

**DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SGEIS)
from DEC (9/30/09)**

CHAPTER 1: INTRODUCTION

1.1 DESCRIPTION OF THE PROPOSED ACTION	1-1
1.2 REGULATORY JURISDICTION	1-2
1.3 PROJECT LOCATION	1-2
1.4 STATE ENVIRONMENTAL QUALITY REVIEW ACT	1-3
1.4.1 Generic Environmental Impact Statement (GEIS).....	1-3
1.4.2 Supplemental Generic Environmental Impact Statement (SGEIS).....	1-4
1.4.3 Well Permit Applications and the Environmental Review Process	1-5

CHAPTER 2: DESCRIPTION OF PROPOSED ACTION

2.1 PURPOSE	2-1
2.2 PUBLIC NEED AND BENEFIT	2-2
2.3 PROJECT LOCATION	2-7
2.4 ENVIRONMENTAL SETTING	2-7
2.4.1 Water Use Classifications	2-8
2.4.2 Water Quality Standards	2-11
2.4.3 Drinking Water	2-12
2.4.4 Public Water Systems	2-17
2.4.5 Private Water Wells and Domestic-Supply Springs	2-24
2.4.6 History of Drilling and Hydraulic Fracturing in Water Supply Areas	2-25
2.4.7 Regulated Drainage Basins	2-27
2.4.8 Water Resources Replenishment	2-31
2.4.9 Floodplains	2-32
2.4.10 Freshwater Wetlands	2-36
2.4.11 Visual Resources	2-37

Figures

Figure 2.1 - Primary and Principal Aquifers	2-20
Figure 2.2 New York City's Water Supply System	2-23
Figure 2.3 - Susquehanna and Delaware River Basins	2-29

Tables

Table 2-2.1 - New York Water Use Classifications	2-9
Table 2-2.2 - Primary Drinking Water Standards	2-13
Table 2-2.3 - Secondary Drinking Water Standards	2-16
Table 2.4 - Public Water System Definition	2-18

CHAPTER 3: PROPOSED SEQRA REVIEW PROCESS

3.1 INTRODUCTION – USE OF A GENERIC ENVIRONMENTAL IMPACT STATEMENT	3-1
3.1.1 1992 GEIS and Findings	3-1
3.1.2 Need for a Supplemental GEIS	3-2
3.2 FUTURE SEQRA COMPLIANCE	3-3
3.2.1 Review Parameters	3-5
3.2.1.1 SGEIS Applicability - Definition of High-Volume Hydraulic Fracturing	3-5
3.2.1.2 Project Scope	3-6

3.2.1.3 Size of Project	3-7
3.2.1.4 Lead Agency	3-7
3.2.2 EAF Addendum	3-8
3.2.2.1 Hydraulic Fracturing Information	3-8
3.2.2.2 Water Source Information	3-9
3.2.2.3 Distances	3-9
3.2.2.4 Water Well Information	3-10
3.2.2.5 Fluid Disposal Plan	3-10
3.2.2.6 Operational Information	3-11
3.2.2.7 Invasive Species Survey and Map	3-11
3.2.2.8 Required Affirmations	3-11
3.2.3 Projects Requiring Site-Specific SEQRA Determinations	3-12

CHAPTER 4: GEOLOGY

4.1 INTRODUCTION	4-2
4.2 BLACK SHALES	4-3
4.3 UTICA SHALE.....	4-6
4.3.2 Thermal Maturity and Fairways.....	4-14
4.3.3 Potential for Gas Production	4-14
4.4 MARCELLUS FORMATION.....	4-15
4.4.1 Total Organic Carbon.....	4-17
4.4.2 Thermal Maturity and Fairways.....	4-17
4.4.3 Potential for Gas Production	4-18
4.5 SEISMICITY IN NEW YORK STATE	4-24
4.5.1 Background	4-24
4.5.2 Seismic Risk Zones	4-25
4.5.4 Seismic Events	4-29
4.5.5 Monitoring Systems in New York	4-35
4.6 NATURALLY OCCURRING RADIOACTIVE MATERIALS IN MARCELLUS SHALE	4-36

