An Integrated Water Treatment Technology Solution for Sustainable Water Resource Management in the Marcellus Shale

DE-FE0000833

Final Scientific / Technical Report

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ABSTRACT

This Final Scientific / Technical Report submitted with respect to Project DE-FE0000833 titled "*An Integrated Water Treatment Technology Solution for Sustainable Water Resource Management in the Marcellus Shale*" in support of final reporting requirements. This final report contains a compilation of previous reports with the most current data in order to produce one final complete document.

The goal of this research was to provide an integrated approach aimed at addressing the increasing water resource challenges between natural gas production and other water stakeholders in shale gas basins. The objective was to demonstrate that the AltelaRain® technology could be successfully deployed in the Marcellus Shale Basin to treat frac flow-back water. That objective has been successfully met.

EXECUTIVE SUMMARY

The purpose of this research was to provide an integrated approach aimed at addressing the increasing water resource challenges between natural gas production and other water stakeholders in shale gas basins. Pictures of the site can be found in Appendix G.

Specific goals of the project included: 1) delivering field-proof that a water treatment technology was actually capable of treating this highly challenged Marcellus frac water to water quality standards required for discharge and/or applicable beneficial re-use, 2) delivering field-proof that the water treatment technology could economically treat the frac water at a cost equal to or lower than current disposal methods, and 3) demonstrating that the regulatory environment would support implementation of the water treatment technology solution.

With respect to verifying field-proof that the technology was capable of treating Marcellus frac water to water quality standards required for discharge and/or applicable beneficial re-use, numerous water quality analyses of the treated water were taken. Both bench-scale water quality analyses and the first field-based quarterly water sampling verified that the system was operating successfully and capable of treating the highly challenged Marcellus Shale frac flow-back and produced water to requisite levels. With respect to those initial field water quality analyses, the specific conductance of the untreated dirty water (PW) was 42,400 umhos/cm; the specific conductance of the clean water (DW) was 30.0 umhos/cm. Copies of the complete water quality analyses have been attached to this report as Appendix C. Additionally, the report contains a comparison of PA DEP's water quality requirements (as applied to latest NPDES permit - TARM's reporting requirements noted previously) with Altela's water quality results from field samples. This comparison further reinforces that the AltelaRain® technology met or exceeded required PA DEP water quality requirements.

With respect to delivering proof that the treatment technology can economically treat the frac water at a cost equal to or lower than current disposal methods, the all in per barrel cost through

the reporting period was calculated to be $0.12/gallon and $4.88/barrel, respectively. This represents a minimum cost savings of 23% as compared to conventional truck and disposal fees (at commercial facilities or UIC reinjection wells). The total per barrel operating cost (OpEx) of $4.88/barrel ($0.12/gal) was calculated by summing the individual OpEx costs listed below:

- Gas Cost: $1.74/barrel of water eliminated
- Electric Cost: $0.345/barrel of water eliminated
- Labor Cost: $2.789/barrel of water eliminated
- Consumables Cost: $0.01/barrel of water eliminated

This total per barrel operating cost (OpEx) of $4.88/barrel ($0.12/gal) reflects the per barrel cost of the water eliminated from trucking and disposal (TR=PW-CW). It does not include the cost of disposal of the concentrate, but it also did not divide these costs by the larger number of "how much input water was treated". The cost calculations can (and should) be done two different ways: (a) as above, based only on the net volume of water eliminated from trucking and disposal, TR = PW-CW; and (b) based on the volume of water treated, PW.

The latter method yields a total per barrel operating cost (OpEx) of $4.88/barrel ($0.12/gal) and reflects the per barrel cost of the water brought into the system (PW). It therefore includes the cost of disposal of the Concentrate Water (CW). Total water treated (PW) equaled 7,120 barrels, and OpEx costs were:

- Total Gas Cost: $9,264 ($1.74/barrel TR X 5,324 barrels)
- Total Electric Cost: $1,837 ($0.345/barrel TR X 5,324 barrels)
- Total Labor Cost: $14,850 ($2.789/barrel TR X 5,324 barrels)
- Total Consumables Cost: $53 ($0.01/barrel TR X 5,324 barrels)
- Total Disposal Cost: $11,315 ($6.30/barrel TR X 1,796 barrels)

Total OpEx costs, including CW disposal, were therefore $37,319. The resulting per gallon and per barrel costs were $0.125/gallon and $5.24/barrel, respectively. This represents a savings of 17% over trucking and disposal without the Altela system (1-$5.24/$6.30). This cost savings increases to 38% when trucking and disposal market pricing, post May 19th, 2011, is taken into account following Chapter 95 discharge limit enforcement.

UIC disposal surcharges for out-of-district brine disposal are increasing total disposal costs to the E&P operators. For example, according to the Ohio Division of Mineral Resources Management (ODNR), "With the passage of Senate Bill 165 in 2010, some changes to the UIC Program include an increase in the Class II saltwater injection permit application fee from $100 to $1000, and an injection disposal fee of $.05 per barrel for brine originating in-district and $.20 per barrel for brine originating out-of-district." In addition, January 2011, PA DEP amended Title 25, Chapter 95, Wastewater Treatment Requirements, to address the dramatic increase in Marcellus Shale wastewater that was being diluted and sent into Pennsylvania's surface water bodies. The

new 95 regulation included more stringent discharge standards including 500 mg/L for Total Dissolved Solids (TDS) and 250 mg/L each for Sulfates and Chlorides.

As a result of PA DEP's Chapter 95 regulation and ensuing enforcement efforts by PA DEP in May of 2011, the per barrel market price for disposal of Marcellus Shale wastewater has increased significantly due to increased costs to comply with the new discharge regulations. Operators have reported per barrel costs exceeding $8.50 per barrel with further increases based on proximity to Ohio or to limited disposal sites still available in Pennsylvania. This in turn, has made new technologies like the AltelaRain® process to be more economical and thereby gain additional market traction. Taking into account this new regulatory market dynamic, industry can currently realize a savings of 38% over trucking and disposal without the Altela system (1-$5.24/$8.50).

Moreover, as outlined in this report, the life cycle assessment results show that experience gained from the Altela 4000 field tests have helped improve the system design and resulted in a 45% increase in overall energy efficiency for the newer Altela 600 system. In the future, if suitable sources of low grade waste heat can be located and systems co-located to take advantage of them (co-generation projects), the system efficiency can improve as much as 85% from the original test system. Altela is in discussion with several entities to pursue this co-generation approach.

Finally, with respect to demonstrating that the regulatory environment support implementation of the water treatment technology solution, this report provides a review of the regulatory requirements as well as confirmation that supports implementation of the AltelaRain® water treatment technology solution in Pennsylvania's Marcellus Shale Basin. Numerous Pennsylvania Commonwealth agencies responsible for both federal and state regulatory requirements have jurisdiction over the deployment and operation of this system demonstration. In each case, where applicable, Recipient received approval or satisfied related permit/regulatory exemptions with respect to deploying and operating the system. Further, water quality samples taken in the field with respect to the demonstration system support that the system indeed met regulatory water quality requirements being imposed by regulators.

REPORT DETAILS

By employing a technology-based approach, Recipient demonstrated how a water treatment technology solution can be deployed that successfully addresses perceived impediments and information gaps with respect to successfully treating flow-back water. The research also highlights the benefits associated with augmenting current water supply through re-use and best water resource management. By proving such a 'best-practices' approach is indeed available to industry, a transformational solution was created that does not merely minimize potential impacts to water caused by natural gas development but rather expands and creates opportunities for water supply augmentation and associated re-use/conservation.

The Recipient's project team reviewed and provided written reports reflecting regulatory approvals, water quality, efficacy as well as summarizing the system operations relative to

project initial expectations found in the System Operations Report. This requirement was stated in the Statement of Project Objectives in relation to the Milestone Review requirement for Phase I outlined below:

Confirm Regulatory Framework is in Place
Confirm Water Quality Meets Regulatory Requirements.
Confirm System Treatment Efficacy
System Operations

1. CONFIRM REGULATORY FRAMEWORK IS IN PLACE

1.1 National Pollution Discharge Elimination System (NPDES)

This project did not require an NDPES permit as all treated, distilled water was recycled and re-used for subsequent well development and in the fracing process during the one year term of this demonstration. Following the successful demonstration, future sites and projects deploying the technology may be interested in obtaining an NPDES-based surface discharge permit. As such, a review of NPDES requirements has been included as part of this regulatory review.

Produced water which is not re-injected into the ground may be alternatively surface discharged pursuant to regulatory oversight. Surface discharge of produced water is governed by the United States Clean Water Act ("CWA"), also known as the Federal Water Pollution Control Act. In 1972, Congress enacted the CWA, "to restore and maintain the chemical, physical and biological integrity of the Nation's waters."[1] The CWA created both state and federal roles for the attainment of these goals. The EPA Administrator must "establish and enforce technology-based limitations on individual discharges into the country's navigable waters from point sources," while each state must establish water quality standards with accompanying goals for all intrastate waters."[2] Section 401 of the CWA requires oil and gas companies to apply for a NPDES permit if they are discharging produced water into surface waters of a state. Clean water regulations provide that there will be no discharge of water pollutants into navigable waters from any source associated with production, field exploration, drilling, well completion, or well treatment (i.e. produced water) without an NPDES permit.[3]

The EPA has published federal NPDES regulations under the Clean Water Act, and may authorize states – as well as territories and tribes – to implement all or parts of the national program. Currently, the EPA has authorized thirty-seven states to implement and monitor the NPDES program. NPDES permits set specific requirements regulating the characteristics of the discharged water based on national technology-based effluent limitations and applicable water quality standards. The permits establish the level of performance the discharger must maintain

[1] 33 U.S.C §§ 1251-1376 33 U.S.C. § 1251(a)(2002).

[2] PUD No. 1 of Jefferson County v. Was. Dept. of Ecology, 511 U.S. 700, 704 (1994).

[3] 40 C.F.R. § 435.32.

and specify monitoring, inspection, and reporting requirements and other actions necessary to achieve compliance. However, the EPA retains the opportunity to review the permits issued by the state, and formally object to elements deemed in conflict with federal requirements. NPDES permits are specifically tailored to individual facilities. General NPDES permits cover multiple facilities within a certain category located in a specific geographical area. The applicant must submit a complete application for a permit, which includes the application form and any supplemental information completed to the satisfaction of the Regional Administrator (NM – Region 6, South Central), who may seek further information by issuing a notice of deficiency.[4]

The primary mechanism for regulating discharges of pollutants to receiving waters is through numerical effluent limits. The effluent limits describe the pollutants subject to monitoring as well as quantity (concentration) of pollutants. Subpart C of 40 CFR Part 35 states that oil and gas companies located onshore may not discharge produced water into navigable waters of the United States. However, two exceptions exist:

1. Subpart E – Allows for onshore discharge for those facilities located in the continental United States located west of the 98th meridian. Produced water with a maximum oil and grease limit of 35 mg/L may be discharged provided that the produced water is of sufficient quality to be re-used for wildlife or livestock watering or other agricultural uses. In addition, the produced water has to be put to use during actual discharge.

2. Subpart F – Allows for onshore discharge for facilities that produce 10 barrels per day or less of crude oil (stripper well exception). PA DEP has issued a general NDPES permit that authorizes discharge of wastewater from stripper oil well facilities to surface waters at the site of the oil wells provided that the operator must have coverage under the general NDPES permit or approval of an individual NPDES permit before treating waste water for discharge. See PA DEP General NPDES Permit No. PAG 310001.

With respect to this project, neither exception applies since Recipient operated the demonstration directly on the pad-site. However, following a successful demonstration, federal regulations do not preclude moving off the pad-site to a centralized treatment facility. For example, recently the PA Department of Environmental Protection ("DEP") issued a NPDES individual permit to TerrAqua Resource Management, LLC authorizing the discharge into waters of Pennsylvania of treated process wastewater generated from the drilling, development and use of natural gas wells in north central Pennsylvania (Permit No. PA0233650, Industrial Waste, SIC 1389). Based on the effluent requirements listed in this recently issued NPDES permit, Recipient's water quality results demonstrate that it was able to comply with such an NPDES framework. In addition, Recipient has previously demonstrated its ability to meet stringent NPDES-based effluent limitations when it received NPDES approval to discharge into the Colorado River Basin. Therefore, when and if applicable for future commercial deployments, Recipient is confident that

[4] 40 CFR § 122.21(e).

NPDES requirements can be achieved. It is important to note that the need for an NPDES permit may not be widely in demand. Both the regulatory community and natural gas operators have stressed the need and demand for every drop of clean water that can be achieved through treatment for re-use and recycling efforts.

1.2 PA Department of Environmental Protection

The Pennsylvania Department of Environmental Protection ("PA DEP"), previously the Department of Environmental Resources, was created in 1995 to help protect the Commonwealth's environment and to assure its residents of clean air and pure water. One method the DEP employs to meet its mission is through a system of permits, licenses, registrations, and certifications. Although some DEP authorizations are issued within the central office in Harrisburg, PA, the majority are issued through the department's six regional offices. Based on the site selected for this project (Sleppy well located in Indiana County), the Southwestern Regional DEP office has jurisdiction (located at 400 Waterfront Drive, Pittsburgh, PA 15222). In addition, Recipient had several regulatory meetings with PA DEP's main office in Harrisburg beginning in early January 2010 to discuss and review the various regulatory requirements and anticipated benefits associated with this NETL project. Representatives from water quality, air quality, waste management and the oil and gas attended and were very helpful in providing both policy and regulatory guidance.

1.3 Air Quality

Pennsylvania's Air Pollution Control Act provides that no person shall construct, assemble, install or modify any air contamination source, or install thereon any air pollution control equipment or device unless the person has applied to and received written approval from the Pennsylvania DEP. The process of obtaining an air permit generally consists of two steps. The first step is obtaining a pre-construction permit authorization (known as a Plan Approval). The second step is obtaining an Operating Permit to allow actual operations at the facility. However, not all air contamination sources require a Plan Approval or Operating Permit. Some may be exempt under PA Commonwealth regulations. Under 25 PA. Code § 127.14, if the air contamination sources being referenced are exempt based on the Air Quality Exemption List, or if the PA DEP determines the sources to be of minor significance, a Plan Approval and/or Operating Permit were not required.

With respect to this project, the AltelaRain® System is exempt based on the Air Quality Exemption List. See Section 127.14(a)(8) Exemption No. 38 – Oil and gas exploration and production facilities and operations that include wells and associated equipment and processes used either to: a) drill or alter oil and gas wells; b) extract, process and deliver crude oil and natural gas to the point of lease custody transfer; c) plug abandoned wells and restore well sites, or d) treat and dispose of associated wastes.

1.4 PA Bureau of Oil and Gas Management

DEP's Bureau of Oil and Gas Management is responsible for the statewide oil and gas conservation and environmental programs to facilitate the safe exploration, development, recovery of Pennsylvania's oil and gas reservoirs in a manner that will protect the commonwealth's natural resources and the environment. The Bureau develops policy and programs for the regulation of oil and gas development and production pursuant to the Oil and Gas Act, the Coal and Gas Resource Coordination Act, and the Oil and Gas Conservation Law; oversees the oil and gas permitting and inspection programs; develops statewide regulation and standards; conducts training programs for industry; and works with the Interstate Oil & Gas Compact Commission and the Technical Advisory Board.

The Oil and Gas Bureau directed Recipient to complete and file a Request for Approval of Alternative Waste Management Practices (PA DEP Form No. 5500-PM-OG0071) with respect to deploying and using the AltelaRain® system at the Sleppy well-pad in support of the project. A copy of the approved application has been included as Appendix A.

1.5 UIC Injection

The Altela ARS evaporation-condensation process generates two liquid streams. The first stream consists of the clean, distilled water ("DW"). The second, or concentrate water stream ("CW"), is the residual liquid solution remaining after approximately 80% of the pure H2O has been removed via the recycling process. This residual CW solution will contain nearly 100% of the salt products by weight contained in the original volume of the produced/frac water processed through the system in a 24-hour period of time. The clean DW produced during the recycling process will be available for re-use by natural gas producers in on-going drilling operations. The residual CW, containing nearly 100% of the salt products that enter the facility, will be removed from the site and transferred to an approved underground reinjection well or commercial disposal facility. Recipient is exploring other recycling uses for this CW as regulations permit (heavy brine water or road salt).

Regulatory control of the injection of produced water into injection wells is governed by the Federal Safe Drinking Water Act, Underground Injection Control (UIC) Program. The charter of this federal act is to ensure high quality drinking water by limiting the injection of produced water to injection zones that geologically will never serve as an Underground Source of Drinking Water ("USDW"). A USDW is an aquifer or portion of an aquifer that supplies any public water system or contains sufficient quantity of groundwater to supply a public water system; currently supplies drinking water for human consumption or contains fewer than 10,000 milligrams/liter total dissolved solids; and is not an aquifer exempted from UIC regulations.[5] Class I wells are used for the injection of hazardous and non-hazardous fluids (industrial and municipal wastes).

[5] 40 C.F.R. § 144.3

Class II wells inject brines and other fluids associated with oil and gas production. Class III wells inject mining fluids. Class IV wells deal with the injection of hazardous or radioactive wastes. Class V wells govern injection not covered above.

The EPA's regulations establish minimum standards for state programs to receive primacy for the UIC program under Section 1422 of the SDWA. In 1981, the federal government added Section 1425 to the SDWA to relieve oil and gas re-injection well programs in the states of having to meet the technical requirements of the federal UIC program.

Recipient received approval to dispose of the CW at the following UIC injection wells located in Ohio: Miller Co. (OH Injection Well Permit No. 4355), D-1 (OH Injection Well Permit No. 2403, Renshaw (OH Injection Well Permit No. 927), Ows (OH Injection Well Permit No. 682) and Clinton (OH Injection Well Permit No. 3262). Due to geological limitations, very few underground injection wells are available in PA. In addition, Recipient received approval to utilize Hart Resources Technologies, Inc. for fluid disposal, if needed.

1.6 PA Water Quality Standards

Pennsylvania Code, Chapter 93 sets forth the water quality standards for surface waters of the Commonwealth including wetlands. These standards are based upon water uses which are to be protected and will be considered by the Department in implementing its authority under the Clean Streams Law and other statutes that authorize protection of surface water quality. See generally the Clean Streams Law, the Act of June 22, 1937 (P.L. 1987, No. 394), as amended, 35 P.S. § 691.1 et seq.; The Clean Water Act (33 U.S.C. § 1251 et seq.); regulatory cite: 25 Pa. Code Chapters 91 through 105 as applicable.

No specific water quality effluent guidelines are provided in a simple regulatory chart. Rather, effluent guidelines are derived from a multitude of considerations including critical uses, protective water uses, anti-degradation, etc. With respect to Recipient's project, a baseline water quality parameter list was developed by employing specific water quality criteria outlined in Table 3, § 93.7 of the PA Code as well as DEP Bureau of Waste Management Form 26R – Chemical Analysis of Residual Waste. In addition, several parameters were added to assist in tracking treatment performance. The 118 Parameter List (increased to 121 parameters when Thorium 228, 230 and 232 were added) is included on the following page.

Parameter List:

1. Acidity
2. Hardness, Total
3. Calcium
4. Magnesium
5. Alkalinity
6. Bicarbonate
7. Total Dissolved Solids
8. Specific Conductance
9. Chloride
10. Fluoride
11. Sodium
12. Total Suspended Solids
13. Total Residual Chlorine
14. Ammonia Distillation
15. Ammonia Nitrogen
16. Total Kjeldahl Nitrogen
17. BOD
18. COD
19. E Coli
20. Total Coliform
21. Heterotrophic Plate Count
22. Color
23. MBAS
24. pH
25. Oil & Grease
26. Osmotic Pressure
27. Temperature (F), Field
28. Gross Alpha DW
29. Gross Beta DW
30. Barium
31. Boron
32. Bromide (EPA 300.1)
33. Bromide (EPA 300)
34. Cobalt
35. Copper
36. Iron
37. Iron, Dissolved
38. Lithium, Total
39. Manganese
40. Molybdenum
41. Phenolics
42. Potassium
43. Radium 226
44. Radium 228
45. Silica, Dissolved
46. Silicon, Total
47. Strontium
48. Sulfate
49. Acetone
50. Gasoline Range Organics
51. Benzene
52. mp-Xylene
53. o-Xylene
54. Total Xylenes
55. Toluene
56. Diesel Range Organic C10-C28
57. Ethane
58. Formaldehyde
59. Methane
60. Methanol
61. Alkalinity, Carbonate
62. Alkalinity, Hydroxide
63. Alkalinity, Phenolphthalein
64. Aluminum
65. Antimony
66. Arsenic
67. Beryllium
68. Cadmium
69. Chromium
70. Lead
71. Mercury
72. Nickel
73. Nitrate
74. Nitrate / Nitrite
75. Nitrite
76. Selenium
77. Silver
78. Thallium
79. Tin
80. Titanium
81. Uranium
82. Vanadium
83. Vinyl Chloride
84. Zinc
85. 1,1,1-Trichloroethane
86. 1,1,2,2-Tetrachloroethane
87. 1,1,2-Trichloroethane
88. 1,1-Dichloroethane
89. 1,1-Dichloroethene
90. 1,2 Dibromoethane
91. 1,2-Dibromo-3-chloropropane
92. 1,2-Dichloroethane
93. 1,2-Dichloropropane
94. 2-Butanone (MEK)
95. 2-Hexanone
96. 4-Methyl-2-Pentanone(MIBK)
97. Bromochloromethane
98. Bromodichloromethane
99. Bromoform
100. Bromomethane
101. Carbon Disulfide
102. Carbon Tetrachloride
103. Chlorobenzene
104. Chlorodibromomethane
105. Chloroethane
106. Chloroform
107. Chloromethane
108. cis-1,2-Dichloroethene
109. cis-1,3-Dichloropropene
110. Ethene
111. Ethylbenzene
112. Ethylene Glycol
113. Methylene Chloride
114. Styrene
115. Tetrachloroethene
116. trans-1,2-Dichloroethene
117. trans-1,3-Dichloropropene
118. Trichloroethene
119. Thorium 228
120. Thorium 230
121. Thorium 232

This water quality parameter list was used to develop baseline water quality data for Marcellus Shale produced water, frac water and frac flow-back water (Appendix C). In addition, this baseline water quality parameter list was used in the analysis of the treated distilled water and concentrate water following test-bench testing of the produced water, frac water and frac flow-back water (Appendix D).

On February 27, 2010, PA DEP released the effluent limits for a precedent setting individual NPDES permit for process wastewater generated from the drilling, development, and use of natural gas wells in north central Pennsylvania and discharge of treated effluent (Marcellus Shale wastewater). As noted earlier, this permit was issued to TerrAqua Resource Management, LLC (PA0233650, Industrial Waste, SIC 1389) in late February 2010 after Recipient's water analysis. The monitored parameters and related effluent limits for TerrAqua Resource Management, LLC are comprehensive based on the precedent-setting nature of this permit and provide additional direction on what effluent requirements will be employed for any additional centralized Marcellus Shale waste water treatment facilities. In addition, it is important to note that many of the parameters included in this recently issued permit have no individual limit but rather have a "Monitor" and report requirement. These parameters include:

1. BOD_5
2. Total Suspended Solids
3. Oil & Grease
4. pH (standard units)
5. Ammonia-N
6. Aluminum, Total
7. Acetone
8. Acetophenone
9. 2-Butanone
10. o-Cresol
11. p-Cresol
12. Phenol
13. Pyridine
14. 2,4,6-Trichorophenol
15. Copper, Total
16. Zinc, Total
17. Barium, Total
18. Strontium, Total
19. Iron, Total
20. Manganese, Total
21. Iron, Dissolved
22. Silver, Total
23. Boron, Total
24. Cobalt, Total
25. Arsenic, Total
26. Cadmium, Total
27. Lead, Total
28. Mercury, Total
29. Nickel, Total
30. Selenium, Total
31. Benzene
32. Toulene
33. Alkalinity, Total as $CaCO_3$
34. Beryllium
35. Bromide
36. Calcium
37. Chemical Oxygen Demand
38. Chromium, Total
39. Ethylene Glycol
40. Hardness, Total as $CaCO_3$
41. Lithium
42. Magnesium
43. MBAS (Surfactants)
44. Molybdenum
45. Osmotic Pressure (mosm/kg)
46. Sodium
47. Specific Conductance (umho/cm)
48. Total Dissolved Solids
49. Chlorides
50. Sulfates
51. Radium 226/228 (pCi/L)
52. Gross Alpha (pCi/L)
53. Acidity
54. Ammonia-N
55. Kjeldahl-N
56. Nitrate-Nitrite as N
57. Total Nitrogen
58. Total Phosphorus
59. Net Total Nitrogen
60. Net Total Phosphorus

In addition to the above effluent limits, the permit contains Chesapeake Bay Nutrient Requirements. Though no surface discharge occurred as part of this technology demonstration, it is nonetheless important for future adoption of the technology that the technology is capable of meeting proposed effluent limit requirements. Based on the extensive water quality analysis performed to date for the project, the technology is capable of purifying this highly challenged Marcellus Shale frac and produced water to a quality commensurate with surface discharge in accordance with regulatory requirements.

As highlighted above, the regulatory environment supports implementation of the AltelaRain® water treatment technology solution in Pennsylvania's Marcellus Shale Basin. Numerous

Pennsylvania Commonwealth agencies responsible for both federal and state regulatory requirements have jurisdiction over the deployment and operation of this system demonstration. In each case, where applicable, Recipient received approval or satisfied related permit/regulatory exemptions with respect to deploying and operating the system. Moreover, although many factors created potential barriers to implementation of the AltelaRain® technology in Pennsylvania and later in other Marcellus Shale regional states, none of them were critical barriers. The Recipient collected data and interacted with the PA DEP to address concerns. No barriers interfered with the successful completion of the full project. Water quality samples taken in the field with respect to the demonstration system supported the system indeed met regulatory water quality requirements being imposed by regulators.

Beginning January of 2011, PA DEP amended Title 25, Chapter 95, Wastewater Treatment Requirements, to address the dramatic increase in Marcellus Shale wastewater that was being diluted and sent into PA's surface water bodies. The new 95 regulation included more stringent discharge standards including 500 mg/L for Total Dissolved Solids (TDS) and 250 mg/L each for Sulfates and Chlorides. The previous PA administration had "grandfathered" 27 facilities that had been accepting Marcellus Shale wastewater prior to the promulgation of Chapter 95 regulations. Some of the "grandfathered" facilities voluntarily ceased accepting Marcellus Shale wastewater following the new rulemaking. However, 16 facilities (either a publically owned treatment work (i.e. municipal sewer system) or commercial treatment facility (i.e. Franklin Brine or Warren Brine) continued accepting Marcellus wastewater.

On April 19, 2011, a press release was issued by PA DEP notifying the E&P industry that it would now begin enforcing the recently passed Chapter 95 regulations. PA DEP provided thirty days for industry to comply. According to Kay Gresch, PA DEP, "More than half of those (16) facilities are now up for permit renewal. Now is the time to take action to end this practice."

As a result of PA DEP's Chapter 95 regulation, the per barrel market price for disposal of Marcellus Shale wastewater has increased significantly due to increased costs to comply with the new discharge regulations. This in turn, has made new technologies like the AltelaRain® process to be more economical and thereby gain additional market traction.

2. CONFIRM WATER QUALITY MEETS REGULATORY REQUIREMENTS

2.1 Baseline Water Quality Review and Site Selection

Recipient conducted a preliminary review of existing water quality analyses to assist in determining a demonstration site that produced water with quality requirements that met the specifications of the treatment system. Frac water and related produced water is highly-complex in the wide variety of its inherent contaminates (e.g., metals, sulfates, chlorides, proprietary constituents, etc.). One common component is the highly challenged waters nearly always have high levels of TDS. Based on these existing water quality analyses, Western Pennsylvania was

targeted resulting in the selection of the demonstration-site at the Sleppy well pad located in Indiana County (True Latitude: North 40 d, 36' 16.60", True Longitude: West 78 d, 57' 39.45"). The well operator was BLX, Inc., DEP Id. No. 27365. The DEP Well Permit No. for the Sleppy well-pad is 37-063-36534.

2.2 Field Water Sampling, Analysis and Reporting

Field water samples were pulled from two well locations in Butler County, PA during the first week of February 2010. Based on the close geographic proximity of these wells, assumptions on the water samples possessing similar chemical constituents from the Marcellus Shale geologic formation are presumed valid.

CWM Environmental, Inc.'s trained personnel collected these water samples. The produced water (PW) was pulled at the Ross Well site using the grab sample technique on 2/2/10 following CWM's standard sampling procedure (Appendix B). Four 55 gallon drums of PW were filled onsite and transported to Altela's Albuquerque facility for testing. Additionally, a small quantity of this raw water was captured and analyzed at CWM Environmental, Inc.'s water testing laboratory to determine chemical constituents before Altela test-bench testing. Four barrels each of frac and flow back water were also pulled from the Bergbigler Well on 2/2/10 and 2/7/10, respectively, for shipment to Altela. Similar to the Ross Well site, raw water samples were analyzed at CWM Environmental, Inc.'s water testing laboratory to determine chemical constituents before Altela's test-bench testing.

Prior to shipping, Altela coordinated with the New Mexico Oil Conservation Division (NM OCD) to acquire a regulatory approval to store and utilize real gas field produced water and frac water for the test-bench testing and analysis (Appendix F).

The laboratory results of the raw water constituent analysis for each sample water type are found in Appendix C. In addition, the chemical concentrations and resultant masses of each constituent were utlilized for the mass balance analysis found in section 3.2 of this report.

2.3 Field Water Quality Analysis

Consistent with Milestone 7, the first field-based quarterly water sampling was taken on September 13, 2010. These water samples were taken and analyzed by a certified water quality laboratory to verify the system was operating successfully and capable of treating the highly challenged Marcellus Shale frac flow-back and produced water. These water quality analyses demonstrated the system's ability to treat highly challenged water and produce extremely clean water output. The initial specific conductance of the untreated dirty water (PW) was 42,400 umhos/cm; the specific conductance of the clean water (DW) was 30.0 umhos/cm. Copies of the complete water quality analyses have been attached to this report as Appendix C.

The chart below compares PA DEP's water quality requirements (as applied to latest NPDES permit - TARM's reporting requirements noted above) with Altela's water quality results from quarterly samples taken. Additional parameters were tested as indicated in the chart below. The complete water quality analyses reinforces that the AltelaRain technology met or exceeded required PA DEP water quality requirements.

QUARTERLY RESULTS OF CHEMICAL ANALYSES OF PW & DW

	PARAMETERS			TERRAQUA EFFLUENT LIMITATIONS / CONCENTRATIONS			ALTELA RESULTS							
		Sample ID #		Mo. Avg.	Daily Max.	Instant Max.	Pre-Treated (PW)	Altela Treated (DW)	Pre-Treated (PW)	Altela Treated (DW)	Pre-Treated (PW)	Altela Treated (DW)	Pre-Treated (PW)	Altela Treated (DW)
		Sampling Date					**9.13.2010**	**9.13.2010**	**2.15.11**	**2.15.11**	**3.31.2011**	**3.31.2011**	**4.6.2011**	**4.6.2011**
1	PA	Biochemical Oxygen Demand	mg/L	53	163	204	76.8	<2	107	26.6	83.9	27.1	99.6	38.8
2	PA	Total Suspended Solids	mg/L	30	45	60	114	3	35	3	60	<3	54	<3
3	PA	Oil and Grease	mg/L	15		30	1.6	2.1	0.1	2.6	2.7	3.2	3.7	1
4	PA	pH	pH Units			9	7	7.87	6.5	4.73	6.9	6.24	6.51	5.77
5	PA	Total Ammonia (N)	mg/L	25	50	63	17.8	3.88	28.1	1.77	10.2	4.42	23.1	3.25
6	PA	Total/Dissolved Aluminum (Al)	mg/L	2	4	5	<1	<0.1	<1	<0.1	<5.0	<0.10	<5.0	<0.10
7		Acetone	ug/L	7.97	30.2	37.8			13800	949	8710	524	11800	658
8		Acetophenone	mg/L	0.056	0.114	0.14								
9		2-Butanone	mg/L	1.85	4.81	6			ND	ND	ND	ND	ND	ND
10		o-Cresol	mg/L	0.561	1.92	2.4								
11		p-Cresol	mg/L	0.205	0.698	0.873								
12		Phenol/Phenolics (Total)	mg/L	1.08	3.65	4.56	0.01	0.03	ND	0.03	ND	0.02	ND	0.02
13		Pyridine	mg/L	0.182	0.37	0.455								
14		2,4,6-Trichlorophenol	mg/L	0.106	0.155	0.265								
15	PA	Total/Dissolved Copper (Cu)	mg/L	0.321	0.501	0.803	0.33	<0.02	<0.2	0.07	<1.0	<0.02	<1.0	0.08
16	PA	Total/Dissolved Zinc (Zn)	mg/L	0.42	0.497	1.05	<0.2	<0.02	<0.2	0.05	<1.0	<0.02	<1.0	0.04
17	PA	Total/Dissolved Barium (Ba)	mg/L	10	20	25	405.5	<0.1	332.2	0.33	284.7	2.47	260.5	4.54
18	PA	Total/Dissolved Strontium (Sr)	mg/L	10	20	25	379	0.026	317.8	0.35	264.2	2.28	233	3.93
19	PA	Total Iron	mg/L	3	6	7.5	23.1	<0.02	17.4	0.12	17.6	0.02	18.5	0.08
20	PA	Total/Dissolved Manganese (Mn)	mg/L	2	4	5	2.9	<0.02	2.1	<0.02	2	<0.02	2	0.04
21	PA	Dissolved Iron (Fe)	mg/L	Monitor	Monitor	7	22.9	<0.02	21.1	<0.02	13.9	0.03	14.3	0.06
22	PA	Total/Dissolved Silver (Ag)	mg/L	0.093	0.145	0.233	<0.05	<0.005	<0.05	<0.005	<0.25	<0.005	<0.01	<0.005
23	PA	Total/Dissolved Boron (Bo)	mg/L	Monitor	Monitor		3.12	0.02	2.7	0.05	2	0.06	<1.0	0.06
24	PA	Tota;/Dissolved Cobalt (Co)	mg/L	Monitor	Monitor		<0.05	<0.005	<0.05	<0.005	<0.25	<0.005	<0.01	<0.005
25	PA	Total/Dissolved Arsenic (As)	mg/L	Monitor	Monitor		0.028	<0.005	<0.05	<0.005	<0.25	<0.005	<0.01	<0.005
26	PA	Total/Dissolved Cadmium (Cd)	mg/L	Monitor	Monitor		<0.05	<0.005	<0.05	<0.005	<0.25	<0.005	<1.0	<0.005
27	PA	Total/Dissolved Lead (Pb)	mg/L	Monitor	Monitor		<0.2	<0.02	<0.02	<0.02	<1.0	<0.02	<1.0	<0.02
28	PA	Total/Dissolved Mercury (Hg)	mg/L	Monitor	Monitor				ND	ND	ND	ND	ND	ND
29	PA	Total/Dissolved Nickel (Ni)	mg/L	Monitor	Monitor		<0.5	<0.05	<0.5	<0.05	<2.5	<0.05	<2.5	<0.05
30	PA	Total/Dissolved Selenium (Se)	mg/L	Monitor	Monitor		<0.05	<0.005	<0.05	<0.005	<0.25	<0.005	<0.01	<0.005
31	PA	Benzene	ug/L	Monitor	Monitor		ND	ND	ND	ND	ND	ND	ND	ND
32	PA	Toluene	ug/L	Monitor	Monitor		ND	ND	8.3	ND	10.9	1.3	15	1.1
33	PA	Alkalinity (Total as CaCO3)	mg/L	Monitor	Monitor		102	14	110	<5	88	<5.0	100	12
34	PA	Dissolved Berylium (Be)	mg/L	Monitor	Monitor		<0.05	<0.005	<0.05	<0.005	<0.25	<0.005	<0.01	<0.005
35	PA	Dissolved Bromide (Br-)	mg/L	Monitor	Monitor		162.5	<0.3	118.5	<0.10	101	0.92	117	1.6
36	PA	Dissolved Calcium (Ca+)	mg/L	Monitor	Monitor		1933	0.36	1634	2.18	1186	11.1	1175	22.2
37	PA	Chemical Oxygen Demand	mg/L	Monitor	Monitor		289	<10	344	48.3	220	35.8	265	51.4
38	PA	Total/Dissolved Chromium (Cr)	mg/L	Monitor	Monitor		<0.2	<0.02	<0.2	<0.02	<1.0	<0.02	<1.0	<0.02
39	PA	Ethylene Glycol	mg/L	Monitor	Monitor		ND	ND	ND	ND	ND	ND	ND	ND
40	PA	Hardness (CaCO3)	mg/L	Monitor	Monitor		5555	<10	4655	<10	3461	32	3386	64
41	PA	Dissolved Lithium (Li)	mg/L	Monitor	Monitor		14.3	ND	10.7	ND	9.1	0.082	10.7	0.13
42	PA	Dissolved Magnesium (Mg)	mg/L	Monitor	Monitor		176.8	<0.1	139.5	0.36	121.3	1.1	109.8	2.04
43	PA	MBAS (Surfactants)	mg/L	Monitor	Monitor		0.18	ND	ND	ND	ND	ND	ND	ND
44	PA	Dissolved Molybdenum (Mo)	mg/L	Monitor	Monitor		<0.05	<0.005	<0.05	<0.005	<0.25	<0.005	<0.01	<0.005

QUARTERLY RESULTS OF CHEMICAL ANALYSES OF PW & DW

	PARAMETERS			TERRAQUA EFFLUENT LIMITATIONS / CONCENTRATIONS			ALTELA RESULTS							
		Sample ID #		Mo. Avg.	Daily Max.	Instant. Max.	Pre-Treated (PW)	Altela Treated (DW)	Pre-Treated (PW)	Altela Treated (DW)	Pre-Treated (PW)	Altela Treated (DW)	Pre-Treated (PW)	Altela Treated (DW)
		Sampling Date					**9/13/2010**	**9/13/2010**	**2/15/2011**	**2/15/2011**	**3.31.2011**	**3.31.2011**	**4.6.2011**	**4.6.2011**
45	PA	Osmotic Pressure	mosm/kg	Monitor	Monitor		808	ND	637	ND	ND	ND	589	ND
46	PA	Dissolved Sodium (Na+)	mg/L	Monitor	Monitor		7781	0.37	5868	6.42	4726	43.8	4712	87.9
47	PA	Specific Conductance/Conductivity	uS/cm	Monitor	Monitor		42400	30	34300	74.5	28450	375	31600	632
48	PA	Total Dissolved Solids	mg/L	500	1000	1250	37600	9	26055	33	22350	196	25560	400
49	PA	Dissolved Chloride (Cl-)	mg/L	250	500	625	16240	2.9	11670	14.6	9760	99.1	11352	184.2
50	PA	Dissolved Sulfate (SO4-)	mg/L	250	500	625	34	<1	20.4	2.2	<100.0	1.98	<100	2.1
51	PA	Radium 226	pCi/L	Monitor	Monitor		162	0.278	153	0.224	155	2.87	130	2.3
52	PA	Radium 228	pCi/L	Monitor	Monitor		85.5	0.259	45	1.32	51.9	0.296	55	0.49
53	PA	Gross Alpha	pCi/L	Monitor	Monitor		352	-0.409	664	0.841	161	1.93	249	6.49
54	PA	Acidity	mg/L	Less than Alkalinity			-30	6	<5	16	-26	<5.0	-16	<5.0
55		Ammonia-N			Report		17.8	3.88	28.1	1.77	10.2	4.42	23.1	3.25
56	PA	Total Kjeldahl Nitrogen	mg/L		Report		1.4	3.3	ND	1.5	30.1	4.5	19.7	4.1
57	PA	Nitrate plus Nitrite Dissolved	mg/L		Report		<2	<0.2	<2	<0.2	<20.0	<0.20	<20	<0.20
58		Total Nitrogen			Report									
59		Total Phosphorus			Report									
	OTHER PARAMETERS TESTED BY ALTELA													
60	PA	Color	pccu				200	<5	130	<5	55	<5	75	<5
61	PA	Temperature	F				62.3	136.1	63	135	51	109	61	97
62	PA	Total Residual Chlorine	mg/L				<.10	<0.10	0	0.45	0	0.21	0	0
63	PA	Dissolved Nitrate (N)	mg/L				<1	<.010	<1	<.10	<10.0	<0.10	<10	<0.10
64	PA	Dissolved Nitrite (N)	mg/L				<1	<0.1	<1	<0.1	<10.0	<0.10	<10	<0.10
65	PA	Alkalinity (PP as CaCO3)	mg/L				ND	ND	ND	ND	ND	ND	ND	ND
66		Hydroxide (OH)	mg/L				ND	ND	ND	ND	ND	ND	ND	ND
67		Carbonate (CO3)	mg/L				ND	ND	ND	ND	ND	ND	ND	ND
68		Bicarbonate (HCO3)	mg/L				102	14	110	<5	88	<5.0	100	12
69		Dissolved Fluoride (F-)	mg/L				4.8	<0.2	<2	<0.2	<20.0	0.32	<20	0.42
70		Dissolved Potassium (K)	mg/L				95.5	<0.1	66.2	<0.10	63.2	0.52	59.6	0.98
71		Dissolved Silica (SiO2))	mg/L				30	ND	25	ND	16	ND	19	ND
72		Total Silicon (Si)	mg/L				7	0.19	6.4	0.19	5.1	0.16	6.4	0.22
73		Ethylbenzene	ug/L				ND	ND	ND	ND	ND	ND	ND	ND
74		o-Xylene	ug/L				ND	ND	ND	ND	ND	ND	ND	ND
75		m & p-Xylene	ug/L				ND	ND	ND	ND	2.3	ND	ND	ND
76		Xylenes (Total)	ug/L				ND	ND	ND	ND	ND	ND	ND	ND
77	PA	GRO (C5-C12) Gasoline	ug/L				ND	ND	ND	ND	ND	ND	ND	ND
78	PA	DRO (C8-C36) Diesel	mg/L				5.4	0.99	7.1	2.3	4	4.9	4.3	3.1
79	PA	Methane (CH4)	ug/L				748	1.3	5490	ND	3570	ND	4550	ND
80		Methanol (CH4O)	mg/L				ND	ND	ND	ND	ND	ND	ND	ND
81		Formaldehyde (CH2O)	mg/L				ND	ND	ND	ND	ND	ND	ND	ND
82	PA	Gross Beta	pCi/L				189	-0.141	847	0.259	79.7	1.57	178	0.754
83	PA	Thorium 232	pCi/L				-0.005	0.025	0.114	0.011	0.055	0.016	0.035	-0.009
84		Dissolved Antimony (Sb)	mg/L				<0.05	<0.005	<0.05	<0.005	<0.25	<0.005	<0.01	<0.005
85		Dissolved Thallium (Tl)	mg/L				<0.05	<0.005	<0.05	<0.005	<0.25	<0.005	<0.01	<0.005
86		Dissolved Tin (Sn)	mg/L				<0.05	<0.005	<0.05	<0.007	<0.25	<0.005	<0.01	<0.005
87		Dissolved Titanium (Ti)	mg/L				0.037	<0.005	<0.05	<0.005	<0.25	<0.005	<0.01	<0.005
88	PA	Dissolved Uranium (U)	mg/L				ND	ND	ND	ND	ND	ND	ND	ND
89		Dissolved Vanadium (V)	mg/L				ND	ND	ND	ND	ND	ND	ND	ND

3. CONFIRM SYSTEM TREATMENT EFFICACY

3.1 Bench Testing of Field Water

The purpose of bench testing the produced water, frac-water, and flow-back water was to determine the performance of the Altela ART-500 tower during concentration testing runs of the three water samples with respect to treatment efficacy. The testing created CW and DW samples from each raw water grab for subsequent mass balance analysis. Tower treatment rate, volume reduction, and f-values (a measure of tower efficiency referred to by Altela as the Energy Re-Use Factor) were calculated from the data generated over a testing period spanning 6- 8 hours.

