70 East Main Street, Suite F
Greenwood, IN 46143
317.889.5760
pinnacleactuaries.com

John Wade, ACAS, MAAA
Senior Consulting Actuary
jwade@pinnacleactuaries.com

June 29, 2015

Mr. Michael Sliva
Chair – Ohio Reclamation Forfeiture Advisory Board
2045 Morse Road, Building H-3
Columbus, Ohio 43229-6693

Dear Chairman Sliva:

Attached is our report documenting our analysis of the financial soundness of Ohio's Reclamation Forfeiture Fund. This report represents the combined efforts contributed by the Ohio Reclamation Forfeiture Advisory Board, the Ohio Department of Natural Resources – Division of Mineral Resources Management, and Pinnacle Actuarial Resources.

It is a pleasure working with you on this study. Please feel free to contact anyone from the engagement team should you have any questions.

Best regards,

John E. Wade, ACAS, MAAA
Senior Consulting Actuary
jwade@pinnacleactuaries.com

Enclosure

cc: Lanny Erdos, Chief ODNR-DMRM

# Analysis of the

# RECLAMATION FORFEITURE FUND

Oversight by the

Reclamation Forfeiture Fund Advisory Board of Ohio

Maintained by the

Ohio Department of Natural Resources

Division of Mineral Resources Management

Issued June 29, 2015

PINNACLE
ACTUARIAL RESOURCES, INC.

70 East Main Street, Suite F
Greenwood, IN 46143
317.889.5760
pinnacleactuaries.com

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## *Purpose*

Pinnacle Actuarial Resources, Inc. (Pinnacle) has been retained by the Reclamation Forfeiture Fund Advisory Board of the State of Ohio (the Advisory Board or RFFAB) to review the Fund's financial soundness.

## *Qualification to Provide Actuarial Report*

This report is provided to the Advisory Board by John E. Wade, ACAS, MAAA. Mr. Wade is a member in good standing of the American Academy of Actuaries and meets its qualification standards to prepare this report.

## *Distribution and Use*

This report and conclusions contained herein are being provided to the Reclamation Forfeiture Fund Advisory Board for its use in connection with our actuarial analysis of the current and estimated future Fund's liability in comparison with the current and estimated future assets. This report has been prepared to support the Advisory Board in complying with the Ohio legislation which established the Board as advisory oversight organization with respect to the Fund. The legislation also required a report be made to the Governor of the State of Ohio by the Advisory Board on a biennial basis.

We understand that copies of this report may be provided to the state auditors and other regulatory authorities along with other parties in compliance with Ohio's open records policies. Permission is hereby granted for this distribution on the condition that the entire report, including all exhibits and appendices, is distributed rather than any excerpt. These third parties should recognize that the furnishing of this report is not a substitute for their own due diligence and should place no reliance on this report or the data contained herein that would result in the creation of any duty or liability by Pinnacle to the third party.

The attached appendices and attachments in support of our findings are an integral part of this report. These sections have been prepared so they document our actuarial assumptions and judgments. Judgments about the conclusions drawn in this report should be made only after considering the report in its entirety. We remain available to answer any questions that may arise regarding this report. We assume that the user of this report will seek such explanation on any matter in question.

Our conclusions are predicated on a number of assumptions as to future conditions and events. Those assumptions, which are documented in subsequent sections of this report, must be understood in

order to place our conclusions in their appropriate context. In addition, our work is subject to inherent limitations, which are also further outlined and discussed later in this report.

## *Reliances and Limitations*

We have prepared this report in conformity with its intended use by persons technically competent in the areas addressed and for the stated purposes only. Judgments as to conclusions, methods, and data contained in this report should be made only after studying the report in its entirety. Furthermore, we are available to explain any matter presented herein, and it is assumed that the user of this report will seek such explanation as to any matter in question.

We have relied upon data and information supplied by members of the Ohio Department of Natural Resources – Division of Mineral Resources Management (ODNR-DMRM) staff including Permitting & Bonding, Forfeiture and AML, Regulatory and Data Management.

There is a limitation upon the accuracy of these estimates in that there is an inherent uncertainty in any actuarial estimate of future costs. This uncertainty is due to the fact that the ultimate liability for claims is subject to the outcome of events yet to occur, e.g., the likelihood of permit holders running into financial difficulty and default, the size and cost of reclamation, changes in the standards of reclamation and desired speed of reclamation. While there are no standard techniques for which to develop estimates for these specific issues, in our judgment, we have employed techniques and assumptions that are appropriate and the conclusions presented herein are reasonable, given the information currently available. However, it should be recognized that future loss emergence will likely deviate, perhaps materially, from our estimates.

We have relied on the data provided without independent audit or verification on the part of Pinnacle to develop our estimates of potential future reclamation cost. We also worked with the ODNR-DMRM staff to understand the operation of the Fund, the reclamation process and the underlying data provided but only to the extent such information may have affected our analysis. While we have not anticipated any extraordinary changes to the economic, legal, or social environment which might affect the cost and frequency of default, we have recognized the current state of the Ohio coal mining industry in selecting our near term forfeiture rates, relying on the RFFAB's judgement of the impact of current economic conditions.

Our estimates are provided net of underlying performance security (also known as performance bonds or bonds). We have made no attempt to evaluate the quality of security provided. Should such

providers be unable to fulfill their obligations, the Fund would be responsible for this additional reclamation cost.

We estimate nominal costs at an expected level (50% likely that actual costs will be below our estimate and 50% likely they will be above), then apply inflationary factors, and finally discount to present values using investment rates derived from the US Treasury, recent returns of the Fund, and discussions with the RFFAB. Discounting is reliant upon the investment rate and timing of payments, both of which are assumptions in this model and are subject to potentially high variability. Looking at future payments on a discounted basis could unintentionally remove a level of conservatism not intended by the RFFAB. For financial statement purposes, the Fund's liabilities might be better stated on an undiscounted basis. Exhibits 2.2 and 2.3 show the claims liabilities for land reclamation and water treatment before the impact of cost inflation and discounting (Columns 1 and 4), after the impact of cost inflation but before discounting (Columns 2 and 5), and after both cost inflation and discounting (Columns 3 and 6). The difference is most profound on the water treatment liability, where a 75 year payout is assumed.

Please note that for the purposes of this report, the Performance Security Estimate (PSE) and Central Tracking System (CTS) data was provided as of March 25, 2015.

Further reliances and limitations are contained in the subsequent text, and in the exhibits accompanying the text.

## *Executive Summary*

There are several ways to view financial soundness. We find that the Fund is solvent on a short term basis as the current Fund assets ($23.8 million) exceed the current Fund outstanding liabilities and obligations for forfeited reclamation projects ($6.1 million). For longer-term solvency, the measurement compares the current available Fund assets with the Fund's long term expected exposure or liability ($36.3 million on a present value basis of expected land reclamation and long-term water treatment costs of current permits plus the administrative expense to settle the liabilities). We do not believe the fund currently meets the criteria for long term solvency. We estimate it will take seven more years of no additional forfeiture costs before the Fund accumulates enough surplus to cover expected liabilities and expenses. This is an expected change from the previous actuarial analysis in 2013 which estimated that it would take two more years of no forfeiture costs before the Fund accumulated enough surplus to cover expected liabilities and expenses, given the recent Valley Mining forfeitures and more conservative selection of forfeiture rates discussed later in the report.

Another indicator of financial soundness is the Fund's ability to withstand a shock loss. The current fund balance covers the failure of either an average loss or the failure of the fifth largest permit holder, even considering the recent forfeitures of Valley Mining. This is an improvement from the 2013 analysis where it would take two more years of non-forfeitures before the Fund could cover an average loss and eight more years to cover the forfeited permits of the failure of the fifth largest permit holder. If the largest permit holder fails, the fund would need over 100 years of non-forfeitures in order to cover the loss. See Exhibit 1 for additional details.

To further describe the situation, if the Ohio law was changed somehow closing the Fund at this time to any new permits, the future expected revenues from severance tax from the operating permits currently covered by the Fund for future forfeiture potential plus the current Fund balance would appear to provide sufficient capital to finance the estimated reclamation cost from the long term expected forfeiture of some of the 188 permits included in the Fund today. However, an average shock loss today, on top of the expected forfeitures, would move the Fund into a negative cash flow position within seven years. Our long term solvency measure is intended to compare the current balance with the exposures currently in place in a fashion similar to the method used to judge the solvency of insurance or bonding companies.

As with the prior study, through the efforts of the engineers with the Division of Mineral Resources Management, we have developed an estimate of the total potential cost to reclaim all of the subject mining operations covered by the Fund. This effort had historically only been undertaken once a site had been forfeited. In general, we note that underlying Performance Security provided through the private insurer/bonding community reduces the potential liability of the Reclamation Forfeiture Fund.

Thus, the total potential cost to the Fund equals the total potential cost for all reclamation efforts less the underlying performance security. This potential Fund figure should be viewed as the maximum possible cost or the worst case scenario (although should a provider of the performance security also default, the Fund would also be obligated for the reclamation cost covered by that provider).

The Fund is involved in assuming financial risk for an exposure that is categorized as low frequency of claims but very high severity in dollar terms, when an event (default) does occur. There are currently 28 mining companies with coal mine related permits in the state of Ohio covered by the Fund and included in our study. Some of the operators have only a single permit while other larger operators have a dozen or more mining permits. The operator with the most coal mining permits in Ohio currently has 68 permits in the Fund.

The small number of operators and the tremendous potential liability from a few of the larger operators create a significant risk to the Fund from a concentration of risk perspective. For example, should one of the permit holders with only a single coal mining permit become financially unable to meet their reclamation obligations, the cost to the Fund might fall anywhere from no cost (liability covered through bonding) to over $4 million. See Exhibit 8.1a. With the current Fund balance, the reclamation cost of a forfeiture of a single permit holder can be financed.

On the other side of the spectrum, should one of the permit holders with a large number of sites become financially troubled, the cost to the Fund for reclamation could easily exceed $17 million, with the largest potentially exceeding $233 million. See Exhibit 8.1b.

Our analysis includes the development of the Expected Cost to the Fund. We define the expected cost as the long run average that considers both the potential of a permit holder's forfeiture along with the potential cost of that forfeiture. If the Fund was collecting a single "premium" from the operators at the start of each project for providing this financial security as do insurance and bonding companies, this Expected Cost (along with any operating expenses) would be the basis for the "premium" required from each site and operator.

With this analysis, we have developed estimates based upon an annual forfeiture rate of 1.00% for the next five calendar years and 0.37% for all remaining years, as developed in Exhibit 6.2. Our method of estimating expected ultimate loss applies the selected forfeiture rates to every permit every year to determine an average expected loss.

The forfeiture rate selection is based upon historical Ohio forfeiture information and forfeiture rates developed by using Kentucky and West Virginia information. Applying the same procedure as the 2013 analysis, Ohio's data received 75% weight in the selection, and the other states combined received 25% weight. The selection also considered the current economic and operational state of the Ohio coal mining industry as gleaned by discussions with the RFFAB. Our prior analysis in 2011 utilized publically available financial ratings for the individual permit holders and a general estimation of business survival (1/3 weight), estimated West Virginia forfeiture rates (1/3 weight), and the two year change in estimated West Virginia forfeiture rates (1/3 weight) applied to the financial ratings selections. Our 2009 analysis gave 100% weight to publically available financial ratings.

To say it another way, with the current analysis the forfeiture rate selection is heavily driven by actual historic Ohio forfeiture experience which was omitted from both our 2009 and 2011 studies. The previous omissions were intentional because the recent years of no forfeiture activity was not thought to be very credible. However, four more years of no forfeiture activity have ensued since our first

analysis. While it would not be prudent to assume that the future forfeiture rates over the long term would be 0%, the stability of the program should be recognized, hence the application of the 75% weight to Ohio's long term average forfeiture rate.

We have also introduced a direct reflection of reclamation cost inflation and discounted the future liabilities to present value using interest rates based on recent US Treasury information. With this analysis we have presented the cash flow tables in Exhibit 1 on a discounted to present value basis.

Based on our analyses, we have developed a net land reclamation Fund Expected Cost estimate for the permits currently included in the Fund of $30.4 million in Exhibit 2.2.

Also, we have developed a long-term water treatment Fund Expected Cost estimate for existing permits of $4.4 million in Exhibit 2.3.

In Exhibit 1, Cash Flow, we display the expected revenues that will cover the above costs. Tonnage fees from the permits associated with the above costs are expected to accumulate to $14.0 million over the next 75 years (the projected time period to work through the long-term water treatment liabilities). During that same time, interest income earned on the positive fund balance would be expected to accumulate to $5.9 million. A portion of the interest income earned over the long time horizon should be thought of as being attributable to new permits that will be issued in the future. This report does not study the potential of new permits, either for income or for costs.

In order to cover the expected costs for land reclamation and long-term water treatment of the current permits, the Fund should have an approximate $36.3 million balance ($30.4 million for land plus $4.4 million for water plus $1.5 million for operating expense). This can be thought of as the funding level to be 50% confident that the funds will adequately cover expected costs, that is, half the time this level of funding would be adequate, and half the time it would be insufficient. It is reliant on the assumptions explained throughout this report.

We have incorporated a shock loss scenario that examines how the forfeiture of an average-sized permit holder would affect the Fund: resulting in an estimated $20.5 million in liability to the Fund. See the derivation in Exhibit 8.1b and the cash flow play-out in Exhibit 1 - Shock Loss. For practical considerations, the cash flow exhibit spreads the shock loss out over a five year period. It is unlikely that the activities required to reclaim the land associated with the hypothetical shock loss could be performed in a shorter time period.

To adequately cover the expected cost of the current permits and the shock loss of an average-sized permit, the Fund would need to build to a balance of $56.8 million ($30.4 million for land plus $4.4 million for water plus $1.5 million for operating expense plus $20.5 million). It is informative to note in Exhibit 1 – Shock Loss that even a shock loss as described above would move the fund to a negative balance in seven more years. In the prior analysis it was estimated that it would take another 60 years before the Fund balance would drop to negative levels after sustaining a Shock Loss. Given the current economy and the financial condition of some of the coal operators in Ohio, the RFFAB should consider to what extent it wants to fund for a shock loss, whether it be an average loss or one far greater as displayed in Exhibit 8.1b.

Please note that our previous analysis did not address the possibility that a permit in danger of forfeiture could be taken over by another more financially secure operator, who would potentially assume the previous permit holder's assets, mining rights and reclamation responsibilities. This replacement action eliminates the reclamation cost to the Fund, potentially saving millions of dollars for the Fund. By using Ohio's historic forfeiture experience, we account for that activity to the extent it has occurred in the past, including the recent activity for Valley Mining.

There are advantages that insurers have that are not available to the Fund. The most obvious advantages include:

- The spread of risk across insureds, locations, industries and lines of business;
- The ability to individually underwrite and price each risk; and, maybe most importantly,
- A level of surplus (available capital) in addition to the collected premium which allows an insurer to survive years and periods where the actual costs exceed (and sometimes greatly so) the expected long run costs. When actual annual costs exceed long-term expected annual costs, the insurers have this operating capital. In contrast, the Fund until recently had been using recent proceeds to pay for the current reclamation projects. The Fund has now begun and continues the capital accumulation process.

## *Summary of Findings*

Based upon the methodology and assumptions described above, we have estimated the present value of potential expected liability of the Fund as follows:

- $30.4 million for land reclamation (Exhibit 2.2)
- $4.4 million for water treatment liability (Exhibit 2.3)

- $1.5 million for administrative expenses (Exhibit 1)

Resulting in a total estimated liability of $36.3 million.

It is noted that the total estimated liability of $36.3 million is substantially greater than estimates in the previous study, reflecting the higher selected forfeiture rates in the near term and the inclusion of the Valley Mining liabilities. In 2013, the estimate equaled $18.9 million, down from our estimate in 2011 of $32.3 million and our 2009 estimate of $42.8 million.

There can be considerable variation around this estimate due to:

- The limited number of coal operators within the state of Ohio,
- The uncertainty with respect to future forfeiture rates,
- The emergence of water treatment liability,
- The number of operators with multiple permits,
- The relationship of the performance security provided by the private insurance market and estimated cost to reclaim the various sites along with the large size of some of the operators.

For example, should one of the largest operators be unable to meet its obligations, the potential cost to the Fund from a single operator could easily approach $233.5 million. An additional $20.5 million would be needed to cover an “average” shock loss. Please see Exhibit 8.1b.

In actuarial and insurance regulatory language, the Fund has significant risk of material adverse deviation from the estimated expected loss. This risk can easily be seen in two contexts. The first would be in comparing the average potential cost with the largest single potential cost. On an operator basis, this is $20.5 million versus $233.5 million or a relationship exceeding 11 to 1. Please see Exhibit 8.1b. The second context would be a comparison of the largest single potential loss with the current available capital in the Fund - $233.5 million to $21.4 million (as of January 2015) or a ratio of nearly 11 to 1. Even the average potential cost of $20.5 million exceeds the Fund’s current capital of $21.4 million after reduction for the Valley Mining losses.

## *Ohio Reclamation Forfeiture Fund Background*

The current Ohio Coal Mine Reclamation Forfeiture Fund ("the Fund") was significantly revised in 2007 by the State Legislature to provide reclamation coverage to eligible coal mine operators permitted by the State of Ohio in addition to the required private performance security for each site. This coverage is designed to step in to provide for funding the reclamation costs of coal mining sites in the event of financial default of the permit holder. The mechanisms prior to House Bill 443 in 2007 had not accumulated a significant amount of capital or revenue for its operations but the Bill did assign the responsibility for the on-going cost associated with the prior operator defaults not yet fully reclaimed to the Reclamation Forfeiture Fund. Fortunately, there have been no new forfeitures requiring Fund financial support from year-end 2006 through year-end 2013. (There are 6 forfeitures from Valley Mining in 2014.) As of the end of January 2011, there were no permits/sites on the list to be reclaimed under the direction of the Fund through the efforts and oversight of the Division of Mineral Resources Management. All reclamation work on permits forfeited prior to 2006 was substantially completed by year-end 2010.

The coal mine permit holders must maintain Performance Security (Bonding) coverage in the amount of $2,500 per acre of land based upon the acreage designated to be affected in the given year as allowed on the permit. The Performance Security can be obtained from the private insurance market or financed by some other means such as letters of credit, certificates of deposit, cash or trust agreements.

The Fund provides additional forfeiture coverage for reclamation efforts on underground mines, surface mines and facility permits. Facility permits might include operations such as preparation plants, coarse refuse and slurry areas. The eligible mine operators who select to be reliant on the Fund for costs above the Performance Security pay a severance tax to the Fund which varies from $0.12 to $0.16 per ton of coal extracted based upon the Fund's balance. The required amount of private performance security is based upon the affected acreage on each permit issued by the Division of Mineral Resources Management. Many operators have submitted permit applications with a significant amount of land not currently affected by mining. The extra acreage has been included within the permit and performance security up front to eliminate the need for the operator to reapply or post additional performance security each time mining operations commence on another parcel of land. Also, some eligible operations, by choice or requirement, are fully covered by private performance security and not part of the "pool" operated by the Fund.

The total potential reclamation cost estimate is based upon the ODNR-DMRM engineer's assessment of the approved mining and reclamation plan on each permit including any on-site processing facilities

covered by the Fund. This cost estimate is commonly referred to as the Performance Security Estimate (PSE). Each PSE uses unit costs derived from the historical reclamation costs on Abandoned Mine Land projects, cost data from R.S. Means and yearly direct inquiries for quotes. These unit costs are applied to the approved mining and reclamation plans to assess the total potential cost in the event of forfeiture. Prior to our 2009 analysis, this PSE information had not been routinely established at the beginning of each permit operation nor reviewed annually to assess the potential cost to the Fund. It should be noted that the forfeiture coverage is now updated periodically by the DMRM during the active mining operation period of the mine and also during the reclamation process until the permit is released by the ODNR-DMRM.

The amount of the required Performance Security on a permit is adjusted during the reclamation process based upon the acreage affected. The amount of the private Performance Security required on any given affected acre is decreased by 50 percent upon satisfactory completion of the procedure to backfill and re-grade the land (phase 1 of reclamation). Another 35 percent decrease in required Performance Security is made when the land is re-planted and re-growth or re-vegetation has been satisfactorily completed in accordance with the requirements set forth in the Ohio Revised Code and Ohio Administrative Code (law and rule) (phase 2 of reclamation). The final 15 percent of the required performance security amount is typically released in about seven years following the date of planting, if no additional action was necessary by the operator to achieve satisfactory reclamation. It should be noted that the private performance security is not related to the estimated reclamation cost but rather a fixed amount of coverage ($2,500) per acre affected. As noted previously, at any site, the operator may elect not to rely upon the financial support of the Fund and choose to provide complete private performance security in the full amount of the estimated reclamation cost (using the same estimation methodology and unit cost values as the permits which are eligible and choose to rely upon the Fund).

In the case of default by the operator, the private bonding company may elect to reclaim all or a portion of the site based upon the amount of performance security remaining as surety bond. The remainder of the site reclamation effort would be turned over to the Fund possibly with the performance security payment of up to $2,500 per acre depending upon the amount previously released. Each coal mine operator may have multiple active sites (permits) with affected acres at various phases at any time. This situation with multiple permits from a single operator results in additional concentration of risk.

As of March 25th, 2015, there were 130 active permits for coal mining operations in Ohio that were part of the Reclamation Forfeiture Fund “Pool”. There were also 58 permits covered by the Fund with no future mining activity planned that had “Final Maps” accepted by the Ohio Department of Natural Resources – Division of Mineral Resources Management. See Exhibit 8.6a. Final Maps reflect the

cumulative affected area on mining operations and are used to determine an accurate reclamation cost estimate on each permit following completion of mining.

From the data provided for this analysis, we had ODNR-DMRM engineer's performance security estimates on all 188 Fund-covered permits from 28 different operators. Of the 188 permits with PSEs, the current PSEs for 176 permits are greater than the possible funding from bonding, letters of credits, deposits or other instruments (private performance security). Please see Exhibit 8.2. The operator counts have been adjusted to reflect the fact that some permit holders are part of one umbrella company structure. This issue is noted due to the impact organizational structure has upon the concentration of risk. If a multiple permit holding operator should run into such financial difficulty that it defaults, we have assumed that all permits under that umbrella corporation are impacted and default as well.

## *Changes in the Data since Previous Report*

We have compared the Performance Security Estimates for the 168 permits which had Performance Security Estimates in the data included in the previous report as well as Performance Security Estimates in the current data provided by the engineers from the Ohio Department of Natural Resources. Of these permits, the PSEs on 19 permits remained unchanged. For 98 permits, the PSEs in this year's data were lower than the PSEs included in the previous data by a total of $206.3 million of potential reclamation cost. For the remaining 51 permits, the performance security estimates increased by a total of $70.9 million since the data for the last review was collected. The overall net change is a decrease in the Performance Security Estimate or the anticipated cost of reclamation of $135.4 million, a vast improvement brought on as part of the DMRM's effort in refining their PSE estimates. Please see the bottom of Exhibit 8.6a.

In the 2009 report, we had performance security estimates on all but 25 of the permits. With the 2011 report, 2013 report, and this year's analysis, we have been provided with performance security estimates on all the permits included in the Fund. Thus in this review, we are relying solely upon engineer's estimates of potential reclamation costs.

As might be expected, a grand majority of the permits in the database are from surface mining operations. Of the 188 permits included with PSEs, only 12 permits are related to underground mining operations and another 20 permits related to facility permits. Please see Exhibits 8.3a, 8.4a, and 8.5a.

Of the 130 active permits, we have PSE data for 105 surface mining operations, 7 active permits for underground mining operations and 18 operating facilities permits. Please see Exhibits 8.3a through

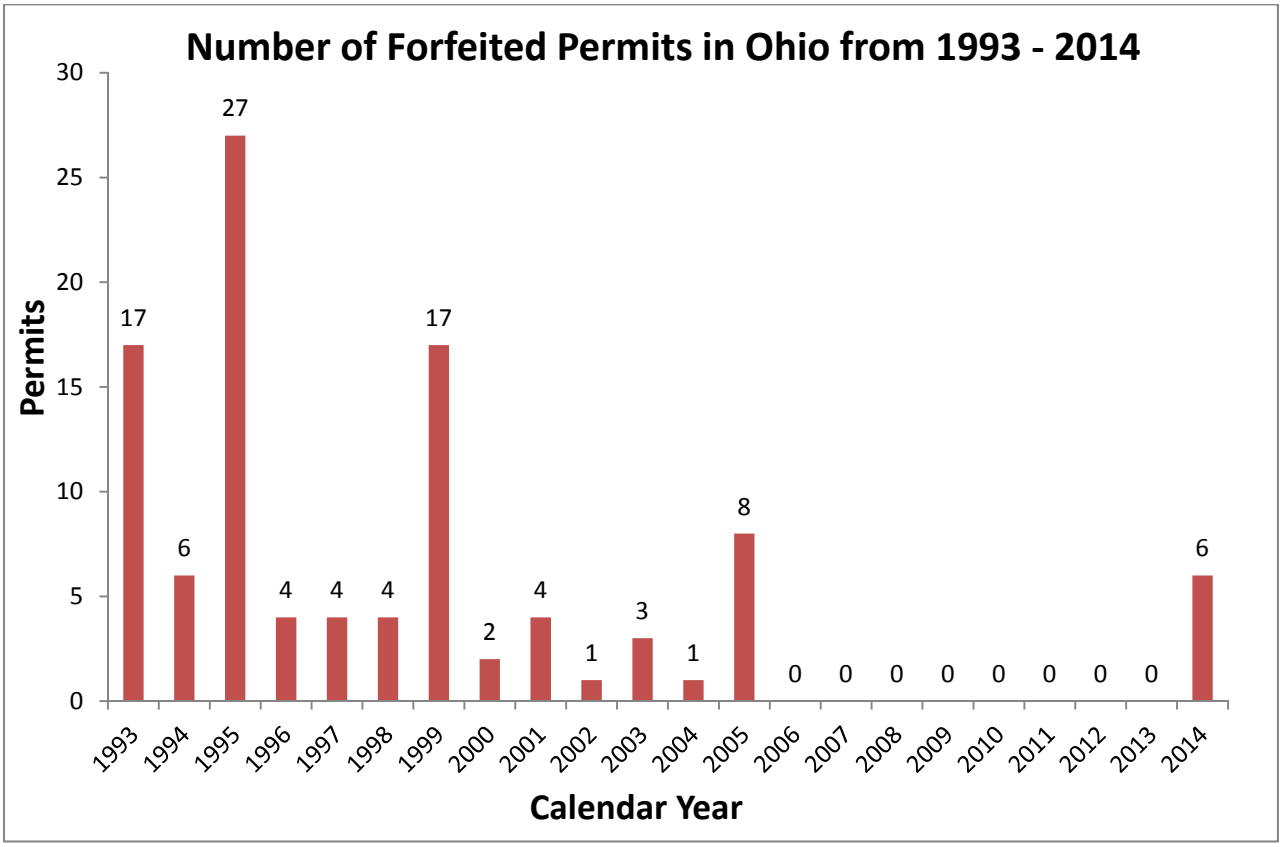
8.6a. We note that the preceding information reflects only those permits covered by the Fund and not those that have elected or are required to operate under full private performance security.