Figures

Figure 4.1 - Gas Shale Distribution	4-5
Figure 4.2 - Stratigraphic Column of New York	4-8
Figure 4.3 - East West Cross-Section of New York State	4-9
Figure 4.4 - Extent of Utica Shale in New York State.....	4-10
Figure 4.5 - Depth to Base of Utica Shale	4-12
Figure 4.6 - Thickness of High-Organic Utica Shale.....	4-13
Figure 4.7 - Utica Shale Fairway	4-16
Figure 4.8 - Depth and Extent of Marcellus Shale.....	4-19
Figure 4.9 - Marcellus Shale Thickness.....	4-20
Figure 4.10 - Total Organic Carbon of Marcellus Shale.....	4-21
Figure 4.11 - Marcellus Shale Thermal Maturity.....	4-22
Figure 4.12 - Marcellus Shale Fairway	4-23
Figure 4.13 - Mapped Geologic Faults	4-26
Figure 4.14 - New York State Seismic Hazard Map.....	4-27
Figure 4.15 - Seismic Events	4-34

Tables

Table 4.1 - Modified Mercalli Scale	4-30
Table 4.2 - Summary of Seismic Events.....	4-31

CHAPTER 5: NATURAL GAS DEVELOPMENT ACTIVITIES AND HIGH-VOLUME HYDRAULIC FRACTURING

5.1 ACCESS ROADS AND WELL PADS	5-5
5.1.1 Access Roads.....	5-5
5.1.2 Well Pads.....	5-9
5.1.3 Well Pad Density.....	5-11
5.1.3.1 Historic Well Density.....	5-11
Vertical Wells.....	5-14
Horizontal Wells in Single-Well Spacing Units.....	5-19
Horizontal Wells with Multiple Wells Drilled from Common Pads.....	5-19
Variances or Non-Conforming Spacing Units	5-20
5.2 HORIZONTAL DRILLING	5-21
5.2.1 Drilling Rigs.....	5-22
5.2.2 Multi-Well Pad Development	5-27
5.2.2.1 Reserve Pits on Multi-Well Pads	5-29
5.2.3 Drilling Mud.....	5-29
5.2.4 Cuttings	5-30
5.2.4.1 Cuttings Volume	5-30
5.2.4.2 Naturally Occurring Radioactive Materials in Marcellus Cuttings.....	5-31
5.3 HYDRAULIC FRACTURING - INTRODUCTION	5-33
5.4 FRACTURING FLUID	5-34
5.4.1 Desirable Properties of Fracturing Fluids	5-41
5.4.2 Classes of Additives	5-42
5.4.3 Composition of Fracturing Fluids	5-43
5.4.3.1 Chemical Categories and Health Information.....	5-52
Petroleum Distillate Products	5-62
Aromatic Hydrocarbons	5-63
Glycols.....	5-63
Glycol Ethers	5-63
Alcohols.....	5-64
Amides.....	5-64
Amines.....	5-64
Organic Acids, Salts and Related Chemicals	5-64
Microbiocides	5-65
Other Constituents	5-65
Conclusions	5-66
5.5 TRANSPORT OF HYDRAULIC FRACTURING ADDITIV	5-66
5.5.1 USDOT Transportation Regulations.....	5-67
5.5.2 New York State DOT Transportation Regulations	5-69
5.6 ON-SITE STORAGE AND HANDLING OF HYDRAULIC FRACTURING ADDITIVES	5-70
5.6.1 Summary of Additive Container Types	5-71
5.6.2 NYSDEC Programs for Bulk Storage.....	5-73
5.7 SOURCE WATER FOR HIGH-VOLUME HYDRAULIC FRACTURING	5-74
5.7.1 Delivery of Source Water to the Well Pad.....	5-76
5.7.2 Use of Centralized Impoundments for Fresh Water Storage	5-76
5.7.2.1 Impoundment Regulation.....	5-77
Statutory Authority.....	5-80
Permit Applicability	5-80

