep aquifers, the analyses consider the pore pressure at the bottom of the aquifer to be zero as if a deep well or well field was operating at maximum drawdown. This assumption maximizes the potential for upward flow of fracturing fluid or its components from the fracture zone to the aquifer.

[134] U.S. EPA, 2004. *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs*, Report number: EPA 816-R-04-003.

1.2.4.2 Gradient

For a fracturing fluid or its additives to have a negative impact on a groundwater aquifer, some deleterious component of the fracturing fluid would need to travel from the target fracture zone to the aquifer. In order for fluid to flow from the fracture zone to an aquifer, the *total head*[135] must be greater in the fracture zone than at the well. We can estimate the *gradient*[136] that might exist between a fracture zone in the shale and a potable water aquifer as follows:

$$i = \frac{h_{t1} - h_{t2}}{L} \quad (1)$$

where i = gradient
h_{tn} = total head at Point n
L = length of flow path from Point 1 to Point 2

Since the total head is the sum of the elevation head and the pressure head,

$$h_t = h_e + h_p \quad (2)$$

The gradient can be restated as

$$i = \frac{\left(h_{e1} + h_{p1}\right) - \left(h_{e2} + h_{p2}\right)}{L} \quad (3)$$

where h_{en} = elevation head at Point n
h_{pn} = pressure head at Point n

If the ground surface is taken as the elevation datum, we can express the elevation head in terms of depth.

$$d_n = -h_{en} \quad (4)$$

Restating the gradient yields

$$i = \frac{\left(h_{e1} + h_{p1}\right) - \left(h_{e2} + h_{p2}\right)}{L} = \frac{\left(-d_1 + h_{p1}\right) - \left(-d_2 + h_{p2}\right)}{L} = \frac{\left(d_2 - d_1\right) + \left(h_{p1} - h_{p2}\right)}{L} \quad (5)$$

where d_n = depth at Point n

We can estimate the maximum likely gradient by considering the combination of parameters which would be most favorable to flow from the hydraulically fractured zone to a potential groundwater aquifer. These include assuming the minimum possible pressure head in the aquifer and the shortest possible flow path, i.e. setting h_{p2} to zero to simulate a well pumped to the maximum aquifer drawdown and setting L to the vertical distance between the fracture zone and the aquifer, $d_1 - d_2$.

[135] Total head at a point is the sum of the elevation at the point plus the pore pressure expressed as the height of a vertical column of water.
[136] The groundwater gradient is the difference in total head between two points divided by the distance between the points.

The gradient now becomes

$$i = \frac{(d_2 - d_1) + h_{p1}}{|d_1 - d_2|} \quad (6)$$

The total vertical stress in the fracture zone equals

$$\sigma_v = d_1 \times \gamma_R \quad (7)$$

where σ_v = total vertical stress
d_1 = depth at Point 1, in the fracture zone
γ_R = average total unit weight of the overlying rock

The effective vertical stress, or the stress transmitted through the mineral matrix, equals the total unit weight minus the pore pressure. For the purposes of this analysis, the pore pressure is taken to be equivalent to that of a vertical water column from the fracture zone to the surface. The effective vertical stress is given by

$$\sigma'_v = \sigma_v - (d_1 \times \gamma_W) \quad (8)$$

where σ'_v = effective vertical stress
γ_W = unit weight of water

The effective horizontal stress and the total horizontal stress therefore equal

$$\sigma'_h = K \times \sigma'_v \quad (9)$$

$$\sigma_h = \sigma'_h + (d_1 \times \gamma_W) \quad (10)$$

where σ'_h = effective horizontal stress
K = ratio of horizontal to vertical stress
σ_h = total horizontal stress

The hydraulic fracturing pressure needs to exceed the minimum total horizontal stress. Allowing for some loss of pressure from the wellbore to the fracture tip, the pressure head in the fracture zone equals

$$h_{p1} = c \times \sigma_h = \frac{c \times d_1 \times [K(\gamma_R - \gamma_W) + \gamma_W]}{\gamma_W} \quad (11)$$

where h_{p1} = pressure head at Point 1, in the fracture zone
c = coefficient to allow for some loss of pressure from the wellbore to the fracture tip

