ATTACHMENT II-H

DETERMINATION OF THE PROBABLE HYDROLOGIC CONSEQUENCES

Baseline data collected at Surface Water Monitoring Site CRCMSW-1 (see Mine Site Location Map) by personnel of the PERC Engineering Laboratory is attached. Parameters analyzed include pH, Total Iron, Total Manganese, Specific Conductance, and Total Suspended solids. The log values of these parameters (except pH) were plotted vs. the corresponding log value of the flow (discharge) using Statpak by Northwest Analytical, Inc. The pH was plotted vs. the log of the flow (discharge) without alteration. These plots are also attached. The data values mentioned above were regressed by the 'least squares' method using the NWA Statpak by Northwest Analytical, Inc. Values for the square of the multiple correlation coefficient (R2), the intercept (a), and the slope (b) for each plot are shown. The regression line is used to predict surface water quality values below the mine site in the receiving stream at specific flowrates before mining by Cahaba Resources, LLC. occurs. These specific flowrates are at the 7Q2, average, and 2 year floods. The method for calculating the 7Q2 flowrate in the receiving stream is shown in "Low-Flow Characteristics of Alabama Streams", Geological Survey of Alabama, Bulletin 117. Calculating average flow in the receiving stream is shown in "A Method of Estimating Average Streamflow and Headwater Limits in U.S. Army Corps of Engineers, Mobile District, Alabama and Adjacent States", U.S. Geological Survey, Water-Resources Investigations, Open-File Report 81-59. The method of calculating the 2-year flowrate in the receiving stream is shown in "Magnitude and Frequency of Floods in Alabama", Water Resources Investigations Report 84-4191.

Surface water quality values for baseline conditions at these specific flowrates for the receiving stream is shown on the attached 'Water Quality & Quantity Projections' page. Notice on this page that both iron and manganese exceeded EPA effluent limitations at the7Q2 flowrate. This is a result of previous mining in this watershed. It should be noted that the slope of the manganese regression plot was flattened using professional judgement. The reasoning for this was a narrow data set with respect to flowrate. When flowrates in the data set are are not widely dispersed, it tends to cause exaggerated predictions to baseline quality. Therefore, the slope was flattened to show more realistic baseline quality for manganese in the receiving stream.

Comparisons should also be made between baseline surface water quality in the receiving stream and effluent limitations specified by the Alabama Dept. of Environmental Mgt. for the receiving streams' use classification, which is "Fish and Wildlife", as referenced by Chapter 335-6-11-.02 in their Water Quality Program, and mentioned previously in this report. As referenced from Chapter 335-6-10 in the Water Quality Program of the Alabama Dept. of Environmental Management, the best usage of the 'Fish and Wildlife' classification for Hurricane Creek at this location is fishing, the propagation of fish, aquatic life, and wildlife, and any other usage except utilization as a supply for drinking or food processing, or for swimming and water contact sports. According to the same reference, the following water quality restrictions are imposed by ADEM for this use classification: Wastes shall not cause the pH to deviate more than one unit from the normal pH, nor be less than 6.0 or greater than 8.5. The temperature shall not exceed 90 degrees Fahrenheit. Dissolved oxygen concentrations will not be less than 5 mg/l. Only such amounts of toxic substances

or taste, odor, and color producing substances will be allowed which will not exhibit acute or chronic toxicity. Fecal coliform will not exceed a geometric mean of 1,000/100ml on a monthly average. Radioactive materials will not exceed the requirements of the State Dept. of Public Health and there shall be no turbidity of other than natural origin that will cause substantial visible contrast with the natural appearance of the waters or interfere with any beneficial uses which they serve. Officials from ADEM were contacted and asked what parameter concentrations would degrade this use classification for parameters not listed in Chapter 335-6-10. They responded that if the parameter is not specifically listed in the above referenced Chapter, baseline quality of the body of water would be used to determine whether or not degradation is taking place. As shown in the attached 'Water Quality & Quantity Projections' page, iron and manganese exceeded EPA effluent limitations at the7Q2 flowrate. for this use classification.

Due to the fact that all overburden at this site does not occupy similar areas, intervals shown in attachment which are located in the upper portions of the drill logs occupy a smaller volume than intervals which are located closer to the bottom, consequently, their acid-base accounts do not contribute as substantially to the overall chemistry of the overburden. In an attempt to more accurately describe the acid-base potential of the overburden at the Carter Mine site, a spreadsheet which was developed at the Pennsylvania Dept. of Environmental Resources, Bureau of Mining and Reclamation was employed. This spreadsheet not only takes into account the volume occupied by each interval tested, but also the amount of coal lost into the spoil. The results of this method showing both the volume weighted acid-base potential of the area each drill hole

represents, but also a summary of the acid-base potential of the entire proposed permit area on a volume weighted basis is attached. The results of the volume weighted acid-base potential of the entire proposed permit area from Geochemical Analysis Site CRCMDH-1 and Groundwater Monitoring Site CRCMMW-3 show that overburden at the Carter Mine contains 0.18 (tons CaCO3/1000 tons overburden) excess neutralization potential.

In addition, as stated in Part II-E, there is a concern that the proposed permit area may contain an interval which has periodically caused reclamation problems at other local facilities due to adverse geochemical quality. This strata is a thin interval at the Coker-Pottsville contact which is locally known to exist. This interval is thought to be re-worked Pottsville Formation strata and is a sand channel, or high energy deposit. This interval is thin (generally less than 3 ft. thick), and is discontinuous (meanders). The dominant lithology for this interval is a light grey friable, or unconsolidated sand. It should be noted that none of the lithologic descriptions presented in this report contains such a description, and no geochemical analysis presented in this report has revealed its' existence, however due to the discontinuous (meandering) nature of the interval, it may or may not exist within the proposed permit area.

It should be noted that there were several intervals in the Cretaceous strata which were analyzed as being questionable with respect to being acid forming. At this site the term "acid-forming' may not be accurate in this instance. In general terms, **potentially acid-forming** indicates that the strata or stratum may form acid if exposed to catalysts such as

the atmosphere or water (oxygen). The geochemical analysis conducted to determine this potential is the acid-base accounting. Acid is determined by a simple sulfur percentage test. The more sulfur that is present, the more acid may potentially be produced. Neutralization potential (or the base) is determined by titration. The titration test is conducted by taking a known volume of the strata, adding de-ionized water and a known amount of acid of known concentration, heating the mixture to make the base react with the acid, and titrating back to normality with a base of known concentration to measure the amount of acid that was neutralized by the base naturally present in the sample. As shown in Part II-E, all of the intervals mentioned above as being questionable have **negative neutralization potentials** (and low sulfur values). This means that during the neutralization potential test, more base was needed to neutralize the mixture than the amount of acid that was added originally. This means that there was acid naturally present in the sample. Where did this acid come from? No doubt, in aeons past, the cretaceous material at the proposed Carter Mine contained much higher amounts of sulfur. Due to the unconsolidated nature of this formation, rainwater which infiltrated into this strata migrated through the formation rapidly, exposing the acid-forming material to oxygen. This resulted in the formation of acid, and the amount of acid which was formed depleted all the neutralization potential that was present in the strata (if any). The amount of excess acid has since either migrated to the surface with the groundwater or remains to this day in the Cretaceous Formation strata discussed above. What are the ramifications of this information?: 1) Negative acid-base account numbers at the Carter Mine do not reflect the potential for creating acid but reflect the amount of acid already formed. 2) Since there are very low levels of sulfur currently in the strata, there is no threat of creating acid by

exposing this strata to the atmosphere (see maximum potential acidity values in Part II-E. 3) Burying this strata during mining would be expensive and largely ineffective due to a) no significant amounts of low permeability material exist in the overburden with which to prevent infiltration, b) no significant amounts of sulfur exists in these intervals to react to infiltrated rainwater, and c) where they exist, these intervals in the Cretaceous Formation are currently exposed to infiltrated rainwater throughout the Hurricane creek basin. 4) Due to the fact that there are very low levels of sulfur currently in the strata and negative acid-base account numbers at the Carter Mine reflect the amount of acid already formed, if a layer(s) is exposed to the surface after regrading occurs, the layer may be easily neutralized by lime without the possibility of future acid being formed. 5) The ONLY interval in the overburden that will be exposed to the surface (and oxygen) which will change the quality of the runoff (or infiltrated groundwater quality) is the Pottsville interval, which has a net positive acid-base account. The evidence of this statement is in the pH's and Alkalinity / Acidity ratios shown in baseline monitoring at CRCMSW-1. Previous mining on the Carter Seam within and adjacent to the proposed mine site (without the benefit of reclamation) has increased both.

'During Mining' water quality estimates for the receiving stream is also given in the attached 'Water Quality & Quantity Projections' page. All estimates for quality and quantity of the receiving stream during the mining of the proposed permit area are based on: 1) baseline surface water quality, 2) the size of the proposed permit area within this watershed, 3) the drainage area of the watershed of the receiving stream at the monitoring site, 4) the anticipated discharge quality of the sediment basins, and 5) the amount of previous

disturbance within the watershed. As shown, both iron and manganese exceeded EPA effluent limitations at the7Q2 flowrate. This is not surprising considering that baseline conditions revealed similar exceedences for the same parameters and at the same flowrate. As stated above, this is a result of previous mining in this watershed .

Mining at the Carter Mine site is expected to increase sulfates and mineralization. These changes in surface water quality are not significant based on baseline water quality in this watershed and should not have a profound affect on the use-classification of Black Creek if the operator complies with state and federal water quality guidelines. Mining at the Carter Mine will also temporarily increase TSS levels (until revegetation success). The main potential problem anticipated for surface water resources downstream of the proposed permit is a result of the physical characteristics of the Cretaceous overburden. Coker soils and underlying subsoils have high erodibility factors, which mean these materials erode easily. When Cretaceous silts, sands, and clays erode, they leave behind an abundance of pebbles. These pebbles become very hot when exposed to sunlight during the growing season. This heat decreases germination rates in reclamation species. A lack of germination increases the potential for erosion, which increases the amount of pebbles on the surface. A topsoil variance utilizing Pottsville shales (and some sandstone) should minimize these effects. Mulch should be utilized on all disturbed surfaces and mulching and revegetation should be achieved as quickly as possible after the disturbance occurs.