Protection of Waters - Dam Safety Permitting Process.....	5-81
Timing of Permit Issuance.....	5-85
Operation and Maintenance of Any Impoundment	5-86
5.8 HYDRAULIC FRACTURING DESIGN	5-87
5.8.1 Fracture Development	5-88
5.8.2 Methods for Limiting Fracture Growth.....	5-89
5.8.3 Hydraulic Fracturing Design – Summary	5-90
5.9 HYDRAULIC FRACTURING PROCEDURE.....	5-91
5.10 RE-FRACTURING	5-98
5.11 FLUID RETURN	5-99
5.11.1 Flowback Water Recovery	5-99
5.11.1.1 Subsurface Mobility of Fracturing Fluids	5-100
5.11.1.2 Flowback Water Handling at the Wellsite	5-100
5.11.1.3 Flowback Water Characteristics.....	5-101
5.11.3.1 Temporal Trends in Flowback Water Composition.....	5-108
5.11.3.2 NYSDOH Chemical Categories.....	5-109
Aromatic Hydrocarbons	5-109
Glycols.....	5-109
Glycol Ethers	5-109
Alcohols.....	5-110
Amides.....	5-110
Amines.....	5-110
Trihalomethanes	5-110
Organic Acids, Salts and Related Chemicals	5-111
Minerals, Metals, Other Characteristics (e.g., TDS)	5-111
Microbiocides	5-111
Other Constituents	5-111
5.11.3.3 Naturally Occurring Radioactive Materials in Flowback Water.....	5-111
5.12 FLOWBACK WATER TREATMENT, RECYCLING AND REUSE.....	5-112
5.12.1 Physical and Chemical Separation	5-114
5.12.2 Dilution.....	5-114
5.12.2.1 Centralized Storage of Flowback Water for Dilution and Reuse.....	5-115
5.12.2 Other On-Site Treatment Technologies	5-116
5.12.2.1 Membranes / Reverse Osmosis	5-117
5.12.2.2 Thermal Distillation	5-118
5.12.2.3 Ion Exchange.....	5-118
5.12.2.4 Electrodialysis	5-118
5.12.2.5 Ozone/Ultrasonic/Ultraviolet	5-119
5.12.3 Comparison of Potential On-Site Treatment Technologies	5-119
5.13 WASTE DISPOSAL.....	5-120
5.13.1 Cuttings from Mud Drilling	5-120
5.13.2 Reserve Pit Liner from Mud Drilling.....	5-121
5.13.3 Flowback Water	5-121
5.13.3.1 Injection Wells	5-122
5.13.3.3 Municipal Sewage Treatment Facilities	5-122
5.13.3.4 Out-of-State Treatment Plants.....	5-123
5.13.3.5 Road Spreading	5-124
5.13.3.6 Private In-State Industrial Treatment Plants	5-124
5.13.3.7 Enhanced Oil Recovery.....	5-124

5.13.4 Solid Residuals from Flowback Water Treatment	5-125
5.14 WELL CLEANUP AND TESTING	5-125
5.15 SUMMARY OF OPERATIONS PRIOR TO PRODUCTION	5-125
5.16 NATURAL GAS PRODUCTION	5-127
5.16.1 Partial Site Reclamation	5-127
5.16.2 Gas Composition	5-127
5.16.2.1 Hydrocarbons	5-127
5.16.2.2 Hydrogen Sulfide	5-128
5.16.3 Production Rate	5-128
5.16.4 Well Pad Production Equipment	5-129
5.16.5 Brine Storage	5-130
5.16.6 Brine Disposal	5-131
5.16.7 Naturally Occurring Radioactive Materials in Marcellus Production Brine	5-131
5.16.8 Gas Gathering and Compression	5-131
5.16.8.1 Regulation of Gas Gathering and Pipeline Systems	5-133
Public Service Commission	5-134
Article VII	5-135
Pre-Application Process	5-137
Application	5-138
Timing of Application & Pipeline Construction	5-139
Filing and Notice Requirements	5-140
Party Status in the Certification Proceeding	5-141
The Certification Process	5-141
Commission Decision	5-142
Amended Certification Process	5-143
Conclusion	5-144
5.17 WELL PLUGGING	5-145
5.18 OTHER STATES' REGULATIONS	5-146
5.18.1 Summary of GWPC's Review	5-147
5.18.1.1 GWPC - Hydraulic Fracturing	5-148
5.18.1.2 GWPC – Other Activities	5-148
Permitting	5-148
Well Construction	5-148
Tanks	5-149
Pits	5-149
Waste Handling and Spills	5-149
5.18.2 ICF Findings	5-150
5.18.3 Summary of Alpha's Regulatory Survey	5-150
5.18.3.1 Alpha – Hydraulic Fracturing	5-151
Pre-Fracturing Notification and Approval	5-151
Post-Fracturing Reports	5-151
5.18.3.2 Alpha – Other Activities	5-151
Pit Rules and Specifications	5-151
Reclamation and Waste Disposal	5-152
Water Well Testing	5-153
Fluid Use and Recycling	5-154
Materials Handling and Transport	5-154
Minimization of Potential Noise and Lighting Impacts	5-155
Setbacks	5-156