Since the horizontal stress is typically in the range of 0.5 to 1.0 times the vertical stress, the fracturing pressure will equal the depth to the fracture zone times, say, 0.75 times the density of

the geologic materials (estimated at 150 pcf average), times the depth.[137] To allow for some loss of pressure from the wellbore to the fracture tip, the calculations assume a fracturing pressure 10% higher than the horizontal stress, yielding

$$h_{p1} = \frac{110\% \times d_1 \times [0.75(150\,pcf - 62.4\,pcf) + 62.4\,pcf]}{62.4\,pcf} = 2.26 d_1 \quad (12)$$

Equation (6) thus becomes

$$i = \frac{(d_2 - d_1) + 2.26 d_1}{|d_1 - d_2|} = \frac{d_2 + 1.26 d_1}{|d_1 - d_2|} \quad (13)$$

Figure 1 shows the variation in the average hydraulic gradient between the fracture zone and an overlying aquifer during hydraulic fracturing for a variety of aquifer and shale depths. The gradient has a maximum of about 3.5, and is less than 2.0 for most depth combinations.

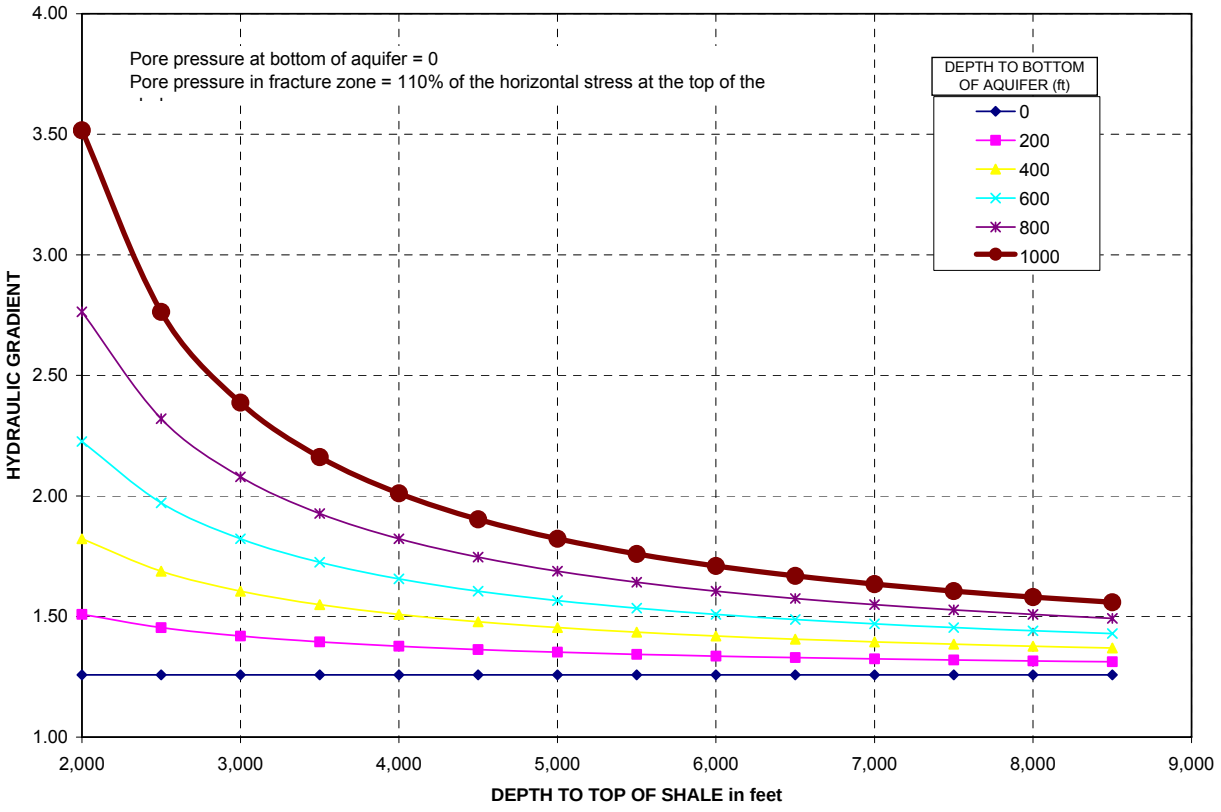

Figure 1: Average hydraulic gradient during fracturing

In an actual fracturing situation, non-steady state conditions will prevail during the limited time of application of the fracturing pressures, and the gradients will be higher than the average closer

[137] Zhang, Lianyang, 2005. *Engineering Properties of Rocks*, Elsevier Geo-Engineering Book Series, Volume 4, Amsterdam.

to the fracture zone and lower than the average closer to the aquifer. It is important to note that these gradients only apply while fracturing pressures are being applied.