In addition, the operator is expected to need to treat for TSS and mineralization (mainly manganese) therefore a flocculent and lime or caustic may be needed to treat basin

discharge at the Carter Mine.

Also shown in the attached 'Water Quality & Quantity Projections' page, a decrease in surface water quantity (during mining activities) is expected at all three flowrates calculated. This is due mainly to sediment basin storage capacity, anticipated evaporation from the basin, the interval of time between rainfall events, and a corresponding time of retention of runoff in the sediment basin prior to basin discharge during a rainfall event.

The long term effects of the proposed operation on surface water quality for the receiving stream are also shown on the attached 'Water Quality & Quantity Projections' page. Post mining estimates are based on: 1) baseline surface water quality, 2) estimated impact during mining, 3) the size of the permit area as compared to the size of the CRCMSW-1 watershed, and 4) the amount of previous disturbance within the CRCMSW-1 watershed. Post mining surface water in the receiving stream will be of generally lower quality but this difference will be low mainly due to low baseline surface water quality and the significant amount of previous coal related disturbance (pre-law) within this watershed.

Sediment loading from the proposed permit area to the PHC point, as determined by a computer program developed at PERC Engineering Co., Inc. utilizing the Universal Soil Loss Equation (USLE), and modified using conservative values for sediment basin trapping efficiencies and sediment delivery ratios for the receiving stream, should average 375 tons per year before mining begins, 766 tons per year during the first year of mining, 815 tons per year during the second year of mining, 772 tons per year during the third year of

mining, 705 tons per year during the fourth year of mining, 586 tons per year during the fifth year of mining, 131 tons per year during the first year after active mining, 63 tons per year during the second year after active mining, 42 tons per year during the third year after active mining, and 41 tons per year after release of the performance bonds. It may seem odd that sediment delivered to the receiving stream decreased as a result of mining the proposed permit area. This is due to the fact that the pre-mine land use for a significant portion (73.35%) of the proposed permit area is previously disturbed, which is favorable for sediment delivery, a majority of the soils within the proposed permit area are formed from Cretaceous sediments (which lends itself to high erodibility), and the sediment basins proposed for this facility are permanent, which means after revegetation occurs, and the permit is released, these sediment basins will continue to retain sediment in permit area runoff.

Sediment levels in surface runoff will be controlled by sediment basins as designed in Part III-B of this application. Timely regrading and revegetation as outlined in Part IV of this application will minimize exposure of unweathered Pottsville Formation overburden to conditions which could result in low quality surface water discharge.

Changes in water quantity within the permit area due to the affects of mining have been estimated using "Procedures For Predictive Analysis Of Selected Hydrologic Impacts Of Surface Mining" by David B. McWhorter. Values for precipitation, temperature, and solar radiation were obtained from the National Weather Service and NOAA. Runoff curve numbers were taken from "Applied Hydrology and Sedimentology for Disturbed Areas" by

Barfield, Warner, and Haan. Water use coefficients were taken from "Water Requirements for Stabilization of Spent Shale" by Wymore. Effective rooting depth values were taken from "Agronomy Journal, Volume 52". Available Water Capacity values for soils and B Horizon mined areas were taken from the Soil Conservation Service's Soil Survey. Available Water Capacity values for A Horizon mined areas were taken from an average of over 40 site-specific studies conducted in Jefferson, Tuscaloosa, Walker, and Winston counties by Tim Thomas of PERC Engineering Co., Inc. utilizing "A Method of Comparing Soil Materials for Plant Available Water" by Sam Lyle. It is estimated that there will be a 14.2 percent increase in base flows, a 1.2 percent decrease in average flows, and a 28.7 percent decrease in peak flowrates relative to baseline conditions within the permit area as a result of mining by Cahaba Resources, LLC.. Changes in flowrates are shown in the attached 'Water Quality & Quantity Projections' page.

Groundwater that will be affected by Cahaba Resources, LLC. at the Carter Mine site includes the aquifers both above and below the target coal seams, however, neither the cretaceous aquifer above the Carter Seam nor the Pottsville aquifer below the Carter Seam will be affected significantly.

In general, any or all Pottsville aquitards above the Carter Seam within the proposed permit area will be eliminated during the mining process. Mining will result in a post mine aquifer in the reclaimed strata that will be a water-table aquifer (like the aquifer located in Cretaceous material), however this aquifer will sit upon the strata immediately below the Carter Seam (such as the shale intervals shown in CRCMDH-1 or CRCMMW-3) due to the

fact that the hydraulic conductivity of the consolidated underlying interval will be much lower than the overlying fractured (and mixed) Pottsville and Cretaceous strata. Due to the unconsolidated nature of the post mine strata and the voids between large consolidated rocks (boulders) present in the spoil after mining, gravitational forces (as opposed to capillary forces) will play a larger role in influencing infiltrated groundwater movement. This, and the fracturing of the Pottsville overburden will result in groundwater levels being lower in the post mine spoil aquifer. These post mine groundwater levels will be lower on average than an unaffected aquifer of similar thickness, lithology, and extent. Lateral groundwater movement in the post mine aquifer will be greater than prior to mining (in the Pottsville aquifer overlying the Carter Coal Seam) therefore, as stated previously, baseflow to surrounding streams will increase. In addition, groundwater in this strata should experience measurable increases in mineralization (mainly manganese) and sulfates while the pH should increase (as compared to cretaceous groundwater). The dip of the target coal seam is toward both the southwest and the northeast, therefore affected groundwater should migrate primarily in these directions.

On-ste groundwater below the Carter Coal Seam will also be affected by the proposed mining activities but this affect should not be significant. The reasoning for this statement is that a majority of the proposed permit area has already been previously disturbed and the quality of the groundwater below the Carter Coal Seam, as shown previously in this report (the groundwater quality exhibited in Groundwater Monitoring Site CRCMMW-4) has already been affected. Impact for off-site groundwater resources, however, should decrease in all directions as the distance from the mine site increases. From a quality

standpoint, this interval will also be affected slightly with respect to pH, mineralization, and sulfates. No significant changes in groundwater quantity to this interval are anticipated.

As stated in Part II-F, a well inventory conducted by PERC Engineering Co., Inc. in November of 2014 through April of 2015 reveals that there are 58 residences within a ½ mile radius of the proposed Carter Mine. Of the 58, 48 residences utilize municipal water from Citizens' Water Authority as their only domestic source, 18 residents were not at home, and four residences were vacant. The discrepancy between the total number of residences and the breakdown of those numbers is explained by the fact that information on several residences was given by either neighbors, relatives, or the owners of mobile home parks. **No domestic wells have been identified during the well inventory.**

However, in the event that it is shown that mining by Cahaba Resources, LLC. has diminished the quality or quantity of surrounding well(s), one of the following methods of replacing the domestic supplies will be implemented: 1) an existing well that penetrates unaffected aquifers but hat has insufficient casing to prevent impact from this operation will be cased to an unaffected aquifer or, 2) a new well will be drilled and cased into an aquifer unaffected by this operation or, 3) the residence will be connected to the nearest municipal water supply, or 4) other methods which replace the groundwater users' supply and is agreeable to both the user and the operator will be considered an alternative.

No alteration of the drainage area of the receiving stream is anticipated as a result of this operation.

PHC FINDINGS:

The findings of the preceding Determination of the Probable Hydrologic Consequences for Cahaba Resources, LLC. at their Carter Mine is as follows:

A) Acid or Toxic-Forming materials: Due to the fact that all overburden at this site does not occupy similar areas, intervals shown in attachment which are located in the upper portions of the drill logs occupy a smaller volume than intervals which are located closer to the bottom, consequently, their acid-base accounts do not contribute as substantially to the overall chemistry of the overburden. In an attempt to more accurately describe the acid-base potential of the overburden at the Carter Mine site, a spreadsheet which was developed at the Pennsylvania Dept. of Environmental Resources, Bureau of Mining and Reclamation was employed. This spreadsheet not only takes into account the volume occupied by each interval tested, but also the amount of coal lost into the spoil. The results of this method showing both the volume weighted acid-base potential of the area each drill hole represents, but also a summary of the acid-base potential of the entire proposed permit area on a volume weighted basis is attached. The results of the volume weighted acid-base potential of the entire proposed permit area from Geochemical Analysis Site CRCMDH-1 and Groundwater Monitoring Site CRCMMW-3 show that overburden at the Carter Mine contains 0.18 (tons CaCO3/1000 tons overburden) excess neutralization potential. In addition, as stated in Part II-E, there is a concern that the proposed permit area may contain an interval which has periodically caused reclamation problems at other local facilities due to adverse geochemical quality.

