



374 Meridian Parke Lane, Suite C
Greenwood, IN 46142
Phone: (317) 889-5760 Fax: (317) 889-5766

John E. Wade, ACAS, MAAA
JWade@PinnacleActuaries.com

May 19, 2008

Lawrence V. Ruane
Administrator, Mine Subsidence Insurance Program
Division of Environmental Analysis and Support
Pennsylvania Department of Environmental Protection
Bureau of Mining and Reclamation
Rachel Carson State Office Building
P.O. Box 8461
Harrisburg, PA 17105-8461

Dear Mr. Ruane:

Enclosed is our revised report for the Pennsylvania Mine Subsidence Insurance Fund (MSI Fund) on the actuarial valuation of premium and outstanding liabilities as of June 30, 2007. Revisions include the comments and requests up to and including the April 18 Board meeting.

Please contact me at (317) 889-5760 or by email at JWade@PinnacleActuaries.com if you have any questions.

Sincerely,

John E. Wade, ACAS, MAAA
Senior Consulting Actuary

Report on the Actuarial Valuation

of the

Pennsylvania Mine Subsidence Insurance Fund

*Actuarial Analysis
as of June 30, 2007*

May, 2008

*Pinnacle Actuarial Resources, Inc.
374 Meridian Parke Lane, Suite C
Greenwood, IN 46142*

TABLE OF CONTENTS

<i>I. BACKGROUND</i>	1
Purpose and Scope	1
Fund History	1
Methodology	2
Data	2
Distribution and Use.....	2
Reliances and Limitations	3
<i>II. EXECUTIVE SUMMARY</i>	4
<i>III. FINANCIAL STATUS</i>	5
Outstanding Liabilities	5
Assets	6
Surplus.....	6
Cash Flow.....	9
Immediate and Future Status of MSI Fund	11
<i>IV. PREMIUM RATES</i>	12
Overall Premium Levels.....	12
Residential and Non-Residential Premium Rates	12
Charges for the Initial Amount of Coverage	14
Multiple Policy Discounts.....	14
Multiple Rating Systems	15
Program Growth.....	15
<i>V. RESERVES FOR OUTSTANDING CLAIMS</i>	16
<i>VI. COVERAGE LIMITS</i>	16
<i>VII. REINSURANCE AND THE RISK OF CATASTROPHIC LOSS</i>	17
<i>VIII. CONCLUDING REMARKS</i>	20

EXHIBITS

Pennsylvania Mine Subsidence Insurance Fund

Actuarial Valuation as of June 30, 2007

I. BACKGROUND

Purpose & Scope

Pinnacle Actuarial Resources, Inc. (Pinnacle) was retained by the Pennsylvania Department of Environmental Protection (DEP or Department) to provide an actuarial valuation of the Mine Subsidence Insurance Fund (MSI Fund or Fund) as of June 30, 2007.

Fund History

Mine Subsidence Insurance typically covers structural damage to residential and/or commercial buildings and specific affixed appurtenances as the result of surface ground movement following a mine subsidence event. In the late 1950s this coverage in the Pennsylvania commercial market place became cost prohibitive. The Commonwealth created the MSI Fund in the early 1960s to address the lack of available affordable coverage.

The MSI Program is administered under the Bureau of Mining and Reclamation, Department of Environmental Protection, taking advantage of administrative resources available to the DEP, including premium collection, policy issuance, claim investigation, claim payments, and data collection. Initial funding for the MSI Fund came from a one million dollar grant. Subsequent premium collections have elevated the Fund balance to over fifty million dollars as of June 30, 2007. The Fund carries a \$700,000 liability on outstanding reported and unknown claims. Over fifty thousand structures are currently insured, providing over six billion dollars of coverage.

Coverage under the Fund has been limited to \$250,000 since 2003, with lesser limits being available prior to 2003. These limitations have greatly reduced the risk of catastrophic loss due to an insured structure having a claim.

Premiums are established by formulas that vary by type of structure (residential versus non-residential) and amount of coverage. A ten percent discount is offered to residential owners who are 65 years of age or older.

It is desired that the MSI Fund remain solvent, providing low-cost coverage that is economically administered, resulting in increased subscriptions.

Methodology

Claims data were analyzed to determine outstanding loss, reporting patterns, average claims, and the adequacy of rate levels. Relevant criteria were utilized in producing a future cash flow model. Standard actuarial techniques were employed throughout. Details are contained in this report and attached exhibits.

Data

The primary source of data was special detail claims and summarized policy runs against MSI Fund databases. Little adjustment to data fields in terms of correction was needed. In some cases occurrence dates had to be reformatted or judgmentally selected. Amy Berrios supplied the internal data to us. Additional insight on Fund operation was provided by Larry Ruane, Administrator, and Amy Berrios in our initial project meeting, follow up phone calls, and subsequent emails. Data was primarily reviewed on a Fiscal Report Year basis, although Calendar Report Year was used in the Catastrophe analysis.

Another key data source was the annual MSI Fund Board meeting minutes on the MSI Fund website. This was a valuable resource in pulling financial and other operation information. Data therein was generally on a Fiscal Year basis and included several years of historic detail.

Some external data was also utilized, including Earthquake and Flood information. This data was limited, but was supplemented by discussion with DEP geologist Greg Schuler. Further, information was assimilated from other state mine subsidence programs.

Distribution & Use

This study has been conducted at the request of DEP officials.

The exhibits attached in support of our findings are an integral part of this report. These sections have been prepared so that our actuarial assumptions and judgments are documented. 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 discussed in this report.

Reliances & 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.

Throughout our analysis we have, without audit or verification, relied on historical data and qualitative information provided by the DEP. We have reviewed this data for consistency and believe it to be reasonable and accurate. However, we have made no attempt to audit or verify this information. The accuracy of our results is dependent upon the accuracy and completeness of this underlying data. Therefore, any material discrepancies discovered in this data by DEP or its auditor should be reported to us and this report amended accordingly, if warranted. It is noted that some claims records were incomplete, particularly in some of the relevant date fields. This adds to the potential uncertainty associated with calculating estimates of the liabilities.

There is a limitation upon the accuracy of these estimates and projections in that there is an inherent uncertainty in any estimate of loss reserves and financial projections. This 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 claimants bringing suit, the size of awards, changes in the standards of liability, and the attitudes of claimants toward settlement of their claims. Also our financial projections are subject to a very high degree of uncertainty because they require prediction of future economic, legal, and judicial conditions which are not knowable. 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 financial results will likely deviate, perhaps materially, from our estimates.

II. EXECUTIVE SUMMARY

The MSI Fund program is a well funded mechanism for providing mine subsidence insurance coverage for those consumers living in designated mine subsidence areas. Claims data is thin, but claims settle quickly once they are reported. Due to the unique nature of the coverage (low claim frequency) and the limitation on data, traditional development techniques for determining outstanding liabilities are not as reliable as in some other lines of insurance, but are necessary in light of just as limited external data and other reserving techniques.

The current Premium Rates have been in use for a long time. The following analysis and recommendation call for a significant rate reduction that should lead to increased penetration without having a negative impact on the financial integrity of the Fund.

Catastrophic potential was analyzed and models were sensitivity tested, leading to the conclusion that reinsurance is not needed at this time.

The following points summarize our observations and recommendations.

- The MSI Fund is financially sound.
- The Fund's projected surplus can withstand significant catastrophic losses.
- A reduction in the Fund's surplus is not recommended at this time.
- A 27.9% Premium reduction is recommended.
- A 10% Multi-Policy/Condominium Association Group discount is recommended.
- The flat reserve for reported claims should be changed to \$3,500.
- No change is recommended to the \$250,000 coverage limit at this time.
- Reinsurance coverage is not recommended at this time.

III. FINANCIAL STATUS

The MSI Fund maintains a strong financial position, as is evidenced by past financial statements, and supported by this actuarial review. The Fund's projected surplus is sufficient to see it through several years of significant underwriting loss and probably even withstand significant catastrophic losses.

1. Outstanding Liabilities

In terms of claim obligations, it is estimated the Fund has an outstanding liability of \$344,000, as developed on Exhibit 1. This estimate is derived from the paid claim file for the 1991 fiscal report year and subsequent as of June 30, 2007, provided by the DEP. Claims were aggregated on a Fiscal Report Year basis. A review was made of the relationship of the reporting pattern and the occurrence date. Adjustment factors, commonly referred to as Loss Development Factors, were estimated to account for unreported claims. It should be noted, that some of the occurrence dates were not always accurate, sometimes being later than the report date, incomplete, or inconsistently coded. In such cases logical assumptions were made to populate this field. Report date issues were not observed.

Mine Subsidence claims are generally considered to be of a high severity, low frequency nature, resulting in thin and volatile historical data. However, once a claim is reported, it generally is adjusted, paid, and settled quickly. There is little development on known claims. Development does exist for unknown claims. Incurred But Not Reported (IBNR) claims are the result of covered occurrences that have not been discovered, or at least have not been reported, or if reported, have not had a claim file established. For an average Fiscal Report Year approximately 10 to 15% of the claim liabilities are not yet reported as of the end of that year. This figure drops to 7 or 8% after the second year, and continues to decline to zero. The longest reporting lag observed in the MSI paid data was 40 years, indicating a need for at least a modest tail factor for all Report Years not at least 40 years old. Since data was only provided back to the 1991 Fiscal Report Year, an estimate of the Prior Years' outstanding liabilities was made based on the oldest of the data and the observed reporting pattern.

It is interesting to observe that the MSI financial statements have recently carried Liabilities for Outstanding Claims in amounts ranging from \$600,000 most recently to \$850,000. It is not

certain how these estimates are derived. They may be IBNR estimates, or they may represent known obligations on known claims that have simply not yet been paid.

2. Assets

The assets of the MSI Fund may generally be considered the funds available for investing as Furniture and Equipment make up less than 1% of MSI assets. MSI investable assets have grown strongly over the years, fueled by premium growth, low claim liabilities, and favorable investment rates of return. As of Fiscal Year ending 06/30/06, investable funds were just over \$54 million. Pinnacle has estimated the investable funds as of 06/30/07 to be \$60 million, matching the growth seen in the prior year, based on recent investment returns and the historically low number of claims that are paid annually.