Once fracturing pressures are removed, the total head in the reservoir will fall to near its original value, which may be higher or lower than the total head in the aquifer. Evidence suggests that the permeabilities of the Devonian shales are too low for any meaningful hydrological connection with the post-Devonian formations. The high dissolved solid content near 300,000 ppm in pre-Late Devonian formations supports the concept that these formations are hydrologically discontinuous, i.e. not well-connected to other formations.[138] During production, the pressure in the shale would decrease as gas is extracted, further reducing any potential for upward flow.

1.2.4.3 Seepage velocity

The second aspect to consider with regards to flow is the time required for a particle of fluid to flow from the fracture zone to the well. Using Darcy's law, the seepage velocity would equal

$$v = \frac{ki}{n} \tag{10}$$

where v = seepage velocity
k = hydraulic conductivity
n = porosity

The average hydraulic conductivity between a fracture zone and an aquifer would depend on the hydraulic conductivity of each intervening stratum, which in turn would depend on the type of material and whether it was intact or fractured. The rock types overlying the Marcellus Shale are primarily sandstones and other shales.[139] Table 4 lists the range of hydraulic conductivities for sandstone and shale rock masses. The hydraulic conductivity of rock masses tends to decrease with depth as higher stress levels close or prevent fractures. Vertical flow across a horizontally layered system of geologic strata is controlled primarily by the less permeable strata, so the average vertical hydraulic conductivity of all the strata lying above the target shale would be expected to be no greater than 1E-5 cm/sec and could be substantially lower.

Table 4: Hydraulic conductivity of rock masses[140]

Material	Minimum k	Maximum k
Intact Sandstone	1E-8 cm/sec	1E-5 cm/sec
Sandstone rock mass	1E-9 cm/sec	1E-1 cm/sec
Intact Shale	1E-11 cm/sec	1E-9 cm/sec
Shale rock mass	1E-9 cm/sec	1E-4 cm/sec

Figure 2 shows the seepage velocity from the fracture zone to an overlying aquifer based on the average gradients shown in Figure 1 over a range of hydraulic conductivity values and for the maximum aquifer depth of 1000 feet. For all lesser aquifer depths, the seepage velocity would

[138] Russell, William L., 1972, "Pressure-Depth Relations in Appalachian Region", *AAPG Bulletin*, March 1972, v. 56, No. 3, p. 528-536.
[139] Arthur, J.D., et al, 2008. "Hydraulic Fracturing Considerations for Natural Gas Wells of the Marcellus Shale," Presented at Ground Water Protection Council 2008 Annual Forum, September 21-24, 2008, Cincinnati, Ohio.
[140] Zhang, Lianyang, 2005. *Engineering Properties of Rocks*, Elsevier Geo-Engineering Book Series, Volume 4, Amsterdam.

be lower. For all of the analyses presented in this report, the porosity is taken as 10%, the reported total porosity for the Marcellus Shale.[141] Total porosity equals the contribution from both micro-pores within the intact rock and void space due to fractures. For the overlying strata, the analyses also use the same value for total porosity of 10% which is in the lower range of the typical values for sandstones and shales. This may result in a slight overestimation of the calculated seepage velocity, and an underestimation of the required travel time and available pore storage volume.