## *Historical Forfeitures*

As background information, the ODNR-DMRM provided the historical forfeiture order information available from the US Department of the Interior's Office of Surface Mining (OSM) covering the past 20 years by the year in which the order was made. Since 1993, there have been a total of 104 bond forfeiture orders to 33 permit holders. This results in an average of 3 permits per permit holder. The actual number of forfeiture orders per permit holder has ranged from 1 to 21 permits.

From years 2000 through 2013, there had been only 19 forfeiture orders. Seven of these forfeiture orders in year 2005 were terminated because the company was able to reclaim and continue operation on the affected sites. These forfeiture orders did not result in any dollars being requested from the Fund to assist with the reclamation process. Even more impressive, there have been no forfeiture orders from years 2006 through 2013. Unfortunately, in October of 2014, permit holder Valley Mining incurred 6 forfeitures. However, even considering this, the lack of recent forfeitures otherwise has allowed the Fund to cover the reclamation costs of previously forfeited locations including those forfeited prior to House Bill 443.

More importantly, the Fund has begun accumulating capital to cover potential future forfeitures of currently covered permits. In the early 2000s before House Bill 443, this capital accumulation process had been further slowed by the insolvency of a performance security provider (bond insurer) for two of the permit holders, one of which was an operator with a significant number of permits.



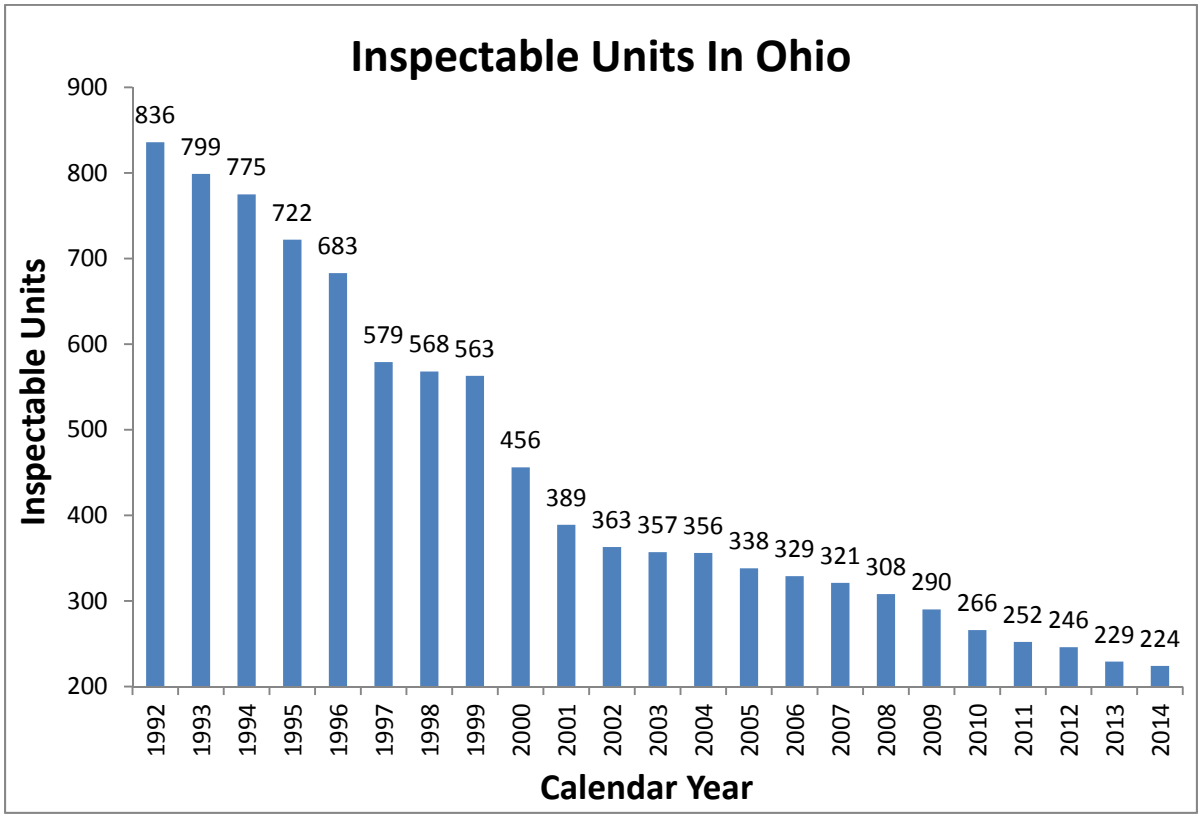

*Source, Ohio Department of Natural Resources, Division of Mineral Resources Management*

We noted in the previous analysis that similar to states that experience hurricanes, the lack of forfeitures in the recent past prior to year 2014 does not provide support for an assumption that there will be no forfeiture events in the future. In 2014 this assertion was proved true when the Fund experienced 6 forfeitures in October of that year.

The average annual number of forfeiture orders over the twenty two year available period has been about 4.7. We note that from 2000 to 2013, the annual permit forfeiture order frequency had declined to 1.4 permits per year. And most notably, from 2006 to 2013 there were no forfeitures. However, the good fortune ended in year 2014 when 6 permits were forfeited. We also note that although there were official forfeiture orders made on eight permits during calendar year 2005, the Fund was only called upon to provide reclamation capital on one of these sites – a very positive development for the Fund's financial situation. We were also provided with forfeiture information as compiled by the ODNR-DMRM which showed forfeiture activity during 1989 to 1992 at roughly the same levels as the 1993 to 1995 period.

If we measure the annual number of forfeitures at the Permit Holder level rather than the permit level, the long term permit holder forfeiture frequency has been less than two operators per year.

The number of inspectable units (permitted mining operations) in Ohio over the 20 year period is displayed in the chart below. Over the period of time 1992 through 2014, there have been anywhere from 836 to 224 inspectable units in Ohio. These figures are provided by the Office of Surface Mining from their publicly available records.




*Source: Office of Surface Mining reports*

The average forfeiture rate per number of permits issued is 1.10%. This translates to an annual forfeiture rate of 0.06% based on an average lifetime of a permit of 19 years and adjusting for the fact that forfeitures rarely occur in the first two years of a permit's active life. Please see Exhibit 6.2. Note that the calculation of forfeiture frequency considers the seven 2005 permits discussed above that were eventually terminated. Since our goal is to estimate future frequency rates, it is prudent to realize that future remediation efforts leading to terminated forfeiture orders may not be as successful.

Comparing Ohio's historic 0.06% forfeiture rate to the Kentucky and West Virginia forfeiture rates of 1.08% and 1.11%, respectively, Pinnacle selected an Ohio annual forfeiture rate of 1.00% for years 2015 – 2019 and 0.37% for years 2020 and subsequent. The selection of 1.00% is a reflection of the long term historical indication, modified upward after discussion with the RFFAB. Ohio coal production is down over 11% this year and is expected to continue to decrease though Fiscal Year 2017. Nationally coal production is down about 6.5%. Considering the economic conditions, the EPA's Clean Power Plan coming on line in 2017, alternative fuel sources, the price of coal and the cost of production, there is significant concern within the RFFAB about the potential for future bankruptcies in the near term.

The selection of the longer term forfeiture rate of 0.37% reflects 75% weight given to Ohio's data, 25% weight to Kentucky and West Virginia, and reflecting the inclusion of a mine status forfeiture rate adjustment factor (Exhibit 6.3). While we do not have historical data to determine the forfeiture rate adjustment factors, our selections are intuitively logical. We have also adjusted the final selected forfeiture rate to account for the impact created by the adjustment factors, rendering the overall impact revenue neutral.

## *Analysis Overview and General Comments*

For the current permits covered by the Fund, we have utilized the site specific current estimates of the total *potential* cost to reclaim all of the subject mining operations (Performance Security Estimate or PSE) from the engineers with the Ohio Department of Natural Resources– Division of Mineral Resources Management (ODNR-DMRM). We have combined the PSEs with estimated probability of forfeiture over the lifetime of the permit to develop an estimate of the total expected (or long term average) costs for the Fund.

The engineering estimation effort is now being undertaken by the ODNR-DMRM on a regular basis. This increased frequency of PSE updates greatly facilitates the monitoring of potential cost at the sites and the future analyses of the Fund's potential liability. Since the PSEs include all portions of the permit within a single figure, they are adjusted during our analysis to reflect the reported site operating status with respect to the various stages of mining and reclamation. A single permit may have various acres in process of achieving phase 1 release (all activity including active mining operations prior to completion of all land replacement), in the process of achieving phase 2 release (replanting and reforestation activity) and in the process of achieving phase 3 and final permit release (the waiting period prior to permit release).

In development of our estimation, we reflect that if a permit is forfeited, the underlying performance security provided through the private insurer/bonding community, letter of credit or other security provided would reduce the potential liability of the Reclamation Forfeiture Fund. Thus, the total potential cost to the Fund equals the total potential cost for all reclamation (PSE) less the underlying performance security (bond, etc.). This Fund potential cost figure should be viewed as the maximum possible cost or the worst case scenario, with one exception. In full disclosure of that one exception, we do note that should a provider of the performance security also default, the Fund would be obligated for the reclamation cost assumed to be covered by that provider.

**Potential Fund Liability**

Our analysis begins with estimates of total land reclamation cost (PSEs) for the 188 Fund-covered permits. In total, the engineer estimated reclamation cost is $800.9 million. This value is reduced by $193.2 million to reflect permitted acres not yet affected and by $54.7 million of available and required performance security. These adjustments to the initial PSEs result in a total *Potential Fund Liability* of $553.0 million for land reclamation. Again, these total potential cost figures should be considered a worst case scenario - if each and every operator would forfeit all their permits and no providers of performance security default.

**Expected Fund Cost**

The combination of the potential cost (adjusted PSEs) and probability that the Fund will be called upon (forfeiture rates) determines the *Expected* Cost to the Fund. This Expected Cost being a combination of the possible cost and the long run probability of default or forfeiture over the life of the permit could be considered the long run average cost of future forfeitures to the Fund. If the Fund was collecting a single up-front “premium” from the operators to provide this financial security in a manner similar to insurance and bonding companies, this Expected Cost (along with any operating expenses) would be the basis for the “premium” required from each site and operator.

We also note that while these are long term average projections, the actual results in any one year or series of years will vary, sometimes significantly, from the long run average. This is the nature of a low frequency/high severity risk such as this. For a similar example, we cite the cost of hurricane losses in a southern state. In some years, there will be no losses due to hurricane while in other years there will be significant losses. Most years are either well below or well above the long term average. The key is to generate sufficient capital in the less than average years to be available to cover the costs in the years where the costs far exceed the long term averages.

**Forfeiture rates**

For our 2011 analysis, we obtained publically available financial information about some of the firms holding Ohio coal mining permits through sources such as Standard & Poor's and Dun and Bradstreet. This potential default information was used to estimate the probability of an operator encountering financial difficulties such that the Fund would be called upon to assume the cost of the reclamation projects for each site of the firm.

Later we developed two additional estimates by using the probability of forfeiture estimates by permit type and permit issuance year from the West Virginia Special Reclamation Fund analysis.

For both this analysis and the previous analysis, we developed a forfeiture rate based on historic Ohio experience. We blended that with projected forfeiture rates in West Virginia and Kentucky (using a 75/12.5/12.5 weighting). We determined that this measure was superior to the financial ratings as it should be directly related to the Reclamation Forfeiture Fund expected cost. The recent history of no forfeitures was fortunate, but it would not have been appropriate to assume the future long term forfeiture rate would also be zero, as proved in October 2014 when the Fund experienced 6 forfeitures. Hence, we use the long term historic average and include the surrounding state information to add stability and credibility to our method.

We did increase the selection of the near term forfeiture rate. The selection of 1.00% is a reflection of the long term historical indication, modified upward after discussion with the RFFAB. Ohio coal production is down over 11% this year and is expected to continue to decrease though Fiscal Year 2017. Nationally coal production is down about 6.5%. There is significant concern within the RFFAB of the potential for future bankruptcies in the near term.

Besides varying the forfeiture rate by year, we maintain the enhancements incorporated in our 2013 analysis, which are:

- An adjustment factor to the forfeiture rates to reflect mine status (active, final map, pending phase 1 release, pending phase 2 release, pending phase 3 release)
- Expanded release rates determined from historic data
- An estimated liability for long-term water treatment or long-term alternative water supply (Water)

Based on a number of estimates and assumptions, described later in this report, along with the PSE information from the permits in the Fund, we have developed an estimated land reclamation expected

cost of $30.4 million, reflecting inflationary trends and discounting to present value, both explained later in this report. See Exhibit 2.2. This compares to our estimate in the 2013 analysis of $13.4 million and our estimate of $32.3 million in the 2011 analysis. The increase of the estimate from our 2013 analysis to our 2015 analysis is the result of selecting a higher forfeiture rate, reflecting the recent forfeiture activity and the current economic conditions within the Ohio coal mining industry. The decrease from the 2011 analysis to the 2013 analysis was driven by the revised methodology of forfeiture rate selection.

**Water**

Effective September 30, 2011 House Bill 163 amended the Ohio Revised Code to account for long-term water treatment and long-term alternative water supplies. In prior statute, long term water treatment was excluded from coverage by the reclamation forfeiture fund. House Bill 163 allowed the fund to cover long-term water treatment for those permittees that are reliant on the bond pool. It included a provision to allow eligible operators to fund the long term water treatment trust or alternative financial security (AFS) over a 5-year period and the bond pool or Fund would be responsible to cover the unfunded portion until such time as the AFS was fully-funded (not to exceed 5 years).As discussed later in this report, we have estimated a liability of $4.4 million to account for long-term water exposure on current permits. See Exhibit 2.3.

**Shock Loss**

Another financial measure of the soundness of the Fund would be its ability to absorb a shock loss without threatening the viability of the Fund. A shock loss for purposes of this study could be considered to be the largest operator, carrying the largest liability, forfeiting all its permits. In this case, an additional $233.5 in estimated liability would come against the Fund.

In conversations between the RFFAB and coal producers it has been postulated that four of the largest operators would be less likely to be involved in a failure. However, there was some concern expressed about the financial difficulties facing large (and small) operators. For purposes of this study we considered the impact of a shock loss that was equal to the average liability for all operators in Ohio who are reliant on the Fund. See Exhibit 1 – Alternative. That amounted to an additional $20.5 million of estimated liabilities for an “average” shock loss. For comparison purposes, this is approximately $3.1 million higher than the estimate of the cost for the fifth largest carrier defaulting. See Exhibit 8.1b.

While shock losses are highly unlikely to occur because of the financial strength and attractive value of the assets of the larger operating companies, it is prudent to be aware that remote possibilities do exist.

## *Actuarial Analysis*

As described briefly above, the objective of our analysis is to measure the Expected Cost to the Fund of the current operating mines and all facilities currently in various phases of reclamation.

**Data**

The ODNR-DMRM has provided the following information by permit in an Excel spreadsheet format:

1. The Performance Security Estimate, which is the ODNR-DMRM engineer's assessment of the cost to reclaim the site based upon the approved mining and reclamation plan (described more fully later in this report) for all 188 mining permits covered by the Fund.
2. The Performance Security on-hand in total for each site along with the amounts separated into the three phases of the reclamation process (also described more fully in a later portion of the report).
3. The distribution of acres on the permitted site between the three phases of operation.
4. The Operator name by permit.
5. The provider of the performance security by permit.

**Performance Security Estimate Groupings**

The 188 PSEs are provided by the ODNR-DMRM engineers in the following two categories:

A. 58 Permits that have an approved Final Map and coal extraction is completed
B. 130 Permits still extracting coal and thus do not have an approved Final Map

The first category, permits with Final Maps, requires no additional adjustment prior to application of the default probabilities in the development of the estimated exposure assumed by the Fund. The second category requires an additional adjustment to account for the typical situation where the PSE has assumed all acres proposed to be affected on the permit will require reclamation, when, in some cases, only a portion of the land proposed to be affected has been disturbed during the mining process. We have utilized the historic relationship of affected-to-permitted acres supplied by the ODNR-DMRM engineers from their work on PSE development of each of the Performance Security

Estimates in Category B as an estimate of the affected–to-permitted acres relationship of our study sample. Please see Exhibit 5.

**Performance Security (Bond) from Insurers**

We next compare the estimated total cost of site reclamation developed in the prior step against the amount of private performance security on hand as provided from the Division of Mineral Resources Management data base (Central Tracking System - CTS) files. The private performance security, available should forfeiture occur, may be provided through any of the following means:

- Bond from an insurer licensed to do business in Ohio
- Letter of credit
- Certificate of Deposit
- Cash
- Trust agreements

The amount that the estimated total site cost exceeds the performance security on hand for the site is the potential reclamation cost to the Fund. There are a number of sites where the Performance Security on hand is greater than the Performance Security Estimate. Of the 188 permits included in the analysis, 12 permits, or more than 6 percent, fall into this category and contribute zero dollars to our estimated potential and estimated expected Fund costs. In these cases, the Fund would have no reclamation liability in the case of operator default. But we understand that the Fund still could have some potential liability, if the provider of the Performance Security should become insolvent prior to fulfilling its obligation. This situation occurred on a number of forfeited sites in Ohio in the early 2000s. We also note that the excess of individual permit Performance Security over the Performance Security Estimate has not been used as an offset to total Fund liabilities, as these monies would not be available to cover other forfeitures.

**Estimated Potential Reclamation Fund Cost by Permit Holder**

Exhibits 8.1a, 8.1b, and 8.1c provide the estimate of the potential reclamation cost by permit holder. One permit holder (operator) only has permits with zero net liability to the Fund. In essence, this operator is privately secured at “full cost”. Therefore, 27 of the 28 current permit holders (operators) pose potential liability to the Fund (assuming their Performance Security providers do not fail).

The average potential cost of a permit holder forfeiture of the operators and sites is over $20.5 million per operator ($553.0 million divided by 27 operators with exposure to the Fund). As can be seen in

Exhibit 8.1b, four of the five largest operators exceed the average. We do note that the estimated potential Fund cost for each of the other 22 operators is well below the average of $20.5 million. In fact, the average potential Fund cost of these 22 operators is roughly $3 million. We can conclude that the greatest concentration of risk to the Fund comes from a small number of mine operators.

Comparing the potential cost as obtained from the engineers at the ODNR-DMRM and adjusted for the available performance security with the number of permits with potential cost to the Fund, we develop the average potential cost of a forfeited permit of approximately $3.0 million ($553.0 million divided by the 176 permits with potential liability to the Fund). Please see Exhibit 4.3.

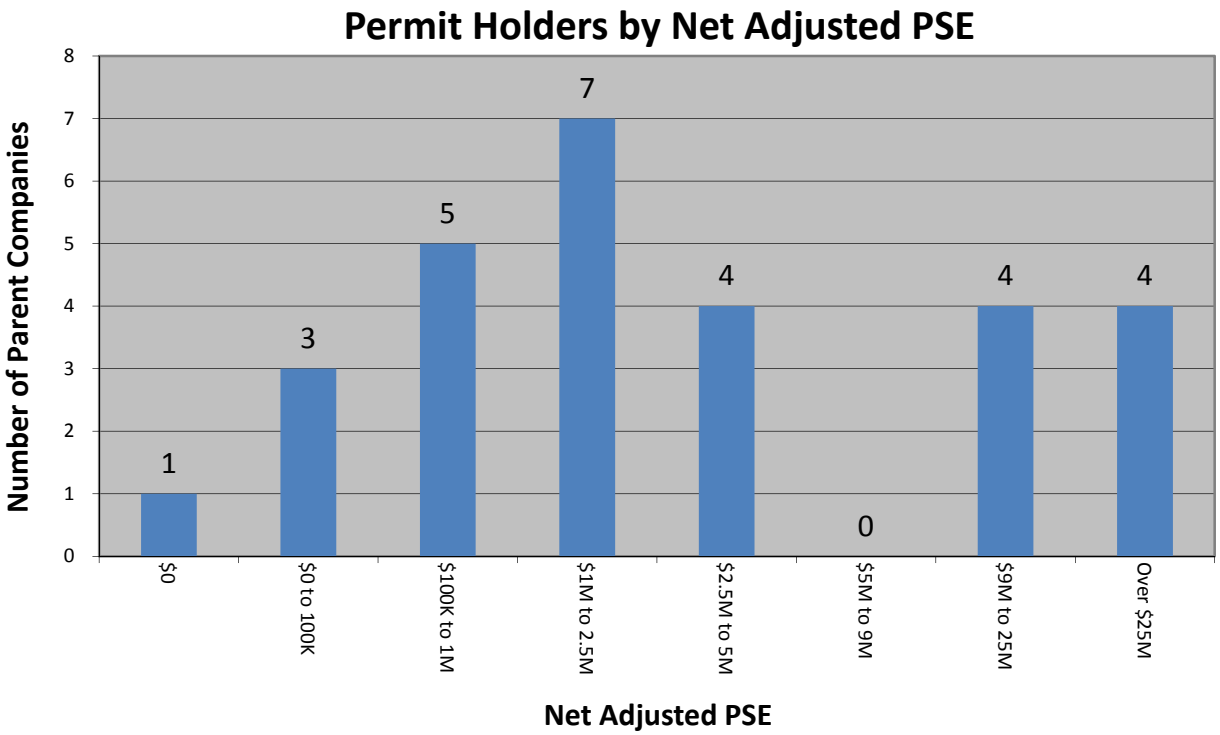
Based upon the information in the ODNR-DMRM data base (CTS) for each site within each of the three phases, we have allocated the total estimated reclamation cost to the three reclamation phases. This step is necessary to reflect the differences in the estimated time until full release of the permit and the associated performance security based upon the assigned phase. These time estimates were developed based upon data from a report by the Office of Surface Mining Reclamation and Enforcement that is titled "A Report on the Success of Achieving Reclamation Standards on Surface Coal Mining Operations in Ohio". Please see Exhibit 3.2. As with any estimates, some sites may operate within significantly longer or shorter time periods – especially the active permits.

- For active permits (those without Final Maps), we have assumed that the future life cycle will take 19 years to completely proceed through the various phases of mining operation from coal extraction to land replacement, removal of collection ponds, replanting and reforestation and the maintenance period required to assure that the land is stable and fulfills the requirements of the approved reclamation plan and final release of the permits. At the point of permit release, the exposure to the Fund declines to zero and the private performance security is also fully released.
- For permits with Final Maps and CTS data pending phase 1 release, we assume that phase 1 release will be reached in 3 years. The additional times to release follows the phase 2 and phase 3 timeframes below.
- For permits with Final Maps and CTS data pending phase 2 release, we assume that phase 2 release will be reached in 5 years. The additional time to release follows the phase 3 timeframe below.
- For permits with Final Maps and CTS data pending phase 3 release, we assume that full release will be reached in 7 years.

The $553.0 million in potential cost from the permits in the study are spread across the Active and Final Map Permits within the three phases of reclamation as follows:

- Active Pending Phase 1 $339.4 million
- Active Pending Phase 2 $131.1 million
- Active Pending Phase 3 $21.7 million
- Final Map Pending Phase 1 $39.3 million
- Final Map Pending Phase 2 $10.8 million
- Final Map Pending Phase 3 $10.7 million

Please see Exhibit 4.2. These figures have significance as the permits now fully contained in phases 1, 2 and 3 of reclamation are no longer contributing revenue to the Fund but will continue to expose the Fund to potential cost. Please note that all potential costs are accumulated in the first category with any current activity. Thus, a permit with a final map pending phase 1 may also have some acres in pending phases 2 and 3 of the reclamation process, but all potential costs from the phase 2 or 3 acres would be included in the pending phase 1 category shown above.



