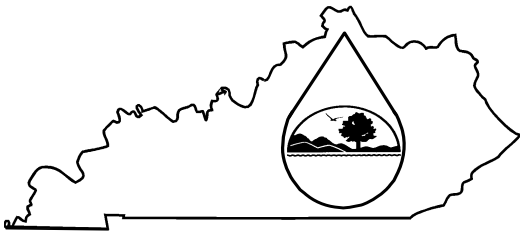

# Kentucky Pollutant Discharge Elimination System (KPDES)

## Socioeconomic Demonstration and Alternatives Analysis

The Antidegradation Implementation Procedure found in 401 KAR 10:030, Section 1(3)(b)3 requires KPDES permit applications for new or expanded discharges to waters categorized as "Exceptional or High Quality Waters" to conduct a socioeconomic demonstration and alternatives analysis to justify the necessity of lowering local water quality to accommodate important economic or social development in the area in which the water is located. This demonstration shall include this completed form and copies of any engineering reports, economic feasibility studies, or other supporting documentation.

## I. Project Information

**Facility Name: Carr Fork / 860-0404, Amendment 01**

| **Location: 1.5 mile northeast from Route 160 junction with Route 15** | **County: Knott** |
|---|---|

**Receiving Waters Impacted: Carr Fork Lake, Wolf Pen Creek, and Breeding Branch**

## II. Socioeconomic Demonstration

**1. Define the boundaries of the affected community:**
(Specify the geographic region the proposed project is expected to affect. Include name all cities, towns, and counties. This geographic region must include the proposed receiving water.)

This project is expected to benefit the Eastern Coal Field region within the Central Appalachian ecological region; including Carr Fork Lake, Wolf Pen Creek, and Breeding Branch. Also benefited by this project and located within Knott County are the cities and communities of Redfox, Littcar, Amburgey, Bath, and Spider. Also benefited by this project and located within Letcher County are the cities and communities of Van, Crown, Isom, Jeremiah, Blackey, Democrat and Deane.

http://kentucky.hometownlocator.com/maps/countymap,cfips,119,c,knott.cfm
http://kentucky.hometownlocator.com/maps/countymap,cfips,133,c,letcher.cfm

**2. The effect on employment in the affected community:**
(Compare current unemployment rates in the affected community to current state and national unemployment rates. Discuss how the proposed project will positively or negatively impact those rates, including quantifying the number of jobs created and/or continued and the quality of those jobs.)

Employment in each community will be directly and indirectly impacted with new employment. The communities of Knott County have unemployment rates that are quite higher than the state and national averages. (See Chart below) This specific project is expected to employ an estimated 50 individuals who will aide in lowering the unemployment rate, in areas that lacks employment and business opportunities.

Each unemployed person who becomes employed in Knott County is estimated to make an income of $20,373 annually (http://www.epodunk.com/cgi-bin/genInfo.php?locIndex=4088).

Section II. 2.

| Percentage of Unemployment Rates | | | | | | |
|---|---|---|---|---|---|---|
| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
| U.S. | 5.5 | 5.1 | 4.6 | 4.6 | 5.8 | 9.3 |
| Kentucky | 5.6 | 6.0 | 5.9 | 5.6 | 6.6 | 10.5 |
| Knott County | 6.4 | 7.1 | 7.2 | 7.0 | 6.9 | 10.7 |

http://www.workforcekentucky.ky.gov/cgi/dataanalysis/AreaSelection.asp?tableName=Labforce

The unemployment rates for the months of January – February for the year of 2010 average:
U.S. = 10.5 %
Kentucky = 11.85 %
Knott County = 14.4 %
http://www.workforcekentucky.ky.gov/cgi/dataanalysis/AreaSelection.asp?tableName=Labforce

According to www.coaleducation.org, in the year of 2006, Knott County miners made up 23.0 % of the total employed people in Knott County. The employees of the local community are estimated to make up 3.55 % of this total number (The total number of mining employees in Knott County = 1,408. Estimated total at the local community = 50.)

Therefore, the ongoing work of this job will not only help maintain the employment number but will aid in raising it. If the jobs are taken away, there would be a detrimental effect on the people causing a drastic rise in unemployment rates. The jobs continued by this project will assure that these employees will not become a part of that number.
In addition to direct jobs provided by this project, it will provide indirect employment opportunities, including equipment sales, engineering services, food services, fuel sales, transportation, and other services.