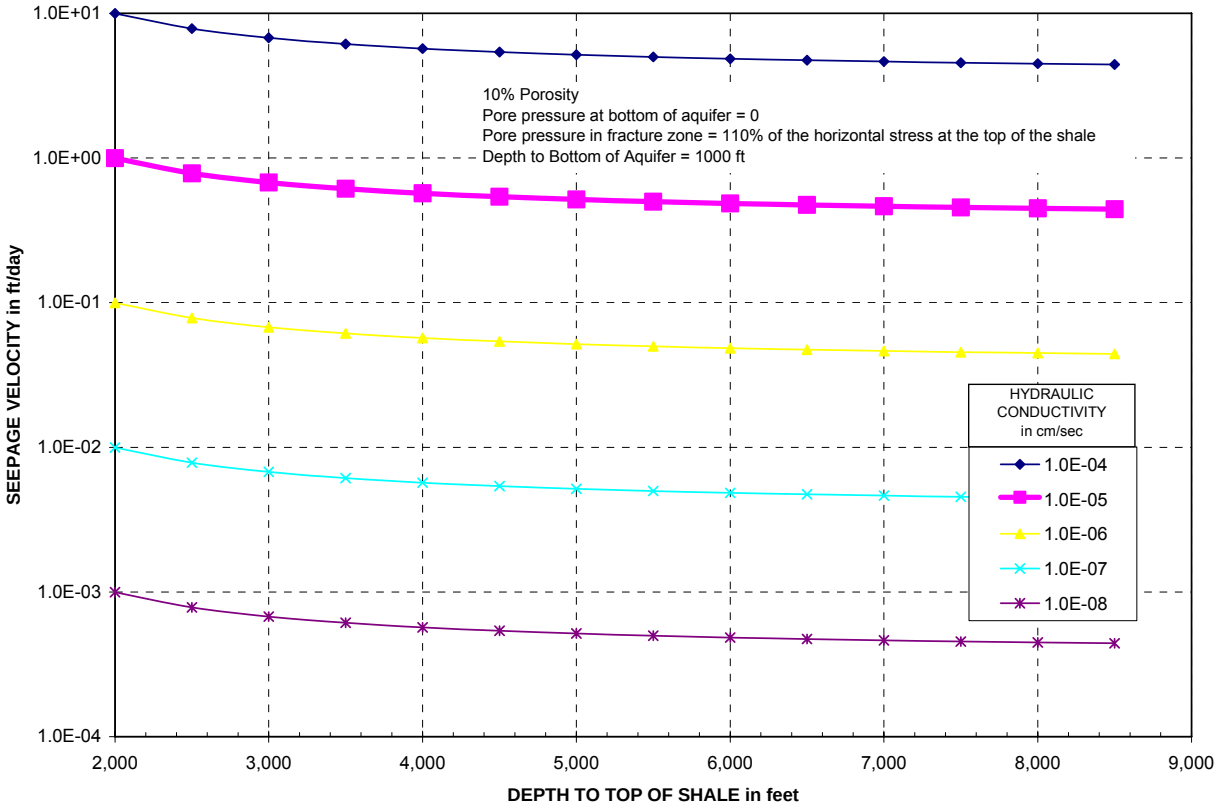

Figure 2: Seepage velocity as a function of hydraulic conductivity

Figure 2 shows that the seepage of hydraulic fracturing fluid would be limited to no more than 10 feet per day, and would be substantially less under most conditions. Since the cumulative amount of time that the fracturing pressure would be applied for all steps of a typical fracture stage is less than one day, the corresponding seepage distance would be similarly limited.

It is important to note that the seepage velocities shown in Figure 2 are based on average gradients between the fracture zone and the overlying aquifer. The actual gradients and seepage velocities will be influenced by non-steady state conditions and by variations in the hydraulic conductivities of the various strata.

[141] DOE, Office of Fossil Energy, 2009. *State Oil and National Gas Regulations Designed to Protect Water Resources*, May 2009.

1.2.4.4 Required travel time

The time that the fracturing pressure would need to be maintained for the fracturing fluid to flow from the fracture zone to an overlying aquifer is given by