Multi-Well Pad Reclamation Practices	5-158
Naturally Occurring Radioactive Materials (NORM)	5-158
Stormwater Runoff	5-158
5.18.4 Colorado’s Final Amended Rules	5-158
5.18.4.1 Colorado - New MSDS Maintenance and Chemical Inventory Rule	5-158
5.18.4.2 Colorado - Setbacks from Public Water Supplies	5-160
5.18.5 Other States’ Regulations – Conclusion.....	5-160

Tables

Table 5-1 - Ten square mile area (i.e., 6,400 acres), completely drilled with horizontal wells in multi-well units or vertical wells in single-well units.....	5-20
Table 5-2 - 2009 Marcellus Radiological Screening Data	5-31
Table 5-3 - Fracturing Additive Products – Full Composition Disclosure Made to the Department	5-36
Table 5-4 - Fracturing Additive Products – Partial Composition Disclosure to the Department	5-40
Table 5-5 - Types and Purposes of Additives Proposed for Use in New York State	5-42
Table 5-6 - Chemical Constituents in Additives/Chemicals,	5-46
Table 5-7 - Categories based on chemical structure of potential fracturing fluid constituents. Chemicals are grouped in order of ascending CAS Number by category.	5-53
Table 5-8 - Parameters present in a limited set of flowback analytical results.....	5-103
Table 5-9 - Typical concentrations of flowback constituents based on limited samples from PA and WV, and regulated in NY	5-106
Table 5-10- Concentrations of NORM constituents based on limited samples from PA and WV.....	5-112
Table 5-11 - Maximum allowable water quality requirements for fracturing fluids, based on input from one expert panel on Barnett Shale.....	5-112
Table 5-12 - Treatment capabilities of EDR and RO Systems	5-119
Table 5-13 - Summary of Characteristics of On-Site Flowback Water Treatment Technologies	5-120
Table 5-14 - Out-of-state treatment plants proposed for disposition of NY flowback water	5-123
Table 5-15 - Primary Pre-Production Well Pad Operations.....	5-126
Table 5-16 - Marcellus Gas Composition from Bradford County, PA	5-127
Table 5-17 - Intrastate Pipeline Regulation	5-137
Table 5-18 - Water Resources and Private Dwelling Setbacks from Alpha,2009	5-157

Figures

Figure 5-1 - Well Pad Schematic	5-13
Figure 5-2 - Well spacing unit and wellbore paths	5-28
Figure 5-3 - Sample Fracture Fluid Composition by Weight	5-45
Figure 5-4 - Protection of Waters – Dam Safety Permitting Criteria	5-81
Figure 5-5 - One configuration of potential on-site treatment technologies.....	5-117
Figure 5-6 - Simplified Illustration of Gas Production Process.....	5-130

Photos

Photo 5.1	5-7
Photo 5.2	5-7
Photo 5.3	5-8
Photo 5.4	5-8
Photo 5.5	5-11
Photo 5.6	5-11
Photo 5.7	5-12
Photo 5.8	5-15
Photo 5.9	5-16
Photo 5.10	5-17
Photo 5.11	5-18

Photo 5.12	5-25
Photo 5.13	5-25
Photo 5.14	5-26
Photo 5.15	5-26
Photo 5.16 - Drilling rig mud system (blue tanks).....	5-30
Photo 5.17 - Sand used in hydraulic fracturing operation in Bradford County, PA.	5-44
Photo 5.18 - Transport truck with totes.....	5-72
Photo 5.19 - Transport trucks for water (above) and hydraulic fracturing acid (HCl) (below).....	5-73
Photo 5.20	5-78
Photo 5.21	5-78
Photo 5.22	5-79
Photo 5.23 - Personnel monitoring a hydraulic fracturing procedure. Source: Fortuna Energy.....	5-91
Photo 5.24 - Three Fortuna Energy wells being prepared for hydraulic fracturing, with 10,000 psi well head and goat head attached to lines. Troy PA. Source: NYS DEC 2009.....	5-93
Photo 5.25	5-96
Photo 5.26	5-97
Photo 5.27 - Pipeline Compressor in New York. Source: Fortuna Energy.....	5-133