3. Surplus

The required surplus level for an insurance entity is dependent on goals of the insuring entity, underlying nature of the risk being insured, and capital structure of the insurance entity. Surplus typically is equated with the net worth of the insurance entity and protects the viability of the insurance entity from extreme or unforeseen adverse events, allows entities to expand coverage, and is a source of income generated through investment activities. The ability of a company to raise capital also impacts how much surplus a company will hold in reserve. If a company has limited means to raise capital, more surplus will need to be held.

Property insurers generally cover short tail exposures with predictable severities and frequencies. When severities or frequencies are less predictable, greater surplus is then needed to cover the potential adverse results that can occur. When the property insured is subject to potential catastrophic loss risk increases. The level of held surplus increase should increase accordingly.

There are a number of considerations when evaluating the appropriate surplus level for the Pennsylvania Mine Subsidence Insurance Fund. Mine subsidence coverage is subject to low frequency, however it is possible that one natural event would impact multiple insureds, increasing frequency. Severity tends to be low in comparison to coverage purchased. However, the potential for total losses does exist and total losses do occur. Further, maximum policy limits restrict the level of loss to any one insured. These factors may mitigate the potential for a catastrophic mine subsidence loss, however the risk remains, requiring a higher surplus level.

The primary source of capital is underwriting income (premium excess of loss and expense.) In the past underwriting income has resulted in consistent increases to surplus, however a reduction in rates as recommended will decrease the level of underwriting income and mostly likely reduce the rate of increase in surplus. Also, the Pennsylvania Mine Subsidence Insurance Fund has limited ability to raise capital. As a government agency, the Fund could possibly borrow money, although this may not be a desirable situation.

In 1972 Hurricane Agnes caused localized flooding in the Wilkes-Barre region. The damages occurred when a levee on the West Bank of the Susquehanna River located across the river from Wilkes-Barre was breached. During the time that flood related claims were processed, from 1972 through 1975, there was a significant increase to the number of claims reported in the Anthracite Region. In 1971 there were 7 claims paid in the Anthracite Region. The paid claims jumped to 34 in 1974 before dropping back to 19 in 1976, when the last of the Agnes related claims were paid. The potential for larger regions of flooding in the future does exist. As the Fund's penetration in the marketplace increases, exposure concentration will increase and exposure to catastrophic events from flooding or earthquake also increases.

One gauge of an appropriate surplus level is to review the surplus levels carried by other property insurance writers. Since, the Pennsylvania Mine Subsidence Insurance Fund covers only property a comparison of companies that write primarily property would be appropriate. Data was collected from A.M. Best on companies where property premium made up at least 80 percent of their total premium. Excerpts from that analysis are shown in the table below.

NET PREMIUM TO SURPLUS RATIOS
ALL WRITERS AND PROPERTY DOMINANT WRITERS

Characteristic	Net Premium to Surplus Ratio	Implied MSIF Surplus
Historic Benchmark (All Writers)	2/1	\$3,000,000
Current Industry Trend (All Writers)	< 1/1	\$7,000,000
Industry Property Writers (2003-2007)	.76/1	\$8,000,000
Industry Property Writers (2007)	.62/1	\$10,000,000
Select Property (only) Reinsurers (2003-2007)	.29/1	\$21,000,000
Select Property (only) Reinsurers (2007)	.26/1	\$23,000,000
California Earthquake Authority (2003-2007)	.15/1	\$40,000,000
California Earthquake Authority (2007)	.12/1	\$50,000,000

The Fund's premium is approximately \$6 million annually. If a similar premium to surplus level as that held by the California Earthquake Authority (CEA), .12/1, then a surplus of approximately \$50 million (\$6,000,000/.12) would be required. Note that this was the approximate level of surplus of the Fund as of 06/30/06.

Consideration should also be given to the relationship of premium to coverage in force (CIF). It might be more appropriate to relate surplus levels to CIF as this benchmark is not subject to shifting rate levels, but is the true measure of exposure at risk and will capture the impact of any significant exposure growth in the Fund. The Fund's CIF at 06/30/06 was about \$6.7 billion. A \$50 million dollar surplus translates to a surplus level of \$7.43 per \$1,000 of CIF.

Current CEA rates range from \$67 to \$948 for \$100,000 of coverage (with a 10% deductible), depending on construction, number of stories, and location. At the higher end of the premium/risk range this amounts to roughly \$10 of premium per \$1,000 of CIF. At the low end

of the premium/risk range this amounts to about \$0.80 of premium per \$1,000 of CIF. With a .12/1 premium to surplus ratio for the CEA, the premium per \$1,000 CIF translates to about \$83 of surplus to \$1,000 CIF (\$10/.12) at the high end of the California earthquake rates, and to \$7 of surplus to \$1,000 CIF (\$0.80/.12) at the low end of the California earthquake rates.

While the CEA has different coverages (contents, loss of use, etc) these coverages were kept at the minimum when reviewing the rate examples. Frequencies and severities will also differ between the CEA and mine subsidence. However, the 06/30/06 numbers of \$7.43 surplus to \$1,000 CIF level for mine subsidence seems reasonable in light of these earthquake numbers.

As a conservative measure, it is recommended that the fund use a \$7.50 surplus to \$1,000 CIF benchmark in gauging a desirable surplus level. Based on estimated 06/30/08 Coverage in Force of \$7.2 billion (see Exhibit 2), this implies a surplus benchmark of about \$53 million. This figure is likely just a little lower than current Fund equity. While a minor redistribution (premium refund) of the excess surplus would be possible, it is not recommended at this time. The recommended rate cuts should be implemented and then their impacts observed before lowering the surplus.

4. Cash Flow

Exhibit 2 displays the Fund's estimated cash flow for the next 10 fiscal years. At the end of 10 years it is estimated that the Fund's ending balance will be over \$165 million if no change is made to the premium rates.

Several factors go into the cash flow analysis, including estimated premium growth and refunds, paid commissions, investment income, paid losses, and administrative expense. Exhibit 3 shows the development of the various growth rates applied within the cash flow analysis. Premium rates have not changed for some time. The relation of premium to Coverage in Force (CIF) was declining, but in the most recent years has been fairly stable at 92 cents per \$1,000 of coverage. This latter figure was selected and held constant to project each of the next 10 years. In addition, premium refunds have been consistently running at about 0.5% per \$1,000 of CIF.

For premium, and many of the other cash flow parameters, projected CIF figures were developed. Many of the cash flow parameters have very consistent relationships with CIF. Losses and Administrative Expenses are the notable exceptions.

The historic annual growth of Coverage In Force was reviewed, along with the growth of Policies In Force and Inflationary Trends. These latter two items are what might be considered the primary drivers of CIF growth. Annual changes of 1.5% and 3.7% were selected for Policy growth and Inflation, respectively. (See Exhibit 3.) However, even after accounting for Policy Growth and Coverage Inflation, there is still a significant residual effect from other unknown factors. The historic pattern of these other factors was also considered in establishing a CIF growth rate. In the end, 6.9% CIF annual growth was selected. Exhibit 3 displays the detail of the above discussion.

Commissions are a relatively new phenomenon and are related to outside producers writing coverage for the MSI program. Currently the MSI pays 50% of the first year premium for an outside producer writing an MSI program policy. The most recent Operational Performance report shows Paid Commissions that have grown to 3.0% of the CIF. See Exhibit 3. For the cash flow analysis the Commission rate to CIF was set at 4.0% and allowed to grow in 0.5% increments until reaching 7.5%. At this point it should be noted that even though Producers have been adding to the MSI program policy counts, it has come at a time of decreasing production by the MSI itself. It's possible that some of the Producer writings have included policies that might have been written by the MSI itself.

Investment return rates have grown steadily over the past few years. The average return for Fiscal Year ending 06/30/06 was 5.86%. For the future cash flow analysis the return was selected to be a constant 5.50%, anticipating the status quo as a probable future likelihood.

Even though the relationship of Paid Loss to CIF has not been consistent, a long term average ratio was selected for future projections. The lack of consistency on a year-to-year basis has nothing to do with the CIF itself, and the CIF is a very reliable measure of exposure. Taking a long term average of a high severity/low frequency exposure is a common actuarial practice and is often used in establishing catastrophe loads. One can not predict, with any kind of certainty, the annual number of catastrophes or the number of mine collapses resulting in insured loss, or

the severity of those losses. Using a long term average applied to the stable CIF allows a good means of bringing in total expected mine subsidence losses in a smooth process, although it does not account for the annual fluctuation that is apparent when reviewing the historic patterns in Exhibit 3. For the cash flow analysis we have selected a long term average ratio to CIF of 12.4%.

The last parameter reviewed in the cash flow analysis was Administrative Expense. Unlike many of the other parameters, Administrative Expense is not directly proportional to CIF. Many expenses are fixed in nature, while others can dramatically increase or decrease regardless of the CIF levels. Over the last 10 fiscal years Administrative Expenses have grown from \$1.2 million to \$1.9 million, in a notably fluctuating manner. See the historic detail in Exhibit 3, column 15. For this analysis, an annual expense growth rate of 5.0% was selected and applied consistently to each new year. A starting expense of \$2.0 million was selected for Fiscal Year ending 06/30/07.

A second scenario was modeled in the cash flow analysis. The only difference from what has been discussed above is a premium rate reduction of 25% was incorporated, effective 01/01/08. As can be seen in Exhibit 2, this change brought the Fund's estimated ending balance down to \$139 million as of 06/30/17.

Finally, both of the above scenarios were run again, but this time selecting an investment rate of return of 4.00% as a more conservative measure. As can be seen in Exhibit 2, this change brought the Fund's estimated ending balance down to \$146 million as of 06/30/17, assuming no premium rate reduction. With a 25% premium rate reduction, the 4.00% rate of return assumptions brings the projected ending balance down to \$122 million as of 06/30/17. See Exhibit 2.

5. Immediate and Future Status of MSI Fund

Exhibit 2 summarizes the various elements that make up the Fund adjustments, and the resulting estimated Fund balance for each of the next 10 Fiscal Years.