$$t = \frac{|d_2 - d_1|}{v} \tag{11}$$

where t = required travel time

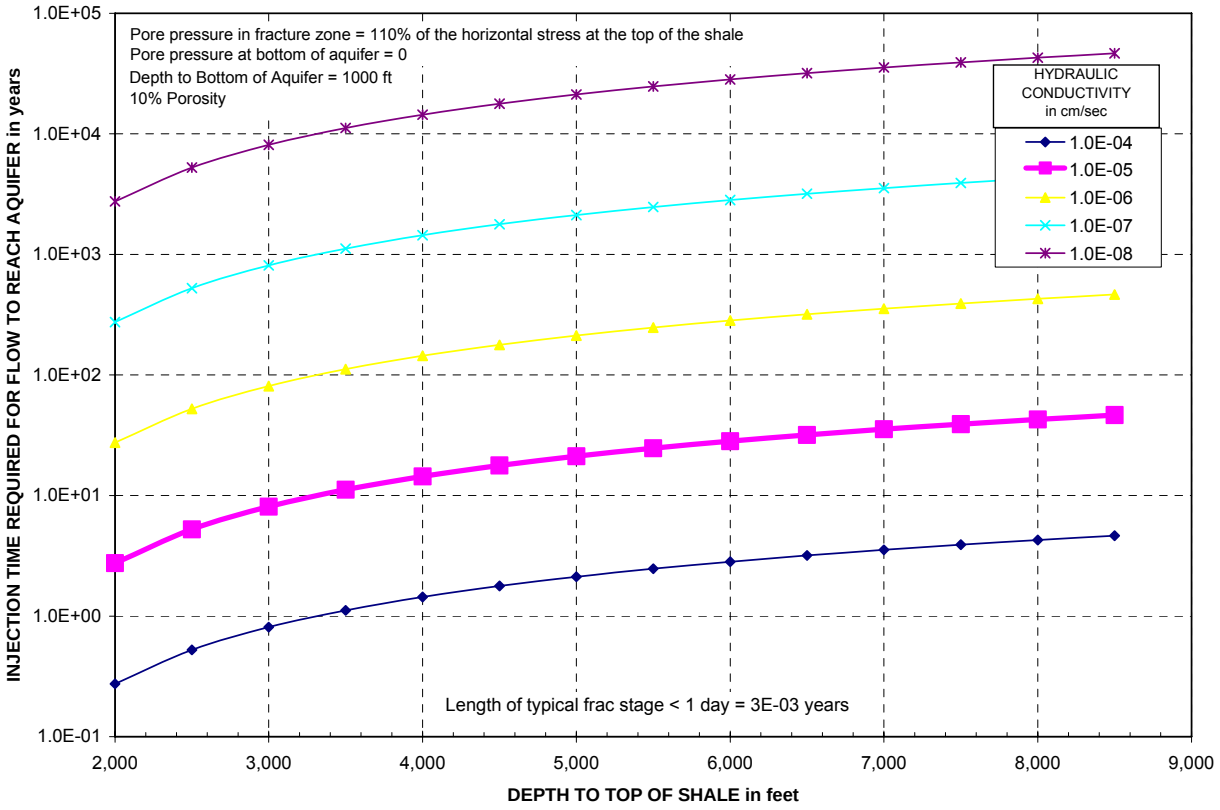

Figure 3: Injection time required for fracture fluid to reach aquifer as a function of hydraulic conductivity

Figure 3 shows the required travel time based on the average gradients shown in Figure 1 over a range of hydraulic conductivity values and for the maximum aquifer depth of 1000 feet. For all lesser aquifer depths, the required flow time would be longer. The required flow times under the fracturing pressure is several orders of magnitude greater than the duration over which the fracturing pressure would be applied.

Figure 4 presents the results of a similar analysis, but with the hydraulic conductivity held at 1E-5 cm/sec and considering various depths to the bottom of the aquifer. Compared to a 1000 ft. deep aquifer, 10 to 20 more years of sustained fracturing pressure would be required for the fracturing fluid to reach an aquifer that was only 200 ft. deep.

The required travel times shown relate to the movement of the groundwater. Dissolved chemicals would move at a slower rate due to retardation. The retardation factor, which is the

ratio of the chemical movement rate compared to the water movement rate, is always between 0.0 and 1.0, so the required travel times for any dissolved chemical would be greater than those shown in Figures 3 and 4.