During the fiscal year 2006-2007, Knott County generated $21,281,331.00 (www.coaleducation.org) in coal severance tax money. For 2006, the coal taxes returned to Knott County (County Estimate Average at 84.5% by the Department of Revenue) estimated at $987,853.00 (www.coaleducation.org). This money is used for local education, health services, and infrastructure projects, etc.

## II. Socioeconomic Demonstration- continued

**3. The effect on median household income levels in the affected community:**
(Compare current median household income levels with projected median household income levels. Discuss how proposed project will positively or negatively impact the median household income in the affected community including the number of households expected to be impacted within the affected community.)

This project will increase median household income and the market value of taxable property in this county. Many households will be economically and/or socially impacted by this project by increasing the direct and indirect employees for this county.

Knott County: (~ 150 +) (50 being direct employees, 100 being indirect)
Total: (~ 150 +) (50 being direct employees, 100 being indirect)

The average weekly earnings for a mining employee in Knott County in 2006 were $1,229.37. These earnings accounted for 60.0 % (www.coaleducation.org) of the total county wages for that time period. Based on this data, these households will earn an estimated $63,927.24 annually ($1,229.37 x 52 weeks).

| Wage Rates YR 2002 – 2004 (Median Household Incomes) | | | |
|---|---|---|---|
| Year | 2002 | 2003 | 2004 |
| U.S. | $42,409 | $43,318 | $44,334 |
| Kentucky | $35,875 | $36,663 | $37,046 |
| Knott County Non-Miner | $22,608 | $23,662 | $24,531 |

http://www.workforcekentucky.ky.gov/cgi/dataanalysis/AreaSelection.asp?tableName=Income

| County Miner | Estimated Annual Wages for Year 2006 |
|---|---|
| Knott | $63,927.24 ($1,229.37 x 52 weeks) |

www.coaleducation.org

This influx of monies will allow these households the ability to maintain and/or enhance their economic status and provides opportunities for improved social welfare. Therefore, the household is positively impacted.

**4. The effect on tax revenues of the affected community:**
(Compare current tax revenues of the affected community with the projected increase in tax revenues generated by the proposed project. Discuss the positive and negative social and economic impacts on the affected community by the projected increase.)

Work on the haul road will benefit the public. This provides better access to the community, and since the coal operators are repairing the roads, county money can be distributed elsewhere.

This project will increase or decrease revenues in these counties. The rationalization for this is that if this project does not exist, revenues will decrease for these counties; if this project does exist, revenues will increase for these counties. If this job exists, taxes that are returned to the respective county will benefit children, teachers, and other employees at schools, parents and their work, local community activities, etc. The children will have an increased opportunity of furthering their education beyond high school; the communities will not suffer any criticism of being uneducated or poor, and therefore will raise Kentucky into a higher ranking educated state. Therefore, providing the future of Kentucky with extra educated workers to supply Kentucky with future tax earnings and added employment opportunities. If this project does not exist, the children of this area and everyone connected to them will have fewer opportunities to enhance their quality in life; these counties would have been deprived of being given more opportunities for bettering their social and economic well-being.

"According to The Budget of the Commonwealth, the coal severance tax serves two key functions: "to improve the environment for new industry and to improve the quality of life of the residents." "
Office of State Budget Director. 2006 – 2008 Budget of the Commonwealth, Volume 1, p. 27.
http://www.maced.org/coal/documents/Impact_of_Coal.pdf
On website, scroll to page 10 for quotation, and scroll to page 30 for reference.

During the fiscal year 2006-2007, Knott County generated $21,281,331.00 and Letcher County generated $18,259,694.00 (www.coaleducation.org) in coal severance tax money. This project will remove approximately 375 thousand tons of coal (surface disturbance acreage X 30" X 120 = tonnage; 104.36 X 30" X 120 = 375,696) that would be made available to the market, and result in the direct employment of 50 people in the area. It will also create new employment opportunities, aid in development and maintenance of indirect jobs, and will increase the amount of money the area receives in personal and severance tax.

## II. Socioeconomic Demonstration- continued

**5. The effect on an existing environmental or public health in affected community:**
(Discuss how the proposed project will have a positive or negative impact on an existing environmental or public health.)