Test Details

An ART-500 tower was used to perform the testing on Altela's test bench apparatus. During the testing, approximately 150 gallons of the test water was treated. The following data points were obtained throughout the series of testing and were used to calculate performance:

- PW Flow Rate
- Air Flow Rate
- Steam Rate
- Gas Consumption
- Time
- Produced Water Temperatures
- Tower Top Temperature
- Conductivity of Produced Water
- Conductivity of Concentrated Water
- Conductivity of Distilled Water
- Produced Water Volume
- Distilled Water Volume

The data listed above was obtained at the following PW/CW volume increments of 150, 125, 100, 75, 50, and 25 gallons.

The first test data set was conducted on the produced water. The starting tank volume before recirculation of the produced water through the ART-500 Tower was 211.37 gallons. The end tank volume after draining the tower was 96.28 gallons, resulting in a 54% volume reduction. The overall amount of produced water treated over the 8.42 hour test period was 115.09 gallons for an average treatment rate of 13.7 GPH. An average f value of 1.57 was calculated.

The second test set was performed on the frac water. The starting tank volume before recirculation of the frac water through the tower was 193.55 gallons. The tank volume after the testing was completed and the tower was drained was 54.20 gallons, resulting in a 72% volume reduction. The total frac water treated was 139.35 gallons over a 6.25 hour test period which results in an average treatment rate of 22.30 GPH. An average f value of 2.41 was calculated.

The third set of testing done was on the flow-back water. The starting tank volume was 194.04 gallons before recirculation of the flow-back water through the tower. The tank volume after the testing was completed and the tower was drained was 53.96 gallons, resulting in a 73% volume reduction. The total flow-back water treated was 140.08 gallons, with a treatment rate of 21.82 GPH over the 6.42 hour test period. An average f value of 2.32 was calculated.

The standard ART-500 Tower test protocol uses a pure sodium chloride solution at a 35,000 ppm concentration with an average treatment rate of 26.70 GPH and an average f value of 3.10. When comparing the test results from the Marcellus Shale produced water with the tests results from the pure sodium chloride solution, the treatment rate of the tower is 49% less. Comparison

of the frac water and the flow-back water treatment rate to the pure sodium chloride solution showed that the treatment rate of the tower decreased by 17% and 18% respectively. The 49% reduction in treatment efficiency of the ART-500 tower when treating the Marcellus produced water can be attributed to the 195,000 ppm initial concentration of the water. The further increase in concentration of the produced water during the test drove the concentration of the water towards the saturation point of the sodium chloride solution. In other words, the Sodium Chloride salt would have begun to precipitate out of the water.

Total volume reduction of PW, frac, and frac flow-back water is dependent on initial concentration of total dissolved solids, primarily salts, in the samples tested, and tower run time.

Test bench testing and related analysis indicated tower test time for the frac and flow- back water would further reduce the volume with minor negative effects on treatment rate or f factor.

3.2 Mass Balance Analysis

As noted previously, three large-volume samples of real-world Marcellus Shale gas water were obtained from three different well-sites in western Pennsylvania. Their labels and initial volumes of brackish raw water are listed below:

1. Sample 1: Label "Frac Water"; PW =194 gallons.

2. Sample 2: Label "Produced Water"; PW =211 gallons.

3. Sample 3: Label "Flow-Back Water"; PW =194 gallons.

All three samples were shipped to Altela's facility in Albuquerque NM, where they were successively processed through Altela's standard AltelaRain® towers. The amount of Concentrate Water (CW) and Distilled Water (DW) generated by each sample was measured upon completion of each test, and their respective volumes are listed below:

4. Sample 1: Label "Frac Water"; CW = 54 gallons and DW = 140 gallons.

5. Sample 2: Label "Produced Water"; CW = 96 gallons and DW = 115 gallons.

6. Sample 3: Label "Flow-Back Water"; CW = 54 gallons and DW = 140 gallons.

The Treatment Rate (TR=PW-CW) and Recovery Rate (RR=1-CW/PW) from each of these three tests are easily calculated from the above PW and CW amounts and are listed below:

7. Sample 1: Label "Frac Water"; TR = 140 gallons and RR = 72.2%.

8. Sample 2: Label "Produced Water"; TR = 115 gallons and RR = 54.5%.

9. Sample 3: Label "Flow-Back Water"; TR = 140 gallons and RR = 72.2%.

Water Quality Measurements

All six (6) water volumes listed above (CW and DW samples each from the produced water, frac water and frac flow-back water) had representative water samples sent to a third-party environmental water quality firm, CWM Environmental, Inc. Each of these 6 water samples was measured for the individual baseline constituents developed for the project, less total residual chlorine. CWM Environmental, Inc.'s water quality results for these six tests are included in Appendix D.

Mass Balance Calculations

In addition, a mass balance analysis was conducted on the water quality samples. Each mass balance sample was measured for the 118 individual constituents. Results are included in Appendix E. The samples yielded mass balance calculations with the following overall results:

1. The right-hand columns of the 3 tabs in the accompanying spreadsheet illustrate the mass balance calculations for each constituent. Total absolute mass, for both incoming and outgoing amounts of each constituent, were calculated by multiplying the respective concentration measured by CWM times the volume of respective PW, CW, or DW water. The last two columns indicate the difference between incoming and outgoing amounts.
2. Of the 118 constituents tested for each raw water sample, there were 57 constituents that tested below the detectable limit. In simple terms, nearly half the constituents tested were from a practical perspective, not in the raw water samples. This was true for the same 57 constituents across all three raw water samples.
3. An analysis of the mass balance results from the constituents labeled "General Parameters" shows good correlation between the achieved results and the theoretical calculated mass balance. Again this same comment holds across all three data sets.
4. Low-boiling point organic constituents (vapor pressures higher than that of water) had higher positive discrepancies (less mass present in the outgoing CW and DW streams than in the incoming PW stream), as expected from previous Altela experience, indicating some volatilization and escape in the air exhaust.
5. In general, the Altela process produced distilled water from incoming frac water, flow-back water, or gas well produced water. Concentrations of contaminant constituents in Altela DW water have been removed to levels generally better than 99.8% of their incoming raw water concentrations.

3.3 Test-Bench Summary and Conclusions

Three samples of "real world" waste water were obtained from two sites in the Marcellus Shale. These samples were from the sources as follows:

(1) Frac Water – a sample of the initial fracturing solution used to fracture a newly drilled natural gas well was pulled at the start of the fracturing process.

(2) Flow-Back Water – a sample of the solution that flows out of the well after the start of the fracturing process was pulled three days following the start of the fracturing process, this was pulled from the same site that used the initial Frac Water solution.

(3) Produced Water (PW) – a sample of the Produced Water that is brought to the surface of a natural gas well once the well is "in production" was pulled on the same day the Flow-Back Water sample was pulled. The PW sample was pulled from a well that was fractured in early October 2009 and been in constant production from early November 2009.

CWM Environmental, Inc.'s baseline water quality reports for these three samples are included in Appendix C. Once pulled, the raw water samples were sent to the Altela facility in New Mexico for process treatment testing on the Altela test apparatus. Each raw sample was "treated" using the same equipment and test tower over a 3-day period, each requiring about 1 full day on the test "tower." During the test of each raw water sample, the water was circulated through the Altela tower until a pre-determined residual volume was obtained. During this process, pure H2O was evaporated from the raw water solution. As a result, the resultant solution is a "concentrated" version of the raw water solution, since the mass of the dissolved constituents should remain fairly consistent, assuming no chemistry changes take place during the process. The evaporated water (DW) is recovered through the condensation process occurring in the "tower", and if successful, the DW should have little or no contaminants in the water. CWM's water quality reports for the CW and DW analyses are included in Appendix D.

Upon completion of all three test-bench tests, a sample was pulled from each test from the three net solutions, i.e. a raw water sample, CW sample, and a DW sample was pulled for each test for applicable mass balance analysis (Appendix E). A thorough review and mass balance analysis of the sample results yielded the following conclusions.

In general, the DW water quality was exceptional, regardless of the raw water solution make-up or net concentration of dissolved salts in the raw water. This result was as-expected and serves to verify that the AltelaRain® technology is an excellent process for treating the various solutions involved with natural gas production on the Marcellus Shale.

The mass balance analysis performed on the raw water and concentrate water samples yielded, for the most part, results within expected levels. It should be noted that, as previously verified, there is some water chemistry taking place in the solutions as the raw water solution is concentrated to higher and higher salt concentration levels. This results in "changes" to the mass of specific constituents in the solutions. This is expected and the mass balance analysis simply provided verification of known water chemistry issues that have been obtained on the Altela test bench apparatus or from similar testing performed with Altela pilot systems used on other natural gas production sites. The Altela process is a useful process as it requires little to no pre-treatment. It allows for the treatment of deep well water on site. It helps reduce the amount of waste produced and transported off site. In order to keep the process up and running, a small

amount of acid may be used to extend the useful run life between maintenance. However, there is need for regularly scheduled distillation column maintenance. The scale which may be formed must be periodically removed. The design of the system must include the down time associated with such routine maintenance.

Recipient completed the system specification document and delivered it to DOE on April 12, 2010. As part of the final analysis of this water on the test-bench scale, the testing produced clean DW and yielded results consistent with previous experience, and as such, field deployment of a test system for further process verification of Marcellus Shale produced and frac flow-back waters was highly recommended as part of the Continuation Application. Recipient received approval of a Go-Decision on May 12, 2010 from the Contracting Officer that provided notification and authorization to proceed to the next phase of the project.

4. SYSTEM OPERATIONS REPORT

4.1 Summary

The ARS-4000 System Specification document previously provided by Recipient to NETL outlines the technical approach employed by the AltelaRain® ARS-4000 water treatment system. A brief description of the demonstration system follows.

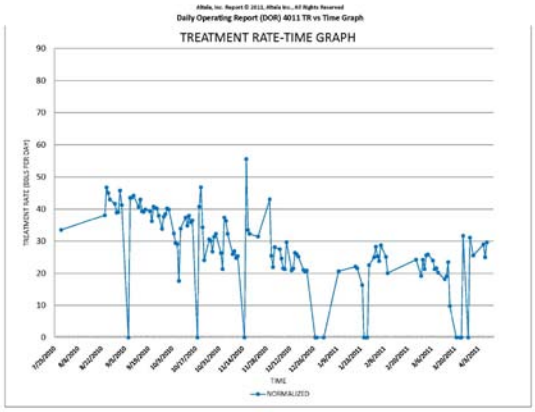
The Altela ARS-4000 System is a fully automated water treatment process designed to operate 24 hours a day, 7 days a week. In most cases the system will be installed in a remote area directly at a natural gas or oil well site. The operator should visit the site daily for system monitoring or routine maintenance actions that should require approximately 1 hour per site visit. To assure continuous operation of the Altela system a reliable remote monitoring capability is installed to provide the remote operator with a visual means of monitoring key system data. The remote monitoring system has an "auto-dial" feature that will notify the operator any time an alarm situation occurs. The Altela ARS-4000 system is controlled by a Programmable Logic Controller (PLC). The PLC has built-in data logging capability and is programmed with a control logic that monitors many system outputs continuously during operation. The logic is designed so that any time a failure condition is sensed, the PLC automatically shuts down the system through one of two shutdown modes. The normal, or "controlled shutdown" will automatically turn off each piece of equipment in a methodical and controlled sequence. The "emergency shutdown" will turn off all operating equipment immediately. The operator can trigger either shutdown mode as required at the push of a button, either at the unit or computer from any remote location.

The Altela system treats produced water by a thermal distillation process. In simple terms, the Altela system converts incoming dirty water into two components – clean distilled water plus a concentrated solution of dirty water (CW). The Altela system is a waste reduction process, meaning the incoming dirty water volume is reduced by up to 80%. The remaining 20%, a

concentrate of the original dirty water, must be disposed of through conventional methods. The process begins with the produced water that is collected in an on-site holding tank. This water is transferred via pump into the Altela containerized system. Once inside the Altela ARS-4000 system, the produced water is circulated continuously through ten AltelaRain® "towers." The towers are designed to evaporate pure water from the brackish produced water. The evaporated water is then condensed within the same tower, on the opposite side of thin plastic sheet. The condensed water, which is of distilled water quality, is collected and transferred from the towers to a "distilled water" (DW) holding tank. The concentrated water (CW, the second component of water exiting the towers) is eventually concentrated up to five times higher dissolved solids content and then pumped out of the Altela system for eventual disposal. Likewise, the distilled water is also pumped from the system and available for recycling and related beneficial, productive uses.

Milestone 6, "System installed, tested and in full operation" was started on June 9, 2010 and was completed on July 22, 2010. As of April 8, 2011, over 299,040 gallons of Marcellus Shale frac flow-back water have been treated and purified at the well-site, resulting in the production of 200,215 gallons of clean distilled water. The concentrated water generated during this time period equal 75,430 gallons (1,796 barrels), representing approximately 75% volume reduction in the original amount of brackish water. This percentage is known as the Recovery Rate (RR), and is defined as RR = 1-CW/PW.

Following Milestone 6, the System continuously treated water beginning July 26, 2010. The volume of incoming water that is eliminated from trucking to a disposal site is known as the Treatment Rate (TR). The amount is given simply by TR = PW-CW. The absolute amount of water eliminated from trucking during this time period was 223,610 gallons (5,324 barrels). The average daily TR for this reporting period is 27.46 Barrels per Day (BPD), normalized for the time the well-site was operational (providing water to be treated and natural gas to the system). Additional charts and graphs are included in Appendix H.



Several factors contributed to a lower Treatment Rate than initially projected. As outlined in the application, under optimum conditions, the ARS-4000 System can process approximately 100 BPD through the system. The system recovery rate is a function of water quality but a recovery rate of up to approximately eighty (80) barrels per day Treatment Rate was anticipated (80% recovery rate). The actual field Treatment Rate had been adversely affected by different issues caused both by external well-site problems and internal Altela system mechanical problems. Mechanical issues that affected the Treatment Rate range from tower issues to individual mechanical components (e.g., off-the-shelf pump failures) operating inside the system. Other external issues contributing to a lower Treatment Rate included well-site shut-downs in either/both natural gas and water to treat. Weather conditions hindered the system performance as well. The figure above illustrates that the well-site was completely non-operational on several occasions as outlined below, especially in the beginning of the Phase I time period.

In addition to the numerous well-site problems, the first internal issue affecting the Treatment Rate was that the system was designed to operate on 14 towers, however; we discovered that it is only able to operate on 10 towers at one time. The first demonstration towers were found to accept more steam than originally thought. Ironically, each tower yielded greater capacity at its maximum operating conditions than originally thought, but this in turn resulted in the System's boiler being under-sized for the full complement of 14 towers. Specifically, maximum steam output from the 25 HP Ajax boiler was 863 lb/hr. Once the boiler is de-rated to a now-recommended operating efficiency of 80%, maximum output of the boiler was found to be only 690 lb/hr. This is equivalent to only 49.3 lb/hr (5.9 GPH) for 14 towers, still only 69 lb/hr (8.3 GPH) for a lessened 10-tower operation.

As originally designed, the steam input needed to operate the 14 towers in the system was thought to be 583 lb/hr (41.6 lb/hr; 5.0 GPH), while the steam input for 10 tower operations was 416 lb/hr (41.6 lb/hr; 5.0 GPH). Even though the boiler is sized to supply a steam output of 690 lb/hr, this is 15% higher than the amount of steam that is needed to operate the 14 towers. Therefore the Ajax boiler is operating at the high end of its operation limits leading to "carryover" from the boiler into the towers, lowering the performance of the towers significantly. The decision to operate on 10 towers was made. At a steam input requirement of 416 lb/hr, the boiler is able to supply the proper amount of steam to the towers.

The towers operated best when they were supplied with a constant supply of steam. We now know that this is not achieved using the Ajax boiler because as it is on/off style of boiler instead of the more preferable modulated flame boilers. The pressure differential is approximately 4 to 5 psi between the boiler flame coming on and shutting down with the Ajax boiler. This hinders the performance of the tower because of the change in steam temperature as the pressure changes, leading to the tower temperatures changing a few degrees when the boiler is cycling. These boiler issues led to the Treatment Rate being lower on the system than what we now know is possible using higher-quality modulated boilers in the future.

The lower Treatment Rate may also be associated with scaling occurring on the tower gauze. The gauze located in the evaporation section of the tower helps to wick the PW across the evaporation area. Scaling on the gauze hinders this wicking affect as well as limits thermal heat transfer vital for the towers to operate effectively. Previously, an injection of Muriatic Acid was added to the incoming PW to the towers to keep a pH of 4.5 which helps control the amount of sulfates that accumulate on the internal gauze of the towers. An acid wash was completed on the system in an attempt to remove or reduce the amount of scale on the gauze. Investigations continue to better understand this field operational issue. Future towers will likely be manufactured with a different wicking material. Additional factors that affected the Treatment rate included the down time required to fix or replace mechanical components.

Several shut-downs were related to gas interruptions at the well-head. These issues were addressed quickly and the system was turned back on and resumed treatment. In addition, Recipient had experienced a shut-down during one quarter due to a system integration issue associated with the RS Logix program. A minor shut-down was associated to a mechanical issue with a float in the boiler blow-down tank. Periodic maintenance caused several brief, scheduled shut-downs of the system. Other system shutdowns included mechanical component failures such as the Main CW Transfer pump, a DW Out Conductivity sensor reading improperly, and float failures on the transfer. These one-time 'learning curve' failures are expected due to the 24/7 operation as well as the harsh environment and materials that were treated by the system.

Other issues affecting the Treatment Rate were external to the system. One major reason for shutdowns were associated with the natural gas well. Initially, the gas well was only hooked up to the system and not to the collection pipeline, leading to failed controllers on the gas well unit and eliminating the gas pressure required to operate the Ajax boiler. After a few months of operation, the gas well unit was hooked up to the pipeline. Continued periodic shutdowns to the system were due to a lack of pressure from the gas well itself. On occasion, water from the gas well entered the gas well line and caused a shut down. As temperatures dropped heading into winter, the presence of water in the natural gas well unit itself caused some problems as well.

Lower Treatment Rates were also related to suspended solids. As there was no pre-treatment of PW prior to entering the system, there was concern about collection of sulfates, iron oxide as well as Total Suspended Solids (TSS) collecting on the gauze. Towards the beginning of field operations, maple seeds and other debris from the PW pond flowed into the system. This led to shutdowns by the tower flows dropping below 2.0 GPM caused by flow meter obstruction of suspended solids. To address the problem, a 100 micron mesh bag filter was placed in the PW line before entering the system. Most but not all suspended solids listed above were filtered. The filter was removed and cleaned every three days of accumulation of solids retained.

These types of issues are common in any new product development. The system operated in a continuous mode. During automatic shut-downs that occurred, the PLC/SCADA components continued to report and track such events.

Consistent with Milestone 7, the first quarterly water sampling was taken on September 13, 2010. These water samples were taken and analyzed by a certified water quality laboratory to verify that the system was operating successfully and capable of treating the highly challenged Marcellus Shale frac flow-back and produced water. These water quality analyses demonstrated the system's ability to successfully treat highly challenged water and, at the same time, produced extremely clean water output. Copies of the complete water quality analyses have been attached to this quarterly report as Appendix C.

Though the demonstration system had not achieved the projected daily treatment rate, it is noteworthy that the system is the first demonstration system that has successfully been operating in the field at a well-site over such a period of time in the Marcellus. As verified by the field water quality analyses to date, the system is capable of treating highly challenged Marcellus Shale frac flow-back and produced waters to a level of clean water purity necessary to be able to discharge the water directly into the Commonwealth's surface water supply (i.e. stream discharge). The technology performed as anticipated with respect to purifying the water. Decreases in treatment volumes had been engineering/well-head system integration in nature rather than core science problems associated with the technology.

4.2 Gas and Electrical Usage

Gas Usage

The Altela process is unique among all water desalination techniques, in that it is driven by low-cost heat, rather than high-cost electricity. In this demonstration setting, the System is powered nearly entirely by natural gas (to generate steam by boiling a fraction of the cleaned water). The average gas usage was found to be 0.485 MCF/bbl of water eliminated for the period. The average price of natural gas during that period was $3.59/MCF. This equates to $1.74/bbl of water eliminated. Although low by comparable desalination techniques, this OpEx expense is likely to decrease further in future units with more efficient boilers.

Electrical Usage

Electrical usage, per gallon of water treated, is estimated below, since no electrical meter exists solely on our System. Average wattage for ARS-4000 System is approximately 3.1kW. Total runtime as of April 8th, 2011 was 4,358 hours. Electricity usage during that period is estimated to be 13,510 kWH. Average cost of electricity in PA during that time period was approximately $0.136 kWH. Total cost of electricity for operating the system is estimated to $1,837. This equates to a per gallon electricity OpEx of $0.0082/gallon ($0.345/bbl).

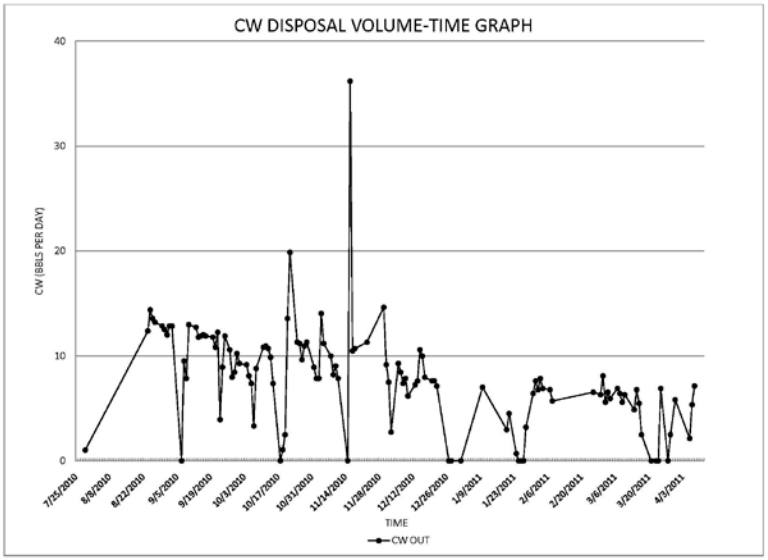
4.3 Concentrate Disposal

The Concentrate Water (CW) stream is the residual liquid solution remaining after approximately 80% of the pure distilled water has been removed via the AltelaRain® treatment

process. The residual CW solution contains nearly 100% of the salts and other constituents contained in the original volume of Produced Water (PW) processed through the demonstration system. The residual CW is removed from the site and transferred to approved commercial produced water disposal facilities. Specifically, the CW is transported to Hart Resource Technologies, 5035 Route 100, Creekside, PA, 15732. Hart Resources has two facilities – Josephine Brine and Franklin Brine. Depending on capacity, both facilities have been used for the disposal of the CW from the demonstration project. Prior to April 19th, Hart Resources Technologies charged $0.06 per gallon for disposal (2.52/bbl). In addition, the trucking cost to either site was approximately $0.08 to $0.10 per gallon for a total CW disposal cost equal to $0.14 to $0.16 per gallon (equivalent to $5.88 to $6.72 per barrel). Assuming a total average Trucking and Disposal cost of $0.15/gallon ($6.30/barrel), results in an absolute cost of $11,315 to dispose of the 75,430 gallons (1796 barrels) of CW during the period.

The chart below outlines the volume of CW production from commencement of the system operations.

Daily Operating Report (DOR) 4011 TR vs Time Graph



4.4 Estimated Costs

Estimated Per Barrel Labor Cost

A total of approximately 495 hours of labor was required during the project. Dividing the 223,610 gallons (5,324 barrels) of water eliminated (TR) by this results in an approximate per barrel labor rate of 0.00221 hours/gallon (0.09297 hours/bbl). An hourly maintenance worker at $30/hr results in total labor costs of approximately $14,850 and per gallon and per barrel costs of $0.066/gal and $2.789/bbl respectively. It should be noted that this amount is likely inordinately

high because both (i) this initial demonstration testing was a first of its kind, and experience learning will reduce further in such installations and (ii) the very nature of this NETL project requires special labor costs not found in future real-world on-site water treatment.

Estimated Per Barrel Consumables Cost

Consumable costs during the period were quite low. Final cost of consumable (filter bags) totaled $53.24. The estimate of consumables per barrel costs equal $0.01/bbl.

Estimated Total Per Barrel Cost

The total per barrel operating cost (OpEx) during the period was $4.88/barrel ($0.12/gal). This was calculated by summing the individual OpEx costs listed below:

- Gas Cost: $1.74/barrel of water eliminated
- Electric Cost: $0.345/barrel of water eliminated
- Labor Cost: $2.789/barrel of water eliminated
- Consumables Cost: $0.01/barrel of water eliminated

This total per barrel operating cost (OpEx) of $4.88/barrel ($0.12/gal) reflects the per barrel cost of the water eliminated from trucking and disposal (TR=PW-CW). It does not include the cost of disposal of the concentrate, but it also did not divide these costs by the larger number of "how much input water was treated". The cost calculations can (and should) be done two different ways: (a) as above, based only on the net volume of water eliminated from trucking and disposal, TR = PW-CW; and (b) based on the volume of water treated, PW.

The latter method yields a total per barrel operating cost (OpEx) of $4.88/barrel ($0.12/gal) and reflects the per barrel cost of the water brought into the System (PW). It therefore includes the cost of disposal of the Concentrate Water (CW). Total water treated (PW) equaled 7,120 barrels, and OpEx costs were:

- Total Gas Cost: $9,264 ($1.74/barrel TR X 5,324 barrels)
- Total Electric Cost: $1,837 ($0.345/barrel TR X 5,324barrels)
- Total Labor Cost: $14,850 ($2.789/barrel TR X 5,324 barrels)
- Total Consumables Cost: $53 ($0.01/barrel TR X 5,324 barrels)
- Total Disposal Cost: $11,315 ($6.30/barrel TR X 1,796 barrels)

Total OpEx costs, including CW disposal, were therefore $37,319. The resulting per gallon and per barrel costs were $0.125/gallon and $5.24/barrel, respectively. This represents a savings of 17% over trucking and disposal without the Altela System (1-$5.24/$6.30). Factors causing the reduction of savings over the 28% reported during Phase 1 are noted in the Executive Summary.

It is noteworthy that recent regulatory changes this past year have increased traditional trucking and disposal costs which are material to the above analysis. A significant volume of Marcellus

Shale wastewater is being disposed of in Ohio in UIC re-injection wells. Ohio has passed regulations increasing the price for such disposal. For example, according to the Ohio Division of Mineral Resources Management (ODNR), "With the passage of Senate Bill 165 in 2010, some changes to the UIC Program include an increase in the Class II saltwater injection permit application fee from $100 to $1000, and an injection disposal fee of $.05 per barrel for brine originating in-district and $.20 per barrel for brine originating out-of-district." These UIC disposal surcharges for out-of-district brine disposal are increasing total disposal costs to the E&P operators. In addition, beginning in January of 2011, PA DEP amended Title 25, Chapter 95, Wastewater Treatment Requirements, to address the dramatic increase in Marcellus Shale wastewater that was being diluted and sent into PA's surface water bodies. The new 95 regulation included more stringent discharge standards including 500 mg/L for Total Dissolved Solids (TDS) and 250 mg/L each for Sulfates and Chlorides.

As a result of PA DEP's Chapter 95 regulation and ensuing enforcement efforts by PA DEP in May of 2011, the per barrel market price for disposal of Marcellus Shale wastewater has increased significantly due to increased costs to comply with the new discharge regulations. Operators have reported per barrel costs exceeding $8.50 per barrel with further increases based on proximity to Ohio or to limited disposal sites still available in Pennsylvania. This in turn, has made new technologies like the AltelaRain® process to be more economical and thereby gain additional market traction. Taking into account this new regulatory market dynamic, industry can currently realize a savings of 38% over trucking and disposal without the Altela System (1-$5.24/$8.50).

5. LIFE CYCLE ANALYSIS REPORT

5.1 Approach

A hybrid life cycle assessment (LCA) approach was used to estimate the environmental performance of the system. Hybrid life cycle assessment combines a traditional process based life cycle assessment approach with an economic input-output life cycle assessment (EIO-LCA) approach to expand the system boundaries and include impacts for process where detailed information is unavailable (Williams 2004). Using this approach energy consumption and greenhouse gas (GHG) emissions were calculated on a life cycle basis.

The Analysis will compare the Altela 4000 mobile test system with the improved Altela 600 stationary system as well as trucking produced water to Ohio for deep well injection. In addition a fourth scenario was analyzed assuming the Altela 600 could be paired with a waste heat source. Four main stages of the life cycle were analyzed: operations, capital equipment manufacturing, transportation, and waste disposal. Of the four stages, three, operations, transportation, and waste disposal were analyzed using the process LCA approach. Capital equipment manufacturing was be analyzed using the EIO-LCA methodology.

The functional unit for the analysis is a single barrel of produced water entering the system. Energy consumption is calculated as total primary energy consumption in BTUs and GHG emissions are calculated in g CO2e. For the Altela systems a treatment rate of 75% is assumed for all systems based upon the field results for the Altela 4000. This means for each barrel entering the system 0.75 bbl are fully treated by the system and 0.25 bbl must be disposed of by conventional methods. In this analysis trucking to Ohio for deep well injection was the assumed disposal method.

The Argonne National Laboratory Greenhouse Gases, Regulatory Emissions, and Energy Use in Transportation (GREET) model was used to develop life cycle energy and emissions factors. These emissions factors incorporate upstream impacts such as fuel production and processing. The emissions factors used for the energy sources included in this analysis are shown below:

Impact Factors (From GREET v1.8d.1)

Energy Source	Primary Energy (btu/btu)	GHG g/mmbtu
Natural Gas	1.07	69,815
Diesel	1.13	83700
Electricity	2.51	211,754

5.2 Operations

Operations impacts were calculated based upon measured energy consumption values. The sources of energy consumption included in the analysis were natural gas to feed the boiler which drives the treatment process and electricity to run additional equipment such as pumps, blowers, sensors, and control electronics. For the Altela 4000 system operational performance data used was from a 58 day period in September and October of 2010. Energy consumptions values for both systems are shown below. For the Altela 600 scenario where waste heat is utilized, natural gas consumption is assumed to be zero.

Operational Energy Consumption per barrel of water treated

System	Natural Gas (MCF/bbl)	Electricity (kWh/bbl)
Altela 4000	0.45	2.03
Altela 600	0.20	2.48

5.3 Capital Equipment Manufacturing

Impacts for capital equipment manufacturing were calculated based upon the EIO-LCA methodology. A detailed cost breakdown of the system was combined with economic sector specific impact factors obtained by the EIOLCA.net life cycle assessment model (CMUGDI

2011). Impact factors in the EIOLCA.net model were in 2002 dollars so they had to be adjusted to 2010 dollars using the latest producer price index values (Economagic 2011). A lifetime of 10 years was assumed for all equipment. A utilization rate of 60% was assumed for the Altela 600 system and the average treatment rate of 37 bbl/day was used for the Altela 4000.

5.4 Transportation

Transportation impacts are included for the Altela 600 system. Since the system is at a centralized location, water will need to be trucked from surrounding wells to this location. The average distance from well pads to the treatment facility was assumed to be 30 miles. Fuel consumption was calculated for a round trip, with trucks were assumed to get 5 mpg while fully loaded and 7 mpg on the return trip.

5.5 Waste Disposal

Waste disposal is assumed to be trucking to deep well injection sites in Ohio. This disposal method was selected due to recent regulatory actions in Pennsylvania restricting the use of conventional treatment and disposal facilities that do not remove TDS. In addition, in order for the Altela systems to effectively reduce salt loads to surface waters, the highly concentrated waste brines should be disposed of through deep well injection. The transportation distance for disposal was estimated based upon the average distance between the location of the Altela 4000 test site and the five nearest disposal wells in Ohio (Veil 2010). This distance was calculated to be approximately 150 miles. Fuel consumption was calculated assuming the same fuel efficiency used for determining the transportation impacts.

Energy required for deep well injection was previous calculated by Argonne for a yet to be published study based upon the average injection pressure of a number of injection wells in the western United States. From this analysis the energy requirements for injection were estimated to be 0.6 kWh/bbl.

5.6 Results

The results of this analysis are shown in the figures below. Figure A shows the life cycle energy consumption for the four scenarios. For the Altela 4000 and 600 systems the energy consumption is dominated by the operations stage, specifically from natural gas consumed to generate steam. The waste heat scenario illustrates that there is a significant opportunity to reduce energy demand (and costs) by pairing the Altela 600 with a low-grade waste heat source. The energy consumption for manufacturing the system itself is quite small, at least when averaged over the entire expected lifetime of the system. Energy for transportation is not insignificant, but small relative to the operational energy consumption and the significantly higher efficiency of the centralized Altela 600 systems appears to outweigh the lack of transportation required for the Altela 4000. However it is possible that this efficiency difference could be narrowed with an improved, optimized version of the mobile system.

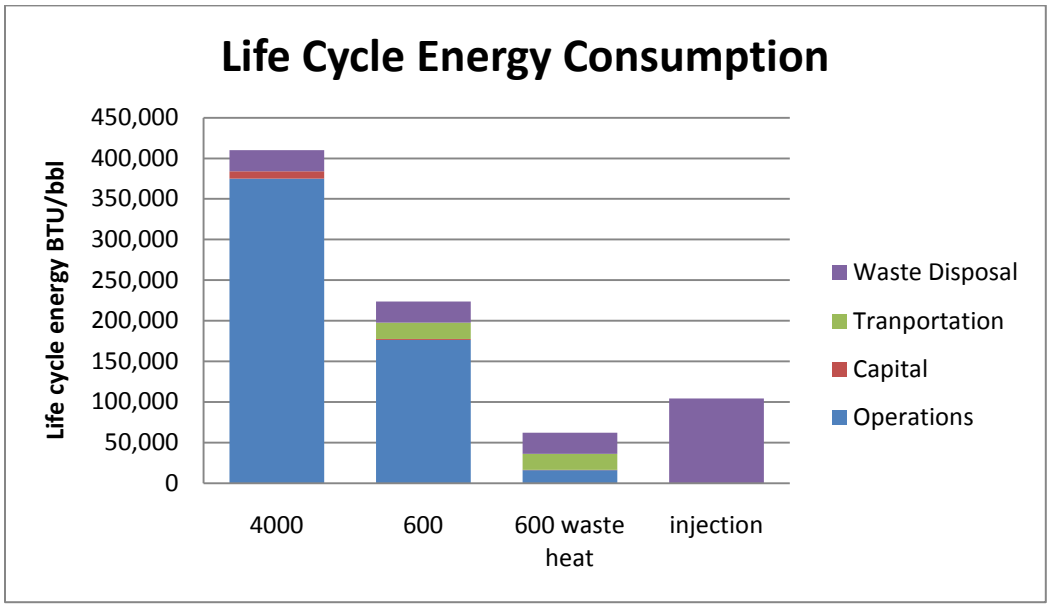


Figure A. Life Cycle Energy Consumption for Water Treatment

Figure B shows the life cycle GHG emissions for each scenario. The GHG emissions data largely track the energy consumption trends. This is not surprising given that the majority of GHG emissions result directly from combustion of fossil fuels.

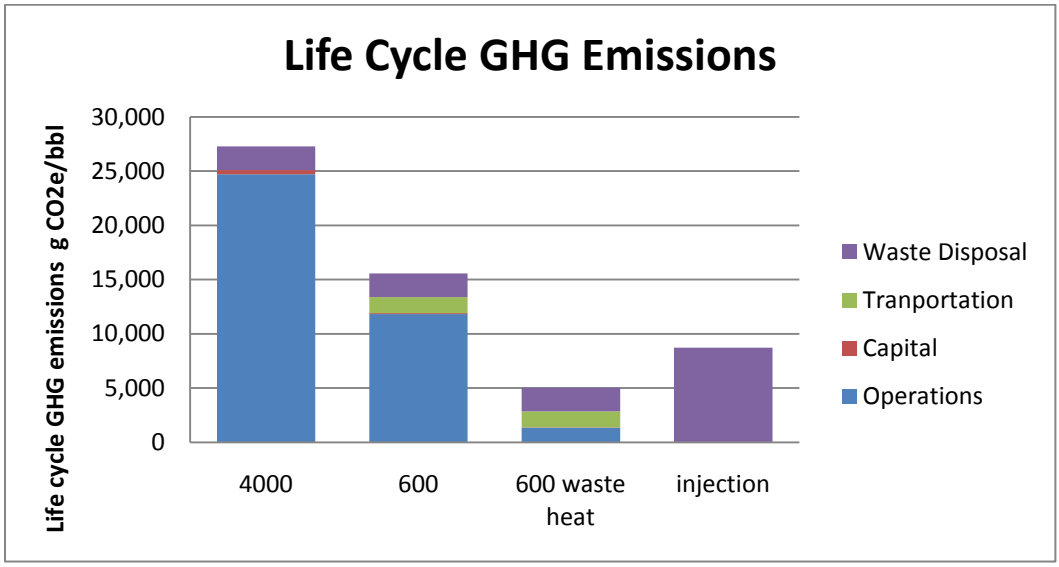


Figure B. Life Cycle GHG Emissions for Water Treatment

5.7 Analysis

While both the Altela 4000 and 600 systems are still currently more energy and GHG intensive than simply trucking water for disposal there are additional benefits beyond energy and emissions. Both systems would significantly reduce truck traffic required for water management. Increased truck traffic is one of the largest complaints of citizens in areas of active

gas development. The availability of disposal wells is also likely to decline in the future as demand increases, potentially increasing costs and the distance to available wells.

The Altela systems also produce as much 0.66 bbl of purified water for every barrel of produced water treated. This water can be returned to operators reducing stress on fresh water resource. The exact amount of purified water produced varies somewhat depending on operating conditions since the clean water is utilized for steam production which drives the system and some of this water is exhausted from the system as saturated water vapor.

The life cycle assessment results show that experience gained from the Altela 4000 field tests have helped improve the system design and resulted in a 45% increase in overall energy efficiency for the newer Altela 600 system. In the future, if suitable sources of low grade waste heat can be located and systems co-located to take advantage of them (co-generation projects), the system efficiency can improve as much as 85% from the original test system.

CONCLUSION

This project successfully delivered field-proof that the AltelaRain® technology is capable of treating Marcellus frac water to water quality standards required for discharge and/or applicable beneficial re-use, numerous water quality analyses of the treated water were taken. Both bench-scale water quality analyses and the first field-based quarterly water sampling verified the system was operating successfully and capable of treating the highly challenged Marcellus Shale frac flow-back and produced water to requisite levels.

The project delivered field proof that the treatment technology can economically treat the frac water at a cost equal to or lower than current disposal methods. Specifically, the resulting per gallon and per barrel costs were $0.125/gallon and $5.24/barrel, respectively. This represents a savings of 17% over trucking and disposal without the Altela System. This cost savings increases to 38% when trucking and disposal market pricing, post May 19th 2011, is taken into account following Chapter 95 discharge limit enforcement.

As a result of PA DEP's Chapter 95 regulation and ensuing enforcement efforts by PA DEP in May of 2011, the per barrel market price for disposal of Marcellus Shale wastewater has increased significantly due to increased costs to comply with the new discharge regulations. Operators have reported per barrel costs exceeding $8.50 per barrel with further increases based on proximity to Ohio or to limited disposal sites still available in Pennsylvania.

UIC disposal surcharges for out-of-district brine disposal are increasing total disposal costs to the E&P operators. For example, according to the Ohio Division of Mineral Resources Management (ODNR), "With the passage of Senate Bill 165 in 2010, some changes to the UIC Program include an increase in the Class II saltwater injection permit application fee from $100 to $1000, and an injection disposal fee of $.05 per barrel for brine originating in-district and $.20 per barrel for brine originating out-of-district." In addition, January of 2011, PA DEP amended Title 25,

Chapter 95, Wastewater Treatment Requirements, to address the dramatic increase in Marcellus Shale wastewater that was being diluted and sent into PA's surface water bodies. The new 95 regulation included more stringent discharge standards including 500 mg/L for Total Dissolved Solids (TDS) and 250 mg/L each for Sulfates and Chlorides.

As outlined in this report, the life cycle assessment results indicate that experience gained from the Altela 4000 field tests have helped improve the system design and resulted in a 45% increase in overall energy efficiency for the newer Altela 600 system. In the future, if suitable sources of low grade waste heat can be located and systems co-located to take advantage of them (co-generation projects), the system efficiency can improve as much as 85% from the original test system. Altela is in discussion with several entities to pursue this co-generation approach.

Finally, with respect to demonstrating that the regulatory environment support implementation of the water treatment technology solution, this report provides a review of the regulatory requirements as well as confirmation that the regulatory environment supports implementation of the AltelaRain® water treatment technology solution in Pennsylvania's Marcellus Shale Basin.

References

Carnegie Mellon University Green Design Institute, 2011, Economic Input-Output Life Cycle Assessment (EIO-LCA), US 2002 purchaser model [Internet], Available from:<http://www.eiolca.net> Accessed July 18, 2011.

Economagic, 2011, "Browse US Producer Price Index Data." http://www.economagic.com/blsppi.htm (accessed 7-18-11).

Veil, J.A., 2010, "Water Management Technologies Used by Marcellus Shale Gas Producers," ANL/EVS/R-10/3, prepared for the U.S. Department of Energy, National Energy Technology Laboratory, July, 59 pp. Available at http://www.ead.anl.gov/pub/dsp_detail.cfm?PubID=2537.

Williams, E., 2004, "Energy Intensity of Computer Manufacturing: Hybrid Assessment Combining Process and Economic Input-Output Methods." Environmental Science & Technology 38: 6166-74.

LIST OF ACRONYMS AND ABBREVIATIONS

CW	Concentrated Water
CWA	Clean Water Act
DW	Distilled Water
EPA	Environmental Protection Agency
GPH	Gallons per hour
NDPES	National Pollution Discharge Elimination System
NETL	National Energy Technology Laboratory
NM OCD	New Mexico Oil Conservation Division
OpEx	Operating Expenses
PA DEP	Pennsylvania Department Environmental Protection
PW	Produced Water
SOPO	Statement of Project Objectives
TR	Treatment Rate
UIC	Underground Injection Control
USDW	Underground Source of Drinking Water

APPENDIX A

PA DEP REQUEST FOR APPROVAL OF ALTERNATIVE WASTE MANAGEMENT PRACTICES

5500-PM-OG0071 Rev . 2/99

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL & GAS MANAGEMENT PROGRAM

DEP USE ONLY	
Auth # 827822	APS #
Site #	Facility #
FIX Client #	Sub-fac #

Request for Approval of Alternative Waste Management Practices

Please read instructions on back before completing this form.

Well Operator	DEP ID	Well Permit or Registration Number	
BLX, Inc.	27365	37-063-36534-00	
Address		Well Farm Name	
233 North Park Drive		R. Steppy	
City / State / Zip Code		Well #	Serial #
Kittanning / PA / 16201		1-86.6	N/A
Phone	Fax	County	Municipality
724-543-5743	724-543-5744	Indiana	Cherry Hill Township

INTENDED ALTERNATIVE PRACTICE *Check the appropriate box and complete the applicable section of the form.*

☐ For temporary containment of fluids and wastes generated during drilling, altering, or completing a well, complete Section A. PITS AND TANKS FOR TEMPORARY CONTAINMENT. See 25 Pa. Code § 78.56 for regulations.

☐ For disposal of drill cuttings from above the surface casing seat, complete Section B. ALTERNATE WASTE DISPOSAL PRACTICES. See 25 Pa. Code § 78.61 for regulations.

☒ For disposal of residual waste and drill cuttings from below the surface casing seat, complete Section B. ALTERNATE WASTE DISPOSAL PRACTICES. See 25 Pa. Code § 78.62 or § 78.63 for regulations.

A. PITS AND TANKS FOR TEMPORARY CONTAINMENT

Complete this section if requesting approval of an alternative practice for temporary containment of pollutional substances and wastes from drilling, altering, or completing a well. See 25 Pa. Code § 78.56.

a) Check the box below and fill in the dates the pit will be used if you are requesting a variance from the requirement that the bottom of the pit be at least 20 inches above the seasonal high groundwater table for a pit that exists only during dry times of the year and is located above groundwater. See 25 Pa. Code § 78.56(a)(4)(iii).

☐ Variance requested; dates to be used, from _____ to _____

b) Check the box below if you are requesting approval of an alternative practice for temporary containment.

☐ Approval of an other alternative practice is requested. Describe the type of waste and the temporary containment method. Include information which will demonstrate that the proposed alternative practices will provide equivalent or superior protection to the practices indentified in 25 Pa. Code § 78.56.