This strata is a thin interval at the Coker-Pottsville contact which is locally known to exist. This interval is thought to be re-worked Pottsville Formation strata and is a sand channel, or high energy deposit. This interval is thin (generally less than 3 ft. thick), and is discontinuous (meanders). The dominant lithology for this interval is a light grey friable, or unconsolidated sand. It should be noted that none of the lithologic descriptions presented in this report contains such a description, and no geochemical analysis presented in this report has revealed its' existence, however due to the discontinuous (meandering) nature of the interval, it may or may not exist within the proposed permit area. It should be noted that there were several intervals in the Cretaceous strata which were analyzed as being questionable with respect to being acid forming. At this site the term "acid-forming' may not be accurate in this instance. In general terms, **potentially acid-forming** indicates that the strata or stratum may form acid if exposed to catalysts such as the atmosphere or water (oxygen). The geochemical analysis conducted to determine this potential is the acid-base accounting. Acid is determined by a simple sulfur percentage test. The more sulfur that is present, the more acid may potentially be produced. Neutralization potential (or the base) is determined by titration. The titration test is conducted by taking a known volume of the strata, adding de-ionized water and a known amount of acid of known concentration, heating the mixture to make the base react with the acid, and titrating back to normality with a base of known concentration to measure the amount of acid that was neutralized by the base naturally present in the sample. As shown in Part II-E, all of the intervals mentioned above as being questionable have **negative neutralization potentials** (and low sulfur values). This means that during the neutralization potential test, more base was needed to neutralize the mixture than the amount of acid that was added

originally. This means that there was acid naturally present in the sample. Where did this acid come from? No doubt, in aeons past, the cretaceous material at the proposed Carter Mine contained much higher amounts of sulfur. Due to the unconsolidated nature of this formation, rainwater which infiltrated into this strata migrated through the formation rapidly, exposing the acid-forming material to oxygen. This resulted in the formation of acid, and the amount of acid which was formed depleted all the neutralization potential that was present in the strata (if any). The amount of excess acid has since either migrated to the surface with the groundwater or remains to this day in the Cretaceous Formation strata discussed above. What are the ramifications of this information?: 1) Negative acid-base account numbers at the Carter Mine do not reflect the potential for creating acid but reflect the amount of acid already formed. 2) Since there are very low levels of sulfur currently in the strata, there is no threat of creating acid by exposing this strata to the atmosphere (see maximum potential acidity values in Part II-E. 3) Burying this strata during mining would be expensive and largely ineffective due to a) no significant amounts of low permeability material exist in the overburden with which to prevent infiltration, b) no significant amounts of sulfur exists in these intervals to react to infiltrated rainwater, and c) where they exist, these intervals in the Cretaceous Formation are currently exposed to infiltrated rainwater throughout the Hurricane creek basin. 4) Due to the fact that there are very low levels of sulfur currently in the strata and negative acid-base account numbers at the Carter Mine reflect the amount of acid already formed, if a layer(s) is exposed to the surface after regrading occurs, the layer may be easily neutralized by lime without the

possibility of future acid being formed. 5) The ONLY interval in the overburden that will be exposed to the surface (and oxygen) which will change the quality of the runoff (or infiltrated groundwater quality) is the Pottsville interval, which has a net positive acid-base account. The evidence of this statement is in the pH's and Alkalinity / Acidity ratios shown in baseline monitoring at CRCMSW-1. Previous mining on the Carter Seam within and adjacent to the proposed mine site (without the benefit of reclamation) has increased both.

B) Adverse impacts to the hydrologic balance:

As stated in the PHC, "Procedures For Predictive Analysis Of Selected Hydrologic Impacts Of Surface Mining" by David B. McWhorter was utilized to predict changes in groundwater storage within the permit area resulting from surface mining. As stated in Part II-H, an increase in storage is expected, (approximately 14.2% increase) and will result in an increased base flow. This change in storage should not be adverse to the hydrologic balance. No other adverse impacts are anticipated as a result of this operation.

C) Contamination, diminution, and interruption of underground or surface source of water used for legitimate purpose on site and adjacent areas:

Surface Water: 'During Mining' water quality estimates for the receiving stream is also given in the attached 'Water Quality & Quantity Projections' page. All estimates for quality and quantity of the receiving stream during the mining of the proposed permit area are based on: 1) baseline surface water quality, 2) the size

of the proposed permit area within this watershed, 3) the drainage area of the watershed of the receiving stream at the monitoring site, 4) the anticipated discharge quality of the sediment basins, and 5) the amount of previous disturbance within the watershed. As shown, both iron and manganese exceeded EPA effluent limitations at the7Q2 flowrate. This is not surprising considering that baseline conditions revealed similar exceedences for the same parameters and at the same flowrate. As stated above, this is a result of previous mining in this watershed. Mining at the Carter Mine site is expected to increase sulfates and mineralization. These changes in surface water quality are not significant based on baseline water quality in this watershed and should not have a profound affect on the use-classification of Black Creek if the operator complies with state and federal water quality guidelines. Mining at the Carter Mine will also temporarily increase TSS levels (until revegetation success). The main potential problem anticipated for surface water resources downstream of the proposed permit is a result of the physical characteristics of the Cretaceous overburden. Coker soils and underlying subsoils have high erodibility factors, which mean these materials erode easily. When Cretaceous silts, sands, and clays erode, they leave behind an abundance of pebbles. These pebbles become very hot when exposed to sunlight during the growing season. This heat decreases germination rates in reclamation species. A lack of germination increases the potential for erosion, which increases the amount of pebbles on the surface. A topsoil variance utilizing Pottsville shales (and some sandstone) should minimize these effects. Mulch should be utilized on all disturbed surfaces and mulching and revegetation should be achieved as quickly as possible

after the disturbance occurs. In addition, the operator is expected to need to treat for TSS and mineralization (mainly manganese) therefore a flocculent and lime or caustic may be needed to treat basin discharge at the Carter Mine.

Groundwater: Groundwater that will be affected by Cahaba Resources, LLC. at the Carter Mine site includes the aquifers both above and below the target coal seams, however, neither the cretaceous aquifer above the Carter Seam nor the Pottsville aquifer below the Carter Seam will be affected significantly. In general, any or all Pottsville aquitards above the Carter Seam within the proposed permit area will be eliminated during the mining process. Mining will result in a post mine aquifer in the reclaimed strata that will be a water-table aquifer (like the aquifer located in Cretaceous material), however this aquifer will sit upon the strata immediately below the Carter Seam (such as the shale intervals shown in CRCMDH-1 or CRCMMW-3) due to the fact that the hydraulic conductivity of the consolidated underlying interval will be much lower than the overlying fractured (and mixed) Pottsville and Cretaceous strata. Due to the unconsolidated nature of the post mine strata and the voids between large consolidated rocks (boulders) present in the spoil after mining, gravitational forces (as opposed to capillary forces) will play a larger role in influencing infiltrated groundwater movement. This, and the fracturing of the Pottsville overburden will result in groundwater levels being lower in the post mine spoil aquifer. These post mine groundwater levels will be lower on average than an unaffected aquifer of similar thickness, lithology, and extent. Lateral groundwater movement in the post mine aquifer will be greater than prior to mining (in the Pottsville aquifer overlying the Carter Coal Seam) therefore, as stated previously,

baseflow to surrounding streams will increase. In addition, groundwater in this strata should experience measurable increases in mineralization (mainly manganese) and sulfates while the pH should increase (as compared to cretaceous groundwater). The dip of the target coal seam is toward both the southwest and the northeast, therefore affected groundwater should migrate primarily in these directions. On-ste groundwater below the Carter Coal Seam will also be affected by the proposed mining activities but this affect should not be significant. The reasoning for this statement is that a majority of the proposed permit area has already been previously disturbed and the quality of the groundwater below the Carter Coal Seam, as shown previously in this report (the groundwater quality exhibited in Groundwater Monitoring Site CRCMMW-4) has already been affected. Impact for off-site groundwater resources, however, should decrease in all directions as the distance from the mine site increases. From a quality standpoint, this interval will also be affected slightly with respect to pH, mineralization, and sulfates. No significant changes in groundwater quantity to this interval are anticipated.

D) Sediment yield from disturbed areas:

As stated in the PHC, sediment loading from the proposed permit area to the PHC point, as determined by a computer program developed at PERC Engineering Co., Inc. utilizing the Universal Soil Loss Equation (USLE), and modified using conservative values for sediment basin trapping efficiencies and sediment delivery ratios for the receiving stream, should average 375 tons per year before mining begins, 766 tons per year during the first year of mining, 815 tons per year during

the second year of mining, 772 tons per year during the third year of mining, 705 tons per year during the fourth year of mining, 586 tons per year during the fifth year of mining, 131 tons per year during the first year after active mining, 63 tons per year during the second year after active mining, 42 tons per year during the third year after active mining, and 41 tons per year after release of the performance bonds. It may seem odd that sediment delivered to the receiving stream decreased as a result of mining the proposed permit area. This is due to the fact that the pre-mine land use for a significant portion (73.35%) of the proposed permit area is previously disturbed, which is favorable for sediment delivery, a majority of the soils within the proposed permit area are formed from Cretaceous sediments (which lends itself to high erodibility), and the sediment basins proposed for this facility are permanent, which means after revegetation occurs, and the permit is released, these sediment basins will continue to retain sediment in permit area runoff.

E) Acidity, TSS, TDS, Fe, Mn, pH, other:

The long term effects of the proposed operation on surface water quality for the receiving stream are also shown on the attached 'Water Quality & Quantity Projections' page. Post mining estimates are based on: 1) baseline surface water quality, 2) estimated impact during mining, 3) the size of the permit area as compared to the size of the CRCMSW-1 watershed, and 4) the amount of previous disturbance within the CRCMSW-1 watershed. Post mining surface water in the receiving stream will be of generally lower quality but this difference will be low mainly due to low baseline surface water quality and the significant amount of

previous coal related disturbance (pre-law) within this watershed.

F) Flooding or Streamflow Alterations:

None anticipated at this site.

G) Groundwater and Surface Water Availability:

Post mining groundwater availability from the overburden aquifer is expected to increase due to fracturing of intervals of lower hydraulic conductivity such as Pottsville sandstones and the resulting voids created by mining. This groundwater will increase base flow to the stream.

H) Other:

No other impacts are anticipated at this site.

I) Supplemental Information:

None required for this mine site.

Company :Cahaba Resources LLC
Mine Name :Carter Mine

Number of mining acres permitted : 115
Number of years permitted : 5
Acres to be mined per quarter : 6
Mining begins in Quarter 4 of 2015 .

Pre-Mining Land Use Summary.....