**Estimated Operator Financial Strength – Potential for Future Default**

Since the Fund will only be called upon to financially support a reclamation effort if the permit holder should no longer have the financial resources to complete the effort, we need to consider the probability of forfeiture or financial default of the permit holder/operator. To reflect this financial capacity of the permit holder in our analysis, we have developed average forfeiture probabilities based on Ohio forfeiture data and the forfeiture rates in Kentucky and West Virginia. Please see Exhibit 6.2.

**Projection into the Future**

The time horizon for potential forfeiture varies based upon the reclamation phase determined by the Division of Mineral Resources Management. For the active permits, we used the longest period available – 19 years for the period of time from current until the reclamation is completed and the permit is released. For the sections of the permits with Final Maps currently working to achieve phase 1 release, we used a shorter period of 15 years to reflect that coal extraction has ceased and reclamation is underway. For the sections of permits currently in process of achieving phase 2 release, we used a 12 year time horizon and for the sections of permits currently within the maintenance period prior to phase 3 and total permit release, we have used 7 years as the appropriate time horizon. Please note that the underlying exposure (cost of reclamation) to the Fund declines when a section moves from one phase to the next in the same fashion as the release of the private performance security declines.

**Impact of Future Inflation and Present Value of Estimate**

As in our previous report, we include an explicit consideration of future inflation on reclamation costs (materials, fuel and manpower). We also explicitly consider that the costs of future potential liabilities could be discounted to present value based upon expected investment returns. That is - “how much money is needed to be set aside today to cover the costs years into the future?”

In this analysis, we make a separate reclamation cost inflation adjustment that varies by year. The following table displays the inflation rates utilized. These rates were provided by the RFFAB and were based on their internal analysis of costs and expected costs.

| Reclamation Cost Inflation Rates | |
|---|---|
| Year | Rate |
| 2015 | 0.00% |
| 2016 | 0.00% |
| 2017 | 3.00% |
| 2018 | 3.00% |
| 2019 | 3.50% |
| 2020 | 3.50% |
| 2021 & Subs | 4.00% |

We also use the investment rates to discount the future costs to present value. The rates are based upon United States Treasury Note return rates as of March 31st, 2015. The Treasury Notes are sold for 1, 2, 3, 5, 7, 10, 20 and 30 year investment periods. The final selections reflect the recent returns experienced by the Fund. After discussing likely investment returns with the RFFAB, we determined to lengthen the time period it will take the Fund to move to the more favorable return rates projected by the Treasury. We have interpolated the years in between those available. When investment returns are less than the assumed reclamation cost rates at any one point in time, the Fund liabilities are adversely impacted by cost inflation. Please see Exhibit 9 for a display of the rate of investment returns used in our analysis.

**Development of the Estimates of Expected Cost**

We develop estimates of the expected cost for each permit by combining the potential cost to the Fund information with the probabilities of forfeiture by permit age over the entire exposure period based upon the current distribution by phase. These forfeiture rates are adjusted to reflect the phase of the mine. The probability of forfeiture declines as the reclamation process transitions from active mining to reclamation and on to final release. Please see Exhibit 6.3. These expected long run average cost estimates by permit are then summed by parent company and then for the Fund in total. In this case, $30.4 million is the estimated long run average expected cost for land reclamation. Exhibit 2.2 summarizes the estimated costs over the next 19 years.

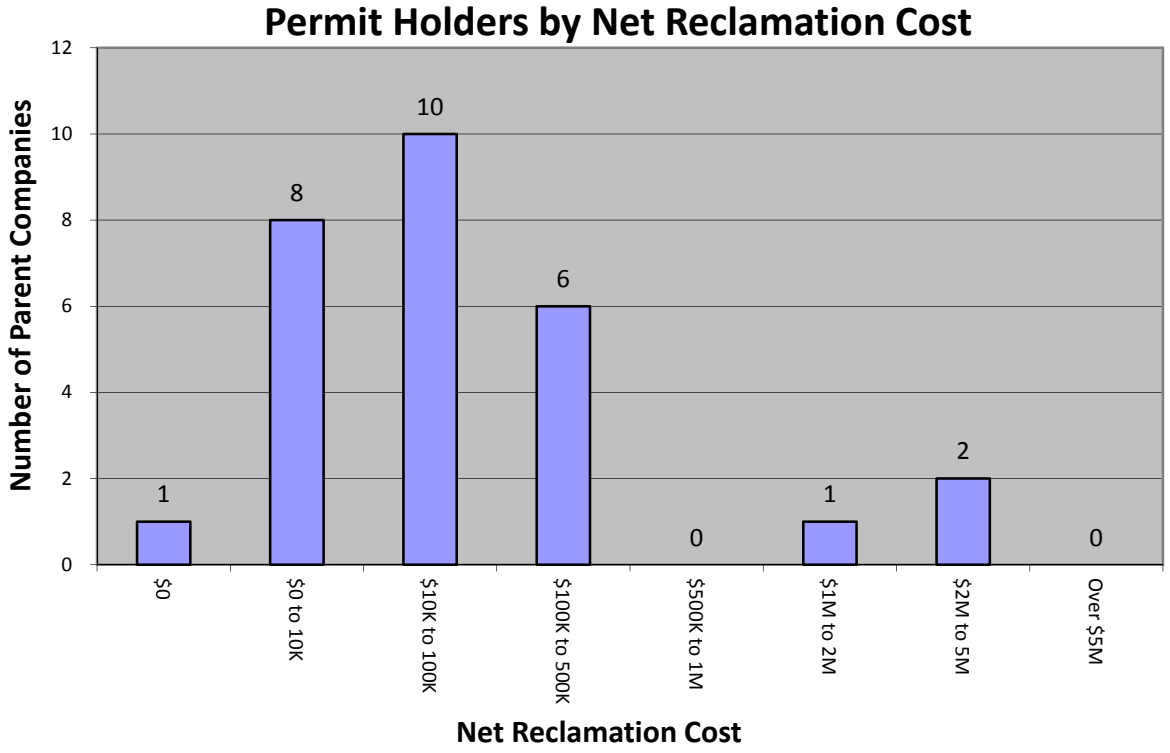
**Estimated Expected Cost by Larger Permit Holders**

There are a number of sites that would be potentially impacted by a single large company becoming financially troubled. We have also developed estimates by permit holder as well as individual permit. Again, we are reflecting the assumption that if a permit holder should forfeit one permit, then all permits for that entity would simultaneously be forfeited.

Thus, in the case of the forfeiture risk borne by the Fund, there is significant correlation between the default probabilities of various permits. On the other hand, we note that no adjustment is made for any spread of risk between the various permit holders as the concentration of risk is much more significant. One might also look at it from the other perspective, i.e., if the larger permit holders continue to remain solid financially, the potential reclamation costs to the Fund might be much more manageable.

In Exhibit 8.1b, we provide the estimated nominal expected costs for the top five permit holders in terms of total expected cost to the Fund before application of reclamation cost inflation or present value calculations.

As can be seen, the estimated expected Fund cost (Net Reclamation Cost) at the permit holder level for those permits in the study is significantly less than the estimated potential Fund cost (Net Adjusted PSE) from the permit holder forfeiture. Please see the charts below and Exhibits 8.1a and 8.1b for comparisons. The difference in these figures can be thought of as being similar to the difference between the insured value of a home (potential cost) and the annual premium to insure the home against a multitude of potential losses over the many years of occupancy (expected cost).




**Impact of Land Reclamation Cost Inflation and Adjustment to Present Value**

We adjust the 2014 nominal estimates to reflect the expected future reclamation cost inflation using the annual rates displayed in a previous table. These figures are then returned to a 2014 present value basis through the use of selected investment rates as previously displayed. Please see Exhibit 2.2 for the results. The following chart shows a summary of the impact of these adjustments to the estimates.

| **Estimated *EXPECTED* Land Reclamation Fund Cost**<br>**After Cost Inflation and Present Value Adjustment** | | |
|---|---|---|
| | **Gross of Bond** | **Net of Bond** |
| **Nominal Estimate** | **$30,110,830** | **$27,982,497** |
| **Impact of Reclamation Cost Inflation** | **4,048,260** | **3,698,548** |
| **Present Value Adjustment** | **(1,402,397)** | **(1,283,632)** |
| **Resulting PV Estimate** | **32,756,694** | **30,397,413** |

**Cost of Forfeited Sites Currently in the Reclamation Forfeiture Fund**

An additional step is required when reviewing the financial condition of the Fund. We need to account for the sites included in the inventory of forfeited permits that are currently the responsibility of the Fund. As of December 31st, 2010, all reclamation projects of previously forfeited permits had been substantially completed. However, the cost of the recent Valley Mining forfeitures has an impact on the analysis too.

The RFFAB has estimated the cost of the Valley Mining forfeitures will be paid out at a rate of $0.4 million, $2.2 million, and $3.4 million over the next three years (design and construction costs combined).

**Potential Cost to the Fund from Bond Company Default**

Since the Fund would be responsible for the full cost of reclamation of forfeited sites in the case of an insolvency of a performance security provider, we have attempted to roughly estimate the potential long term cost of this exposure to the Fund. As this has already happened in the past with a number of sites reclaimed by the Fund, this possibility of concurrent permit forfeiture and insurer insolvency is clearly a valid concern. In order for the Fund to be obligated to provide reclamation coverage, there would need to be forfeiture by the permit holder and an insolvency of the bonding company for that permit holder. Bond amounts and account numbers are verified by the bonding company and by the DMRM every five years at renewal.

Typically, the Performance Security provided by the bonding company carries an annual premium for coverage that is irrevocable - even for non-payment of premium. The Fund's exposure to insurer insolvency is typically contained within a period of roughly 12 months rather than across the full life of the permit. The Fund management can require the replacement of a Performance Security provider in the event of an insurer's insolvency. The Ohio Revised Code allows up to 12 months for the operator to replace the coverage provided by an insolvent surety.

Other alternative financial arrangements do not carry a significant default risk. The following summarizes some of the underlying structure of those programs:

- Irrevocable Letters of Credit (LOC) must be issued for a term of 12 months or more and intent to non-renew requires 60-day notice to the DMRM. Verification of validity prior to the expiration date of the LOC and value of the LOC is conducted annually by the DMRM.

- Certificates of Deposit are automatically renewable and held at the Treasurer of the State's office. The amount of required security is verified annually at maturity. The Treasurer's office reports to the DMRM on any issues monthly.
- Cash is held by the Treasurer of State in a separate fund.

If we assume the probability of forfeiture by a permit operator in any one year is the same as selected for our analysis (1.00% in years 2015 through 2019 and 0.37% for all subsequent years, Exhibit 6.2) and the probability of the insolvency of a performance security provider is equal to the two year average default rate in 2011 for US financial institutions and insurance providers (0.57 percent) based on a recent Standard & Poor's study, the combined probability of default of both the permit holder and the provider of performance security for years 2015 - 2019 is 1.00 percent times 0.57 percent, or .0057 percent. When applied to the estimated performance security of the sites included in the Study as provided in the CTS files ($607.7 million), we develop an annual expected cost of approximately $34,333. Applying the same procedure to calculate years 2020 and subsequent, multiplying the 0.37 percent forfeiture rate and 0.57 percent results in 0.0021 percent which is applied to the $607.7 million in performance security. This results in an annual expected cost of $12,700 for years 2020 and subsequent. These expected costs do not appear to be material to the total Fund expected cost.

But it should be noted that, as has actually been previously witnessed, in the event of the situation where both the permit holder AND the performance security provider are unable to meet their obligations with respect to the completion of the reclamation, the actual cost of a provider of performance security to the Fund can be significant and material.

**Reclamation Forfeiture Fund Operating Expenses**

Reclamation Forfeiture Fund operating expenses include various oversight services provided by ODNR-DMRM personnel, travel cost reimbursements of Advisory Board members, external consulting costs, etc. The ODNR-DMRM booked operating expenses of $30,198 for Fund 5310/Reclamation Forfeiture for Fiscal Year 2014, and has booked $29,342 to the Fund through the first nine months of Fiscal Year 2015.

The PSEs that we used to develop our future cost of reclamation estimates already include a 15% mark up for administrative expenses. For our estimates, we have assumed annual expenses of $5,000 for overhead costs not included in the PSEs, a biennial actuarial study at $60,000 per study, spread over two years, and long-term water treatment administrative expense of $10,000. (It should be noted that even though long-term water treatment trusts include operating expenses, our determination of the water treatment costs described below are not based on ODNR-DMRM cost estimates. We therefore

add this additional expense in.) Our estimate therefore assumes the need for a periodic update to this type of analysis, annual water treatment administrative expense, and the need for the Advisory Board to meet periodically to discuss critical issues related to the financial operation of the Fund.

### *Long-Term Water Treatment and Alternative Water Supply*

Currently there are 6 permits determined by ODNR-DMRM to require long-term water treatment. One of these permits, #433, Consolidated Coal Company (Consol), has established a standby trust fund to meet its obligation to cover long-term water treatment liability. The DMRM is monitoring another 4 permitted sites for potential long-term water treatment. The list of monitored sites is continually being updated as new information becomes available. See Exhibits 10.2a and 10.2b for the current listing of sites designated for water treatment or monitoring.

There is limited data on how these potential long-term water treatment sites might develop. In order to determine an estimated liability on current permits, we considered the limited data available in Ohio along with the somewhat broader data base available from our analysis of West Virginia water reclamation liabilities.

In our first approach we consider the average costs per permitted acre separately for water treatment and capital cost (including cost of set up, annual maintenance and abandonment). We developed averages for the Ohio Consol permit and another set of averages based on West Virginia data. The data for the one Ohio permit does not contain sufficient information to make use of our intended exposure measure of permitted acres. (Consol is showing the footprint of acres rather than the permitted number of acres, which may be different than our intended measure.) Since we only have this one data point for Ohio, we selected the West Virginia cost indications to use in our estimates for Ohio. It should be noted that the West Virginia indications are prior to that state having to meet higher NPDES standards (implemented in 2011), since Ohio is not currently subject to those standards. That is, we used 2011 West Virginia indications, reduced by our estimate of the 2011 NPDES standards on that state's water capital and water treatment costs.

We also developed an estimate of permitted acres that will be in future need of long-term water treatment. That estimate is the sum of current permitted acres designated for long-term water treatment and a portion of monitored permitted acres. Our initial estimate of the portion of monitored permitted acres that will become treated permitted acres has been set at 50%. There is limited data to estimate how many of the monitored sites will become treatment sites. The 50% estimate was selected to give a substantial weight to this liability and roughly reflects the judgment of

the ODNR-DMRM as to the number of permits (2) of the current permits (4) on the monitor list that could require long term water treatment.

Since these situations are potentially perpetual in nature, the ODNR-DMRM has settled on a 75 year time horizon to estimate future costs. We also used the 75 year time horizon in our estimates, after considering a three year delay before the first payment activity.

The final piece of the first estimate is to determine a forfeiture rate. There is only a liability to the Fund if the permit is forfeited. We have already selected a 1.00% near term and a 0.37% long term annual forfeiture rates for all permits in Ohio. That annual forfeiture rate was developed from Ohio, Kentucky and West Virginia lifetime forfeiture rates. We selected a lifetime forfeiture rate of 2.21% for permits involving water. Again, there is no data to develop statistical estimates. Our thinking was that the mere involvement of water treatment would lead to potentially catastrophic costs that would greatly increase the probability of forfeiture, thus we selected the 2.21% forfeiture rate (double the Ohio overall historical rate of 1.10%) as a potentially conservative measure.

Our first method of estimating the ultimate liability for long-term water treatment on current permits is then simply the product of the number of permitted acres, the average cost per permitted acre, the number of years for payment, and the probability a forfeiture will occur. This method yielded a long-term water cost of $1.4 million.

Our second estimate is fairly simple. We developed an estimate of the ratio of long-term water cost to land reclamation cost in West Virginia. The West Virginia ratio is approaching 100%. Because West Virginia's water treatment standards were greatly increased recently, beyond what Ohio currently would have to meet, we estimated the relationship of West Virginia's cost of the prior standards to the newer, stricter standards and found that to be roughly 5 percent. Water capital costs under the old West Virginia standards are estimated to be about 25% of what they will be under the new standards. The average relationship in West Virginia, of the old standards to the new standards for water treatment and water capital combined is estimated to be about 15%. Considering these values to define a reasonable range of what might be expected for Ohio, we have selected a conservative ratio of 20% of estimated land costs instead of West Virginia's 100% of estimated land cost, reflecting the fact that Ohio's geology is less likely to develop water issues. Applying the 20% ratio to the average land reclamation cost in Ohio (30.1 million) produces our second estimate for long-term water treatment liabilities of $6.0 million.

Based upon these two methods' estimates of $1.4 million and $6.0 million, we selected a final estimate of $2.25 million. Our selection is down slightly from the previous analysis selection of $2.5 million. We

feel this is appropriate given the minimal amount of activity in setting up water treatment trusts since our last analysis.

We make a final adjustment to the estimate to account for underlying security, primarily in the form of standby trust funds. While these funds are to be set up to cover 100% of the cost of capital and treatment, the operator can spread the funding of standby trusts over five years. In the meantime, the Reclamation Forfeiture Fund provides the remainder of the coverage. The one trust that has already been established is fully funded and presents no liability to the Fund since the trust has a built in mechanism to adjust for shortages over time. Of course, not all permits needing standby trust funds will necessarily have established a trust fund before a forfeiture occurs. In fact, the discovery of the need for water treatment could escalate the probability of forfeiture for permits owned by operators already in economic distress. We selected a 10% credit adjustment factor to apply to our water liability estimate. This adjustment factor will likely increase with time as more of these trusts actually become reality.

It is recognized that permitted acres is not the most desirable estimate for costs. Actual engineering estimates will be much more accurate when they become available, or even basing the projection on an exposure base other than acreage. The flow of contaminated water could be useful, but there will be many assumptions built into estimated treatment costs even then.

Applying the 10% mitigating water trust adjustment factor estimate to the selected $2.25 million estimated expected costs results in a net $2.025 million estimate for long-term water treatment and alternative water supply liabilities. See Exhibit 10.1. As the underlying data for our calculations is very limited and the assumptions made to determine the estimated costs are open to a large range of variation, it is important to note here that final results could in fact deviate substantially from these estimates. The ODNR-DMRM will want to monitor this aspect of the Fund's liability closely and update these estimates as often as practical.

Please note that the above figures for long term water treatment are stated on a basis before inflation and present value are taken into account over the 75 year payout period. After consideration of inflation and present value, the estimated expected cost of $2.025 million becomes $4.4 million. See Exhibit 2.3.

### *Financial Capacity of the Fund*

The capital available to operate the Fund is generated from revenues from the severance tax on the covered permit holders based upon their coal production. As explained in other sections of the report,

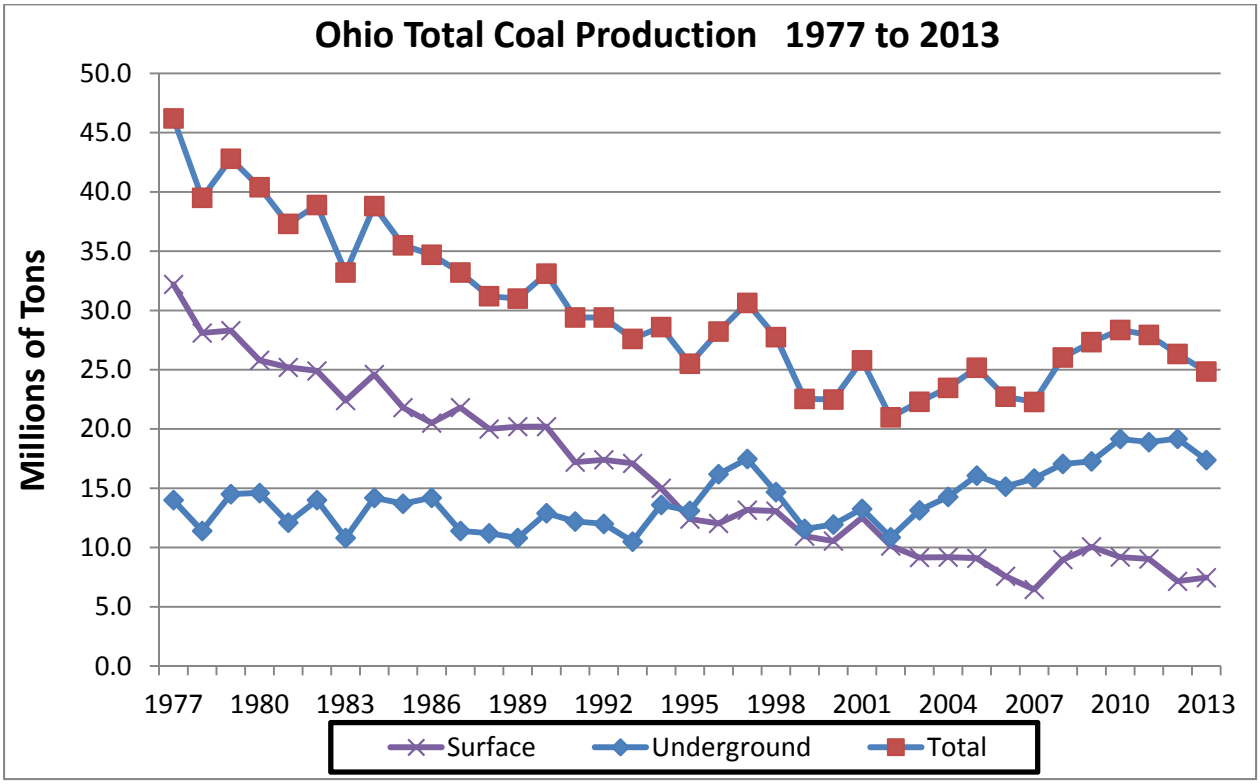
this revenue is not directly related to the liability assumed / forfeiture protection provided by the Fund to the operators nor does it reflect the different financial capacity of each permit holder to fulfill his obligations to complete the land reclamation process. As opposed to an up-front premium payment required by the providers of the underlying private performance security (often to provide security over a single year time horizon) as is provided on "full cost" permits, Ohio's alternative bonding system is comprised of a per acre bond plus a severance tax charged to operators to build capital on an as-you-go basis. The collections from today need to cover the exposure that exists currently from both active mining sites and sites in the process of reclamation as well as potentially provide some additional capital accumulation to cover the current sites in the future.

The dynamic nature of the process whereby portions of the permitted sites move from active mining to phase 1 reclamation to phase 2 reclamation to phase 3 reclamation over time adds a complicating feature to any analysis or comparison of future revenue with either future expected or future potential costs. Any increase in mining operations will result in both an increase in revenue and an increase in potential future cost to the Fund. Similarly, declines in mining operations will result in decreased revenue and decreased exposure to the Fund. Since the Fund retains responsibility for forfeited reclamation projects in the years following the cessation of mining operations, the financial exposure to the Fund remains for a number of years after the revenue to the Fund has ceased.

**Future Coal Production Projection**

Based upon historical coal production figures developed by the Ohio Department of Natural Resources, Division of Geological Survey and provided for our use by the Ohio Department of Natural Resources, we have the historical coal production from surface mining operations and underground mining operations. In the prior review, we used this data to attempt to project coal production into the future and thus the severance tax revenues.

The following chart displays the historical coal production in Ohio.