MAR 16 2010

DEP, SOUTHWEST REGION
OIL & GAS

(continued over)

B. ALTERNATIVE WASTE DISPOSAL PRACTICES

Complete this section if requesting approval of an alternative practice to dispose of drill cuttings or residual wastes at the well site. Describe the type of waste, including any additives, and the proposed alternative practice. Include information that will demonstrate the proposed practice will provide protection equivalent or superior to the practices identified in 25 Pa. Code § 78.61, 78.62, or 78.63.

BLX, submits this application with respect to using the AltelaRain water desalination and purification technology to treat and clean the frac flow-back water generated at a BLX, Inc. gas well more specifically identified as follows:
True Lattitude: North 40 d, 36' 16.60"
True Longitude: West 78 d, 57' 39.45"

A well location plat has been attached.

The type of waste is frac flow back and production water generated from gas well exploration and production. The alternative practice deals with applying thermal distillation for the treatment and purification of such water. The proposed AltelaRain demonstration project is anticipated to last up to 120 days. Altela, Inc. will place and operate its mobile water desalination unit (AltelaRain System) to treat frac water at the well-site. Each AltelaRain System is built and fully contained in a standard 45' shipping container (45' x 8' x 9'6"). Following treatment, the distilled, treated water will be recycled for frac and well completion. No surface discharge of the clean, distilled water will occur. Any remaining frac water effluent will be disposed of pursuant to PA Oil and Gas Management Bureau rules and regulations at approved commercial disposal facilities. The proposed demonstration will provide protection equivalent or superior to the practices identifed in 25 Pa. Code Sec. 78.61, 78.62, or 78.63. Additional detailed information has been included in the following attached documents: AltelaRain Process Description, Process Flow Diagram and Schematic.

SIGNATURE OF APPLICANT

Signature of Applicant / Well Operator	Print or Type Signer's Name and Title	Date
Stan Berdell	Stan Berdell, President	3/10/2010

DEP USE ONLY

☒ Approved ☐ Denied DEP Representative:	Conditions: ☒ YES, see below or attached. ☐ NO	Date 3/31/10

Conditions:

Operator should notify Michael Morgart at 412-417-7944, 48 hours prior to beginning ~~solidification~~ treatment process

Instructions

Use this form to apply for approval of alternative waste management practices under 25 Pa. Code § 78.56, 78.61, 78.62, or 78.63.

Complete this form and submit it with all other necessary documentation. Label each attachment with applicant's name and the information item it refers to.

Send your application to the Oil and Gas Management Program at the appropriate DEP regional office:

PA DEP
Oil & Gas Management Program
Northwest Regional Office
230 Chestnut Street
Meadville, PA 16335-3481
Phone: 814-332-6860
Fax: 814-332-6121

PA DEP
Oil & Gas Management Program
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745
Phone: 412-442-4015
Fax: 412-442-4328

MAR 16 2010
DEP, SOUTHWEST REGION OIL & GAS

5500-PM-OG0002-DWG Rev. 09/2008

pennsylvania

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil and Gas Management Program

WELL LOCATION PLAT

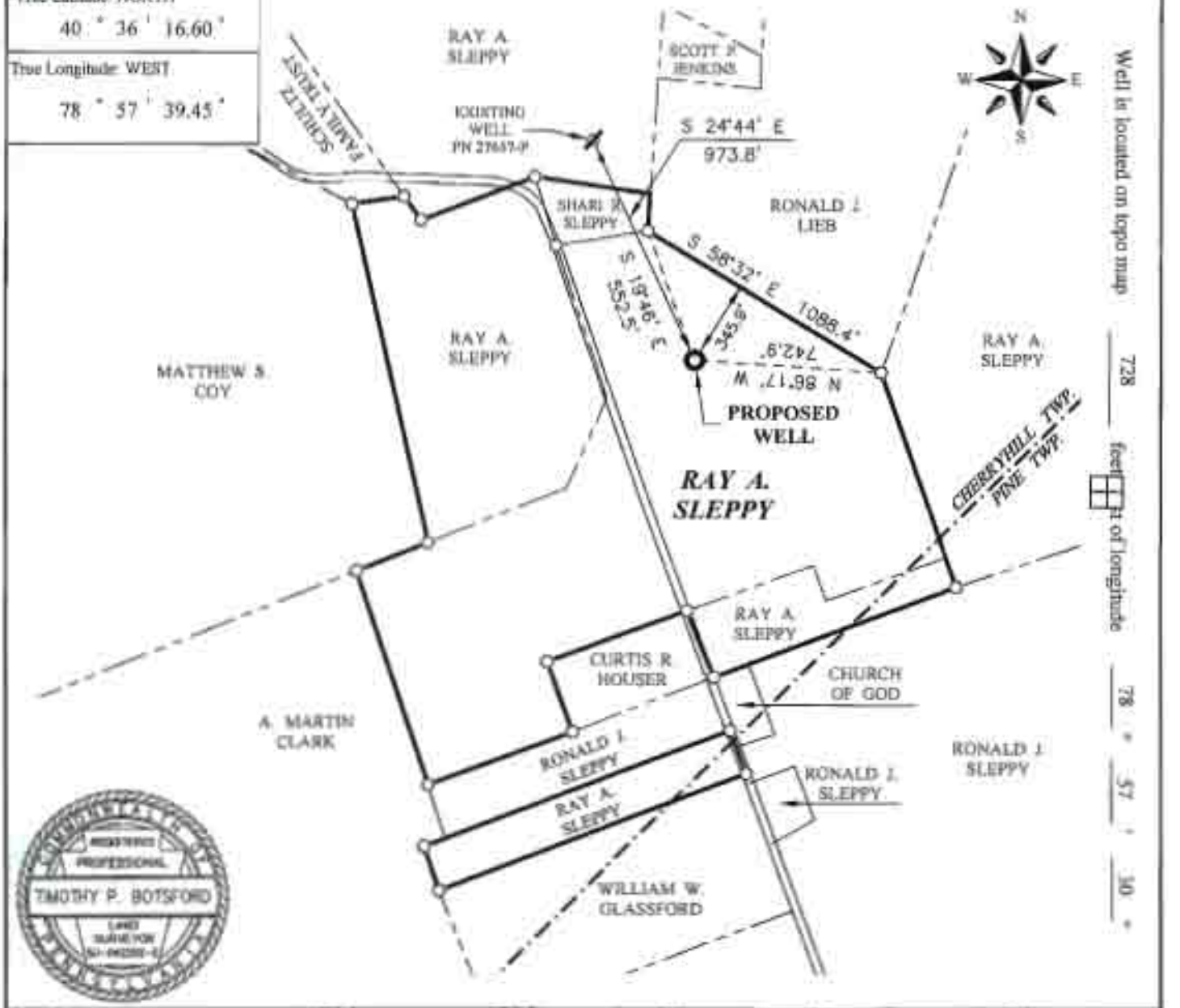
DEP USE ONLY	DEP Application	
	Permit #	
	Project #	

Denotes location of well on topo map

Well is located on topo map 7,427 feet south of latitude 40 ° 37 ' 30 "

True Latitude: NORTH
40 ° 36 ' 16.60 "

True Longitude: WEST
78 ° 57 ' 39.45 "



Well is located on topo map 728 feet East of longitude 78 ° 57 ' 30 "

REGISTERED PROFESSIONAL
TIMOTHY P. BOTSFORD
LAND SURVEYOR

Surveyor or Engineer: TIMOTHY P. BOTSFORD	Phone #: 724-349-5659	Dwg #: W-107	Date: 2-26-09	Scale: 1" = 600'	Declination (Magnetic) Angle: 86.6 ±		
Lat. & Long. Methods: Method: Direct GPS	Accuracy: 3	Datum: NAD 27	Elevation: Methods: Method: Direct GPS	Accuracy: 10	Datum: NGVD 29	Survey Date: 2-20-09	
Applicant / Well Operator Name: BLX, INC.		DEP ID#:	Well Farm Name: R. SLEPPY		Well #: 1-8566	Serial #:	
Address: 233 NORTH PARK DRIVE, KITTANNING, PA 16201			County: INDIANA	Municipality: CHERRY HILL TOWNSHIP		Well Type: GAS	
Surface Landowner / Lessor: RAY A. SLEPPY			USGS 7½ Quadrangle Map Name: STRONGSTOWN		Map Number: 1	Surface Elevation: 1635 ±	
Target Formation(s): MARCELLUS SHALE			Angle & Direction (Deviated Drilling): 0°		Anticipated Total Depth: TVD: 8000	TMD: N/A	

Surface Owner or Water Purveyor with a Water Supply within 1,000 ft	Approximate Course and Distance to Water Supply	Owner, Lessee, or Operator of Workable Coal Seam	Name of Coal Seam Owned, Leased, or Operated
		RAY A. SLEPPY (OWNER)	LOWER FREEPORT
RAY A. SLEPPY	S 40° E 864'	1684 LAUREL RUN RD., PENN RUN, PA 15765	LOWER KITTANNING
1684 LAUREL RUN RD., PENN RUN, PA 15765	S 30° E 801'	AMFIRE MINING CO. LLC (OPERATOR)	
		ONE ENERGY PLACE, LATROBE, PA 15650	LOWER KITTANNING

APPENDIX B

CWM ENVIRONMENTAL, INC.
SAMPLING PROCEDURES

Sampling Procedure

Approvals/Date:

Ryan Shafer, Technical Director

Anagha Lele, Quality Assurance Officer

CONTROLLED DISTRIBUTION

Copy No.: MASTER COPY

Issued To: QAO Desk (accessible to all lab personnel)

1.0 PURPOSE

1.1 This procedure describes the general requirements for sampling and field measurements when obtaining a specimen sample for subsequent analytical testing.

1.2 The objective of sampling is to collect a portion of material small enough in volume to be transported conveniently and handled in the laboratory while still accurately representing the material being sampled.

1.3 Samples may be biological, wastewater, potable water, groundwater, surface water, or domestic or industrial wastes.

1.4 Deviations, additions, or exclusions from this procedure must be documented.

2.0 SCOPE

This procedure is applicable to all sampling events planned and conducted by CWM. Clients are encouraged to adhere to this procedure.

3.0 RESPONSIBILITIES

3.1 ***Safety*** is the responsibility of all involved in the planning, collection and handling of the samples. Because sample constituents can be toxic, take adequate precautions during sampling and sample handling. Precautions may be limited to wearing gloves or may include coveralls, aprons, or other protective apparel. Always wear eye protection. Label adequately any sample known or suspected to be hazardous because of flammability, corrosivity, toxicity, or radioactivity, so that appropriate precautions can be taken during sample handling, storage, and disposal.

3.2 The sampler is responsible for maintenance of a field logbook, with entries printed neatly and legibly in ink. Logbooks may be used as evidentiary records in a court of law at some future date.

3.3 The sampler is responsible for documenting any deviations, additions, or exclusions applied to a sample set in the field record log, and ensuring that this information is forwarded to the laboratory along with routine sample identification information. This shall be applicable regardless of the whether changes were initiated due to client request or due to conditions in the field. Additionally, these changes must be brought to the attention of the project manager as soon as is practicable.

3.4 The project manager is responsible for transmitting any client-requested deviations, additions, or exclusions to this procedure to the sampler, and ensuring that these changes are reported with the resultant data.

3.5 The project manager must notify the client of any deviations, additions, or exclusions to this procedure that were not requested by the client, and ensure that these changes are reported with the resultant data.

3.6 The laboratory manager is responsible for ensuring that samplers have been properly trained in the techniques appropriate to the requested sampling event. This training must be documented.

4.0 RELATED DOCUMENTS

4.1 *Standard Methods for the Examination of Water and Wastewater*, 19th Edition, APHA/AWWA/WEF, 1995. Method 1060 F

4.2 *Field Procedures Manual for Water Data Acquisition*, NJDEP Division of Water Resources, 1987.

4.3 *National Environmental Laboratory Accreditation Conference Standards, Chapter 7, Field Activities,* Proposed Changes, May 2002

4.4 CWM cross-referenced documents:

Document Number	Title (may be abbreviated)
MS Notebook	Material Safety Data Sheets (MSDS) Notebook
QS-001M	Laboratory Quality Manual
SM-001T	Sample Containers, Preservation, Holding Time
SM-101P	Sample Acceptance Policy
SM-102P	Sample Receipt & Tracking
SM-002P	Sampling Procedure - Micro
SM-003P	Sampling Procedure - Oil & Gas Plat Collection
SM-004P	Sampling Procedure - Atlas Oil & Gas Plat Collection

5.0 PROCEDURE

5.1 Planning

5.1.1 Parameters

Determine what pollutants and/or physical environmental conditions are to be monitored. Make a list of analytical requests based on applicable client permits, regulatory requirements, review of provided data, and/or specific client input.

5.1.2 Sample Scheduling

Develop a projected sampling schedule, taking into consideration factors such as laboratory workload, periodic monitoring requirements (e.g., is the project for

quarterly compliance monitoring?), hold times, analysis time (will you need to pay overtime to have someone read results on the weekend or a holiday?), and client expectations.

5.1.3 Sample Containers

5.1.3.1 Refer to work instruction SM-001T, Sample Containers, Preservation, and Hold Time to determine the type, size and quantity of sample containers for all analyses identified in Section 5.1.1. The volumes identified in SM-001T are the minimum quantities required. It does not provide enough sample volume for reanalysis or for laboratory duplicates and matrix spikes. For one in every 10 or 20 samples, collect enough volume to perform the analysis three times (one for the sample, one for the duplicate, and one for the matrix spike).

When determining what containers are needed, also take into consideration what parameters can be grouped together from the same bottle to minimize the number of sample containers needed.

5.1.3.2 Obtain the needed bottles and label them with the appropriate parameters to be tested from the respective bottles. If the analysis requires chemical preservation, add the preservative to the bottle prior to leaving the laboratory and clearly mark the bottle with the preservative added.

Note 1: Be sure to use pre-cleaned bottles if requested by the client. Ensure that a copy of the certificate is forwarded to the project file for the sampling event. Record the lot numbers of any preservatives added to the bottles.

Note 2: For litigation samples, or if requested by the client, initiate the chain-of-custody at the time bottles are prepared, and ensure that the sampler signs the receipt from the laboratory.

Note 3: For volatiles and if required for other analytes by the client, include a trip blank with the bottle order. If field blanks are to be collected, provide laboratory reagent water to prepare the blanks.

Note 4: If soluble components are requested, and the samples are to be field filtered, provide extra bottles to collect total and soluble samples. If the sample is to be filtered for soluble components, DO NOT preserve until AFTER filtering.

5.1.4 Sampling Equipment

Determine what type of sampling equipment will be needed. Ensure that it will be available when needed and is clean, in working condition, and ready for use. This includes verifying and documenting that calibrations are current and/or the materials needed to calibrate in the field are available and traceable, as appropriate. Cleaning of sampling equipment is addressed in the respective equipment procedures.

5.1.5 Field Measurements

If any field measurements are planned, ensure that the necessary instruments are available and that required quality control has been performed. Ensure that appropriate materials needed to calibrate in the field are available and traceable, as appropriate.

5.1.6 Field Log

Field records shall be recorded on a sample chain-of-custody form. Records shall include the following, as appropriate, for the interpretation of test results.

5.1.6.1 Sampling/field measurement organization, including address, phone number, and email address

5.1.6.2 Printed name and signature of technician, plus names of all members of the sampling team

5.1.6.3 Sample type (grab, composite, etc.), including an identification of the matrix sampled; (aqueous, solids, etc.)

5.1.6.4 Sample identification number including a unique field identification code for each sample container

5.1.6.5 Reason for sampling/measurement

5.1.6.6 Date and time of sampling/measurement

5.1.6.7 Location of sampling, including any diagrams, sketches, or photographs; name of sampling station, and/or latitude, longitude, and altitude when sample point is not otherwise identified

5.1.6.8 For water sampling: the water level measure, sample depth, and water discharge rate, if appropriate or required

5.1.6.9 Reference to the sampling plan and procedures used, including field blanks, spikes and duplicates; field instrument calibration, span, drift, and calibration standards; sampling system bias and response time; and field test standards and reagents as required by the standard/test method

5.1.6.10 Sample preservation, transportation, and storage, including a description of sample containers and chain of custody

5.1.6.11 Details of any conditions during sampling that may affect the outcome or interpretation of the test results

5.1.6.12 Any standard or other specification for the sampling method or procedure, plus any deviations, additions to or exclusions from the specification concerned

5.1.6.13 Certification from the organization collecting the samples that samples and field measurements were collected in accordance with NELAC standards or provide reasons and/or justification if they were not.

5.2 Sample Collection

5.2.1 Samples will generally be a grab or composite.

- Grab: a sample collected at a particular time and place.
- Composite: a combination of grab samples collected at the same point over different times. The procedure for compositing must be documented for each sampling event.

5.2.2 Obtain a sample that meets the requirements of the sampling program and handle it so that it does not deteriorate or become contaminated before it reaches the laboratory. In water sampling, before filling the sample bottle, rinse it two or three times with the water being collected, unless the bottle contains a preservative or dechlorinating agent. If the bottle already contains preservative, take care not to overfill the bottle to prevent loss or dilution of the preservative.

5.2.3 Representative samples of some sources can be obtained only by making composites of samples collected over a period of time or at many different sampling points.

5.2.4 Collect the sample carefully to ensure that analytical results represent the actual sample composition. Important factors affecting results are the presence of suspended matter or turbidity, the method chosen for its removal, and the physical and chemical changes brought about by storage or aeration.

5.3 Sample Handling, Preservation and Labeling

5.3.1 General Sample Handling

5.3.1.1 Obtain a sample that meets the requirements of the sampling program and handle it so that it does not deteriorate or become contaminated before it reaches the laboratory. In water sampling, before filling the sample bottle, rinse it two or three times with the water being collected, unless the bottle contains a preservative or dechlorinating agent. If the bottle already contains preservative, take care not to overfill the bottle to prevent dilution or loss of the preservative.

5.3.1.2 Representative samples of some sources can be obtained only by making composites of samples collected over a period of time or at many different sampling points.

5.3.1.3 Sample carefully to insure that analytical results represent the actual sample composition. Important factors affecting results are the presence of suspended matter or turbidity, the method chosen for its removal, and the physical and chemical changes brought about by storage or aeration.

5.3.2 Special Sample Handling

5.3.2.1 Bacteriological Samples. Sterile bottles containing sodium thiosulfate must be used.

5.3.2.1.1 Choose a tap that is frequently used for drinking. Remove the screen or aerator and allow the cold water to run for 2-3 minutes. Remove the lid and fill the bottle without rinsing. Do not overfill. Do not touch the inside of the bottle or lid. Secure the lid tightly and refrigerate. Relevant COC information must be completed.

5.3.2.2 Dissolved Oxygen Samples

3.3.2.2.1 If dissolved oxygen is not done in the field, a glass BOD bottle must be used. Fill the bottle to the top and stopper and cap the bottle immediately. Preferably, the bottle should be completely immersed in the water being tested; after the bottle fills, cap and stopper the bottle while continuing to immerse it.

5.3.2.3 Volatile Organic Samples

5.3.2.3.1 VOCs must be collected in glass 40-ml vials with no headspace. Do not rinse the bottles. Refer to SM-001T for preservation and hold time requirements.

5.3.2.4 Composite Samples. The following <u>cannot</u> be analyzed from a composite sampler:

Dissolved Oxygen	Volatile Organics
Bacteriological	Temperature
Oil & Grease	Phenols
Petroleum Hydrocarbons	

5.3.3 Sample Preservation

Refer to work instructions SM-001T, Sample Containers, Preservation, and Hold Time. Samples must be shipped and stored with proper preservation. Holding time commences with the collection of the sample. If hold time is less than 48 hours, time of analysis must be recorded and verified to meet requirements with collection of the sample.
When fixing a sample (with an acid or base) to a specific pH, use the following steps to check the sample pH:

5.3.3.1 Use the appropriate prepared acid or base solution from the lab to preserve the sample. Make sure the acid preservatives dispenser is labeled correctly to directly tie it to its preparation.

5.3.3.2 For acid preservation, a pH of less than 2 is required. For basic (alkaline) preservation, a pH of greater than 10 is required. Use appropriate pH strips to test a small portion of the preserved sample to verify that the required pH has been achieved.

5.3.4 Acid Preservatives Preparation:

5.3.4.1 Laboratory uses (1:1) HN03, (1:1) HCl & (1:1) H2S04 acid preservatives for pH preservation.

5.3.4.2 A separate acid preservatives preparation log is maintained to record the preparation details.

5.3.4.3 Acid dispensers are clearly labeled with date of preparation, details of stock solution and recent calibration check.

6.0 RECORDKEEPING

Records generated as a result of the sampling and/or field testing process are included with the chain of custody.

7.0 QUALITY CONTROL

Records kept for sampling include the chain of custody, field data sheets and LIMS generated data sheets (where applicable – Ground Water Field data is entered in LIMS directly from COCs) that are used for reportable field measurements. COCs are reviewed to ensure all information is present.

8.0 REVISION SUMMARY

No.	Summary of Changes
00	Initial release
01	Revised to include the reference to Microbiological Sampling SOP, Section 4.4
02	Revised header effective 01/01/05, Section 7.0 to include LIMS data sheets.
03	Replaces SM -001P_02 eff 01/01/05. Annual Review 2009. Updated to correct the deficiencies identified during Reliant Audit (NOV 08). Added section 5.3.4.

APPENDIX C

WATER QUALITY REPORTS

(PRODUCED WATER, FRAC WATER AND FRAC FLOW-BACK WATER)

WATER QUALITY REPORT

#02100194

PRODUCED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: PW
Source Type: N/A

Collection Date: 02/03/10 07:30
Received Date: 02/04/10 08:50
Matrix: N/A
Collection Method: Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
pH	6.17 SU	SU	SM4500 H+B	2/5/10 13:10	AML
Total Dissolved Solids	195,130 mg/l	5 mg/l	SM 2540 C	2/5/10 14:49	RCS
Total Suspended Solids	403 mg/L	3 mg/L	SM 2540 D	2/5/10 11:44	RCS
Oil & Grease	0.9 mg/l	5 mg/l	EPA 1664 Rev A	2/5/10 10:20	NJD
COD	6270 mg/L	10 mg/L	HACH 8000	2/11/10 10:11	NJD
Surfactants (MBAS)	0.344 mg/L	0.025 mg/L	SM20-5540 C	2/6/10 2:15	22-293
Heterotrophic Plate Count	21 /ml	1 /ml	SM 9215B	2/4/10 16:55	WEH
Color	150 pccu	5 pccu		2/4/10 13:36	WEH
Temperature (F), Field	40 deg F	deg F	na	2/4/10 9:27	RCS
Total Residual Chlorine	<0.10 mg/L	0.10 mg/L	HACH 8167	2/4/10 9:26	RCS
Acidity	404 mg/L	3 mg/L	SM 2310 B	2/5/10 0:00	AML
Alkalinity	94.0 mg/l	5 mg/l	SM 2320 B	2/5/10 13:11	AML
Hardness, Total	44,431 mg/l	10 mg/l	EPA 200.7	2/5/10 10:15	AML

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: PW
Source Type: N/A

Collection Date: 02/03/10 07:30
Received Date: 02/04/10 08:50
Matrix: N/A
Collection Method: Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
Bicarbonate	94.0 mg/L	5 mg/L	SM4500 CO2 D	2/12/10 11:55	AML
Sulfate	130.0 mg/l	1 mg/l	EPA 300.0	2/5/10 13:39	AML
Chloride	108600 mg/L	1 mg/L	EPA 300.0	2/5/10 13:35	AML
Fluoride	8.5 mg/l	0.20 mg/l	EPA 300.0	2/5/10 13:39	AML
Calcium	15460 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:05	AML
Bromide	1,060 mg/l	0.10 mg/l	EPA 300.1	2/5/10 13:41	AML
Iron	68.0 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:10	AML
Magnesium	1415 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:06	AML
Potassium	465.0 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:14	AML
Sodium	21,200 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:15	AML
Gross Alpha DW	3009 PCi/L	3 PCi/L	EPA 900	2/17/10 17:44	6502103
Gross Beta DW	416 PCi/L	4 PCi/L	EPA 900	2/17/10 17:44	6502103
Radium 226	1448 pCi/L	.6 pCi/L	EPA 903.1	2/25/10 13:14	6502103

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: PW
Source Type: N/A

Collection Date: 02/03/10 07:30
Received Date: 02/04/10 08:50
Matrix: N/A
Collection Method: Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
Radium 228	715 pCi/L	.9 pCi/L	EPA 904.0	2/24/10 13:53	6502103
Aluminum	<2.0 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:07	AML
Antimony	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:02	AML
Arsenic	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:59	AML
Barium	158.0 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:13	AML
Beryllium	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:01	AML
Boron	11.0 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:13	AML
Cadmium	0.012 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:01	AML
Chromium	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:11	AML
Cobalt	0.012 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:58	AML
Lead	<0.4 mg/L	0.02 mg/L	EPA 200.7	2/5/10 10:12	AML
Lithium, Total	152 mg/L	5.0 mg/L	EPA 200.7	2/12/10 9:23	22-293
Manganese	5.2 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:09	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	02/03/10 07:30
Site:	NETL Grant	**Received Date:**	02/04/10 08:50
Monitoring Pt:	PW	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
Mercury, Total	ND	0.020 mg/L	EPA 200.8	2/14/10 15:08	22-293
Molybdenum	0.003 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:59	AML
Nickel	<1.0 mg/l	0.05 mg/l	EPA 200.7	2/5/10 10:11	AML
Selenium	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:59	AML
Silver	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:00	AML
Strontium, Total	2190 mg/L	0.25 mg/L	EPA 200.7	2/12/10 9:23	22-293
Thallium	0.006 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:00	AML
Tin	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:58	AML
Titanium	0.0058 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:58	AML
Vanadium, Total	ND	0.25 mg/L	EPA 200.7	2/12/10 9:23	22-293
Uranium	ND	1.0 mg/L	SW846 6020A	2/18/10 23:53	22-293
Zinc	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:12	AML
Osmotic Pressure	2990 mOs/kg	10 mOs/kg	PA DEP	2/6/10 6:12	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: PW
Source Type: N/A

Collection Date: 02/03/10 07:30
Received Date: 02/04/10 08:50
Matrix: N/A
Collection Method: Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
Phenolics	0.07 mg/L	0.01 mg/L	EPA 420.4	2/17/10 4:39	22-293
BOD	>77.9	2 mg/L	SM5210B	2/4/10 12:37	TO
Thorium 228	31.0 pCi/L	pCi/L	HSL-300M	2/26/10 15:15	6502103
Thorium 230	0.181 pCi/L	pCi/L	HSL-300m	2/26/10 15:15	6502103
Thorium 232	0.058 pCi/L	pCi/L	HSL-300m	2/26/10 15:15	6502103
Specific Conductance	194,800 umhos/cm	2 umhos/cm	EPA 120.1	2/8/10 0:00	TO
Iron, Dissolved	16.0 mg/l	0.02 mg/l	EPA 200.7	2/18/10 16:02	AML
Copper	0.8 mg/l	0.02 mg/l	EPA 200.7	2/5/10 14:09	AML
1,1,2,2-Tetrachloroethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
1,1-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
1,2-Dibromo-3-chloropropane	ND	35.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
1,2-Dibromoethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
2-Butanone	ND	50.0 ug/L	SW846 8260B	2/11/10 19:02	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: PW
Source Type: N/A

Collection Date: 02/03/10 07:30
Received Date: 02/04/10 08:50
Matrix: N/A
Collection Method: Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
2-Hexanone	ND	25.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
4-Methyl-2-Pentanone(MIBK)	ND	25.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Acetone	ND	50.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Bromide	1140 mg/L	600 mg/L	EPA 300	2/10/10 5:03	22-293
Bromochloromethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Bromodichloromethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Bromoform	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Bromomethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Carbon Disulfide	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Chlorodibromomethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Chloroethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Chloroform	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Chloromethane	10.9 ug/L	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: PW
Source Type: N/A

Collection Date: 02/03/10 07:30
Received Date: 02/04/10 08:50
Matrix: N/A
Collection Method: Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
Diesel Range Organics C10-C28	5.9 mg/L	3.1 mg/L	SW846 8015D	2/11/10 23:50	22-293
Ethane	120 ug/L	30.0 ug/L	RSK 175	2/8/10 21:40	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	2/9/10 22:27	22-293
Gasoline Range Organics	6690 ug/L	2500 ug/L	SW846 8015D	2/16/10 22:09	22-293
Methane	52.6 ug/L	10.0 ug/L	RSK 175	2/8/10 21:40	22-293
Silica, Dissolved	52 mg/L	5 mg/L	SM20-4500SiD	2/17/10 0:44	22-293
Silicon, Total	7.0 mg/L	5.0 mg/L	EPA 200.7	2/16/10 13:12	22-293
Total Kjeldahl Nitrogen	17.0 mg/L	1.0 mg/L	SM20-4500-N C	2/16/10 9:00	22-293
cis-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
mp-Xylene	294 ug/L	10.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
o-Xylene	60.1 ug/L	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
trans-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
trans-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: PW
Source Type: N/A

Collection Date: 02/03/10 07:30
Received Date: 02/04/10 08:50
Matrix: N/A
Collection Method: Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	2/6/10 5:48	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/6/10 5:48	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	2/6/10 5:48	22-293
Ethene	ND	30.0 ug/L	RSK 175	2/8/10 21:40	22-293
Formaldehyde	9890 mg/L	100 mg/L	SW846 8015D	2/18/10 12:01	22-293
Methanol	4330 mg/L	100 mg/L	SW846 8015D	2/18/10 20:21	22-293
Benzene	756 ug/L	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Carbon Tetrachloride	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
1,2-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
1,1-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
cis-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Methylene Chloride	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
1,2-Dichloropropane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: PW
Source Type: N/A

Collection Date: 02/03/10 07:30
Received Date: 02/04/10 08:50
Matrix: N/A
Collection Method: Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
Ethylbenzene	27.3 ug/L	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Chlorobenzene	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Styrene	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Tetrachloroethene	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Toluene	948 ug/L	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
1,1,1-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
1,1,2-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Trichloroethene	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Vinyl Chloride	ND	5.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Total Xylenes	354 ug/L	15.0 ug/L	SW846 8260B	2/11/10 19:02	22-293
Nitrate	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/5/10 13:40	AML
Nitrite	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/5/10 13:41	AML
Nitrate / Nitrite	<10.0 mg/l	0.20 mg/l	EPA 300.0	2/5/10 13:41	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: PW
Source Type: N/A

Collection Date: 02/03/10 07:30
Received Date: 02/04/10 08:50
Matrix: N/A
Collection Method: Grab

02100194	Result	Reporting Limit	Method	Analysis Date	Analyst
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/4/10 16:54	WEH
E Coli	NA	+/-	SM 9223B	2/4/10 16:54	WEH

Sample Comments:

BOD: Duplicate analysis recovery was outside established control limits.

Ryan C Shafer, Technical Director

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WATER QUALITY REPORT

#02100193

FRAC WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A

Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
pH	7.53 SU	SU	SM4500 H+B	2/5/10 13:10	AML
Total Dissolved Solids	19,630 mg/l	5 mg/l	SM 2540 C	2/5/10 14:49	RCS
Total Suspended Solids	15 mg/L	3 mg/L	SM 2540 D	2/5/10 11:44	RCS
Oil & Grease	3.2 mg/l	5 mg/l	EPA 1664 Rev A	2/5/10 10:20	NJD
COD	1253 mg/L	10 mg/L	HACH 8000	2/11/10 10:11	NJD
Surfactants (MBAS)	0.328 mg/L	0.025 mg/L	SM20-5540 C	2/6/10 2:15	22-293
Heterotrophic Plate Count	24,600 /ml	1 /ml	SM 9215B	2/4/10 16:55	WEH
Color	100 pccu	5 pccu		2/4/10 13:36	WEH
Temperature (F), Field	71 deg F	deg F	na	2/4/10 9:27	RCS
Osmotic Pressure	533 mOs/kg	10 mOs/kg	PA DEP	2/6/10 6:12	22-293
Acidity	- 136 mg/L	3 mg/L	SM 2310 B	2/5/10 0:00	AML
Hardness, Total	2621 mg/l	10 mg/l	EPA 200.7	2/5/10 10:15	AML
Alkalinity	230.0 mg/l	5 mg/l	SM 2320 B	2/5/10 13:11	AML

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Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A

Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
Bicarbonate	229.0 mg/L	5 mg/L	SM4500 CO2 D	2/12/10 11:55	AML
Sulfate	155.0 mg/l	1 mg/l	EPA 300.0	2/5/10 13:39	AML
Chloride	9,500 mg/L	1 mg/L	EPA 300.0	2/5/10 13:35	AML
Fluoride	27.0 mg/l	0.20 mg/l	EPA 300.0	2/5/10 13:39	AML
Calcium	915.0 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:05	AML
Bromide	141.0 mg/l	0.10 mg/l	EPA 300.1	2/5/10 13:41	AML
Iron, Dissolved	4.2 mg/l	0.02 mg/l	EPA 200.7	2/18/10 16:00	AML
Iron	5.6 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:10	AML
Magnesium	81.6 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:06	AML
Potassium	55.3 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:14	AML
Sodium	5250 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:15	AML
Silicon, Total	6.7 mg/L	1.3 mg/L	EPA 200.7	2/16/10 13:08	22-293
Gross Alpha DW	27.0 PCi/L	3 PCi/L	EPA 900	2/17/10 17:44	6502103

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A

Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
Gross Beta DW	36.0 PCi/L	4 PCi/L	EPA 900	2/17/10 17:44	6502103
Radium 226	46.0 pCi/L	.6 pCi/L	EPA 903.1	2/25/10 13:14	6502103
Radium 228	17.0 pCi/L	.9 pCi/L	EPA 904.0	2/24/10 13:53	6502103
Aluminum	<2.0 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:07	AML
Arsenic	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:59	AML
Barium	17.1 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:13	AML
Cadmium	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:01	AML
Chromium	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:11	AML
Cobalt	0.031 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:58	AML
Beryllium	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:01	AML
Boron	4.4 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:13	AML
Antimony	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:02	AML
Lead	<0.4 mg/L	0.02 mg/L	EPA 200.7	2/5/10 10:12	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A

Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
Lithium, Total	10.7 mg/L	1.3 mg/L	EPA 200.7	2/12/10 9:07	22-293
Manganese	0.8 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:09	AML
Mercury, Total	ND	0.0020 mg/L	EPA 200.8	2/14/10 15:45	22-293
Molybdenum	0.018 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:59	AML
Nickel	<1.0 mg/l	0.05 mg/l	EPA 200.7	2/5/10 10:11	AML
Selenium	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:59	AML
Silver	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:00	AML
Strontium, Total	97.5 mg/L	0.063 mg/L	EPA 200.7	2/12/10 9:07	22-293
Thallium	0.015 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:00	AML
Tin	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:58	AML
Titanium	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:58	AML
Zinc	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:12	AML
Uranium	ND	0.10 mg/L	SW846 6020A	2/18/10 23:49	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A

Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
Vanadium, Total	ND	0.063 mg/L	EPA 200.7	2/12/10 9:07	22-293
Total Residual Chlorine	<0.10 mg/L	0.10 mg/L	HACH 8167	2/4/10 9:26	RCS
Phenolics	0.05 mg/L	0.01 mg/L	EPA 420.4	2/17/10 4:38	22-293
BOD	>76.0	2 mg/L	SM5210B	2/4/10 12:37	TO
Thorium 228	1.10 pCi/L	pCi/L	HSL-300M	2/26/10 15:15	6502103
Thorium 230	0.773 pCi/L	pCi/L	HSL-300m	2/26/10 15:15	6502103
Thorium 232	-0.031 pCi/L	pCi/L	HSL-300m	2/26/10 15:15	6502103
Specific Conductance	29,400 umhos/cm	2 umhos/cm	EPA 120.1	2/8/10 0:00	TO
Copper	0.46 mg/l	0.02 mg/l	EPA 200.7	2/5/10 14:09	AML
Silica, Dissolved	54 mg/L	5 mg/L	SM20-4500SiD	2/17/10 0:44	22-293
1,1,2,2-Tetrachloro ethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
1,1-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
1,2-Dibromo-3-chl oropropane	ND	35.0 ug/L	SW846 8260B	2/9/10 23:26	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A
Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
1,2-Dibromoethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
2-Butanone	ND	50.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
2-Hexanone	ND	25.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
4-Methyl-2-Pentanone(MIBK)	ND	25.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Acetone	304 ug/L	50.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Bromide	150 mg/L	30.0 mg/L	EPA 300	2/10/10 4:48	22-293
Bromochloromethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Bromodichloromethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Bromomethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Bromoform	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Carbon Disulfide	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Chlorodibromomethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Chloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A
Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
Chloroform	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Chloromethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Diesel Range Organics C10-C28	28.4 mg/L	3.7 mg/L	SW846 8015D	2/11/10 23:20	22-293
Ethane	140 ug/L	30.0 ug/L	RSK 175	2/8/10 21:24	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	2/9/10 22:06	22-293
Gasoline Range Organics	2100 ug/L	100 ug/L	SW846 8015D	2/13/10 1:36	22-293
Methane	848 ug/L	10.0 ug/L	RSK 175	2/8/10 21:24	22-293
Total Kjeldahl Nitrogen	29.6 mg/L	1.0 mg/L	SM20-4500-N C	2/16/10 9:00	22-293
cis-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
mp-Xylene	47.5 ug/L	10.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
o-Xylene	18.8 ug/L	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
trans-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
trans-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A

Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	2/6/10 5:41	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/6/10 5:41	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	2/6/10 5:41	22-293
Ethene	ND	30.0 ug/L	RSK 175	2/8/10 21:24	22-293
Formaldehyde	110 mg/L	5.0 mg/L	SW846 8015D	2/18/10 12:31	22-293
Methanol	50.1 mg/L	1.0 mg/L	SW846 8015D	2/18/10 20:05	22-293
Benzene	218 ug/L	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Carbon Tetrachloride	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
1,2-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
1,1-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
cis-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Methylene Chloride	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
1,2-Dichloropropane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A

Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
Ethylbenzene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Chlorobenzene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Styrene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Tetrachloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Toluene	228 ug/L	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
1,1,1-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
1,1,2-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Trichloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Vinyl Chloride	ND	5.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Total Xylenes	66.2 ug/L	15.0 ug/L	SW846 8260B	2/9/10 23:26	22-293
Nitrate	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/5/10 13:40	AML
Nitrite	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/5/10 13:41	AML
Nitrate / Nitrite	<10.0 mg/l	0.20 mg/l	EPA 300.0	2/5/10 13:41	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Frac Water
Source Type: N/A

Collection Date: 02/03/10 07:00
Received Date: 02/04/10 08:37
Matrix: N/A
Collection Method: Grab

02100193	Result	Reporting Limit	Method	Analysis Date	Analyst
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/4/10 16:54	WEH
E Coli	NA	+/-	SM 9223B	2/4/10 16:54	WEH

Sample Comments:

BOD: Duplicate analysis recovery was outside established control limits.