IV. PREMIUM RATES

1. Overall Premium Levels

The current premium rate levels have adequately funded the MSI program for some years to come. An indicated premium adjustment is developed in Exhibit 4. Many of the parameters in Exhibit 4 were developed in Exhibit 3. The rate indication methodology employed is referred to as a loss ratio approach. Under this approach, the estimated future loss plus non-premium variable expense is divided by the estimated premium less premium variable expense plus investment income.

Generally, an adjustment for profit and contingencies is included in the denominator of the indications calculation. While this was not done explicitly in this case, as a conservative measure, an allowance for the fluctuating amount of losses was included in the calculation. This allowance was set equal to the average incurred loss (average paid loss plus average loss reserve). A review of exhibit 3 shows that the paid loss amount (as a percent of Coverage In Force), was at about double the selected long term average in one year, and at or above 20% in two other years. Many years were well below the 12.4% selected average. By basically doubling the average expected loss we have accounted for a recurrence of the most extreme loss in the data period under review without having to consider a rate increase. The surplus increase that will be generated in most years should comfortably add to the amount of funds available to cover the improbable catastrophe loss.

The overall premium indicated rate level change is for a 58.1% decrease.

An overall premium rate level decrease of 27.9% is proposed, a summary of which can be found in Exhibit 5. Parts of this proposed decrease are discussed in the following sections. A larger decrease is not suggested at this time for conservative reasons, to mitigate market disruptions, and in recognition of the fact that a significant portion of the indicated decrease is driven by the investment income generated from surplus.

2. Residential and Non-Residential Premium Rates

Non-Residential Premium Rates are currently about four times the Residential Premium Rates. When these rate differentials were first established consideration may have been given to

intuitive factors such as types of construction and their susceptibility to damage in the event of a mine subsidence, predominant location of each type of structure, affordability to each type of purchaser, the differential for other property perils, and the likelihood of submitting a claim for minor damage. The combination of the above factors could lead to an assumed rate differential as is currently in place.

When the differentials were established there was no direct historic evidence to support the selected implied relationships. Even now the amount of Non-Residential claim experience is negligible. What little Pennsylvania experience does exist gives merit to a Non-Residential surcharge, with that surcharge being about 70% as opposed to 300%. A display of Indiana mine subsidence rates can be seen in Exhibit 8. For Indiana, the Non-Dwelling surcharge runs from 30% to 75%. It should be noted that Indiana has not changed its rates in a long time and that a rate review by the state is currently under way.

Common elements to both Indiana and Pennsylvania mine subsidence insurance programs is that purchase of coverage is optional, coverage is available only in designated counties, and coverage is available to both residential and commercial risks, but at differing rate levels. The Kentucky and Ohio programs have mandatory coverage which is available at lower rate levels.

With this proposal it is recommended that the Non-Residential Premiums be established by applying a Non-Residential surcharge to the premiums otherwise developed using the residential rate levels. It is proposed that the Non-Residential surcharge be set at 100% (a factor of 2.00). While this adds a rating variable (Non-Residential Surcharge), and therefore complexity to the rating algorithm, it also simplifies it by only requiring one rating program instead of two. As experience develops, it will be very easy to move the Non-Residential Surcharge down, even to 0% if warranted.

The base rate decrease, combined with the change to the surcharge methodology, leads to an approximate premium decrease of 60 to 65% for Non-Residential risks. (See Exhibit 5.) While this is a significant decrease for these risks, it should be kept in mind that the current size of the Non-Residential book is minor in relationship to the Residential book. This change should also lead to increased penetration in the Non-Residential category, which may then encourage further penetration in the Residential category.

3. Charges for the Initial Amount of Coverage

In addition to the Non-Residential surcharge, some policyholders have expressed dissatisfaction with the basic rate level for low-cost housing. The purpose of the higher rate charge for the initial amount of coverage is to equitably share some of the fixed costs of providing this coverage. A review of the claims file provided to Pinnacle continues to support higher rate levels for the initial coverage. See Exhibits 6 and 7 for a sampling of some of the claims characteristics.

Higher charges for the initial amounts of coverage are intuitive from a claims perspective. As in other property insurance, most losses are not total losses or total limits losses. Over 25% of the Pennsylvania claims are for less than \$10,000. Decreasing rate levels for increasing coverage is a well documented standard for property insurance.

Be that as it may, it still does not address the affordability issue that is probably driving this concern. The overall rate decrease will help this in some regard. A uniform rate per coverage dollar regardless of the coverage amount would be easy to understand, less prone to error, and make the cost for low-cost housing policyholders more affordable. While it is financially possible to lower the basic charges for the initial coverage even further than is recommended at this time, doing so is left to the discretion of the MSI.

4. Multiple Policy Discounts

Interest has been expressed in developing a discount for multiple policies or policies written under condominium associations. While such a discount is not supported from loss experience, there is consideration for other, intuitive, savings in regards to policyholder expenses, marketing expenses, and the increased retention that generally comes from multiple policyholders. It is unknown what the premium impact of implementing such a discount would be, but given the adequacy of the current and proposed premium rate levels and the MSI initiative to increase penetration, such a discount could be implemented, even though it adds to the complexity of the rating program. To help keep it simple, it is suggested that one discount apply, whether it is a condominium association credit, or a multiple policy credit. The latter will be more difficult to program and validate, and there may not be enough multiple Residential policyholders to make it

worthwhile. An initial multiple discount of 10% should provide significant incentive for the potential policyholder and is not uncommon in other personal lines of coverage.

5. Multiple Rating Systems

It is recommended that multiple rating systems be avoided due to the additional cost associated with programming, maintenance, and possible policyholder and DEP staff confusion. If possible, it is recommended that one rating algorithm be developed, utilizing either the two tier rate approach or one tier rate approach, and further adjusting for a non-residential surcharge and a multiple policy/condo associations discount.

6. Program Growth

The MSI desires to increase its penetration in the available marketplace, thus lowering costs and providing a needed service to Pennsylvania consumers. Currently only about 5% of the available market is insured. The above changes should stimulate growth, especially in the Non-Residential category. Advertising these changes will also help, if it is deemed to be cost effective. Notification of changes to Producers will already be required. Getting some free press should also be easy to do.

V. RESERVES FOR OUTSTANDING CLAIMS

Exhibit 9 develops the estimated trended ultimate average claim. This estimate is used in Exhibit 7 to develop some claim benchmarks by Layer of Coverage. The reserves for known claims would be set equal to the benchmark ultimate claim (\$45,000) less any payments made to date.

Based on the relationship of reported claim counts to paid claim counts, a reserve of \$3,500 per reported claim regardless of mine type is more appropriate than the current standards of \$1,400 and \$6,500 for Anthracite and Bituminous type claims, respectively.

VI. COVERAGE LIMITS

Currently the Fund offers coverage limits up to \$250,000. Exhibit 7 displays claims activity on Paid Claims, broken down into a claim range within an amount of purchased coverage range. On the Summary page of Exhibit 7 it can be seen that on average, paid claims tend to settle for about 22.1% of the coverage amount purchased. As the amount of coverage purchased increases, the relationship of the settlement to purchased coverage tends to decrease. This is not only intuitive, but supported by the Detail in Exhibit 7 which shows that smaller claims tend to be more prevalent regardless of the amount of coverage purchased. Exhibit 6 restates these same numbers, but summarized on a range of claims size basis. In this exhibit it can also be seen that claims at or below \$100,000 make up the majority of claims payments.

The MSI Fund has about 4,300 policies with the maximum limit of \$250,000, or a little less than 10% of total policies. Under the current and recommended rate structure, if the available limit of coverage were increased to \$300,000 it should not cause a concern regarding fund solvency. The likelihood of total loss under a policy is very small, and as discussed below, the increased pressure on catastrophic considerations would be minimal. However, given the other recommendations at this time (premium decrease and not pursuing reinsurance) it is recommended that the coverage limit be maintained at \$250,000.

VII. REINSURANCE AND THE RISK OF CATASTROPHIC LOSS

Reinsurance coverage for an insurance entity typically can be purchased on an individual risk, property excess of loss, an aggregation of losses from one event, or on a catastrophe excess of loss basis.

Since MSI Fund limits coverage to \$250,000 per policy, the largest loss to one building from an event is the coverage limit of \$250,000 times the number of units insured within the building. In order to determine the actual size of loss from one risk for one event a number of basic statistics were calculated in Exhibit 11. Exhibit 11, Table 1 - Claims Summary summarizes the historic claims and insured values for MSI Fund. Column (7) shows the claims frequency per risk, with the average claim frequency of 0.03% per risk. Column (11) shows the average severity per loss as a percent of average insured value shown in Column (5). The average severity per loss as a percent of the \$250,000 coverage limit is 16.1%, implying an expected severity of approximately \$40,000. Buildings with multiple units insured would expect a severity as a multiple of \$40,000, if a loss occurs. Finally, Column (10) shows the largest loss in each year. The largest loss in the period was \$250,000 in 2006, followed by a loss of \$218,868 in 2003.

Exhibit 11, Table 2 – Size of Loss, reviews the size of loss by year. Though the losses are not trended, the table shows that just over 72% of the losses paid by MSI Fund are less than \$50,000. Further, 3.6% of losses paid by MSI Fund are greater than \$150,000. Since there is a coverage limit of \$250,000 and there is small probability of those limit losses occurring, there is no need for any property excess of loss reinsurance for MSI Fund.

A review of the catastrophe loss potential for MSI Fund was analyzed in Exhibit 12 and Exhibit 13. The types of historic events reviewed in this section included an earthquake occurring on September 25, 1998 in Crawford County which registered as a magnitude 5.2 event and tropical storms or other events generating significant precipitation in the Pennsylvania like Hurricane Fran in September 1996 or the flooding in January 1996.

The catastrophe exposure reviewed in Exhibit 12 focused on the Earthquake exposures to the MSI Fund. Exhibit 14 is a map which compares the location of MSI Fund insured values by county and along with the peak horizontal acceleration (PHA) in Pennsylvania as determined by

the United States Geological Survey (USGS). The PHA is the amount of shaking felt at a location from all earthquake sources. The higher the PHA, the greater the shaking felt at the location. The frequency of the PHA shown in Exhibit 14 is measured as a 2% probability of exceedance in 50 year period, specifically; there is a 2% chance of experiencing a shake greater than the indicated PHA in any 50 year period. The map shows the greatest insured value by county and the lowest earthquake shaking are both in Southwestern Pennsylvania.