In our work on another project, we became aware of the "Consensus Coal Production Forecast Report for West Virginia 2014". This report was prepared for the West Virginia Department of Environmental Protection by Christine Rish, Jennifer Shand, and Alicia K. Copley. While this projection is specifically tailored to coal mining in West Virginia, it utilizes economic assumptions with respect to supply and demand related specifically to Northern Appalachia coal. We have developed a projected future annual change in Ohio coal production based upon the changes forecast in Northern Appalachian coal in the Energy Information Administration Annual Energy Outlook 2014 and a study performed by Energy Ventures. We also relied upon the recommendations from the DMRM.

| | Energy Information Agency Northern Appalachia Coal Production | | Energy Ventures Analysis Northern Appalachia Coal Production | | | |
|---|---|---|---|---|---|---|
| Year | Millions of Tons | Index to 2017 | Short Tons Per Miner Hour | Index to 2017 | DMRM Recommendation Index to 2013 | Selected Average Index |
| 2013 | *138.0* | | 3.02 | | 1.0000 | 1.0000 |
| 2014 | 134.2 | | 2.96 | | 0.9000 | 0.9000 |
| 2015 | 132.0 | | 2.90 | | 0.8100 | 0.8100 |
| 2016 | 138.3 | | 2.84 | | 0.8100 | 0.8100 |
| 2017 | 141.4 | 1.0000 | 2.78 | 1.0000 | 0.8100 | 0.8100 |
| 2018 | 145.4 | 1.0283 | 2.72 | 0.9784 | | 0.8289 |
| 2019 | 142.9 | 1.0177 | 2.66 | 0.9568 | | 0.8194 |
| 2020 | 142.6 | 1.0080 | 2.60 | 0.9353 | | 0.8106 |
| 2021 | 145.6 | 1.0296 | 2.57 | 0.9252 | | 0.8255 |
| 2022 | 142.5 | 1.0072 | 2.54 | 0.9151 | | 0.8084 |
| 2023 | 143.2 | 1.0123 | 2.52 | 0.9050 | | 0.8113 |
| 2024 | 144.5 | 1.0216 | 2.49 | 0.8950 | | 0.8172 |
| 2025 | 144.0 | 1.0185 | 2.46 | 0.8849 | | 0.8141 |
| 2026 | 143.7 | 1.0164 | 2.43 | 0.8741 | | 0.8117 |
| 2027 | 141.2 | 0.9982 | 2.40 | 0.8633 | | 0.7976 |
| 2028 | 141.6 | 1.0009 | 2.37 | 0.8525 | | 0.7987 |
| 2029 | 142.1 | 1.0046 | 2.34 | 0.8417 | | 0.8005 |
| 2030 | 144.4 | 1.0209 | 2.31 | 0.8309 | | 0.8115 |
| 2031 | 142.9 | 1.0104 | 2.29 | 0.8245 | | 0.8034 |
| 2032 | 146.0 | 1.0324 | 2.27 | 0.8180 | | 0.8189 |
| 2033 | 147.5 | 1.0428 | 2.26 | 0.8115 | | 0.8259 |
| 2034 | 147.2 | 1.0404 | 2.24 | 0.8050 | | 0.8237 |
| 2035 | 147.5 | 1.0429 | 2.22 | 0.7986 | | 0.8250 |
| 2036 | 146.2 | 1.0336 | 2.20 | 0.7921 | | 0.8176 |
| 2037 | 145.1 | 1.0256 | 2.18 | 0.7856 | | 0.8113 |
| 2038 | 145.8 | 1.0309 | 2.17 | 0.7791 | | 0.8146 |
| 2039 | 145.5 | 1.0288 | 2.15 | 0.7727 | | 0.8126 |
| - | - | - | - | - | | - |
| 2069 | N/A | 1.1423 | N/A | 0.5774 | | 0.8795 |

We have used the average index to develop a projection of future Ohio coal production. In 2013, there were 24.8 million tons of coal mined in the state of Ohio, of which we attribute 22.4 million tons to

operations that participate in the Fund. Based upon the methodology described above, the following table provides the projected future coal production in Ohio for operations under the Fund.

| Ohio RFF Coal Production Projections (in million tons) | | |
|---|---|---|
| **Year** | **Avg. Index** | **Tons** |
| 2014 | 0.9000 | 20.1 |
| 2015 | 0.8100 | 18.1 |
| 2016 | 0.8100 | 18.1 |
| 2017 | 0.8100 | 18.1 |
| 2018 | 0.8289 | 18.5 |
| 2019 | 0.8194 | 18.3 |
| 2020 | 0.8106 | 18.1 |
| 2021 | 0.8255 | 18.5 |
| 2022 | 0.8084 | 18.1 |
| 2023 | 0.8113 | 18.1 |
| 2024 | 0.8172 | 18.3 |
| 2025 | 0.8141 | 18.2 |
| 2026 | 0.8117 | 18.2 |
| 2027 | 0.7976 | 17.8 |
| 2028 | 0.7987 | 17.9 |
| 2029 | 0.8005 | 17.9 |
| 2030 | 0.8115 | 18.1 |
| 2031 | 0.8034 | 18.0 |
| 2032 | 0.8189 | 18.3 |
| 2033 | 0.8259 | 18.5 |
| 2034 | 0.8237 | 18.4 |
| 2035 | 0.8250 | 18.4 |

As in our prior analysis, we feel that this projection is more predictive of the future than the use of an exponential trend of past Ohio coal production.

We caveat these estimates by stating that we assume the demand for coal from Ohio's mines will follow those projected in West Virginia for Northern Appalachia / Steam Coal. These assumptions are less certain the further out in the time horizon one goes. Another important assumption is that the supply of coal is more or less unlimited and thus the revenue to the Fund is not constrained or limited over the time horizon.

The per ton based severance tax rate is predicated upon the Fund balance from the prior year-end according to the following chart:

| Fund Balance | Rate per Ton of Coal |
|---|---|
| Less than $5 Million | $0.16 |
| Between $5 and $10 Million | $0.14 |
| In excess of $10 Million | $0.12 |

The levels of estimated production along with the severance tax rates would generate between $2.1 and $3.3 million in annual operating capital for the Fund. We understand that currently about 90 percent of the current coal extraction is from Fund covered permits and have adjusted our revenue projections to account for this fact.

Based upon the various projections of future coal production provided, we have developed the following table that displays the estimated revenue from the severance tax that would be generated by these production levels with the added assumption that 90% of the coal production is from operators participating in the Fund. We provide the estimates at the three tax rates currently included in the statute.

| OHIO RECLAMATION FORFEITURE FUND ANALYSIS<br>Potential Reclamation Fund Revenue Projection | | | |
|---|---|---|---|
| **Tons (in millions)** | **$0.12** | **$0.14** | **$0.16** |
| 17.0 | 2,040,000 | 2,380,000 | 2,720,000 |
| 17.5 | 2,100,000 | 2,450,000 | 2,800,000 |
| 18.0 | 2,160,000 | 2,520,000 | 2,880,000 |
| 18.5 | 2,220,000 | 2,590,000 | 2,960,000 |
| 19.0 | 2,280,000 | 2,660,000 | 3,040,000 |
| 19.5 | 2,340,000 | 2,730,000 | 3,120,000 |
| 20.0 | 2,400,000 | 2,800,000 | 3,200,000 |
| 20.5 | 2,460,000 | 2,870,000 | 3,280,000 |
| 21.0 | 2,520,000 | 2,940,000 | 3,360,000 |
| 21.5 | 2,580,000 | 3,010,000 | 3,440,000 |

**Current Fund Balance**

The Fund is in the process of collecting the revenue to build up sufficient capital to provide for future potential reclamation projects. The balance in the Fund as of May 2013 was approximately $16.3 million. This capital has increased $8.1 million from the December 2010 balance of $8.2 million.

We note that since June 2010, current reclamation work has been substantially completed on forfeited sites. Thus, a grand majority of the severance tax has been added to the Fund. The Fund balance at the end of December 2014 had risen to $21.4 million.

**Investment Rate of Return**

In addition to the revenue received from the "severance tax", the capital funds will be invested by the State Treasurer in conservative instruments. We note that the Fund's capital is invested along with all of the other State investments and the returns are allocated back to the Reclamation Forfeiture Fund's account. This investment income opportunity should be included in the projection of possible Fund financial levels.

Based upon the current investment situation, we have assumed that the current returns are slightly less than those seen more historically. The investment rates are based upon recent US Treasury Note return rates. The Treasury Notes are sold for 1, 2, 3, 5, 7, 10, 20 and 30 year investment periods. The final selections reflect the recent returns experienced by the Fund. After discussing likely investment returns with the RFFAB, we determined to lengthen the time period it will take the Fund to move to the more favorable return rates projected by the Treasury. We have interpolated the years between the years available. Please see Exhibit 9 for the resulting rates and discount factors used in our analysis.

**Financial Picture – Current Permit Portfolio**

One way to view the financial situation and outlook of a dynamic system is to review such an analysis on a current portfolio run-off basis. While we understand that at times the system has operated on an approach where the revenues of present sites have funded the reclamation of previously forfeited sites, our assignment included the task of measuring the current solvency of the Fund. In most analyses of this type, it is not appropriate to only reflect future income without a reflection of the additional potential liabilities. The current permit portfolio approach attempts to match the current capital and expected revenue from the current sites with the potential and expected costs or future

liabilities from those same sites. This view eliminates the burden of the past being placed upon the future operations.

In this view, we review the financial picture of the system without the complication of adding any new entrants with respect to permits beyond those currently in the Fund as time goes forward. This view allows us to compare the current Fund Balance and estimated future revenue from only the permits currently in the Fund with the estimated expected costs for the same permits over a time horizon from current until all of the permits are anticipated to have completed phase 3 of the reclamation process.

The addition of new permits would add both revenue and potential cost to the system – estimating the impact of that dynamic would rely upon the information in the current analysis – thus not providing additional information. Again, as with any estimation of the future, there are many assumptions made and actual results may vary from the estimated expected results. In the case of the Fund, as is shown, these projected financial results can vary significantly and the differences can be very material.

In our estimation of the expected costs, we have assumed that the active mining operations continue fairly uniformly over a 7 year period of time. This is followed by a 5 year period pending phase 2 release and then a 7 year observation period pending phase 3 release. Any acreage pending phase 1 release with no associated mining is assumed to reach phase 1 release in 3 additional years. Because the probability of forfeiture varies based upon the number of years that we are projecting into the future, the expected cost to the Fund from a site will vary - even between years in the same phase of reclamation.

Exhibit 1 summarizes the revenues and costs associated with current permits that are expected to flow through the Fund through 2092. The tonnage fee revenue is based on the assumption of coal production of 22.4 million tons from the currently issued permits covered by the Fund, changing annually according to the Ohio RFF Coal Production table displayed above, and the associated revenue for the first six years. In the seventh and final year of assumed mining, we assume that coal extraction will be half of the indexed amount or 9.2 million tons from permits currently in-force

We have credited the Fund with investment income on the prior year surplus – this assumes the current revenue is not invested until after the annual costs are paid. Also, investment income is constrained to not less than zero. The reclamation costs are the expected reclamation costs from Exhibit 2.1. Please note that we have assumed ongoing operating expenses to be $10,000 in the next few years to cover general overhead not included in the land reclamation cost estimates, and another $10,000 for the next 75 years for water treatment expenses not already included in the water treatment reclamation costs.

As can be seen in Exhibit 1, the recent Fund balance of $21.4 million could decrease to $5.0 million in the next 75 to 78 years. This figure is on a present value basis, which is a relatively important consideration given the long time horizon associated with water treatment liabilities.

**Alternative Approach**

One other way of approaching the issue of capital and solvency would be to determine how many additional years with no permit holder forfeitures would be needed to generate sufficient capital to fund the reclamation of various permit holders. For purpose of explanation, we have developed these estimates at four levels based upon expected permit cost:

- the median permit holder,
- the average permit holder value,
- the 5th largest, and
- the largest permit holder.

With this approach, we have utilized the total annual coal production and assumed on-going operating expenses as described above and no on-going reclamation projects. Please see Exhibit 1 – Alternative for the details in the cash flow analysis.

**Number of Years with No Forfeitures Needed to Accumulate Capital to Cover the Forfeiture of a Permit Holder**

| Permit Holder Size | Net Adjusted PSE | Years from 2014 |
|---|---|---|
| Median | 2,051,190 | 0 |
| Average | 20,481,541 | 0 |
| 5th Largest | 17,400,910 | 0 |
| Largest | 233,515,057 | over 100 |

These estimates are before inclusion of otherwise expected land reclamation and water treatment liability. Making this adjustment would add several more years to the last three estimates in the table above.

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

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**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 1**
**Cash Flow**
(all figures discounted to present value)

| Calendar Year | Tonnage Fee | Interest Income | Land Reclamation | Water Reclamation | Operating Expense | Fund Balance |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2014 | | | | | | 21,384,886 |
| 2015 | 2,169,000 | 58,345 | 443,639 | 0 | 35,000 | 23,133,592 |
| 2016 | 2,164,000 | 62,716 | 2,224,320 | 0 | 35,000 | 23,100,988 |
| 2017 | 2,152,000 | 134,114 | 3,420,833 | 0 | 35,000 | 21,931,269 |
| 2018 | 2,187,000 | 127,011 | 3,603,338 | 27,802 | 45,000 | 20,569,141 |
| 2019 | 2,144,000 | 188,053 | 3,852,318 | 28,452 | 45,000 | 18,975,423 |
| 2020 | 2,102,000 | 172,486 | 4,085,952 | 29,188 | 45,000 | 17,089,768 |
| 2021 | 1,062,000 | 190,539 | 4,102,107 | 29,945 | 45,000 | 14,165,257 |
| 2022 | 0 | 151,462 | 4,218,522 | 30,794 | 45,000 | 10,022,403 |
| 2023 | 0 | 128,169 | 1,081,560 | 31,593 | 45,000 | 8,992,419 |
| 2024 | 0 | 113,444 | 1,109,620 | 32,413 | 45,000 | 7,918,829 |
| 2025 | 0 | 110,593 | 384,631 | 33,198 | 45,000 | 7,566,593 |
| 2026 | 0 | 105,402 | 370,740 | 33,996 | 45,000 | 7,222,259 |
| 2027 | 0 | 108,425 | 379,087 | 34,761 | 45,000 | 6,871,835 |
| 2028 | 0 | 103,179 | 387,508 | 35,533 | 45,000 | 6,506,972 |
| 2029 | 0 | 98,198 | 395,960 | 36,308 | 45,000 | 6,127,902 |
| 2030 | 0 | 92,364 | 47,862 | 37,089 | 45,000 | 6,090,315 |
| 2031 | 0 | 91,633 | 48,877 | 37,876 | 45,000 | 6,050,195 |
| 2032 | 0 | 90,816 | 49,899 | 38,668 | 45,000 | 6,007,443 |
| 2033 | 0 | 90,377 | 46,267 | 39,461 | 45,000 | 5,967,092 |
| 2034 | 0 | 89,444 | 47,202 | 40,258 | 45,000 | 5,924,075 |
| 2035 | 0 | 89,751 | 48,128 | 41,048 | 45,000 | 5,879,650 |
| 2036 | 0 | 89,898 | 49,043 | 41,828 | 45,000 | 5,833,678 |
| 2037 | 0 | 89,888 | 0 | 42,598 | 10,000 | 5,870,968 |
| 2038 | 0 | 91,038 | 0 | 43,357 | 10,000 | 5,908,649 |
| 2039 | 0 | 92,081 | 0 | 44,103 | 10,000 | 5,946,627 |
| 2040 | 0 | 93,016 | 0 | 44,836 | 10,000 | 5,984,806 |
| 2041 | 0 | 93,841 | 0 | 45,555 | 10,000 | 6,023,093 |
| 2042 | 0 | 94,554 | 0 | 46,257 | 10,000 | 6,061,389 |
| 2043 | 0 | 95,154 | 0 | 46,943 | 10,000 | 6,099,600 |
| 2044 | 0 | 95,642 | 0 | 47,612 | 10,000 | 6,137,630 |
| 2045 | 0 | 94,915 | 0 | 48,836 | 10,000 | 6,173,710 |
| 2046 | 0 | 93,108 | 0 | 49,531 | 10,000 | 6,207,287 |
| 2047 | 0 | 91,296 | 0 | 50,236 | 10,000 | 6,238,347 |
| 2048 | 0 | 89,480 | 0 | 50,952 | 10,000 | 6,266,875 |
| 2049 | 0 | 87,662 | 0 | 51,677 | 10,000 | 6,292,860 |
| 2050 | 0 | 85,845 | 0 | 52,413 | 10,000 | 6,316,293 |
| 2051 | 0 | 84,031 | 0 | 53,159 | 10,000 | 6,337,164 |
| 2052 | 0 | 82,220 | 0 | 53,916 | 10,000 | 6,355,468 |
| 2053 | 0 | 80,415 | 0 | 54,684 | 10,000 | 6,371,199 |
| 2054 | 0 | 78,617 | 0 | 55,462 | 10,000 | 6,384,354 |
| 2055 | 0 | 76,828 | 0 | 56,252 | 10,000 | 6,394,930 |
| 2056 | 0 | 75,049 | 0 | 57,053 | 10,000 | 6,402,926 |
| 2057 | 0 | 73,281 | 0 | 57,865 | 10,000 | 6,408,342 |
| 2058 | 0 | 71,527 | 0 | 58,689 | 10,000 | 6,411,180 |
| 2059 | 0 | 69,786 | 0 | 59,525 | 10,000 | 6,411,441 |
| 2060 | 0 | 68,060 | 0 | 60,372 | 10,000 | 6,409,129 |
| 2061 | 0 | 66,350 | 0 | 61,232 | 10,000 | 6,404,247 |
| 2062 | 0 | 64,657 | 0 | 62,104 | 10,000 | 6,396,800 |
| 2063 | 0 | 62,982 | 0 | 62,988 | 10,000 | 6,386,795 |
| 2064 | 0 | 61,326 | 0 | 63,885 | 10,000 | 6,374,236 |
| 2065 | 0 | 59,689 | 0 | 64,794 | 10,000 | 6,359,131 |
| 2066 | 0 | 58,073 | 0 | 65,717 | 10,000 | 6,341,487 |
| 2067 | 0 | 56,477 | 0 | 66,653 | 10,000 | 6,321,311 |
| 2068 | 0 | 54,903 | 0 | 67,602 | 10,000 | 6,298,612 |

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 1**
**Cash Flow**
(all figures discounted to present value)

| Calendar Year | Tonnage Fee | Interest Income | Land Reclamation | Water Reclamation | Operating Expense | Fund Balance |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2069 | 0 | 53,351 | 0 | 68,564 | 10,000 | 6,273,399 |
| 2070 | 0 | 51,821 | 0 | 69,541 | 10,000 | 6,245,679 |
| 2071 | 0 | 50,314 | 0 | 70,531 | 10,000 | 6,215,463 |
| 2072 | 0 | 48,830 | 0 | 71,535 | 10,000 | 6,182,758 |
| 2073 | 0 | 47,370 | 0 | 72,553 | 10,000 | 6,147,575 |
| 2074 | 0 | 45,934 | 0 | 73,586 | 10,000 | 6,109,922 |
| 2075 | 0 | 44,522 | 0 | 74,634 | 10,000 | 6,069,810 |
| 2076 | 0 | 43,134 | 0 | 75,697 | 10,000 | 6,027,246 |
| 2077 | 0 | 41,770 | 0 | 76,775 | 10,000 | 5,982,242 |
| 2078 | 0 | 40,432 | 0 | 77,868 | 10,000 | 5,934,806 |
| 2079 | 0 | 39,117 | 0 | 78,977 | 10,000 | 5,884,946 |
| 2080 | 0 | 37,828 | 0 | 80,101 | 10,000 | 5,832,673 |
| 2081 | 0 | 36,563 | 0 | 81,242 | 10,000 | 5,777,995 |
| 2082 | 0 | 35,323 | 0 | 82,398 | 10,000 | 5,720,920 |
| 2083 | 0 | 34,108 | 0 | 83,572 | 10,000 | 5,661,456 |
| 2084 | 0 | 32,917 | 0 | 84,761 | 10,000 | 5,599,612 |
| 2085 | 0 | 31,751 | 0 | 85,968 | 10,000 | 5,535,395 |
| 2086 | 0 | 30,610 | 0 | 87,192 | 10,000 | 5,468,812 |
| 2087 | 0 | 29,492 | 0 | 88,434 | 10,000 | 5,399,871 |
| 2088 | 0 | 28,399 | 0 | 89,693 | 10,000 | 5,328,577 |
| 2089 | 0 | 27,330 | 0 | 90,970 | 10,000 | 5,254,937 |
| 2090 | 0 | 26,285 | 0 | 92,265 | 10,000 | 5,178,956 |
| 2091 | 0 | 25,263 | 0 | 93,579 | 10,000 | 5,100,640 |
| 2092 | 0 | 24,265 | 0 | 94,911 | 10,000 | 5,019,994 |
| Total | 13,980,000 | 5,924,941 | 30,397,413 | 4,352,420 | 1,520,000 | |

**Coal Extraction Fee**

| Fund Balance | Rate |
|---|---|
| < $5M | 0.16 |
| $5M - $10M | 0.14 |
| > $10M | 0.12 |

Footnotes:

All columns shown at present value, based on Exhibit 9, Investment Rates

(1) Based on coal production from the Ohio Department of Natural Resources, Division of Geological Survey.
Future production forecast based on the report "Consensus Coal Production Forecast Report for West Virginia 2014".
The per ton coal extraction fee is predicated upon the prior year Fund Balance in column (6) according to the chart at the bottom of the second page, titled Coal Extraction Fee.
Active mining continues for seven years, with the seventh year coal production being half the prior year. See Exhibit 3.1.

(2) [Prior year Col (6) x Exhibit 9 Col (1)] + [Col (1) / 2 x Exhibit 9 Col (1)]. Years 2045 and subsequent based on 2.540% discount factor

(3) Exhibit 2.1 Col (2).

(4) Exhibit 2.1 Col (4).

(5) Based on discussion with client. Inflation and discount rates assumed to offset.
Majority of expense for land reclamation, based on 15% load in PSEs. Others include:

| | | |
|---|---|---|
| Overhead $5,000 | Actuarial/2 yrs $60,000 | Water Treatment $10,000 |

(6) Year 2014 client provided data. Subsequent years = prior year col (6) + Col (1) + Col (2) - Col (3) - Col (4) - Col (5)

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 1 - Alternative**
**Cash Flow - Number of Years to Accumulate Capital to Cover a Forfeiture**
(all figures discounted to present value)

| Calendar Year | Tonnage Fee | Interest Income | Land Reclamation | Water Reclamation | Operating Expense | Fund Balance |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2014 | | | | | | 21,384,886 |
| 2015 | 2,169,000 | 58,345 | 443,639 | 0 | 35,000 | 23,133,592 |
| 2016 | 2,164,000 | 62,716 | 2,224,320 | 0 | 35,000 | 23,100,988 |
| 2017 | 2,152,000 | 134,114 | 3,420,833 | 0 | 35,000 | 21,931,269 |
| 2018 | 2,187,000 | 127,011 | 0 | 0 | 45,000 | 24,200,280 |
| 2019 | 2,144,000 | 219,606 | 0 | 0 | 45,000 | 26,518,886 |
| 2020 | 2,102,000 | 237,458 | 0 | 0 | 45,000 | 28,813,344 |
| 2021 | 2,124,000 | 323,052 | 0 | 0 | 45,000 | 31,215,397 |
| 2022 | 2,055,000 | 344,758 | 0 | 0 | 45,000 | 33,570,154 |
| 2023 | 2,027,000 | 442,266 | 0 | 0 | 45,000 | 35,994,421 |
| 2024 | 2,022,000 | 466,841 | 0 | 0 | 45,000 | 38,438,261 |
| 2025 | 1,981,000 | 550,655 | 0 | 0 | 45,000 | 40,924,916 |
| 2026 | 1,950,000 | 583,661 | 0 | 0 | 45,000 | 43,413,577 |
| 2027 | 1,875,000 | 665,824 | 0 | 0 | 45,000 | 45,909,401 |
| 2028 | 1,854,000 | 703,235 | 0 | 0 | 45,000 | 48,421,636 |
| 2029 | 1,821,000 | 744,483 | 0 | 0 | 45,000 | 50,942,119 |
| 2030 | 1,809,000 | 781,472 | 0 | 0 | 45,000 | 53,487,592 |
| 2031 | 1,766,000 | 818,047 | 0 | 0 | 45,000 | 56,026,639 |
| 2032 | 1,763,000 | 854,213 | 0 | 0 | 45,000 | 58,598,851 |
| 2033 | 1,749,000 | 894,724 | 0 | 0 | 45,000 | 61,197,575 |
| 2034 | 1,706,000 | 930,114 | 0 | 0 | 45,000 | 63,788,688 |
| 2035 | 1,673,000 | 979,084 | 0 | 0 | 45,000 | 66,395,773 |
| 2036 | 1,630,000 | 1,027,635 | 0 | 0 | 45,000 | 69,008,408 |
| 2037 | 1,579,000 | 1,075,475 | 0 | 0 | 10,000 | 71,652,883 |
| 2038 | 1,553,000 | 1,123,123 | 0 | 0 | 10,000 | 74,319,006 |
| 2039 | 1,519,000 | 1,170,035 | 0 | 0 | 10,000 | 76,998,041 |
| 2040 | 1,526,000 | 1,216,325 | 0 | 0 | 10,000 | 79,730,366 |
| 2041 | 1,499,000 | 1,261,911 | 0 | 0 | 10,000 | 82,481,276 |
| 2042 | 1,463,000 | 1,306,321 | 0 | 0 | 10,000 | 85,240,597 |
| 2043 | 1,428,000 | 1,349,355 | 0 | 0 | 10,000 | 88,007,952 |
| 2044 | 1,400,000 | 1,390,940 | 0 | 0 | 10,000 | 90,788,892 |
| 2045 | 1,381,000 | 1,414,681 | 0 | 0 | 10,000 | 93,574,573 |
| 2046 | 1,347,000 | 1,421,394 | 0 | 0 | 10,000 | 96,332,968 |
| 2047 | 1,313,000 | 1,426,505 | 0 | 0 | 10,000 | 99,062,472 |
| 2048 | 1,288,000 | 1,430,141 | 0 | 0 | 10,000 | 101,770,613 |
| 2049 | 1,256,000 | 1,432,373 | 0 | 0 | 10,000 | 104,448,986 |
| 2050 | 1,225,000 | 1,433,218 | 0 | 0 | 10,000 | 107,097,204 |
| 2051 | 1,200,000 | 1,432,781 | 0 | 0 | 10,000 | 109,719,986 |
| 2052 | 1,171,000 | 1,431,131 | 0 | 0 | 10,000 | 112,312,116 |
| 2053 | 1,142,000 | 1,428,295 | 0 | 0 | 10,000 | 114,872,411 |
| 2054 | 1,119,000 | 1,424,365 | 0 | 0 | 10,000 | 117,405,776 |
| 2055 | 1,092,000 | 1,419,406 | 0 | 0 | 10,000 | 119,907,182 |
| 2056 | 1,065,000 | 1,413,444 | 0 | 0 | 10,000 | 122,375,626 |
| 2057 | 1,044,000 | 1,406,563 | 0 | 0 | 10,000 | 124,816,189 |
| 2058 | 1,018,000 | 1,398,816 | 0 | 0 | 10,000 | 127,223,005 |
| 2059 | 993,000 | 1,390,228 | 0 | 0 | 10,000 | 129,596,233 |
| 2060 | 973,000 | 1,380,878 | 0 | 0 | 10,000 | 131,940,111 |
| 2061 | 949,000 | 1,370,813 | 0 | 0 | 10,000 | 134,249,924 |
| 2062 | 925,000 | 1,360,056 | 0 | 0 | 10,000 | 136,524,980 |
| 2063 | 907,000 | 1,348,677 | 0 | 0 | 10,000 | 138,770,657 |
| 2064 | 885,000 | 1,336,727 | 0 | 0 | 10,000 | 140,982,384 |
| 2065 | 863,000 | 1,324,223 | 0 | 0 | 10,000 | 143,159,607 |
| 2066 | 846,000 | 1,311,226 | 0 | 0 | 10,000 | 145,306,833 |
| 2067 | 825,000 | 1,297,776 | 0 | 0 | 10,000 | 147,419,609 |
| 2068 | 804,000 | 1,283,888 | 0 | 0 | 10,000 | 149,497,497 |