Prior underground mining occurred in this area, thus positively affecting some of the watersheds. However, the area will benefit because once mitigation begins, the stream banks will be stabilized to prevent erosion. Also, species indigenous to the area will be planted and help establish an adequate riparian zone; Stream channels will be rehabilitated to curb sedimentation. This will provide a healthier habitat for aquatic species and wildlife leading to a well balanced ecosystem. State and federal regulations are being followed so that no problems occur.

Residents in the surrounding permit area either use septic tank systems, or other means of waste disposal. There is no other treatment taking place within the project boundary.

Sediment control from mining will be improved. There are gas wells in the area, lacking any form of control. This project will improve sediment control for these locations. Prior to the start of this project, the mine site will be cleared and all garbage material will be disposed of. The estimated land run-off is 104.36 acres.

Existing overgrowth by invasive plant species will be removed and channelization of receiving streams due to excessive silting will be improved. Haul roads in the area will be maintained and improved to assure proper water containment. After completion of reclamation, these sources will be fixed.

**6. Discuss any other economic or social benefit to the affected community:**
(Discuss any positive or negative impact on the economy of the affected community including direct and or indirect benefits that could occur as a result of the project. Discuss any positive or negative impact on the social benefits to the community including direct and indirect benefits that could occur as a result of the project.)

Economically this project will also benefit retailers, service industry personnel, food establishments and entertainment industries in the community. Severance tax dollars not only fund basic needs such as water and sewer projects but also fund recreational, social and cultural developments.
This project will increase median household income in this county. Many households will be economically and/or socially impacted by this project by increasing the direct and indirect employees for this county.
According to www.coaleducation.org, in the year of 2006, Knott County miners made up 23.0 % of the total employed people in Knott County. The employees of the local community are estimated to make up 3.55 % of this total number (The total number of mining employees in Knott County = 1,408. Estimated total at the local community = 50.)

The average weekly earnings for a mining employee in Knott County in 2006 were $1,229.37. These earnings accounted for 60.0 % (www.coaleducation.org) of the total county wages for that time period. Based on this data, these households will earn an estimated $63,927.24 annually ($1,229.37 x 52 weeks).

During the fiscal year 2006-2007, Knott County generated $21,281,331.00 (www.coaleducation.org) in coal severance tax money. For 2006, the coal taxes returned to Knott County (County Estimate Average at 84.5% by the Department of Revenue) estimated at $987,853.00 (www.coaleducation.org). This money is used for local education, health services, and infrastructure projects, etc.

Taxes that are returned to the respective county will benefit children, teachers, and other employees at schools, parents and their work, local community activities, etc. The children will have an increased opportunity of furthering their education beyond high school; the communities will not suffer any criticism of being uneducated or poor, and therefore will raise Kentucky into a higher ranking educated state. Therefore, providing the future of Kentucky with extra educated workers to supply Kentucky with future tax earnings and added employment opportunities.
Work on the haul road will benefit the public. This provides better access to the community, and since the coal operators are repairing the roads, the counties monies can be distributed elsewhere.

## III. Alternative Analysis

**1. Pollution prevention measures:**
(Discuss the pollution prevention measures evaluated including the feasibility of those measures and the cost. Measures to be addressed include but are not limited to changes in processes, source reductions or substitution with less toxic substances. Indicate which measures are to be implemented.)

The first alternative treatment option that was explored was Limestone Sand Dosing. Limestone Sand Dosing is when limestone sand is being added to an acidic stream by a dump truck.
The limestone would be distributed downstream by periodic flooding. The sand must be replenished approximately 1 or 2 times per year, depending on flooding frequency. Limestone sand addition is most effective for streams that have low pH, but also relatively low dissolved metal concentrations. Iron and/or aluminum hydroxides precipitate in the stream, but probably over a shorter stretch than without treatment (http://www.facstaff.bucknell.edu/kirby/AMDtrmt.html). As stated, the limestone sand is added by dump trucks. Even with the availability of trucks already on site, one isn't guaranteed this option will work. The site must have truck access to stream at all times. All ponds may not have truck access at all points in time, therefore hindering the use of this option. The estimated cost of this project is $200,000 (http://www.epa.gov/owow/nps/Success319/state/ky.htm#results) per site. This estimate includes the $350.00/ton of limestone cost, and the cost of sand. The cost, alone, per small dump truck is ~$47,500.00, not including maintenance and upkeep. Bringing the cost of this project to $200,000+ per limestone sand dosing site. A second option of limestone channeling was also considered. Limestone channel bars are constructed by combining limestone gravel and sand. The limestone gets coated by iron or aluminum hydroxides, but some limestone dissolution still occurs. These methods are most effective for streams that have low pH, but also relatively low dissolved metal concentrations. Iron and/or aluminum hydroxides precipitate in the stream. Again, the cost of installation and upkeep would reach well over $200,000.00 per site (Including limestone and the cost of dump trucks). Other disadvantages of limestone channeling is that:

1. Limestone does not guarantee a safe result.
2. Limestone is easily coated and is then ineffective.
3. Limestone must be replaced regularly.
4. Limestone is unpredictable.

(**Limestone Treatment of Acid Waste**, A white paper by Wastech Controls & Engineering, Inc., http://www.wastechengineering.com/papers/limestone.htm)

Both options obviously aren't reliable and may impose unsafe conditions, notwithstanding the fact that results on ph, alkalinity and other water tested components are going to fully depend on the limestone actions, therefore being inaccurate.

**2. The use of best management practices to minimize impacts:**
(Discuss the consideration and use of best management practices that will assist in minimizing impacts to water quality from the proposed permitted activity.)

Because surface mining techniques must be used to maximize the recovery of coal reserves, on site water treatment were considered. Sediment ponds will be used to retain the water for an acceptable amount of time to allow the solids to settle effectively. Silt fences and straw bales can be used in lower elevations where run-off may not flow to a pond. However these fences would not be stable in the steeper areas where strong flows could / would possibly sweep them away. Existing overgrowth by invasive plant species will be removed and channelization of receiving streams due to excessive silting will be improved. Sediment control from mining will be improved.

Best Management Practices (BMPs) will be used by this project anticipating minimal disturbances in the construction and maintenance of containment areas designed to contain all water collected on-site. The containment areas would be designed to accommodate a 25 year, 24 hour storm event.

Species indigenous to the area will be planted and help establish an adequate riparian zone.

Stream channels will be rehabilitated to curb sedimentation. This will provide a healthier habitat for aquatic species and wildlife leading to a well balanced ecosystem.

**3. Recycle or reuse of wastewater, waste by-products, or production materials and fluids:**
(Discuss the potential recycle or reuse opportunities evaluated including the feasibility of implementation and the costs. Indicate which of these opportunities are to be implemented)

The water from this job could be used for maintaining dust and for watering of the postmining land, but after evaluating the option, it was found to not be useful because the slope of the land is greater than 10%. With the slope of the land being greater than 6%, the water couldn't be absorbed quickly enough. The effects of this problem would greatly impact the land, and cause economic stress, by possibly causing slides, and erosion of soil. (Please note that some of the water will be used for dust containment.)

The estimated water volume on hand at this job is 38.816 ac-ft (acre-foot). This estimated water volume is a total of an estimated 19 ponds on the job site. One acre-foot equals 326,700 gallons.
(http://www.grow.arizona.edu/water/waterscience/acrefoot.shtml and / or
http://www.grow.arizona.edu/GrowResources.php?ResourcesID=28).

Embankment Ponds cost an estimated $15,000 to $20,000 to construct. On Bench Ponds cost an estimated $11,000 to $15,000 to construct.

A 10,000 gallon size truck could haul water at least 12 times a day; more or less, depending on the size of the water trucks and the weather conditions. The total amount of this water volume that could be used in a day, depending on weather conditions, is an estimate of 120,000 gallons or 0.3673094 acre-foot. (10,000 X 12 = 120,000)

Secondly, we looked at implementing a cistern system. The normal cistern system is estimated to cost approximately $12,000.00/each 5000 gallon tank (Kessner, K., 2000: How to Build a Rainwater Catchment Cistern. The March Hare, Summer 2000, Issue 25, (http://www.dancingrabbit.org/newsletter/). With a generous quote of 500,000 gallon of water per job; one would need at least 100 cistern tanks. Thus, the cost to even establish this option would be $1,200,000.00 ($12,000.00 X 100 tanks). This estimate does not include the cost of maintaining the cistern system. Maintenance alone is ~$16,233.00 per year/per cistern.