CHAPTER 6: POTENTIAL ENVIRONMENTAL IMPACTS

6.1 WATER RESOURCES	6-3
6.1.1 Water Withdrawals.....	6-4
6.1.3 Surface Spills and Releases at the Well Pad	6-16
6.1.4 Groundwater Impacts Associated With Well Drilling and Construction.....	6-34
6.1.5 Hydraulic Fracturing Procedure	6-36
6.1.6 Waste Transport	6-38
6.1.7 Centralized Flowback Water Surface Impoundments.....	6-38
6.1.8 Fluid Discharges.....	6-39
6.1.9 Solids Disposal.....	6-40
6.1.10 Potential Impacts to Subsurface NYC Water Supply Infrastructure.....	6-41
6.1.11 Degradation of New York City’s Drinking Water Supply.....	6-41
6.2 FLOODPLAINS	6-42
6.X PRIMARY AND PRINCIPAL AQUIFERS.....	6-42
6.3 FRESHWATER WETLANDS	6-43
6.4 ECOSYSTEMS AND WILDLIFE	6-43
6.4.1 Invasive Species	6-44
6.4.2 Centralized Flowback Water Surface Impoundments.....	6-48
6.5 AIR QUALITY	6-48
6.5.1 Regulatory Analysis	6-48
6.5.2 Air Quality Impact Assessment.....	6-57
6.6 GREENHOUSE GAS EMISSIONS.....	6-109
6.6.1 Greenhouse Gases	6-110
6.6.2 Emissions from Oil and Gas Operations	6-110
6.6.3 Emissions Source Characterization	6-112
6.6.4 Emission Rates	6-116
6.6.5 Drilling Rig Mobilization, Site Preparation and Demobilization	6-117
6.6.6 Completion Rig Mobilization and Demobilization	6-118
6.6.7 Well Drilling	6-119
6.6.8 Well Completion	6-119

6.6.9 Well Production.....	6-121
6.6.10 Summary of GHG Emissions.....	6-123
6.7 CENTRALIZED FLOWBACK WATER SURFACE IMPOUNDMENTS	6-129
6.8 NORMS IN THE MARCELLUS SHALE	6-129
6.9 VISUAL IMPACTS.....	6-131
6.10 NOISE.....	6-134
6.11 ROAD USE.....	6-138
6.12 COMMUNITY CHARACTER IMPACTS	6-139
6.12.1 Land Use Patterns.....	6-140
6.12.2 Environmental Justice	6-140
6.13 CUMULATIVE IMPACTS	6-141
6.13.1 Site-Specific Cumulative Impacts	6-141
6.13.2 Regional Cumulative Impacts	6-143
6.14 SEISMICITY	6-146
6.14.1 Hydraulic Fracturing-Induced Seismicity	6-147
6.14.2 Summary of Potential Seismicity Impacts	6-154

Figures

Figure 6.1 - Water Withdrawals in the United States	6-12
Figure 6.2 - Maximum Approved Daily Consumptive Use in the Susquehanna River Basin.....	6-13
Figure 6.3 - Daily Water Withdrawals, Exports, and Consumptive Uses in the Delaware River Basin.....	6-14
Figure 6.4 - Marcellus Shale Extent.....	6-105
Figure 6.5 - Location of Well Pad Sources of Air Pollution Used in Modeling.....	6-106
Figure 6.6 - Centralized Impoundment Annual Impact Areas for Marcellus Shale	6-108
Figure 6.7 - Centralized Impoundment Annual Impact Areas for Marcellus Shale	6-108

Tables

Table 6.1 - Comparison of additives used or proposed for use in NY, parameters detected in analytical results of flowback from the Marcellus operations in PA and WV, and parameters regulated via primary and secondary drinking water standards, SPDES or TOGS111	6-19
Table 6.2 - Typical concentrations of flowback constituents based on limited samples from PA and WV, and regulated in NY	6-31
Table 6.3 - Detected flowback parameters not regulated in New York. Data from limited PA and WV flowback analyses.	6-34
Table 6.4 - Terrestrial Invasive Plant Species In New York State (Interim List).....	6-45
Table 6.5 - Aquatic, Wetland & Littoral Invasive Plant Species in New York State (Interim List)	6-47
Table 6.6 - Estimated Wellsite Emissions (Dry Gas) - Flowback Gas Flaring (Tons/Year).....	6-54
Table 6.7 - Estimated Wellsite Emissions (Dry Gas) - Flowback Gas Venting (Tons/Year).....	6-54
Table 6.8 - Estimated Wellsite Emissions (Wet Gas) - Flowback Gas Flaring (Tons/Year).....	6-54
Table 6.9 - Estimated Wellsite Emissions (Wet Gas) - Flowback Gas Venting (Tons/Year)	6-54
Table 6.10 - Estimated Off-Site Compressor Station Emissions (Tons/Year).....	6-55
Table 6.11 - Sources and Pollutants Modeled for Short-Term Simultaneous Operations	6-95
Table 6.12 - National Weather Service Data Sites Used in the Modeling.....	6-95
Table 6.13 - Assumed Drilling & Completion Time Frames Per Well	6-115
Table 6.14 - Global Warming Potential for Given Time Horizon	6-125
Table 6.15 - Summary of Estimated Greenhouse Gas Emissions.....	6-126
Table 6.16 - Emission Estimation Approaches – General Considerations	6-128