In Exhibit 12 we quantify the impact of earthquake on the MSI Fund. Earthquake is modeled by reviewing the frequency and severity of the earthquake events. The frequency is based upon two factors: first the frequency of an earthquake event and determining the frequency of loss when an earthquake occurs. The probability of an earthquake impacting any county in Pennsylvania is determined by using the 2% probability of exceedance in a 50 year time period from Exhibit 14. The probability of an event occurring that exceeds the PHA of the Exhibit 14 is calculated as $0.02/50$, (0.04%) or approximately 1 in 250 year chance. This is shown in Column (5) Exhibit 12. Once an earthquake is felt, the number of risks impacted by the event needs to be determined. This is calculated using the frequency generated in Exhibit 11 Column (7) and modifying it by a judgmental frequency factor that is based upon a selected county PHA. For further information see the footnote in Exhibit 12. For instance, Huntingdon County has a PHA of 7.0% and thus a factor of 1.75 is applied to the frequency to determine the frequency of loss from an earthquake. The mean frequency of a loss for Huntingdon County when an earthquake occurs is then 0.03% , which is the overall frequency for the MSI Fund from Exhibit 11, multiplied by the 1.70 frequency factor resulting in a mean frequency of 0.054% for Huntingdon County. The severity is based upon the severity determined in Exhibit 11 without modification, or 16.1% of the average limit of \$250,000. The frequency of loss is modeled using a Poisson distribution and the severities are modeled using a Beta distribution.

Losses for flood follow a similar calculation, however, there is no alteration in the frequency factor by county. The probability of a flood occurring is 10.0% and would generally compare to flooding caused by a tropical storm or other significant precipitation event impacting the area. The severity assumption is the same for flood as for earthquake.

For both earthquake and flood the analysis was run twice, once with our best estimate and a second time with higher frequency factors in order to determine the range of potential outcomes.

Exhibit 10 summarizes the results of the analysis. For the earthquake best estimate developed in Exhibit 12 Page 1, the 1 in 500 year event (exceedance probability of 99.80%) is just over \$48,497 and \$112,523 for the second scenario in Exhibit 12 Page 2. For flood, the 1 in 250 year event (exceedance probability of 99.60%) shows a loss of \$166,489 under our best estimate developed in Exhibit 13 Page 1 and \$593,718 under Exhibit 13 Page 2. Note the probability of exceeding the loss amount is simply one minus the reciprocal of the return period. For instance the probability of loss exceedance at the 1 in 10 years level is $1 - 1/10$, or 90.0%. Note the results in Exhibit 10 are based upon the 1996 distribution of insured values and assumes that there is no significant increase in the aggregate insured value of the MSI Fund, and that the limit of coverage remains at \$250,000. Increases in either of those numbers will result in increases in the loss potential for the portfolio.

Because the infrequent occurrence of earthquake and the low loss severity for flood, catastrophe excess of loss coverage is not needed for the MSI. While it has been commented that deep cover subsidence events may be on the rise (which increases the potential for an event to impact multiple structures) and multiple insured units within a structure may become more common, because of the strength of the MSI Fund's current and projected financial condition (projected \$60,000,000 surplus and growing) the MSI Fund has the financial resources to pay probable losses resulting from multiple unit loss or any projected catastrophe loss. It is recommended that the MSI Fund not pursue reinsurance mechanisms at this time.

VIII. CONCLUDING REMARKS

In wrapping up our study, the following observations and recommendations are made:

- The MSI Fund is financially sound.
- The Fund's projected surplus is sufficient to see it through several years of significant underwriting loss and probably even withstand significant catastrophic losses.
- A reduction in surplus is not recommended at this time. Rather, changes noted below are recommended and their impacts observed before lowering the surplus.
- A 27.9% Premium reduction is recommended. This includes reducing residential base rates 25%, reducing non-residential base rates 60%, and reducing initial coverage charges by similar amounts.
- A 10% Multi-Policy/Condominium Association Group discount is recommended.
- The flat reserve for reported claims should be changed to \$3,500 for both Bituminous and Anthracite mine subsidence claims.
- No change is recommended to the \$250,000 coverage limit at this time.
- Reinsurance coverage is not recommended at this time.

It has been a pleasure working with the DEP to develop this analysis and resulting recommendations. Pinnacle remains available to further discuss this analysis or add to it if so desired by the DEP.

<i>Exhibit</i>	<i>Description</i>
1.	Estimated Outstanding Liabilities
2.	Projected Cash Flow
	Page 1. No Rate Change, 5.50% Investment Rate
	Page 2. 25% Rate Change, 5.50% Investment Rate
	Page 3. No Rate Change, 4.00% Investment Rate
	Page 4. 25% Rate Change, 4.00% Investment Rate
3.	Historic Coverage In Force and Other Parameters
4.	Indicated Premium Change
5.	Rating Program Proposal
6.	Claims by Range
7.	Claims by Range of Coverage
	Page 1. Summary
	Page 2. Detail
8.	Indiana Premium by Coverage Layer
9.	Estimated Outstanding Liabilities
10.	Summary of Catastrophe Modeling
11.	Claims Analysis
12.	Catastrophe Analysis Earthquake
	Page 1. Scenario 1
	Page 2. Scenario 2
13.	Catastrophe Analysis Flood
	Page 1. Scenario 1
	Page 2. Scenario 2
14.	Peak Horizontal Acceleration by County

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Estimated Outstanding Liabilities
as of 06/30/2007**

Fiscal Report Year (1)	Paid Claim Amount (2)	Amount Ultimate Adjustment (3)	Estimated Ultimate Amount (4)	Estimated Outstanding Liability (5)
Prior				50,000
1991	1,415,693	1.010	1,429,850	14,157
1992	1,012,866	1.010	1,022,995	10,129
1993	1,279,515	1.010	1,292,311	12,795
1994	744,356	1.010	751,799	7,444
1995	973,174	1.010	982,906	9,732
1996	602,438	1.010	608,463	6,024
1997	501,380	1.011	506,900	5,520
1998	513,075	1.011	518,724	5,649
1999	521,008	1.012	527,008	6,000
2000	314,507	1.013	318,447	3,940
2001	477,460	1.014	483,924	6,465
2002	1,253,900	1.017	1,274,691	20,791
2003	160,478	1.029	165,181	4,703
2004	246,683	1.050	258,991	12,308
2005	1,265,732	1.074	1,358,816	93,085
2006	502,142	1.150	577,463	75,321
Total				344,062

Notes

- (1) FY begins 07/01 of report year listed
- (2) Provided by MSI. 2006 from separate data run.
- (3) Internal Analysis of MSI Reported Data
- (4) (2) x (3), 2007 based on prior 5 year average
- (5) (4) - (2), Prior based on subsequent 5 year average extended for 5 years.

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Projected Cash Flow
Assuming No Change in Premium Rates**

Fiscal Year (1)	Coverage In Force in \$Thousands (2)	Beginning Balance (3)	Premium (4)	Paid Commission (5)	Premium Refund (6)	Investment Income (7)	Paid Loss (8)	Administrative Expense (9)	Ending Balance (10)
05-06	6,728,375								54,658,859
06-07 (est)	6,728,375	54,658,859							60,000,000
07-08	7,194,864	60,000,000	6,619,275	287,795	35,974	3,518,412	888,746	2,000,000	66,925,172
08-09	7,693,695	66,925,172	7,078,199	346,216	38,468	3,917,535	950,364	2,100,000	74,485,857
09-10	8,227,111	74,485,857	7,568,942	411,356	41,136	4,353,035	1,016,254	2,205,000	82,734,089
10-11	8,797,509	82,734,089	8,093,708	483,863	43,988	4,827,880	1,086,713	2,315,250	91,725,864
11-12	9,407,454	91,725,864	8,654,857	564,447	47,037	5,345,263	1,162,056	2,431,013	101,521,431
12-13	10,059,687	101,521,431	9,254,912	653,880	50,298	5,908,618	1,242,623	2,552,563	112,185,597
13-14	10,757,141	112,185,597	9,896,570	753,000	53,786	6,521,639	1,328,776	2,680,191	123,788,052
14-15	11,502,950	123,788,052	10,582,714	862,721	57,515	7,188,299	1,420,902	2,814,201	136,403,726
15-16	12,300,468	136,403,726	11,316,430	922,535	61,502	7,914,604	1,519,416	2,954,911	150,176,396
16-17	13,153,278	150,176,396	12,101,016	986,496	65,766	8,707,221	1,624,759	3,102,656	165,204,955

Notes

- (2) Reflects Average Annual Change developed in Exhibit 3
- (3) Prior Year Ending Balance
- (4) (2) x Selected Premium Rate developed in Exhibit 3
- (5) (2) x Selected Commission Rate and Increment developed in Exhibit 3, capped at 7.5%
- (6) (2) x Selected Premium Refund Rate developed in Exhibit 3
- (7) Based on a Selected Investment Rate of 5.5%**
- (8) (2) x Selected Paid Loss Rate developed in Exhibit 3
- (9) Reflects Average Annual Change developed in Exhibit 3
- (10) (3) + (4) - (5) - (6) + (7) - (8) - (9)

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Projected Cash Flow
Assuming a One Time Premium Reduction of 25%**

Fiscal Year (1)	Coverage In Force in \$Thousands (2)	Beginning Balance (3)	Premium (4)	Paid Commission (5)	Premium Refund (6)	Investment Income (7)	Paid Loss (8)	Administrative Expense (9)	Ending Balance (10)
05-06	6,728,375								54,658,859
06-07 (est)	6,728,375	54,658,859							60,000,000
07-08	7,194,864	60,000,000	5,791,865	251,820	31,478	3,496,176	888,746	2,000,000	66,115,998
08-09	7,693,695	66,115,998	5,308,649	259,662	28,851	3,824,523	950,364	2,100,000	71,910,293
09-10	8,227,111	71,910,293	5,676,706	308,517	30,852	4,157,213	1,016,254	2,205,000	78,183,589
10-11	8,797,509	78,183,589	6,070,281	362,897	32,991	4,517,274	1,086,713	2,315,250	84,973,294
11-12	9,407,454	84,973,294	6,491,143	423,335	35,278	4,906,839	1,162,056	2,431,013	92,319,594
12-13	10,059,687	92,319,594	6,941,184	490,410	37,724	5,328,196	1,242,623	2,552,563	100,265,654
13-14	10,757,141	100,265,654	7,422,427	564,750	40,339	5,783,803	1,328,776	2,680,191	108,857,828
14-15	11,502,950	108,857,828	7,937,036	647,041	43,136	6,276,298	1,420,902	2,814,201	118,145,881
15-16	12,300,468	118,145,881	8,487,323	691,901	46,127	6,809,819	1,519,416	2,954,911	128,230,668
16-17	13,153,278	128,230,668	9,075,762	739,872	49,325	7,388,964	1,624,759	3,102,656	139,178,781