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

WATER QUALITY REPORT

#02100197

FRAC FLOW-BACK WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Flow Back Water
Source Type: N/A

Collection Date: 02/04/10 10:14
Received Date: 02/04/10 11:30
Matrix: N/A
Collection Method: Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
pH	7.39 SU	SU	SM4500 H+B	2/5/10 13:10	AML
Total Dissolved Solids	40,530 mg/l	5 mg/l	SM 2540 C	2/5/10 14:49	RCS
Total Suspended Solids	22 mg/L	3 mg/L	SM 2540 D	2/5/10 11:44	RCS
Oil & Grease	1.1 mg/l	5 mg/l	EPA 1664 Rev A	2/5/10 10:20	NJD
BOD	>74.2	2 mg/L	SM5210B	2/5/10 9:31	TO
COD	1042 mg/L	10 mg/L	HACH 8000	2/11/10 10:11	NJD
Surfactants (MBAS)	0.239 mg/L	0.025 mg/L	SM20-5540 C	2/6/10 2:15	22-293
Heterotrophic Plate Count	4,810,000 /ml	1 /ml	SM 9215B	2/4/10 16:55	WEH
Color	125 pccu	5 pccu		2/4/10 13:36	WEH
Temperature (F), Field	74 deg F	deg F	na	2/4/10 13:35	RCS
Osmotic Pressure	1110 mOs/kg	10 mOs/kg	PA DEP	2/6/10 6:12	22-293
Total Residual Chlorine	<0.10 mg/L	0.10 mg/L	HACH 8167	2/4/10 13:36	RCS
Acidity	- 114 mg/L	3 mg/L	SM 2310 B	2/5/10 0:00	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Flow Back Water
Source Type: N/A
Collection Date: 02/04/10 10:14
Received Date: 02/04/10 11:30
Matrix: N/A
Collection Method: Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
Alkalinity	196.0 mg/l	5 mg/l	SM 2320 B	2/5/10 13:11	AML
Hardness, Total	7040 mg/l	10 mg/l	EPA 200.7	2/5/10 10:15	AML
Bicarbonate	196.0 mg/L	5 mg/L	SM4500 CO2 D	2/12/10 11:55	AML
Sulfate	155.0 mg/l	1 mg/l	EPA 300.0	2/5/10 13:39	AML
Chloride	20100 mg/L	1 mg/L	EPA 300.0	2/5/10 13:35	AML
Fluoride	9.5 mg/l	0.20 mg/l	EPA 300.0	2/5/10 13:39	AML
Calcium	2465 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:05	AML
Bromide	291.0 mg/l	0.10 mg/l	EPA 300.1	2/5/10 13:41	AML
Iron	8.4 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:10	AML
Magnesium	215 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:06	AML
Potassium	94.8 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:14	AML
Sodium	10,380 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:15	AML
Gross Alpha DW	76.4 PCi/L	3 PCi/L	EPA 900	2/19/10 17:41	6502103

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Flow Back Water
Source Type: N/A
Collection Date: 02/04/10 10:14
Received Date: 02/04/10 11:30
Matrix: N/A
Collection Method: Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
Gross Beta DW	240 PCi/L	4 PCi/L	EPA 900	2/13/10 16:14	6502103
Radium 226	33.1 pCi/L	.6 pCi/L	EPA 903.1	2/25/10 13:24	6502103
Radium 228	27.3 pCi/L	.9 pCi/L	EPA 904.0	2/24/10 13:53	6502103
Aluminum	<2.0 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:07	AML
Antimony	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:02	AML
Arsenic	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:59	AML
Barium	52.9 mg/l	0.10 mg/l	EPA 200.7	2/5/10 10:13	AML
Beryllium	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:01	AML
Boron	6.4 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:13	AML
Cadmium	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:01	AML
Chromium	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:11	AML
Cobalt	0.033 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:58	AML
Lead	<0.4 mg/L	0.02 mg/L	EPA 200.7	2/5/10 10:12	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	02/04/10 10:14
Site:	NETL Grant	**Received Date:**	02/04/10 11:30
Monitoring Pt:	Flow Back Water	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
Lithium, Total	21.5 mg/L	1.3 mg/L	EPA 200.7	2/12/10 9:02	22-293
Manganese	2.0 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:09	AML
Mercury, Total	ND	0.0050 mg/L	EPA 200.8	2/14/10 15:37	22-293
Molybdenum	0.016 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:59	AML
Nickel	<1.0 mg/l	0.05 mg/l	EPA 200.7	2/5/10 10:11	AML
Selenium	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:59	AML
Silver	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:00	AML
Strontium, Total	265 mg/L	0.063 mg/L	EPA 200.7	2/12/10 9:02	22-293
Thallium	0.009 mg/L	0.001 mg/L	EPA 200.7	2/19/10 14:00	AML
Tin	<0.5 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:58	AML
Titanium	0.0094 mg/L	0.001 mg/L	EPA 200.7	2/19/10 13:58	AML
Uranium	ND	0.25 mg/L	SW846 6020A	2/18/10 23:45	22-293
Zinc	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/5/10 10:12	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Flow Back Water
Source Type: N/A
Collection Date: 02/04/10 10:14
Received Date: 02/04/10 11:30
Matrix: N/A
Collection Method: Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
Vanadium, Total	ND	0.063 mg/L	EPA 200.7	2/12/10 9:02	22-293
Thorium 228	1.21 pCi/L	pCi/L	HSL-300M	2/26/10 11:07	6502103
Thorium 230	0.567 pCi/L	pCi/L	HSL-300m	2/26/10 11:07	6502103
Thorium 232	0.096 pCi/L	pCi/L	HSL-300m	2/26/10 11:07	6502103
Specific Conductance	56,700 umhos/cm	2 umhos/cm	EPA 120.1	2/8/10 0:00	TO
Iron, Dissolved	8.3 mg/l	0.02 mg/l	EPA 200.7	2/18/10 16:02	AML
Copper	0.52 mg/l	0.02 mg/l	EPA 200.7	2/5/10 14:09	AML
1,1,2,2-Tetrachloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
1,1-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
1,2-Dibromo-3-chloropropane	ND	35.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
1,2-Dibromoethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
2-Butanone	ND	50.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
2-Hexanone	ND	25.0 ug/L	SW846 8260B	2/9/10 22:55	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Flow Back Water
Source Type: N/A
Collection Date: 02/04/10 10:14
Received Date: 02/04/10 11:30
Matrix: N/A
Collection Method: Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
4-Methyl-2-Pentanone(MIBK)	ND	25.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Acetone	2090 ug/L	50.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Bromide	270 mg/L	150 mg/L	EPA 300	2/10/10 5:18	22-293
Bromochloromethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Bromodichloromethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Bromomethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Bromoform	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Carbon Disulfide	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Chlorodibromomethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Chloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Chloroform	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Chloromethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Diesel Range Organics C10-C28	17.4 mg/L	3.2 mg/L	SW846 8015D	2/11/10 22:49	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Flow Back Water
Source Type: N/A
Collection Date: 02/04/10 10:14
Received Date: 02/04/10 11:30
Matrix: N/A
Collection Method: Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
Ethane	133 ug/L	6.0 ug/L	RSK 175	2/8/10 20:35	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	2/9/10 21:46	22-293
Gasoline Range Organics	928 ug/L	100 ug/L	SW846 8015D	2/13/10 1:01	22-293
Methane	390 ug/L	2.0 ug/L	RSK 175	2/8/10 20:35	22-293
Silica, Dissolved	49 mg/L	5 mg/L	SM20-4500SiD	2/17/10 0:44	22-293
Silicon, Total	9.2 mg/L	1.3 mg/L	EPA 200.7	2/16/10 13:03	22-293
Phenolics	0.04 mg/L	0.01 mg/L	EPA 420.4	2/17/10 4:37	22-293
Total Kjeldahl Nitrogen	9.2 mg/L	1.0 mg/L	SM20-4500-N C	2/16/10 9:00	22-293
cis-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
mp-Xylene	27.2 ug/L	10.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
o-Xylene	8.9 ug/L	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
trans-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
trans-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Flow Back Water
Source Type: N/A
Collection Date: 02/04/10 10:14
Received Date: 02/04/10 11:30
Matrix: N/A
Collection Method: Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	2/6/10 5:35	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/6/10 5:35	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	2/6/10 5:35	22-293
Ethene	ND	6.0 ug/L	RSK 175	2/8/10 20:35	22-293
Formaldehyde	75.4 mg/L	1.0 mg/L	SW846 8015D	2/18/10 1:26	22-293
Methanol	35.2 mg/L	1.0 mg/L	SW846 8015D	2/13/10 1:21	22-293
Benzene	55.3 ug/L	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Carbon Tetrachloride	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
1,2-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
1,1-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
cis-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Methylene Chloride	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
1,2-Dichloropropane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Flow Back Water
Source Type: N/A
Collection Date: 02/04/10 10:14
Received Date: 02/04/10 11:30
Matrix: N/A
Collection Method: Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
Ethylbenzene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Chlorobenzene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Styrene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Tetrachloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Toluene	85.3 ug/L	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
1,1,1-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
1,1,2-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Trichloroethene	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Vinyl Chloride	ND	5.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Total Xylenes	36.2 ug/L	15.0 ug/L	SW846 8260B	2/9/10 22:55	22-293
Nitrate	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/5/10 13:40	AML
Nitrite	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/5/10 13:41	AML
Nitrate / Nitrite	<10.0 mg/l	0.20 mg/l	EPA 300.0	2/5/10 13:41	AML

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Grant
Monitoring Pt: Flow Back Water
Source Type: N/A

Collection Date: 02/04/10 10:14
Received Date: 02/04/10 11:30
Matrix: N/A
Collection Method: Grab

02100197	Result	Reporting Limit	Method	Analysis Date	Analyst
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/4/10 16:54	WEH
E Coli	NA	+/-	SM 9223B	2/4/10 16:54	WEH

Sample Comments:

None

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

WATER QUALITY REPORT

#09100467

PRODUCED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Entry Point
Source Type: N/A
Collection Date: 09/13/10 10:45
Received Date: 09/13/10 14:35
Matrix: N/A
Collection Method: Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
pH	7.00 SU	SU	SM4500 H+B	9/14/10 13:17	AML
Total Dissolved Solids	37,600 mg/l	5 mg/l	SM 2540 C	9/17/10 11:46	TSA
Total Suspended Solids	114 mg/L	3 mg/L	SM 2540 D	9/14/10 14:25	TSA
Oil & Grease	1.6 mg/l	5 mg/l	EPA 1664 Rev A	9/17/10 0:00	NJD
BOD	76.8 mg/L	2 mg/L	SM5210B	9/15/10 9:16	TSA
COD	289 mg/L	10 mg/L	HACH 8000	9/24/10 13:50	NJD
Surfactants (MBAS)	0.180 mg/L	0.025 mg/L	SM20-5540 C	9/15/10 21:00	22-293
Color	200 pccu	5 pccu		9/13/10 14:54	WEH
Temperature (F), Field	62.3 deg F	deg F	na	9/13/10 17:13	RCJ
Osmotic Pressure	808 mOs/kg	10 mOs/kg	PA DEP	9/16/10 6:05	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	9/14/10 8:52	WEH
Ammonia Nitrogen	17.8 mg/L	.10 mg/L	SM 4500 NH3 D	9/14/10 13:27	WEH
Nitrate	<1.0 mg/l	0.10 mg/l	EPA 300.0	9/14/10 13:38	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Entry Point
Source Type: N/A
Collection Date: 09/13/10 10:45
Received Date: 09/13/10 14:35
Matrix: N/A
Collection Method: Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
Nitrite	<1.0 mg/l	0.10 mg/l	EPA 300.0	9/14/10 13:37	AML
Nitrate / Nitrite	<2.0 mg/l	0.20 mg/l	EPA 300.0	9/14/10 13:37	AML
Acidity	-30.0 mg/L	3 mg/L	SM 2310 B	9/14/10 13:16	AML
Alkalinity	102.0 mg/l	5 mg/l	SM 2320 B	9/14/10 13:17	AML
Bicarbonate	102.0 mg/L	5 mg/L	SM4500 CO2 D	9/14/10 13:25	AML
Sulfate	34.0 mg/l	1 mg/l	EPA 300.0	9/14/10 13:38	AML
Chloride	16,240 mg/L	1 mg/L	EPA 300.0	9/14/10 13:38	AML
Fluoride	4.8 mg/l	0.20 mg/l	EPA 300.0	9/14/10 13:39	AML
Calcium	1,933 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:18	AML
Iron	23.1 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:21	AML
Iron, Dissolved	22.9 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:24	AML
Magnesium	176.8 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:19	AML
Potassium	95.5 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:19	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	09/13/10 10:45
Site:	4011	**Received Date:**	09/13/10 14:35
Monitoring Pt:	PW Entry Point	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
Sodium	7,781 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:19	AML
Aluminum	<1.0 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:23	AML
Arsenic	0.028 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:54	AML
Barium	405.5 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:17	AML
Beryllium	<0.05 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:56	AML
Cadmium	<0.05 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:53	AML
Chromium	<0.2 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:22	AML
Cobalt	<0.05 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:57	AML
Manganese	2.9 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:20	AML
Molybdenum	<0.05 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:53	AML
Nickel	<0.5 mg/l	0.05 mg/l	EPA 200.7	9/17/10 16:22	AML
Selenium	<0.05 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:52	AML
Silver	<0.05 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:55	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Entry Point
Source Type: N/A
Collection Date: 09/13/10 10:45
Received Date: 09/13/10 14:35
Matrix: N/A
Collection Method: Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
Strontium, Total	379 mg/L	0.13 mg/L	EPA 200.7	9/21/10 11:27	22-293
Thallium	<0.05 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:55	AML
Tin	<0.05 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:52	AML
Titanium	0.037 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:52	AML
Zinc	<0.2 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:24	AML
Gross Alpha DW	352 PCi/L	3 PCi/L	EPA 900	9/26/10 10:56	6502103
Gross Beta DW	189 PCi/L	4 PCi/L	EPA 900	9/25/10 10:57	6502103
Radium 226	162 pCi/L	.6 pCi/L	EPA 903.1	9/27/10 11:02	6502103
Radium 228	85.5 pCi/L	.9 pCi/L	EPA 904.0	10/11/10 11:02	6502103
Total Residual Chlorine	<0.10 mg/L	0.10 mg/L	HACH 8167	9/13/10 15:54	RCJ
Phenolics	0.01 mg/L	0.01 mg/L	EPA 420.4	9/21/10 11:38	22-293
Uranium, Total	ND	0.11 mg/L	SW846 6020A	9/27/10 17:40	22-293
Lead	<0.2 mg/L	0.02 mg/L	EPA 200.7	9/17/10 16:23	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Entry Point
Source Type: N/A
Collection Date: 09/13/10 10:45
Received Date: 09/13/10 14:35
Matrix: N/A
Collection Method: Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
Lithium, Total	14.3 mg/L	2.5 mg/L	EPA 200.7	9/21/10 11:27	22-293
Boron	3.12 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:24	AML
Antimony	<0.05 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:56	AML
Silicon, Total	7.0 mg/L	0.50 mg/L	EPA 200.7	9/20/10 14:40	22-293
Hardness, Total	5,555 mg/l	10 mg/l	EPA 200.7	9/17/10 16:17	AML
Heterotrophic Plate Count	5,900 /ml	1 /ml	SM 9215B	9/13/10 15:37	TSA
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	9/13/10 15:33	TSA
E Coli	NA	+/-	SM 9223B	9/13/10 15:33	TSA
Specific Conductance	42,400 umhos/cm	2 umhos/cm	EPA 120.1	9/14/10 11:36	AML
Gasoline Range Organics	ND	500 ug/L	SW846 8015D	9/23/10 8:14	22-293
Diesel Range Organics C10-C28	5.4 mg/L	1.6 mg/L	SW846 8015D	9/23/10 8:53	22-293
Methane	748 ug/L	1.0 ug/L	RSK 175	9/17/10 20:09	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	9/18/10 0:54	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Entry Point
Source Type: N/A
Collection Date: 09/13/10 10:45
Received Date: 09/13/10 14:35
Matrix: N/A
Collection Method: Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	9/16/10 9:57	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	9/16/10 9:57	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	9/16/10 9:57	22-293
Total Kjeldahl Nitrogen	1.4 mg/L	1.0 mg/L	SM20-4500-N C	9/28/10 9:30	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	9/23/10 19:33	22-293
Acetone	9520 ug/L	500 ug/L	SW846 8260B	9/22/10 9:25	22-293
Silica, Dissolved	30 mg/L	5 mg/L	SM20-4500SiO2C	9/22/10 23:35	22-293
2-Hexanone	ND	25.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
4-Methyl-2-Pentanone(MIBK)	ND	25.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
2-Butanone	ND	50.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Ethene	ND	3.0 ug/L	RSK 175	9/17/10 20:09	22-293
Methanol	ND	1.0 mg/L	SW846 8015D	9/21/10 20:55	22-293
o-Xylene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Entry Point
Source Type: N/A
Collection Date: 09/13/10 10:45
Received Date: 09/13/10 14:35
Matrix: N/A
Collection Method: Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
mp-Xylene	ND	10.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Chloromethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Ethane	3.8 ug/L	3.0 ug/L	RSK 175	9/17/10 20:09	22-293
Chlorodibromomethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Chloroethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Chloroform	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Bromomethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Carbon Disulfide	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Bromide	162.5 mg/L	0.3 mg/L	EPA 300	9/14/10 13:36	AML
Bromochloromethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Bromodichloromethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
1,2-Dibromo-3-chloropropane	ND	35.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
1,2-Dibromoethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Entry Point
Source Type: N/A
Collection Date: 09/13/10 10:45
Received Date: 09/13/10 14:35
Matrix: N/A
Collection Method: Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
1,1,2,2-Tetrachloroethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
1,1-Dichloroethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
1,1-Dichloroethene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
cis-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Methylene Chloride	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
1,2-Dichloropropane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Chlorobenzene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Tetrachloroethene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Trichloroethene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
trans-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
trans-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
cis-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Benzene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Entry Point
Source Type: N/A

Collection Date: 09/13/10 10:45
Received Date: 09/13/10 14:35
Matrix: N/A
Collection Method: Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
Carbon Tetrachloride	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
1,2-Dichloroethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Ethylbenzene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Styrene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Toluene	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
1,1,1-Trichloroethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
1,1,2-Trichloroethane	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Vinyl Chloride	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Total Xylenes	ND	15.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Vanadium, Total	ND	0.13 mg/L	EPA 200.7	9/21/10 11:27	22-293
Copper	0.33 mg/l	0.02 mg/l	EPA 200.7	9/22/10 13:22	AML
Bromoform	ND	5.0 ug/L	SW846 8260B	9/21/10 13:52	22-293
Thorium 228	5.273 pCi/L	pCi/L	HSL-300M	9/28/10 11:03	6502103

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Entry Point
Source Type: N/A

Collection Date: 09/13/10 10:45
Received Date: 09/13/10 14:35
Matrix: N/A
Collection Method: Grab

09100467	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 230	0.048 pCi/L	pCi/L	HSL-300m	9/28/10 11:04	6502103
Thorium 232	-0.005 pCi/L	pCi/L	HSL-300m	9/28/10 11:04	6502103

Sample Comments:

Cadmium: Matrix Spike recovery was outside established control limits. Silver: Matrix Spike recovery was outside established control limits.

Ryan C Shafer, Technical Director

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WATER QUALITY REPORT

#09100468

DISTILLED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Basin
Source Type: N/A

Collection Date: 09/13/10 11:30
Received Date: 09/13/10 14:39
Matrix: N/A
Collection Method: Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
pH	7.87 SU	SU	SM4500 H+B	9/14/10 13:17	AML
Total Dissolved Solids	9 mg/l	5 mg/l	SM 2540 C	9/17/10 11:46	TSA
Total Suspended Solids	3 mg/L	3 mg/L	SM 2540 D	9/14/10 14:25	TSA
Oil & Grease	2.1 mg/l	5 mg/l	EPA 1664 Rev A	9/17/10 0:00	NJD
BOD	< 2.0 mg/L	2 mg/L	SM5210B	9/15/10 9:16	TSA
COD	<10 mg/L	10 mg/L	HACH 8000	9/24/10 13:50	NJD
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	9/15/10 21:00	22-293
Color	< 5 pccu	5 pccu		9/13/10 14:54	WEH
Temperature (F), Field	136.1 deg F	deg F	na	9/13/10 17:13	RCJ
Osmotic Pressure	ND	10 mOs/kg	PA DEP	9/16/10 6:05	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	9/15/10 9:15	WEH
Ammonia Nitrogen	3.88 mg/L	.10 mg/L	SM 4500 NH3 D	9/16/10 11:04	WEH
Nitrate	<0.10 mg/l	0.10 mg/l	EPA 300.0	9/14/10 13:38	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	09/13/10 11:30
Site:	4011	**Received Date:**	09/13/10 14:39
Monitoring Pt:	DW Basin	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
Nitrite	<0.10 mg/l	0.10 mg/l	EPA 300.0	9/14/10 13:37	AML
Nitrate / Nitrite	<0.20 mg/l	0.20 mg/l	EPA 300.0	9/14/10 13:37	AML
Acidity	6.0 mg/L	3 mg/L	SM 2310 B	9/14/10 13:16	AML
Alkalinity	14.0 mg/l	5 mg/l	SM 2320 B	9/14/10 13:17	AML
Bicarbonate	14.0 mg/L	5 mg/L	SM4500 CO2 D	9/14/10 13:25	AML
Sulfate	<1.0 mg/l	1 mg/l	EPA 300.0	9/14/10 13:38	AML
Chloride	2.9 mg/L	1 mg/L	EPA 300.0	9/14/10 13:38	AML
Fluoride	<0.20 mg/l	0.20 mg/l	EPA 300.0	9/14/10 13:39	AML
Calcium	0.36 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:18	AML
Iron	<0.02 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:21	AML
Iron, Dissolved	<0.02 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:24	AML
Magnesium	<0.10 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:19	AML
Potassium	<0.10 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:19	AML

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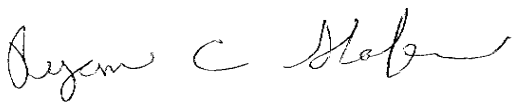
CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	09/13/10 11:30
Site:	4011	**Received Date:**	09/13/10 14:39
Monitoring Pt:	DW Basin	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
Sodium	0.37 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:19	AML
Aluminum	<0.10 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:23	AML
Arsenic	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:54	AML
Barium	<0.10 mg/l	0.10 mg/l	EPA 200.7	9/17/10 16:17	AML
Beryllium	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:56	AML
Cadmium	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:53	AML
Chromium	<0.02 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:22	AML
Cobalt	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:57	AML
Manganese	<0.02 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:20	AML
Molybdenum	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:53	AML
Nickel	<0.05 mg/l	0.05 mg/l	EPA 200.7	9/17/10 16:22	AML
Selenium	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:52	AML
Silver	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:55	AML



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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Basin
Source Type: N/A
Collection Date: 09/13/10 11:30
Received Date: 09/13/10 14:39
Matrix: N/A
Collection Method: Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
Strontium, Total	0.026 mg/L	0.0025 mg/L	EPA 200.7	9/21/10 11:37	22-293
Thallium	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:55	AML
Tin	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:52	AML
Titanium	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:52	AML
Zinc	<0.02 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:24	AML
Gross Alpha DW	-0.409 PCi/L	3 PCi/L	EPA 900	9/25/10 10:57	6502103
Gross Beta DW	-0.141 PCi/L	4 PCi/L	EPA 900	9/25/10 10:57	6502103
Radium 226	0.278 pCi/L	.6 pCi/L	EPA 903.1	9/27/10 11:02	6502103
Radium 228	0.259 pCi/L	.9 pCi/L	EPA 904.0	10/11/10 11:02	6502103
Total Residual Chlorine	<0.10 mg/L	0.10 mg/L	HACH 8167	9/13/10 15:54	RCJ
Phenolics	0.03 mg/L	0.01 mg/L	EPA 420.4	9/21/10 11:39	22-293
Uranium, Total	ND	0.11 mg/L	SW846 6020A	9/27/10 17:46	22-293
Lead	<0.02 mg/L	0.02 mg/L	EPA 200.7	9/17/10 16:23	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Basin
Source Type: N/A

Collection Date: 09/13/10 11:30
Received Date: 09/13/10 14:39
Matrix: N/A
Collection Method: Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
Lithium, Total	ND	0.050 mg/L	EPA 200.7	9/21/10 11:37	22-293
Boron	0.02 mg/l	0.02 mg/l	EPA 200.7	9/17/10 16:24	AML
Antimony	<0.005 mg/L	0.005 mg/L	EPA 200.7	10/1/10 13:56	AML
Silicon, Total	0.19 mg/L	0.050 mg/L	EPA 200.7	9/20/10 15:03	22-293
Hardness, Total	<10.0 mg/l	10 mg/l	EPA 200.7	9/17/10 16:17	AML
Heterotrophic Plate Count	< 100 /ml	1 /ml	SM 9215B	9/13/10 15:37	TSA
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	9/13/10 15:33	TSA
E Coli	NA	+/-	SM 9223B	9/13/10 15:33	TSA
Specific Conductance	30.0 umhos/cm	2 umhos/cm	EPA 120.1	9/14/10 11:36	AML
Gasoline Range Organics	ND	100 ug/L	SW846 8015D	9/23/10 0:17	22-293
Diesel Range Organics C10-C28	0.99 mg/L	0.16 mg/L	SW846 8015D	9/21/10 21:21	22-293
Methane	1.3 ug/L	1.0 ug/L	RSK 175	9/17/10 20:24	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	9/18/10 1:15	22-293

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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Basin
Source Type: N/A
Collection Date: 09/13/10 11:30
Received Date: 09/13/10 14:39
Matrix: N/A
Collection Method: Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	9/16/10 10:05	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	9/16/10 10:05	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	9/16/10 10:05	22-293
Total Kjeldahl Nitrogen	3.3 mg/L	1.0 mg/L	SM20-4500-N C	9/28/10 9:30	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	9/23/10 19:15	22-293
Acetone	174 ug/L	10.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Silica, Dissolved	ND	1 mg/L	SM20-4500SiO2C	9/22/10 23:35	22-293
2-Hexanone	ND	5.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
2-Butanone	ND	10.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Ethene	ND	3.0 ug/L	RSK 175	9/17/10 20:24	22-293
Methanol	ND	1.0 mg/L	SW846 8015D	9/21/10 21:10	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Basin
Source Type: N/A
Collection Date: 09/13/10 11:30
Received Date: 09/13/10 14:39
Matrix: N/A
Collection Method: Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
mp-Xylene	ND	2.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Ethane	ND	3.0 ug/L	RSK 175	9/17/10 20:24	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Bromomethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Carbon Disulfide	2.8 ug/L	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Bromide	<0.30 mg/L	0.3 mg/L	EPA 300	9/14/10 13:36	AML
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293

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11931 State Route 85
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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Basin
Source Type: N/A
Collection Date: 09/13/10 11:30
Received Date: 09/13/10 14:39
Matrix: N/A
Collection Method: Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Benzene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293

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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Basin
Source Type: N/A
Collection Date: 09/13/10 11:30
Received Date: 09/13/10 14:39
Matrix: N/A
Collection Method: Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Toluene	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Vinyl Chloride	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Total Xylenes	ND	3.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Vanadium, Total	ND	0.0025 mg/L	EPA 200.7	9/21/10 11:37	22-293
Copper	<0.02 mg/l	0.02 mg/l	EPA 200.7	9/22/10 13:22	AML
Bromoform	ND	1.0 ug/L	SW846 8260B	9/23/10 2:08	22-293
Thorium 228	0.096 pCi/L	pCi/L	HSL-300M	9/28/10 11:03	6502103

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CWM Environmental
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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	09/13/10 11:30
Site:	4011	**Received Date:**	09/13/10 14:39
Monitoring Pt:	DW Basin	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

09100468	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 230	0.087 pCi/L	pCi/L	HSL-300m	9/28/10 11:04	6502103
Thorium 232	0.025 pCi/L	pCi/L	HSL-300m	9/28/10 11:04	6502103

Sample Comments:

Cadmium: Matrix Spike recovery was outside established control limits. Silver: Matrix Spike recovery was outside established control limits.

Ryan C Shafer, Technical Director

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WATER QUALITY REPORT

#02110642

PRODUCED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Water
Source Type: N/A

Collection Date: 02/15/11 12:30
Received Date: 02/15/11 14:38
Matrix: N/A
Collection Method: Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
pH	6.50 SU	SU	SM4500 H+B	2/15/11 16:38	AML
Total Dissolved Solids	26,055 mg/l	5 mg/l	SM 2540 C	2/18/11 15:33	WEH
Total Suspended Solids	35 mg/L	3 mg/L	SM 2540 D	2/15/11 15:32	WEH
Oil & Grease	0.1 mg/l	5 mg/l	EPA 1664 Rev A	2/21/11 0:00	TO
BOD	107 mg/L	2 mg/L	SM5210B	2/16/11 11:30	TSA
COD	344 mg/L	10 mg/L	HACH 8000	2/23/11 9:53	WEH
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	2/16/11 21:45	22-293
Color	130 pccu	5 pccu		2/15/11 15:19	WEH
Temperature (F), Field	63 deg F	deg F	na	2/15/11 0:00	ZW
Osmotic Pressure	637 mOs/kg	10 mOs/kg	PA DEP	2/17/11 5:15	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	2/16/11 14:09	WEH
Ammonia Nitrogen	28.1 mg/L	.10 mg/L	SM 4500 NH3 D	2/17/11 9:03	WEH
Nitrate	<1.0 mg/l	0.10 mg/l	EPA 300.0	2/16/11 13:03	AML

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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	02/15/11 12:30
Site:	4011	**Received Date:**	02/15/11 14:38
Monitoring Pt:	PW Water	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
Nitrite	<1.0 mg/l	0.10 mg/l	EPA 300.0	2/16/11 13:02	AML
Nitrate / Nitrite	<2.0 mg/l	0.20 mg/l	EPA 300.0	2/16/11 13:03	AML
Acidity	< 5 mg/L	3 mg/L	SM 2310 B	2/15/11 16:38	AML
Alkalinity	110 mg/l	5 mg/l	SM 2320 B	2/15/11 16:38	AML
Bicarbonate	110 mg/L	5 mg/L	SM4500 CO2 D	2/15/11 16:38	AML
Sulfate	20.4 mg/l	1 mg/l	EPA 300.0	2/16/11 13:04	AML
Chloride	11,670 mg/L	1 mg/L	EPA 300.0	2/16/11 13:04	AML
Fluoride	<2.0 mg/l	0.20 mg/l	EPA 300.0	2/16/11 13:01	AML
Calcium	1,634 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:09	AML
Iron	17.4 mg/l	0.02 mg/l	EPA 200.7	2/18/11 12:11	AML
Iron, Dissolved	21.1 mg/l	0.02 mg/l	EPA 200.7	2/18/11 12:23	AML
Magnesium	139.5 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:10	AML
Potassium	66.2 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:12	AML

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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	02/15/11 12:30
Site:	4011	**Received Date:**	02/15/11 14:38
Monitoring Pt:	PW Water	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
Sodium	5,868 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:09	AML
Aluminum	<1.0 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:11	AML
Arsenic	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:11	AML
Barium	332.2 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:10	AML
Beryllium	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:10	AML
Cadmium	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:10	AML
Chromium	<0.2 mg/l	0.02 mg/l	EPA 200.7	2/18/11 13:37	AML
Cobalt	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:09	AML
Manganese	2.1 mg/l	0.02 mg/l	EPA 200.7	2/18/11 12:13	AML
Molybdenum	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:09	AML
Nickel	<0.5 mg/l	0.05 mg/l	EPA 200.7	2/18/11 13:36	AML
Selenium	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:09	AML
Silver	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:08	AML

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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Water
Source Type: N/A

Collection Date: 02/15/11 12:30
Received Date: 02/15/11 14:38
Matrix: N/A
Collection Method: Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
Strontium	317.8 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:10	AML
Thallium	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:08	AML
Tin	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:08	AML
Titanium	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:07	AML
Zinc	<0.2 mg/l	0.02 mg/l	EPA 200.7	2/18/11 13:36	AML
Gross Alpha DW	664 PCi/L	3 PCi/L	EPA 900	2/25/11 13:51	6502103
Gross Beta DW	847 PCi/L	4 PCi/L	EPA 900	2/21/11 13:51	6502103
Radium 226	153 pCi/L	.6 pCi/L	EPA 903.1	2/22/11 13:53	6502103
Radium 228	45.0 pCi/L	.9 pCi/L	EPA 904.0	2/25/11 14:00	6502103
Total Residual Chlorine	0.00 mg/L	0.10 mg/L	HACH 8167	2/15/11 0:00	RCJ
Phenolics	ND	0.01 mg/L	EPA 420.4	3/1/11 4:09	22-293
Uranium, Total	ND	0.14 mg/L	SW846 6020A	2/28/11 17:06	22-293
Mercury	ND	0.001 mg/l	EPA 200.8	2/23/11 8:45	22-293

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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Water
Source Type: N/A

Collection Date: 02/15/11 12:30
Received Date: 02/15/11 14:38
Matrix: N/A
Collection Method: Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
Lead	<0.02 mg/L	0.02 mg/L	EPA 200.7	2/18/11 12:11	AML
Lithium, Total	10.7 mg/L	4.0 mg/L	EPA 200.7	2/22/11 11:28	22-293
Boron	2.7 mg/l	0.02 mg/l	EPA 200.7	2/18/11 12:13	AML
Antimony	<0.05 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:11	AML
Silicon, Total	6.4 mg/L	4.0 mg/L	EPA 200.7	2/22/11 14:14	22-293
Bromide	118.5 mg/l	0.10 mg/l	EPA 300.1	2/16/11 13:04	AML
Hardness, Total	4,655 mg/l	10 mg/l	EPA 200.7	2/18/11 12:08	AML
Heterotrophic Plate Count	18,600 /ml	1 /ml	SM 9215B	2/15/11 16:10	TSA
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/15/11 16:14	TSA
E Coli	NA	+/-	SM 9223B	2/15/11 16:14	TSA
Specific Conductance	34,300 umhos/cm	2 umhos/cm	EPA 120.1	2/17/11 13:15	AML
Gasoline Range Organics	ND	500 ug/L	SW846 8015D	2/16/11 22:51	22-293
Diesel Range Organics C10-C28	7.1 mg/L	1.6 mg/L	SW846 8015D	2/23/11 8:32	22-293

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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Water
Source Type: N/A
Collection Date: 02/15/11 12:30
Received Date: 02/15/11 14:38
Matrix: N/A
Collection Method: Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
Methane	5490 ug/L	1.0 ug/L	RSK 175	2/18/11 17:59	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	2/18/11 19:46	22-293
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	2/17/11 8:52	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/17/11 8:52	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	2/17/11 8:52	22-293
Total Kjeldahl Nitrogen	ND	1.0 mg/L	SM20-4500-N C	2/17/11 12:30	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	2/25/11 21:37	22-293
Acetone	13800 ug/L	250 ug/L	SW846 8260B	2/23/11 21:26	22-293
Silica, Dissolved	25 mg/L	10 mg/L	SM20-4500SiO2C	2/23/11 3:17	22-293
2-Hexanone	ND	25.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
4-Methyl-2-Pentanone(MIBK)	ND	25.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
2-Butanone	ND	50.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Ethene	ND	3.0 ug/L	RSK 175	2/18/11 17:59	22-293

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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Water
Source Type: N/A

Collection Date: 02/15/11 12:30
Received Date: 02/15/11 14:38
Matrix: N/A
Collection Method: Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
Methanol	ND	1.0 mg/L	SW846 8015D	3/1/11 0:24	22-293
o-Xylene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
mp-Xylene	ND	10.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Chloromethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Ethane	8.9 ug/L	3.0 ug/L	RSK 175	2/18/11 17:59	22-293
Chlorodibromomethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Chloroethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Chloroform	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Bromomethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Carbon Disulfide	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Bromochloromethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Bromodichloromethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
1,2-Dibromo-3-chloropropane	ND	35.0 ug/L	SW846 8260B	2/18/11 23:57	22-293

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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Water
Source Type: N/A
Collection Date: 02/15/11 12:30
Received Date: 02/15/11 14:38
Matrix: N/A
Collection Method: Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
1,2-Dibromoethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
1,1,2,2-Tetrachloroethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
1,1-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
1,1-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
cis-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Methylene Chloride	22.0 ug/L	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
1,2-Dichloropropane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Chlorobenzene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Tetrachloroethene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Trichloroethene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
trans-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
trans-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
cis-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293

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CWM Environmental
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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Water
Source Type: N/A

Collection Date: 02/15/11 12:30
Received Date: 02/15/11 14:38
Matrix: N/A
Collection Method: Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
Benzene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Carbon Tetrachloride	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
1,2-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Ethylbenzene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Styrene	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Toluene	8.3 ug/L	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
1,1,1-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
1,1,2-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Vinyl Chloride	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Total Xylenes	ND	15.0 ug/L	SW846 8260B	2/18/11 23:57	22-293
Vanadium, Total	ND	0.20 mg/L	EPA 200.7	2/22/11 11:28	22-293
Copper	<0.2 mg/l	0.02 mg/l	EPA 200.7	2/18/11 14:34	AML
Bromoform	ND	5.0 ug/L	SW846 8260B	2/18/11 23:57	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: PW Water
Source Type: N/A

Collection Date: 02/15/11 12:30
Received Date: 02/15/11 14:38
Matrix: N/A
Collection Method: Grab

02110642	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 228	10.760 pCi/L	pCi/L	HSL-300M	2/21/11 14:00	6502103
Thorium 230	-0.135 pCi/L	pCi/L	HSL-300m	2/22/11 14:01	6502103
Thorium 232	0.114 pCi/L	pCi/L	HSL-300m	2/22/11 14:01	6502103

Sample Comments:

None

Ryan C Shafer, Technical Director

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WATER QUALITY REPORT

#02110641

DISTILLED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
pH	4.73 SU	SU	SM4500 H+B	2/15/11 16:38	AML
Total Dissolved Solids	33 mg/l	5 mg/l	SM 2540 C	2/18/11 15:33	WEH
Total Suspended Solids	3 mg/L	3 mg/L	SM 2540 D	2/15/11 15:32	WEH
Oil & Grease	2.6 mg/l	5 mg/l	EPA 1664 Rev A	2/21/11 0:00	TO
BOD	26.6 mg/L	2 mg/L	SM5210B	2/16/11 11:30	TSA
COD	48.3 mg/L	10 mg/L	HACH 8000	2/23/11 9:53	WEH
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	2/16/11 21:45	22-293
Color	< 5 pccu	5 pccu		2/15/11 15:19	WEH
Temperature (F), Field	135 deg F	deg F	na	2/15/11 0:00	ZW
Osmotic Pressure	ND	10 mOs/kg	PA DEP	2/17/11 5:15	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	2/16/11 14:09	WEH
Ammonia Nitrogen	1.77 mg/L	.10 mg/L	SM 4500 NH3 D	2/17/11 9:03	WEH
Nitrate	<0.10 mg/l	0.10 mg/l	EPA 300.0	2/16/11 13:03	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
Nitrite	<0.10 mg/l	0.10 mg/l	EPA 300.0	2/16/11 13:02	AML
Nitrate / Nitrite	<0.20 mg/l	0.20 mg/l	EPA 300.0	2/16/11 13:03	AML
Acidity	16 mg/L	3 mg/L	SM 2310 B	2/15/11 16:38	AML
Alkalinity	< 5 mg/l	5 mg/l	SM 2320 B	2/15/11 16:38	AML
Bicarbonate	< 5 mg/L	5 mg/L	SM4500 CO2 D	2/15/11 16:38	AML
Sulfate	2.2 mg/l	1 mg/l	EPA 300.0	2/16/11 13:04	AML
Chloride	14.6 mg/L	1 mg/L	EPA 300.0	2/16/11 13:04	AML
Fluoride	<0.20 mg/l	0.20 mg/l	EPA 300.0	2/16/11 13:01	AML
Calcium	2.18 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:09	AML
Iron	0.12 mg/l	0.02 mg/l	EPA 200.7	2/18/11 12:11	AML
Iron, Dissolved	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/18/11 12:23	AML
Magnesium	0.36 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:10	AML
Potassium	<0.10 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:12	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
Sodium	6.42 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:09	AML
Aluminum	<0.10 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:11	AML
Arsenic	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:11	AML
Barium	0.33 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:10	AML
Beryllium	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:10	AML
Cadmium	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:10	AML
Chromium	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/18/11 13:37	AML
Cobalt	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:09	AML
Manganese	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/18/11 12:13	AML
Molybdenum	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:09	AML
Nickel	<0.05 mg/l	0.05 mg/l	EPA 200.7	2/18/11 13:36	AML
Selenium	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:09	AML
Silver	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:08	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
Strontium	0.35 mg/l	0.10 mg/l	EPA 200.7	2/18/11 12:10	AML
Thallium	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:08	AML
Tin	0.007 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:08	AML
Titanium	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:07	AML
Zinc	0.05 mg/l	0.02 mg/l	EPA 200.7	2/18/11 13:36	AML
Gross Alpha DW	0.841 PCi/L	3 PCi/L	EPA 900	2/21/11 13:51	6502103
Gross Beta DW	0.259 PCi/L	4 PCi/L	EPA 900	2/21/11 13:51	6502103
Radium 226	0.224 pCi/L	.6 pCi/L	EPA 903.1	2/22/11 13:53	6502103
Radium 228	1.32 pCi/L	.9 pCi/L	EPA 904.0	2/25/11 14:00	6502103
Total Residual Chlorine	0.45 mg/L	0.10 mg/L	HACH 8167	2/15/11 0:00	RCJ
Phenolics	0.03 mg/L	0.01 mg/L	EPA 420.4	2/23/11 14:55	22-293
Uranium, Total	ND	0.028 mg/L	SW846 6020A	2/28/11 16:36	22-293
Mercury	ND	0.001 mg/l	EPA 200.8	2/23/11 8:45	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
Lead	<0.02 mg/L	0.02 mg/L	EPA 200.7	2/18/11 12:11	AML
Lithium, Total	ND	0.050 mg/L	EPA 200.7	2/18/11 16:15	22-293
Boron	0.05 mg/l	0.02 mg/l	EPA 200.7	2/18/11 12:13	AML
Antimony	<0.005 mg/L	0.005 mg/L	EPA 200.7	3/1/11 14:11	AML
Silicon, Total	0.19 mg/L	0.050 mg/L	EPA 200.7	2/22/11 14:10	22-293
Bromide	<0.10 mg/l	0.10 mg/l	EPA 300.1	2/16/11 13:04	AML
Hardness, Total	<10.0 mg/l	10 mg/l	EPA 200.7	2/18/11 12:08	AML
Heterotrophic Plate Count	20 /ml	1 /ml	SM 9215B	2/15/11 16:10	TSA
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/15/11 16:14	TSA
E Coli	NA	+/-	SM 9223B	2/15/11 16:14	TSA
Specific Conductance	74.5 umhos/cm	2 umhos/cm	EPA 120.1	2/17/11 13:15	AML
Gasoline Range Organics	ND	100 ug/L	SW846 8015D	2/16/11 23:25	22-293
Diesel Range Organics C10-C28	2.3 mg/L	0.31 mg/L	SW846 8015D	2/23/11 4:51	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
Methane	ND	1.0 ug/L	RSK 175	2/18/11 17:06	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	2/18/11 19:24	22-293
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	2/17/11 8:46	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/17/11 8:46	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	2/17/11 8:46	22-293
Total Kjeldahl Nitrogen	1.5 mg/L	1.0 mg/L	SM20-4500-N C	2/17/11 12:30	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	2/25/11 20:52	22-293
Acetone	949 ug/L	50.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Silica, Dissolved	ND	1 mg/L	SM20-4500SiO2C	2/23/11 3:17	22-293
2-Hexanone	ND	25.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
4-Methyl-2-Pentanone(MIBK)	ND	25.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
2-Butanone	ND	50.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Ethene	ND	3.0 ug/L	RSK 175	2/18/11 17:06	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
Methanol	ND	1.0 mg/L	SW846 8015D	2/28/11 23:26	22-293
o-Xylene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
mp-Xylene	ND	10.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Chloromethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Ethane	ND	3.0 ug/L	RSK 175	2/18/11 17:06	22-293
Chlorodibromomethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Chloroethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Chloroform	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Bromomethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Carbon Disulfide	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Bromochloromethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Bromodichloromethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
1,2-Dibromo-3-chloropropane	ND	35.0 ug/L	SW846 8260B	2/19/11 0:27	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
1,2-Dibromoethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
1,1,2,2-Tetrachloroethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
1,1-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
1,1-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
cis-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Methylene Chloride	9.0 ug/L	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
1,2-Dichloropropane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Chlorobenzene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Tetrachloroethene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Trichloroethene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
trans-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
trans-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
cis-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
Benzene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Carbon Tetrachloride	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
1,2-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Ethylbenzene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Styrene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Toluene	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
1,1,1-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
1,1,2-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Vinyl Chloride	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Total Xylenes	ND	15.0 ug/L	SW846 8260B	2/19/11 0:27	22-293
Vanadium, Total	ND	0.0025 mg/L	EPA 200.7	2/18/11 16:15	22-293
Copper	0.07 mg/l	0.02 mg/l	EPA 200.7	2/18/11 14:34	AML
Bromoform	ND	5.0 ug/L	SW846 8260B	2/19/11 0:27	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: 4011
Monitoring Pt: DW Water
Source Type: N/A

Collection Date: 02/15/11 12:00
Received Date: 02/15/11 14:37
Matrix: N/A
Collection Method: Grab

02110641	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 228	0.118 pCi/L	pCi/L	HSL-300M	2/21/11 14:00	6502103
Thorium 230	0.085 pCi/L	pCi/L	HSL-300m	2/22/11 14:01	6502103
Thorium 232	0.011 pCi/L	pCi/L	HSL-300m	2/22/11 14:01	6502103

Sample Comments:

None

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

WATER QUALITY REPORT

#03111242

PRODUCED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 03/31/11 11:00
Received Date: 03/31/11 12:59
Matrix: N/A
Collection Method: Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
Total Residual Chlorine, Field	0.00 mg/L	0.1 mg/L	HACH 8167	3/31/11 0:00	RCJ
pH	6.90 SU	SU	SM4500 H+B	4/1/11 15:44	AML
Total Dissolved Solids	22,350 mg/l	5 mg/l	SM 2540 C	4/1/11 13:12	TSA
Total Suspended Solids	60 mg/L	3 mg/L	SM 2540 D	4/1/11 15:25	TSA
Oil & Grease	2.7 mg/l	5 mg/l	EPA 1664 Rev A	4/1/11 0:00	TO
BOD	83.9 mg/L	2 mg/L	SM5210B	4/1/11 11:10	TO
COD	220 mg/L	10 mg/L	HACH 8000	4/11/11 0:00	TO
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	4/1/11 21:00	22-293
Color	55 pccu	5 pccu		4/1/11 8:20	WEH
Temperature (F), Field	51 deg F	deg F	na	3/31/11 0:00	RCJ
Osmotic Pressure	ND	10 mOs/kg	PA DEP	4/2/11 5:00	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	4/4/11 8:23	WEH
Ammonia Nitrogen	10.2 mg/L	.10 mg/L	SM 4500 NH3 D	4/4/11 13:49	WEH

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 03/31/11 11:00
Received Date: 03/31/11 12:59
Matrix: N/A
Collection Method: Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
Nitrate	<10.0 mg/l	0.10 mg/l	EPA 300.0	4/1/11 13:04	AML
Nitrite	<10.0 mg/l	0.10 mg/l	EPA 300.0	4/1/11 13:04	AML
Nitrate / Nitrite	<20.0 mg/l	0.20 mg/l	EPA 300.0	4/1/11 13:04	AML
Acidity	-26.0 mg/L	3 mg/L	SM 2310 B	4/1/11 15:44	AML
Alkalinity	88.0 mg/l	5 mg/l	SM 2320 B	4/1/11 15:43	AML
Bicarbonate	88.0 mg/L	5 mg/L	SM4500 CO2 D	4/1/11 15:44	AML
Sulfate	<100.0 mg/l	1 mg/l	EPA 300.0	4/1/11 13:03	AML
Chloride	9,760 mg/L	1 mg/L	EPA 300.0	4/1/11 13:05	AML
Fluoride	<20.0 mg/l	0.20 mg/l	EPA 300.0	4/1/11 13:03	AML
Calcium	1,186 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:34	AML
Iron	17.6 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:37	AML
Iron, Dissolved	13.9 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:36	AML
Magnesium	121.3 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:35	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	03/31/11 11:00
Site:	PW Water	**Received Date:**	03/31/11 12:59
Monitoring Pt:	PW Influent	**Matrix:**	N/A
Source Type:	Discharge	**Collection Method:**	Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
Potassium	63.2 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:59	AML
Sodium	4,726 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:41	AML
Aluminum	<5.0 mg/l	0.10 mg/l	EPA 200.7	4/1/11 15:16	AML
Arsenic	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/5/11 16:35	AML
Barium	284.7 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:36	AML
Beryllium, Total	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:35	AML
Cadmium	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/5/11 16:36	AML
Chromium	<1.0 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:40	AML
Cobalt	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:35	AML
Manganese	2.0 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:37	AML
Molybdenum	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:36	AML
Nickel	<2.5 mg/l	0.05 mg/l	EPA 200.7	4/1/11 15:16	AML
Selenium	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/5/11 16:37	AML