Water Conservation Practices that may be employed when and where necessary include Hydroseeding and dust control. Dust will be controlled when necessary by watering the roads with rain water collected by ponds. Watering equipment will be kept in good working condition and water leaks will be repaired promptly.

## III. Alternative Analysis - continued

**4. Application of water conversation methods:**
(Discuss the potential water conservation opportunities evaluated including the feasibility of implementation and the costs. Indicate which of, of these opportunities are to be implemented)

Effective implementation of some aspects of the use of best management practices to minimize impacts would be effective and instrumental in ensuring water conservation. The effective design of the containment areas to accommodate a 25 year, 24 hour rainfall event would ensure that waste water which overflows is stored. Containment areas will be situated at locations which have the requisite gradient to ensure that they function at their optimum.

Water Conservation Practices that may be employed when and where necessary include Hydroseeding and dust control. Dust will be controlled when necessary by watering the roads with rain water collected by ponds. Watering equipment will be kept in good working condition and water leaks will be repaired promptly.

Once final grading has been completed, the area will be seeded in accordance with a vegetation plan. Seeding minimizes erosion and reduces the possibilities of adverse effects to water quality and/or fish and wildlife habitat.

**5. Alternative or enhanced treatment technology:**
(Compare feasibility and costs of proposed treatment with the feasibility and costs of alternative or enhanced treatment technologies that may result in more complete pollutant removal. Describe each candidate technology including the efficiency and reliability in pollutant removal and the capital and operational costs to implement those candidate technologies. Justify the selection of the proposed treatment technology.)

The first alternative treatment option that was explored was Limestone Sand Dosing. Limestone Sand Dosing is when limestone sand is being added to an acidic stream by a dump truck.
The limestone would be distributed downstream by periodic flooding. The sand must be replenished approximately 1 or 2 times per year, depending on flooding frequency. Limestone sand addition is most effective for streams that have low pH, but also relatively low dissolved metal concentrations. Iron and/or aluminum hydroxides precipitate in the stream, but probably over a shorter stretch than without treatment (http://www.facstaff.bucknell.edu/kirby/AMDtrmt.html). As stated, the limestone sand is added by dump trucks. Even with the availability of trucks already on site, one isn't guaranteed this option will work. The site must have truck access to stream at all times. All ponds may not have truck access at all points in time, therefore hindering the use of this option. The estimated cost of this project is $200,000 (http://www.epa.gov/owow/nps/Success319/state/ky.htm#results) per site. This estimate includes the $350.00/ton of limestone cost, and the cost of sand. The cost, alone, per small dump truck is ~$47,500.00, not including maintenance and upkeep. Bringing the cost of this project to $200,000+ per limestone sand dosing site. A second option of limestone channeling was also considered. Limestone channel bars are constructed by combining limestone gravel and sand. The limestone gets coated by iron or aluminum hydroxides, but some limestone dissolution still occurs. These methods are most effective for streams that have low pH, but also relatively low dissolved metal concentrations. Iron and/or aluminum hydroxides precipitate in the stream. Again, the cost of installation and upkeep would reach well over $200,000.00 per site (Including limestone and the cost of dump trucks). Other disadvantages of limestone channeling is that:

**1.** Limestone does not guarantee a safe result.
**2.** Limestone is easily coated and is then ineffective.
**3.** Limestone must be replaced regularly.
**4.** Limestone is unpredictable.

(**Limestone Treatment of Acid Waste**, A white paper by Wastech Controls & Engineering, Inc., http://www.wastechengineering.com/papers/limestone.htm)

Both options obviously aren't reliable and may impose unsafe conditions, notwithstanding the fact that results on ph, alkalinity and other water tested components are going to fully depend on the limestone actions, therefore being inaccurate.

Section III. 5.
Hydrologically controlled releases will not be a customary practice for this operation. Should a hydrologically controlled release be required for the clean out of accumulated sediment or correction of structural deficiencies, hydrologically controlled releases will not be performed when the receiving stream is flowing less than 1/10 cfs. Other dewatering methods may be implemented. Such methods that may be implemented are the use of water trucks to transfer water to other containment areas; the use of backhoes dipping accumulated silt out of the containment area; and/or the use of a fuel powered pumping system that would deploy water through a hose to another containment area, etc.