	Land Use Category	Acres	% Total	Avg Slope	Cp	K
1	Pre-law Disturbance	84	73.04 %	22.49 %	.045	.26
2	Forest (natural)	31	26.95 %	18 %	.001	.29

Pre, During & Post-Mining Land Use Summary.....

	Land Use Category	Co	K	Avg Slope
1	Premining Area	.033	.268	21.28 %
2	Clearing & Grubbing	.45	.26	21.28 %
3	Active Mining	1	.24	33 %
4	Regraded Area	.9	.24	28.31 %
5	Planted 0-90 days	.4	.26	28.31 %
6	Planted 90 days-2yrs	.05	.26	28.31 %
7	Permanent Revegetated	.01	.25	28.31 %

General Information.....

Grass will be used for terminal revegetation.
Topsoil waiver has been granted.
Sediment Basins are permanent structures.
Sediment Basin Trapping Efficiency : 82.49 %
Drainage Area of Probable Hydrologic Consequence : 3.356 sq.mi.
Average post-mining slope is assumed to be 1.33 X avg pre-mining slope.
'R' value to be used in the Universal Soil Loss Equation : 350
Sediment Delivery Ratio = .2198
Average area to be cleared and grubbed at any time : 2 Ac.
Maximum time land may remain ungraded : 3 months.
Percent of Pre-Mining Area routed through Basin 0 %

Begin Quarterly Analysis On Next Page...

Quarter : 4 Year : 2014

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	115	290.41	No	290.41	63.83
2 Clearing & Grubbing	0	0	No	0	0
3 Active Mining	0	0	No	0	0
4 Regraded Area	0	0	No	0	0
5 Planted 0-90 days	0	0	No	0	0
6 Planted 90 days-2yrs	0	0	No	0	0
7 Permanent Revegetated	0	0	No	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 63.83 tons.

Quarter : 1 Year : 2015

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	115	307.5	No	307.5	67.58
2 Clearing & Grubbing	0	0	No	0	0
3 Active Mining	0	0	No	0	0
4 Regraded Area	0	0	No	0	0
5 Planted 0-90 days	0	0	No	0	0
6 Planted 90 days-2yrs	0	0	No	0	0
7 Permanent Revegetated	0	0	No	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 67.58 tons.

Quarter : 2 Year : 2015

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	115	461.25	No	461.25	101.38
2 Clearing & Grubbing	0	0	No	0	0
3 Active Mining	0	0	No	0	0
4 Regraded Area	0	0	No	0	0
5 Planted 0-90 days	0	0	No	0	0
6 Planted 90 days-2yrs	0	0	No	0	0
7 Permanent Revegetated	0	0	No	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 101.38 tons.

Quarter : 3 Year : 2015

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	115	649.17	No	649.17	142.68
2 Clearing & Grubbing	0	0	No	0	0
3 Active Mining	0	0	No	0	0
4 Regraded Area	0	0	No	0	0
5 Planted 0-90 days	0	0	No	0	0
6 Planted 90 days-2yrs	0	0	No	0	0
7 Permanent Revegetated	0	0	No	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 142.68 tons.

Total Soil Loss Delivered to PHC Point during Previous Year: 375.49 tons

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Quarter : 4 Year : 2015 ********** MINING COMMENCES HERE **********

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	109	275.26	No	275.26	50.5
2 Clearing & Grubbing	2	88.46	Yes	15.46	3.4
3 Active Mining	4	746.34	Yes	130.6	28.7
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	0	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 92.61 tons.

Quarter : 1 Year : 2016

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	103	275.41	No	275.41	50.52
2 Clearing & Grubbing	2	93.67	Yes	16.29	3.6
3 Active Mining	6	1185.36	Yes	207.43	45.59
4 Regraded Area	4	552.44	Yes	96.65	21.25
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	0	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 131.02 tons.

Quarter : 2 Year : 2016

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	97	383.85	No	383.85	85.51
2 Clearing & Grubbing	2	140.3	Yes	24.56	5.4
3 Active Mining	6	1778.04	Yes	311.15	68.29
4 Regraded Area	6	1245.26	Yes	217.92	47.89
5 Planted 0-90 days	4	299.71	Yes	52.94	10.37
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	0	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 222.56 tons.

Quarter : 3 Year : 2016

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	91	513.69	No	513.69	112.9
2 Clearing & Grubbing	2	197.74	Yes	34.6	7.6
3 Active Mining	6	2502.43	Yes	437.92	96.25
4 Regraded Area	6	1752.59	Yes	306.7	67.41
5 Planted 0-90 days	6	842.83	Yes	147.67	32.48
6 Planted 90 days-2yrs	4	70.31	Yes	12.3	2.7
7 Permanent Revegetated	3	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 319.34 tons.

Total Soil Loss Delivered to PHC Point during Previous Years: 765.57 tons

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Quarter : 4 Year : 2016

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	85	214.65	No	214.65	47.18
2 Clearing & Grubbing	2	88.46	Yes	15.48	3.4
3 Active Mining	6	1119.51	Yes	195.91	43.06
4 Regraded Area	6	784.05	Yes	137.2	30.15
5 Planted 0-90 days	6	377.5	Yes	66.06	14.52
6 Planted 90 days-2yrs	10	78.64	Yes	13.76	3.02
7 Permanent Revegetated	0	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 141.35 tons.

Quarter : 1 Year : 2017

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	79	211.24	No	211.24	46.43
2 Clearing & Grubbing	2	93.67	Yes	16.39	3.6
3 Active Mining	6	1185.36	Yes	207.43	45.59
4 Regraded Area	6	830.17	Yes	145.28	31.93
5 Planted 0-90 days	6	399.71	Yes	69.94	15.37
6 Planted 90 days-2yrs	16	133.23	Yes	23.31	5.12
7 Permanent Revegetated	0	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 149.86 tons.

Quarter : 2 Year : 2017

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	73	292.79	No	292.79	64.35
2 Clearing & Grubbing	2	140.9	Yes	24.58	5.4
3 Active Mining	6	1778.04	Yes	311.15	68.39
4 Regraded Area	6	1245.26	Yes	217.92	47.92
5 Planted 0-90 days	6	599.57	Yes	104.92	23.08
6 Planted 90 days-2yrs	22	274.8	Yes	48.09	10.57
7 Permanent Revegetated	0	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 219.68 tons.

Quarter : 3 Year : 2017

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	67	378.21	No	378.21	83.13
2 Clearing & Grubbing	2	197.74	Yes	34.6	7.6
3 Active Mining	6	2502.43	Yes	437.92	96.25
4 Regraded Area	6	1752.59	Yes	306.7	67.41
5 Planted 0-90 days	6	843.83	Yes	147.67	32.45
6 Planted 90 days-2yrs	28	492.23	Yes	86.14	18.93
7 Permanent Revegetated	0	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 305.79 tons.

Total Soil Loss Delivered to PHC Point during Previous Year: 814.89 tons

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Quarter : 4 Year : 2017

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	61	154.04	No	154.04	33.85
2 Clearing & Grubbing	2	88.46	Yes	15.48	3.4
3 Active Mining	6	1119.51	Yes	195.91	43.06
4 Regraded Area	6	784.05	Yes	137.2	30.15
5 Planted 0-90 days	6	377.5	Yes	66.06	14.52
6 Planted 90 days-2yrs	34	267.4	Yes	46.79	10.28
7 Permanent Revegetated	0	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 135.28 tons.

Quarter : 1 Year : 2018

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	55	147.86	No	147.86	32.52
2 Clearing & Grubbing	2	93.67	Yes	16.39	3.6
3 Active Mining	6	1185.35	Yes	207.45	45.64
4 Regraded Area	6	830.17	Yes	145.28	31.96
5 Planted 0-90 days	6	399.71	Yes	69.94	15.37
6 Planted 90 days-2yrs	40	283.09	Yes	58.29	12.81
7 Permanent Revegetated	0	0	Yes	0	0

Total Soil Loss Delivered to PHC Point this Quarter: 141.64 tons.

Quarter : 2 Year : 2018

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	49	196.53	No	196.53	42.19
2 Clearing & Grubbing	2	140.5	Yes	24.58	5.4
3 Active Mining	6	1778.04	Yes	311.15	68.39
4 Regraded Area	6	1245.26	Yes	217.92	47.89
5 Planted 0-90 days	6	599.57	Yes	104.92	23.06
6 Planted 90 days-2yrs	42	424.62	Yes	74.6	25.17
7 Permanent Revegetated	4	9.99	Yes	1.74	.38

Total Soil Loss Delivered to PHC Point this Quarter: 208.52 tons.

Quarter : 3 Year : 2018

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	43	242.73	No	242.73	53.35
2 Clearing & Grubbing	2	197.74	Yes	34.6	7.6
3 Active Mining	6	2502.48	Yes	437.92	96.25
4 Regraded Area	6	1752.59	Yes	306.7	67.41
5 Planted 0-90 days	6	843.82	Yes	147.67	32.45
6 Planted 90 days-2yrs	42	738.35	Yes	129.21	28.4
7 Permanent Revegetated	10	35.15	Yes	6.15	1.35

Total Soil Loss Delivered to PHC Point this Quarter: 236.84 tons.

Total Soil Loss Delivered to PHC Point during Previous Year: 771.29 tons

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Quarter : 4 Year : 2018

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	37	93.43	No	93.43	20.53
2 Clearing & Grubbing	2	88.46	Yes	15.48	3.4
3 Active Mining	6	1119.51	Yes	195.91	43.06
4 Regraded Area	6	784.05	Yes	137.2	30.15
5 Planted 0-90 days	6	377.5	Yes	66.06	14.52
6 Planted 90 days-2yrs	42	330.31	Yes	57.8	12.7
7 Permanent Revegetated	15	25.16	Yes	4.4	.96

Total Soil Loss Delivered to PHC Point this Quarter: 125.35 tons.