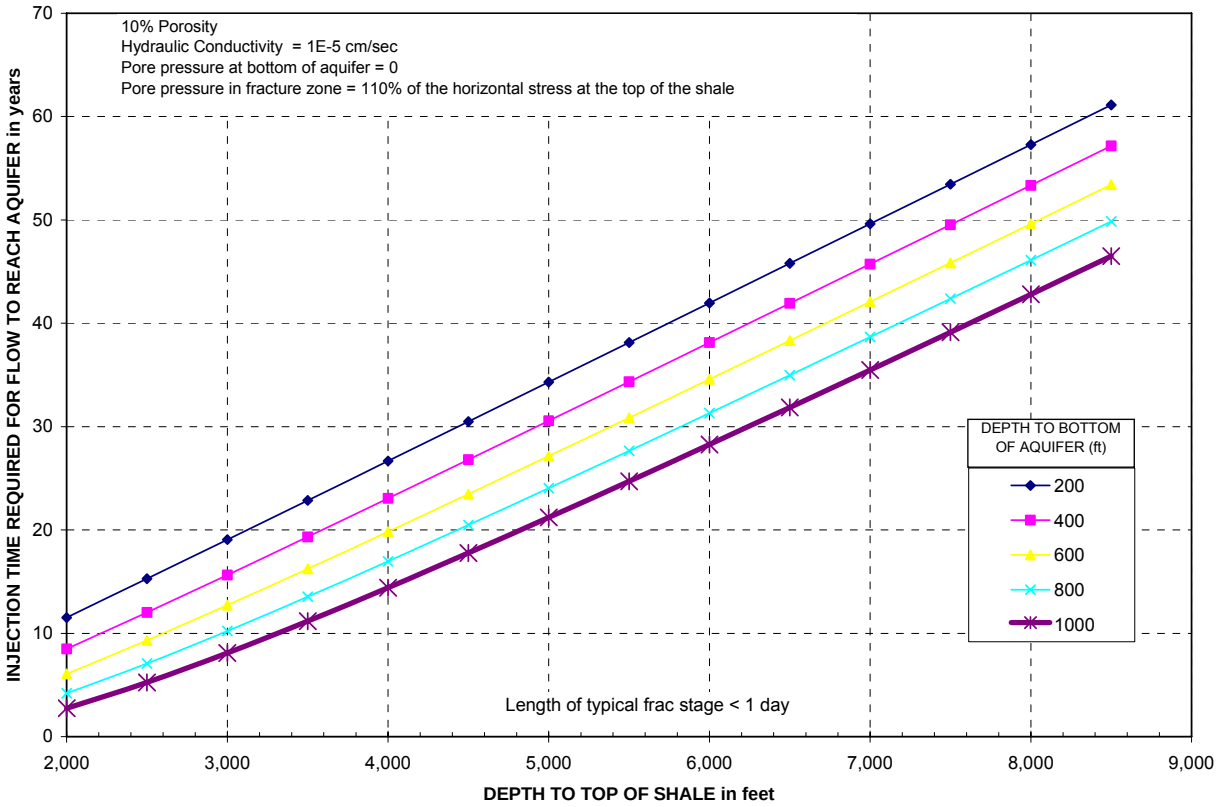

Figure 4: Injection time required for flow to reach aquifer as a function of aquifer depth

1.2.4.5 Pore storage volume

The fourth aspect to consider in evaluating the potential for adverse impacts to overlying aquifers is the volume of fluid injected compared to the volume of the void spaces and fractures that the fluid would need to fill in order to flow from the fracture zone to the aquifer. Figure 5 shows the void volume based on 10% total porosity for the geologic materials for various combinations of depths for the bottom of an aquifer and for the top of the shale, calculated as follows:

$$V = |d_1 - d_2| \times n \times \frac{43{,}560\ ft^2}{acre} \times \frac{7.48 gal}{ft^3} \qquad (12)$$

where V = volume of void spaces and fractures

A typical slickwater fracturing treatment in a horizontal well would use less than 4 million gallons of fracturing fluid, and some portion of this fluid would be recovered as flowback. The void volume, based on 10% total porosity, for the geologic materials between the bottom of an aquifer at 1,000 ft. depth and the top of the shale at a 2,000 ft. depth is greater than 32 million gallons per acre. Since the expected area of a well spacing unit is no less than the equivalent of

40 acres per well,[142,143,144,145] the fracturing fluid could only fill about 0.3% of the overall void space. Alternatively, if the fracturing fluid were to uniformly fill the overall void space, it would be diluted by a factor of over 300. As shown in Figure 5, for shallower aquifers and deeper shales, the void volume per acre is significantly greater.