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 03/31/11 11:00
Received Date: 03/31/11 12:59
Matrix: N/A
Collection Method: Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
Silver	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/5/11 16:35	AML
Strontium	264.2 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:38	AML
Thallium	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:36	AML
Tin	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:34	AML
Titanium	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:34	AML
Zinc	<1.0 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:41	AML
Gross Alpha DW	161 PCi/L	3 PCi/L	EPA 900	4/7/11 16:06	6502103
Gross Beta DW	79.7 PCi/L	4 PCi/L	EPA 900	4/7/11 16:06	6502103
Radium 226	155 pCi/L	.6 pCi/L	EPA 903.1	4/15/11 16:07	6502103
Radium 228	51.9 pCi/L	.9 pCi/L	EPA 904.0	4/15/11 16:07	6502103
Phenolics	ND	0.01 mg/L	EPA 420.4	4/11/11 14:19	22-293
Uranium, Total	ND	0.25 mg/L	SW846 6020A	4/16/11 6:47	22-293
Mercury, Total	ND	0.00050 mg/L	EPA 245.1	4/8/11 9:27	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 03/31/11 11:00
Received Date: 03/31/11 12:59
Matrix: N/A
Collection Method: Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
Lead	<1.0 mg/L	0.02 mg/L	EPA 200.7	4/1/11 15:17	AML
Lithium, Total	9.1 mg/L	1.5 mg/L	EPA 200.7	4/7/11 16:14	22-293
Boron	2.0 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:40	AML
Antimony	<0.25 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:36	AML
Silicon, Total	5.1 mg/L	1.5 mg/L	EPA 200.7	4/11/11 15:51	22-293
Bromide	101.0 mg/l	0.10 mg/l	EPA 300.1	4/1/11 13:05	AML
Hardness, Total	3,461 mg/l	10 mg/l	EPA 200.7	4/1/11 14:48	AML
Heterotrophic Plate Count	2,970 /ml	1 /ml	SM 9215B	3/31/11 15:47	TSA
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	3/31/11 15:45	TSA
E Coli	NA	+/-	SM 9223B	3/31/11 15:45	TSA
Specific Conductance	28,450 umhos/cm	2 umhos/cm	EPA 120.1	4/1/11 11:47	AML
Gasoline Range Organics	ND	5000 ug/L	SW846 8015D	4/5/11 22:49	22-293
Diesel Range Organics C10-C28	4.0 mg/L	0.78 mg/L	SW846 8015D	4/7/11 17:31	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 03/31/11 11:00
Received Date: 03/31/11 12:59
Matrix: N/A
Collection Method: Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
Methane	3570 ug/L	1.0 ug/L	RSK 175	4/11/11 16:39	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	4/9/11 3:26	22-293
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	4/2/11 5:38	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	4/2/11 5:38	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	4/2/11 5:38	22-293
Total Kjeldahl Nitrogen	30.1 mg/L	4.0 mg/L	SM20-4500-N C	4/5/11 12:37	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	4/11/11 22:33	22-293
Acetone	8710 ug/L	500 ug/L	SW846 8260B	4/11/11 17:57	22-293
Silica, Dissolved	16 mg/L	5 mg/L	SM20-4500SiO2C	4/9/11 1:34	22-293
2-Hexanone	ND	5.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
2-Butanone	ND	10.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Ethene	ND	3.0 ug/L	RSK 175	4/11/11 16:39	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 03/31/11 11:00
Received Date: 03/31/11 12:59
Matrix: N/A
Collection Method: Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
Methanol	ND	1.0 mg/L	SW846 8015D	4/8/11 17:47	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
mp-Xylene	2.3 ug/L	2.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Ethane	6.4 ug/L	3.0 ug/L	RSK 175	4/11/11 16:39	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Bromomethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Carbon Disulfide	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	4/9/11 20:04	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 03/31/11 11:00
Received Date: 03/31/11 12:59
Matrix: N/A
Collection Method: Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 03/31/11 11:00
Received Date: 03/31/11 12:59
Matrix: N/A
Collection Method: Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
Benzene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Toluene	10.9 ug/L	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Vinyl Chloride	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Total Xylenes	ND	3.0 ug/L	SW846 8260B	4/9/11 20:04	22-293
Vanadium, Total	ND	0.075 mg/L	EPA 200.7	4/7/11 16:14	22-293
Copper	<1.0 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:38	AML
Bromoform	ND	1.0 ug/L	SW846 8260B	4/9/11 20:04	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 03/31/11 11:00
Received Date: 03/31/11 12:59
Matrix: N/A
Collection Method: Grab

03111242	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 228	11.408 pCi/L	pCi/L	HSL-300M	4/19/11 16:08	6502103
Thorium 230	0.035 pCi/L	pCi/L	HSL-300m	4/19/11 16:08	6502103
Thorium 232	0.055 pCi/L	pCi/L	HSL-300m	4/19/11 16:09	6502103

Sample Comments:

None

Ryan C Shafer, Technical Director

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WATER QUALITY REPORT

#03111241

DISTILLED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: D W Water
Monitoring Pt: DW Tank
Source Type: N/A

Collection Date: 03/31/11 10:00
Received Date: 03/31/11 12:57
Matrix: N/A
Collection Method: Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
Total Residual Chlorine, Field	0.21 mg/L	0.1 mg/L	HACH 8167	3/31/11 0:00	RCJ
pH	6.24 SU	SU	SM4500 H+B	4/1/11 15:44	AML
Total Dissolved Solids	196 mg/l	5 mg/l	SM 2540 C	4/1/11 13:12	TSA
Total Suspended Solids	< 3 mg/L	3 mg/L	SM 2540 D	4/1/11 15:25	TSA
Oil & Grease	3.2 mg/l	5 mg/l	EPA 1664 Rev A	4/1/11 0:00	TO
BOD	27.1 mg/L	2 mg/L	SM5210B	4/1/11 11:10	TO
COD	35.8 mg/L	10 mg/L	HACH 8000	4/11/11 0:00	TO
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	4/1/11 21:00	22-293
Color	< 5 pccu	5 pccu		4/1/11 8:20	WEH
Temperature (F), Field	109 deg F	deg F	na	3/31/11 0:00	RCJ
Osmotic Pressure	ND	10 mOs/kg	PA DEP	4/2/11 5:00	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	4/4/11 8:23	WEH
Ammonia Nitrogen	4.42 mg/L	.10 mg/L	SM 4500 NH3 D	4/4/11 13:49	WEH

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: D W Water
Monitoring Pt: DW Tank
Source Type: N/A

Collection Date: 03/31/11 10:00
Received Date: 03/31/11 12:57
Matrix: N/A
Collection Method: Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
Nitrate	<0.10 mg/l	0.10 mg/l	EPA 300.0	4/1/11 13:04	AML
Nitrite	<0.10 mg/l	0.10 mg/l	EPA 300.0	4/1/11 13:04	AML
Nitrate / Nitrite	<0.20 mg/l	0.20 mg/l	EPA 300.0	4/1/11 13:04	AML
Acidity	<5.0 mg/L	3 mg/L	SM 2310 B	4/1/11 15:44	AML
Alkalinity	<5.0 mg/l	5 mg/l	SM 2320 B	4/1/11 15:43	AML
Bicarbonate	<5.0 mg/L	5 mg/L	SM4500 CO2 D	4/1/11 15:44	AML
Sulfate	1.98 mg/l	1 mg/l	EPA 300.0	4/1/11 13:03	AML
Chloride	99.1 mg/L	1 mg/L	EPA 300.0	4/1/11 13:05	AML
Fluoride	0.32 mg/l	0.20 mg/l	EPA 300.0	4/1/11 13:03	AML
Calcium	11.1 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:34	AML
Iron	0.02 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:37	AML
Iron, Dissolved	0.03 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:36	AML
Magnesium	1.10 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:35	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	03/31/11 10:00
Site:	D W Water	**Received Date:**	03/31/11 12:57
Monitoring Pt:	DW Tank	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
Potassium	0.52 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:36	AML
Sodium	43.8 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:41	AML
Aluminum	<0.10 mg/l	0.10 mg/l	EPA 200.7	4/1/11 15:16	AML
Arsenic	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/5/11 16:35	AML
Barium	2.47 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:36	AML
Beryllium, Total	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:35	AML
Cadmium	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/5/11 16:36	AML
Chromium	<0.02 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:40	AML
Cobalt	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:35	AML
Manganese	<0.02 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:37	AML
Molybdenum	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:36	AML
Nickel	<0.05 mg/l	0.05 mg/l	EPA 200.7	4/1/11 15:16	AML
Selenium	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/5/11 16:37	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: D W Water
Monitoring Pt: DW Tank
Source Type: N/A

Collection Date: 03/31/11 10:00
Received Date: 03/31/11 12:57
Matrix: N/A
Collection Method: Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
Silver	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/5/11 16:35	AML
Strontium	2.28 mg/l	0.10 mg/l	EPA 200.7	4/1/11 14:38	AML
Thallium	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:36	AML
Tin	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:34	AML
Titanium	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:34	AML
Zinc	<0.02 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:41	AML
Gross Alpha DW	1.93 PCi/L	3 PCi/L	EPA 900	4/7/11 16:06	6502103
Gross Beta DW	1.57 PCi/L	4 PCi/L	EPA 900	4/7/11 16:06	6502103
Radium 226	2.87 pCi/L	.6 pCi/L	EPA 903.1	4/15/11 16:07	6502103
Radium 228	0.296 pCi/L	.9 pCi/L	EPA 904.0	4/15/11 16:07	6502103
Phenolics	0.02 mg/L	0.01 mg/L	EPA 420.4	4/11/11 13:43	22-293
Uranium, Total	ND	0.25 mg/L	SW846 6020A	4/16/11 6:26	22-293
Mercury, Total	ND	0.00050 mg/L	EPA 245.1	4/8/11 9:26	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: D W Water
Monitoring Pt: DW Tank
Source Type: N/A

Collection Date: 03/31/11 10:00
Received Date: 03/31/11 12:57
Matrix: N/A
Collection Method: Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
Lead	<0.02 mg/L	0.02 mg/L	EPA 200.7	4/1/11 15:17	AML
Lithium, Total	0.082 mg/L	0.050 mg/L	EPA 200.7	4/5/11 14:12	22-293
Boron	0.06 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:40	AML
Antimony	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/6/11 10:36	AML
Silicon, Total	0.16 mg/L	0.050 mg/L	EPA 200.7	4/11/11 14:54	22-293
Bromide	0.92 mg/l	0.10 mg/l	EPA 300.1	4/1/11 13:05	AML
Hardness, Total	32.0 mg/l	10 mg/l	EPA 200.7	4/1/11 14:48	AML
Heterotrophic Plate Count	8,100 /ml	1 /ml	SM 9215B	3/31/11 15:47	TSA
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	3/31/11 15:45	TSA
E Coli	NA	+/-	SM 9223B	3/31/11 15:45	TSA
Specific Conductance	375.0 umhos/cm	2 umhos/cm	EPA 120.1	4/1/11 11:47	AML
Gasoline Range Organics	ND	500 ug/L	SW846 8015D	4/5/11 23:24	22-293
Diesel Range Organics C10-C28	4.9 mg/L	0.77 mg/L	SW846 8015D	4/7/11 16:26	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: D W Water
Monitoring Pt: DW Tank
Source Type: N/A

Collection Date: 03/31/11 10:00
Received Date: 03/31/11 12:57
Matrix: N/A
Collection Method: Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
Methane	ND	1.0 ug/L	RSK 175	4/11/11 16:30	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	4/9/11 3:04	22-293
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	4/2/11 5:31	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	4/2/11 5:31	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	4/2/11 5:31	22-293
Total Kjeldahl Nitrogen	4.5 mg/L	1.0 mg/L	SM20-4500-N C	4/5/11 12:37	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	4/11/11 22:16	22-293
Acetone	524 ug/L	10.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Silica, Dissolved	ND	1 mg/L	SM20-4500SiO2C	4/9/11 1:34	22-293
2-Hexanone	ND	5.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
2-Butanone	ND	10.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Ethene	ND	3.0 ug/L	RSK 175	4/11/11 16:30	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: D W Water
Monitoring Pt: DW Tank
Source Type: N/A

Collection Date: 03/31/11 10:00
Received Date: 03/31/11 12:57
Matrix: N/A
Collection Method: Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
Methanol	ND	1.0 mg/L	SW846 8015D	4/8/11 17:32	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
mp-Xylene	ND	2.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Ethane	ND	3.0 ug/L	RSK 175	4/11/11 16:30	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Bromomethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Carbon Disulfide	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	4/9/11 19:35	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: D W Water
Monitoring Pt: DW Tank
Source Type: N/A
Collection Date: 03/31/11 10:00
Received Date: 03/31/11 12:57
Matrix: N/A
Collection Method: Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: D W Water
Monitoring Pt: DW Tank
Source Type: N/A

Collection Date: 03/31/11 10:00
Received Date: 03/31/11 12:57
Matrix: N/A
Collection Method: Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
Benzene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Toluene	1.3 ug/L	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Vinyl Chloride	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Total Xylenes	ND	3.0 ug/L	SW846 8260B	4/9/11 19:35	22-293
Vanadium, Total	ND	0.0025 mg/L	EPA 200.7	4/5/11 14:12	22-293
Copper	<0.02 mg/l	0.02 mg/l	EPA 200.7	4/1/11 14:38	AML
Bromoform	ND	1.0 ug/L	SW846 8260B	4/9/11 19:35	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: D W Water
Monitoring Pt: DW Tank
Source Type: N/A

Collection Date: 03/31/11 10:00
Received Date: 03/31/11 12:57
Matrix: N/A
Collection Method: Grab

03111241	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 228	0.103 pCi/L	pCi/L	HSL-300M	4/19/11 16:08	6502103
Thorium 230	0.169 pCi/L	pCi/L	HSL-300m	4/19/11 16:08	6502103
Thorium 232	0.016 pCi/L	pCi/L	HSL-300m	4/19/11 16:09	6502103

Sample Comments:

None

Ryan C Shafer, Technical Director

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WATER QUALITY REPORT

#04110152

PRODUCED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 04/06/11 08:00
Received Date: 04/06/11 10:06
Matrix: N/A
Collection Method: Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
Total Residual Chlorine, Field	0.00 mg/L	0.1 mg/L	HACH 8167	4/6/11 0:00	RCJ
pH	6.51 SU	SU	SM4500 H+B	4/6/11 16:39	AML
Total Dissolved Solids	25560 mg/l	5 mg/l	SM 2540 C	4/7/11 14:17	TSA
Total Suspended Solids	54 mg/L	3 mg/L	SM 2540 D	4/6/11 16:23	MH
Oil & Grease	3.7 mg/l	5 mg/l	EPA 1664 Rev A	4/8/11 0:00	TO
BOD	99.6 mg/L	2 mg/L	SM5210B	4/7/11 10:46	TSA
COD	265 mg/L	10 mg/L	HACH 8000	4/11/11 0:00	TO
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	4/7/11 22:00	22-293
Color	75 pccu	5 pccu		4/6/11 10:35	WEH
Temperature (F), Field	61 deg F	deg F	na	4/6/11 0:00	RCJ
Osmotic Pressure	589 mOs/kg	10 mOs/kg	PA DEP	4/8/11 4:25	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	4/6/11 15:09	WEH
Ammonia Nitrogen	23.1 mg/L	.10 mg/L	SM 4500 NH3 D	4/7/11 10:05	WEH

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	04/06/11 08:00
Site:	PW Water	**Received Date:**	04/06/11 10:06
Monitoring Pt:	PW Influent	**Matrix:**	N/A
Source Type:	Discharge	**Collection Method:**	Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
Nitrate	<10 mg/l	0.10 mg/l	EPA 300.0	4/7/11 15:04	AML
Nitrite	<10 mg/l	0.10 mg/l	EPA 300.0	4/7/11 15:03	AML
Nitrate / Nitrite	<20 mg/l	0.20 mg/l	EPA 300.0	4/7/11 15:03	AML
Acidity	-16.0 mg/L	3 mg/L	SM 2310 B	4/7/11 12:58	AML
Alkalinity	100.0 mg/l	5 mg/l	SM 2320 B	4/6/11 16:39	AML
Bicarbonate	100.0 mg/L	5 mg/L	SM4500 CO2 D	4/7/11 10:47	AML
Sulfate	<100 mg/l	1 mg/l	EPA 300.0	4/7/11 15:02	AML
Chloride	11,352 mg/L	1 mg/L	EPA 300.0	4/7/11 15:05	AML
Fluoride	<20 mg/l	0.20 mg/l	EPA 300.0	4/7/11 15:04	AML
Calcium	1,175 mg/l	0.10 mg/l	EPA 200.7	4/8/11 16:01	AML
Iron	18.5 mg/l	0.02 mg/l	EPA 200.7	4/8/11 16:11	AML
Iron, Dissolved	14.3 mg/l	0.02 mg/l	EPA 200.7	4/8/11 16:09	AML
Magnesium	109.8 mg/l	0.10 mg/l	EPA 200.7	4/8/11 16:00	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	04/06/11 08:00
Site:	PW Water	**Received Date:**	04/06/11 10:06
Monitoring Pt:	PW Influent	**Matrix:**	N/A
Source Type:	Discharge	**Collection Method:**	Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
Potassium	59.6 mg/l	0.10 mg/l	EPA 200.7	4/8/11 16:10	AML
Sodium	4,712 mg/l	0.10 mg/l	EPA 200.7	4/8/11 16:01	AML
Aluminum	<5.0 mg/l	0.10 mg/l	EPA 200.7	4/8/11 16:13	AML
Arsenic	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:27	AML
Barium	260.5 mg/l	0.10 mg/l	EPA 200.7	4/8/11 16:09	AML
Beryllium, Total	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:26	AML
Cadmium	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:27	AML
Chromium	<1.0 mg/l	0.02 mg/l	EPA 200.7	4/8/11 16:14	AML
Cobalt	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:28	AML
Manganese	2.0 mg/l	0.02 mg/l	EPA 200.7	4/8/11 16:12	AML
Molybdenum	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:28	AML
Nickel	<2.5 mg/l	0.05 mg/l	EPA 200.7	4/8/11 16:14	AML
Selenium	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:28	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 04/06/11 08:00
Received Date: 04/06/11 10:06
Matrix: N/A
Collection Method: Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
Silver	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:29	AML
Strontium	233.0 mg/l	0.10 mg/l	EPA 200.7	4/8/11 16:10	AML
Thallium	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/14/11 14:29	AML
Tin	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/14/11 14:29	AML
Titanium	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:30	AML
Zinc	<1.0 mg/l	0.02 mg/l	EPA 200.7	4/8/11 11:17	AML
Gross Alpha DW	249 PCi/L	3 PCi/L	EPA 900	4/15/11 16:10	6502103
Gross Beta DW	178 PCi/L	4 PCi/L	EPA 900	4/11/11 16:11	6502103
Radium 226	130 pCi/L	.6 pCi/L	EPA 903.1	4/20/11 16:12	6502103
Radium 228	55.0 pCi/L	.9 pCi/L	EPA 904.0	4/27/11 16:13	6502103
Phenolics	ND	0.01 mg/L	EPA 420.4	4/11/11 13:48	22-293
Uranium, Total	ND	0.11 mg/L	SW846 6020A	4/16/11 6:54	22-293
Mercury, Total	ND	0.00050 mg/L	EPA 245.1	4/13/11 11:43	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 04/06/11 08:00
Received Date: 04/06/11 10:06
Matrix: N/A
Collection Method: Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
Lead	<1.0 mg/L	0.02 mg/L	EPA 200.7	4/8/11 16:16	AML
Lithium, Total	10.7 mg/L	2.5 mg/L	EPA 200.7	4/14/11 14:31	22-293
Boron	<1.0 mg/l	0.02 mg/l	EPA 200.7	4/8/11 16:10	AML
Antimony	<0.01 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:30	AML
Silicon, Total	6.4 mg/L	2.5 mg/L	EPA 200.7	4/15/11 10:48	22-293
Bromide	117.0 mg/l	0.10 mg/l	EPA 300.1	4/7/11 15:05	AML
Hardness, Total	3,386 mg/l	10 mg/l	EPA 200.7	4/8/11 16:07	AML
Heterotrophic Plate Count	140 /ml	1 /ml	SM 9215B	4/6/11 15:00	TSA
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	4/6/11 15:00	TSA
E Coli	NA	+/-	SM 9223B	4/6/11 15:00	TSA
Specific Conductance	31,600 umhos/cm	2 umhos/cm	EPA 120.1	4/6/11 15:08	AML
Gasoline Range Organics	ND	500 ug/L	SW846 8015D	4/9/11 0:35	22-293
Diesel Range Organics C10-C28	4.3 mg/L	0.79 mg/L	SW846 8015D	4/18/11 12:51	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 04/06/11 08:00
Received Date: 04/06/11 10:06
Matrix: N/A
Collection Method: Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
Methane	4550 ug/L	1.0 ug/L	RSK 175	4/12/11 16:47	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	4/14/11 12:25	22-293
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	4/8/11 11:59	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	4/8/11 11:59	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	4/8/11 11:59	22-293
Total Kjeldahl Nitrogen	19.7 mg/L	4.0 mg/L	SM20-4500-N C	4/11/11 11:11	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	4/11/11 22:50	22-293
Acetone	11800 ug/L	500 ug/L	SW846 8260B	4/15/11 7:45	22-293
Silica, Dissolved	19 mg/L	5 mg/L	SM20-4500SiO2C	4/9/11 1:34	22-293
2-Hexanone	ND	5.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
2-Butanone	ND	10.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Ethene	ND	6.0 ug/L	RSK 175	4/12/11 16:44	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 04/06/11 08:00
Received Date: 04/06/11 10:06
Matrix: N/A
Collection Method: Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
Methanol	ND	1.0 mg/L	SW846 8015D	4/20/11 20:57	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
mp-Xylene	ND	2.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Ethane	6.3 ug/L	3.0 ug/L	RSK 175	4/12/11 16:47	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Bromomethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Carbon Disulfide	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	4/14/11 23:51	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 04/06/11 08:00
Received Date: 04/06/11 10:06
Matrix: N/A
Collection Method: Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 04/06/11 08:00
Received Date: 04/06/11 10:06
Matrix: N/A
Collection Method: Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
Benzene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Toluene	15.0 ug/L	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Vinyl Chloride	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Total Xylenes	ND	3.0 ug/L	SW846 8260B	4/14/11 23:51	22-293
Vanadium, Total	ND	0.13 mg/L	EPA 200.7	4/14/11 14:31	22-293
Copper	<1.0 mg/l	0.02 mg/l	EPA 200.7	4/8/11 16:13	AML
Bromoform	ND	1.0 ug/L	SW846 8260B	4/14/11 23:51	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: PW Water
Monitoring Pt: PW Influent
Source Type: Discharge

Collection Date: 04/06/11 08:00
Received Date: 04/06/11 10:06
Matrix: N/A
Collection Method: Grab

04110152	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 228	11.082 pCi/L	pCi/L	HSL-300M	4/19/11 16:14	6502103
Thorium 230	0.100 pCi/L	pCi/L	HSL-300m	4/19/11 16:15	6502103
Thorium 232	0.035 pCi/L	pCi/L	HSL-300m	4/19/11 16:15	6502103

Sample Comments:

BOD: Duplicate analysis recovery was outside established control limits.

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

WATER QUALITY REPORT

#04110153

DISTILLED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: DW Tank
Monitoring Pt: DW Water
Source Type: Discharge

Collection Date: 04/06/11 08:30
Received Date: 04/06/11 10:28
Matrix: N/A
Collection Method: Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
Total Residual Chlorine, Field	0.00 mg/L	0.1 mg/L	HACH 8167	4/6/11 0:00	RCJ
pH	5.77 SU	SU	SM4500 H+B	4/6/11 16:39	AML
Total Dissolved Solids	400 mg/l	5 mg/l	SM 2540 C	4/7/11 14:17	TSA
Total Suspended Solids	< 3 mg/L	3 mg/L	SM 2540 D	4/6/11 16:23	MH
Oil & Grease	1.0 mg/l	5 mg/l	EPA 1664 Rev A	4/8/11 0:00	TO
BOD	38.8 mg/L	2 mg/L	SM5210B	4/7/11 10:46	TSA
COD	51.4 mg/L	10 mg/L	HACH 8000	4/11/11 0:00	TO
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	4/7/11 22:00	22-293
Color	< 5 pccu	5 pccu		4/6/11 10:35	WEH
Temperature (F), Field	97 deg F	deg F	na	4/6/11 0:00	RCJ
Osmotic Pressure	ND	10 mOs/kg	PA DEP	4/8/11 4:25	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	4/6/11 15:09	WEH
Ammonia Nitrogen	3.25 mg/L	.10 mg/L	SM 4500 NH3 D	4/7/11 10:05	WEH

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	04/06/11 08:30
Site:	DW Tank	**Received Date:**	04/06/11 10:28
Monitoring Pt:	DW Water	**Matrix:**	N/A
Source Type:	Discharge	**Collection Method:**	Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
Nitrate	<0.10 mg/l	0.10 mg/l	EPA 300.0	4/7/11 15:04	AML
Nitrite	<0.10 mg/l	0.10 mg/l	EPA 300.0	4/7/11 15:03	AML
Nitrate / Nitrite	<0.20 mg/l	0.20 mg/l	EPA 300.0	4/7/11 15:03	AML
Acidity	<5.0 mg/L	3 mg/L	SM 2310 B	4/7/11 12:58	AML
Alkalinity	12.0 mg/l	5 mg/l	SM 2320 B	4/6/11 16:39	AML
Bicarbonate	12.0 mg/L	5 mg/L	SM4500 CO2 D	4/7/11 10:47	AML
Sulfate	2.1 mg/l	1 mg/l	EPA 300.0	4/7/11 15:02	AML
Chloride	184.2 mg/L	1 mg/L	EPA 300.0	4/7/11 15:05	AML
Fluoride	0.42 mg/l	0.20 mg/l	EPA 300.0	4/7/11 15:04	AML
Calcium	22.2 mg/l	0.10 mg/l	EPA 200.7	4/8/11 16:01	AML
Iron	0.08 mg/l	0.02 mg/l	EPA 200.7	4/7/11 14:53	AML
Iron, Dissolved	0.06 mg/l	0.02 mg/l	EPA 200.7	4/8/11 16:09	AML
Magnesium	2.04 mg/l	0.10 mg/l	EPA 200.7	4/7/11 14:52	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	04/06/11 08:30
Site:	DW Tank	**Received Date:**	04/06/11 10:28
Monitoring Pt:	DW Water	**Matrix:**	N/A
Source Type:	Discharge	**Collection Method:**	Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
Potassium	0.98 mg/l	0.10 mg/l	EPA 200.7	4/7/11 14:51	AML
Sodium	87.9 mg/l	0.10 mg/l	EPA 200.7	4/8/11 16:01	AML
Aluminum	<0.10 mg/l	0.10 mg/l	EPA 200.7	4/7/11 14:48	AML
Arsenic	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:27	AML
Barium	4.54 mg/l	0.10 mg/l	EPA 200.7	4/7/11 14:50	AML
Beryllium, Total	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:26	AML
Cadmium	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:27	AML
Chromium	<0.02 mg/l	0.02 mg/l	EPA 200.7	4/7/11 14:47	AML
Cobalt	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:28	AML
Manganese	0.04 mg/l	0.02 mg/l	EPA 200.7	4/7/11 15:00	AML
Molybdenum	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:28	AML
Nickel	<0.05 mg/l	0.05 mg/l	EPA 200.7	4/7/11 14:48	AML
Selenium	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:28	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: DW Tank
Monitoring Pt: DW Water
Source Type: Discharge

Collection Date: 04/06/11 08:30
Received Date: 04/06/11 10:28
Matrix: N/A
Collection Method: Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
Silver	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:29	AML
Strontium	3.93 mg/l	0.10 mg/l	EPA 200.7	4/7/11 14:49	AML
Thallium	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/14/11 14:29	AML
Tin	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/14/11 14:29	AML
Titanium	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:30	AML
Zinc	0.04 mg/l	0.02 mg/l	EPA 200.7	4/7/11 14:45	AML
Gross Alpha DW	6.49 PCi/L	3 PCi/L	EPA 900	4/12/11 16:10	6502103
Gross Beta DW	0.754 PCi/L	4 PCi/L	EPA 900	4/12/11 16:11	6502103
Radium 226	2.30 pCi/L	.6 pCi/L	EPA 903.1	4/20/11 16:12	6502103
Radium 228	0.490 pCi/L	.9 pCi/L	EPA 904.0	4/20/11 16:13	6502103
Phenolics	0.02 mg/L	0.01 mg/L	EPA 420.4	4/11/11 13:53	22-293
Uranium, Total	ND	0.25 mg/L	SW846 6020A	4/16/11 7:02	22-293
Mercury, Total	ND	0.00050 mg/L	EPA 245.1	4/13/11 11:44	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: DW Tank
Monitoring Pt: DW Water
Source Type: Discharge

Collection Date: 04/06/11 08:30
Received Date: 04/06/11 10:28
Matrix: N/A
Collection Method: Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
Lead	<0.02 mg/L	0.02 mg/L	EPA 200.7	4/7/11 14:47	AML
Lithium, Total	0.13 mg/L	0.050 mg/L	EPA 200.7	4/12/11 15:05	22-293
Boron	0.06 mg/l	0.02 mg/l	EPA 200.7	4/7/11 14:46	AML
Antimony	<0.005 mg/L	0.005 mg/L	EPA 200.7	4/13/11 14:30	AML
Silicon, Total	0.22 mg/L	0.050 mg/L	EPA 200.7	4/15/11 10:53	22-293
Bromide	1.60 mg/l	0.10 mg/l	EPA 300.1	4/7/11 15:05	AML
Hardness, Total	64.0 mg/l	10 mg/l	EPA 200.7	4/8/11 16:07	AML
Heterotrophic Plate Count	7,020 /ml	1 /ml	SM 9215B	4/6/11 15:00	TSA
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	4/6/11 15:00	TSA
E Coli	NA	+/-	SM 9223B	4/6/11 15:00	TSA
Specific Conductance	632.0 umhos/cm	2 umhos/cm	EPA 120.1	4/6/11 15:08	AML
Gasoline Range Organics	ND	100 ug/L	SW846 8015D	4/8/11 23:59	22-293
Diesel Range Organics C10-C28	3.1 mg/L	0.77 mg/L	SW846 8015D	4/18/11 13:33	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: DW Tank
Monitoring Pt: DW Water
Source Type: Discharge

Collection Date: 04/06/11 08:30
Received Date: 04/06/11 10:28
Matrix: N/A
Collection Method: Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
Methane	ND	1.0 ug/L	RSK 175	4/12/11 16:36	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	4/14/11 12:46	22-293
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	4/8/11 12:04	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	4/8/11 12:04	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	4/8/11 12:04	22-293
Total Kjeldahl Nitrogen	4.1 mg/L	2.0 mg/L	SM20-4500-N C	4/12/11 21:00	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	4/11/11 23:07	22-293
Acetone	658 ug/L	10.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Silica, Dissolved	ND	1 mg/L	SM20-4500SiO2C	4/9/11 1:34	22-293
2-Hexanone	ND	5.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
2-Butanone	ND	10.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Ethene	ND	6.0 ug/L	RSK 175	4/12/11 16:44	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: DW Tank
Monitoring Pt: DW Water
Source Type: Discharge

Collection Date: 04/06/11 08:30
Received Date: 04/06/11 10:28
Matrix: N/A
Collection Method: Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
Methanol	ND	1.0 mg/L	SW846 8015D	4/20/11 21:42	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
mp-Xylene	ND	2.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Ethane	ND	3.0 ug/L	RSK 175	4/12/11 16:36	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Bromomethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Carbon Disulfide	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	4/14/11 18:59	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: DW Tank
Monitoring Pt: DW Water
Source Type: Discharge

Collection Date: 04/06/11 08:30
Received Date: 04/06/11 10:28
Matrix: N/A
Collection Method: Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: DW Tank
Monitoring Pt: DW Water
Source Type: Discharge

Collection Date: 04/06/11 08:30
Received Date: 04/06/11 10:28
Matrix: N/A
Collection Method: Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
Benzene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Toluene	1.1 ug/L	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Vinyl Chloride	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Total Xylenes	ND	3.0 ug/L	SW846 8260B	4/14/11 18:59	22-293
Vanadium, Total	ND	0.0025 mg/L	EPA 200.7	4/12/11 15:05	22-293
Copper	0.08 mg/l	0.02 mg/l	EPA 200.7	4/7/11 14:46	AML
Bromoform	ND	1.0 ug/L	SW846 8260B	4/14/11 18:59	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: DW Tank
Monitoring Pt: DW Water
Source Type: Discharge

Collection Date: 04/06/11 08:30
Received Date: 04/06/11 10:28
Matrix: N/A
Collection Method: Grab

04110153	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 228	0.128 pCi/L	pCi/L	HSL-300M	4/20/11 16:14	6502103
Thorium 230	0.113 pCi/L	pCi/L	HSL-300m	4/20/11 16:15	6502103
Thorium 232	-0.009 pCi/L	pCi/L	HSL-300m	4/20/11 16:15	6502103

Sample Comments:

BOD: Duplicate analysis recovery was outside established control limits.

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

APPENDIX D

WATER QUALITY REPORTS

(TEST-BENCH CONCENTRATE WATER AND DISTILLED WATER)

WATER QUALITY REPORT

#02100762

PRODUCED WATER

TEST-BENCH

CONCENTRATE WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resutant CW
Source Type: N/A

Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 232	0.150 pCi/L	pCi/L	HSL-300m	3/19/10 13:34	6502103
Thorium 228	22.7 pCi/L	pCi/L	HSL-300M	3/19/10 13:32	6502103
Thorium 230	0.465 pCi/L	pCi/L	HSL-300m	3/19/10 13:34	6502103
Copper	2.0 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:16	AML
Benzene	1.2 ug/L	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
pH	5.96 SU	SU	SM4500 H+B	2/24/10 15:21	AML
Total Dissolved Solids	345,680 mg/l	5 mg/l	SM 2540 C	2/23/10 11:49	RCS
Total Suspended Solids	176 mg/L	3 mg/L	SM 2540 D	2/23/10 13:00	RCS
Oil & Grease	2.2 mg/l	5 mg/l	EPA 1664 Rev A	2/26/10 12:40	NJD
BOD	62.7 mg/L	2 mg/L	SM5210B	2/24/10 10:35	TO
COD	3800 mg/L	10 mg/L	HACH 8000	3/10/10 7:22	NJD
Surfactants (MBAS)	0.184 mg/L	0.025 mg/L	SM20-5540 C	2/24/10 21:45	22-293
Color	20 pccu	5 pccu		2/23/10 11:16	WEH

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resutant CW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Temperature (F), Field	NA	deg F	na	3/5/10 9:02	RCS
Osmotic Pressure	2970 mOs/kg	10 mOs/kg	PA DEP	2/25/10 6:00	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	2/25/10 8:42	WEH
Ammonia Nitrogen	267 mg/L	.10 mg/L	SM 4500 NH3 D	2/25/10 9:40	WEH
Nitrate	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/24/10 12:52	AML
Nitrite	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/24/10 12:51	AML
Nitrate / Nitrite	<10.0 mg/l	0.20 mg/l	EPA 300.0	2/24/10 12:51	AML
Acidity	236.0 mg/L	3 mg/L	SM 2310 B	2/24/10 16:13	AML
Alkalinity	32.0 mg/l	5 mg/l	SM 2320 B	2/24/10 15:20	AML
Bicarbonate	32.0 mg/L	5 mg/L	SM4500 CO2 D	2/25/10 10:46	AML
Sulfate	550.0 mg/l	1 mg/l	EPA 300.0	2/24/10 12:52	AML
Chloride	205200 mg/L	1 mg/L	EPA 300.0	2/24/10 12:53	AML
Fluoride	10.5 mg/l	0.20 mg/l	EPA 300.0	2/24/10 12:52	AML

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resutant CW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Calcium	29,800 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Iron	2.4 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Iron, Dissolved	<0.4 mg/l	0.02 mg/l	EPA 200.7	3/12/10 13:47	AML
Magnesium	3120.0 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Potassium	1320 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:53	AML
Sodium	85,600 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:53	AML
Aluminum	<2.0 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:25	AML
Arsenic	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Barium	148.0 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:28	AML
Beryllium	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Cadmium	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Chromium	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Cobalt	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resutant CW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Manganese	8.2 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Molybdenum	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML
Nickel	<1.0 mg/l	0.05 mg/l	EPA 200.7	2/26/10 14:51	AML
Selenium	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:58	AML
Silver	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:57	AML
Strontium, Total	4970 mg/L	1.5 mg/L	EPA 200.7	3/5/10 9:10	22-293
Thallium	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:59	AML
Tin	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:02	AML
Titanium	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Zinc	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Gross Alpha DW	1,912 PCi/L	3 PCi/L	EPA 900	3/3/10 11:49	6502103
Gross Beta DW	529 PCi/L	4 PCi/L	EPA 900	3/3/10 11:49	6502103
Radium 226	1,527 pCi/L	.6 pCi/L	EPA 903.1	3/19/10 11:47	6502103

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resutant CW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Radium 228	751 pCi/L	.9 pCi/L	EPA 904.0	3/18/10 11:48	6502103
Total Residual Chlorine	<0.10 mg/L	0.10 mg/L	HACH 8167	2/23/10 15:39	RCS
Phenolics	ND	0.01 mg/L	EPA 420.4	3/1/10 10:11	22-293
Uranium	ND	1.1 mg/L	SW846 6020A	3/8/10 14:52	22-293
Mercury, Total	ND	0.013 mg/L	EPA 245.1	3/1/10 12:01	22-293
Lead	<0.4 mg/L	0.02 mg/L	EPA 200.7	2/26/10 14:51	AML
Lithium, Total	319 mg/L	30.0 mg/L	EPA 200.7	3/5/10 9:10	22-293
Boron	17.4 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:48	AML
Antimony	<1.0 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Silicon, Total	10.0 mg/L	10.0 mg/L	EPA 200.7	3/3/10 11:07	22-293
Bromide	2360.0 mg/l	0.10 mg/l	EPA 300.1	2/24/10 12:53	AML
Hardness, Total	87,259 mg/l	10 mg/l	EPA 200.7	2/26/10 13:43	AML
Heterotrophic Plate Count	32 /ml	1 /ml	SM 9215B	2/23/10 15:14	WEH

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resutant CW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/23/10 15:14	WEH
E Coli	NA	+/-	SM 9223B	2/23/10 15:14	WEH
Specific Conductance	234,000 umhos/cm	2 umhos/cm	EPA 120.1	2/23/10 0:00	WEH
Gasoline Range Organics	ND	500 ug/L	SW846 8015D	3/1/10 20:52	22-293
Diesel Range Organics C10-C28	1.0 mg/L	0.15 mg/L	SW846 8015D	2/28/10 1:53	22-293
Methane	ND	1.0 ug/L	RSK 175	2/26/10 20:39	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	2/25/10 2:54	22-293
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	2/25/10 8:31	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/25/10 8:31	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	2/25/10 8:31	22-293
Total Kjeldahl Nitrogen	42.3 mg/L	1.0 mg/L	SM20-4500-N C	2/27/10 11:00	22-293
Formaldehyde	34.5 mg/L	1.0 mg/L	SW846 8015D	3/4/10 17:41	22-293
Acetone	978 ug/L	10.0 ug/L	SW846 8260B	3/1/10 7:00	22-293

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CWM Environmental
11931 State Route 85
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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resutant CW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Silica, Dissolved	15 mg/L	1 mg/L	SM20-4500SiD	3/2/10 0:15	22-293
2-Hexanone	ND	5.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
2-Butanone	74.0 ug/L	10.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Ethene	ND	3.0 ug/L	RSK 175	2/26/10 20:39	22-293
Methanol	11.3 mg/L	1.0 mg/L	SW846 8015D	3/7/10 20:54	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
mp-Xylene	3.3 ug/L	2.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Ethane	ND	3.0 ug/L	RSK 175	2/26/10 20:39	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293

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CWM Environmental
11931 State Route 85
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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
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Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Bromomethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Carbon Disulfide	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Bromide	2000 mg/L	1000 mg/L	EPA 300	3/2/10 6:42	22-293
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resutant CW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Toluene	3.0 ug/L	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resutant CW
Source Type: N/A

Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:03
Matrix: N/A
Collection Method: Grab

02100762	Result	Reporting Limit	Method	Analysis Date	Analyst
Vinyl Chloride	24.8 ug/L	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Total Xylenes	4.1 ug/L	3.0 ug/L	SW846 8260B	3/1/10 7:00	22-293
Vanadium, Total	ND	1.5 mg/L	EPA 200.7	3/5/10 9:10	22-293
Bromoform	ND	1.0 ug/L	SW846 8260B	3/1/10 7:00	22-293

Sample Comments:

BOD: Unseeded Blank depletion was greater than 0.2 mg/L limit.