Quarter : 1 Year : 2019

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	31	82.89	No	82.89	18.21
2 Clearing & Grubbing	2	93.67	Yes	16.39	3.6
3 Active Mining	6	1185.36	Yes	207.43	45.59
4 Regraded Area	6	830.17	Yes	145.28	31.93
5 Planted 0-90 days	6	399.71	Yes	69.94	15.37
6 Planted 90 days-2yrs	42	349.74	Yes	61.2	13.45
7 Permanent Revegetated	22	36.64	Yes	6.41	1.4

Total Soil Loss Delivered to PHC Point this Quarter: 129.58 tons.

Quarter : 2 Year : 2019

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	25	100.27	No	100.27	22.03
2 Clearing & Grubbing	2	140.5	Yes	24.58	5.4
3 Active Mining	6	1778.04	Yes	311.15	68.39
4 Regraded Area	6	1245.26	Yes	217.92	47.89
5 Planted 0-90 days	6	599.57	Yes	104.92	23.06
6 Planted 90 days-2yrs	42	524.62	Yes	91.8	20.17
7 Permanent Revegetated	28	69.94	Yes	12.24	2.69

Total Soil Loss Delivered to PHC Point this Quarter: 189.66 tons.

Quarter : 3 Year : 2019

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	19	107.25	No	107.25	23.57
2 Clearing & Grubbing	2	197.74	Yes	34.6	7.6
3 Active Mining	6	2502.43	Yes	437.92	96.25
4 Regraded Area	6	1752.59	Yes	306.7	67.41
5 Planted 0-90 days	6	843.83	Yes	147.67	32.45
6 Planted 90 days-2yrs	42	738.35	Yes	129.21	28.4
7 Permanent Revegetated	34	119.54	Yes	20.92	4.59

Total Soil Loss Delivered to PHC Point this Quarter: 260.3 tons.

Total Soil Loss Delivered to PHC Point during Previous Year: 704.92 tons

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Quarter : 4 Year : 2019

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	13	32.83	No	32.83	7.21
2 Clearing & Grubbing	2	88.46	Yes	15.48	3.4
3 Active Mining	6	1119.51	Yes	195.91	43.06
4 Regraded Area	5	784.85	Yes	137.2	30.15
5 Planted 0-90 days	6	377.5	Yes	66.06	14.52
6 Planted 90 days-2yrs	42	330.31	Yes	57.8	12.7
7 Permanent Revegetated	40	62.91	Yes	11.01	2.42

Total Soil Loss Delivered to PHC Point this Quarter: 113.48 tons.

Quarter : 1 Year : 2020

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	7	18.71	No	18.71	4.11
2 Clearing & Grubbing	2	93.67	Yes	16.39	3.6
3 Active Mining	5	1185.36	Yes	207.43	45.59
4 Regraded Area	6	830.17	Yes	145.28	31.93
5 Planted 0-90 days	6	399.71	Yes	69.94	15.37
6 Planted 90 days-2yrs	42	349.74	Yes	61.2	13.45
7 Permanent Revegetated	46	75.61	Yes	13.4	2.94

Total Soil Loss Delivered to PHC Point this Quarter: 117.81 tons.

Quarter : 2 Year : 2020

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	1	4.01	No	4.01	.88
2 Clearing & Grubbing	2	146.9	Yes	24.58	5.4
3 Active Mining	6	1778.04	Yes	311.15	68.39
4 Regraded Area	6	1245.26	Yes	217.92	47.89
5 Planted 0-90 days	6	599.57	Yes	104.92	23.06
6 Planted 90 days-2yrs	42	524.62	Yes	91.8	20.17
7 Permanent Revegetated	52	129.9	Yes	22.73	4.99

Total Soil Loss Delivered to PHC Point this Quarter: 170.81 tons.

Quarter : 3 Year : 2020

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	3	1251.21	Yes	218.96	48.12
4 Regraded Area	6	1758.59	Yes	306.7	67.41
5 Planted 0-90 days	6	843.83	Yes	147.67	32.48
6 Planted 90 days-2yrs	42	736.35	Yes	129.21	28.4
7 Permanent Revegetated	58	283.92	Yes	35.38	7.84

Total Soil Loss Delivered to PHC Point this Quarter: 184.24 tons.

Total Soil Loss Delivered to PHC Point during Previous Years: 335.36 tons

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Quarter : 4 Year : 2020

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	3	392.02	Yes	68.6	15.07
5 Planted 0-90 days	2	377.5	Yes	66.06	14.52
6 Planted 90 days-2yrs	42	330.31	Yes	57.8	12.7
7 Permanent Revegetated	64	100.66	Yes	17.61	3.87

Total Soil Loss Delivered to PHC Point this Quarter: 46.17 tons.

Quarter : 1 Year : 2021

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	3	199.85	Yes	34.97	7.68
6 Planted 90 days-2yrs	42	349.74	Yes	61.2	13.45
7 Permanent Revegetated	70	116.58	Yes	20.4	4.48

Total Soil Loss Delivered to PHC Point this Quarter: 25.62 tons.

Quarter : 2 Year : 2021

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	39	487.15	Yes	85.25	18.72
7 Permanent Revegetated	75	189.86	Yes	33.22	7.3

Total Soil Loss Delivered to PHC Point this Quarter: 26.04 tons.

Quarter : 3 Year : 2021

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	33	580.14	Yes	101.52	22.31
7 Permanent Revegetated	82	288.31	Yes	50.45	11.08

Total Soil Loss Delivered to PHC Point this Quarter: 33.4 tons.

Total Soil Loss Delivered to PHC Point during Previous Year: 131.24 tons

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Quarter : 4 Year : 2021

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	27	212.34	Yes	37.16	8.16
7 Permanent Revegetated	88	138.41	Yes	24.22	5.32

Total Soil Loss Delivered to PHC Point this Quarter: 13.49 tons.

Quarter : 1 Year : 2022

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	21	174.87	Yes	30.6	6.72
7 Permanent Revegetated	94	156.55	Yes	27.39	6.02

Total Soil Loss Delivered to PHC Point this Quarter: 12.74 tons.

Quarter : 2 Year : 2022

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	15	187.35	Yes	32.78	7.2
7 Permanent Revegetated	100	249.22	Yes	43.71	9.6

Total Soil Loss Delivered to PHC Point this Quarter: 16.81 tons.

Quarter : 3 Year : 2022

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	9	158.22	Yes	27.69	6.08
7 Permanent Revegetated	105	372.59	Yes	65.22	14.33

Total Soil Loss Delivered to PHC Point this Quarter: 20.42 tons.

Total Soil Loss Delivered to PHC Point during Previous Year: 63.47 tons

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Quarter : 4 Year : 2022

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	3	23.59	Yes	4.12	.9
7 Permanent Revegetated	112	176.17	Yes	30.82	6.77

Total Soil Loss Delivered to PHC Point this Quarter: 7.68 tons.

Quarter : 1 Year : 2023

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	115	191.52	Yes	33.51	7.36

Total Soil Loss Delivered to PHC Point this Quarter: 7.36 tons.

Quarter : 2 Year : 2023

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	115	287.29	Yes	50.27	11.85

Total Soil Loss Delivered to PHC Point this Quarter: 11.85 tons.

Quarter : 3 Year : 2023

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	115	404.33	Yes	70.75	15.55

Total Soil Loss Delivered to PHC Point this Quarter: 15.55 tons.

Total Soil Loss Delivered to PHC Point during Previous Year: 41.65 tons

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Quarter : 4 Year : 2023

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	115	180.88	Yes	31.65	6.95

Total Soil Loss Delivered to PHC Point this Quarter: 6.95 tons.

Quarter : 1 Year : 2024

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	115	191.52	Yes	33.51	7.36

Total Soil Loss Delivered to PHC Point this Quarter: 7.36 tons.

Quarter : 2 Year : 2024

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	115	287.29	Yes	50.27	11.05

Total Soil Loss Delivered to PHC Point this Quarter: 11.05 tons.

Quarter : 3 Year : 2024

Land Use Category	Area(Ac)	Gross Soil Loss (tons)	Routed Thru Basin ?	Sediment Passing Basin (tons)	Delivered to PHC point (tons)
1 Premining Area	0	0	No	0	0
2 Clearing & Grubbing	0	0	Yes	0	0
3 Active Mining	0	0	Yes	0	0
4 Regraded Area	0	0	Yes	0	0
5 Planted 0-90 days	0	0	Yes	0	0
6 Planted 90 days-2yrs	0	0	Yes	0	0
7 Permanent Revegetated	115	404.32	Yes	78.75	15.35

Total Soil Loss Delivered to PHC Point this Quarter: 15.35 tons.