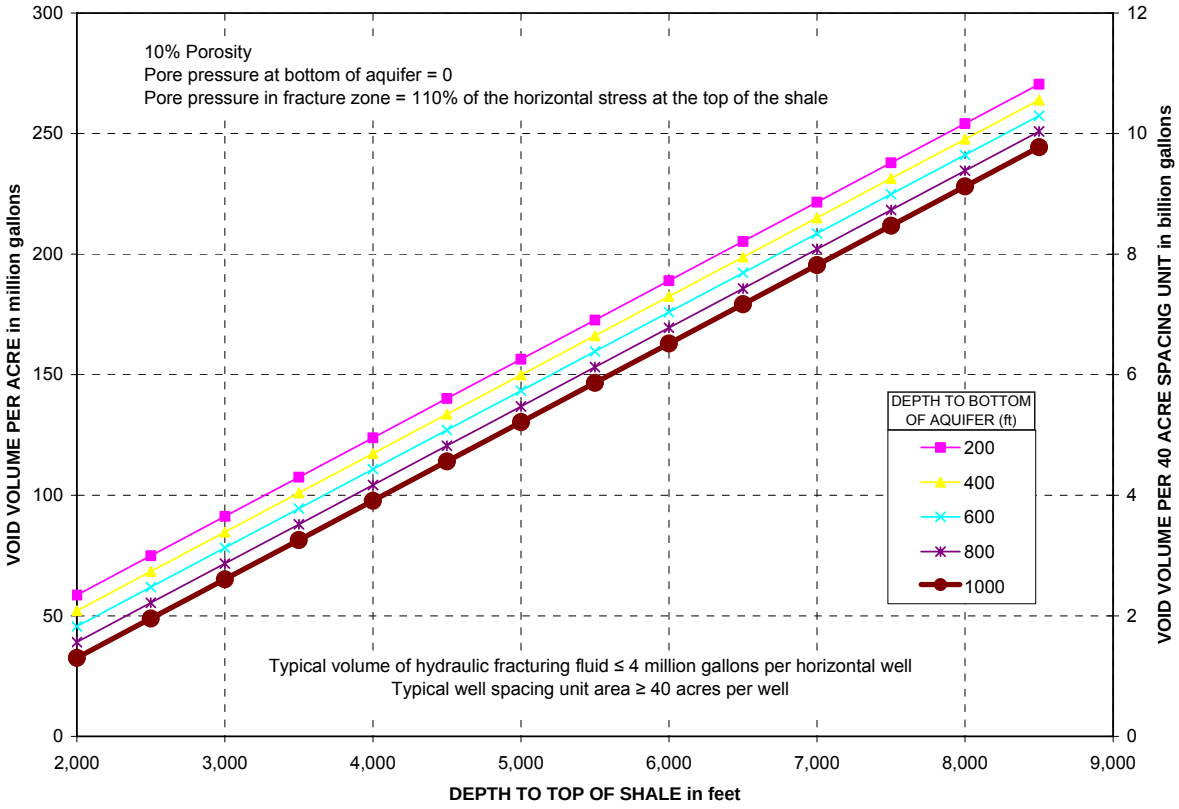

Figure 5: Comparison of void volume to frac fluid volume

1.2.5 Flow through fractures, faults, or unplugged borings

It is theoretically possible but extremely unlikely that a flow path such as a network of open fractures, an open fault, or an undetected and unplugged wellbore could exist that directly connects the hydraulically fractured zone to an aquifer. The open flow path would have a much smaller area of flow leading to the aquifer and the resistance to flow would be lower. In such an improbable case, the flow velocity would be greater, the time required for the fracturing fluid to reach the aquifer would be shorter, and the storage volume between the fracture zone and the aquifer would be less than in the scenarios described above. The probability of such a combination of unlikely conditions occurring simultaneously (deep aquifer, shallow fracture

[142] Infill wells could result in local increases in well density.
[143] New York regulations (Part 553.1 Statewide spacing) require a minimum spacing of 1320 ft. from other oil and gas wells in the same pool. This spacing equals 40 acres per well for wells in a rectangular grid.
[144] New York Codes, Rules, and Regulations, Title 6 Department of Environmental Conservation, Chapter V Resource Management Services, Subchapter B Mineral Resources, 6 NYCRR Part 553.1 Statewide spacing, (as of 5 April 2009).
[145] NYSDEC, 2009, "Final Scope for Draft Supplemental Generic Environmental Impact Statement (dSGEIS) on the Oil, Gas And Solution Mining Regulatory Program, Well Permit Issuance For Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-permeability Gas Reservoirs", February 2009.

zone, and open flow path) is very small. The fracturing contractor would notice an anomaly if these conditions led to the inability to develop or maintain the predicted fracturing pressure.

During flowback, the same conditions would result in a high rate of recapture of the frac fluid from the open flow path, decreasing the potential for any significant adverse environmental impacts. Moreover, during production the gradients along the open flow path would be toward the production zone, flushing any stranded fracturing fluid in the fracture or unplugged wellbore back toward the production well.

1.2.6 Geochemistry

The ability of the chemical constituents of the additives in fracturing fluids to migrate from the fracture zone are influenced not just by the forces governing the flow of groundwater, but also by the properties of the chemicals and their interaction with the subterranean environment. In addition to direct flow to an aquifer, the constituents of fracturing fluid would be affected by limitations on solubility, adsorption and diffusion.