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 1 - Alternative**
**Cash Flow - Number of Years to Accumulate Capital to Cover a Forfeiture**
(all figures discounted to present value)

| Calendar Year | Tonnage Fee | Interest Income | Land Reclamation | Water Reclamation | Operating Expense | Fund Balance |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2069 | 788,000 | 1,269,617 | 0 | 0 | 10,000 | 151,545,114 |
| 2070 | 769,000 | 1,255,004 | 0 | 0 | 10,000 | 153,559,117 |
| 2071 | 750,000 | 1,240,064 | 0 | 0 | 10,000 | 155,539,181 |
| 2072 | 735,000 | 1,224,844 | 0 | 0 | 10,000 | 157,489,025 |
| 2073 | 717,000 | 1,209,373 | 0 | 0 | 10,000 | 159,405,398 |
| 2074 | 699,000 | 1,193,668 | 0 | 0 | 10,000 | 161,288,066 |
| 2075 | 685,000 | 1,177,767 | 0 | 0 | 10,000 | 163,140,833 |
| 2076 | 668,000 | 1,161,699 | 0 | 0 | 10,000 | 164,960,532 |
| 2077 | 655,000 | 1,145,488 | 0 | 0 | 10,000 | 166,751,020 |
| 2078 | 639,000 | 1,129,161 | 0 | 0 | 10,000 | 168,509,181 |
| 2079 | 623,000 | 1,112,726 | 0 | 0 | 10,000 | 170,234,907 |
| 2080 | 610,000 | 1,096,214 | 0 | 0 | 10,000 | 171,931,121 |
| 2081 | 595,000 | 1,079,646 | 0 | 0 | 10,000 | 173,595,767 |
| 2082 | 581,000 | 1,063,036 | 0 | 0 | 10,000 | 175,229,803 |
| 2083 | 569,000 | 1,046,410 | 0 | 0 | 10,000 | 176,835,214 |
| 2084 | 555,000 | 1,029,783 | 0 | 0 | 10,000 | 178,409,997 |
| 2085 | 544,000 | 1,013,173 | 0 | 0 | 10,000 | 179,957,170 |
| 2086 | 530,000 | 996,593 | 0 | 0 | 10,000 | 181,473,763 |
| 2087 | 517,000 | 980,050 | 0 | 0 | 10,000 | 182,960,813 |
| 2088 | 507,000 | 963,568 | 0 | 0 | 10,000 | 184,421,380 |
| 2089 | 494,000 | 947,157 | 0 | 0 | 10,000 | 185,852,538 |
| 2090 | 484,000 | 930,829 | 0 | 0 | 10,000 | 187,257,367 |
| 2091 | 472,000 | 914,595 | 0 | 0 | 10,000 | 188,633,962 |
| 2092 | 461,000 | 898,462 | 0 | 0 | 10,000 | 189,983,424 |
| **2144** | 140,000 | 299,671 | 0 | 0 | 0 | 232,508,204 |
| **2145** | 136,000 | 292,799 | 0 | 0 | 0 | 232,937,003 |
| **2146** | 133,000 | 286,071 | 0 | 0 | 0 | 233,356,073 |
| **2147** | 130,000 | 279,484 | 0 | 0 | 0 | 233,765,558 |
| **2148** | 127,000 | 273,038 | 0 | 0 | 0 | 234,165,595 |
| Total | 110,728,000 | 114,096,622 | 6,088,791 | 0 | 1,520,000 | |

**Coal Extraction Fee**

| Fund Balance | Rate |
|---|---|
| < $5M | 0.16 |
| $5M - $10M | 0.14 |
| > $10M | 0.12 |

**Number of Years with No Forfeitures Needed to Accumulate Capital to Cover the Forfeiture of a Permit Holder**

| Permit Holder Size | Net Adjusted PSE | Years from 2014 |
|---|---|---|
| Median | 2,051,190 | 0 |
| Average | 20,481,541 | 0 |
| 5th Largest | 17,400,910 | 0 |
| Largest | 233,515,057 | 133 |

**Number of Years with No Forfeitures Needed to Accumulate Capital to Cover the Forfeiture of a Permit Holder and otherwise expected land and water reclamations costs**

| Permit Holder Size | Net Adjusted PSE | Years from 2014 |
|---|---|---|
| Median | 36,801,023 | 10 |
| Average | 55,231,374 | 17 |
| 5th Largest | 52,150,743 | 16 |
| Largest | 268,264,890 | Over 150 |

Footnotes:

All columns shown at present value, based on Exhibit 9, Investment Rates

(1) Based on coal production from the Ohio Department of Natural Resources, Division of Geological Survey. Future production forecast based on the report "Consensus Coal Production Forecast Report for West Virginia 2014". The per ton coal extraction fee is predicated upon the prior year Fund Balance in column (6) according to the chart at the bottom of the second page, titled Coal Extraction Fee.

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 1 - Alternative**
**Cash Flow - Number of Years to Accumulate Capital to Cover a Forfeiture**
(all figures discounted to present value)

| Calendar Year | Tonnage Fee | Interest Income | Land Reclamation | Water Reclamation | Operating Expense | Fund Balance |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |

(2) [Prior year Col (6) x Exhibit 9 Col (1)] + [Col (1) / 2 x Exhibit 9 Col (1)]. Years 2045 and subsequent based on 2.540% discount factor
(3) Years 2015-2017 reflect Valley Mining Payments.
(4) Assume no losses
(5) Based on discussion with client. Inflation and discount rates assumed to offset.
(6) Year 2014 client provided data. Subsequent years = prior year col (6) + Col (1) + Col (2) - Col (3) - Col (4) - Col (5)

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 1 - Shock Loss**
**Cash Flow - Shock Loss Scenario with 5 Year Spread**
(all figures discounted to present value)

| Calendar Year | Tonnage Fee | Interest Income | Land Reclamation | Water Reclamation | Operating Expense | Fund Balance |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2014 | | | | | | 21,384,886 |
| 2015 | 2,169,000 | 58,345 | 443,639 | 0 | 35,000 | 23,133,592 |
| 2016 | 2,164,000 | 62,716 | 2,224,320 | 0 | 35,000 | 23,100,988 |
| 2017 | 2,152,000 | 134,114 | 3,420,833 | 0 | 35,000 | 21,931,269 |
| 2018 | 2,187,000 | 127,011 | **7,699,646** | 27,802 | 45,000 | 16,472,832 |
| 2019 | 2,144,000 | 152,458 | **7,948,627** | 28,452 | 45,000 | 10,747,211 |
| 2020 | 2,102,000 | 101,617 | **8,182,260** | 29,188 | 45,000 | 4,694,380 |
| 2021 | 1,416,000 | 58,418 | **8,198,415** | 29,945 | 45,000 | (2,104,562) |
| 2022 | 0 | 0 | **8,314,830** | 30,794 | 45,000 | (10,495,186) |
| 2023 | 0 | 0 | 1,081,560 | 31,593 | 45,000 | (11,653,339) |
| 2024 | 0 | 0 | 1,109,620 | 32,413 | 45,000 | (12,840,373) |
| 2025 | 0 | 0 | 384,631 | 33,198 | 45,000 | (13,303,202) |
| 2026 | 0 | 0 | 370,740 | 33,996 | 45,000 | (13,752,938) |
| 2027 | 0 | 0 | 379,087 | 34,761 | 45,000 | (14,211,786) |
| 2028 | 0 | 0 | 387,508 | 35,533 | 45,000 | (14,679,828) |
| 2029 | 0 | 0 | 395,960 | 36,308 | 45,000 | (15,157,097) |
| 2030 | 0 | 0 | 47,862 | 37,089 | 45,000 | (15,287,048) |
| 2031 | 0 | 0 | 48,877 | 37,876 | 45,000 | (15,418,802) |
| 2032 | 0 | 0 | 49,899 | 38,668 | 45,000 | (15,552,369) |
| 2033 | 0 | 0 | 46,267 | 39,461 | 45,000 | (15,683,097) |
| 2034 | 0 | 0 | 47,202 | 40,258 | 45,000 | (15,815,558) |
| 2035 | 0 | 0 | 48,128 | 41,048 | 45,000 | (15,949,734) |
| 2036 | 0 | 0 | 49,043 | 41,828 | 45,000 | (16,085,604) |
| 2037 | 0 | 0 | 0 | 42,598 | 10,000 | (16,138,203) |
| 2038 | 0 | 0 | 0 | 43,357 | 10,000 | (16,191,559) |
| 2039 | 0 | 0 | 0 | 44,103 | 10,000 | (16,245,663) |
| 2040 | 0 | 0 | 0 | 44,836 | 10,000 | (16,300,499) |
| 2041 | 0 | 0 | 0 | 45,555 | 10,000 | (16,356,053) |
| 2042 | 0 | 0 | 0 | 46,257 | 10,000 | (16,412,311) |
| 2043 | 0 | 0 | 0 | 46,943 | 10,000 | (16,469,254) |
| 2044 | 0 | 0 | 0 | 47,612 | 10,000 | (16,526,866) |
| 2045 | 0 | 0 | 0 | 48,836 | 10,000 | (16,585,702) |
| 2046 | 0 | 0 | 0 | 49,531 | 10,000 | (16,645,233) |
| 2047 | 0 | 0 | 0 | 50,236 | 10,000 | (16,705,469) |
| 2048 | 0 | 0 | 0 | 50,952 | 10,000 | (16,766,420) |
| 2049 | 0 | 0 | 0 | 51,677 | 10,000 | (16,828,098) |
| 2050 | 0 | 0 | 0 | 52,413 | 10,000 | (16,890,510) |
| 2051 | 0 | 0 | 0 | 53,159 | 10,000 | (16,953,669) |
| 2052 | 0 | 0 | 0 | 53,916 | 10,000 | (17,017,585) |
| 2053 | 0 | 0 | 0 | 54,684 | 10,000 | (17,082,269) |
| 2054 | 0 | 0 | 0 | 55,462 | 10,000 | (17,147,731) |
| 2055 | 0 | 0 | 0 | 56,252 | 10,000 | (17,213,983) |
| 2056 | 0 | 0 | 0 | 57,053 | 10,000 | (17,281,036) |
| 2057 | 0 | 0 | 0 | 57,865 | 10,000 | (17,348,901) |
| 2058 | 0 | 0 | 0 | 58,689 | 10,000 | (17,417,591) |
| 2059 | 0 | 0 | 0 | 59,525 | 10,000 | (17,487,115) |
| 2060 | 0 | 0 | 0 | 60,372 | 10,000 | (17,557,488) |
| 2061 | 0 | 0 | 0 | 61,232 | 10,000 | (17,628,719) |
| 2062 | 0 | 0 | 0 | 62,104 | 10,000 | (17,700,823) |
| 2063 | 0 | 0 | 0 | 62,988 | 10,000 | (17,773,811) |
| 2064 | 0 | 0 | 0 | 63,885 | 10,000 | (17,847,696) |
| 2065 | 0 | 0 | 0 | 64,794 | 10,000 | (17,922,491) |
| 2066 | 0 | 0 | 0 | 65,717 | 10,000 | (17,998,208) |
| 2067 | 0 | 0 | 0 | 66,653 | 10,000 | (18,074,860) |
| 2068 | 0 | 0 | 0 | 67,602 | 10,000 | (18,152,462) |

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 1 - Shock Loss**
**Cash Flow - Shock Loss Scenario with 5 Year Spread**
(all figures discounted to present value)

| Calendar Year | Tonnage Fee | Interest Income | Land Reclamation | Water Reclamation | Operating Expense | Fund Balance |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2069 | 0 | 0 | 0 | 68,564 | 10,000 | (18,231,026) |
| 2070 | 0 | 0 | 0 | 69,541 | 10,000 | (18,310,567) |
| 2071 | 0 | 0 | 0 | 70,531 | 10,000 | (18,391,098) |
| 2072 | 0 | 0 | 0 | 71,535 | 10,000 | (18,472,632) |
| 2073 | 0 | 0 | 0 | 72,553 | 10,000 | (18,555,186) |
| 2074 | 0 | 0 | 0 | 73,586 | 10,000 | (18,638,772) |
| 2075 | 0 | 0 | 0 | 74,634 | 10,000 | (18,723,407) |
| 2076 | 0 | 0 | 0 | 75,697 | 10,000 | (18,809,104) |
| 2077 | 0 | 0 | 0 | 76,775 | 10,000 | (18,895,878) |
| 2078 | 0 | 0 | 0 | 77,868 | 10,000 | (18,983,746) |
| 2079 | 0 | 0 | 0 | 78,977 | 10,000 | (19,072,723) |
| 2080 | 0 | 0 | 0 | 80,101 | 10,000 | (19,162,824) |
| 2081 | 0 | 0 | 0 | 81,242 | 10,000 | (19,254,065) |
| 2082 | 0 | 0 | 0 | 82,398 | 10,000 | (19,346,464) |
| 2083 | 0 | 0 | 0 | 83,572 | 10,000 | (19,440,035) |
| 2084 | 0 | 0 | 0 | 84,761 | 10,000 | (19,534,797) |
| 2085 | 0 | 0 | 0 | 85,968 | 10,000 | (19,630,765) |
| 2086 | 0 | 0 | 0 | 87,192 | 10,000 | (19,727,957) |
| 2087 | 0 | 0 | 0 | 88,434 | 10,000 | (19,826,391) |
| 2088 | 0 | 0 | 0 | 89,693 | 10,000 | (19,926,084) |
| 2089 | 0 | 0 | 0 | 90,970 | 10,000 | (20,027,054) |
| 2090 | 0 | 0 | 0 | 92,265 | 10,000 | (20,129,319) |
| 2091 | 0 | 0 | 0 | 93,579 | 10,000 | (20,232,898) |
| 2092 | 0 | 0 | 0 | 94,911 | 10,000 | (20,337,810) |
| Total | 14,334,000 | 694,678 | 50,878,954 | 4,352,420 | 1,520,000 | |

**Coal Extraction Fee**

| Fund Balance | Rate |
|---|---|
| < $5M | 0.16 |
| $5M - $10M | 0.14 |
| > $10M | 0.12 |

Footnotes:

All columns shown at present value, based on Exhibit 9, Investment Rates

(1) Based on coal production from the Ohio Department of Natural Resources, Division of Geological Survey.
Future production forecast based on the report "Consensus Coal Production Forecast Report for West Virginia 2014".
The per ton coal extraction fee is predicated upon the prior year Fund Balance in column (6) according to the chart at the bottom of the second page, titled Coal Extraction Fee.
Active mining continues for seven years, with the seventh year coal production being half the prior year. See Exhibit 3.1.

(2) [Prior year Col (6) x Exhibit 9 Col (1)] + [Col (1) / 2 x Exhibit 9 Col (1)]. Years 2045 and subsequent based on 2.540% discount factor

(3) Exhibit 2.1 Col (2).
* In addition, Years 2018-2022 include a shock loss of $20,481,541, derived in Exhibit 8.1b Col (3), spread evenly over five years.

(4) Exhibit 2.1 Col (4).

(5) Based on discussion with client. Inflation and discount rates assumed to offset.

(6) Year 2014 client provided data. Subsequent years = prior year col (6) + Col (1) + Col (2) - Col (3) - Col (4) - Col (5)

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 2.1**
**Total Expenditures**

| Calendar | Land Reclamation | | Water Reclamation | | | | |
|---|---|---|---|---|---|---|---|
| Year | Gross | Net | Gross | Net | Operating Expense | Gross Total | Net Total |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 2014 | | | | | | 0 | 0 |
| 2015 | 443,639 | 443,639 | 0 | 0 | 35,000 | 478,639 | 478,639 |
| 2016 | 2,224,320 | 2,224,320 | 0 | 0 | 35,000 | 2,259,320 | 2,259,320 |
| 2017 | 3,420,833 | 3,420,833 | 0 | 0 | 35,000 | 3,455,833 | 3,455,833 |
| 2018 | 3,959,674 | 3,603,338 | 30,891 | 27,802 | 45,000 | 4,035,565 | 3,676,140 |
| 2019 | 4,233,456 | 3,852,318 | 31,614 | 28,452 | 45,000 | 4,310,070 | 3,925,771 |
| 2020 | 4,484,544 | 4,085,952 | 32,432 | 29,188 | 45,000 | 4,561,976 | 4,160,141 |
| 2021 | 4,500,627 | 4,102,107 | 33,272 | 29,945 | 45,000 | 4,578,898 | 4,177,051 |
| 2022 | 4,628,351 | 4,218,522 | 34,216 | 30,794 | 45,000 | 4,707,567 | 4,294,316 |
| 2023 | 1,182,249 | 1,081,560 | 35,104 | 31,593 | 45,000 | 1,262,352 | 1,158,153 |
| 2024 | 1,212,922 | 1,109,620 | 36,014 | 32,413 | 45,000 | 1,293,936 | 1,187,033 |
| 2025 | 421,212 | 384,631 | 36,887 | 33,198 | 45,000 | 503,099 | 462,829 |
| 2026 | 405,519 | 370,740 | 37,773 | 33,996 | 45,000 | 488,292 | 449,736 |
| 2027 | 414,649 | 379,087 | 38,624 | 34,761 | 45,000 | 498,272 | 458,849 |
| 2028 | 423,860 | 387,508 | 39,482 | 35,533 | 45,000 | 508,341 | 468,042 |
| 2029 | 433,105 | 395,960 | 40,343 | 36,308 | 45,000 | 518,447 | 477,269 |
| 2030 | 52,250 | 47,862 | 41,210 | 37,089 | 45,000 | 138,461 | 129,952 |
| 2031 | 53,359 | 48,877 | 42,085 | 37,876 | 45,000 | 140,443 | 131,753 |
| 2032 | 54,474 | 49,899 | 42,964 | 38,668 | 45,000 | 142,439 | 133,567 |
| 2033 | 50,396 | 46,267 | 43,846 | 39,461 | 45,000 | 139,242 | 130,728 |
| 2034 | 51,415 | 47,202 | 44,732 | 40,258 | 45,000 | 141,146 | 132,461 |
| 2035 | 52,423 | 48,128 | 45,609 | 41,048 | 45,000 | 143,032 | 134,176 |
| 2036 | 53,419 | 49,043 | 46,476 | 41,828 | 45,000 | 144,895 | 135,871 |
| 2037 | 0 | 0 | 47,331 | 42,598 | 10,000 | 57,331 | 52,598 |
| 2038 | 0 | 0 | 48,174 | 43,357 | 10,000 | 58,174 | 53,357 |
| 2039 | 0 | 0 | 49,004 | 44,103 | 10,000 | 59,004 | 54,103 |
| 2040 | 0 | 0 | 49,818 | 44,836 | 10,000 | 59,818 | 54,836 |
| 2041 | 0 | 0 | 50,616 | 45,555 | 10,000 | 60,616 | 55,555 |
| 2042 | 0 | 0 | 51,397 | 46,257 | 10,000 | 61,397 | 56,257 |
| 2043 | 0 | 0 | 52,159 | 46,943 | 10,000 | 62,159 | 56,943 |
| 2044 | 0 | 0 | 52,902 | 47,612 | 10,000 | 62,902 | 57,612 |
| 2045 | 0 | 0 | 54,262 | 48,836 | 10,000 | 64,262 | 58,836 |
| 2046 | 0 | 0 | 55,034 | 49,531 | 10,000 | 65,034 | 59,531 |
| 2047 | 0 | 0 | 55,818 | 50,236 | 10,000 | 65,818 | 60,236 |
| 2048 | 0 | 0 | 56,613 | 50,952 | 10,000 | 66,613 | 60,952 |
| 2049 | 0 | 0 | 57,419 | 51,677 | 10,000 | 67,419 | 61,677 |
| 2050 | 0 | 0 | 58,236 | 52,413 | 10,000 | 68,236 | 62,413 |
| 2051 | 0 | 0 | 59,066 | 53,159 | 10,000 | 69,066 | 63,159 |
| 2052 | 0 | 0 | 59,907 | 53,916 | 10,000 | 69,907 | 63,916 |
| 2053 | 0 | 0 | 60,760 | 54,684 | 10,000 | 70,760 | 64,684 |
| 2054 | 0 | 0 | 61,625 | 55,462 | 10,000 | 71,625 | 65,462 |
| 2055 | 0 | 0 | 62,502 | 56,252 | 10,000 | 72,502 | 66,252 |
| 2056 | 0 | 0 | 63,392 | 57,053 | 10,000 | 73,392 | 67,053 |
| 2057 | 0 | 0 | 64,295 | 57,865 | 10,000 | 74,295 | 67,865 |
| 2058 | 0 | 0 | 65,210 | 58,689 | 10,000 | 75,210 | 68,689 |
| 2059 | 0 | 0 | 66,139 | 59,525 | 10,000 | 76,139 | 69,525 |
| 2060 | 0 | 0 | 67,080 | 60,372 | 10,000 | 77,080 | 70,372 |
| 2061 | 0 | 0 | 68,035 | 61,232 | 10,000 | 78,035 | 71,232 |
| 2062 | 0 | 0 | 69,004 | 62,104 | 10,000 | 79,004 | 72,104 |
| 2063 | 0 | 0 | 69,987 | 62,988 | 10,000 | 79,987 | 72,988 |
| 2064 | 0 | 0 | 70,983 | 63,885 | 10,000 | 80,983 | 73,885 |
| 2065 | 0 | 0 | 71,994 | 64,794 | 10,000 | 81,994 | 74,794 |
| 2066 | 0 | 0 | 73,019 | 65,717 | 10,000 | 83,019 | 75,717 |
| 2067 | 0 | 0 | 74,059 | 66,653 | 10,000 | 84,059 | 76,653 |
| 2068 | 0 | 0 | 75,113 | 67,602 | 10,000 | 85,113 | 77,602 |

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 2.1**
**Total Expenditures**

| Calendar Year | Land Reclamation | | Water Reclamation | | Operating Expense | Gross Total | Net Total |
|---|---|---|---|---|---|---|---|
| | Gross | Net | Gross | Net | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 2069 | 0 | 0 | 76,183 | 68,564 | 10,000 | 86,183 | 78,564 |
| 2070 | 0 | 0 | 77,267 | 69,541 | 10,000 | 87,267 | 79,541 |
| 2071 | 0 | 0 | 78,367 | 70,531 | 10,000 | 88,367 | 80,531 |
| 2072 | 0 | 0 | 79,483 | 71,535 | 10,000 | 89,483 | 81,535 |
| 2073 | 0 | 0 | 80,615 | 72,553 | 10,000 | 90,615 | 82,553 |
| 2074 | 0 | 0 | 81,763 | 73,586 | 10,000 | 91,763 | 83,586 |
| 2075 | 0 | 0 | 82,927 | 74,634 | 10,000 | 92,927 | 84,634 |
| 2076 | 0 | 0 | 84,108 | 75,697 | 10,000 | 94,108 | 85,697 |
| 2077 | 0 | 0 | 85,305 | 76,775 | 10,000 | 95,305 | 86,775 |
| 2078 | 0 | 0 | 86,520 | 77,868 | 10,000 | 96,520 | 87,868 |
| 2079 | 0 | 0 | 87,752 | 78,977 | 10,000 | 97,752 | 88,977 |
| 2080 | 0 | 0 | 89,001 | 80,101 | 10,000 | 99,001 | 90,101 |
| 2081 | 0 | 0 | 90,268 | 81,242 | 10,000 | 100,268 | 91,242 |
| 2082 | 0 | 0 | 91,554 | 82,398 | 10,000 | 101,554 | 92,398 |
| 2083 | 0 | 0 | 92,857 | 83,572 | 10,000 | 102,857 | 93,572 |
| 2084 | 0 | 0 | 94,179 | 84,761 | 10,000 | 104,179 | 94,761 |
| 2085 | 0 | 0 | 95,520 | 85,968 | 10,000 | 105,520 | 95,968 |
| 2086 | 0 | 0 | 96,880 | 87,192 | 10,000 | 106,880 | 97,192 |
| 2087 | 0 | 0 | 98,260 | 88,434 | 10,000 | 108,260 | 98,434 |
| 2088 | 0 | 0 | 99,659 | 89,693 | 10,000 | 109,659 | 99,693 |
| 2089 | 0 | 0 | 101,078 | 90,970 | 10,000 | 111,078 | 100,970 |
| 2090 | 0 | 0 | 102,517 | 92,265 | 10,000 | 112,517 | 102,265 |
| 2091 | 0 | 0 | 103,977 | 93,579 | 10,000 | 113,977 | 103,579 |
| 2092 | 0 | 0 | 105,457 | 94,911 | 10,000 | 115,457 | 104,911 |
| Total | 32,756,694 | 30,397,413 | 4,836,022 | 4,352,420 | 1,520,000 | 39,112,716 | 36,269,833 |

Footnotes:

(1) Exhibit 2.2 Col (3). Inflated and discounted reclamation costs.
(2) Exhibit 2.2 Col (6). Inflated and discounted reclamation costs.
(3) Exhibit 2.3 Col (3). Inflated and discounted reclamation costs.
(4) Exhibit 2.3 Col (6). Inflated and discounted reclamation costs.
(5) Client provided data
(6) Col (1) + Col (3) + Col (5)
(7) Col (2) + Col (4) + Col (5)

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 2.2**
**Land Reclamation Expenditures**

| Calendar | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| Year | Expenditure | Inflated | Discounted | Expenditure | Inflated | Discounted |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2014 | | | | | | |
| 2015 | 444,215 | 444,215 | 443,639 | 444,215 | 444,215 | 443,639 |
| 2016 | 2,233,000 | 2,233,000 | 2,224,320 | 2,233,000 | 2,233,000 | 2,224,320 |
| 2017 | 3,402,750 | 3,453,414 | 3,420,833 | 3,402,750 | 3,453,414 | 3,420,833 |
| 2018 | 3,845,437 | 4,019,773 | 3,959,674 | 3,499,381 | 3,658,028 | 3,603,338 |
| 2019 | 4,017,359 | 4,335,960 | 4,233,456 | 3,655,677 | 3,945,594 | 3,852,318 |
| 2020 | 4,148,315 | 4,634,007 | 4,484,544 | 3,779,607 | 4,222,130 | 4,085,952 |
| 2021 | 4,058,070 | 4,703,177 | 4,500,627 | 3,698,737 | 4,286,722 | 4,102,107 |
| 2022 | 4,058,070 | 4,891,304 | 4,628,351 | 3,698,737 | 4,458,191 | 4,218,522 |
| 2023 | 1,010,365 | 1,266,533 | 1,182,249 | 924,315 | 1,158,666 | 1,081,560 |
| 2024 | 1,010,365 | 1,317,195 | 1,212,922 | 924,315 | 1,205,013 | 1,109,620 |
| 2025 | 342,570 | 464,467 | 421,212 | 312,819 | 424,129 | 384,631 |
| 2026 | 322,069 | 454,138 | 405,519 | 294,448 | 415,190 | 370,740 |
| 2027 | 322,069 | 472,304 | 414,649 | 294,448 | 431,797 | 379,087 |
| 2028 | 322,069 | 491,196 | 423,860 | 294,448 | 449,069 | 387,508 |
| 2029 | 322,069 | 510,843 | 433,105 | 294,448 | 467,032 | 395,960 |
| 2030 | 38,037 | 62,744 | 52,250 | 34,842 | 57,475 | 47,862 |
| 2031 | 38,037 | 65,254 | 53,359 | 34,842 | 59,774 | 48,877 |
| 2032 | 38,037 | 67,864 | 54,474 | 34,842 | 62,165 | 49,899 |
| 2033 | 34,482 | 63,983 | 50,396 | 31,657 | 58,741 | 46,267 |
| 2034 | 34,482 | 66,543 | 51,415 | 31,657 | 61,091 | 47,202 |
| 2035 | 34,482 | 69,204 | 52,423 | 31,657 | 63,534 | 48,128 |
| 2036 | 34,482 | 71,972 | 53,419 | 31,657 | 66,076 | 49,043 |
| Total | 30,110,830 | 34,159,091 | 32,756,694 | 27,982,497 | 31,681,045 | 30,397,413 |

Footnotes:

(1) See report for details.
Years 2015-2017 reflect Valley Mining Payments. Payments for future forfeitures delayed by three years to reflect period between forfeiture order and reclamation activity.