Total Soil Loss Delivered to PHC Point during Previous Year: 40.92 tons

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Comment: CAHABA RESOURCES / CARTER / CRCMSW-1

	FLOW	PH	FET	MNT	SPC	TSS	ACID
1:	5.816	6.41	0.21	1.61	187	1	8
2:	5.601	6.25	0.69	0.05	70	0.5	4
3:	5.634	6.49	0.52	0.04	63	1	18
4:	5.813	6.49	0.85	0.10	62	1	16
5:	6.087	7.10	0.72	0.12	80	1	4
6:	6.153	7.20	0.67	0.08	95	1	4
7:	5.992	6.90	0.37	0.07	58	2	6
8:	1.886	6.55	1.00	1.46	127	3	10

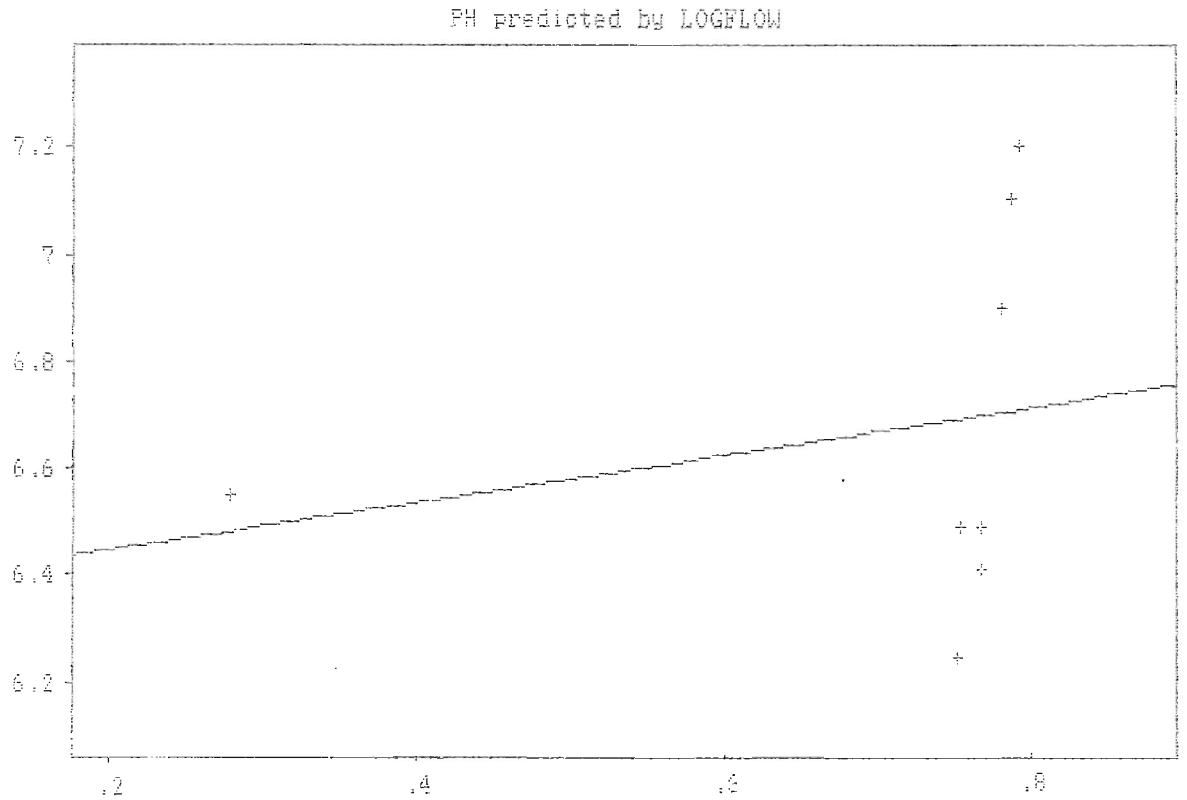
Comment: CAHABA RESOURCES / CARTER / CRCMSW-1

	ALK	SO4	DATE
1:	14	67	08-26-14
2:	26	62	09-26-14
3:	24	64	10-29-14
4:	20	62	11-24-14
5:	16	59	12-26-14
6:	20	57	01-13-15
7:	16	54	02-27-15
8:	12	53	03-26-15

Variable	Variable Name	Variable Description
1	FLOW	(CFSM)
2	PH	(S.U.)
3	FET	(mg/l)
4	MNT	(mg/l)
5	SPC	(umhos)
6	TSS	(mg/l)
7	ACID	(mg/l)
8	ALK	(mg/l)
9	SO4	(mg/l)
10	DATE	mm-dd-yy

Comment: CAHABA RESOURCES / CARTER MINE / FOR CRCMSW-1 / FLOW VS pH

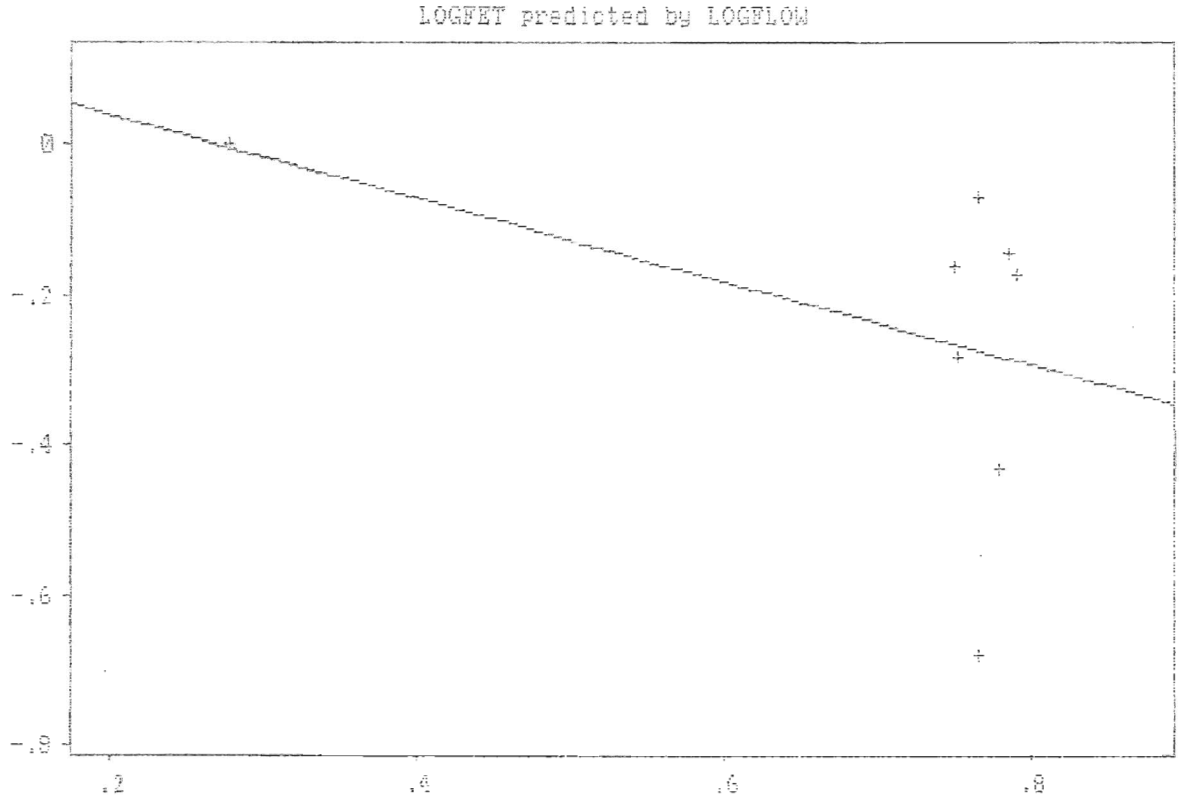
	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	6.315787	6.328758	6.362536	6.373448
B REG COEFF	0.0666256	0.0096621	0.1912152	0.0275722
A STD ERROR	0.5297822	0.4983938	0.5726444	0.5423231
B STD ERROR	0.0957126	0.0142274	0.3427819	0.0509350
A t-STAT	11.92148	23.4297	11.1108	21.76659
B t-STAT	0.6961014	0.6791175	0.5578335	0.5413219
STD ERR EST	0.3602974	0.0535572	0.3652129	0.0542681
R-SQUARED	0.0747248	0.0713800	0.0493059	0.0465641
COVARIANCE	0.1348739	0.0195595	0.0310085	0.0044713
F-TEST	0.4845571	0.4612006	0.3111782	0.2930294
CORR COEFF	0.2733584	0.2671704	0.2220493	0.2157872
DURBN-WATSN	0.6762692	0.6806343	0.6936106	0.6979271



CAHABA RESOURCES - CARTER MINE
FOR CRCMSW-1
PLOT OF LOG FLOW (X) VS pH (Y)

Comment: CAHABA RESOURCES / CARTER MINE / FOR CRCMSW-1 / FLOW VS. FeT

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	1.182296	1.307668	1.228472	1.405531
B REG COEFF	-.1030284	-.1539564	-.3684802	-.55257
A STD ERROR	0.3311235	0.9449574	0.3509359	1.079058
B STD ERROR	0.0598221	0.1305528	0.2100683	0.4595547
A t-STAT	3.570559	0.3712085	3.500562	0.4434091
B t-STAT	-1.722247	-1.179266	-1.754097	-1.202403
STD ERR EST	0.2251925	0.491449	0.2238148	0.4896271
R-SQUARED	0.3308153	0.1881653	0.3389782	0.1941737
COVARIANCE	-.208566	-.3116624	-.0597548	-.0896078
F-TEST	2.966134	1.390668	3.076855	1.445773
CORR COEFF	-.5751655	-.4337803	-.5822183	-.4406515
DURBN-WATSN	1.689549	1.580662	1.712025	1.587218