Ryan C Shafer, Technical Director

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WATER QUALITY REPORT

#02100763

PRODUCED WATER

TEST-BENCH

DISTILLED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:06
Matrix: N/A
Collection Method: Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 232	0.000 pCi/L	pCi/L	HSL-300m	3/18/10 13:35	6502103
Copper	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:16	AML
Thorium 228	0.177 pCi/L	pCi/L	HSL-300M	3/18/10 13:32	6502103
Thorium 230	0.400 pCi/L	pCi/L	HSL-300m	3/18/10 13:34	6502103
Benzene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
pH	8.58 SU	SU	SM4500 H+B	2/24/10 15:21	AML
Total Dissolved Solids	88 mg/l	5 mg/l	SM 2540 C	2/23/10 11:49	RCS
Total Suspended Solids	<3 mg/L	3 mg/L	SM 2540 D	2/23/10 13:00	RCS
Oil & Grease	2.9 mg/l	5 mg/l	EPA 1664 Rev A	2/26/10 12:40	NJD
BOD	> 75.3	2 mg/L	SM5210B	2/24/10 10:35	TO
COD	185 mg/L	10 mg/L	HACH 8000	3/10/10 7:22	NJD
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	2/24/10 21:45	22-293
Color	< 5 pccu	5 pccu		2/23/10 11:16	WEH

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:06
Matrix: N/A
Collection Method: Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Temperature (F), Field	NA	deg F	na	3/5/10 9:02	RCS
Osmotic Pressure	27 mOs/kg	10 mOs/kg	PA DEP	2/25/10 6:00	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	2/25/10 8:42	WEH
Ammonia Nitrogen	6.99 mg/L	.10 mg/L	SM 4500 NH3 D	2/25/10 9:40	WEH
Nitrate	<0.10 mg/l	0.10 mg/l	EPA 300.0	2/24/10 12:52	AML
Nitrite	<0.10 mg/l	0.10 mg/l	EPA 300.0	2/24/10 12:51	AML
Nitrate / Nitrite	<0.20 mg/l	0.20 mg/l	EPA 300.0	2/24/10 12:51	AML
Acidity	-18.0 mg/L	3 mg/L	SM 2310 B	2/24/10 16:13	AML
Alkalinity	30.0 mg/l	5 mg/l	SM 2320 B	2/24/10 15:20	AML
Bicarbonate	29.0 mg/L	5 mg/L	SM4500 CO2 D	2/25/10 10:46	AML
Sulfate	3.1 mg/l	1 mg/l	EPA 300.0	2/24/10 12:52	AML
Chloride	45.1 mg/L	1 mg/L	EPA 300.0	2/24/10 12:53	AML
Fluoride	0.16 mg/l	0.20 mg/l	EPA 300.0	2/24/10 12:52	AML

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer:	Altela	**Collection Date:**	02/18/10 17:25
Site:	NETL Ross PW	**Received Date:**	02/23/10 11:06
Monitoring Pt:	Resultant DW	**Matrix:**	N/A
Source Type:	N/A	**Collection Method:**	Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Calcium	5.12 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Iron	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Iron, Dissolved	<0.02 mg/l	0.02 mg/l	EPA 200.7	3/12/10 13:47	AML
Magnesium	0.47 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Potassium	0.35 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:53	AML
Sodium	24.8 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:56	AML
Aluminum	<0.10 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:25	AML
Arsenic	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Barium	<0.10 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:28	AML
Beryllium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Cadmium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Chromium	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Cobalt	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML

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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:06
Matrix: N/A
Collection Method: Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Manganese	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Molybdenum	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML
Nickel	<0.05 mg/l	0.05 mg/l	EPA 200.7	2/26/10 14:51	AML
Selenium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:58	AML
Silver	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:57	AML
Strontium, Total	0.70 mg/L	0.0025 mg/L	EPA 200.7	3/1/10 14:34	22-293
Thallium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:59	AML
Tin	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:02	AML
Titanium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Zinc	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Gross Alpha DW	0.685 PCi/L	3 PCi/L	EPA 900	3/3/10 11:49	6502103
Gross Beta DW	0.429 PCi/L	4 PCi/L	EPA 900	3/3/10 11:49	6502103
Radium 226	0.231 pCi/L	.6 pCi/L	EPA 903.1	3/17/10 11:47	6502103

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:06
Matrix: N/A
Collection Method: Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Radium 228	0.434 pCi/L	.9 pCi/L	EPA 904.0	3/11/10 11:48	6502103
Total Residual Chlorine	<0.10 mg/L	0.10 mg/L	HACH 8167	2/23/10 15:39	RCS
Phenolics	0.06 mg/L	0.01 mg/L	EPA 420.4	3/1/10 10:12	22-293
Uranium	ND	1.1 mg/L	SW846 6020A	3/8/10 14:54	22-293
Mercury, Total	ND	0.00050 mg/L	EPA 245.1	3/1/10 12:02	22-293
Lead	<0.02 mg/L	0.02 mg/L	EPA 200.7	2/26/10 14:51	AML
Lithium, Total	ND	0.050 mg/L	EPA 200.7	3/1/10 14:34	22-293
Boron	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:48	AML
Antimony	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Silicon, Total	0.20 mg/L	0.050 mg/L	EPA 200.7	3/3/10 11:11	22-293
Bromide	0.40 mg/l	0.10 mg/l	EPA 300.1	2/24/10 12:53	AML
Hardness, Total	15 mg/l	10 mg/l	EPA 200.7	2/26/10 13:43	AML
Heterotrophic Plate Count	5400 /ml	1 /ml	SM 9215B	2/23/10 15:14	WEH

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:06
Matrix: N/A
Collection Method: Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/23/10 15:14	WEH
E Coli	NA	+/-	SM 9223B	2/23/10 15:14	WEH
Specific Conductance	211 umhos/cm	2 umhos/cm	EPA 120.1	2/23/10 0:00	WEH
Gasoline Range Organics	ND	100 ug/L	SW846 8015D	2/27/10 0:36	22-293
Diesel Range Organics C10-C28	0.53 mg/L	0.15 mg/L	SW846 8015D	2/28/10 3:52	22-293
Methane	ND	1.0 ug/L	RSK 175	2/26/10 20:54	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	2/25/10 3:15	22-293
Alkalinity, Carbonate	9 mg/L	5 mg/L	SM20-2322	2/25/10 8:40	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/25/10 8:40	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	2/25/10 8:40	22-293
Total Kjeldahl Nitrogen	6.0 mg/L	1.0 mg/L	SM20-4500-N C	2/27/10 11:00	22-293
Formaldehyde	1870 mg/L	500 mg/L	SW846 8015D	3/4/10 19:22	22-293
Acetone	195 ug/L	10.0 ug/L	SW846 8260B	2/26/10 19:36	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:06
Matrix: N/A
Collection Method: Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Silica, Dissolved	ND	1 mg/L	SM20-4500SiD	3/2/10 0:15	22-293
2-Hexanone	ND	5.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
2-Butanone	ND	10.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Ethene	ND	3.0 ug/L	RSK 175	2/26/10 20:54	22-293
Methanol	1030 mg/L	100 mg/L	SW846 8015D	3/3/10 19:07	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
mp-Xylene	ND	2.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Ethane	ND	3.0 ug/L	RSK 175	2/26/10 20:54	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:06
Matrix: N/A
Collection Method: Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Bromomethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Carbon Disulfide	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Bromide	0.43 mg/L	0.30 mg/L	EPA 300	2/25/10 9:03	22-293
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:06
Matrix: N/A
Collection Method: Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Toluene	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Ross PW
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/18/10 17:25
Received Date: 02/23/10 11:06
Matrix: N/A
Collection Method: Grab

02100763	Result	Reporting Limit	Method	Analysis Date	Analyst
Vinyl Chloride	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Total Xylenes	ND	3.0 ug/L	SW846 8260B	2/26/10 19:36	22-293
Vanadium, Total	ND	0.0025 mg/L	EPA 200.7	3/1/10 14:34	22-293
Bromoform	ND	1.0 ug/L	SW846 8260B	2/26/10 19:36	22-293

Sample Comments:

BOD: Unseeded Blank depletion was greater than 0.2 mg/L limit.

Ryan C Shafer, Technical Director

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WATER QUALITY REPORT

#02100809

FRAC WATER

TEST-BENCH

CONCENTRATE WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 230	0.554 pCi/L	pCi/L	HSL-300m	3/18/10 13:34	6502103
Thorium 232	0.111 pCi/L	pCi/L	HSL-300m	3/18/10 13:35	6502103
Bromoform	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Copper	0.8 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:16	AML
Thorium 228	2.07 pCi/L	pCi/L	HSL-300M	3/18/10 13:32	6502103
pH	7.58 SU	SU	SM4500 H+B	2/24/10 15:21	AML
Total Dissolved Solids	52,504 mg/l	5 mg/l	SM 2540 C	2/26/10 12:55	RCS
Total Suspended Solids	338 mg/L	3 mg/L	SM 2540 D	2/25/10 14:00	RCS
Oil & Grease	6.4 mg/l	5 mg/l	EPA 1664 Rev A	2/26/10 12:40	NJD
BOD	373 mg/L	2 mg/L	SM5210B	2/25/10 9:38	TO
COD	2275 mg/L	10 mg/L	HACH 8000	3/10/10 7:22	NJD
Surfactants (MBAS)	0.395 mg/L	0.025 mg/L	SM20-5540 C	2/25/10 23:00	22-293
Color	150 pccu	5 pccu		2/24/10 11:47	WEH

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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
Temperature (F), Field	NA	deg F	na	3/5/10 9:02	RCS
Osmotic Pressure	1620 mOs/kg	10 mOs/kg	PA DEP	2/26/10 6:50	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	2/25/10 8:42	WEH
Ammonia Nitrogen	9.04 mg/L	.10 mg/L	SM 4500 NH3 D	2/25/10 9:40	WEH
Nitrate	< 5.0 mg/l	0.10 mg/l	EPA 300.0	2/24/10 0:00	AML
Nitrite	< 5 mg/l	0.10 mg/l	EPA 300.0	2/24/10 0:00	AML
Nitrate / Nitrite	< 10 mg/l	0.20 mg/l	EPA 300.0	2/24/10 0:00	AML
Acidity	14.0 mg/L	3 mg/L	SM 2310 B	2/24/10 16:13	AML
Alkalinity	160.0 mg/l	5 mg/l	SM 2320 B	2/24/10 15:20	AML
Bicarbonate	159.0 mg/L	5 mg/L	SM4500 CO2 D	2/25/10 10:46	AML
Sulfate	240 mg/l	1 mg/l	EPA 300.0	2/24/10 0:00	AML
Chloride	32400 mg/L	1 mg/L	EPA 300.0	2/24/10 0:00	AML
Fluoride	15.5 mg/l	0.20 mg/l	EPA 300.0	2/24/10 0:00	AML

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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
Calcium	2540 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Iron	10.8 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Iron, Dissolved	11.1 mg/l	0.02 mg/l	EPA 200.7	3/12/10 13:47	AML
Magnesium	240.0 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Potassium	180.0 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:53	AML
Sodium	15,840 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:53	AML
Aluminum	<2.0 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:25	AML
Arsenic	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Barium	25.4 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:28	AML
Beryllium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Cadmium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Chromium	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Cobalt	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML

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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
Manganese	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Molybdenum	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML
Nickel	<1.0 mg/l	0.05 mg/l	EPA 200.7	2/26/10 14:51	AML
Selenium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:58	AML
Silver	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:57	AML
Strontium, Total	305 mg/L	0.13 mg/L	EPA 200.7	3/4/10 14:10	22-293
Thallium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:59	AML
Tin	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:02	AML
Titanium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Zinc	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Gross Alpha DW	-92.601 PCi/L	3 PCi/L	EPA 900	3/3/10 11:53	6502103
Gross Beta DW	2.46 PCi/L	4 PCi/L	EPA 900	3/3/10 11:53	6502103
Radium 226	86.2 pCi/L	.6 pCi/L	EPA 903.1	3/17/10 11:54	6502103

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
Radium 228	16.9 pCi/L	.9 pCi/L	EPA 904.0	3/11/10 11:54	6502103
Phenolics	0.06 mg/L	0.01 mg/L	EPA 420.4	3/1/10 11:26	22-293
Uranium	ND	0.050 mg/L	SW846 6020A	3/3/10 21:46	22-293
Mercury, Total	ND	0.00050 mg/L	EPA 245.1	3/1/10 12:03	22-293
Lead	<0.4 mg/L	0.02 mg/L	EPA 200.7	2/26/10 14:51	AML
Lithium, Total	32.0 mg/L	2.5 mg/L	EPA 200.7	3/4/10 14:10	22-293
Boron	10.0 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:48	AML
Antimony	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Silicon, Total	22.1 mg/L	2.5 mg/L	EPA 200.7	3/3/10 11:34	22-293
Bromide	467.5 mg/l	0.10 mg/l	EPA 300.1	2/24/10 0:00	AML
Hardness, Total	7331 mg/l	10 mg/l	EPA 200.7	2/26/10 13:43	AML
Heterotrophic Plate Count	58000 /ml	1 /ml	SM 9215B	2/24/10 15:30	WEH
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/24/10 15:50	WEH

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
E Coli	NA	+/-	SM 9223B	2/24/10 15:50	WEH
Specific Conductance	76,600 umhos/cm	2 umhos/cm	EPA 120.1	2/26/10 0:00	TO
Gasoline Range Organics	2560 ug/L	2500 ug/L	SW846 8015D	3/4/10 1:55	22-293
Diesel Range Organics C10-C28	3.5 mg/L	0.76 mg/L	SW846 8015D	3/3/10 10:17	22-293
Methane	5.5 ug/L	1.0 ug/L	RSK 175	2/26/10 21:12	22-293
Ethylene Glycol	33.2 mg/L	10.0 mg/L	SW846 8015D	3/5/10 20:01	22-293
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	2/26/10 11:22	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/26/10 11:22	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	2/26/10 11:22	22-293
Total Kjeldahl Nitrogen	5.4 mg/L	1.0 mg/L	SM20-4500-N C	3/1/10 19:44	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	3/4/10 18:02	22-293
Acetone	1850 ug/L	50.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Silica, Dissolved	142 mg/L	10 mg/L	SM20-4500SiD	3/2/10 0:15	22-293

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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
2-Hexanone	ND	25.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
4-Methyl-2-Pentanone(MIBK)	ND	25.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
2-Butanone	ND	50.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Ethene	ND	3.0 ug/L	RSK 175	2/26/10 21:12	22-293
Methanol	ND	1.0 mg/L	SW846 8015D	9/8/10 21:51	22-293
o-Xylene	6.4 ug/L	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
mp-Xylene	34.2 ug/L	10.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Chloromethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Ethane	3.5 ug/L	3.0 ug/L	RSK 175	2/26/10 21:12	22-293
Chlorodibromomethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Chloroethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Chloroform	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Bromomethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

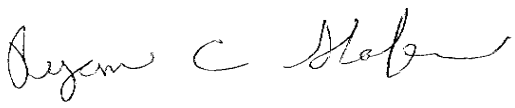
Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
Carbon Disulfide	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Bromide	425 mg/L	150 mg/L	EPA 300	2/26/10 5:06	22-293
Bromochloromethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Bromodichloromethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
1,2-Dibromo-3-chloropropane	ND	35.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
1,2-Dibromoethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
1,1,2,2-Tetrachloroethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
1,1-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
1,1-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
cis-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Methylene Chloride	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
1,2-Dichloropropane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Chlorobenzene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293



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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
Tetrachloroethene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Trichloroethene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
trans-1,2-Dichloroethene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
trans-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
cis-1,3-Dichloropropene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Benzene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Carbon Tetrachloride	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
1,2-Dichloroethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Ethylbenzene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Styrene	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Toluene	11.8 ug/L	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
1,1,1-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
1,1,2-Trichloroethane	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293

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11931 State Route 85
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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:20
Matrix: N/A
Collection Method: Grab

02100809	Result	Reporting Limit	Method	Analysis Date	Analyst
Vinyl Chloride	ND	5.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Total Xylenes	40.6 ug/L	15.0 ug/L	SW846 8260B	2/26/10 21:08	22-293
Vanadium, Total	ND	0.13 mg/L	EPA 200.7	3/4/10 14:10	22-293

Sample Comments:

BOD: Unseeded Blank depletion was greater than 0.2 mg/L limit.

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

WATER QUALITY REPORT

#02100810

FRAC WATER

TEST-BENCH

DISTILLED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 230	0.244 pCi/L	pCi/L	HSL-300m	3/18/10 13:34	6502103
Thorium 232	0.027 pCi/L	pCi/L	HSL-300m	3/18/10 13:35	6502103
Bromoform	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Copper	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:16	AML
Thorium 228	0.236 pCi/L	pCi/L	HSL-300M	3/18/10 13:32	6502103
pH	9.22 SU	SU	SM4500 H+B	2/24/10 15:21	AML
Total Dissolved Solids	198 mg/l	5 mg/l	SM 2540 C	2/26/10 12:55	RCS
Total Suspended Solids	<3 mg/L	3 mg/L	SM 2540 D	2/25/10 14:00	RCS
Oil & Grease	1.3 mg/l	5 mg/l	EPA 1664 Rev A	2/26/10 12:40	NJD
BOD	74.3 mg/L	2 mg/L	SM5210B	2/25/10 9:38	TO
COD	194 mg/L	10 mg/L	HACH 8000	3/10/10 7:22	NJD
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	2/25/10 23:00	22-293
Color	< 5 pccu	5 pccu		2/24/10 11:47	WEH

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
Temperature (F), Field	NA	deg F	na	3/5/10 9:02	RCS
Osmotic Pressure	ND	10 mOs/kg	PA DEP	2/26/10 6:50	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	2/25/10 8:42	WEH
Ammonia Nitrogen	8.22 mg/L	.10 mg/L	SM 4500 NH3 D	2/25/10 9:40	WEH
Nitrate	< 0.10 mg/l	0.10 mg/l	EPA 300.0	2/24/10 0:00	AML
Nitrite	< 0.10 mg/l	0.10 mg/l	EPA 300.0	2/24/10 0:00	AML
Nitrate / Nitrite	< 0.20 mg/l	0.20 mg/l	EPA 300.0	2/24/10 0:00	AML
Acidity	-118.0 mg/L	3 mg/L	SM 2310 B	2/24/10 16:13	AML
Alkalinity	38.0 mg/l	5 mg/l	SM 2320 B	2/24/10 15:20	AML
Bicarbonate	32.0 mg/L	5 mg/L	SM4500 CO2 D	2/25/10 10:46	AML
Sulfate	2.4 mg/l	1 mg/l	EPA 300.0	2/24/10 0:00	AML
Chloride	23.2 mg/L	1 mg/L	EPA 300.0	2/24/10 0:00	AML
Fluoride	0.14 mg/l	0.20 mg/l	EPA 300.0	2/24/10 0:00	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
Calcium	1.91 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Iron	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Iron, Dissolved	0.04 mg/l	0.02 mg/l	EPA 200.7	3/12/10 13:47	AML
Magnesium	0.17 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Potassium	0.14 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:53	AML
Sodium	14.3 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:56	AML
Aluminum	<0.10 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:25	AML
Arsenic	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Barium	<0.10 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:28	AML
Beryllium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Cadmium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Chromium	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Cobalt	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
Manganese	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Molybdenum	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML
Nickel	<0.05 mg/l	0.05 mg/l	EPA 200.7	2/26/10 14:51	AML
Selenium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:58	AML
Silver	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:57	AML
Strontium, Total	0.23 mg/L	0.0025 mg/L	EPA 200.7	3/1/10 19:48	22-293
Thallium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:59	AML
Tin	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:02	AML
Titanium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Zinc	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Gross Alpha DW	-0.127 PCi/L	3 PCi/L	EPA 900	3/3/10 11:53	6502103
Gross Beta DW	0.481 PCi/L	4 PCi/L	EPA 900	3/3/10 11:53	6502103
Radium 226	0.144 pCi/L	.6 pCi/L	EPA 903.1	3/17/10 11:54	6502103

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
Radium 228	0.238 pCi/L	.9 pCi/L	EPA 904.0	3/11/10 11:54	6502103
Phenolics	0.06 mg/L	0.01 mg/L	EPA 420.4	3/1/10 11:27	22-293
Uranium	ND	0.0050 mg/L	SW846 6020A	3/3/10 21:17	22-293
Mercury, Total	ND	0.00050 mg/L	EPA 245.1	3/1/10 12:04	22-293
Lead	<0.02 mg/L	0.02 mg/L	EPA 200.7	2/26/10 14:51	AML
Lithium, Total	ND	0.050 mg/L	EPA 200.7	3/1/10 19:48	22-293
Boron	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:48	AML
Antimony	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Silicon, Total	0.12 mg/L	0.050 mg/L	EPA 200.7	3/3/10 11:55	22-293
Bromide	0.23 mg/l	0.10 mg/l	EPA 300.1	2/24/10 0:00	AML
Hardness, Total	<10 mg/l	10 mg/l	EPA 200.7	2/26/10 13:43	AML
Heterotrophic Plate Count	5000 /ml	1 /ml	SM 9215B	2/24/10 15:30	WEH
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/24/10 15:50	WEH

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
E Coli	NA	+/-	SM 9223B	2/24/10 15:50	WEH
Specific Conductance	130 umhos/cm	2 umhos/cm	EPA 120.1	2/26/10 0:00	TO
Gasoline Range Organics	266 ug/L	100 ug/L	SW846 8015D	3/2/10 5:54	22-293
Diesel Range Organics C10-C28	1.4 mg/L	0.15 mg/L	SW846 8015D	3/2/10 19:28	22-293
Methane	ND	1.0 ug/L	RSK 175	3/2/10 14:54	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	3/5/10 20:21	22-293
Alkalinity, Carbonate	15 mg/L	5 mg/L	SM20-2322	2/26/10 11:30	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/26/10 11:30	22-293
Alkalinity, Phenolphthalein	7 mg/L	5 mg/L	SM20-2320 B	2/26/10 11:30	22-293
Total Kjeldahl Nitrogen	7.2 mg/L	1.0 mg/L	SM20-4500-N C	3/2/10 12:30	22-293
Formaldehyde	71.4 mg/L	1.0 mg/L	SW846 8015D	3/4/10 18:14	22-293
Acetone	985 ug/L	10.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Silica, Dissolved	ND	1 mg/L	SM20-4500SiD	3/2/10 0:15	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
2-Hexanone	ND	5.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
2-Butanone	ND	10.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Ethene	ND	3.0 ug/L	RSK 175	3/2/10 14:54	22-293
Methanol	22.3 mg/L	1.0 mg/L	SW846 8015D	9/8/10 22:07	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
mp-Xylene	ND	2.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Ethane	ND	3.0 ug/L	RSK 175	3/2/10 14:54	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Bromomethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A
Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
Carbon Disulfide	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Bromide	0.21 mg/L	0.10 mg/L	EPA 300	2/26/10 5:21	22-293
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Benzene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Toluene	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Frac Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/22/10 14:45
Received Date: 02/24/10 10:21
Matrix: N/A
Collection Method: Grab

02100810	Result	Reporting Limit	Method	Analysis Date	Analyst
Vinyl Chloride	ND	1.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Total Xylenes	ND	3.0 ug/L	SW846 8260B	2/26/10 20:37	22-293
Vanadium, Total	ND	0.0025 mg/L	EPA 200.7	3/1/10 19:48	22-293

Sample Comments:

BOD: Unseeded Blank depletion was greater than 0.2 mg/L limit.

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

WATER QUALITY REPORT

#02100864

FRAC FLOW-BACK WATER

TEST-BENCH

CONCENTRATE WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 228	5.31 pCi/L	pCi/L	HSL-300M	3/19/10 13:35	6502103
Thorium 230	0.635 pCi/L	pCi/L	HSL-300m	3/19/10 13:36	6502103
Thorium 232	0.276 pCi/L	pCi/L	HSL-300m	3/19/10 13:36	6502103
Copper	0.8 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:16	AML
Bromoform	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
pH	6.90 SU	SU	SM4500 H+B	2/25/10 15:10	AML
Total Dissolved Solids	113,460 mg/l	5 mg/l	SM 2540 C	2/26/10 12:55	RCS
Total Suspended Solids	32 mg/L	3 mg/L	SM 2540 D	2/25/10 14:00	RCS
Oil & Grease	1.4 mg/l	5 mg/l	EPA 1664 Rev A	2/26/10 12:40	NJD
BOD	> 379	2 mg/L	SM5210B	2/26/10 9:13	TO
COD	1040 mg/L	10 mg/L	HACH 8000	3/10/10 7:22	NJD
Surfactants (MBAS)	0.184 mg/L	0.025 mg/L	SM20-5540 C	2/26/10 21:45	22-293
Color	250 pccu	5 pccu		2/25/10 11:36	WEH

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
Temperature (F), Field	NA	deg F	na	3/5/10 9:02	RCS
Osmotic Pressure	3440 mOs/kg	10 mOs/kg	PA DEP	2/27/10 4:35	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	3/3/10 13:51	WEH
Ammonia Nitrogen	28.2 mg/L	.10 mg/L	SM 4500 NH3 D	3/4/10 14:58	WEH
Nitrate	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/26/10 10:43	AML
Nitrite	<5.0 mg/l	0.10 mg/l	EPA 300.0	2/26/10 10:44	AML
Nitrate / Nitrite	<10.0 mg/l	0.20 mg/l	EPA 300.0	2/26/10 10:43	AML
Acidity	50.0 mg/L	3 mg/L	SM 2310 B	2/25/10 15:09	AML
Alkalinity	148.0 mg/l	5 mg/l	SM 2320 B	2/25/10 15:10	AML
Bicarbonate	148.0 mg/L	5 mg/L	SM4500 CO2 D	2/25/10 10:46	AML
Sulfate	275.0 mg/l	1 mg/l	EPA 300.0	2/26/10 10:45	AML
Chloride	64,800 mg/L	1 mg/L	EPA 300.0	2/26/10 10:42	AML
Fluoride	12.0 mg/l	0.20 mg/l	EPA 300.0	2/26/10 10:45	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
Calcium	6780 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Iron	16.6 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Iron, Dissolved	16.7 mg/l	0.02 mg/l	EPA 200.7	3/12/10 13:47	AML
Magnesium	660.0 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Potassium	360.0 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:53	AML
Sodium	32,200 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:53	AML
Aluminum	<2.0 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:25	AML
Arsenic	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Barium	45.4 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:28	AML
Beryllium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Cadmium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Chromium	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Cobalt	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
Manganese	2.6 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Molybdenum	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML
Nickel	<1.0 mg/l	0.05 mg/l	EPA 200.7	2/26/10 14:51	AML
Selenium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:58	AML
Silver	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:57	AML
Strontium, Total	788 mg/L	0.25 mg/L	EPA 200.7	3/4/10 10:25	22-293
Thallium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:59	AML
Tin	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:02	AML
Titanium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Zinc	<0.4 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Gross Alpha DW	15.8 PCi/L	3 PCi/L	EPA 900	3/3/10 11:56	6502103
Gross Beta DW	86.5 PCi/L	4 PCi/L	EPA 900	3/3/10 11:57	6502103
Radium 226	46.6 pCi/L	.6 pCi/L	EPA 903.1	3/17/10 11:58	6502103

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
Radium 228	17.9 pCi/L	.9 pCi/L	EPA 904.0	3/18/10 11:58	6502103
Phenolics	0.02 mg/L	0.01 mg/L	EPA 420.4	3/1/10 11:48	22-293
Uranium	ND	0.050 mg/L	SW846 6020A	3/3/10 21:56	22-293
Mercury, Total	ND	0.010 mg/L	EPA 200.8	3/4/10 8:29	22-293
Lead	<0.4 mg/L	0.02 mg/L	EPA 200.7	2/26/10 14:51	AML
Lithium, Total	66.1 mg/L	5.0 mg/L	EPA 200.7	3/4/10 10:25	22-293
Boron	17.0 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:48	AML
Antimony	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Silicon, Total	26.6 mg/L	5.0 mg/L	EPA 200.7	3/3/10 11:59	22-293
Bromide	995.0 mg/l	0.10 mg/l	EPA 300.1	2/26/10 10:44	AML
Hardness, Total	19,648 mg/l	10 mg/l	EPA 200.7	2/26/10 13:43	AML
Heterotrophic Plate Count	8,200 /ml	1 /ml	SM 9215B	2/25/10 15:37	WEH
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/25/10 15:35	WEH

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
E Coli	NA	+/-	SM 9223B	2/25/10 15:35	WEH
Specific Conductance	143,500 umhos/cm	2 umhos/cm	EPA 120.1	2/26/10 0:00	TO
Gasoline Range Organics	2850 ug/L	2500 ug/L	SW846 8015D	3/4/10 1:21	22-293
Diesel Range Organics C10-C28	5.1 mg/L	0.75 mg/L	SW846 8015D	3/3/10 11:16	22-293
Methane	ND	1.0 ug/L	RSK 175	3/2/10 15:10	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	3/6/10 1:13	22-293
Alkalinity, Carbonate	ND	5 mg/L	SM20-2322	2/27/10 7:14	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/27/10 7:14	22-293
Alkalinity, Phenolphthalein	ND	5 mg/L	SM20-2320 B	2/27/10 7:14	22-293
Total Kjeldahl Nitrogen	47.0 mg/L	4.0 mg/L	SM20-4500-N C	3/8/10 11:20	22-293
Formaldehyde	ND	1.0 mg/L	SW846 8015D	3/4/10 18:25	22-293
Acetone	661 ug/L	10.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Silica, Dissolved	14 mg/L	1 mg/L	SM20-4500SiD	3/2/10 0:15	22-293

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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
2-Hexanone	ND	5.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
2-Butanone	46.6 ug/L	10.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Ethene	ND	3.0 ug/L	RSK 175	3/2/10 15:10	22-293
Methanol	ND	1.0 mg/L	SW846 8015D	9/8/10 22:22	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
mp-Xylene	3.5 ug/L	2.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Ethane	ND	3.0 ug/L	RSK 175	3/2/10 15:10	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Bromomethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293

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CWM Environmental
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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
Carbon Disulfide	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Bromide	825 mg/L	150 mg/L	EPA 300	2/27/10 9:17	22-293
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293

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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Benzene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Toluene	1.3 ug/L	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant CW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:10
Matrix: N/A
Collection Method: Grab

02100864	Result	Reporting Limit	Method	Analysis Date	Analyst
Vinyl Chloride	ND	1.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Total Xylenes	4.3 ug/L	3.0 ug/L	SW846 8260B	3/1/10 23:39	22-293
Vanadium, Total	ND	0.25 mg/L	EPA 200.7	3/4/10 10:25	22-293

Sample Comments:

None

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WATER QUALITY REPORT

#02100865

FRAC FLOW-BACK WATER

TEST-BENCH

DISTILLED WATER

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
Thorium 228	0.143 pCi/L	pCi/L	HSL-300M	3/18/10 13:35	6502103
Thorium 230	0.126 pCi/L	pCi/L	HSL-300m	3/18/10 13:36	6502103
Thorium 232	0.000 pCi/L	pCi/L	HSL-300m	3/18/10 13:37	6502103
Copper	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:16	AML
Bromoform	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
pH	9.94 SU	SU	SM4500 H+B	2/25/10 15:10	AML
Total Dissolved Solids	76 mg/l	5 mg/l	SM 2540 C	2/26/10 12:55	RCS
Total Suspended Solids	<3 mg/L	3 mg/L	SM 2540 D	2/25/10 14:00	RCS
Oil & Grease	1.2 mg/l	5 mg/l	EPA 1664 Rev A	2/26/10 12:40	NJD
BOD	> 75.3	2 mg/L	SM5210B	2/26/10 9:13	TO
COD	410 mg/L	10 mg/L	HACH 8000	3/10/10 7:22	NJD
Surfactants (MBAS)	ND	0.025 mg/L	SM20-5540 C	2/26/10 21:45	22-293
Color	< 5 pccu	5 pccu		2/25/10 11:36	WEH

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CWM Environmental
11931 State Route 85
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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
Temperature (F), Field	NA	deg F	na	3/5/10 9:02	RCS
Osmotic Pressure	ND	10 mOs/kg	PA DEP	2/27/10 4:35	22-293
Ammonia Distillation	Completed	mg/L	SM 4500 NH3 B	3/3/10 13:51	WEH
Ammonia Nitrogen	9.64 mg/L	.10 mg/L	SM 4500 NH3 D	3/4/10 14:58	WEH
Nitrate	0.19 mg/l	0.10 mg/l	EPA 300.0	2/26/10 10:43	AML
Nitrite	<0.10 mg/l	0.10 mg/l	EPA 300.0	2/26/10 10:44	AML
Nitrate / Nitrite	0.29 mg/l	0.20 mg/l	EPA 300.0	2/26/10 10:43	AML
Acidity	- 22.0 mg/L	3 mg/L	SM 2310 B	2/25/10 15:09	AML
Alkalinity	48.0 mg/l	5 mg/l	SM 2320 B	2/25/10 15:10	AML
Bicarbonate	24.0 mg/L	5 mg/L	SM4500 CO2 D	2/25/10 10:46	AML
Sulfate	2.2 mg/l	1 mg/l	EPA 300.0	2/26/10 10:45	AML
Chloride	35.4 mg/L	1 mg/L	EPA 300.0	2/26/10 10:42	AML
Fluoride	0.15 mg/l	0.20 mg/l	EPA 300.0	2/26/10 10:45	AML

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Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
Calcium	3.81 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Iron	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Iron, Dissolved	0.02 mg/l	0.02 mg/l	EPA 200.7	3/12/10 13:47	AML
Magnesium	0.36 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:52	AML
Potassium	0.19 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:53	AML
Sodium	18.6 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:56	AML
Aluminum	<0.10 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:25	AML
Arsenic	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Barium	<0.10 mg/l	0.10 mg/l	EPA 200.7	2/26/10 14:28	AML
Beryllium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Cadmium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:00	AML
Chromium	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Cobalt	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML

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Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
Manganese	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:26	AML
Molybdenum	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:59	AML
Nickel	<0.05 mg/l	0.05 mg/l	EPA 200.7	2/26/10 14:51	AML
Selenium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:58	AML
Silver	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 13:57	AML
Strontium, Total	0.47 mg/L	0.0025 mg/L	EPA 200.7	3/4/10 12:30	22-293
Thallium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:59	AML
Tin	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:02	AML
Titanium	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Zinc	0.16 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:49	AML
Gross Alpha DW	-0.125 PCi/L	3 PCi/L	EPA 900	3/3/10 11:56	6502103
Gross Beta DW	-0.088 PCi/L	4 PCi/L	EPA 900	3/3/10 11:57	6502103
Radium 226	0.0917 pCi/L	.6 pCi/L	EPA 903.1	3/17/10 11:58	6502103

Ryan C Shafer, Technical Director

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CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
Radium 228	-0.134 pCi/L	.9 pCi/L	EPA 904.0	3/11/10 11:59	6502103
Phenolics	0.05 mg/L	0.01 mg/L	EPA 420.4	3/1/10 11:49	22-293
Uranium	ND	0.0050 mg/L	SW846 6020A	3/3/10 21:37	22-293
Mercury, Total	ND	0.0010 mg/L	EPA 200.8	3/4/10 8:19	22-293
Lead	<0.02 mg/L	0.02 mg/L	EPA 200.7	2/26/10 14:51	AML
Lithium, Total	ND	0.050 mg/L	EPA 200.7	3/4/10 12:30	22-293
Boron	<0.02 mg/l	0.02 mg/l	EPA 200.7	2/26/10 14:48	AML
Antimony	<0.5 mg/L	0.001 mg/L	EPA 200.7	3/10/10 14:01	AML
Silicon, Total	0.089 mg/L	0.050 mg/L	EPA 200.7	3/3/10 12:04	22-293
Bromide	0.40 mg/l	0.10 mg/l	EPA 300.1	2/26/10 10:44	AML
Hardness, Total	11 mg/l	10 mg/l	EPA 200.7	2/26/10 13:43	AML
Heterotrophic Plate Count	55,000 /ml	1 /ml	SM 9215B	2/25/10 15:37	WEH
Total Coliform	0 /100 mls	0 /100 mls	SM 9223B	2/25/10 15:35	WEH

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CWM Environmental
11931 State Route 85
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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
E Coli	NA	+/-	SM 9223B	2/25/10 15:35	WEH
Specific Conductance	184 umhos/cm	2 umhos/cm	EPA 120.1	2/26/10 0:00	TO
Gasoline Range Organics	154 ug/L	100 ug/L	SW846 8015D	3/2/10 5:19	22-293
Diesel Range Organics C10-C28	1.7 mg/L	0.15 mg/L	SW846 8015D	3/2/10 22:31	22-293
Methane	ND	1.0 ug/L	RSK 175	2/26/10 21:26	22-293
Ethylene Glycol	ND	10.0 mg/L	SW846 8015D	3/6/10 1:34	22-293
Alkalinity, Carbonate	20 mg/L	5 mg/L	SM20-2322	2/27/10 7:22	22-293
Alkalinity, Hydroxide	ND	5 mg/L	SM20-2320 B	2/27/10 7:22	22-293
Alkalinity, Phenolphthalein	10 mg/L	5 mg/L	SM20-2320 B	2/27/10 7:22	22-293
Total Kjeldahl Nitrogen	9.8 mg/L	1.0 mg/L	SM20-4500-N C	3/3/10 14:00	22-293
Formaldehyde	41.4 mg/L	1.0 mg/L	SW846 8015D	3/4/10 18:37	22-293
Acetone	5230 ug/L	200 ug/L	SW846 8260B	3/2/10 0:40	22-293
Silica, Dissolved	ND	1 mg/L	SM20-4500SiD	3/2/10 0:15	22-293

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724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
2-Hexanone	ND	5.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
4-Methyl-2-Pentanone(MIBK)	ND	5.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
2-Butanone	ND	10.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Ethene	ND	3.0 ug/L	RSK 175	2/26/10 21:26	22-293
Methanol	27.4 mg/L	1.0 mg/L	SW846 8015D	9/8/10 22:37	22-293
o-Xylene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
mp-Xylene	ND	2.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Chloromethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Ethane	ND	3.0 ug/L	RSK 175	2/26/10 21:26	22-293
Chlorodibromomethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Chloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Chloroform	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Bromomethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
Carbon Disulfide	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Bromide	0.38 mg/L	0.30 mg/L	EPA 300	2/27/10 9:32	22-293
Bromochloromethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Bromodichloromethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
1,2-Dibromo-3-chloropropane	ND	7.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
1,2-Dibromoethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
1,1,2,2-Tetrachloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
1,1-Dichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
1,1-Dichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
cis-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Methylene Chloride	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
1,2-Dichloropropane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Chlorobenzene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
Tetrachloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Trichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
trans-1,2-Dichloroethene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
trans-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
cis-1,3-Dichloropropene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Benzene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Carbon Tetrachloride	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
1,2-Dichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Ethylbenzene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Styrene	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Toluene	2.2 ug/L	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
1,1,1-Trichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
1,1,2-Trichloroethane	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011

Lab # 03-457

Lab Analysis Report

Customer: Altela
Site: NETL Flowback Water
Monitoring Pt: Resultant DW
Source Type: N/A

Collection Date: 02/23/10 17:55
Received Date: 02/25/10 11:11
Matrix: N/A
Collection Method: Grab

02100865	Result	Reporting Limit	Method	Analysis Date	Analyst
Vinyl Chloride	ND	1.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Total Xylenes	ND	3.0 ug/L	SW846 8260B	3/1/10 12:09	22-293
Vanadium, Total	ND	0.0025 mg/L	EPA 200.7	3/4/10 12:30	22-293

Sample Comments:

None

Ryan C Shafer, Technical Director

Analyte names in bold are listed under the laboratory's current NELAP scope of accreditation.

APPENDIX E

MASS BALANCE ANALYSIS

MASS BALANCE ANALYSIS

OF

FRAC WATER

Altela Mass Balance of Frac Water											
Raw Water (RW); Lab #02100193 >		194.00 gals									
Concentrate Water (CW); Lab #02100809 >		54.00 gals									
Distilled Water (DW); Lab #02100810 >		140.00 gals									
		CWM WATER QUALITY RESULTS				MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)		RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
GENERAL PARAMETERS											
Acidity	mg/L	-136.000	14.000	-18.000							
Hardness, Total	mg/L	2621.000	7331.000	15.000		1927.12	1500.36	7.96	1508.32	418.80	21.73
Calcium	mg/L	915.000	2540.000	5.120		672.76	519.84	2.72	522.55	150.21	22.33
Magnesium	mg/L	81.600	240.000	0.470		60.00	49.12	0.25	49.37	10.63	17.72
Alkalinity	mg/L	230.000	160.000	30.000							
Bicarbonate	mg/L	229.000	159.000	29.000		168.37	32.54	15.39	47.93	120.45	71.53
Total Dissolved Solids	mg/L	19630.000	52504.000	88.000		14433.15	10745.47	46.69	10792.16	3640.99	25.23
Specific Conductance	uS/CM	29400.000	76600.000	211.000							
Chloride	mg/L	9500.000	32400.000	45.100		6984.97	6630.98	23.93	6654.91	330.06	4.73
Fluoride	mg/L	27.000	15.500	0.160		19.85	3.17	0.08	3.26	16.59	83.59
Sodium	mg/L	5250.000	15840.000	24.800		3860.12	3241.81	13.16	3254.97	605.14	15.68
Total Suspended Solids	mg/L	15.000	338.000	0.000		11.03	69.18	0.00	69.18	-58.15	-527.22
Total Residual Chlorine	mg/L	< 0.100	0.000	0.000							
Ammonia Distillation	mg/L	0.000	Completed	Completed							
Ammonia Nitrogen	mg/L	0.000	9.040	6.990							
Total Kjeldahl Nitrogen		29.600	5.400	6.000		21.76	1.11	3.18	4.29	17.47	80.29
BOD	mg/L	> 76.000	373.000	373.000							
COD	mg/L	1253.000	2275.000	185.000							
E Coli		NA	NA	NA							
Total Coliform	/100 mls	0.000	0.000	0.000							
Heterotrophic Plate Count	/ml	24600.000	58000.000	5400.000							
Color	pccu	100.000	150.000	0.000							
MBAS	mg/L	0.328	0.395	0.000							
pH	SU	7.530	7.580	8.580							
Oil & Grease	mg/L	3.200	6.400	2.900		2.35	1.31	1.54	2.85	-0.50	-21.07
Osmotic Pressure	mOs/KG	533.000	1620.000	27.000							
Temperature (F), Field	deg F	71.000									
Gross Alpha DW	pCi/L	27.000	0.000	0.685		19.85	0.00	0.36	0.36	19.49	98.17
Gross Beta DW	pCi/L	36.000	2.460	0.429		26.47	0.50	0.23	0.73	25.74	97.24

Altela Mass Balance of Frac Water											
Raw Water (RW); Lab #02100193 >		194.00 gals									
Concentrate Water (CW); Lab #02100809 >		54.00 gals									
Distilled Water (DW); Lab #02100810 >		140.00 gals									
		CWM WATER QUALITY RESULTS				MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)		RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
SPECIFIC IONS											
Barium	mg/L	17.100	25.400	0.000		12.57	5.20	0.00	5.20	7.37	58.65
Boron	mg/L	4.400	10.000	0.000		3.24	2.05	0.00	2.05	1.19	36.74
Bromide	mg/L	141.000	467.500	0.430		103.67	95.68	0.23	95.91	7.76	7.49
Bromide	mg/L	150.000	467.500	0.430		110.29	95.68	0.23	95.91	14.38	13.04
Cobalt	mg/L	0.031	< 0.500	0.000		0.02	< 0.10	# 0.00	# 0.10	-0.08	-348.95
Copper	mg/L	0.460	0.800	0.000		0.34	0.16	0.00	0.16	0.17	51.59
Iron	mg/L	5.600	10.800	0.000		4.12	2.21	0.00	2.21	1.91	46.32
Iron, Dissolved	mg/L	4.200	11.100	0.000		3.09	2.27	0.00	2.27	0.82	26.44
Lithium, Total	mg/L	10.700	32.000	0.000		7.87	6.55	0.00	6.55	1.32	16.75
Manganese	mg/L	0.800	< 0.400	0.000		0.59	< 0.08	# 0.00	# 0.08	0.51	86.08
Molybdenum	mg/L	0.018	< 0.500	0.000		0.01	< 0.10	# 0.00	# 0.10	-0.09	-673.20
Phenolics	mg/L	0.050	0.060	0.060		0.04	0.01	0.03	0.04	-0.01	-20.00
Potassium	mg/L	55.300	180.000	0.350		40.66	36.84	0.19	37.02	3.64	8.94
Radium 226	pCi/L	46.000	0.000	0.231		33.82	0.00	0.12	0.12	33.70	99.64
Radium 228	pCi/L	17.000	0.000	0.434		12.50	0.00	0.23	0.23	12.27	98.16
Silica, Dissolved	mg/L	54.000	142.000	0.000		39.70	29.06	0.00	29.06	10.64	26.80
Silicon, Total	mg/L	6.700	22.100	0.200		4.93	4.52	0.11	4.63	0.30	6.03
Strontium	mg/L	97.500	305.000	0.700		71.69	62.42	0.37	62.79	8.90	12.41
Sulfate	mg/L	155.000	240.000	3.100		113.97	49.12	1.64	50.76	63.20	55.46
ORGANICS											
Acetone	mg/L	0.304	1.850	0.195		0.22	0.38	0.10	0.48	-0.26	-115.68
Gasoline Range Organics	mg/L	2.100	2.560	0.000		1.54	0.52	0.00	0.52	1.02	66.07
Benzene	mg/L	0.218	0.000	0.000		0.16	# 0.00	# 0.00	# 0.00	0.16	100.00
mp-Xylene	mg/L	0.048	0.034	0.000		0.03	0.01	0.00	0.01	0.03	79.96
o-Xylene	mg/L	0.019	0.006	0.000		0.01	0.00	0.00	0.00	0.01	90.52
Total Xylenes	mg/L	0.066	0.041	0.000		0.05	0.01	0.00	0.01	0.04	82.93
Toluene	mg/L	0.228	0.012	0.000		0.17	0.00	0.00	0.00	0.17	98.56
Diesel Range Organic C10-C28	mg/L	28.400	3.500	0.530		20.88	0.72	0.28	1.00	19.88	95.22
Ethane	mg/L	0.140	0.004	0.000		0.10	0.00	0.00	0.00	0.10	99.30
Formaldehyde	mg/L	110.000	1.000	1.870		80.88	# 0.20	# 0.99	# 1.20	79.68	98.52
Methane	mg/L	0.848	0.006	0.000		0.62	0.00	0.00	0.00	0.62	99.82
Methanol	mg/L	50.100	0.000	1.030		36.84	# 0.00	# 0.55	# 0.55	36.29	98.52

Altela Mass Balance of Frac Water

Raw Water (RW); Lab #02100193 >	194.00 gals
Concentrate Water (CW); Lab #02100809 >	54.00 gals
Distilled Water (DW); Lab #02100810 >	140.00 gals