Notes

- (2) Reflects Average Annual Change developed in Exhibit 3
- (3) Prior Year Ending Balance
- (4) (2) x Selected Premium Rate developed in Exhibit 3
- (5) (2) x Selected Commission Rate and Increment developed in Exhibit 3, capped at 7.5%
- (6) (2) x Selected Premium Refund Rate developed in Exhibit 3
- (7) Based on a Selected Investment Rate of 5.5%**
- (8) (2) x Selected Paid Loss Rate developed in Exhibit 3
- (9) Reflects Average Annual Change developed in Exhibit 3
- (10) (3) + (4) - (5) - (6) + (7) - (8) - (9)

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Projected Cash Flow
Assuming No Change in Premium Rates
And a 4.0% Rate of Return on Investments**

Fiscal Year (1)	Coverage In Force in \$Thousands (2)	Beginning Balance (3)	Premium (4)	Paid Commission (5)	Premium Refund (6)	Investment Income (7)	Paid Loss (8)	Administrative Expense (9)	Ending Balance (10)
05-06	6,728,375								54,658,859
06-07 (est)	6,728,375	54,658,859							60,000,000
07-08	7,194,864	60,000,000	6,619,275	287,795	35,974	2,540,167	888,746	2,000,000	65,946,927
08-09	7,693,695	65,946,927	7,078,199	346,216	38,468	2,788,407	950,364	2,100,000	72,378,485
09-10	8,227,111	72,378,485	7,568,942	411,356	41,136	3,056,755	1,016,254	2,205,000	79,330,436
10-11	8,797,509	79,330,436	8,093,708	483,863	43,988	3,346,687	1,086,713	2,315,250	86,841,019
11-12	9,407,454	86,841,019	8,654,857	564,447	47,037	3,659,786	1,162,056	2,431,013	94,951,109
12-13	10,059,687	94,951,109	9,254,912	653,880	50,298	3,997,741	1,242,623	2,552,563	103,704,398
13-14	10,757,141	103,704,398	9,896,570	753,000	53,786	4,362,357	1,328,776	2,680,191	113,147,572
14-15	11,502,950	113,147,572	10,582,714	862,721	57,515	4,755,563	1,420,902	2,814,201	123,330,509
15-16	12,300,468	123,330,509	11,316,430	922,535	61,502	5,180,673	1,519,416	2,954,911	134,369,249
16-17	13,153,278	134,369,249	12,101,016	986,496	65,766	5,641,370	1,624,759	3,102,656	146,331,956

Notes

- (2) Reflects Average Annual Change developed in Exhibit 3
- (3) Prior Year Ending Balance
- (4) (2) x Selected Premium Rate developed in Exhibit 3
- (5) (2) x Selected Commission Rate and Increment developed in Exhibit 3, capped at 7.5%
- (6) (2) x Selected Premium Refund Rate developed in Exhibit 3
- (7) Based on a Selected Investment Rate of 4.0%**
- (8) (2) x Selected Paid Loss Rate developed in Exhibit 3
- (9) Reflects Average Annual Change developed in Exhibit 3
- (10) (3) + (4) - (5) - (6) + (7) - (8) - (9)

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Projected Cash Flow
Assuming a One Time Premium Reduction of 25%
And a 4.0% Rate of Return on Investments**

Fiscal Year (1)	Coverage In Force in \$Thousands (2)	Beginning Balance (3)	Premium (4)	Paid Commission (5)	Premium Refund (6)	Investment Income (7)	Paid Loss (8)	Administrative Expense (9)	Ending Balance (10)
05-06	6,728,375								54,658,859
06-07 (est)	6,728,375	54,658,859							60,000,000
07-08	7,194,864	60,000,000	5,791,865	251,820	31,478	2,524,114	888,746	2,000,000	65,143,936
08-09	7,693,695	65,143,936	5,308,649	259,662	28,851	2,721,508	950,364	2,100,000	69,835,216
09-10	8,227,111	69,835,216	5,676,706	308,517	30,852	2,916,695	1,016,254	2,205,000	74,867,995
10-11	8,797,509	74,867,995	6,070,281	362,897	32,991	3,126,034	1,086,713	2,315,250	80,266,459
11-12	9,407,454	80,266,459	6,491,143	423,335	35,278	3,350,523	1,162,056	2,431,013	86,056,444
12-13	10,059,687	86,056,444	6,941,184	490,410	37,724	3,591,230	1,242,623	2,552,563	92,265,538
13-14	10,757,141	92,265,538	7,422,427	564,750	40,339	3,849,294	1,328,776	2,680,191	98,923,202
14-15	11,502,950	98,923,202	7,937,036	647,041	43,136	4,125,930	1,420,902	2,814,201	106,060,887
15-16	12,300,468	106,060,887	8,487,323	691,901	46,127	4,423,378	1,519,416	2,954,911	113,759,233
16-17	13,153,278	113,759,233	9,075,762	739,872	49,325	4,744,132	1,624,759	3,102,656	122,062,515

Notes

- (2) Reflects Average Annual Change developed in Exhibit 3
- (3) Prior Year Ending Balance
- (4) (2) x Selected Premium Rate developed in Exhibit 3
- (5) (2) x Selected Commission Rate and Increment developed in Exhibit 3, capped at 7.5%
- (6) (2) x Selected Premium Refund Rate developed in Exhibit 3
- (7) Based on a Selected Investment Rate of 4.0%**
- (8) (2) x Selected Paid Loss Rate developed in Exhibit 3
- (9) Reflects Average Annual Change developed in Exhibit 3
- (10) (3) + (4) - (5) - (6) + (7) - (8) - (9)

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

Historic Coverage In Force and Other Parameters

Fiscal Year (1)	Coverage In Force in \$Thousands (2)	Coverage Annual Change (3)	Policies In Force (4)	Policies Annual Change (5)	Coverage/Policy Change (6)	Estimated Inflation Change (7)	Residual Change (8)	Average Premium/\$1000 Coverage (9)
96-97	3,478,793		43,589					1.10
97-98	3,640,974	4.7%	44,319	1.7%	2.9%	0.9%	2.0%	1.06
98-99	3,746,272	2.9%	44,574	0.6%	2.3%	0.6%	1.7%	1.09
99-00	3,945,403	5.3%	45,420	1.9%	3.4%	2.1%	1.3%	1.06
00-01	4,754,237	20.5%	52,395	15.4%	4.5%	3.2%	1.2%	0.93
01-02	4,950,738	4.1%	53,309	1.7%	2.3%	1.9%	0.4%	0.93
02-03	5,134,789	3.7%	53,280	-0.1%	3.8%	2.3%	1.5%	0.97
03-04	5,484,411	6.8%	53,487	0.4%	6.4%	4.7%	1.6%	0.92
04-05	5,972,256	8.9%	54,749	2.4%	6.4%	7.0%	-0.5%	0.92
05-06	6,728,375	12.7%	56,567	3.3%	9.0%	3.6%	5.3%	0.92
Selected		6.9%		1.5%		3.7%	1.6%	0.92

Fiscal Year (1)	Paid Commission (10)	Commssion Rate per \$1000 Coverage (11)	Paid Loss (12)	Paid Loss Rate per \$1000 Coverage (13)	Administrative Expense (14)	Expense Annual Change (15)	Expense Rate per \$1000 Coverage (16)	Premium Refund (17)	Refund Rate per \$1000 Coverage (18)
96-97			891,182	25.6%	1,238,671		35.6%	12,765	0.37%
97-98			727,549	20.0%	1,363,026	10.0%	37.4%	18,642	0.51%
98-99			552,787	14.8%	1,399,249	2.7%	37.4%	17,862	0.48%
99-00			221,432	5.6%	1,779,486	27.2%	45.1%	19,568	0.50%
00-01			436,366	9.2%	1,853,614	4.2%	39.0%	19,206	0.40%
01-02			208,063	4.2%	1,585,883	-14.4%	32.0%	17,185	0.35%
02-03			317,129	6.2%	1,834,257	15.7%	35.7%	23,289	0.45%
03-04	67,446	1.23%	1,126,212	20.5%	1,808,099	-1.4%	33.0%	24,462	0.45%
04-05	124,767	2.09%	604,179	10.1%	1,583,470	-12.4%	26.5%	33,165	0.56%
05-06	201,525	3.00%	494,450	7.3%	1,881,931	18.8%	28.0%	41,035	0.61%
Selected		4.00%		12.4%		5.0%	28.0%		0.50%
Annual Increment		0.50%							

Notes	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(2)	MSI 2006 Board Report	(10) / (2)							
(3)	(2) / Prior (2)	MSI 2006 Board Report							
(4)	MSI 2006 Board Report	(12) / (2)							
(5)	(4) / Prior (4)	MSI 2006 and Prior Board Reports							
(6)	[1 + (3)] / (1+ (5)) - 1	(14) / Prior (14)							
(7)	Derived from MSI 2006 Board Report	(14) / (2)							
(8)	[1 + (6)] / (1+ (7)) - 1	MSI 2006 and Prior Board Reports							
(9)	MSI 2006 Board Report	(17) / (2)							

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

Indicated Premium Change

Item (1)	Percent of \$1000 Coverage In Force (2)	Adjustment to Earned Premium (3)	Restated to Net Earned Premium (4)
Written Premium	92.0%		
Premium Refund	0.5%		
Net Premium	91.5%	88.3%	100.0%
Paid Claim	12.4%	11.9%	13.5%
Claim Reserve*		1.8%	2.0%
Claim Fluctuation Reserve**	12.4%	13.7%	15.5%
Commission***	7.5%	7.5%	7.5%
Investment Income^	50.0%	48.3%	54.6%
Administrative Expense^^	28.0%	27.0%	30.6%
Underwriting and Investment Profit	81.3%		85.5%
Indicated Rate Change^^^			-58.1%

Notes

- (2) Exhibit 3
(3) Reflects Earning Lag of 50% and Annual Written Premium Increase equal to Coverage In Force Increase (Exhibit 3)
(4) (3) / (3) Net EP

* Based on 12-Ultimate Development Factor in Exhibit 1

** Set equal to Average Paid Claim and Claim Reserve.
See Exhibit 3 for variability range.

*** Set at estimated Ultimate Level

^ Based on relationships developed from Exhibit 2.