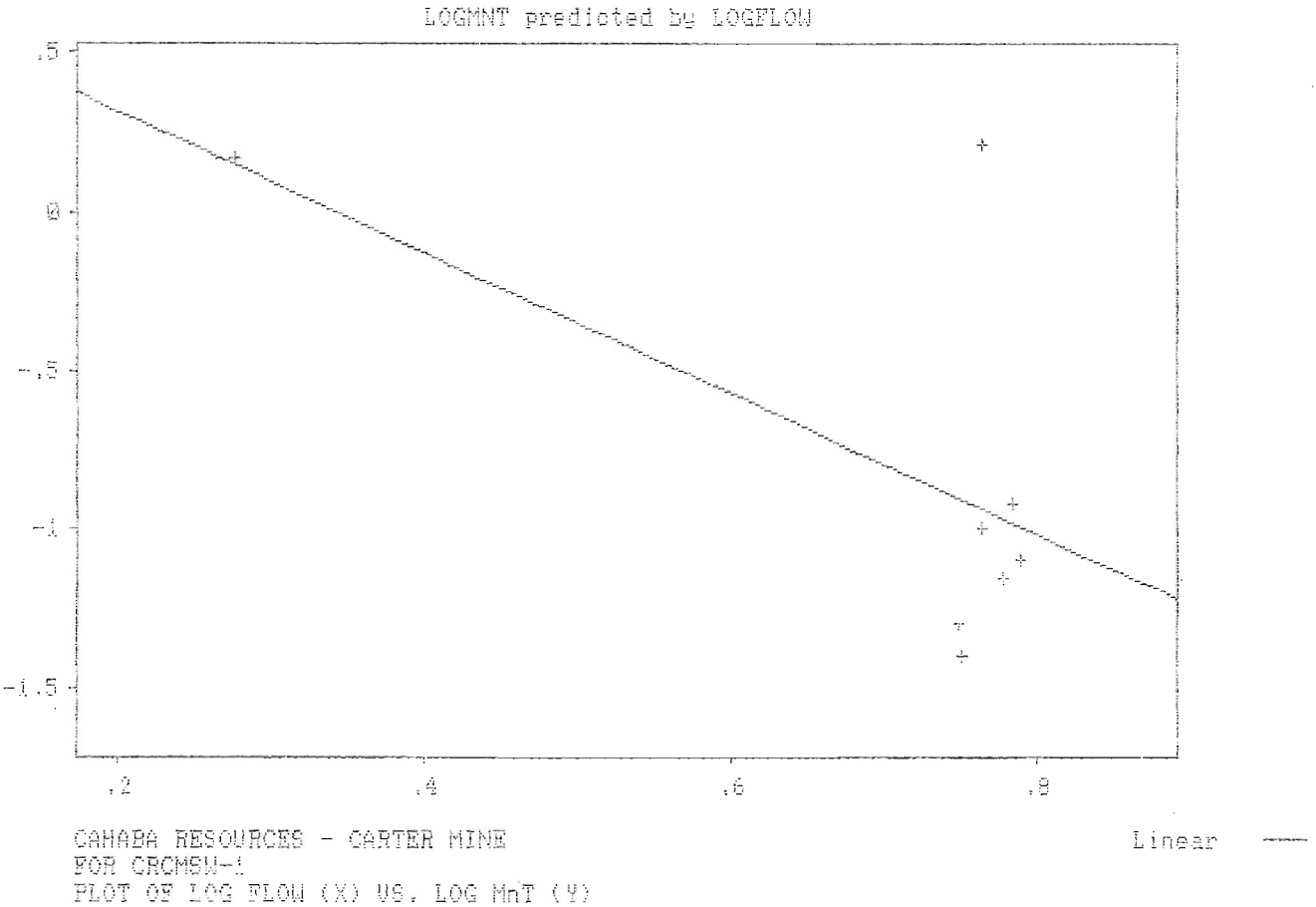


CAHABA RESOURCES - CARTER MINE
FOR CRCMSW-1
PLOT OF LOG FLOW (X) VS. LOG FeT (Y)

Linear ——

Comment: CAHABA RESOURCES / CARTER MINE / FOR CRCMSW-1 / FLOW VS MnT

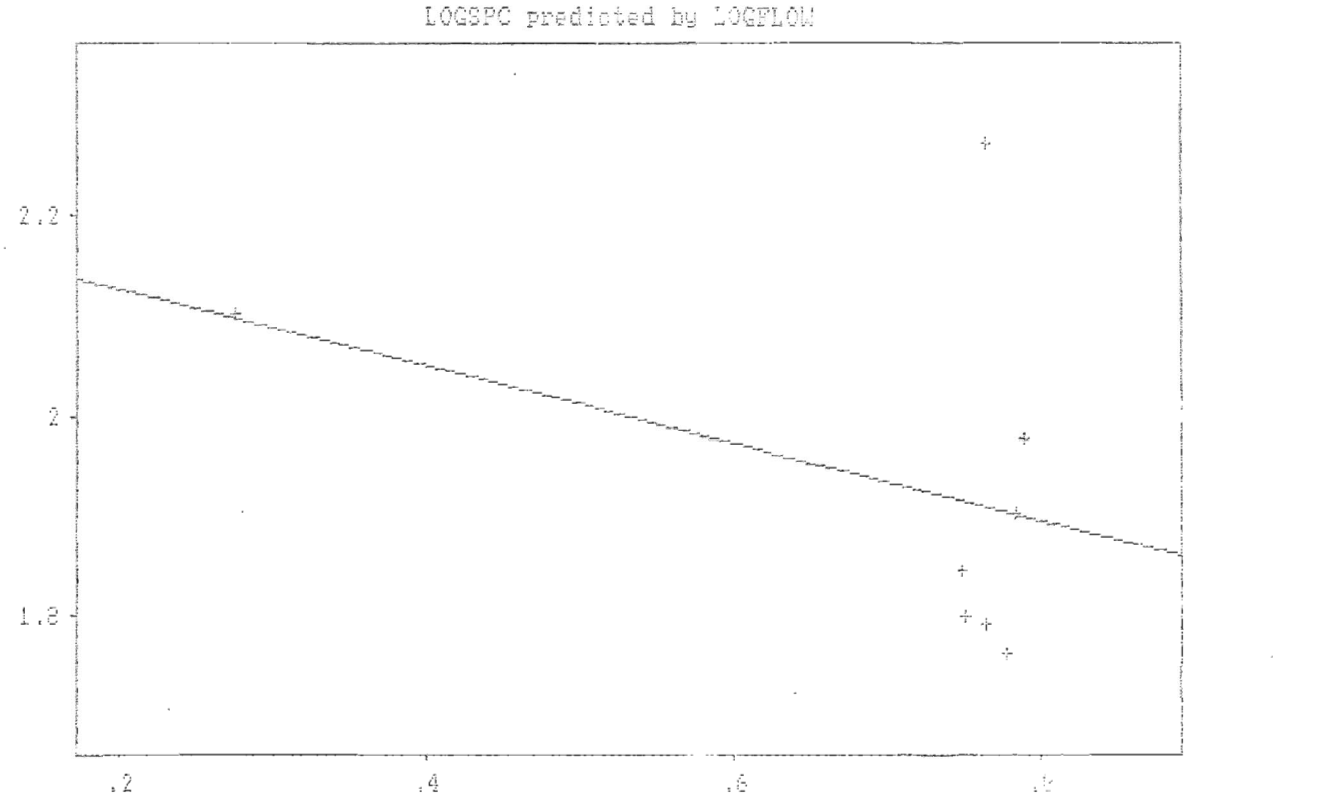
	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	2.003222	4.295103	2.11252	5.705178
B REG COEFF	-.2907212	-.6195054	-1.026858	-2.21949
A STD ERROR	0.850679	7.951567	0.9072902	11.17167
B STD ERROR	0.1536871	0.3344651	0.5430991	1.172146
A t-STAT	2.354851	0.7872671	2.328384	0.8892897
B t-STAT	-1.891644	-1.852227	-1.890738	-1.893527
STD ERR EST	0.5785349	1.25905	0.5786384	1.248849
R-SQUARED	0.3735851	0.3637832	0.3733609	0.3740509
COVARIANCE	-.5885226	-1.254098	-.1665209	-.3599246
F-TEST	3.578316	3.430747	3.574889	3.585445
CORR COEFF	-.6112161	-.6031444	-.6110327	-.611597
DURBN-WATSN	1.343083	1.114042	1.300307	1.100863



CAHABA RESOURCES - CARTER MINE
FOR CRCMSW-1
PLOT OF LOG FLOW (X) VS. LOG MnT (Y)

Comment: CAHABA RESOURCES / CARTER MINE / FOR CRCMSW-1 / FLOW VS. SpC

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	143.1837	151.3379	147.5804	159.9235
B REG COEFF	-9.386948	-.1062238	-33.68876	-.3845608
A STD ERROR	67.1972	91.38037	71.54263	102.5653
B STD ERROR	12.14011	0.109088	42.82504	0.3839025
A t-STAT	2.130799	8.312974	2.062831	7.912649
B t-STAT	-.7732175	-.9737445	-.7866603	-1.001715
STD ERR EST	45.69988	0.4106475	45.62743	0.4090244
R-SQUARED	0.0906149	0.1364643	0.0934960	0.1432772
COVARIANCE	-19.00251	-.2150346	-5.463153	-.0623625
F-TEST	0.5978653	0.9481782	0.6188344	1.003432
CORR COEFF	-.3010232	-.3694108	-.3057711	-.3785198
DURBN-WATSN	1.379672	1.318661	1.360275	1.297534