Photos

Photo 6-1- Electric Generators, Active Drilling Site: Source: NTC Consulting	6-135
Photo 6.2	6-156
Photo 6.3	6-157

Photo 6.4	6-157
Photo 6.5	6-158
Photo 6.6	6-158
Photo 6.7	6-159
Photo 6.8	6-160
Photo 6.9	6-161
Photo 6.10	6-161
Photo 6.11	6-162
Photo 6.12	6-163
Photo 6.13	6-163

CHAPTER 7: MITIGATION MEASURES

7.1 PROTECTING WATER RESOURCES	7-2
7.1.1 Water Withdrawal Regulatory and Oversight Programs.....	7-3
7.1.2 Stormwater	7-23
7.1.3 Surface Spills and Releases at the Well Pad	7-26
7.1.4 Ground Water Impacts Associated With Well Drilling and Construction.....	7-36
7.1.5 Hydraulic Fracturing Procedure	7-48
7.1.6 Waste Transport	7-50
7.1.7 Centralized Flowback Water Surface Impoundments.....	7-51
7.1.8 SPDES-Regulated Discharges.....	7-56
7.1.9 Solids Disposal.....	7-61
7.1.10 Protecting New York City’s Subsurface Water Supply Infrastructure	7-61
7.1.11 Protecting the Quality of New York City’s Drinking Water Supply	7-62
7.1.12 Setbacks.....	7-64
7.2 PROTECTING FLOODPLAINS.....	7-72
7.3 PROTECTING FRESHWATER WETLANDS	7-73
7.4 PROTECTING ECOSYSTEMS AND WILDLIFE	7-73
7.4.1 Invasive Species	7-74
7.4.2 Centralized Flowback Water Surface Impoundments.....	7-83
7.5 PROTECTING AIR QUALITY	7-83
7.5.1 Mitigation Measures Resulting from Regulatory Analysis (Internal Combustion Engines and Glycol Dehydrators)	7-83
7.5.2 Mitigation Measures Resulting from Air Quality Impact Assessment	7-88
7.5.3 Summary of Air Quality Impacts Mitigation	7-89
7.6 MITIGATING GREENHOUSE GAS EMISSIONS	7-91
7.6.1 General	7-92
7.6.2 Site Selection.....	7-92
7.6.4 Well Design and Drilling	7-93
7.6.5 Well Completion	7-94
7.6.7 Mitigating Greenhouse Gas Emissions Impacts - Conclusion.....	7-95
7.7 MITIGATING IMPACTS FROM CENTRALIZED FLOWBACK WATER IMPOUNDMENTS.....	7-96
7.8 MITIGATING NATURALLY OCCURRING RADIOACTIVE MATERIAL IMPACTS	7-99
7.8.1 State and Federal Responses to Oil and Gas Norm.....	7-99
7.8.2 Regulation of NORM in NYS.....	7-102
7.9 PROTECTING VISUAL RESOURCES	7-104
7.9.1 Pad Siting	7-104
7.9.2 Lighting	7-104

7.9.3 Reclamation.....	7-105
7.9.4 Protecting Visual Resources - Conclusion.....	7-106
7.10 MITIGATING NOISE IMPACTS.....	7-107
7.10.1 Pad Siting.....	7-107
7.10.2 Access Road.....	7-107
7.10.3 Multi-Well Pads.....	7-107
7.10.4 Mitigating Noise Impacts - Conclusion.....	7-109
7.11 MITIGATING ROAD USE IMPACTS.....	7-110
7.12 MITIGATING COMMUNITY CHARACTER IMPACTS.....	7-111
7.12.1 Trucking.....	7-111
7.12.2 Land Use.....	7-111
7.12.3 Environmental Justice.....	7-112
7.13 MITIGATING CUMULATIVE IMPACTS.....	7-112