^^ Set at estimated Fiscal Year 07-08 Level

^^^ $(Loss + Admin) / (Premium - Commission - Inv Inc) - 1.000$

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

Rating Program Proposal

Rating Element	Present		Proposed		Change		
	Res.	Non-Res.	Res.	Non-Res.	Res.	Non-Res.	Total
Rate/\$1, First \$5,000	0.0025	0.0126	0.0020	0.0040	-20.0%	-68.3%	-24.7%
Rate/\$1, Each Subsequent \$1	0.0008	0.0030	0.0006	0.0012	-25.0%	-60.0%	-28.2%
Senior Discount	10.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%
Multiple Policy Discount	0.0%	0.0%	10.0%	0.0%	-10.0%	0.0%	0.0%
Condo Assoc Discount	0.0%	0.0%	10.0%	10.0%	-10.0%	-10.0%	0.0%
Total							-27.9%

Note: Non-Resident Rate/\$1 is set as a factor to the Resident Rate

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

Claims by Range

Top End of Claims Range (1)	Claim Count (2)	Settlement Amount (3)	Eliminated Layer			
			5,000 (4)	10,000 (5)	25,000 (6)	100,000 (7)
5,000	20	67,144	0	0	0	0
10,000	21	154,997	49,997	0	0	0
15,000	16	202,096	122,096	42,096	0	0
20,000	12	204,274	144,274	84,274	0	0
25,000	9	198,563	153,563	108,563	0	0
50,000	29	986,993	841,993	696,993	261,993	0
75,000	13	768,633	703,633	638,633	443,633	0
100,000	17	1,504,548	1,419,548	1,334,548	1,079,548	0
125,000	4	455,302	435,302	415,302	355,302	55,302
150,000	3	429,788	414,788	399,788	354,788	129,788
225,000	1	218,868	213,868	208,868	193,868	118,868
250,000	1	250,000	245,000	240,000	225,000	150,000
Grand Total	146	5,441,206	4,744,062	4,169,065	2,914,132	453,958
Eliminated Loss			697,144	1,272,141	2,527,074	4,987,248
Eliminated Ratio*			12.8%	23.4%	46.4%	91.7%

Notes

- (2) Closed Claims, Provided by MSI, excludes claims without payment
(3) Closed Claims, Provided by MSI, excludes claims without payment
(4) (3) - (2) x Eliminated Layer
(5) (3) - (2) x Eliminated Layer
(6) (3) - (2) x Eliminated Layer
(7) (3) - (2) x Eliminated Layer
* Eliminated Loss / (3) Total

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Claims by Range of Coverage
Summary**

Top End of Coverage Range (1)	Claim Count (2)	Settlement Amount (3)	Coverage Amount (4)	Settlement/ Claim (5)	Settlement/ Coverage (6)	Trended Ultimate Claim (7)	Trended Settlement/ Claim (8)	Trended Settlement/ Coverage (9)
15,000	3	23,675	54,900	7,892	43.1%		9,529	52.1%
20,000	1	5,420	19,600	5,420	27.7%		6,544	33.4%
25,000	2	36,400	41,900	18,200	86.9%		21,976	104.9%
50,000	10	153,110	512,800	15,311	29.9%		18,487	36.1%
75,000	19	531,068	1,762,220	27,951	30.1%		33,749	36.4%
100,000	36	1,206,778	4,001,300	33,522	30.2%		40,476	36.4%
125,000	27	806,982	4,272,100	29,888	18.9%		36,089	22.8%
150,000	20	713,786	4,603,000	35,689	15.5%		43,093	18.7%
175,000	8	504,328	1,775,100	63,041	28.4%		76,119	34.3%
200,000	9	474,330	2,972,400	52,703	16.0%		63,637	19.3%
225,000	1	87,450	406,600	87,450	21.5%		105,592	26.0%
250,000	10	897,879	4,200,200	89,788	21.4%		108,415	25.8%
Total	146	5,441,206	24,622,120	37,269	22.1%	45,000	45,000	26.7%

Notes

- (2) Closed Claims, Provided by MSI, excludes claims without payment
(3) Closed Claims, Provided by MSI, excludes claims without payment
(4) Closed Claims, Provided by MSI, excludes claims without payment
(5) (3) / (2)
(6) (3) / (4)
(7) Exhibit 9
(8) (5) x Total (7) / Total (5)
(9) (6) x Total (7) / Total (5)

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Claims by Range of Coverage
Detail**

Coverage Band	Data Element	Claim Band (Upper Limit)												Total	Settlement per Claim	Settlement per Cover.	
		5,000	10,000	15,000	20,000	25,000	50,000	75,000	100,000	125,000	150,000	225,000	250,000				
15,000	Claim Count	1	1	1											3		
	Total Settlement	4,325	9,150	10,200											23,675	7,892	43.1%
	Total Coverage	14,900	29,800	10,200											54,900		
20,000	Claim Count		1												1		
	Total Settlement		5,420												5,420	5,420	27.7%
	Total Coverage		19,600												19,600		
25,000	Claim Count				1	1									2		
	Total Settlement				16,000	20,400									36,400	18,200	86.9%
	Total Coverage				20,600	21,300									41,900		
50,000	Claim Count	2	4		1		3								10		
	Total Settlement	8,140	33,688		17,894		93,388								153,110	15,311	29.9%
	Total Coverage	84,000	168,000		147,000		113,800								512,800		
75,000	Claim Count	2	1	3	1		8	4							19		
	Total Settlement	6,130	9,341	38,761	15,425		264,516	196,895							531,068	27,951	30.1%
	Total Coverage	140,300	74,500	339,300	68,700		866,900	272,520							1,762,220		
100,000	Claim Count	7	5	3	4	2	5	2	8						36		
	Total Settlement	26,028	36,079	37,584	70,400	45,838	175,210	131,800	683,838						1,206,778	33,522	30.2%
	Total Coverage	688,900	408,600	263,800	517,300	265,200	776,700	277,300	803,500						4,001,300		
125,000	Claim Count	5	5	3	2		6	3	2	1					27		
	Total Settlement	11,665	35,244	38,863	32,192		202,984	198,502	178,032	109,500					806,982	29,888	18.9%
	Total Coverage	677,900	693,900	434,900	230,200		1,374,300	413,800	333,300	113,800					4,272,100		
150,000	Claim Count	1	2	4	2	4	2	2	1	1	1				20		
	Total Settlement	4,550	12,775	49,266	33,673	89,225	57,030	120,132	95,536	101,600	150,000				713,786	35,689	15.5%
	Total Coverage	273,400	272,200	822,500	401,000	1,006,100	563,000	685,600	150,000	129,200	300,000				4,603,000		
175,000	Claim Count		1	1			2	1	2		1				8		
	Total Settlement		8,200	13,822			91,255	59,307	181,790		149,954				504,328	63,041	28.4%
	Total Coverage		159,100	509,400			328,600	162,300	458,000		157,700				1,775,100		
200,000	Claim Count	1		1	1	2		1	1	1	1				9		
	Total Settlement	2,806		13,600	18,691	43,100		61,997	84,900	119,402	129,834				474,330	52,703	16.0%
	Total Coverage	189,700		197,500	185,100	375,100		525,300	178,200	564,300	757,200				2,972,400		
225,000	Claim Count								1						1		
	Total Settlement								87,450						87,450	87,450	21.5%
	Total Coverage								406,600						406,600		
250,000	Claim Count	1	1				3	2	1		1		1		10		
	Total Settlement	3,500	5,100				102,610		193,001	124,800		218,868	250,000		897,879	89,788	21.4%
	Total Coverage	250,000	250,000				750,000		1,450,200	1,000,000		250,000	250,000		4,200,200		
Total	Claim Count	20	21	16	12	9	29	13	17	4	3	1	1	146			
	Total Settlement	67,144	154,997	202,096	204,274	198,563	986,993	768,633	1,504,548	455,302	429,788	218,868	250,000	5,441,206	37,269	22.1%	
	Total Coverage	2,319,100	2,075,700	2,577,600	1,569,900	1,667,700	4,773,300	2,336,820	3,779,800	1,807,300	1,214,900	250,000	250,000	24,622,120			

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

Indiana Premium by Coverage Layer

Dwelling				Non-Dwelling				
Top End of Coverage Range (1)	Premium (2)	Incremental Premium (3)	Rate Per \$1 Cover (4)	Top End of Coverage Range (5)	Premium (6)	Incremental Premium (7)	Rate Per \$1 Cover (8)	Relation to Dwelling (9)
25,000	24	24	0.0010	25,000	42	42	0.0017	1.75
40,000	30	6	0.0004	35,000	48	6	0.0006	1.60
60,000	36	6	0.0003	45,000	54	6	0.0006	1.50
75,000	42	6	0.0004	55,000	60	6	0.0006	1.67
100,000	60	18	0.0007	65,000	66	6	0.0006	1.57
125,000	80	20	0.0008	75,000	72	6	0.0006	1.71
150,000	99	19	0.0008	85,000	75	3	0.0003	1.25
175,000	120	21	0.0008	100,000	90	15	0.0010	1.50
200,000	139	19	0.0008	125,000	115	25	0.0010	1.44
				150,000	139	24	0.0010	1.40
				175,000	159	20	0.0008	1.33
				200,000	179	20	0.0008	1.29