(2) Col (1) x annual inflation of…
0.0% for years 2015-16
3.0% for years 2017-18
3.5% for years 2019-20
4.0% for years 2021 & Subs

(3) Col (2) + Col (2) x Exhibit 9 Col (3)

(4) See report for details
Years 2015-2017 reflect Valley Mining Payments. Payments for future forfeitures delayed by three years to reflect period between forfeiture order and reclamation activity.

(5) Col (4) x annual inflation of…
0.0% for years 2015-16
3.0% for years 2017-18
3.5% for years 2019-20
4.0% for years 2021 & Subs

(6) Col (5) + Col (5) x Exhibit 9 Col (3)

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 2.3**
**Water Reclamation Expenditures**

| Calendar | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| Year | Expenditure | Inflated | Discounted | Expenditure | Inflated | Discounted |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2014 | | | | | | |
| 2015 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2016 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2017 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2018 | 30,000 | 31,360 | 30,891 | 27,000 | 28,224 | 27,802 |
| 2019 | 30,000 | 32,379 | 31,614 | 27,000 | 29,141 | 28,452 |
| 2020 | 30,000 | 33,512 | 32,432 | 27,000 | 30,161 | 29,188 |
| 2021 | 30,000 | 34,769 | 33,272 | 27,000 | 31,292 | 29,945 |
| 2022 | 30,000 | 36,160 | 34,216 | 27,000 | 32,544 | 30,794 |
| 2023 | 30,000 | 37,606 | 35,104 | 27,000 | 33,846 | 31,593 |
| 2024 | 30,000 | 39,110 | 36,014 | 27,000 | 35,199 | 32,413 |
| 2025 | 30,000 | 40,675 | 36,887 | 27,000 | 36,607 | 33,198 |
| 2026 | 30,000 | 42,302 | 37,773 | 27,000 | 38,072 | 33,996 |
| 2027 | 30,000 | 43,994 | 38,624 | 27,000 | 39,595 | 34,761 |
| 2028 | 30,000 | 45,754 | 39,482 | 27,000 | 41,178 | 35,533 |
| 2029 | 30,000 | 47,584 | 40,343 | 27,000 | 42,825 | 36,308 |
| 2030 | 30,000 | 49,487 | 41,210 | 27,000 | 44,539 | 37,089 |
| 2031 | 30,000 | 51,467 | 42,085 | 27,000 | 46,320 | 37,876 |
| 2032 | 30,000 | 53,525 | 42,964 | 27,000 | 48,173 | 38,668 |
| 2033 | 30,000 | 55,666 | 43,846 | 27,000 | 50,100 | 39,461 |
| 2034 | 30,000 | 57,893 | 44,732 | 27,000 | 52,104 | 40,258 |
| 2035 | 30,000 | 60,209 | 45,609 | 27,000 | 54,188 | 41,048 |
| 2036 | 30,000 | 62,617 | 46,476 | 27,000 | 56,355 | 41,828 |
| 2037 | 30,000 | 65,122 | 47,331 | 27,000 | 58,610 | 42,598 |
| 2038 | 30,000 | 67,727 | 48,174 | 27,000 | 60,954 | 43,357 |
| 2039 | 30,000 | 70,436 | 49,004 | 27,000 | 63,392 | 44,103 |
| 2040 | 30,000 | 73,253 | 49,818 | 27,000 | 65,928 | 44,836 |
| 2041 | 30,000 | 76,183 | 50,616 | 27,000 | 68,565 | 45,555 |
| 2042 | 30,000 | 79,231 | 51,397 | 27,000 | 71,308 | 46,257 |
| 2043 | 30,000 | 82,400 | 52,159 | 27,000 | 74,160 | 46,943 |
| 2044 | 30,000 | 85,696 | 52,902 | 27,000 | 77,126 | 47,612 |
| 2045 | 30,000 | 89,124 | 54,262 | 27,000 | 80,211 | 48,836 |
| 2046 | 30,000 | 92,689 | 55,034 | 27,000 | 83,420 | 49,531 |
| 2047 | 30,000 | 96,396 | 55,818 | 27,000 | 86,757 | 50,236 |
| 2048 | 30,000 | 100,252 | 56,613 | 27,000 | 90,227 | 50,952 |
| 2049 | 30,000 | 104,262 | 57,419 | 27,000 | 93,836 | 51,677 |
| 2050 | 30,000 | 108,433 | 58,236 | 27,000 | 97,589 | 52,413 |
| 2051 | 30,000 | 112,770 | 59,066 | 27,000 | 101,493 | 53,159 |
| 2052 | 30,000 | 117,281 | 59,907 | 27,000 | 105,553 | 53,916 |
| 2053 | 30,000 | 121,972 | 60,760 | 27,000 | 109,775 | 54,684 |
| 2054 | 30,000 | 126,851 | 61,625 | 27,000 | 114,166 | 55,462 |
| 2055 | 30,000 | 131,925 | 62,502 | 27,000 | 118,732 | 56,252 |
| 2056 | 30,000 | 137,202 | 63,392 | 27,000 | 123,482 | 57,053 |
| 2057 | 30,000 | 142,690 | 64,295 | 27,000 | 128,421 | 57,865 |
| 2058 | 30,000 | 148,398 | 65,210 | 27,000 | 133,558 | 58,689 |
| 2059 | 30,000 | 154,333 | 66,139 | 27,000 | 138,900 | 59,525 |
| 2060 | 30,000 | 160,507 | 67,080 | 27,000 | 144,456 | 60,372 |
| 2061 | 30,000 | 166,927 | 68,035 | 27,000 | 150,234 | 61,232 |
| 2062 | 30,000 | 173,604 | 69,004 | 27,000 | 156,244 | 62,104 |
| 2063 | 30,000 | 180,548 | 69,987 | 27,000 | 162,493 | 62,988 |
| 2064 | 30,000 | 187,770 | 70,983 | 27,000 | 168,993 | 63,885 |
| 2065 | 30,000 | 195,281 | 71,994 | 27,000 | 175,753 | 64,794 |
| 2066 | 30,000 | 203,092 | 73,019 | 27,000 | 182,783 | 65,717 |
| 2067 | 30,000 | 211,216 | 74,059 | 27,000 | 190,094 | 66,653 |
| 2068 | 30,000 | 219,665 | 75,113 | 27,000 | 197,698 | 67,602 |

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 2.3**
**Water Reclamation Expenditures**

| Calendar | Gross | | | Net | | |
|---|---|---|---|---|---|---|
| Year | Expenditure | Inflated | Discounted | Expenditure | Inflated | Discounted |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2069 | 30,000 | 228,451 | 76,183 | 27,000 | 205,606 | 68,564 |
| 2070 | 30,000 | 237,589 | 77,267 | 27,000 | 213,830 | 69,541 |
| 2071 | 30,000 | 247,093 | 78,367 | 27,000 | 222,383 | 70,531 |
| 2072 | 30,000 | 256,976 | 79,483 | 27,000 | 231,279 | 71,535 |
| 2073 | 30,000 | 267,256 | 80,615 | 27,000 | 240,530 | 72,553 |
| 2074 | 30,000 | 277,946 | 81,763 | 27,000 | 250,151 | 73,586 |
| 2075 | 30,000 | 289,064 | 82,927 | 27,000 | 260,157 | 74,634 |
| 2076 | 30,000 | 300,626 | 84,108 | 27,000 | 270,564 | 75,697 |
| 2077 | 30,000 | 312,651 | 85,305 | 27,000 | 281,386 | 76,775 |
| 2078 | 30,000 | 325,157 | 86,520 | 27,000 | 292,642 | 77,868 |
| 2079 | 30,000 | 338,164 | 87,752 | 27,000 | 304,347 | 78,977 |
| 2080 | 30,000 | 351,690 | 89,001 | 27,000 | 316,521 | 80,101 |
| 2081 | 30,000 | 365,758 | 90,268 | 27,000 | 329,182 | 81,242 |
| 2082 | 30,000 | 380,388 | 91,554 | 27,000 | 342,349 | 82,398 |
| 2083 | 30,000 | 395,603 | 92,857 | 27,000 | 356,043 | 83,572 |
| 2084 | 30,000 | 411,428 | 94,179 | 27,000 | 370,285 | 84,761 |
| 2085 | 30,000 | 427,885 | 95,520 | 27,000 | 385,096 | 85,968 |
| 2086 | 30,000 | 445,000 | 96,880 | 27,000 | 400,500 | 87,192 |
| 2087 | 30,000 | 462,800 | 98,260 | 27,000 | 416,520 | 88,434 |
| 2088 | 30,000 | 481,312 | 99,659 | 27,000 | 433,181 | 89,693 |
| 2089 | 30,000 | 500,565 | 101,078 | 27,000 | 450,508 | 90,970 |
| 2090 | 30,000 | 520,587 | 102,517 | 27,000 | 468,528 | 92,265 |
| 2091 | 30,000 | 541,411 | 103,977 | 27,000 | 487,270 | 93,579 |
| 2092 | 30,000 | 563,067 | 105,457 | 27,000 | 506,760 | 94,911 |
| Total | 2,250,000 | 13,867,770 | 4,836,022 | 2,025,000 | 12,480,993 | 4,352,420 |

Footnotes:

(1) Exhibit 10.1 Row (21), spread over 75 years
Payments for future forfeitures delayed by three years to reflect period between forfeiture order and reclamation activity.

(2) Col (1) x annual inflation of…
0.0% for years 2015-16
3.0% for years 2017-18
3.5% for years 2019-20
4.0% for years 2021 & Subs

(3) Col (2) + Col (2) x Exhibit 9 Col (3)
Years 2045 and Subsequent based on 2.540% discount factor

(4) Exhibit 10.1 Row (23), spread over 75 years
Payments for future forfeitures delayed by three years to reflect period between forfeiture order and reclamation activity.

(5) Col (4) x annual inflation of…
0.0% for years 2015-16
3.0% for years 2017-18
3.5% for years 2019-20
4.0% for years 2021 & Subs

(6) Col (5) + Col (5) x Exhibit 9 Col (3)
Years 2045 and Subsequent based on 2.540% discount factor

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 3.1**
**Remaining Performance Security Requirement**

| Years Since Issuance | Active Pending Phase 1 Release | Final Map Pending Phase 1 Release | Pending Phase 2 Release | Pending Phase 3 Release |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| 1 | 100% | 100% | 50% | 15% |
| 2 | 100% | 100% | 50% | 15% |
| 3 | 100% | 100% | 50% | 15% |
| 4 | 100% | 50% | 50% | 15% |
| 5 | 100% | 50% | 50% | 15% |
| 6 | 100% | 50% | 15% | 15% |
| 7 | 100% | 50% | 15% | 15% |
| 8 | 50% | 50% | 15% | |
| 9 | 50% | 15% | 15% | |
| 10 | 50% | 15% | 15% | |
| 11 | 50% | 15% | 15% | |
| 12 | 50% | 15% | 15% | |
| 13 | 15% | 15% | | |
| 14 | 15% | 15% | | |
| 15 | 15% | 15% | | |
| 16 | 15% | | | |
| 17 | 15% | | | |
| 18 | 15% | | | |
| 19 | 15% | | | |
| 20 | | | | |

Footnotes:
(1) - (4) Judgmentally selected based on historic Ohio timing of various stages of the mining and reclamation process

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 3.2**
**Reclamation Lifecycles**

| Evaluation | Final Map to Phase 1 release | | | Phase 1 release to Phase 2 release | | | Phase 2 release to Phase 3 release | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Permit Count | Acres | Avg # Yrs | Permit Count | Acres | Avg # Yrs | Permit Count | Acres | Avg # Yrs |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1999 | 115 | 5,470 | 1.9 | 129 | 7,117 | 3.9 | 147 | 5,961 | 6.5 |
| 2000 | 73 | 2,615 | 1.2 | 113 | 4,751 | 3.8 | 179 | 8,688 | 6.5 |
| 2001 | 91 | 7,671 | 1.7 | 117 | 7,640 | 3.6 | 162 | 6,844 | 6.9 |
| 2002 | 73 | 2,444 | 1.3 | 78 | 2,862 | 3.5 | 110 | 5,277 | 6.8 |
| 2003 | 87 | 4,840 | 2.6 | 62 | 2,603 | 3.7 | 105 | 4,800 | 7.2 |
| 2004 | 67 | 2,778 | 1.7 | 62 | 2,519 | 3.6 | 108 | 5,121 | 7.2 |
| 2005 | 70 | 3,357 | 1.2 | 50 | 2,415 | 3.3 | 73 | 2,519 | 6.0 |
| 2006 | 70 | 2,580 | 2.2 | 71 | 4,187 | 3.6 | 78 | 3,452 | 6.8 |
| 2007 | 53 | 2,216 | 1.6 | 61 | 2,675 | 4.2 | 81 | 3,125 | 7.8 |
| 2008 | 64 | 3,221 | 1.7 | 63 | 2,348 | 4.0 | 69 | 2,558 | 6.7 |
| 2009 | 40 | 2,030 | 1.8 | 57 | 1,852 | 5.2 | 50 | 2,358 | 8.5 |
| 2010 | 44 | 2,475 | 1.9 | 46 | 2,114 | 6.0 | 70 | 3,037 | 8.0 |
| 2011 | 54 | 2,285 | 3.4 | 68 | 3,181 | 4.3 | 73 | 3,081 | 7.0 |
| 2012 | 36 | 2,083 | 4.0 | 33 | 1,512 | 6.6 | 61 | 2,687 | 8.9 |
| 2013 | 112 | 7,090 | 3.8 | 72 | 4,005 | 7.3 | 82 | 4,037 | 8.9 |
| 2014 | 66 | 3,462 | 2.7 | 80 | 4,470 | 5.9 | 93 | 3,989 | 8.7 |
| **Total** | 1,115 | 56,617 | | 1,162 | 56,251 | | 1,541 | 67,534 | |
| **Average** | 70 | 3,539 | 2.17 | 73 | 3,516 | 4.53 | 96 | 4,221 | 7.40 |
| **Selected** | | | 3.00 | | | 5.00 | | | 7.00 |

Footnotes:

From the September 2014 Office of Surface Mining Reclamation and Enforcement report
"A Report on the Success of Achieving Reclamation Standards on Surface Coal Mining Operations in Ohio"
Table C "Timing and Acreage Released Over a 16-Year Period

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 4.1**
**Performance Security Estimate (PSE)**

| PSE | **Spring 2015** | *Spring 2013* | *Spring 2011* | 2015 vs. 2013 | 2015 vs. 2011 |
|---|---|---|---|---|---|
| (1) Total Constant PSE | **357,811,096** | *424,121,656* | *252,891,003* | (66,310,560) | 104,920,093 |
| (2) Total PSE without Constant | **443,056,704** | *448,080,344* | *479,411,077* | (5,023,640) | (36,354,373) |
| (3) Total PSE | **800,867,800** | *872,202,000* | *732,302,080* | (71,334,200) | 68,565,720 |
| (4) Final Map PSE | **70,508,800** | *170,182,000* | *170,812,000* | (99,673,200) | (100,303,200) |
| (5) Active PSE | **537,158,580** | *529,266,142* | *396,722,889* | 7,892,438 | 140,435,691 |
| (6) Total Adjusted PSE | **607,667,380** | *699,448,142* | *567,534,889* | (91,780,762) | 40,132,491 |
| (7) Bond Amount | **54,665,778** | *71,783,943* | *69,293,576* | (17,118,165) | (14,627,798) |
| (8) Total Net Adjusted PSE | **553,001,601** | *627,664,199* | *498,241,313* | (74,662,597) | 54,760,289 |

Footnotes:

| | |
|---|---|
| (1), (3), (4), (5), (6), (8) | See report for details |
| (2) | Row (3) - Row (1) |
| (7) | Row (6) - Row (8) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 4.2**
**Net Adjusted PSE by Mine Status**

| Phase | **Spring 2015** | *Spring 2013* | *Spring 2011* | 2015 vs. 2013 | 2015 vs. 2011 |
|---|---|---|---|---|---|
| (1) Active - Pending Phase 1 release | **339,402,844** | *420,449,906* | *271,267,028* | (81,047,062) | 68,135,816 |
| (2) Active - Pending Phase 2 release | **131,073,897** | *30,432,476* | *61,646,604* | 100,641,421 | 69,427,293 |
| (3) Active - Pending Phase 3 release | **21,723,796** | *28,552,017* | *16,381,793* | (6,828,221) | 5,342,003 |
| (4) Active - Total | **492,200,537** | *479,434,399* | *349,295,425* | 12,766,138 | 142,905,112 |
| (5) Final Map - Pending Phase 1 release | **39,256,913** | *139,564,625* | *138,898,250* | (100,307,713) | (99,641,338) |
| (6) Final Map - Pending Phase 2 release | **10,811,000** | *6,455,063* | *7,838,688* | 4,355,938 | 2,972,313 |
| (7) Final Map - Pending Phase 3 release | **10,733,152** | *2,210,113* | *2,208,950* | 8,523,040 | 8,524,202 |
| (8) Final Map - Total | **60,801,065** | *148,229,800* | *148,945,888* | (87,428,736) | (88,144,823) |
| (9) Total Net Adjusted PSE | **553,001,601** | *627,664,199* | *498,241,313* | (74,662,597) | 54,760,289 |

Footnotes:

| | |
|---|---|
| (1) - (8) | See report for details |
| (9) | Row (4) + Row (8) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 4.3**
**Average PSE**

| PSE Average | **Spring 2015** | *Spring 2013* | *Spring 2011* | 2015 vs. 2013 | 2015 vs. 2011 |
|---|---|---|---|---|---|
| (1) Total PSE Per Permit Count | **3,232,273** | *3,108,658* | *2,384,600* | 3.82% | 26.23% |
| (2) Net Adj PSE Per Permit Count | **2,941,498** | *2,789,619* | *2,093,451* | 5.16% | 28.83% |
| (3) Total PSE Per Bonded Acre | **9,038** | *8,667* | *6,312* | 4.10% | 30.16% |
| (4) Net Adj PSE Per Bonded Acre | **8,225** | *7,778* | *5,541* | 5.44% | 32.63% |
| (5) Total PSE Per Permit Count w/ PSE > Bond | **3,452,656** | *3,346,642* | *2,782,034* | 3.07% | 19.42% |
| (6) Net Adj PSE Per Permit Count w/ PSE > Bond | **3,142,055** | *3,003,178* | *2,442,359* | 4.42% | 22.27% |

Footnotes:

| | |
|---|---|
| (1) | Exhibit 4.1 Row (6) / Exhibit 8.6a Col (9) Total |
| (2) | Exhibit 4.1 Row (8) / Exhibit 8.6a Col (9) Total |
| (3) | Exhibit 4.1 Row (6) / Exhibit 8.6b Col (9) Total |
| (4) | Exhibit 4.1 Row (8) / Exhibit 8.6b Col (9) Total |
| (5) | Exhibit 4.1 Row (6) / Exhibit 8.2 Col (9) Total |
| (6) | Exhibit 4.1 Row (8) / Exhibit 8.2 Col (9) Total |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 5**
**Permit Count**

| Ratio of Affected to Permitted Active Acres | **Spring 2015** | *Spring 2013* | *Spring 2011* | 2015 vs. 2013 | 2015 vs. 2011 |
|---|---|---|---|---|---|
| 0% | 13 | *14* | *N/A* | (1) | N/A |
| 0.1 to 25% | 16 | *12* | | 4 | |
| 25.1 to 50% | 21 | *25* | | (4) | |
| 50.1 to 67.5% | 31 | *27* | | 4 | |
| 67.6 to 100% | 49 | *47* | | 2 | |
| Total Active Permits | 130 | *125* | | 5 | |

Footnotes:
See report for details

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 6.1**
**Forfeiture Rates**

| Years Since Issuance | CY 2015 - 2019 (1) | CY 2020 & Subs. (2) |
|---|---|---|
| 1 | 0.00% | 0.00% |
| 2 | 0.00% | 0.00% |
| 3 | 1.00% | 0.37% |
| 4 | 1.00% | 0.37% |
| 5 | 1.00% | 0.37% |
| 6 | 1.00% | 0.37% |
| 7 | 1.00% | 0.37% |
| 8 | 1.00% | 0.37% |
| 9 | 1.00% | 0.37% |
| 10 | 1.00% | 0.37% |
| 11 | 1.00% | 0.37% |
| 12 | 1.00% | 0.37% |
| 13 | 1.00% | 0.37% |
| 14 | 1.00% | 0.37% |
| 15 | 1.00% | 0.37% |
| 16 | 1.00% | 0.37% |
| 17 | 1.00% | 0.37% |
| 18 | 1.00% | 0.37% |
| 19 | 1.00% | 0.37% |
| 20 | 1.00% | 0.37% |

Footnotes:
(1) Exhibit 6.2 Row (8a)
(2) Exhibit 6.2 Row (8b)

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 6.2**
**Forfeiture Rate Calculation**

| Calendar Year | Number of Permits In Force | Number of Permits Forfeited | Forfeiture Rate |
|---|---|---|---|
| | (1) | (2) | (3) |
| 1993 | 799 | 17 | 2.13% |
| 1994 | 775 | 6 | 0.77% |
| 1995 | 722 | 27 | 3.74% |
| 1996 | 683 | 4 | 0.59% |
| 1997 | 579 | 4 | 0.69% |
| 1998 | 568 | 4 | 0.70% |
| 1999 | 563 | 17 | 3.02% |
| 2000 | 456 | 2 | 0.44% |
| 2001 | 389 | 4 | 1.03% |
| 2002 | 363 | 1 | 0.28% |
| 2003 | 357 | 3 | 0.84% |
| 2004 | 356 | 1 | 0.28% |
| 2005 | 338 | 8 | 2.37% |
| 2006 | 329 | 0 | 0.00% |
| 2007 | 321 | 0 | 0.00% |
| 2008 | 308 | 0 | 0.00% |
| 2009 | 290 | 0 | 0.00% |
| 2010 | 266 | 0 | 0.00% |
| 2011 | 252 | 0 | 0.00% |
| 2012 | 246 | 0 | 0.00% |
| 2013 | 229 | 0 | 0.00% |
| 2014 | 224 | 6 | 2.68% |
| Total | 9,413 | 104 | 1.10% |
| (4a) Average lifetime of permit | | | 19.00 |
| (4b) Selected avg lifetime of permits w/o forfeitures | | | 17.00 |
| (5) Ohio indicated forfeiture annual incremental rate | | | 0.06% |
| (6) Kentucky forfeiture annual incremental rate | | | 1.08% |
| (7) West Virginia forfeiture annual incremental rate | | | 1.11% |
| (8) Ohio selected forfeiture annual incremental rate | | | |
| (a) Years 2015 - 2019 | | | 1.00% |
| (b) Years 2020 & Subsequent | | | 0.37% |

Footnotes:

| | |
|---|---|
| (1) | Historical Ohio permit data |
| (2) | Historical Ohio permit data |
| (3) | Col (2) / Col (1) |
| (4a) | Exhibit 3.1 |
| (4b) | Selected average lifetime based on assumption of minimal forfeitures within the first two years of issuance |
| (5) | Col (3) / Row (4b) |
| (6) | From Pinnacle analysis of Kentucky data applied to Ohio permit count by mine type distribution |
| (7) | From Pinnacle analysis of West Virginia data applied to Ohio permit count by mine type distribution |
| (8) | Selected based on rows (5) through (7)<br>(a) Based on adverse economic conditions in the coal industry<br>(b) Based on the coal industry returning to a more stable condition |

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 6.3**
**Forfeiture Rate Adjustment Factor for Mine Status**

| Mine Status | Factor |
|---|---|
| | (1) |
| Active, Pending Phase 1 Release | 1.00 |
| Final Map, Pending Phase 1 Release | 0.80 |
| Pending Phase 2 Release | 0.67 |
| Pending Phase 3 Release | 0.33 |

Footnotes:

(1) Judgmentally selected

These factors are intended to reflect that the probability of forfeiture declines as the reclamation process moves from active mining to reclamation and on to final release.