## III. Alternative Analysis - continued

**6. Improved operation and maintenance of existing treatment systems:**
(Discuss improvements in the operation and maintenance of any available existing treatment system that could accept the wastewater. Compare the feasibility and costs of improving an existing system with the feasibility and cost of the proposed treatment system.)

Because surface mining techniques must be used to maximize the recovery of coal reserves, on site water treatment were considered. Sediment ponds will be used to retain the water for an acceptable amount of time to allow the solids to settle effectively. Sediment structures are designed to accommodate a 10 year 24 hour storm event while allowing time for settling of sediment prior to discharge into the receiving stream to meet effluent discharge limitations. Discharge from these structures is precipitation dependent. These structures are designed to safely impound and discharge the runoff from the project area while limiting the impact to what is required based on industry standards. Silt fences and straw bales can be used in lower elevations where run-off may not flow to a pond. However these fences would not be stable in the steeper areas where strong flows could / would possibly sweep them away.

Another alternative would be to accept more stringent water limits. To maintain these limits, one would have to continually add soda ash and lime. According to a test run in AMDtreat4.0 (this program can be obtained and downloaded at http://amd.osmre.gov/GettingStarted.htm#Reverse) to maintain these limits would cost approximately $23,512.00 more than the current costs. Withstanding the fact that the lowering of limits wants to be avoided, the cost is quite steep per change.

**7. Seasonal or controlled discharge options:**
(Discuss the potential of retaining generated wastewaters for controlled releases under optimal conditions, i.e. during periods when the receiving water has greater assimilative capacity. Compare the feasibility and cost of such a management technique with the feasibility and cost of the proposed treatment system.)

Hydrologically controlled releases will not be a customary practice for this operation. Should a hydrologically controlled release be required for the clean out of accumulated sediment or correction of structural deficiencies, hydrologically controlled releases will not be performed when the receiving stream is flowing less than 1/10 cfs. Other dewatering methods may be implemented. Such methods that may be implemented are the use of water trucks to transfer water to other containment areas; the use of backhoes dipping accumulated silt out of the containment area; and/or the use of a fuel powered pumping system that would deploy water through a hose to another containment area, etc.

**III. Alternative Analysis - continued**

**8. Land application or infiltration or disposal via an Underground Injection Control Well**
(Discuss the potential of utilizing a spray field or an Underground Injection Control Well for shallow or deep well disposal. Compare the feasibility and costs of such treatment techniques with the feasibility and costs of .proposed treatment system.)

**See Attachment 8.A**

**9. Discharge to other treatment systems**
(Discuss the availability of either public or private treatments systems with sufficient hydrologic capacity and sophistication to treat the wastewaters generated by this project. Compare the feasibility and costs of such options with the feasibility and costs of the proposed treatment system.)

**See Attachment 9.A**

**IV Certification:** I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

| | | | |
|---|---|---|---|
| **Name and Title:** | **Stephen Hamilton / Secretary-Treasurer** | **Telephone No.:** | (502) 348 -0084 |
| **Signature:** | Stephen Hamilton | **Date:** | 06/22/11 |

ATTACHMENT 8.A

One option would be setting up pump stations to transport wastewater to septic tanks. In most cases, the mining facility is normally located in remote areas away from the urban settlements; therefore, making the disposal of wastewater into public sewers a true challenge. Even if the mining industry is located nearby a public sewer, it may not be allowed to discharge the wastewater into public sewers as the quantity and quality of mine wastewater can create considerable imbalance in the operation of municipal wastewater treatment plants. As stated above, to effectively transport the discharge to this facility it would require multiple lift and pump stations, which are approximately $200,000.00 each, and cost approximately $393,792 per year, per pump to maintain them
(Estimate derived from:
http://www.pumpingmachinery.com/pump_magazine/pump_articles/article_33/PS%20paper%20November%2010%202004.doc Pump Operation Costs as a Function of Operating Flow in Wastewater Treatment, Case Study, Dr. Lev Nelik, P.E., APICS, Pumping Machinery, LLC) page 4 and 5. "If we assume a 24/360 operation, at $0.07 per KWxHR, the operating cost per year is: 2930 x 24 x 360 x 0.07 = $ 1,772,064. If efficiency is reduced from 90% to 70% (20% difference), we can estimate, approximately, the wasted ("inefficient") power, as: 2930 x 20/90 = 651 hp (wasted), or, in, similarly, in dollars: 1,772,064 x 20/90 = ***$ 393,792*** ! – per year, per pump."