Notes		(6)	Indiana Department of Insurance Website
(2)	Indiana Department of Insurance Website	(7)	(6) - Prior (6)
(3)	(2) - Prior (2)	(8)	(7) / [(5) - Prior (5)]
(4)	(3) / [(1) - Prior (1)]	(9)	(6) / (2)

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Estimated Outstanding Liabilities
as of 06/30/2007**

Fiscal Report Year (1)	Paid Claim Count (2)	Paid Claim Amount (3)	Average Claim (4)	Count Ultimate Adjustment (5)	Amount Ultimate Adjustment (6)	Estimated Ultimate Count (7)	Estimated Ultimate Amount (8)	Estimated Ultimate Average (9)	Inflation Index 0.028 (10)	Trended Ultimate Average (11)
1991	43	1,415,693	32,923	1.006	1.010	43.26	1,429,850	33,054	1.534	50,712
1992	34	1,012,866	29,790	1.006	1.010	34.20	1,022,995	29,908	1.492	44,637
1993	42	1,279,515	30,465	1.006	1.010	42.25	1,292,311	30,585	1.452	44,404
1994	24	744,356	31,015	1.006	1.010	24.14	751,799	31,138	1.412	43,974
1995	40	973,174	24,329	1.006	1.010	40.24	982,906	24,426	1.374	33,556
1996	21	602,438	28,688	1.006	1.010	21.13	608,463	28,801	1.336	38,489
1997	18	501,380	27,854	1.031	1.011	18.56	506,900	27,310	1.300	35,502
1998	22	513,075	23,322	1.031	1.011	22.69	518,724	22,866	1.265	28,915
1999	15	521,008	34,734	1.032	1.012	15.48	527,008	34,055	1.230	41,892
2000	12	314,507	26,209	1.033	1.013	12.40	318,447	25,684	1.197	30,734
2001	13	477,460	36,728	1.037	1.014	13.48	483,924	35,902	1.164	41,791
2002	22	1,253,900	56,995	1.042	1.017	22.92	1,274,691	55,604	1.132	62,961
2003	9	160,478	17,831	1.052	1.029	9.47	165,181	17,439	1.101	19,208
2004	9	246,683	27,409	1.071	1.050	9.64	258,991	26,872	1.071	28,792
2005	26	1,265,732	48,682	1.109	1.074	28.82	1,358,816	47,145	1.042	49,139
2006	8	502,142	62,768	1.250	1.150	10.00	577,463	57,746	1.014	58,549
Average										40,828
Weighted Average										42,405
Selected										45,000

Notes

- (2) Provided by MSI. 2006 from separate data run.
- (3) Exhibit 1
- (4) (2) / (3)
- (5) Internal Analysis of MSI Reported Data
- (6) Exhibit 1
- (7) (2) x (5)
- (8) (3) * (6)
- (9) (8) / (7)
- (10) Based on claim trend of 2.8%
- (11) (9) x (10)

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Summary of Catastrophe Modeling
as of 6/30/2007**

Return Period	Probability of Exceedence	Earthquake	
10	90.00%	-	-
25	96.00%	-	-
50	98.00%	-	-
100	99.00%	-	-
250	99.60%	-	-
500	99.80%	48,497	112,523
1000	99.90%	158,605	276,775
10000	99.99%	640,261	1,781,819
Mean		592	1,162
Standard Dev		18,949	36,855
		Flood	
10	90.00%	30,398	139,555
25	96.00%	62,224	271,577
50	98.00%	89,896	356,452
100	99.00%	119,438	466,666
250	99.60%	166,489	593,718
500	99.80%	190,584	693,157
1000	99.90%	212,107	827,828
10000	99.99%	335,700	1,118,307
Mean		9,107	44,472
Standard Dev		24,452	95,320

Loss are generated from simulation analysis in Exhibit 12 and Exhibit 13

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

Claim Analysis

Table 1 - Claim Summary

Year (1)	Insured Value (000's) (2)	Policy Count (3)	Number of Claims (4)	Average Insured Value (5)	Trend in Insured Value (6)	Claim Frequency (7)	Trended Total Claim Amount (8)	Severity of Claims (9)	Maximum Claim Paid (10)	Severity as % of Insured Value (11)
1994			26				\$1,262,240	\$48,548	\$150,000	
1995			35				1,056,631	30,189	143,546	
1996			29				817,696	28,196	76,993	
1997	3,762,186	46,419	27	81,048		0.06%	981,928	36,368	110,000	14.5%
1998	3,899,707	47,062	14	82,863	1.02	0.03%	494,716	35,337	82,500	14.1%
1999	4,026,481	47,386	17	84,972	1.03	0.04%	532,422	31,319	95,536	12.5%
2000	4,582,866	51,448	12	89,078	1.05	0.02%	487,652	40,638	109,500	16.3%
2001	4,828,127	52,681	12	91,648	1.03	0.02%	300,931	25,078	90,900	10.0%
2002	5,054,935	53,841	22	93,886	1.02	0.04%	1,116,787	50,763	129,834	20.3%
2003	5,488,149	54,910	13	99,948	1.06	0.02%	876,464	67,420	218,868	27.0%
2004	5,710,420	53,881	12	105,982	1.06	0.02%	275,929	22,994	93,527	9.2%
2005	6,346,288	55,747	12	113,841	1.07	0.02%	376,835	31,403	97,550	12.6%
2006	7,063,740	57,734	22	122,350	1.07	0.04%	1,324,951	60,225	250,000	24.1%
Total (97 - 06)		521,109	163				6,768,614	41,525		
Average						0.03%				16.1%
Standard Deviation						0.01%				5.9%
Coefficient of Variation						37.3%				36.9%

Column

(2) - (3), (8), (10)	Provided by PA MSI
(5)	(2) / (3) * 1,000
(6)	Prior (5) / Current (5)
(7)	(4) / (3)
(8)	Losses provided by PAMSI trended at an annual rate of 2.0% to June 2008.
(9)	(8) / (4)
(11)	(9) / 250,000, Assumes a \$250,000 coverage limit.
Average	Average of Column (11)
Standard Dev.	Standard Dev. of Column (11)
CV	Standard Dev. / Average

Table 2 - Claim Size

Year	Size of Loss in (000's)						Total
	< 10	10 - 24	25 - 49	50 - 99	100 - 149	≥ 150	
1994	11	5	1	2	5	2	26
1995	11	14	4	2	2	2	35
1996	8	7	8	5	1	0	29
1997	5	8	8	4	2	0	27
1998	2	3	5	3	1	0	14
1999	5	5	4	1	2	0	17
2000	3	4	1	3	1	0	12
2001	6	3	1	1	1	0	12
2002	5	6	2	3	5	1	22
2003	1	3	3	4	0	2	13
2004	5	3	2	1	1	0	12
2005	2	5	3	1	1	0	12
2006	5	5	2	6	2	2	22
Total	69	71	44	36	24	9	253
% of Total	27.3%	28.1%	17.4%	14.2%	9.5%	3.6%	100.0%

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Catastrophe Analysis
Earthquake - Scenario 1**

County (1)	Insured Value (000's) (2)	Number of Policies (3)	Average Value (4)	EQ Probability (5)	EQ Occur (6)	Peak Horizontal Acceleration (7)	Freq in EQ (8)	# of Risks Impacted (9)	Severity Percent (10)	Loss (11)	Sum of Loss (12)
Carbon	1,697	22	77,145	0.0004	0	12.0%	0.074%	0	0.00	0	640,261
Columbia	0	0	0	0.0004	0	9.0%	0.057%	0	0.00	0	
Unknown	0	0	0	0.0004	0	6.0%	0.052%	0	0.00	0	
Huntingdon	81	1	81,200	0.0004	0	7.0%	0.054%	0	0.00	0	
Lackawanna	417,555	4,284	97,468	0.0004	0	11.0%	0.066%	0	0.00	0	
Lebanon	184	1	183,700	0.0004	0	12.0%	0.074%	0	0.00	0	
Luzerne	461,553	5,125	90,059	0.0004	0	10.0%	0.059%	0	0.00	0	
Montour	250	1	250,000	0.0004	0	8.0%	0.055%	0	0.00	0	
Northumberland	11,295	93	121,447	0.0004	0	9.0%	0.057%	0	0.00	0	
Schuylkill	12,471	128	97,427	0.0004	1	11.0%	0.066%	11	0.23	640,261	
Susquehanna	1,845	20	92,230	0.0004	0	8.0%	0.055%	0	0.00	0	
Wayne	669	6	111,500	0.0004	0	9.0%	0.057%	0	0.00	0	
Adams	0	0	0	0.0004	0	8.0%	0.055%	0	0.00	0	
Allegheny	3,613,975	28,420	127,163	0.0004	0	4.0%	0.047%	0	0.00	0	
Armstrong	53,637	492	109,017	0.0004	0	4.0%	0.047%	0	0.00	0	
Beaver	48,247	363	132,912	0.0004	0	6.0%	0.052%	0	0.00	0	
Butler	18,777	137	137,058	0.0004	0	6.0%	0.052%	0	0.00	0	
Cambria	15,351	137	112,050	0.0004	0	6.0%	0.052%	0	0.00	0	
Centre	2,180	18	121,089	0.0004	0	7.0%	0.054%	0	0.00	0	
Clarion	1,529	15	101,960	0.0004	0	6.0%	0.052%	0	0.00	0	
Clearfield	8,817	98	89,972	0.0004	0	6.0%	0.052%	0	0.00	0	
Crawford	280	2	140,000	0.0004	0	8.0%	0.055%	0	0.00	0	
Elk	1,006	6	167,583	0.0004	0	6.0%	0.052%	0	0.00	0	
Fayette	203,356	2,064	98,525	0.0004	0	6.0%	0.052%	0	0.00	0	
Greene	27,121	262	103,516	0.0004	0	4.0%	0.047%	0	0.00	0	
Indiana	24,914	184	135,403	0.0004	0	6.0%	0.052%	0	0.00	0	
Jefferson	1,290	13	99,231	0.0004	0	4.0%	0.047%	0	0.00	0	
Lawrence	26,992	167	161,631	0.0004	0	7.0%	0.054%	0	0.00	0	
Mercer	19,357	138	140,270	0.0004	0	8.0%	0.055%	0	0.00	0	
Somerset	6,007	51	117,784	0.0004	0	7.0%	0.054%	0	0.00	0	
Venango	195	2	97,500	0.0004	0	7.0%	0.054%	0	0.00	0	
Warren	134	1	134,100	0.0004	0	7.0%	0.054%	0	0.00	0	
Washington	1,157,594	8,368	138,336	0.0004	0	4.0%	0.047%	0	0.00	0	
Westmoreland	925,382	7,115	130,061	0.0004	0	6.0%	0.052%	0	0.00	0	