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 7**
**Net Reclamation Cost by Mine Status**

| Phase | **Spring 2015** | *Spring 2013* | *Spring 2011* | 2015 vs. 2013 | 2015 vs. 2011 |
|---|---|---|---|---|---|
| (1) Active - Pending Phase 1 release | **15,872,249** | *9,110,576* | *23,279,440* | 6,761,673 | (7,407,191) |
| (2) Active - Pending Phase 2 release | **3,800,171** | *339,359* | *1,491,776* | 3,460,812 | 2,308,396 |
| (3) Active - Pending Phase 3 release | **411,492** | *244,034* | *192,800* | 167,458 | 218,692 |
| (4) Active - Total | **20,083,913** | *9,693,970* | *24,964,016* | 10,389,943 | (4,880,103) |
| (5) Final Map - Pending Phase 1 release | **1,296,140** | *1,813,560* | *4,363,792* | (517,420) | (3,067,652) |
| (6) Final Map - Pending Phase 2 release | **319,172** | *71,130* | *201,678* | 248,043 | 117,494 |
| (7) Final Map - Pending Phase 3 release | **203,307** | *18,890* | *22,973* | 184,418 | 180,334 |
| (8) Final Map - Total | **1,818,619** | *1,903,579* | *4,588,444* | (84,960) | (2,769,824) |
| (9) Total Net Reclamation Cost | **21,902,532** | *11,597,549* | *29,552,459* | 10,304,983 | (7,649,927) |

Footnotes:

| | |
|---|---|
| (1), (2), (3), (5), (6), (7) | See report for details |
| (4) | Row (1) + Row (2) + Row (3) |
| (8) | Row (5) + Row (6) + Row (7) |
| (9) | Row (4) + Row (8) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.1a**
**Permit Information by Parent Company**

| Parent Company | Total PSE | Net Adjusted PSE | Permit Count | Implied Bond Acres | Net Reclamation Cost |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| WESTMORELAND COAL COMPANY | 368,113,000 | 233,515,057 | 68 | 36,550 | 8,685,612 |
| MURRAY ENERGY | 168,150,000 | 136,079,930 | 14 | 8,191 | 6,343,330 |
| RHINO ENERGY, LLC | 82,132,000 | 67,643,941 | 10 | 2,567 | 2,235,583 |
| WATERLOO COAL COMPANY INC | 37,223,000 | 26,571,252 | 13 | 2,984 | 946,012 |
| ROSEBUD MINING COMPANY | 31,709,000 | 17,400,910 | 24 | 4,463 | 696,601 |
| KIMBLE CLAY & LIMESTONE | 23,294,000 | 12,309,258 | 14 | 3,586 | 609,969 |
| ANTHONY MINING COMPANY INC. | 20,062,000 | 13,728,056 | 3 | 914 | 638,024 |
| CONSOL ENERGY | 17,630,800 | 14,336,300 | 5 | 3,437 | 473,681 |
| B&N COAL INC | 11,041,000 | 4,655,851 | 6 | 660 | 191,525 |
| SIDWELL MATERIALS INC | 9,866,000 | 4,980,356 | 3 | 638 | 215,614 |
| HERITAGE COAL COMPANY LLC | 5,019,000 | 4,644,625 | 1 | 384 | 149,667 |
| VALLEY MINING INC | 4,225,000 | 2,357,510 | 1 | 219 | 69,485 |
| THOMPSON BROTHERS MINING | 4,210,000 | 3,558,180 | 4 | 174 | 116,419 |
| ETTA MAE INC | 3,512,000 | 1,189,496 | 1 | 110 | 36,788 |
| MARIETTA COAL COMPANY | 3,350,000 | 2,490,044 | 5 | 588 | 117,592 |
| DTE DICKERSON LLC | 3,240,000 | 1,744,870 | 1 | 83 | 83,585 |
| AMERICAN LANDFILL INC | 1,971,000 | 1,741,424 | 1 | 82 | 83,049 |
| COLLIER PORTS INC | 1,585,000 | 1,028,198 | 1 | 416 | 66,709 |
| L & M MINERAL CO | 1,562,000 | 1,099,266 | 2 | 522 | 71,320 |
| R T G INC | 653,000 | 426,250 | 1 | 200 | 14,200 |
| COUNTYWIDE RECYCLING & DISPOSAL FACILITY | 584,000 | 386,904 | 1 | 76 | 18,534 |
| FRANKLIN MINERAL | 563,000 | 533,625 | 1 | 40 | 16,504 |
| STATE LINE RESOURCES INC | 338,000 | 200,295 | 2 | 109 | 9,552 |
| SCHANEY MINING | 314,000 | 76,104 | 1 | 19 | 3,646 |
| F & M COAL CO | 231,000 | 117,526 | 1 | 13 | 5,630 |
| AMERIKOHL MINING CO | 153,000 | 89,475 | 2 | 130 | 2,066 |
| SAGINAW MINING CO | 126,000 | 96,900 | 1 | 78 | 1,835 |
| CHAMBERS DEVL OF OHIO INC | 11,000 | 0 | 1 | 1 | 0 |
| **Total** | **800,867,800** | **553,001,601** | **188** | **67,234** | **21,902,532** |
| *Spring 2013 Total* | *872,202,000* | *627,664,199* | *225* | *80,699* | *11,597,549* |
| *Spring 2011 Total* | *732,302,080* | *498,241,313* | *238* | *89,912* | *29,552,459* |
| 2015 vs. 2013 | (71,334,200) | (74,662,597) | (37) | (13,465) | 10,304,983 |
| 2015 vs. 2011 | 68,565,720 | 54,760,289 | (50) | (22,678) | (7,649,927) |

Footnotes:
(1), (2), (3), (4), (5) See report for details

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.1b**
**Top Five Parent Companies**

| Parent Company | Net Adjusted PSE | | | Net Reclamation Cost | | |
|---|---|---|---|---|---|---|
| | Amount | % of Total | Average | Amount | % of Total | Average |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| WESTMORELAND COAL COMPANY | 233,515,057 | 42.23% | | 8,685,612 | 39.66% | |
| MURRAY ENERGY | 136,079,930 | 24.61% | | 6,343,330 | 28.96% | |
| RHINO ENERGY, LLC | 67,643,941 | 12.23% | | 2,235,583 | 10.21% | |
| WATERLOO COAL COMPANY INC | 26,571,252 | 4.80% | | 946,012 | 4.32% | |
| ROSEBUD MINING COMPANY | 17,400,910 | 3.15% | | 696,601 | 3.18% | |
| Subtotal | 481,211,090 | 87.02% | 96,242,218 | 18,907,137 | 86.32% | 3,781,427 |
| Remaining Parent Companies | 71,790,511 | 12.98% | 3,263,205 | 2,995,395 | 13.68% | 136,154 |
| **Total** | **553,001,601** | **100.00%** | **20,481,541** | **21,902,532** | **100.00%** | **811,205** |
| *Spring 2013 Total* | *627,664,199* | | *20,922,140* | *11,597,549* | | *386,585* |
| *Spring 2011 Total* | *498,241,313* | | *12,775,418* | *29,552,459* | | *757,755* |
| 2015 vs. 2013 | (74,662,597) | | -2.15% | 10,304,983 | | 52.34% |
| 2015 vs. 2011 | 54,760,289 | | 37.62% | (7,649,927) | | 6.59% |

Footnotes:

| | |
|---|---|
| (1) | Exhibit 8.1a Col (2) |
| (2) | Col (1) / Total Col (1) |
| (3) | Derived from Exhibit 8.1a Col (2) |
| (4) | Exhibit 8.1a Col (5) |
| (5) | Col (4) / Total Col (4) |
| (6) | Derived from Exhibit 8.1a Col (5) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.1c**
**Parent Company Counts by PSE Range and Net Reclamation Cost Range**

| Net Adjusted PSE | Company Count | Net Reclamation Cost | Company Count |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| $0 | 1 | $0 | 1 |
| $0 to 100K | 3 | $0 to 10K | 5 |
| $100K to 1M | 5 | $10K to 100K | 9 |
| $1M to 2.5M | 7 | $100K to 500K | 6 |
| $2.5M to 5M | 4 | $500K to 1M | 4 |
| $5M to 9M | 0 | $1M to 2M | 0 |
| $9M to 25M | 4 | $2M to 5M | 1 |
| Over $25M | 4 | Over $5M | 2 |
| **Total** | **28** | **Total** | **28** |

Footnotes:

(2) Exhibit 8.1a Col (2)
(4) Exhibit 8.1a Col (5)

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.2**
**Permits Counts with a Performance Security Estimate Greater Than Bond on Hand**

| Issue Year | Active | | | | Final Map | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Phase 1 | Phase 2 | Phase 3 | Total | Phase 1 | Phase 2 | Phase 3 | Total | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1982 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1983 | 7 | 0 | 0 | 7 | 1 | 0 | 0 | 1 | 8 |
| 1984 | 7 | 0 | 0 | 7 | 3 | 0 | 2 | 5 | 12 |
| 1985 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1987 | 4 | 0 | 0 | 4 | 0 | 0 | 2 | 2 | 6 |
| 1988 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 3 |
| 1989 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1990 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 1991 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 2 |
| 1992 | 1 | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 4 |
| 1993 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 1994 | 3 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 4 |
| 1995 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1996 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | 3 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1998 | 6 | 0 | 0 | 6 | 0 | 1 | 0 | 1 | 7 |
| 1999 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 3 |
| 2000 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 2 |
| 2001 | 1 | 1 | 0 | 2 | 0 | 2 | 1 | 3 | 5 |
| 2002 | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 2 | 4 |
| 2003 | 4 | 1 | 0 | 5 | 0 | 0 | 1 | 1 | 6 |
| 2004 | 5 | 2 | 0 | 7 | 0 | 0 | 4 | 4 | 11 |
| 2005 | 2 | 1 | 0 | 3 | 0 | 1 | 2 | 3 | 6 |
| 2006 | 6 | 2 | 0 | 8 | 0 | 1 | 2 | 3 | 11 |
| 2007 | 3 | 3 | 0 | 6 | 1 | 1 | 2 | 4 | 10 |
| 2008 | 4 | 1 | 0 | 5 | 1 | 0 | 3 | 4 | 9 |
| 2009 | 4 | 1 | 0 | 5 | 0 | 0 | 3 | 3 | 8 |
| 2010 | 1 | 1 | 1 | 3 | 0 | 2 | 1 | 3 | 6 |
| 2011 | 6 | 4 | 0 | 10 | 0 | 1 | 0 | 1 | 11 |
| 2012 | 8 | 3 | 0 | 11 | 0 | 0 | 0 | 0 | 11 |
| 2013 | 8 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 8 |
| 2014 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 7 |
| **Total** | **96** | **26** | **4** | **126** | **9** | **13** | **28** | **50** | **176** |
| *Spring 2013 Total* | *107* | *9* | *6* | *122* | *31* | *26* | *30* | *87* | *209* |
| *Spring 2011 Total* | | | | *119* | | | | *85* | *204* |
| 2015 vs. 2013 | (11) | 17 | (2) | 4 | (22) | (13) | (2) | (37) | (33) |
| 2015 vs. 2011 | | | | 7 | | | | (35) | (28) |

Footnotes:

(1) Client provided data, Pending Phase 1 Release
(2) Client provided data, Pending Phase 2 Release
(3) Client provided data, Pending Phase 3 Release
(4) Sum of Col (1) through Col (3)
(5) Client provided data, Pending Phase 1 Release
(6) Client provided data, Pending Phase 2 Release
(7) Client provided data, Pending Phase 3 Release
(8) Sum of Col (5) through Col (7)
(9) Col (4) + Col (8)

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.3a**
**Permits Counts by Mine Status and Year of Issuance - Surface**

| Issue Year | Active | | | | Final Map | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Phase 1 | Phase 2 | Phase 3 | Total | Phase 1 | Phase 2 | Phase 3 | Total | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1982 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1983 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 1984 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 3 |
| 1985 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1987 | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 2 | 4 |
| 1988 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 1989 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1990 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 1991 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 3 |
| 1992 | 1 | 2 | 1 | 4 | 0 | 1 | 0 | 1 | 5 |
| 1993 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 1994 | 3 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 4 |
| 1995 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 3 |
| 1996 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | 3 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1998 | 5 | 0 | 1 | 6 | 0 | 1 | 0 | 1 | 7 |
| 1999 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 3 |
| 2000 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 3 | 4 |
| 2001 | 1 | 1 | 0 | 2 | 0 | 2 | 1 | 3 | 5 |
| 2002 | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 2 | 4 |
| 2003 | 3 | 1 | 0 | 4 | 0 | 0 | 1 | 1 | 5 |
| 2004 | 4 | 2 | 0 | 6 | 0 | 0 | 4 | 4 | 10 |
| 2005 | 2 | 1 | 0 | 3 | 0 | 1 | 2 | 3 | 6 |
| 2006 | 5 | 2 | 0 | 7 | 0 | 1 | 2 | 3 | 10 |
| 2007 | 4 | 3 | 0 | 7 | 1 | 1 | 2 | 4 | 11 |
| 2008 | 4 | 1 | 0 | 5 | 1 | 0 | 3 | 4 | 9 |
| 2009 | 3 | 1 | 0 | 4 | 0 | 0 | 3 | 3 | 7 |
| 2010 | 1 | 1 | 1 | 3 | 0 | 2 | 1 | 3 | 6 |
| 2011 | 6 | 4 | 0 | 10 | 0 | 1 | 0 | 1 | 11 |
| 2012 | 7 | 3 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| 2013 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 7 |
| 2014 | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 6 |
| **Total** | **76** | **25** | **4** | **105** | **4** | **19** | **28** | **51** | **156** |
| *Spring 2013 Total* | *89* | *7* | *5* | *101* | *30* | *34* | *30* | *94* | *195* |
| *Spring 2011 Total* | | | | *103* | | | | *104* | *207* |
| 2015 vs. 2013 | (13) | 18 | (1) | 4 | (26) | (15) | (2) | (43) | (39) |
| 2015 vs. 2011 | | | | 2 | | | | (53) | (51) |

| | |
|---|---|
| Permits Released Since Spring 2013 | 56 |
| Total PSE of Permits Released Since Spring 2013 | 26,618,000 |
| Net Adjusted PSE of Permits Released Since Spring 2013 | 16,527,424 |

| | |
|---|---|
| Permits Issued Since Spring 2013 | 17 |
| Total PSE of Permits Issued Since Spring 2013 | 82,241,000 |
| Net Adjusted PSE of Permits Issued Since Spring 2013 | 28,327,399 |

| | |
|---|---|
| Permits remaining in system from Spring 2013 to Spring 2015 | 139 |
| Total PSE change of permits remaining in system from Spring 2013 to Spring 2015 | (21,384,000) |
| Net Adjusted PSE change of permits remaining in system from Spring 2013 to Spring 2015 | 18,188,308 |

Footnotes:

| | | | |
|---|---|---|---|
| (1) | Client provided data, Pending Phase 1 Release | (5) | Client provided data, Pending Phase 1 Release |
| (2) | Client provided data, Pending Phase 2 Release | (6) | Client provided data, Pending Phase 2 Release |
| (3) | Client provided data, Pending Phase 3 Release | (7) | Client provided data, Pending Phase 3 Release |
| (4) | Sum of Col (1) through Col (3) | (8) | Sum of Col (5) through Col (7) |
| | | (9) | Col (4) + Col (8) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.3b**
**Implied Bonded Acres by Mine Status and Year of Issuance - Surface**

| Issue | Active | | | | Final Map | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| Year | Phase 1 | Phase 2 | Phase 3 | Total | Phase 1 | Phase 2 | Phase 3 | Total | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1982 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1983 | 203 | 2 | 3 | 208 | 0 | 0 | 0 | 0 | 208 |
| 1984 | 87 | 0 | 0 | 87 | 0 | 0 | 87 | 87 | 174 |
| 1985 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 56 | 80 | 136 | 136 |
| 1987 | 383 | 109 | 156 | 648 | 0 | 0 | 445 | 445 | 1,093 |
| 1988 | 0 | 39 | 55 | 94 | 0 | 0 | 0 | 0 | 94 |
| 1989 | 0 | 0 | 0 | 0 | 0 | 83 | 119 | 203 | 203 |
| 1990 | 0 | 0 | 0 | 0 | 45 | 63 | 91 | 200 | 200 |
| 1991 | 138 | 0 | 0 | 138 | 0 | 113 | 336 | 449 | 587 |
| 1992 | 7 | 168 | 274 | 449 | 0 | 28 | 40 | 68 | 517 |
| 1993 | 14 | 27 | 59 | 100 | 0 | 0 | 0 | 0 | 100 |
| 1994 | 48 | 362 | 944 | 1,354 | 0 | 0 | 0 | 0 | 1,354 |
| 1995 | 46 | 64 | 153 | 264 | 0 | 147 | 210 | 358 | 622 |
| 1996 | 188 | 0 | 0 | 188 | 0 | 341 | 564 | 905 | 1,093 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 105 | 388 | 493 | 493 |
| 1998 | 385 | 893 | 1,589 | 2,867 | 0 | 65 | 93 | 159 | 3,025 |
| 1999 | 11 | 42 | 92 | 145 | 0 | 16 | 124 | 140 | 285 |
| 2000 | 0 | 0 | 0 | 0 | 20 | 37 | 133 | 190 | 190 |
| 2001 | 12 | 286 | 602 | 900 | 0 | 31 | 1,020 | 1,051 | 1,952 |
| 2002 | 5 | 92 | 202 | 299 | 0 | 0 | 81 | 81 | 380 |
| 2003 | 294 | 399 | 571 | 1,264 | 0 | 0 | 69 | 69 | 1,334 |
| 2004 | 32 | 294 | 453 | 780 | 0 | 0 | 454 | 454 | 1,234 |
| 2005 | 8 | 79 | 411 | 498 | 0 | 56 | 760 | 817 | 1,315 |
| 2006 | 903 | 766 | 1,189 | 2,859 | 0 | 146 | 403 | 549 | 3,408 |
| 2007 | 2,931 | 437 | 1,038 | 4,405 | 7 | 496 | 1,120 | 1,623 | 6,028 |
| 2008 | 114 | 1,142 | 1,769 | 3,025 | 141 | 197 | 1,063 | 1,401 | 4,426 |
| 2009 | 97 | 485 | 745 | 1,327 | 0 | 0 | 204 | 204 | 1,531 |
| 2010 | 9 | 86 | 225 | 319 | 0 | 62 | 150 | 212 | 531 |
| 2011 | 6,976 | 649 | 928 | 8,553 | 0 | 62 | 88 | 150 | 8,703 |
| 2012 | 2,608 | 415 | 593 | 3,616 | 0 | 0 | 0 | 0 | 3,616 |
| 2013 | 4,329 | 76 | 109 | 4,514 | 0 | 0 | 0 | 0 | 4,514 |
| 2014 | 4,884 | 0 | 0 | 4,884 | 0 | 0 | 0 | 0 | 4,884 |
| **Total** | **24,713** | **6,913** | **12,157** | **43,783** | **213** | **2,108** | **8,124** | **10,444** | **54,227** |
| *Spring 2013 Total* | *28,451* | *5,903* | *10,283* | *44,638* | *1,723* | *6,762* | *15,465* | *23,950* | *68,588* |
| *Spring 2011 Total* | | | | *49,315* | | | | *23,585* | *72,901* |
| 2015 vs. 2013 | (3,738) | 1,009 | 1,874 | (855) | (1,510) | (4,655) | (7,341) | (13,506) | (14,361) |
| 2015 vs. 2011 | | | | (5,532) | | | | (13,141) | (18,674) |

| | |
|---|---|
| Acres Released Since Spring 2013 | 10,209 |

| | |
|---|---|
| Acres Issued Since Spring 2013 | 11,199 |

Footnotes:

| | | | |
|---|---|---|---|
| (1) | Client provided data, Pending Phase 1 Release | (5) | Client provided data, Pending Phase 1 Release |
| (2) | Client provided data, Pending Phase 2 Release | (6) | Client provided data, Pending Phase 2 Release |
| (3) | Client provided data, Pending Phase 3 Release | (7) | Client provided data, Pending Phase 3 Release |
| (4) | Sum of Col (1) through Col (3) | (8) | Sum of Col (5) through Col (7) |
| | | (9) | Col (4) + Col (8) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.4a**
**Permits Counts by Mine Status and Year of Issuance - Underground**

| Issue Year | Active | | | | Final Map | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Phase 1 | Phase 2 | Phase 3 | Total | Phase 1 | Phase 2 | Phase 3 | Total | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1982 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1983 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1984 | 3 | 0 | 0 | 3 | 4 | 0 | 0 | 4 | 7 |
| 1985 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1987 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1988 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1989 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1992 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1993 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1994 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1995 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1996 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1998 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2012 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2013 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2014 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **7** | **0** | **0** | **7** | **5** | **0** | **0** | **5** | **12** |
| *Spring 2013 Total* | *7* | *1* | *0* | *8* | *4* | *0* | *0* | *4* | *12* |
| *Spring 2011 Total* | | | | *8* | | | | *5* | *13* |
| 2015 vs. 2013 | 0 | (1) | 0 | (1) | 1 | 0 | 0 | 1 | 0 |
| 2015 vs. 2011 | | | | (1) | | | | 0 | (1) |

| | |
|---|---|
| Permits Released Since Spring 2013 | 1 |
| Total PSE of Permits Released Since Spring 2013 | 1,869,000 |
| Net Adjusted PSE of Permits Released Since Spring 2013 | 1,547,206 |

| | |
|---|---|
| Permits Issued Since Spring 2013 | 1 |
| Total PSE of Permits Issued Since Spring 2013 | 1,558,000 |
| Net Adjusted PSE of Permits Issued Since Spring 2013 | 598,042 |

| | |
|---|---|
| Permits remaining in system from Spring 2013 to Spring 2015 | 11 |
| Total PSE change of permits remaining in system from Spring 2013 to Spring 2015 | (92,043,200) |
| Net Adjusted PSE change of permits remaining in system from Spring 2013 to Spring 2015 | (89,914,161) |