Tables

Table 7.1 - Regulations Pertaining to Watershed Withdrawal.....	7-9
Table 7.2 - Methods for Determination of Passby Flow Based on Data Availability.....	7-22
Table 7.3 - NYSDOW Water Well Testing Recommendations.....	7-40
Table 7.4 - Summary of Regulations Pertaining to Transfer of Invasive Species.....	7-80
Table 7.5 - Required Well Pad Stack Heights to Prevent Exceedences.....	7-90
Table 7.6 - Stack Heights for Equipment at Centralized Compressor Stations.....	7-91

CHAPTER 8: PERMIT PROCESS AND REGULATORY COORDINATION

8.1 INTERAGENCY COORDINATION.....	8-1
8.1.1 Local Governments.....	8-2
8.1.2 State.....	8-5
8.1.3 Federal.....	8-5
8.1.4 River Basin Commissions.....	8-6
8.2 INTRA-DEC.....	8-6
8.2.1 Well Permit Review Process.....	8-6
8.2.2 Other DEC Permits and Approvals.....	8-7
8.3 WELL PERMIT ISSUANCE.....	8-8
8.3.1 Use and Summary of Supplementary Permit Conditions for High-Volume Hydraulic Fracturing.....	8-8
8.3.2 High-Volume Re-Fracturing.....	8-9

Tables

Table 8-1.....	8-10
----------------	------

CHAPTER 9: ALTERNATIVE ACTIONS

9.1 Prohibition of Development.....	9-1
9.2 Phased Permitting Approach.....	9-3
9.2.1 Rate of Development and Thresholds.....	9-6
9.2.2 Regional Cumulative Impacts Conclusion/Recommendation.....	9-8
9.3 Green or non-chemical fracturing technologies and additives.....	9-8
9.3.1 Environmentally-Friendly Chemical Alternatives.....	9-9
9.3.2 Summary.....	9-11

Glossary

APPENDICES

- 1 FEMA Flood Insurance Rate Map Availability
- 2 1992 SEQRA Findings Statement On the GEIS on the Oil, Gas, and Solution Mining Regulatory Program
- 3 Supplemental SEQRA Findings Statement On Leasing of State Lands for Activities Regulated Under the Oil, Gas, and Solution Mining Law
- 4 Application Form for Permit to Drill, Deepen, Plug Back or Convert a Well Subject to the Oil, Gas, and Solution Mining Regulatory Program
- 5 Environmental Assessment Form For Well Permitting
- 6 PROPOSED Environmental Assessment Form (EAF) Addendum
- 7 Sample Drilling Rig Specifications Provided By Chesapeake Energy
- 8 Casing & Cementing Practices Required for All Wells in NY
- 9 Fresh Water Aquifer Supplementary Permit Conditions Required for All Wells in Primary and Principal Aquifers
- 10 PROPOSED Supplementary Permit Conditions for High-Volume Hydraulic Fracturing
- 11 Analysis of Surface Mobility of Fracturing Fluids Excerpted from ICF International, Task 1,2009
- 12 Beneficial Use Determination (BUD) Notification Regarding Roadspreading
- 13 NYS Marcellus Radiological Data From Production Brine
- 14 Department of Public Service Environmental Management & Construction Standards and Practices - Pipelines
- 15 Hydraulic Fracturing – 15 Statements from Regulatory Officials
- 16 Applicability of NO_x RACT Requirements for Natural Gas Production Facilities
- 17 Applicability of Proposed Revision of 40 CFG Part 63 Subpart ZZZZ (Engine MACT) for Natural Gas Production Facilities
- 18 Clean Air Act Unique Regulatory Definition of Facility for the Oil and Gas Industry
- 19 Greenhouse Gas (GHG) Emissions
- 20 PROPOSED Pre-Frac Checklist and Certification
- 21 Publically Owned Treatment Works (POTWs) With Approved Pretreatment Programs
- 22 NYSDEC - Division of Water Hydrofracturing Chemical (HFC) Evaluation Requirements for POTWs
- 23 USEPA Natural Gas STAR Program
- 24 Key Features of USEPA Natural Gas STAR Program
- 25 Reduced Emissions Completion (REC) Executive Summary
- 26 Instructions for Using The On-Line Searchable Database To Locate Drilling Applications