1.2.6.1 Solubility

The solubility of a substance indicates the propensity of the substance to dissolve in a solvent, in this case, groundwater. The substance can continue to dissolve up to its saturation concentration, i.e. its solubility. Substances with high solubilities in water have a higher likelihood of moving with the groundwater flow at high concentrations, whereas substances with low solubilities may act as longer term sources at low level concentrations. The solubilities of many chemicals proposed for use in hydraulic fracturing in New York State are not well established or are not available in standard databases such as the IUPAC-NIST Solubility Database.[146]

The solubility of a chemical determines the maximum concentration of the chemical that is likely to exist in groundwater. Solubility is temperature dependent, generally increasing with temperature. Since the temperature at the depths of the gas shales is higher than the temperature closer to the surface where a usable aquifer may lie, the solubility in the aquifer will be lower than in the shale formation.

Given the depth of the New York gas shales and the distance between the shales and any overlying aquifer, chemicals with high solubilities would be more likely to reach an aquifer at higher concentrations than chemicals of low solubility. Based on the previously presented fluid flow calculations, the concentrations would be significantly lower than the initial solubilities due to dilution.

1.2.6.2 Adsorption

Adsorption occurs when molecules of a substance bind to the surface of another material. As chemicals pass through porous media or narrow fractures, some of the chemical molecules may adsorb onto the mineral surface. The adsorption will retard the flow of the chemical constituents relative to the rate of fluid flow. The retardation factor, expressed as the ratio of the fluid flow velocity to the chemical movement velocity, generally is higher in fine grained materials and in materials with high organic content. The Marcellus shale is both fine grained and of high organic content, so the expected retardation factors are high. The gray shales overlying the Marcellus

[146] IUPAC-NIST Solubility Database, Version 1.0, NIST Standard Reference Database 106, URL: http://srdata.nist.gov/solubility/index.aspx.

shale would also be expected to substantially retard any upward movement of fracturing chemicals.

The octanol-water partition coefficient, commonly expressed as K_{ow}, is often used in environmental engineering to estimate the adsorption of chemicals to geologic materials, especially those containing organic materials. Chemicals with high partition coefficients are more likely to adsorb onto organic solids and become locked in the shale, and less likely to remain in the dissolve phase than are chemicals with low partition coefficients.

The partition coefficients of many chemicals proposed for use in hydraulic fracturing in New York State are not well established or are not available in standard databases. The partition coefficient is inversely proportional to solubility, and can be estimated from the following equation[147]

$$\log K_{ow} = -0.862 \log S_w + 0.710 \quad (13)$$

where K_{ow} = octanol-water partition coefficient
S_w = solubility in water at 20ºC in mol/liter

Adsorption in the target black shales or the overlying gray shales would effectively remove some percentage of the chemical mass from the groundwater for long periods of time, although as the concentration in the water decreased some of the adsorbed chemicals could repartition back into the water. The effect of adsorption could be to lower the concentration of dissolved chemicals in any groundwater migrating from the shale formation.

1.2.6.3 Diffusion

Through diffusion, chemicals in fracturing fluids would move from locations with higher concentrations to locations with lower concentrations. Diffusion may cause the transport of chemicals even in the absence of or in a direction opposed to the gradient driving fluid flow. Diffusion is a slow process, but may continue for a very long time. As diffusion occurs, the concentration necessarily decreases. If all diffusion were to occur in an upward direction (an unlikely, worst-case scenario) from the fracture zone to an overlying freshwater aquifer, the diffused chemical would be dispersed within the intervening void volume and be diluted by at least an average factor of 160 based on the calculated pore volumes in Section 1.2.4.5. Since a concentration gradient would exist from the fracture zone to the aquifer, the concentration at the aquifer would be significantly lower than the calculated average. Increased vertical distance between the aquifer and the fracture zone due to shallower aquifers and deeper shales would further increase the dilution and reduce the concentration reaching the aquifer.

1.2.6.4 Chemical interactions

Mixtures of chemicals in a geologic formation will behave differently than pure chemicals analyzed in a laboratory environment, so any estimates based on the solubility, adsorption, or diffusion properties of individual chemicals or chemical compounds should only be used as a guide to how they might behave when injected with other additives into the shale. Co-solubilities can change the migration properties of the chemicals and chemical reactions can create new compounds.

[147] Chiou, Cary T., *Partition and adsorption of organic contaminants in environmental systems*, John Wiley & Sons, New York, 2002, p.57.