		CWM WATER QUALITY RESULTS			MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)	RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
CONSTITUENTS TESTED BELOW DETECTABLE LIMITS IN THE PRIMARY SOLUTION - NO MASS BALANCE CALCULATIONS PROVIDED										
SPECIFIC IONS										
Alkalinity, Carbonate	mg/L	< 5.000	< 5.000	9.000						
Alkalinity, Hydroxide	mg/L	< 5.000	< 5.000	< 0.000						
Alkalinity, Phenolphthalein	mg/L	< 5.000	< 5.000	< 0.000						
Aluminum	mg/L	< 2.000	< 2.000	< 0.100						
Antimony	mg/L	< 0.500	< 0.500	< 0.500						
Arsenic	mg/L	< 0.500	< 0.500	< 0.500						
Beryllium	mg/L	< 0.500	< 0.500	< 0.100						
Cadmium	mg/L	< 0.500	< 0.500	< 0.500						
Chromium	mg/L	< 0.400	< 0.400	< 0.020						
Lead	mg/L	< 0.400	< 0.400	< 0.020						
Mercury	mg/L	< 0.002	< 0.002	< 0.002						
Nickel	mg/L	< 0.050	< 0.050	< 0.050						
Nitrate	mg/L	< 0.100	< 5.000	< 0.100						
Nitrate / Nitrite	mg/L	< 0.200	< 10.000	< 0.200						
Nitrite	mg/L	< 0.100	< 5.000	< 0.100						
Selenium	mg/L	< 0.500	< 0.500	< 0.500						
Silver	mg/L	< 0.500	< 0.500	< 0.500						
Thallium	mg/L	0.015	< 0.500	0.000						
Tin	mg/L	< 0.500	< 0.500	< 0.500						
Titanium	mg/L	< 0.500	< 0.500	< 0.500						
Uranium	mg/L	< 0.100	< 0.050	< 0.000						
Vanadium	mg/L	< 0.063	< 0.130	< 0.130						
Vinyl Chloride	mg/L	< 0.005	< 0.005	< 0.005						
Zinc	mg/L	< 0.400	< 0.400	< 0.020						
ORGANICS										
1,1,1-Trichloroethane	mg/L	< 0.005	< 0.005	< 0.005						
1,1,2,2-Tetrachloroethane	mg/L	< 0.005	< 0.005	< 0.005						
1,1,2-Trichloroethane	mg/L	< 0.005	< 0.005	< 0.005						
1,1-Dichloroethane	mg/L	< 0.005	< 0.005	< 0.005						
1,1-Dichloroethene	mg/L	< 0.005	< 0.005	< 0.005						
1,2 Dibromoethane	mg/L	< 0.005	< 0.005	< 0.005						

Altela Mass Balance of Frac Water												
Raw Water (RW); Lab #02100193 >		194.00	gals									
Concentrate Water (CW); Lab #02100809 >		54.00	gals									
Distilled Water (DW); Lab #02100810 >		140.00	gals									
		CWM WATER QUALITY RESULTS						MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)		CW Conc (mg/L)		DW Conc (mg/L)		RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
1,2-Dibromo-3-chloropropane	mg/L	<	0.035	<	0.035	<	0.035						
1,2-Dichloroethane	mg/L	<	0.005	<	0.005	<	0.005						
1,2-Dichloropropane	mg/L	<	0.005	<	0.005	<	0.005						
2-Butanone (MEK)	mg/L	<	0.050	<	0.050	<	0.050						
2-Hexanone	mg/L	<	0.025	<	0.025	<	0.025						
4-Methyl-2-Pentanone(MIBK)	mg/L	<	0.025	<	0.025	<	0.025						
Bromochloromethane	mg/L	<	0.005	<	0.005	<	0.005						
Bromodichloromethane	mg/L	<	0.005	<	0.005	<	0.005						
Bromoform	mg/L	<	0.005	<	0.005	<	0.005						
Bromomethane	mg/L	<	0.005	<	0.005	<	0.005						
Carbon Disulfide	mg/L	<	0.005	<	0.005	<	0.005						
Carbon Tetrachloride	mg/L	<	0.005	<	0.005	<	0.005						
Chlorobenzene	mg/L	<	0.005	<	0.005	<	0.005						
Chlorodibromomethane	mg/L	<	0.005	<	0.005	<	0.005						
Chloroethane	mg/L	<	0.005	<	0.005	<	0.005						
Chloroform	mg/L	<	0.005	<	0.005	<	0.005						
Chloromethane	mg/L	<	0.005	<	0.005	<	0.005						
cis-1,2-Dichloroethene	mg/L	<	0.005	<	0.005	<	0.005						
cis-1,3-Dichloropropene	mg/L	<	0.005	<	0.005	<	0.005						
Ethene	mg/L	<	0.030	<	0.030	<	0.030						
Ethylbenzene	mg/L	<	0.005	<	0.005	<	0.005						
Ethylene Glycol	mg/L	<	10.000	<	10.000	<	10.000						
Methylene Chloride	mg/L	<	0.005	<	0.005	<	0.005						
Styrene	mg/L	<	0.005	<	0.005	<	0.005						
Tetrachloroethene	mg/L	<	0.005	<	0.005	<	0.005						
trans-1,2-Dichloroethene	mg/L	<	0.005	<	0.005	<	0.005						
trans-1,3-Dichloropropene	mg/L	<	0.005	<	0.005	<	0.005						
Trichloroethene	mg/L	<	0.005	<	0.005	<	0.005						

MASS BALANCE ANALYSIS

OF

PRODUCED WATER

Altela Mass Balance of Produced Water

Raw Water (RW); Lab #02100194 >	211.00 gals
Concentrate Water (CW); Lab #02100762 >	96.00 gals
Distilled Water (DW); Lab #02100763 >	115.00 gals

		CWM WATER QUALITY RESULTS			MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)	RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
GENERAL PARAMETERS										
Acidity	mg/L	404.000	236.000							
Hardness, Total	mg/L	44431.000	87259.000	15.000	35531.03	31748.31	6.54	31754.85	3776.17	10.63
Calcium	mg/L	15460.000	29800.000	5.120	12363.21	10842.43	2.23	10844.66	1518.54	12.28
Magnesium	mg/L	1415.000	3120.000	0.470	1131.56	1135.18	0.20	1135.39	-3.82	-0.34
Alkalinity	mg/L	94.000	32.000							
Bicarbonate	mg/L	94.000	32.000	29.000	75.17	11.64	12.64	24.28	50.89	67.70
Total Dissolved Solids	mg/L	195130.000	345680.000	88.000	156043.51	125772.21	38.35	125810.57	30232.94	19.37
Specific Conductance	uS/CM	194800.000	234000.000							
Chloride	mg/L	108600.000	205200.000	45.100	86846.33	74659.97	19.66	74679.62	12166.71	14.01
Fluoride	mg/L	8.500	10.500	0.160	6.80	3.82	0.07	3.89	2.91	42.77
Sodium	mg/L	21200.000	85600.000	24.800	16953.43	31144.70	10.81	31155.51	-14202.09	-83.77
Total Suspended Solids	mg/L	403.000	176.000	< 0.000	322.28	64.04	0.00	64.04	258.24	80.13
Total Residual Chlorine	mg/L	< 0.100	< 0.100							
Ammonia Distillation	mg/L	0.000	Completed	Completed						
Ammonia Nitrogen	mg/L	0.000	267.000	6.990						
Total Kjeldahl Nitrogen		17.000	42.300	6.000	13.59	15.39	2.62	18.01	-4.41	-32.44
BOD	mg/L	> 77.900	62.700	> 75.300						
COD	mg/L	6270.000	3800.000	185.000						
E Coli		NA	NA	NA						
Total Coliform	/100 mls	0.000	0.000	0.000						
Heterotrophic Plate Count	/ml	21.000	32.000	5400.000						
Color	pccu	150.000	20.000	0.000						
MBAS	mg/L	0.344	0.184	< 0.000						
pH	SU	6.170	5.960	8.580						
Oil & Grease	mg/L	0.900	2.200	2.900	0.72	0.80	1.26	2.06	-1.34	-186.84
Osmotic Pressure	mOs/KG	2990.000	2970.000	27.000						
Temperature (F), Field	deg F	40.000	NA	NA						
Gross Alpha DW	pCi/L	3009.000	0.000	0.000						
Gross Beta DW	pCi/L	416.000	0.000	0.000						

Altela Mass Balance of Produced Water											
Raw Water (RW); Lab #02100194 >		211.00 gals									
Concentrate Water (CW); Lab #02100762 >		96.00 gals									
Distilled Water (DW); Lab #02100763 >		115.00 gals									
		CWM WATER QUALITY RESULTS				MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)		RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
SPECIFIC IONS											
Barium	mg/L	158.000	148.000	0.000		126.35	53.85	0.00	53.85	72.50	57.38
Boron	mg/L	11.000	17.400	0.000		8.80	6.33	0.00	6.33	2.47	28.03
Bromide	mg/L	1060.000	2360.000	0.400		847.67	858.66	0.17	858.84	-11.17	-1.32
Bromide	mg/L	1060.000	2360.000	0.400		847.67	858.66	0.17	858.84	-11.17	-1.32
Cobalt	mg/L	0.012	0.012	0.000		0.01	# 0.00	0.00	0.00	0.01	54.50
Copper	mg/L	0.800	2.000	0.000		0.64	0.73	0.00	0.73	-0.09	-13.74
Iron	mg/L	68.000	2.400	0.000		54.38	0.87	0.00	0.87	53.51	98.39
Iron, Dissolved	mg/L	16.000	0.400	0.000		12.80	# 0.15	0.00	0.15	12.65	98.86
Lithium, Total	mg/L	152.000	319.000	0.000		121.55	116.06	0.00	116.06	5.49	4.51
Manganese	mg/L	5.200	8.200	0.000		4.16	2.98	0.00	2.98	1.17	28.25
Molybdenum	mg/L	0.003	0.000	0.000		0.00	# 0.00	0.00	0.00	0.00	100.00
Phenolics	mg/L	0.070	0.010	0.060		0.06	# 0.00	0.03	0.03	0.03	46.78
Potassium	mg/L	465.000	1320.000	0.350		371.86	480.27	0.15	480.42	-108.57	-29.20
Radium 226	pCi/L	1448.000	0.000	0.000		1157.95	0.00	0.00	0.00	1157.95	100.00
Radium 228	pCi/L	715.000	0.000	0.000		571.78	0.00	0.00	0.00	571.78	100.00
Silica, Dissolved	mg/L	52.000	15.000	0.000		41.58	5.46	0.00	5.46	36.13	86.88
Silicon, Total	mg/L	7.000	10.000	0.200		5.60	3.64	0.09	3.73	1.87	33.45
Strontium	mg/L	2190.000	4970.000	0.700		1751.32	1808.28	0.31	1808.59	-57.27	-3.27
Sulfate	mg/L	130.000	550.000	3.100		103.96	200.11	1.35	201.46	-97.50	-93.79
ORGANICS											
Acetone	mg/L	< 0.050	0.978	0.195		< 0.04	0.36	< 0.08	0.44	-0.40	-1002.49
Gasoline Range Organics	mg/L	6.690	< 0.500	< 0.100		5.35	< 0.18	0.04	0.23	5.12	95.78
Benzene	mg/L	756.000	1.200	0.000		604.57	0.44	0.00	0.44	604.13	99.93
mp-Xylene	mg/L	0.294	0.003	< 0.002		0.24	0.00	0.00	0.00	0.23	99.12
o-Xylene	mg/L	0.060	< 0.001	< 0.001		0.05	< 0.00	0.00	0.00	0.05	98.33
Total Xylenes	mg/L	0.354	0.004	< 0.003		0.28	0.00	0.00	0.00	0.28	99.01
Toluene	mg/L	0.984	0.003	< 0.001		0.79	0.00	0.00	0.00	0.79	99.81
Diesel Range Organic C10-C28	mg/L	5.900	1.000	0.530		4.72	0.36	0.23	0.59	4.12	87.39
Ethane	mg/L	0.120	< 0.003	< 0.003		0.10	< 0.00	0.00	0.00	0.09	97.50
Formaldehyde	mg/L	9.890	0.035	1.870		7.91	0.01	0.82	0.83	7.08	89.54
Methane	mg/L	0.053	< 0.001	< 0.001		0.04	< 0.00	0.00	0.00	0.04	98.10
Methanol	mg/L	4330.000	11.300	1030.000		3462.66	4.11	448.93	453.04	3009.62	86.92

Altela Mass Balance of Produced Water

Raw Water (RW); Lab #02100194 >	211.00 gals
Concentrate Water (CW); Lab #02100762 >	96.00 gals
Distilled Water (DW); Lab #02100763 >	115.00 gals

		CWM WATER QUALITY RESULTS			MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)	RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
CONSTITUENTS TESTED BELOW DETECTABLE LIMITS IN THE PRIMARY SOLUTION - NO MASS BALANCE CALCULATIONS PROVIDED										
SPECIFIC IONS										
Alkalinity, Carbonate	mg/L	< 5.000	< 5.000	9.000						
Alkalinity, Hydroxide	mg/L	< 5.000	< 5.000	< 5.000						
Alkalinity, Phenolphthalein	mg/L	< 5.000	< 5.000	< 5.000						
Aluminum	mg/L	< 2.000	< 2.000	< 0.100						
Antimony	mg/L	< 0.500	< 1.000	< 0.500						
Arsenic	mg/L	< 0.500	< 1.000	< 0.500						
Beryllium	mg/L	< 0.500	< 1.000	< 0.500						
Cadmium	mg/L	0.012	0.012	0.000						
Chromium	mg/L	< 0.400	< 0.400	< 0.020						
Lead	mg/L	< 0.400	0.000	0.000						
Mercury	mg/L	< 0.020	< 0.013	< 0.001						
Nickel	mg/L	< 1.000	< 1.000	< 0.050						
Nitrate	mg/L	< 5.000	< 5.000	< 0.100						
Nitrate / Nitrite	mg/L	< 10.000	< 10.000	< 0.200						
Nitrite	mg/L	< 5.000	< 5.000	< 0.100						
Selenium	mg/L	< 0.500	< 1.000	< 0.500						
Silver	mg/L	< 0.500	< 1.000	< 0.500						
Thallium	mg/L	0.006	< 1.000	< 0.500						
Tin	mg/L	< 0.500	< 1.000	< 0.500						
Titanium	mg/L	0.006	< 1.000	< 0.500						
Uranium	mg/L	< 1.000	< 1.100	< 1.100						
Vanadium	mg/L	< 0.250	< 1.500	< 0.003						
Vinyl Chloride	mg/L	< 0.005	< 0.001	< 0.001						
Zinc	mg/L	< 0.400	< 0.400	< 0.020						
ORGANICS										
1,1,1-Trichloroethane	mg/L	< 0.005	< 0.005	< 0.001						
1,1,2,2-Tetrachloroethane	mg/L	< 0.005	< 0.005	< 0.001						
1,1,2-Trichloroethane	mg/L	< 0.005	< 0.005	< 0.001						
1,1-Dichloroethane	mg/L	< 0.005	< 0.005	< 0.001						
1,1-Dichloroethene	mg/L	< 0.005	< 0.005	< 0.001						
1,2 Dibromoethane	mg/L	< 0.005	< 0.005	< 0.001						

Altela Mass Balance of Produced Water												
Raw Water (RW); Lab #02100194 >		211.00	gals									
Concentrate Water (CW); Lab #02100762 >		96.00	gals									
Distilled Water (DW); Lab #02100763 >		115.00	gals									
		CWM WATER QUALITY RESULTS						MASS BALANCE CALCULATIONS				
Parameter		RW Conc (mg/L)		CW Conc (mg/L)		DW Conc (mg/L)		RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
1,2-Dibromo-3-chloropropane	mg/L	<	0.035	<	0.035	<	0.007						
1,2-Dichloroethane	mg/L	<	0.005	<	0.005	<	0.001						
1,2-Dichloropropane	mg/L	<	0.005	<	0.005	<	0.001						
2-Butanone (MEK)	mg/L	<	0.050	<	0.050	<	0.010						
2-Hexanone	mg/L	<	0.025	<	0.025	<	0.005						
4-Methyl-2-Pentanone(MIBK)	mg/L	<	0.025	<	0.025	<	0.005						
Bromochloromethane	mg/L	<	0.005	<	0.001	<	0.001						
Bromodichloromethane	mg/L	<	0.005	<	0.001	<	0.001						
Bromoform	mg/L	<	0.005	<	0.001	<	0.001						
Bromomethane	mg/L	<	0.005	<	0.001	<	0.001						
Carbon Disulfide	mg/L	<	0.005	<	0.001	<	0.001						
Carbon Tetrachloride	mg/L	<	0.005	<	0.001	<	0.001						
Chlorobenzene	mg/L	<	0.005	<	0.001	<	0.001						
Chlorodibromomethane	mg/L	<	0.005	<	0.001	<	0.001						
Chloroethane	mg/L	<	0.005	<	0.001	<	0.001						
Chloroform	mg/L	<	0.005	<	0.001	<	0.001						
Chloromethane	mg/L		0.011	<	0.001	<	0.001						
cis-1,2-Dichloroethene	mg/L	<	0.005	<	0.001	<	0.001						
cis-1,3-Dichloropropene	mg/L	<	0.005	<	0.001	<	0.001						
Ethene	mg/L	<	0.030	<	0.003	<	0.003						
Ethylbenzene	mg/L		0.027	<	0.001	<	0.001						
Ethylene Glycol	mg/L	<	10.000	<	10.000	<	10.000						
Methylene Chloride	mg/L	<	0.005	<	0.001	<	0.001						
Styrene	mg/L	<	0.005	<	0.001	<	0.001						
Tetrachloroethene	mg/L	<	0.005	<	0.001	<	0.001						
trans-1,2-Dichloroethene	mg/L	<	0.005	<	0.001	<	0.001						
trans-1,3-Dichloropropene	mg/L	<	0.005	<	0.001	<	0.001						
Trichloroethene	mg/L	<	0.005	<	0.001	<	0.001						

MASS BALANCE ANALYSIS

OF

FRAC FLOW-BACK WATER

Altela Mass Balance of Frac Flow Back Water

Raw Water (RW); Lab #02100197; 194 gals
Concentrate Water (CW); Lab #02100864; 54 gals
Distilled Water (DW); Lab #02100865; 140 gals

		CWM WATER QUALITY RESULTS			MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)	RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
GENERAL PARAMETERS										
Acidity	mg/L	-114.000	50.000	-22.000	-83.82	10.23	-11.67	-1.44	-82.38	98.28
Hardness, Total	mg/L	7040.000	19648.000	11.000	5176.23	4021.16	5.84	4027.00	1149.23	22.20
Calcium	mg/L	2465.000	6780.000	3.810	1812.42	1387.59	2.02	1389.62	422.80	23.33
Magnesium	mg/L	215.000	660.000	0.360	158.08	135.08	0.19	135.27	22.81	14.43
Alkalinity	mg/L	196.000	148.000	48.000	144.11	30.29	25.47	55.76	88.35	61.31
Bicarbonate	mg/L	196.000	148.000	24.000	144.11	30.29	12.73	43.02	101.09	70.15
Total Dissolved Solids	mg/L	40530.000	113460.000	76.000	29800.09	23220.72	40.33	23261.05	6539.04	21.94
Specific Conductance	uS/CM	56700.000	143500.000	184.000	41689.24	29368.71	97.63	29466.34	12222.90	29.32
Chloride	mg/L	20100.000	64800.000	35.400	14778.73	13261.97	18.78	13280.75	1497.97	10.14
Fluoride	mg/L	9.500	12.000	0.150	6.98	2.46	0.08	2.54	4.45	63.70
Sodium	mg/L	10380.000	32200.000	18.600	7632.00	6590.05	9.87	6599.92	1032.08	13.52
Total Suspended Solids	mg/L	22.000	32.000	< 3.000	16.18	6.55	< 1.59	8.14	8.03	49.67
Total Residual Chlorine	mg/L	< 0.100	0.000	0.000						
Ammonia Distillation	mg/L	0.000	Completed	Completed						
Ammonia Nitrogen	mg/L	0.000	28.200	9.640						
Total Kjeldahl Nitrogen		9.200	47.000	9.800	6.76	9.62	5.20	14.82	-8.05	-119.07
BOD	mg/L	> 74.200	> 379.000	> 75.300						
COD	mg/L	1042.000	1040.000	410.000						
E Coli		NA	NA	NA						
Total Coliform	/100 mls	0.000	0.000	0.000						
Heterotrophic Plate Count	/ml	4,810,000	8200.000	55000.000						
Color	pccu	125.000	250.000	< 5.000						
MBAS	mg/L	0.239	0.184	< 0.025						
pH	SU	7.390	6.900	9.940						
Oil & Grease	mg/L	1.100	1.400	1.200	0.81	0.29	0.64	0.92	-0.11	-14.15
Osmotic Pressure	mOs/KG	1110.000	3440.000	< 10.000						
Temperature (F), Field	deg F	74.000	NA	NA						
Gross Alpha DW	pCi/L	76.400	0.000	0.000	56.17	0.00	0.00	0.00	56.17	100.00
Gross Beta DW	pCi/L	240.000	0.000	0.000	176.46	0.00	0.00	0.00	176.46	100.00

Altela Mass Balance of Frac Flow Back Water

Raw Water (RW); Lab #02100197; 194 gals
Concentrate Water (CW); Lab #02100864; 54 gals
Distilled Water (DW); Lab #02100865; 140 gals

		CWM WATER QUALITY RESULTS			MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)	RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
SPECIFIC IONS										
Barium	mg/L	52.900	45.400	< 0.100	38.90	9.29	< 0.05	9.34	29.55	75.97
Boron	mg/L	6.400	17.000	< 0.020	4.71	3.48	< 0.01	3.49	1.22	25.84
Bromide	mg/L	270.000	995.000	0.400	198.52	203.64	0.21	203.85	-5.33	-2.68
Bromide	mg/L	291.000	995.000	0.400	213.96	203.64	0.21	203.85	10.11	4.73
Cobalt	mg/L	0.033	< 0.500	< 0.500	0.02	< 0.10	< 0.27	< 0.37	-0.34	-1415.15
Copper	mg/L	0.520	0.800	< 0.020	0.38	0.16	< 0.01	0.17	0.21	54.40
Iron	mg/L	8.400	16.600	< 0.020	6.18	3.40	< 0.01	3.41	2.77	44.82
Iron, Dissolved	mg/L	8.300	16.700	0.020	6.10	3.42	0.01	3.43	2.67	43.82
Lithium, Total	mg/L	21.500	66.100	< 0.050	15.81	13.53	< 0.03	13.55	2.25	14.26
Manganese	mg/L	2.000	2.600	< 0.020	1.47	0.53	< 0.01	0.54	0.93	63.09
Molybdenum	mg/L	0.016	< 0.500	< 0.500	0.01	< 0.10	< 0.27	< 0.37	-0.36	-3025.00
Phenolics	mg/L	0.040	0.020	0.050	0.03	0.00	0.03	0.03	0.00	-4.12
Potassium	mg/L	94.800	360.000	0.190	69.70	73.68	0.10	73.78	-4.08	-5.85
Radium 226	pCi/L	33.100	0.000	0.000	24.34	0.00	0.00	0.00	24.34	100.00
Radium 228	pCi/L	27.300	0.000	0.000	20.07	0.00	0.00	0.00	20.07	100.00
Silica, Dissolved	mg/L	49.000	14.000	< 1.000	36.03	2.87	< 0.53	3.40	32.63	90.57
Silicon, Total	mg/L	9.200	26.600	0.089	6.76	5.44	0.05	5.49	1.27	18.82
Strontium	mg/L	265.000	788.000	0.470	194.84	161.27	0.25	161.52	33.32	17.10
Sulfate	mg/L	155.000	275.000	2.200	113.97	56.28	1.17	57.45	56.52	49.59
ORGANICS										
Acetone	mg/L	2.090	0.661	5.230	1.54	0.14	2.78	2.91	-1.37	-89.39
Gasoline Range Organics	mg/L	0.928	2.850	0.154	0.68	0.58	0.08	0.66	0.02	2.54
Benzene	mg/L	0.055	< 0.001	< 0.001	0.04	< 0.00	< 0.00	< 0.00	0.04	98.19
mp-Xylene	mg/L	0.027	0.004	< 0.002	0.02	0.00	< 0.00	0.00	0.02	91.05
o-Xylene	mg/L	0.009	< 0.001	< 0.001	0.01	< 0.00	< 0.00	< 0.00	0.01	88.76
Total Xylenes	mg/L	0.036	0.004	< 0.003	0.03	0.00	< 0.00	0.00	0.02	90.71
Toluene	mg/L	0.085	0.001	0.002	0.06	0.00	0.00	0.00	0.06	97.71
Diesel Range Organic C10-C28	mg/L	17.400	5.100	1.700	12.79	1.04	0.90	1.95	10.85	84.79
Ethane	mg/L	0.133	< 0.003	< 0.003	0.10	< 0.00	< 0.00	< 0.00	0.10	97.74
Formaldehyde	mg/L	75.400	< 1.000	41.400	55.44	< 0.20	21.97	22.17	33.27	60.01
Methane	mg/L	0.390	< 0.001	< 0.001	0.29	< 0.00	< 0.00	< 0.00	0.29	99.74
Methanol	mg/L	35.200	< 0.001	0.027	25.88	< 0.00	0.01	0.01	25.87	99.94

Altela Mass Balance of Frac Flow Back Water

Raw Water (RW); Lab #02100197; 194 gals
Concentrate Water (CW); Lab #02100864; 54 gals
Distilled Water (DW); Lab #02100865; 140 gals

		CWM WATER QUALITY RESULTS			MASS BALANCE CALCULATIONS					
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)	RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta
CONSTITUENTS TESTED BELOW DETECTABLE LIMITS IN THE PRIMARY SOLUTION - NO MASS BALANCE CALCULATIONS PROVIDED										
SPECIFIC IONS										
Alkalinity, Carbonate	mg/L	< 5.000	< 5.000	20.000						
Alkalinity, Hydroxide	mg/L	< 5.000	< 5.000	< 5.000						
Alkalinity, Phenolphthalein	mg/L	< 5.000	< 5.000	10.000						
Aluminum	mg/L	< 2.000	< 2.000	< 0.100						
Antimony	mg/L	< 0.500	< 0.500	< 0.500						
Arsenic	mg/L	< 0.500	< 0.500	< 0.500						
Beryllium	mg/L	< 0.500	< 0.500	< 0.500						
Cadmium	mg/L	< 0.500	< 0.500	< 0.500						
Chromium	mg/L	< 0.400	< 0.400	< 0.020						
Lead	mg/L	< 0.400	0.000	0.000						
Mercury	mg/L	< 0.005	< 0.010	< 0.001						
Nickel	mg/L	< 1.000	< 1.000	< 0.050						
Nitrate	mg/L	< 5.000	< 5.000	0.190						
Nitrate / Nitrite	mg/L	< 10.000	< 10.000	0.290						
Nitrite	mg/L	< 5.000	< 5.000	< 0.100						
Selenium	mg/L	< 0.500	< 0.500	< 0.500						
Silver	mg/L	< 0.500	< 0.500	< 0.500						
Thallium	mg/L	0.009	< 0.500	< 0.500						
Tin	mg/L	< 0.500	< 0.500	< 0.500						
Titanium	mg/L	0.009	< 0.500	< 0.500						
Uranium	mg/L	< 0.250	< 0.050	< 0.005						
Vanadium	mg/L	< 0.063	< 0.250	< 0.003						
Vinyl Chloride	mg/L	< 0.005	< 0.001	< 0.001						
Zinc	mg/L	< 0.400	< 0.400	0.160						
ORGANICS										
1,1,1-Trichloroethane	mg/L	< 0.005	< 0.001	< 0.001						
1,1,2,2-Tetrachloroethane	mg/L	< 0.005	< 0.001	< 0.001						
1,1,2-Trichloroethane	mg/L	< 0.005	< 0.001	< 0.001						
1,1-Dichloroethane	mg/L	< 0.005	< 0.001	< 0.001						
1,1-Dichloroethene	mg/L	< 0.005	< 0.001	< 0.001						
1,2 Dibromoethane	mg/L	< 0.005	< 0.001	< 0.001						

Altela Mass Balance of Frac Flow Back Water											
Raw Water (RW); Lab #02100197; 194 gals Concentrate Water (CW); Lab #02100864; 54 gals Distilled Water (DW); Lab #02100865; 140 gals											
		CWM WATER QUALITY RESULTS			MASS BALANCE CALCULATIONS						
Parameter		RW Conc (mg/L)	CW Conc (mg/L)	DW Conc (mg/L)	RW Mass (g)	CW Mass (g)	DW Mass (g)	CW + DW Mass (g)	Delta	% Delta	
1,2-Dibromo-3-chloropropane	mg/L	< 0.035	< 0.007	< 0.007							
1,2-Dichloroethane	mg/L	< 0.005	< 0.001	< 0.001							
1,2-Dichloropropane	mg/L	< 0.005	< 0.001	< 0.001							
2-Butanone (MEK)	mg/L	< 0.005	0.047	< 0.010							
2-Hexanone	mg/L	< 0.025	< 0.005	< 0.005							
4-Methyl-2-Pentanone(MIBK)	mg/L	< 0.025	< 0.005	< 0.005							
Bromochloromethane	mg/L	< 0.005	< 0.001	< 0.001							
Bromodichloromethane	mg/L	< 0.005	< 0.001	< 0.001							
Bromoform	mg/L	< 0.005	< 0.001	< 0.001							
Bromomethane	mg/L	< 0.005	< 0.001	< 0.001							
Carbon Disulfide	mg/L	< 0.005	< 0.001	< 0.001							
Carbon Tetrachloride	mg/L	< 0.005	< 0.001	< 0.001							
Chlorobenzene	mg/L	< 0.005	< 0.001	< 0.001							
Chlorodibromomethane	mg/L	< 0.005	< 0.001	< 0.001							
Chloroethane	mg/L	< 0.005	< 0.001	< 0.001							
Chloroform	mg/L	< 0.005	< 0.001	< 0.001							
Chloromethane	mg/L	< 0.005	< 0.001	< 0.001							
cis-1,2-Dichloroethene	mg/L	< 0.005	< 0.001	< 0.001							
cis-1,3-Dichloropropene	mg/L	< 0.005	< 0.001	< 0.001							
Ethene	mg/L	< 0.006	< 0.003	< 0.003							
Ethylbenzene	mg/L	< 0.005	< 0.001	< 0.001							
Ethylene Glycol	mg/L	< 0.010	< 0.010	< 0.010							
Methylene Chloride	mg/L	< 0.005	< 0.001	< 0.001							
Styrene	mg/L	< 0.005	< 0.001	< 0.001							
Tetrachloroethene	mg/L	< 0.005	< 0.001	< 0.001							
trans-1,2-Dichloroethene	mg/L	< 0.005	< 0.001	< 0.001							
trans-1,3-Dichloropropene	mg/L	< 0.005	< 0.001	< 0.001							
Trichloroethene	mg/L	< 0.005	< 0.001	< 0.001							

APPENDIX F

NEW MEXICO OIL CONSERVATION DIVISION APPROVAL FOR MARCELLUS WATER

New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson
Governor

Jon Goldstein
Cabinet Secretary

Jim Noel
Deputy Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division

January 27, 2010

Mr. Matthew J. Bruff
Altela, Inc.
Denver Technology Center
5350 South Roslyn Street, Suite 430
Englewood, Colorado 80111

Re: Request for a Temporary Exemption Regarding Condition #2 of an Annual Temporary Approval to Store and Use Produced Water for R&D of the AltelaRain™ Technology
Temporary Approval: EPWM -004
2450 Alamo SE Albuquerque, New Mexico 87106

Dear Mr. Bruff:

The Oil Conservation Division (OCD) has received and reviewed Altela, Inc.'s (Altela) request, dated January 26, 2010, for a temporary exemption regarding Condition #2 of Altela's annual temporary approval (EPWM-004) to store and use oilfield produced water for testing and development of the AltelaRain® technology at Altela's design, research, and manufacturing facility dated December 14, 2009. Condition #2 requires "only haulers authorized (OCD approved C-133) to move produced water shall provide transport of produced water to the Alamo facility."

Based upon the information provided in the request, Altela proposes to ship approximately 660 gallons, not to exceed 1000 gallons, of produced water by a commercial shipper from the Marcellus Basin of Pennsylvania to Altela's Albuquerque Alamo facility for testing. The test bench analyses will allow Altela to finalize the design requirements of the AltelaRain® system for the Marcellus grant project.

The OCD hereby approves this temporary exemption request with the following understandings and conditions:

1. Altela shall transport the produced water from the Marcellus Basin of Pennsylvania to Altela's Albuquerque Alamo facility via a commercial shipper. Altela shall ensure that the commercial shipper will be responsible for complying with all applicable shipping requirements and related Department of Transportation rules and regulations; and

2. Altela shall continue to comply with the conditions specified within the OCD temporary approval (EPWM-004), dated December 14, 2009, upon the arrival and acceptance of the produced water from the Marcellus Basin of Pennsylvania at Altela's Albuquerque Alamo facility;

This authorization is a one-time approval. Altela shall request and obtain OCD approval for any future exemption requests of a similar nature. Approval may be revoked or suspended for violation of any applicable provisions and/or conditions.

Please be advised that approval of this request does not relieve Altela of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve Altela of its responsibility to comply with any other applicable governmental authority's rules and regulations.

If there are any questions regarding this matter, please do not hesitate to contact me at (505) 476-3487 or brad.a.jones@state.nm.us.

Sincerely,

Brad A. Jones
Environmental Engineer

BAJ/baj

cc: OCD District IV Office, Santa Fe

APPENDIX G

PHOTOS OF SITE

Sleepy Well Site

- Site location – Laurel Run Rd, Penn Run, PA 15765

The Well

Vents for NG, unflared

Produced Water Holding Tanks

The Wellhead, pressure ~1400 PSI

Pressure Reduction and Water Separation

Series of tanks and valves used to reduce pressure and remove water

Series of control valves used to reduce pressure before feeding to the production pipeline

Frac Flowback Holding Pit

Pit, slightly frozen over and collecting rainwater

Submersible pump feeding pipeline that feeds the treatment system

Treatment System

Altela Rain Units

Pipes carrying saturated air from the system and tanks collecting treated water at the side

Insulated Steam Pipe

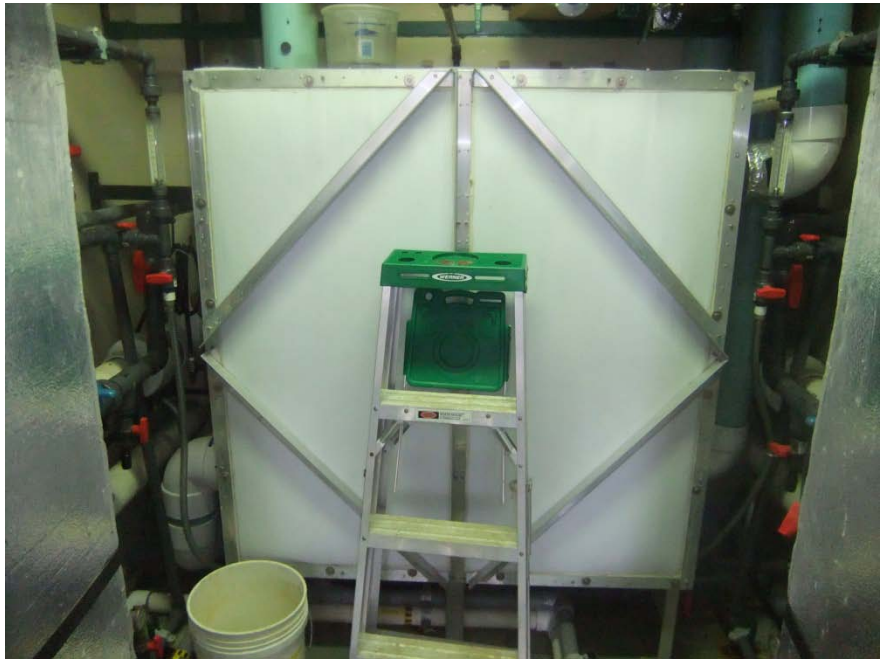
A row of units

Steam Generation

-Treated water holding tank- Treated water used as water source for steam generation

Natural gas boiler to generate steam used to drive the system

Heat Exchanger



Heat exchanger, constructed of same material as treatment towers, to pre-heat inlet air and cool saturated outlet air (water condensing out of outlet air in heat exchanger is collected)

Blower drives air flow through heat exchanger

Miscellaneous Equipment

Monitoring and Control system

Valves controlling brine flow to treatment towers

Pump, pressure gauges, and meter in boiler room

Blower in boiler room

Batch brine recirculation tank


PW Feed Line
PW Feed Sump Pump


Electrical Connection


External CW Storage Tank
BLX Gas Well
External DW Storage Tank
Natural Gas Inlet
Produced Water Feed Line


FRESH
DO NOT ENTER
POTABLE
WATER
DO NOT ENTER
NON POTABLE
WATER

APPENDIX H

MISCELLANEOUS CHARTS AND GRAPHS

NETL DEMONSTRATION SYSTEM TREATMENT SUMMARY									
As of	9/1/2010	10/1/2010	11/1/2010	12/1/2010	1/1/2011	2/1/2011	3/1/2011	3/31/2011	4/7/2011
Actual Treatment Rate (avg. BPD)	31.37	34.39	27.09	24.64	16.77	12.20	12.86	11.56	3.45
Normalized Treatment Rate (BPD)	44.82	40.19	32.58	29.65	24.01	26.26	23.58	23.31	24.83
Total Recovery Rate (%)	76.11	76.76	75.50	72.11	73.12	75.11	73.11	72.67	72.50
PW In (bbls)	1,236.31	1,344.05	1,112.26	1,059.29	710.83	503.69	545.36	477.38	33.33
CW Out (bbls)	283.33	312.38	272.50	295.48	191.07	125.36	146.67	130.48	9.17
DW Out (bbls)	263.93	253.69	121.31	114.40	48.93	46.19	71.19	44.52	4.88
Average PW Cond.	33,835	41,314	41,580	40,815	35,481	36,548	28,201	12,133	33,918
Average CW Cond.	60,519	73,804	70,761	72,001	63,251	64,418	49,249	21,480	58,341
Average DW Cond.	35	35	583	44	50	674	38	57	256

As of	7/29/2010	8/24/2010	8/25/2010	8/26/2010	8/27/2010	8/30/2010	8/31/2010	9/1/2010	9/2/2010
Actual Treatment Rate (avg. BPD)	19.55	38.10	46.55	45.00	42.98	41.67	38.93	38.45	45.00
Normalized Treatment Rate (BPD)	33.51	38.10	46.74	45.00	42.98	41.67	38.93	39.10	45.76
Total Recovery Rate (%)	94.94	75.47	76.37	76.38	76.48	76.42	75.69	76.18	77.78
PW In (bbls)	20.59	50.48	60.95	58.57	56.19	54.52	51.43	50.48	57.86
CW Out (bbls)	1.04	12.38	14.40	13.57	13.21	12.86	12.50	12.02	12.86
DW Out (bbls)	6.95	13.33	13.33	11.31	12.26	11.19	10.00	10.24	11.31
Average PW Cond.	31,450	32,390	33,290	35,980	38,130	38,950	39,040	39,210	39,179
Average CW Cond.	59,764	61,650	56,560	60,860	65,785	65,290	78,230	56,760	69,426
Average DW Cond.	90	32	32	34	36	35	31	32	41

9/3/2010	9/7/2010	9/8/2010	9/9/2010	9/10/2010	9/13/2010	9/14/2010	9/15/2010	9/16/2010	9/17/2010	9/20/2010	9/21/2010
41.07	0.00	31.19	25.24	44.17	40.71	42.98	39.29	39.17	39.40	39.29	36.19
41.24	0.00	43.50	43.58	44.17	40.71	42.98	39.29	39.17	39.90	39.29	36.19
76.16	0.00	76.61	76.26	77.29	76.17	78.48	76.74	76.51	76.80	76.92	76.96
53.93	0.00	40.71	33.10	57.14	53.45	54.76	51.19	51.19	51.31	51.07	47.02
12.86	0.00	9.52	7.86	12.98	12.74	11.79	11.90	12.02	11.90	11.79	10.83
10.12	0.00	6.90	8.21	12.98	11.31	11.31	10.00	9.05	10.36	8.81	7.74
39,464	40,385	40,502	40,530	40,930	41,325	41,396	41,549	41,806	41,967	41,992	42,060
69,975	84,169	72,756	73,168	72,656	73,398	73,215	73,756	74,516	74,570	74,898	74,939
30	30	34	38	38	33	33	34	33	34	34	34

9/22/2010	9/23/2010	9/24/2010	9/25/2010	9/27/2010	9/28/2010	9/29/2010	9/30/2010	10/1/2010	10/4/2010	10/5/2010	10/6/2010
39.05	10.60	29.29	37.98	33.81	25.71	29.64	34.17	30.60	32.38	29.40	26.31
40.75	40.36	40.16	37.98	33.81	37.63	38.46	40.20	39.91	32.38	29.40	29.10
73.10	72.95	76.64	76.13	76.14	76.33	77.81	76.94	76.72	77.94	78.41	78.09
51.31	14.52	38.21	49.88	44.40	33.69	38.10	44.40	39.88	41.55	37.50	33.69
12.26	3.93	8.93	11.90	10.60	7.98	8.45	10.24	9.29	9.17	8.10	7.38
8.33	3.21	5.95	8.21	8.21	4.76	5.95	7.26	6.55	2.26	1.07	0.24
41,963	42,024	42,006	41,960	42,099	41,953	41,997	41,612	41,430	41,432	41,521	41,601
74,149	64,210	72,150	75,077	75,735	74,583	75,179	74,319	57,360	74,149	74,720	74,322
35	34	37	35	39	38	38	40	38	36	34	33

10/7/2010	10/8/2010	10/11/2010	10/12/2010	10/13/2010	10/14/2010	10/15/2010	10/18/2010	10/19/2010	10/20/2010	10/21/2010
7.98	29.64	37.38	34.64	37.98	33.93	15.95	0.00	29.40	46.79	34.29
17.56	33.88	37.38	34.79	37.98	35.87	36.46	0.00	40.79	46.79	34.29
70.53	77.09	77.53	75.98	78.00	77.45	68.37	0.00	96.48	94.93	71.64
11.31	38.45	48.21	45.60	48.69	43.81	23.33	0.00	30.48	49.29	47.86
3.33	8.81	10.83	10.95	10.71	9.88	7.38	0.00	1.07	2.50	13.57
1.43	5.36	5.60	5.24	5.36	6.43	2.14	0.00	8.10	7.62	7.38
41,574	41,476	41,544	41,396	41,443	41,536	41,741	42,674	42,250	41,481	41,517
73,610	74,044	73,714	73,941	73,881	73,959	38,563	58,592	66,038	73,106	73,476
59	55	159	77	78	91	70	5,004	2,419	74	171

10/22/2010	10/25/2010	10/26/2010	10/27/2010	10/28/2010	10/29/2010	11/1/2010	11/2/2010	11/3/2010	11/4/2010	11/5/2010	11/8/2010
21.79	30.60	30.12	22.74	31.31	32.02	26.31	21.31	18.69	36.31	32.38	25.95
24.09	30.60	30.12	26.75	31.31	32.29	26.31	21.31	37.38	36.31	32.28	25.95
52.29	73.01	72.91	70.22	74.08	73.90	74.66	73.06	70.40	72.10	74.32	72.19
41.67	41.90	41.31	32.38	42.26	43.33	35.24	29.17	26.55	50.36	43.57	35.95
19.88	11.31	11.19	9.64	10.95	11.31	8.93	7.86	7.86	14.05	11.19	10.00
4.76	4.52	3.33	2.02	3.33	3.10	0.24	0.00	5.48	10.00	5.36	1.07
41,609	41,497	41,324	41,054	41,041	41,216	41,790	41,855	41,743	41,310	41,395	41,506
73,779	73,203	73,357	73,792	73,198	73,233	73,230	75,176	78,190	73,113	73,031	7,334
211	46	46	169	88	44	34	34	130	47	39	36

NETL DEMONSTRATION SYSTEM TREATMENT										
11/9/2010	11/10/2010	11/11/2010	11/15/2010	11/16/2010	11/17/2010	11/18/2010	11/23/2010	11/30/2010	12/1/2010	12/2/2010
26.90	24.76	21.79	0.00	30.12	33.45	32.26	31.43	42.14	20.60	18.81
26.90	24.76	25.38	0.00	55.60	33.45	32.26	31.43	43.04	25.48	21.91
76.61	73.24	73.49	0.00	45.42	76.15	75.07	73.54	74.21	69.20	71.49
35.12	33.81	29.64	0.00	66.31	43.93	42.98	42.74	56.79	29.76	26.31
8.21	9.05	7.86	0.00	36.19	10.48	10.71	11.31	14.64	9.17	7.50
0.00	0.24	1.90	0.00	4.52	8.93	6.55	3.69	6.43	2.14	4.29
41,392	41,400	41,350	41,965	41,711	40,773	39,933	40,156	38,690	35,750	34,522
72,754	73,418	72,341	74,000	65,483	72,162	70,629	71,055	68,321	46,530	61,133
34	129	475	0	13	13	13	13	13	0	0