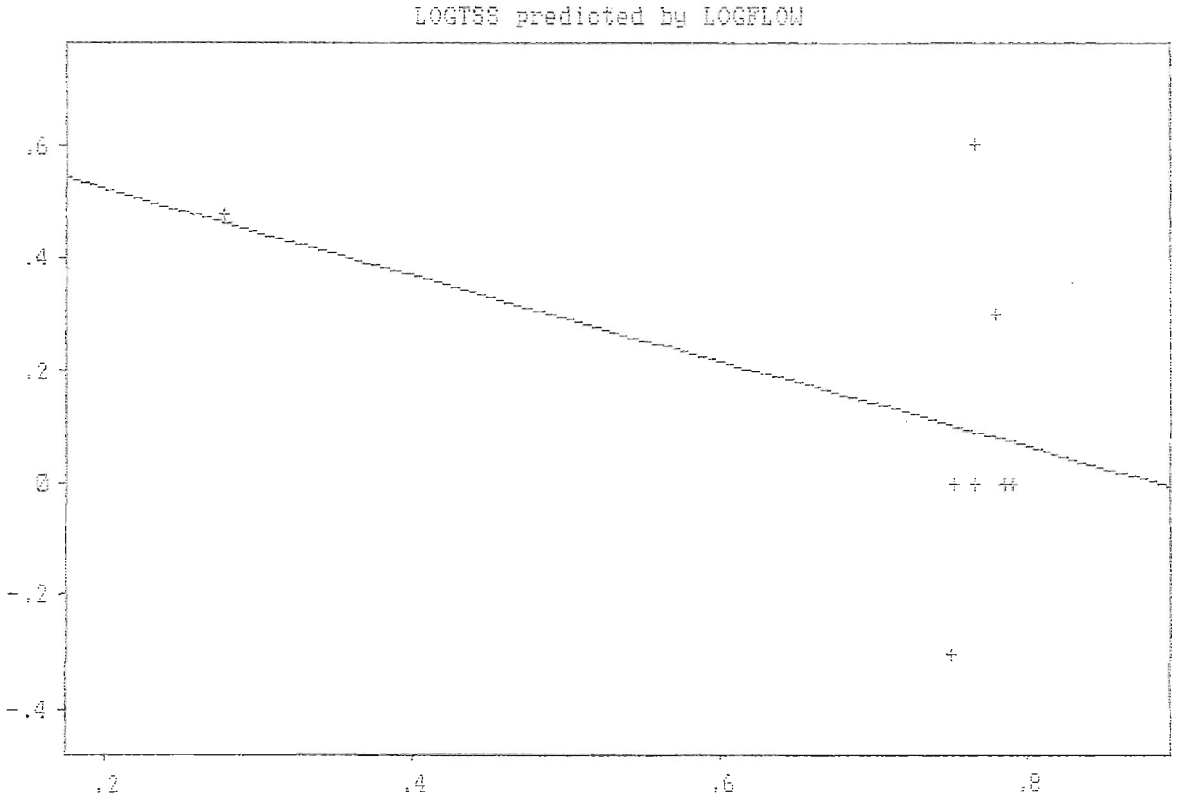


CAHABA RESOURCES - CARTER MINE
FOR CRCMSW-1
PLOT OF LOG FLOW (X) VS. LOG SpC (Y)

Linear ——

Comment: CAHABA RESOURCES / CARTER MINE / FOR CRCMSW-1 / FLOW VS. TSS

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	3.639226	4.173786	3.800021	4.685146
B REG COEFF	-.3632639	-.2081262	-1.29797	-.7580589
A STD ERROR	1.760271	4.119974	1.872435	4.896387
B STD ERROR	0.3180176	0.1783347	1.12083	0.6255838
A t-STAT	2.067423	1.447486	2.029454	1.477768
B t-STAT	-1.142276	-1.167054	-1.158044	-1.211762
STD ERR EST	1.197136	0.6713178	1.194175	0.6665207
R-SQUARED	0.1786216	0.1850057	0.1826801	0.1956117
COVARIANCE	-.7353746	-.4213212	-.210486	-.122931
F-TEST	1.304794	1.362015	1.341066	1.468368
CORR COEFF	-.4226365	-.4301229	-.4274109	-.4434091
DURBN-WATSN	2.271487	2.16869	2.294449	2.191896

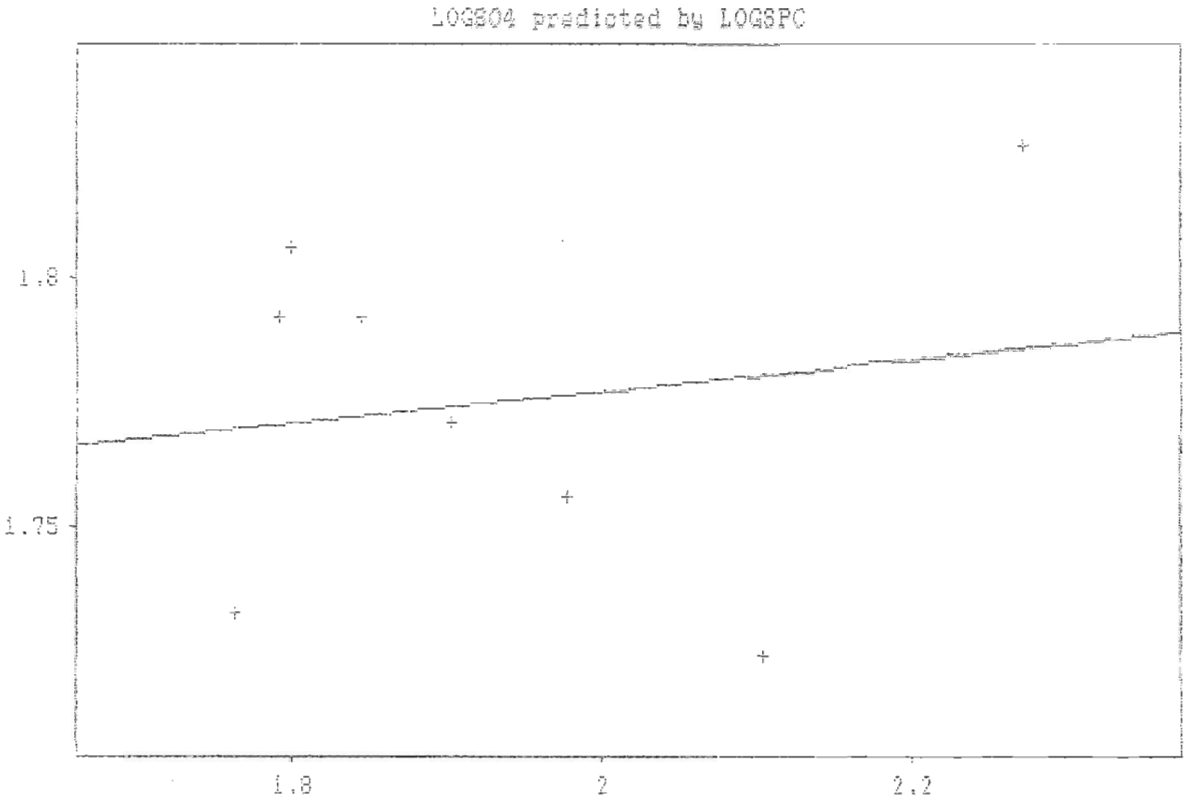


CAHABA RESOURCES - CARTER MINE
FOR CRCMSW-1
PLOT OF LOG FLOW (X) VS. LOG TSS (Y)

Linear ——

Comment: CAHABA RESOURCES / CARTER MINE / FOR CRCMSW-1 / SpC VS. SO4

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	57.00038	57.12429	50.16829	51.74893
B REG COEFF	0.0296455	0.0004527	2.153774	0.0316512
A STD ERROR	4.405183	4.266373	21.43918	18.75537
B STD ERROR	0.0433530	0.0007350	4.801359	0.0811672
A t-STAT	12.93939	54.16331	2.340029	10.88873
B t-STAT	0.6838167	0.6158525	0.4485759	0.3899508
STD ERR EST	5.089037	0.0862799	5.197193	0.0878587
R-SQUARED	0.0722996	0.0594541	0.0324485	0.0247172
COVARIANCE	58.35714	0.8910561	0.360505	0.0052979
F-TEST	0.4676052	0.3792743	0.2012203	0.1520616
CORR COEFF	0.2688858	0.2438322	0.1801347	0.157217
DURBN-WATSN	0.2732545	0.2705226	0.2858683	0.2862591



CAHABA RESOURCES - CARTER MINE
FOR CRCMSW-1
PLOT OF LOG SpC (X) VS. LOG SO4 (Y)

Linear ——

WATER QUALITY & QUANTITY PROJECTIONS

Company Name : CAHABA RESOURCES, LLC.
Mine Name : CARTER MINE
Site ID Number : BLACK CREEK AT CRCMSW-1

Watershed Drainage Area (sq.mi.)	:	3.356
Permit Area (sq.mi.)	:	Ø.194
Previously Disturbed Area (sq.mi.)	:	Ø.748
Percent Previously Disturbed	:	22.29%
Percent to be Permitted	:	5.78%
Remaining Watershed Area	:	94.22%

CHANGES IN POST MINE FLOW RATES WITHIN PERMIT AREA...

7Q2 : 1.142 AVG : Ø.988 2YR : Ø.713

N.P.D.E.S. EFFLUENT LIMITATIONS

pH (s.u.)	--	6.ØØ
FeT (mg/l)	--	3.ØØ
MnT (mg/l)	--	2.ØØ
SpC (umhos)	--	2ØØØ.ØØ
TSS (mg/l)	--	7Ø.ØØ

REGRESSION ANALYSIS VALUES.....

Parameter	A	B
pH	6.373	Ø.Ø28
Fe	1.4Ø6	-Ø.553
Mn	5.7Ø5	-1.Ø19
SpC	16Ø	-Ø.385
TSS	4.69	-Ø.758
SO4	51.749	Ø.Ø32

WATERSHED DRAINAGE AREA FLOWS IN CFSM.....

	Baseline	During Mining	Post Mining
7Q2 Event	Ø.137Ø	Ø.1291	Ø.1381
AVG Event	1.45Ø	1.4Ø8	1.449
2YR Event	1Ø2.25	1ØØ.77	1ØØ.55

QUALITY PARAMTERS/PROJECTIONS.....

	pH	FeT	MnT	SpC	TSS	SO4
7Q2 EVENT----------						
Baseline	6.Ø3	4.221	43.245	344	21.2	62.4
During Mining	6.Ø2	4.283	43.41Ø	447	24.9	62.9
Post Mine	6.Ø3	4.227	43.261	354	21.5	62.4
AVG EVENT----------						
Baseline	6.44	1.145	3.9Ø7	139	3.5	6Ø.6
During Mining	6.41	1.27Ø	3.9Ø8	248	7.5	61.7
Post Mine	6.44	1.157	3.9Ø7	149	3.9	6Ø.7
2YR EVENT----------						
Baseline	7.25	Ø.1Ø9	Ø.Ø51	27	Ø.1	57.5
During Mining	7.18	Ø.277	Ø.164	141	4.2	6Ø.6
Post Mine	7.25	Ø.125	Ø.Ø62	38	Ø.5	58.1

CERTIFICATION STATEMENT:

All hydrologic analyses and computations performed in preparing this Determination of Probable Hydrologic Consequences were prepared by, or under the direction of, a professional engineer.

_____

Date:_____

TIMOTHY S. THOMAS

PROFESSIONAL ENGINEER

REGISTRATION NO. 18830