With piping cost, estimated at $22/foot, alone piping for a 5 mile radius would cost over $580,000.00. (5 miles X 5280 ft/mile= $26,400.00. $26,400.00 X $22/foot = $580,800.00). Too, after the job is finished, there would be no sewage users, thus the pump stations would have to be removed. At paying men ~$25.00 per hour to remove lines, haul garbage, etc, the removal would cost, alone, more than $30,000.00 (4 men working at 4 weeks =-640 hours. 640 hours X $25.00/hour = $16,000.00. $16,000.00 + the cost to remove and dispose of the system = $20,000.00+).

Septic tanks are estimated to cost as low as $1,500.00 to over $8,000.00. "An average installation cost of $4,000.00 is assumed for a traditional septic tank/soil absorption system in a geological favorable area." (http://www.epa.gov/owm/mtb/septic.pdf). Every home that is not hooked to a sewer system is required to have a septic tank system. So if a permit has several hundred acres, then that will require multiple septic tank systems.

For this permit, it is estimated to have 104.36 acres of surface disturbance area. With estimating one septic tank per acre, that makes 105 septic tanks. That would cost an estimated $157,500.00 to an estimated $840,000.00 (105 x $1,500.00 = $157,500.00) (105 x $8,000 = $840,000.00).

The next option evaluated was the use to dispose wastewater into an underground mine through a piping system. By putting wastewater into already abandoned mines, it would displace water that's already been collected there. An example of this would be an overflowing cup of milk. This would also increase the potential for blowouts. An underground mine was proposed in permit 860-5202, and is operated by Consol of Kentucky, Inc. The mine is currently active; therefore, cannot be used as a water reservoir.

Spray Irrigation would be difficult to accomplish due to the topography of the land. For this permit, the land has a slope of 10 % or greater. Spray Irrigation calls for a slope of 6 % or less, and calls for at least 1,000 gallons of water per acre. To accomplish Spray Irrigation, flat land would have to be purchased. This would become unnecessary as flat land would be located away from the permit area, thus defeating the purpose of helping the permit area since it wouldn't be located next to it.

# ATTACHMENT 9.A

The estimated closest water treatment facility to Carr Fork in Knott County (Lat: 37° 13' 52" / Long: 82° 57' 19") is the Whitesburg Wastewater Treatment Plant in Letcher County (Lat: 37° 7' 34" / Lon: 82° 50' 23"). Thus, the wastewater treatment facility is approximately 9.66 miles from the job site (http://jan.ucc.nau.edu/~cvm/latlongdist.html). To effectively transport the discharge to this facility it would require multiple lift and pump stations; which are approximately $200,000.00 each, and it cost approximately $393,792 per year, per pump to maintain them
(Estimate derived from:
http://www.pumpingmachinery.com/pump_magazine/pump_articles/article_33/PS%20paper%20November%2010%202004.doc Pump Operation Costs as a Function of Operating Flow in Wastewater Treatment
Case Study, Dr. Lev Nelik, P.E., APICS, Pumping Machinery, LLC) page 4 and 5. "If we assume a 24/360 operation, at $0.07 per KWxHR, the operating cost per year is: 2930 x 24 x 360 x 0.07 = $ 1,772,064. If efficiency is reduced from 90% to 70% (20% difference), we can estimate, approximately, the wasted ("inefficient") power, as: 2930 x 20/90 = 651 hp (wasted), or, in, similarly, in dollars: 1,772,064 x 20/90 = ***$ 393,792*** ! – per year, per pump."

With piping costs, estimated at $22/foot, alone would cost over $1.1 million. (9.66 miles X 5280 ft/mile = 51,004.80 ft. 51,004.80 X $22/foot = $1,122,105.60).

Another option for water removal would be the use of water disposal trucks. 10,000 gallon water disposal trucks cost an estimated $120,000.00 each, with an estimated monthly maintenance price of $3,000 per month per truck. Hiring drivers for these vehicles cost an estimated $15.00 per hour, per driver. $15.00 x 160 (4 x 40) hours = $2,400.00 per month; not including overtime, etc.