12/3/2010	12/6/2010	12/7/2010	12/8/2010	12/9/2010	12/10/2010	12/13/2010	12/14/2010	12/15/2010	12/16/2010	12/17/2010
8.45	27.50	24.64	21.55	21.31	15.95	20.95	20.36	25.83	25.95	21.31
28.17	27.50	24.64	21.55	21.31	29.68	20.95	21.52	26.38	25.95	25.19
75.53	74.76	74.46	74.49	73.06	72.04	74.26	72.77	70.92	72.19	72.76
11.19	36.79	33.10	28.93	29.17	22.14	28.21	27.98	36.43	35.95	29.29
2.74	9.29	8.45	7.38	7.86	6.19	7.26	7.62	10.60	10.00	7.98
2.14	4.17	2.62	1.43	0.12	2.14	0.95	0.24	3.21	2.26	2.26
33,355	33,438	34,198	35,428	35,903	36,280	35,110	34,147	34,315	34,475	34,608
59,848	58,163	59,509	62,203	62,304	64,692	61,300	59,446	59,325	59,167	59,085
0	0	0	0	0	0	12	16	12	47	58

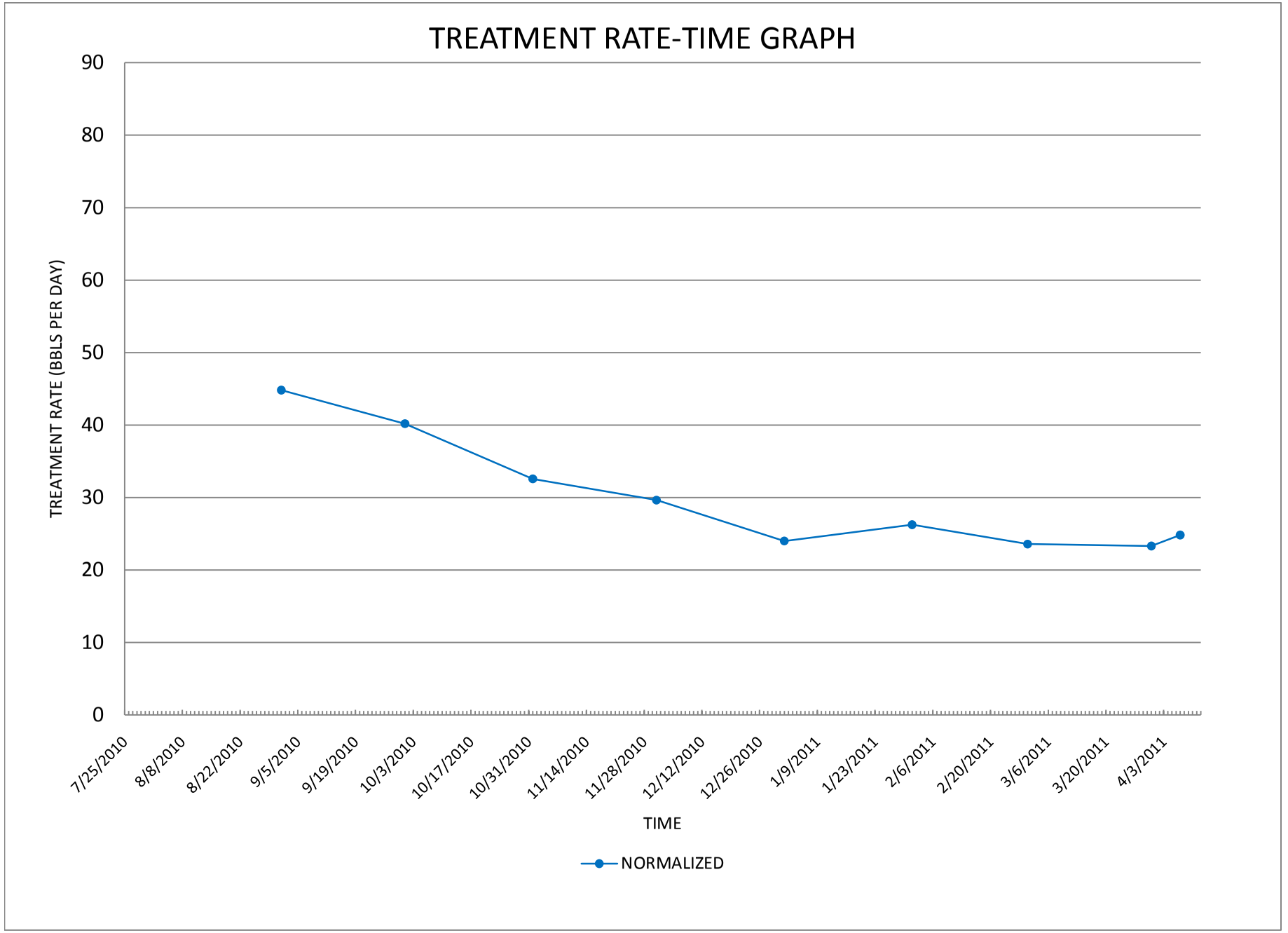
12/20/2010	12/21/2010	12/22/2010	12/27/2010	12/28/2010	1/1/2011	1/10/2011	1/20/2011	1/21/2011	1/24/2011	1/25/2011	1/26/2011
21.07	20.60	20.60	0.00	0.00	0.00	16.79	5.71	17.26	2.50	0.00	0.00
21.07	20.60	20.86	0.00	0.00	0.00	20.66	22.12	21.58	16.30	0.00	0.00
73.44	73.00	74.25	0.00	0.00	0.00	70.50	65.75	79.23	77.78	0.00	0.00
28.69	28.21	27.74	0.00	0.00	0.00	23.81	8.69	21.79	3.21	0.00	0.00
7.62	7.62	7.14	0.00	0.00	0.00	7.02	2.98	4.52	0.70	0.00	0.00
1.19	0.24	1.19	0.00	0.00	0.00	2.26	0.12	1.55	0.00	0.00	0.00
34,522	35,019	36,880	36,986	37,368	36,540	35,954	36,536	36,745	36,791	37,071	37,085
60,127	60,950	63,580	73,018	73,794	58,460	62,565	65,085	64,900	61,052	61,426	63,163
57	71	77	60	60	316	38	4,105	284	38	5	359

1/27/2011	1/28/2011	1/31/2011	2/1/2011	2/2/2011	2/3/2011	2/4/2011	2/7/2011	2/8/2011	2/25/2011	2/28/2011	3/1/2011	3/2/2011
0.00	6.55	20.00	22.62	20.24	19.05	22.98	20.12	14.52	19.40	19.17	19.40	8.81
0.00	22.58	25.00	28.27	25.30	23.81	28.72	25.15	20.08	24.26	19.17	24.26	21.31
0.00	67.07	75.68	74.80	74.89	70.80	76.89	74.78	71.76	74.77	75.23	70.56	61.16
0.00	9.76	26.43	30.24	27.02	26.90	29.88	26.90	20.24	25.95	25.48	27.50	14.40
0.00	3.21	6.43	7.62	6.79	7.86	6.90	6.79	5.71	6.55	6.31	8.10	5.60
0.00	1.31	2.50	4.52	4.52	5.60	4.76	2.50	2.74	3.81	2.38	2.26	2.26
37,084	37,396	38,115	38,580	38,218	36,845	36,627	35,641	35,591	21,292	17,711	14,600	14,465
67,895	70,279	67,519	64,400	67,161	65,048	64,143	62,739	62,390	36,913	30,747	23,710	26,309
691	569	66	40	38	35	67	31	73	40	24	22	27

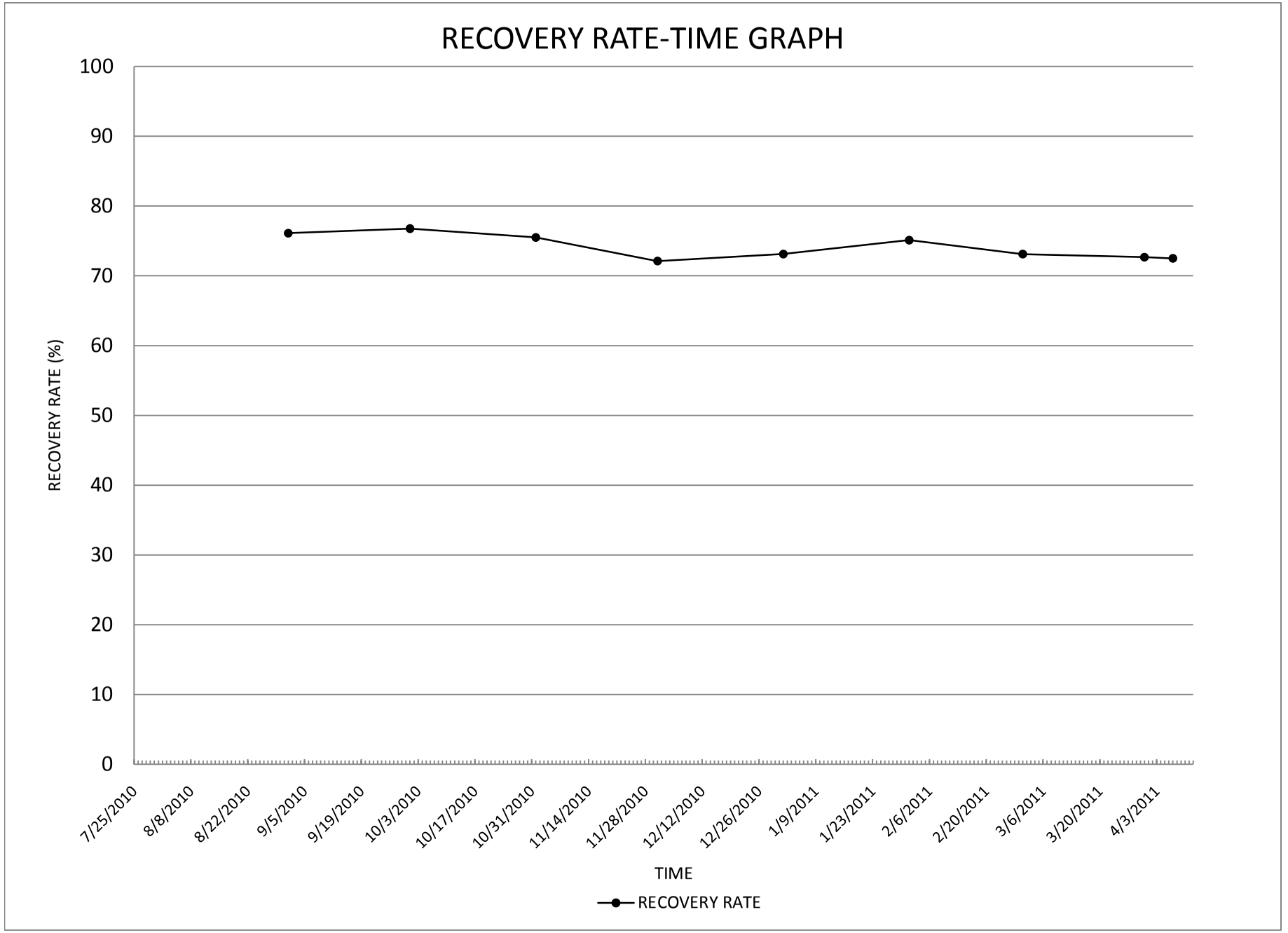
3/3/2011	3/4/2011	3/7/2011	3/8/2011	3/9/2011	3/10/2011	3/14/2011	3/15/2011	3/16/2011	3/17/2011	3/21/2011	3/23/2011	3/24/2011
20.48	20.71	19.17	17.02	17.26	16.19	14.52	15.24	18.81	7.86	0.00	0.00	0.00
25.60	25.89	23.96	21.28	21.58	20.24	18.15	19.05	23.51	9.82	0.00	0.00	0.00
75.77	77.68	73.52	72.59	75.52	71.96	74.85	69.19	77.45	75.86	0.00	0.00	0.00
27.02	26.67	26.07	23.45	22.86	22.50	19.40	22.02	24.29	10.36	0.00	0.00	0.00
6.55	5.95	6.90	6.43	5.60	6.31	4.88	6.79	5.48	2.50	0.00	0.00	0.00
3.33	3.57	1.31	2.14	1.43	2.26	0.00	1.19	1.19	0.24	0.00	0.00	0.00
14,446	14,635	13,181	12,767	12,692	12,384	8,051	8,116	8,346	8,396	7,428	8,369	8,310
24,911	25,246	23,021	21,889	21,989	21,480	13,829	13,925	14,385	14,440	14,929	13,643	13,799
38	40	21	21	24	37	17	19	27	34	34	175	176

3/25/2011	3/28/2011	3/29/2011	3/31/2011	4/6/2011	4/7/2011	4/8/2011
12.02	0.00	14.40	18.57	5.12	14.76	23.69
31.64	0.00	31.09	25.56	28.98	25.02	29.61
63.52	0.00	85.21	76.10	70.49	73.37	76.83
18.93	0.00	16.90	24.40	7.26	20.12	30.83
6.90	0.00	2.50	5.83	2.14	5.36	7.14
2.26	0.00	3.45	4.17	0.83	3.10	4.88
7,621	6,417	22,752	36,446	30,799	31,860	32,367
12,843	16,634	33,365	62,897	58,068	56,134	56,174
138	39	90	202	321	368	418

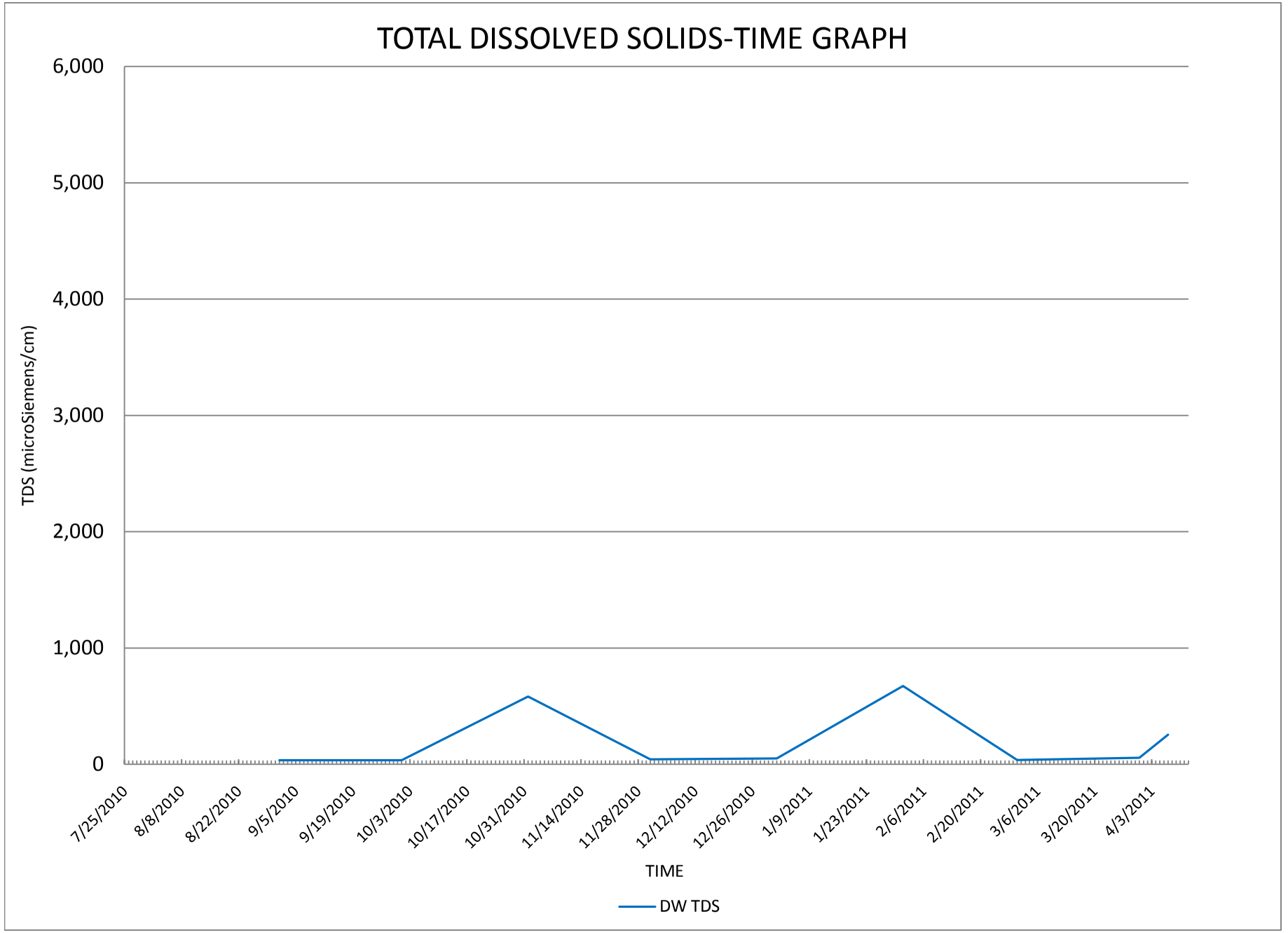
Daily Operating Report (DOR) 4011 TR vs Time Graph



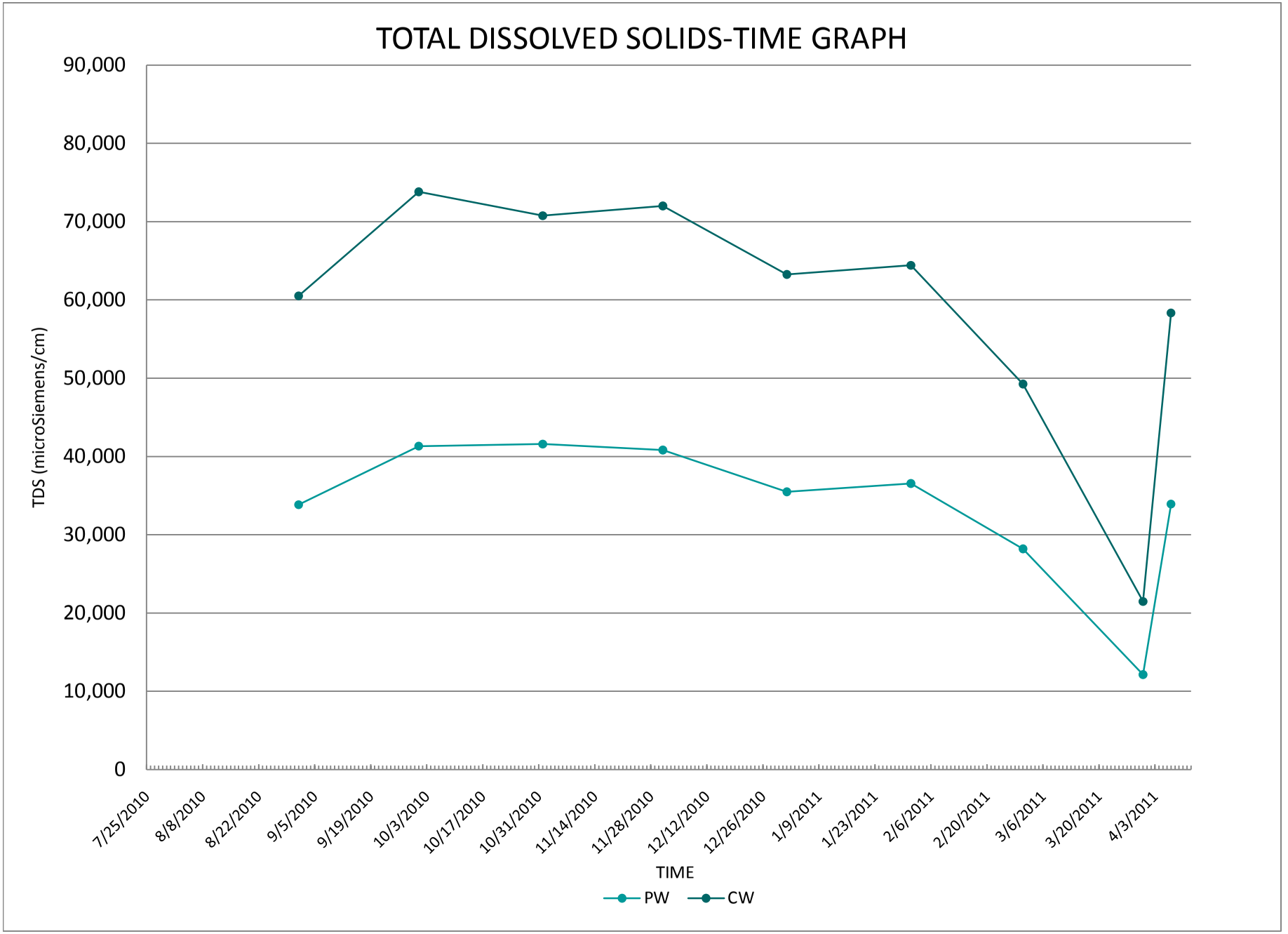
Daily Operating Report (DOR) 4011 TR vs Time Graph



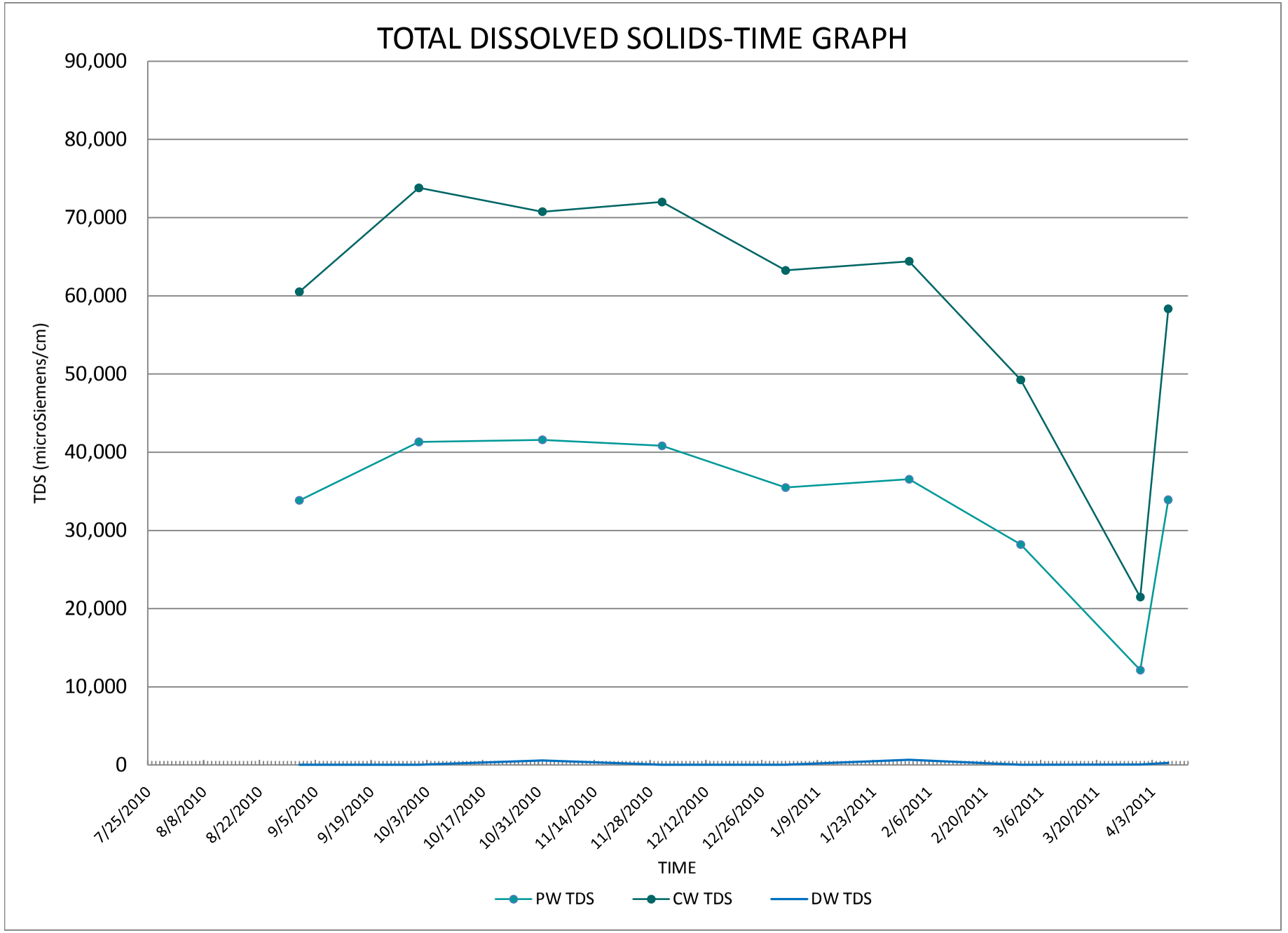
Daily Operating Report (DOR) 4011 TR vs Time Graph



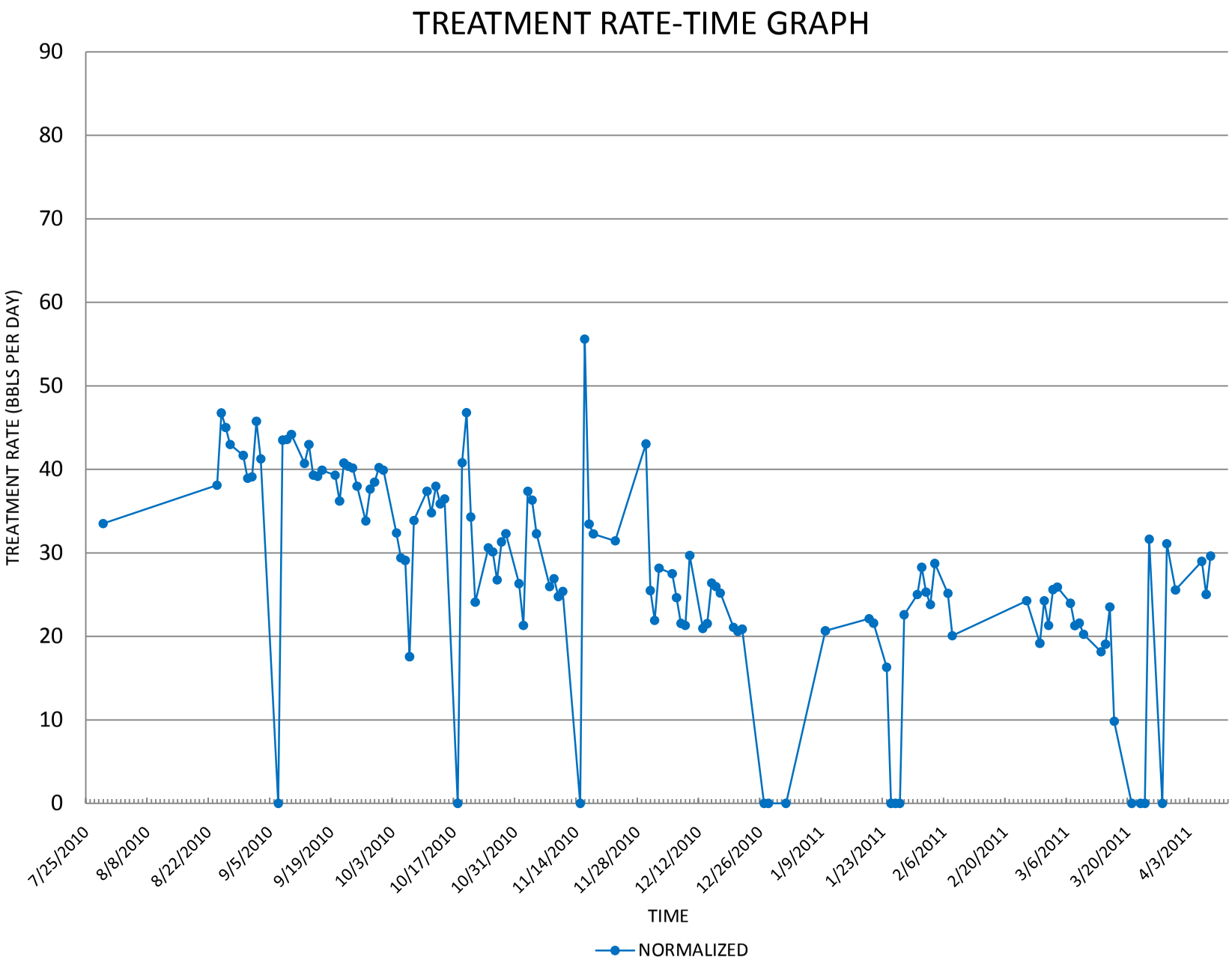
Daily Operating Report (DOR) 4011 TR vs Time Graph



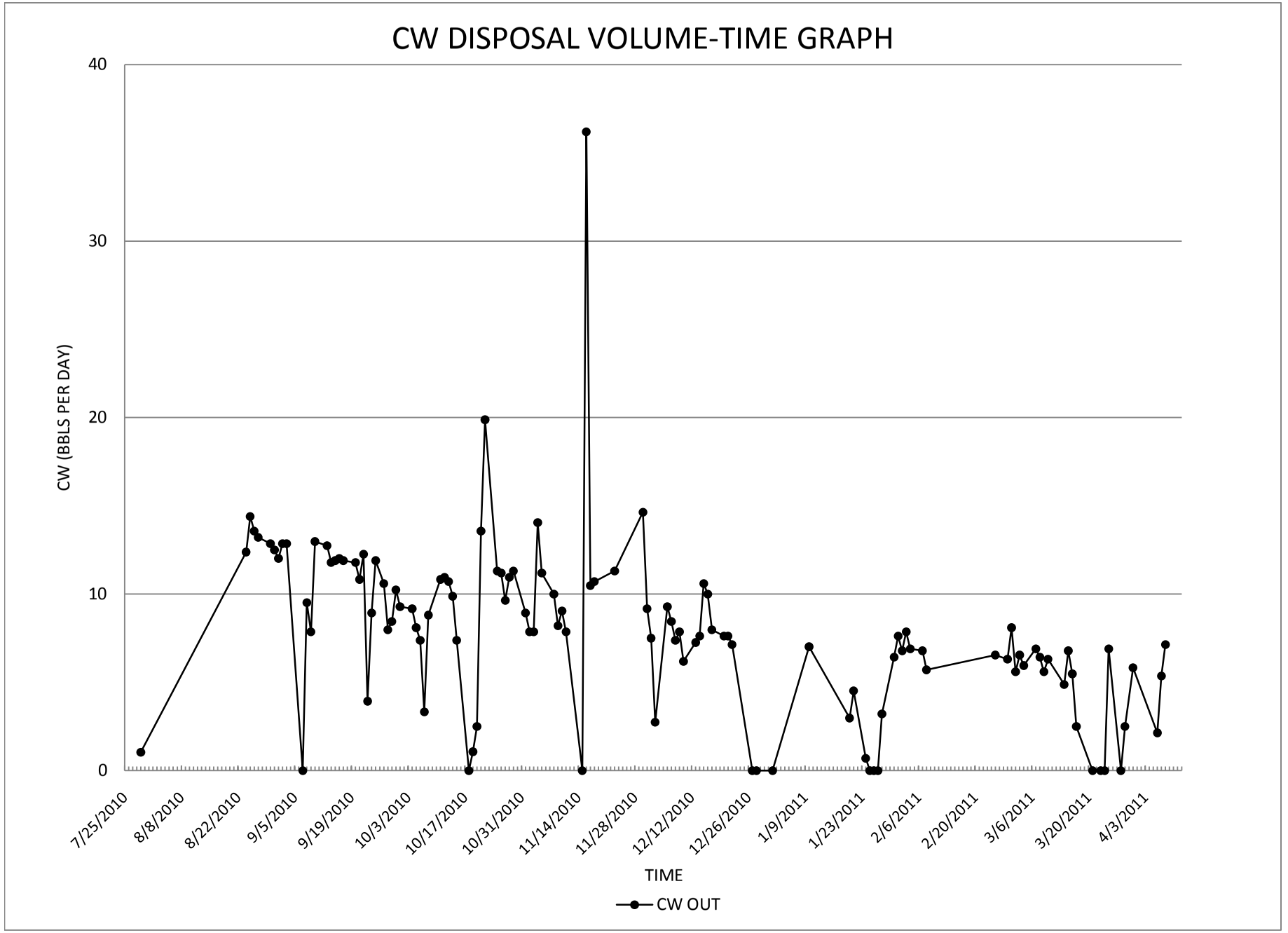
Daily Operating Report (DOR) 4011 TR vs Time Graph



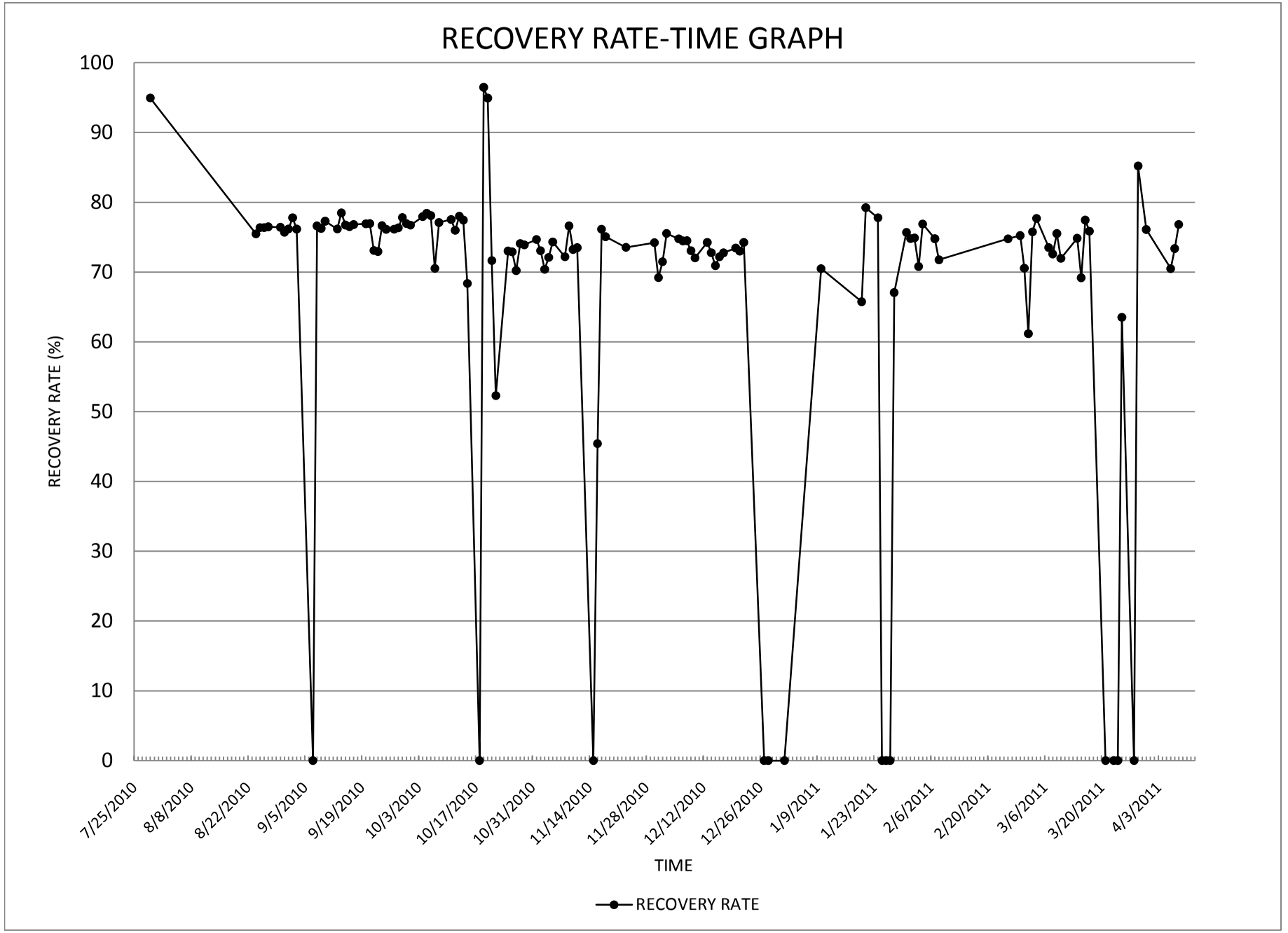
Daily Operating Report (DOR) 4011 TR vs Time Graph



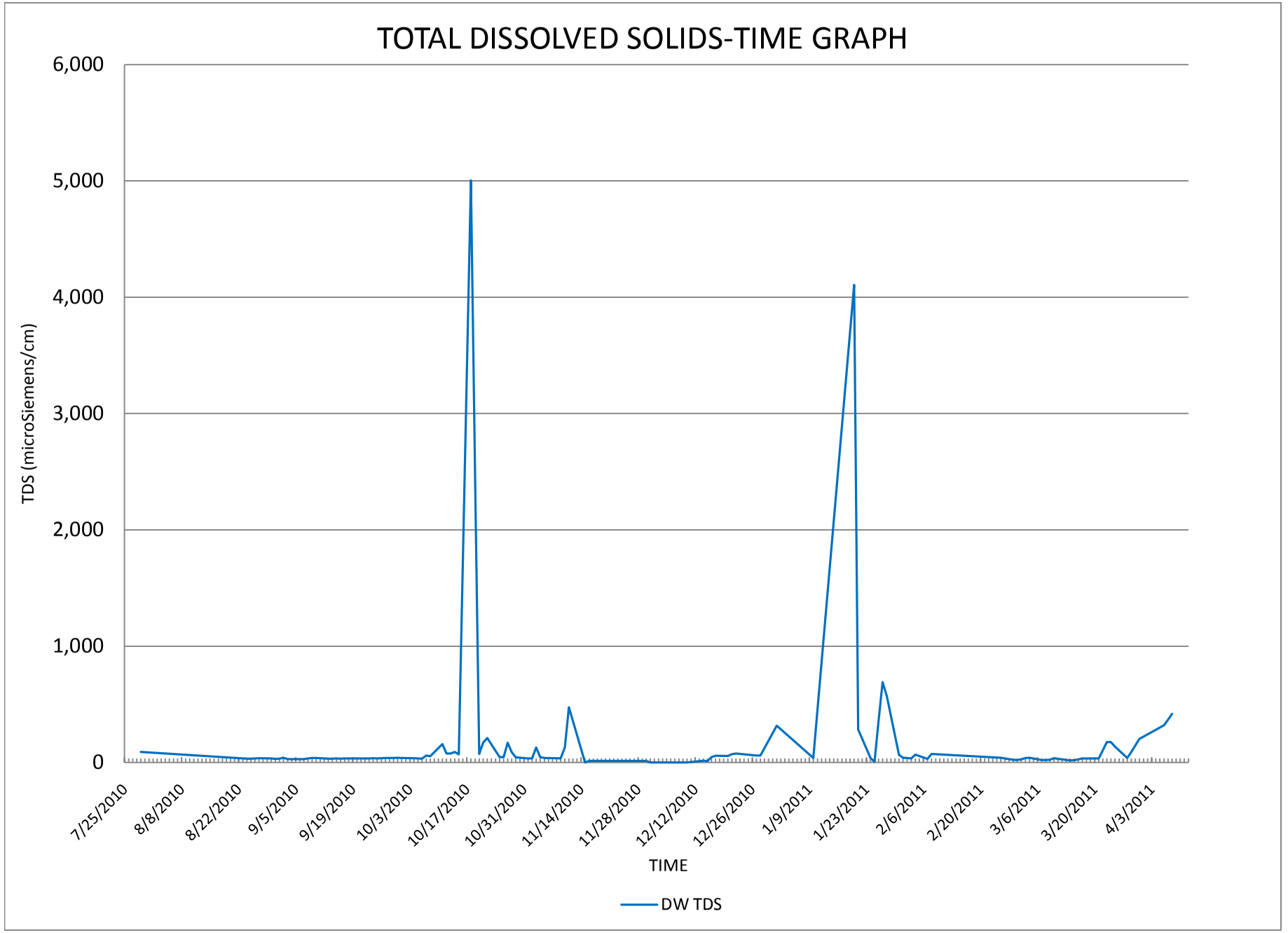
Daily Operating Report (DOR) 4011 TR vs Time Graph



Daily Operating Report (DOR) 4011 TR vs Time Graph



Daily Operating Report (DOR) 4011 TR vs Time Graph



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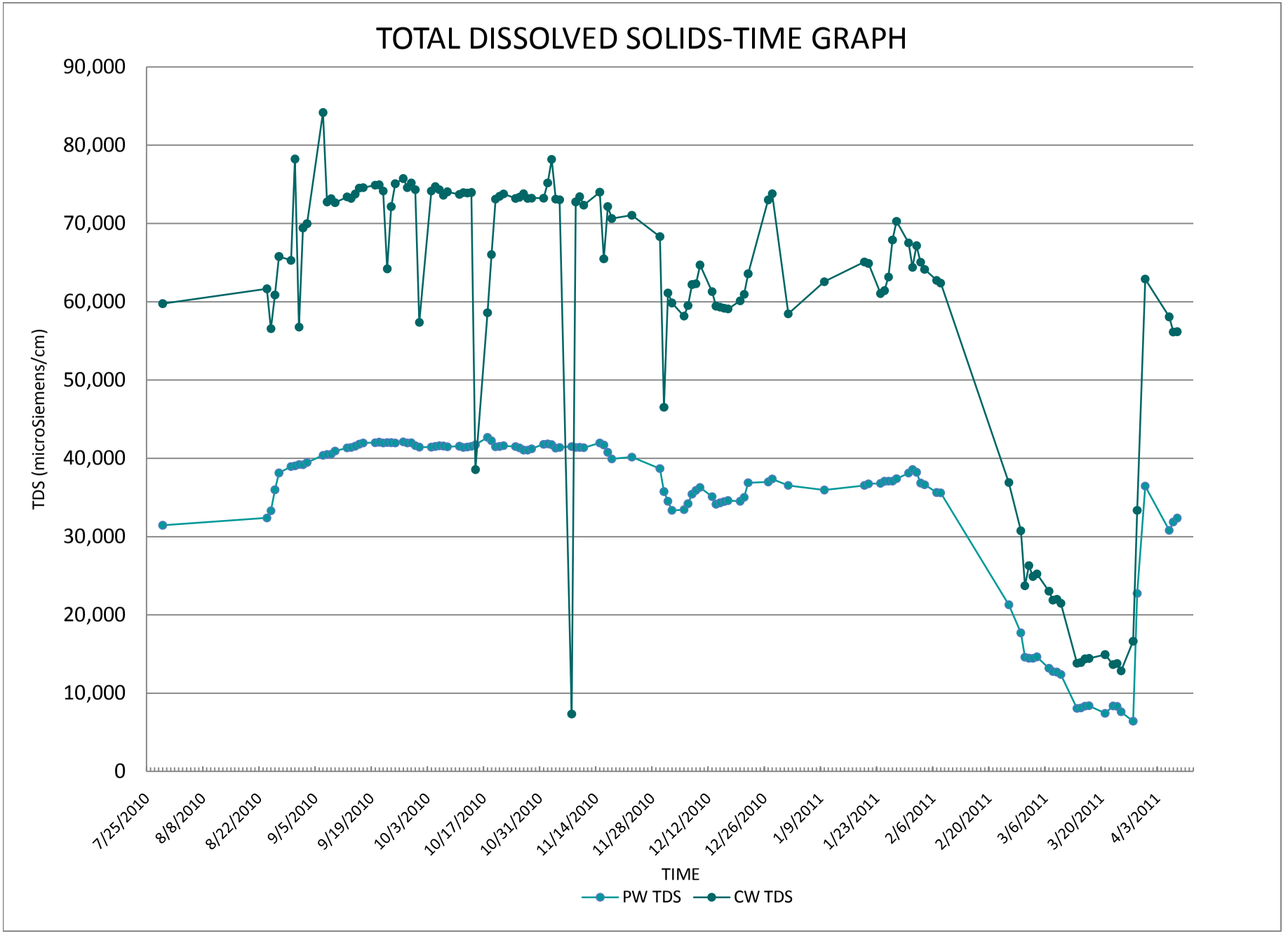

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