Footnotes:

| | | | |
|---|---|---|---|
| (1) | Client provided data, Pending Phase 1 Release | (5) | Client provided data, Pending Phase 1 Release |
| (2) | Client provided data, Pending Phase 2 Release | (6) | Client provided data, Pending Phase 2 Release |
| (3) | Client provided data, Pending Phase 3 Release | (7) | Client provided data, Pending Phase 3 Release |
| (4) | Sum of Col (1) through Col (3) | (8) | Sum of Col (5) through Col (7) |
| | | (9) | Col (4) + Col (8) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.4b**
**Implied Bonded Acres by Mine Status and Year of Issuance - Underground**

| Issue | Active | | | | Final Map | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| Year | Phase 1 | Phase 2 | Phase 3 | Total | Phase 1 | Phase 2 | Phase 3 | Total | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1982 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1983 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1984 | 745 | 57 | 82 | 884 | 501 | 951 | 1,359 | 2,811 | 3,695 |
| 1985 | 0 | 0 | 0 | 0 | 8 | 204 | 291 | 502 | 502 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1987 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1988 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1989 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1992 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1993 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1994 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1995 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1996 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1998 | 0 | 3 | 4 | 7 | 0 | 0 | 0 | 0 | 7 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 1,109 | 0 | 0 | 1,109 | 0 | 0 | 0 | 0 | 1,109 |
| 2005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 1,304 | 0 | 0 | 1,304 | 0 | 0 | 0 | 0 | 1,304 |
| 2007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2012 | 273 | 0 | 0 | 273 | 0 | 0 | 0 | 0 | 273 |
| 2013 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2014 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **3,431** | **60** | **86** | **3,576** | **509** | **1,155** | **1,650** | **3,314** | **6,889** |
| *Spring 2013 Total* | *5,201* | *60* | *85* | *5,346* | *483* | *1,118* | *1,597* | *3,197* | *8,543* |
| *Spring 2011 Total* | | | | *4,424* | | | | *7,727* | *12,151* |
| 2015 vs. 2013 | (1,771) | 0 | 0 | (1,770) | 26 | 37 | 53 | 116 | (1,654) |
| 2015 vs. 2011 | | | | (848) | | | | (4,413) | (5,262) |

| | |
|---|---|
| Acres Released Since Spring 2013 | 662 |

| | |
|---|---|
| Acres Issued Since Spring 2013 | 273 |

Footnotes:

| | | | |
|---|---|---|---|
| (1) | Client provided data, Pending Phase 1 Release | (5) | Client provided data, Pending Phase 1 Release |
| (2) | Client provided data, Pending Phase 2 Release | (6) | Client provided data, Pending Phase 2 Release |
| (3) | Client provided data, Pending Phase 3 Release | (7) | Client provided data, Pending Phase 3 Release |
| (4) | Sum of Col (1) through Col (3) | (8) | Sum of Col (5) through Col (7) |
| | | (9) | Col (4) + Col (8) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.5a**
**Permits Counts by Mine Status and Year of Issuance - Facility Operations**

| Issue | Active | | | | Final Map | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| Year | Phase 1 | Phase 2 | Phase 3 | Total | Phase 1 | Phase 2 | Phase 3 | Total | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1982 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1983 | 5 | 0 | 0 | 5 | 2 | 0 | 0 | 2 | 7 |
| 1984 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 |
| 1985 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1987 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 1988 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1989 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1992 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1993 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1994 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1995 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1996 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1998 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2003 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2012 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2014 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| **Total** | **16** | **1** | **1** | **18** | **2** | **0** | **0** | **2** | **20** |
| *Spring 2013 Total* | *14* | *1* | *1* | *16* | *2* | *0* | *0* | *2* | *18* |
| *Spring 2011 Total* | | | | *16* | | | | *2* | *18* |
| 2015 vs. 2013 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 2015 vs. 2011 | | | | 2 | | | | 0 | 2 |

| | |
|---|---|
| Permits Released Since Spring 2013 | 0 |
| Total PSE of Permits Released Since Spring 2013 | 0 |
| Net Adjusted PSE of Permits Released Since Spring 2013 | 0 |

| | |
|---|---|
| Permits Issued Since Spring 2013 | 2 |
| Total PSE of Permits Issued Since Spring 2013 | 8,736,000 |
| Net Adjusted PSE of Permits Issued Since Spring 2013 | 6,211,657 |

| | |
|---|---|
| Permits remaining in system from Spring 2013 to Spring 2015 | 18 |
| Total PSE change of permits remaining in system from Spring 2013 to Spring 2015 | (21,955,000) |
| Net Adjusted PSE change of permits remaining in system from Spring 2013 to Spring 2015 | (19,999,213) |

Footnotes:

| | | | |
|---|---|---|---|
| (1) | Client provided data, Pending Phase 1 Release | (5) | Client provided data, Pending Phase 1 Release |
| (2) | Client provided data, Pending Phase 2 Release | (6) | Client provided data, Pending Phase 2 Release |
| (3) | Client provided data, Pending Phase 3 Release | (7) | Client provided data, Pending Phase 3 Release |
| (4) | Sum of Col (1) through Col (3) | (8) | Sum of Col (5) through Col (7) |
| | | (9) | Col (4) + Col (8) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.5b**
**Implied Bonded Acres by Mine Status and Year of Issuance - Facility Operations**

| Issue | Active | | | | Final Map | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| Year | Phase 1 | Phase 2 | Phase 3 | Total | Phase 1 | Phase 2 | Phase 3 | Total | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1982 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 4 |
| 1983 | 921 | 53 | 78 | 1,052 | 131 | 183 | 262 | 576 | 1,628 |
| 1984 | 475 | 8 | 11 | 493 | 0 | 0 | 0 | 0 | 493 |
| 1985 | 21 | 31 | 45 | 97 | 0 | 0 | 0 | 0 | 97 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1987 | 203 | 0 | 0 | 203 | 0 | 0 | 0 | 0 | 203 |
| 1988 | 0 | 31 | 47 | 78 | 0 | 0 | 0 | 0 | 78 |
| 1989 | 42 | 0 | 0 | 42 | 0 | 0 | 0 | 0 | 42 |
| 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1992 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1993 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1994 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1995 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1996 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1998 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2003 | 32 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 32 |
| 2004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 908 | 0 | 0 | 908 | 0 | 0 | 0 | 0 | 908 |
| 2010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2012 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 2,277 | 0 | 0 | 2,277 | 0 | 0 | 0 | 0 | 2,277 |
| 2014 | 355 | 0 | 0 | 355 | 0 | 0 | 0 | 0 | 355 |
| **Total** | **5,234** | **123** | **184** | **5,542** | **131** | **183** | **262** | **576** | **6,118** |
| *Spring 2013 Total* | *2,740* | *78* | *117* | *2,935* | *131* | *183* | *318* | *632* | *3,567* |
| *Spring 2011 Total* | | | | *4,228* | | | | *632* | *4,860* |
| 2015 vs. 2013 | 2,494 | 46 | 67 | 2,607 | 0 | 0 | (57) | (57) | 2,550 |
| 2015 vs. 2011 | | | | 1,314 | | | | (57) | 1,257 |

| | |
|---|---|
| Acres Released Since Spring 2013 | 0 |

| | |
|---|---|
| Acres Issued Since Spring 2013 | 2,632 |

Footnotes:

| | | | |
|---|---|---|---|
| (1) | Client provided data, Pending Phase 1 Release | (5) | Client provided data, Pending Phase 1 Release |
| (2) | Client provided data, Pending Phase 2 Release | (6) | Client provided data, Pending Phase 2 Release |
| (3) | Client provided data, Pending Phase 3 Release | (7) | Client provided data, Pending Phase 3 Release |
| (4) | Sum of Col (1) through Col (3) | (8) | Sum of Col (5) through Col (7) |
| | | (9) | Col (4) + Col (8) |

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.6a**
**Permits Counts by Mine Status and Year of Issuance - Total**

| Issue Year | Active | | | | Final Map | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Phase 1 | Phase 2 | Phase 3 | Total | Phase 1 | Phase 2 | Phase 3 | Total | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1982 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1983 | 7 | 0 | 0 | 7 | 2 | 0 | 0 | 2 | 9 |
| 1984 | 7 | 0 | 0 | 7 | 4 | 0 | 2 | 6 | 13 |
| 1985 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1987 | 4 | 0 | 0 | 4 | 0 | 0 | 2 | 2 | 6 |
| 1988 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 3 |
| 1989 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 2 |
| 1990 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 1991 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 3 |
| 1992 | 1 | 2 | 1 | 4 | 0 | 1 | 0 | 1 | 5 |
| 1993 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 1994 | 3 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 4 |
| 1995 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 3 |
| 1996 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | 3 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1998 | 6 | 0 | 1 | 7 | 0 | 1 | 0 | 1 | 8 |
| 1999 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 3 |
| 2000 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 3 | 4 |
| 2001 | 1 | 1 | 0 | 2 | 0 | 2 | 1 | 3 | 5 |
| 2002 | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 2 | 4 |
| 2003 | 4 | 1 | 0 | 5 | 0 | 0 | 1 | 1 | 6 |
| 2004 | 5 | 2 | 0 | 7 | 0 | 0 | 4 | 4 | 11 |
| 2005 | 2 | 1 | 0 | 3 | 0 | 1 | 2 | 3 | 6 |
| 2006 | 6 | 2 | 0 | 8 | 0 | 1 | 2 | 3 | 11 |
| 2007 | 4 | 3 | 0 | 7 | 1 | 1 | 2 | 4 | 11 |
| 2008 | 4 | 1 | 0 | 5 | 1 | 0 | 3 | 4 | 9 |
| 2009 | 4 | 1 | 0 | 5 | 0 | 0 | 3 | 3 | 8 |
| 2010 | 1 | 1 | 1 | 3 | 0 | 2 | 1 | 3 | 6 |
| 2011 | 6 | 4 | 0 | 10 | 0 | 1 | 0 | 1 | 11 |
| 2012 | 8 | 3 | 0 | 11 | 0 | 0 | 0 | 0 | 11 |
| 2013 | 8 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 8 |
| 2014 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 7 |
| **Total** | **99** | **26** | **5** | **130** | **11** | **19** | **28** | **58** | **188** |
| *Spring 2013 Total* | *110* | *9* | *6* | *125* | *36* | *34* | *30* | *100* | *225* |
| *Spring 2011 Total* | | | | *127* | | | | *111* | *238* |
| 2015 vs. 2013 | (11) | 17 | (1) | 5 | (25) | (15) | (2) | (42) | (37) |
| 2015 vs. 2011 | | | | 3 | | | | (53) | (50) |

| | |
|---|---|
| Permits Released Since Spring 2013 | 57 |
| Total PSE of Permits Released Since Spring 2013 | 28,487,000 |
| Net Adjusted PSE of Permits Released Since Spring 2013 | 18,074,630 |

| | |
|---|---|
| Permits Issued Since Spring 2013 | 20 |
| Total PSE of Permits Issued Since Spring 2013 | 92,535,000 |
| Net Adjusted PSE of Permits Issued Since Spring 2013 | 35,137,098 |

| | |
|---|---|
| Permits remaining in system from Spring 2013 to Spring 2015 | 168 |
| Total PSE change of permits remaining in system from Spring 2013 to Spring 2015 | (135,382,200) |
| Net Adjusted PSE change of permits remaining in system from Spring 2013 to Spring 2015 | (91,725,066) |

Footnotes:

(1) Sum of Exhibits 8.3a through 8.5a Col (1), Pending Release
(2) Sum of Exhibits 8.3a through 8.5a Col (2), Pending Release
(3) Sum of Exhibits 8.3a through 8.5a Col (3), Pending Release
(4) Sum of Col (1) through Col (3)
(5) Sum of Exhibits 8.3a through 8.5a Col (5), Pending Release
(6) Sum of Exhibits 8.3a through 8.5a Col (6), Pending Release
(7) Sum of Exhibits 8.3a through 8.5a Col (7), Pending Release
(8) Sum of Col (5) through Col (7)
(9) Col (4) + Col (8)

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 8.6b**
**Implied Bonded Acres by Mine Status and Year of Issuance - Total**

| Issue Year | Active | | | | Final Map | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Phase 1 | Phase 2 | Phase 3 | Total | Phase 1 | Phase 2 | Phase 3 | Total | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1982 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 4 |
| 1983 | 1,124 | 55 | 80 | 1,260 | 131 | 183 | 262 | 576 | 1,836 |
| 1984 | 1,306 | 65 | 93 | 1,463 | 501 | 951 | 1,446 | 2,898 | 4,361 |
| 1985 | 21 | 31 | 45 | 97 | 8 | 204 | 291 | 502 | 599 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 56 | 80 | 136 | 136 |
| 1987 | 587 | 109 | 156 | 852 | 0 | 0 | 445 | 445 | 1,297 |
| 1988 | 0 | 70 | 102 | 172 | 0 | 0 | 0 | 0 | 172 |
| 1989 | 42 | 0 | 0 | 42 | 0 | 83 | 119 | 203 | 245 |
| 1990 | 0 | 0 | 0 | 0 | 45 | 63 | 91 | 200 | 200 |
| 1991 | 138 | 0 | 0 | 138 | 0 | 113 | 336 | 449 | 587 |
| 1992 | 7 | 168 | 274 | 449 | 0 | 28 | 40 | 68 | 517 |
| 1993 | 14 | 27 | 59 | 100 | 0 | 0 | 0 | 0 | 100 |
| 1994 | 48 | 362 | 944 | 1,354 | 0 | 0 | 0 | 0 | 1,354 |
| 1995 | 46 | 64 | 153 | 264 | 0 | 147 | 210 | 358 | 622 |
| 1996 | 188 | 0 | 0 | 188 | 0 | 341 | 564 | 905 | 1,093 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 105 | 388 | 493 | 493 |
| 1998 | 385 | 895 | 1,593 | 2,873 | 0 | 65 | 93 | 159 | 3,032 |
| 1999 | 11 | 42 | 92 | 145 | 0 | 16 | 124 | 140 | 285 |
| 2000 | 0 | 0 | 0 | 0 | 20 | 37 | 133 | 190 | 190 |
| 2001 | 12 | 286 | 602 | 900 | 0 | 31 | 1,020 | 1,051 | 1,952 |
| 2002 | 5 | 92 | 202 | 299 | 0 | 0 | 81 | 81 | 380 |
| 2003 | 327 | 399 | 571 | 1,297 | 0 | 0 | 69 | 69 | 1,366 |
| 2004 | 1,141 | 294 | 453 | 1,888 | 0 | 0 | 454 | 454 | 2,343 |
| 2005 | 8 | 79 | 411 | 498 | 0 | 56 | 760 | 817 | 1,315 |
| 2006 | 2,207 | 766 | 1,189 | 4,162 | 0 | 146 | 403 | 549 | 4,711 |
| 2007 | 2,931 | 437 | 1,038 | 4,405 | 7 | 496 | 1,120 | 1,623 | 6,028 |
| 2008 | 114 | 1,142 | 1,769 | 3,025 | 141 | 197 | 1,063 | 1,401 | 4,426 |
| 2009 | 1,005 | 485 | 745 | 2,235 | 0 | 0 | 204 | 204 | 2,439 |
| 2010 | 9 | 86 | 225 | 319 | 0 | 62 | 150 | 212 | 531 |
| 2011 | 6,976 | 649 | 928 | 8,553 | 0 | 62 | 88 | 150 | 8,703 |
| 2012 | 2,881 | 415 | 593 | 3,889 | 0 | 0 | 0 | 0 | 3,889 |
| 2013 | 6,606 | 76 | 109 | 6,791 | 0 | 0 | 0 | 0 | 6,791 |
| 2014 | 5,238 | 0 | 0 | 5,238 | 0 | 0 | 0 | 0 | 5,238 |
| **Total** | **33,378** | **7,096** | **12,427** | **52,901** | **853** | **3,446** | **10,035** | **14,334** | **67,234** |
| *Spring 2013 Total* | *36,393* | *6,041* | *10,486* | *52,919* | *2,337* | *8,063* | *17,380* | *27,780* | *80,699* |
| *Spring 2011 Total* | | | | *57,968* | | | | *31,944* | *89,912* |
| 2015 vs. 2013 | (3,015) | 1,055 | 1,941 | (19) | (1,484) | (4,618) | (7,345) | (13,446) | (13,465) |
| 2015 vs. 2011 | | | | (5,067) | | | | (17,611) | (22,678) |

| | |
|---|---|
| Acres Released Since Spring 2013 | 10,871 |

| | |
|---|---|
| Acres Issued Since Spring 2013 | 14,104 |

Footnotes:

(1) Sum of Exhibits 8.3b through 8.5b Col (1), Pending Release
(2) Sum of Exhibits 8.3b through 8.5b Col (2), Pending Release
(3) Sum of Exhibits 8.3b through 8.5b Col (3), Pending Release
(4) Sum of Col (1) through Col (3)
(5) Sum of Exhibits 8.3b through 8.5b Col (5), Pending Release
(6) Sum of Exhibits 8.3b through 8.5b Col (6), Pending Release
(7) Sum of Exhibits 8.3b through 8.5b Col (7), Pending Release
(8) Sum of Col (5) through Col (7)
(9) Col (4) + Col (8)

Spring 2013 and Spring 2011 Amounts from the Spring 2013 and Spring 2011 Reports by Pinnacle

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 9**
**Projected Investment Rates**
Based on US Treasury Returns in Spring 2015

| Calendar Year | Investment Return (%) | Yearly Discount Factor | Compound Discount Factor |
|---|---|---|---|
| | (1) | (2) | (3) |
| 2015 | **0.260%** | 99.741% | -0.130% |
| 2016 | 0.260% | 99.741% | -0.389% |
| 2017 | **0.560%** | 99.443% | -0.943% |
| 2018 | 0.560% | 99.443% | -1.495% |
| 2019 | **0.890%** | 99.118% | -2.364% |
| 2020 | 0.890% | 99.118% | -3.225% |
| 2021 | 1.130% | 98.883% | -4.307% |
| 2022 | 1.130% | 98.883% | -5.376% |
| 2023 | **1.370%** | 98.649% | -6.655% |
| 2024 | 1.370% | 98.649% | -7.916% |
| 2025 | 1.540% | 98.483% | -9.313% |
| 2026 | 1.560% | 98.464% | -10.706% |
| 2027 | **1.710%** | 98.319% | -12.207% |
| 2028 | 1.740% | 98.290% | -13.709% |
| 2029 | 1.780% | 98.251% | -15.218% |
| 2030 | 1.810% | 98.222% | -16.725% |
| 2031 | 1.840% | 98.193% | -18.230% |
| 2032 | 1.870% | 98.164% | -19.731% |
| 2033 | 1.910% | 98.126% | -21.235% |
| 2034 | **1.940%** | 98.097% | -22.734% |
| 2035 | 2.000% | 98.039% | -24.249% |
| 2036 | 2.060% | 97.982% | -25.778% |
| 2037 | 2.120% | 97.924% | -27.319% |
| 2038 | 2.180% | 97.867% | -28.869% |
| 2039 | 2.240% | 97.809% | -30.428% |
| 2040 | 2.300% | 97.752% | -31.992% |
| 2041 | 2.360% | 97.694% | -33.560% |
| 2042 | 2.420% | 97.637% | -35.130% |
| 2043 | 2.480% | 97.580% | -36.700% |
| 2044 | **2.540%** | 97.523% | -38.268% |

Footnotes:

(1) Based on US Treasury Returns in Spring 2015; Returns not in **Bold** are interpolated from US Treasury Rates

(2), (3) Based on Col (1)

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 10.1**
**Water Reclamation Cost**

| | | Surface | Underground | Other | Total |
|---|---|---|---|---|---|
| Acres | (1) Permitted acres with water treatment | 82 | 2,617 | 0 | 2,699 |
| | (2) Permitted acres with water monitoring | 1,075 | 0 | 391 | 1,466 |
| | (3) Percent of monitored permits that become water treatment | 50.00% | 50.00% | 50.00% | |
| | (4) Projected permitted acres with water treatment | 619 | 2,617 | 195 | 3,431 |
| Average Cost | (5) Water capital Ohio permit #433 avg cost per *affected* acre | | 13.36 | | |
| | (6) Water treatment Ohio permit #433 avg cost per *affected* acre | | 318.36 | | |
| | (7) Water capital West Virginia avg cost per permitted acre | 11.94 | 54.91 | 42.68 | |
| | (8) Water treatment West Virginia avg cost per permitted acre | 6.91 | 241.40 | 180.88 | |
| Selected Average Cost | (9) Water capital selected avg cost per permitted acre | 11.94 | 54.91 | 42.68 | |
| | (10) Water treatment selected avg cost per permitted acre | 6.91 | 241.40 | 180.88 | |
| Number of Exposure Years | (11) Number of years for water capital reclamation | 75 | 75 | 75 | |
| | (12) Number of years for water treatment reclamation | 75 | 75 | 75 | |
| Forfeiture Rate | (13) Water forfeiture rate | 2.21% | 2.21% | 2.21% | |
| Estimate 1 Gross Reclamation Cost | (14) Water capital reclamation cost | 12,242 | 238,142 | 13,825 | 264,208 |
| | (15) Water treatment reclamation cost | 7,088 | 1,046,916 | 58,588 | 1,112,592 |
| | (16) Estimate 1 - Total gross water reclamation cost | 19,329 | 1,285,058 | 72,413 | 1,376,800 |
| Estimate 2 Gross Reclamation Cost | (17) Gross land reclamation cost | | | | 30,110,830 |
| | (18) Selected relationship of water cost to land cost | | | | 20% |
| | (19) Estimate 2 - Total gross water reclamation cost | | | | 6,022,166 |
| Estimate 3 | (20) Prior Ohio analysis selected gross water reclamation cost | | | | 2,500,000 |
| | (21) Selected gross water reclamation cost | | | | 2,250,000 |
| Net Reclamation Cost | (22) Water Trust Fund mitigation adjustment percentage | | | | 10% |
| | (23) Total estimated net water reclamation cost | | | | 2,025,000 |

Footnotes:

| | |
|---|---|
| (1), (2) | Provided by Client |
| (3) | Judgmental Selection (2 of 4 current monitored sites not expected to develop into long term water treatment) |
| (4) | Row (1) + Row (2) x Row (3) |
| (5), (6) | Derived from Client Data, Exhibit 10.2a |
| (7), (8) | Internal Analysis of West Virginia Data, treatment costs adjusted for pre 2011 NPDES standards |
| (9) | Row (7) |
| (10) | Row (8) |
| (11), (12) | Based on Client estimates. |
| (13) | Judgmental Selection. Compares to approximate 1.1% selection of non-water forfeiture. |
| (14) | Row (4) x Row (9) x Row (11) x Row (13) |
| (15) | Row (4) x Row (10) x Row (12) x Row (13) |
| (16) | Row (14) + Row (15) |
| (17) | Exhibit 2.2 Col (1) |
| (18) | Based on West Virginia 2012 Analysis: Water (Capital and Treatment) Liability / Land Liability approaching 100%, then adjusting for Ohio WATER TREATMENT being about 10% of WV post NPDES updated standards average costs. |
| (19) | Row (17) x Row (18) |
| (20) | Selection from the Prior Ohio analysis (2013 Report) |
| (21) | Selection based on Row (16), Row (19), and Row (20) |
| (22) | Judgmental Selection, considering forfeitures before Trust is set up or while Trust is partially funded by the RFF. |
| (23) | Row (21) x [1.00 - Row (22)] |

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 10.2a**
**Water Reclamation Cost**

**Ohio Permits with Water Treatment**

| | | Surface | Underground | Other |
|---|---|---|---|---|
| | Water Capital Cost per Year | | 7,293 | |
| Permit # | Water Treatment Cost per Year | | 173,728 | |
| 433 | Permitted Acres | | 579 | |
| Issue Yr. | Affected Acres | | 546 | |
| 1984 | Implied Bonded Acres | | 116 | |
| | Total PSE | | 21,000 | |
| | Net Adjusted PSE | | 16,750 | |
| | Water Capital Cost per Year | | N/A | |
| Permit # | Water Treatment Cost per Year | | N/A | |
| 325 | Permitted Acres | | 934 | |
| Issue Yr. | Affected Acres | | 440 | |
| 1984 | Implied Bonded Acres | | 384 | |
| | Total PSE | | 5,019,000 | |
| | Net Adjusted PSE | | 4,644,625 | |
| | Water Capital Cost per Year | N/A | | |
| Permit # | Water Treatment Cost per Year | N/A | | |
| 328 | Permitted Acres | 82 | | |
| Issue Yr. | Affected Acres | 78 | | |
| 1984 | Implied Bonded Acres | 78 | | |
| | Total PSE | 126,000 | | |
| | Net Adjusted PSE | 96,900 | | |
| | Water Capital Cost per Year | | N/A | |
| Permit # | Water Treatment Cost per Year | | N/A | |
| 354 | Permitted Acres | | 1,048 | |
| Issue Yr. | Affected Acres | | 835 | |
| 1984 | Implied Bonded Acres | | 1,796 | |
| | Total PSE | | 15,243,000 | |
| | Net Adjusted PSE | | 13,257,625 | |
| | Water Capital Cost per Year | | N/A | |
| Permit # | Water Treatment Cost per Year | | N/A | |
| 355 | Permitted Acres | | 316 | |
| Issue Yr. | Affected Acres | | 267 | |
| 1984 | Implied Bonded Acres | | 514 | |
| | Total PSE | | 422,000 | |
| | Net Adjusted PSE | | 0 | |
| | Water Capital Cost per Year | | N/A | |
| Permit # | Water Treatment Cost per Year | | N/A | |
| 463 | Permitted Acres | | 319 | |
| Issue Yr. | Affected Acres | | 319 | |
| 1985 | Implied Bonded Acres | | 502 | |
| | Total PSE | | 1,444,800 | |
| | Net Adjusted PSE | | 1,061,925 | |

Data provided by Client

**OHIO RECLAMATION FORFEITURE FUND ANALYSIS**
**SPRING 2015**

**Exhibit 10.2b**
**Water Reclamation Cost**

| **Ohio Permits Being Monitored For Possible Water Treatment** | | | | |
|---|---|---|---|---|
| | | Surface | Underground | Other |
| Permit # | Permitted Acres | | | 344 |
| 215 | Affected Acres | | | 279 |
| Issue Yr. | Implied Bonded Acres | | | 508 |
| 1983 | Total PSE | | | 500,000 |
| | Net Adjusted PSE | | | 0 |
| Permit # | Permitted Acres | 134 | | |
| 219 | Affected Acres | 127 | | |
| Issue Yr. | Implied Bonded Acres | 202 | | |
| 1983 | Total PSE | 532,000 | | |
| | Net Adjusted PSE | 316,727 | | |
| Permit # | Permitted Acres | 940 | | |
| 1149 | Affected Acres | 530 | | |
| Issue Yr. | Implied Bonded Acres | 493 | | |
| 1997 | Total PSE | 881,000 | | |
| | Net Adjusted PSE | 604,563 | | |
| Permit # | Permitted Acres | | | 47 |
| 223 | Affected Acres | | | 42 |
| Issue Yr. | Implied Bonded Acres | | | 86 |
| 1983 | Total PSE | | | 322,000 |
| | Net Adjusted PSE | | | 200,295 |

Data provided by client.