Column

- (1) - (3) Provided by PA MSI
- (4) (2) / (3)
- (5) Peak Horizontal Acceleration given as 2% probability of exceedance in 50 years implies a rate of 0.02/50 or 0.0004
- (6) Equals 1 when uniform random number is less than 0.0004
- (7) Peak Horizontal Acceleration for each county see Map
- (8) Exhibit 11 Col (7) Average x PHA adjustment

PHA Adjustment	
PHA	Freq Factor
18.0%	3.50
17.0%	3.00
16.0%	2.95
15.0%	2.80
14.0%	2.60
13.0%	2.50
12.0%	2.35
11.0%	2.10
10.0%	1.85
9.0%	1.80
8.0%	1.75
7.0%	1.70
6.0%	1.65
5.0%	1.55
4.0%	1.50
- (9) Simulated number of risks impacted based, Poisson with mean equal to (8) x (3)
- (10) Percent of insured value damaged based upon a Beta distribution with mean and standard deviation from Exhibit 11 Col (11)
- (11) (10) x limit of \$250,000
- (12) Calculated earthquake loss

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Catastrophe Analysis
Earthquake - Scenario 2**

County (1)	Insured Value (000's) (2)	Number of Policies (3)	Average Value (4)	EQ Probability (5)	EQ Occur (6)	Peak Horizontal Acceleration (7)	Freq in EQ (8)	# of Risks Impacted (9)	Severity Percent (10)	Loss (11)	Sum of Loss (12)
Carbon	1,697	22	77,145	0.0004	0	12.0%	0.149%	0.00	0	0	1,781,819
Columbia	0	0	0	0.0004	0	9.0%	0.114%	0.00	0	0	
Unknown	0	0	0	0.0004	0	6.0%	0.104%	0.00	0	0	
Huntingdon	81	1	81,200	0.0004	0	7.0%	0.108%	0.00	0	0	
Lackawanna	417,555	4,284	97,468	0.0004	0	11.0%	0.133%	0.00	0	0	
Lebanon	184	1	183,700	0.0004	0	12.0%	0.149%	0.00	0	0	
Luzerne	461,553	5,125	90,059	0.0004	0	10.0%	0.117%	0.00	0	0	
Montour	250	1	250,000	0.0004	0	8.0%	0.111%	0.00	0	0	
Northumberland	11,295	93	121,447	0.0004	0	9.0%	0.114%	0.00	0	0	
Schuylkill	12,471	128	97,427	0.0004	1	11.0%	0.133%	29.00	0	1781819	
Susquehanna	1,845	20	92,230	0.0004	0	8.0%	0.111%	0.00	0	0	
Wayne	669	6	111,500	0.0004	0	9.0%	0.114%	0.00	0	0	
Adams	0	0	0	0.0004	0	8.0%	0.111%	0.00	0	-	
Allegheny	3,613,975	28,420	127,163	0.0004	0	4.0%	0.095%	0.00	0	0	
Armstrong	53,637	492	109,017	0.0004	0	4.0%	0.095%	0.00	0	0	
Beaver	48,247	363	132,912	0.0004	0	6.0%	0.104%	0.00	0	0	
Butler	18,777	137	137,058	0.0004	0	6.0%	0.104%	0.00	0	0	
Cambria	15,351	137	112,050	0.0004	0	6.0%	0.104%	0.00	0	0	
Centre	2,180	18	121,089	0.0004	0	7.0%	0.108%	0.00	0	0	
Clarion	1,529	15	101,960	0.0004	0	6.0%	0.104%	0.00	0	0	
Clearfield	8,817	98	89,972	0.0004	0	6.0%	0.104%	0.00	0	0	
Crawford	280	2	140,000	0.0004	0	8.0%	0.111%	0.00	0	0	
Elk	1,006	6	167,583	0.0004	0	6.0%	0.104%	0.00	0	0	
Fayette	203,356	2,064	98,525	0.0004	0	6.0%	0.104%	0.00	0	0	
Greene	27,121	262	103,516	0.0004	0	4.0%	0.095%	0.00	0	0	
Indiana	24,914	184	135,403	0.0004	0	6.0%	0.104%	0.00	0	0	
Jefferson	1,290	13	99,231	0.0004	0	4.0%	0.095%	0.00	0	0	
Lawrence	26,992	167	161,631	0.0004	0	7.0%	0.108%	0.00	0	0	
Mercer	19,357	138	140,270	0.0004	0	8.0%	0.111%	0.00	0	0	
Somerset	6,007	51	117,784	0.0004	0	7.0%	0.108%	0.00	0	0	
Venango	195	2	97,500	0.0004	0	7.0%	0.108%	0.00	0	0	
Warren	134	1	134,100	0.0004	0	7.0%	0.108%	0.00	0	0	
Washington	1,157,594	8,368	138,336	0.0004	0	4.0%	0.095%	0.00	0	0	
Westmoreland	925,382	7,115	130,061	0.0004	0	6.0%	0.104%	0.00	0	0	

Column

- (1) - (3) Provided by PA MSI
- (4) (2) / (3)
- (5) Peak Horizontal Acceleration given as 2% probability of exceedance in 50 years implies a rate of 0.02/50 or 0.0004
- (6) Equals 1 when uniform random number is less than 0.0004
- (7) Peak Horizontal Acceleration for each county see Map
- (8) Exhibit 11 Col (7) Average x PHA adjustment

PHA Adjustment	
PHA	Freq Factor
18.0%	7.00
17.0%	6.00
16.0%	5.90
15.0%	5.60
14.0%	5.20
13.0%	5.00
12.0%	4.70
11.0%	4.20
10.0%	3.70
9.0%	3.60
8.0%	3.50
7.0%	3.40
6.0%	3.30
5.0%	3.10
4.0%	3.00
- (9) Simulated number of risks impacted based, Poisson with mean equal to (8) x (3)
- (10) Percent of insured value damaged based upon a Beta distribution with mean and standard deviation from Exhibit 11 Col (11)
- (11) (10) x limit of \$250,000
- (12) Calculated earthquake loss

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

**Catastrophe Analysis
Flood - Scenario 1**

County (1)	Insured Value (000's) (2)	Number of Policies (3)	Average Value (4)	Flood Probability (5)	Flood Occur (6)	Freq in Flood (7)	# of Risks Impacted (8)	Severity Percent (9)	Loss (10)	Sum of Loss (11)
Carbon	1,697	22	77,145	10.0%	0	0.008%	0	0.00	0	335,700
Columbia	0	0	0	10.0%	0	0.008%	0	0.00	0	
Unknown	0	0	0	10.0%	0	0.008%	0	0.00	0	
Huntingdon	81	1	81,200	10.0%	0	0.008%	0	0.00	0	
Lackawanna	417,555	4,284	97,468	10.0%	0	0.008%	0	0.00	0	
Lebanon	184	1	183,700	10.0%	0	0.008%	0	0.00	0	
Luzerne	461,553	5,125	90,059	10.0%	1	0.008%	1	0.83	74,504	
Montour	250	1	250,000	10.0%	0	0.008%	0	0.00	0	
Northumberland	11,295	93	121,447	10.0%	0	0.008%	0	0.00	0	
Schuylkill	12,471	128	97,427	10.0%	1	0.008%	2	0.47	92,482	
Susquehanna	1,845	20	92,230	10.0%	1	0.008%	0	0.59	0	
Wayne	669	6	111,500	10.0%	0	0.008%	0	0.00	0	
Adams	0	0	0	10.0%	0	0.008%	0	0.00	0	
Allegheny	3,613,975	28,420	127,163	10.0%	1	0.008%	5	0.23	143,852	
Armstrong	53,637	492	109,017	10.0%	0	0.008%	0	0.00	0	
Beaver	48,247	363	132,912	10.0%	0	0.008%	0	0.00	0	
Butler	18,777	137	137,058	10.0%	0	0.008%	0	0.00	0	
Cambria	15,351	137	112,050	10.0%	0	0.008%	0	0.00	0	
Centre	2,180	18	121,089	10.0%	0	0.008%	0	0.00	0	
Clarion	1,529	15	101,960	10.0%	0	0.008%	0	0.00	0	
Clearfield	8,817	98	89,972	10.0%	0	0.008%	0	0.00	0	
Crawford	280	2	140,000	10.0%	0	0.008%	0	0.00	0	
Elk	1,006	6	167,583	10.0%	0	0.008%	0	0.00	0	
Fayette	203,356	2,064	98,525	10.0%	0	0.008%	0	0.00	0	
Greene	27,121	262	103,516	10.0%	0	0.008%	0	0.00	0	
Indiana	24,914	184	135,403	10.0%	0	0.008%	0	0.00	0	
Jefferson	1,290	13	99,231	10.0%	0	0.008%	0	0.00	0	
Lawrence	26,992	167	161,631	10.0%	1	0.008%	1	0.15	24,861	
Mercer	19,357	138	140,270	10.0%	0	0.008%	0	0.00	0	
Somerset	6,007	51	117,784	10.0%	0	0.008%	0	0.00	0	
Venango	195	2	97,500	10.0%	0	0.008%	0	0.00	0	
Warren	134	1	134,100	10.0%	0	0.008%	0	0.00	0	
Washington	1,157,594	8,368	138,336	10.0%	0	0.008%	0	0.00	0	
Westmoreland	925,382	7,115	130,061	10.0%	0	0.008%	0	0.00	0	

- Column
- (1) - (3) Provided by PA MSI
 - (4) (2) / (3)
 - (5) Assumes 1 in 100 year flood
 - (6) Equals 1 when uniform random number is less than 10.0 %
 - (7) Exhibit 11 Col (7) Average x Frequency factor
Freq Factor 0.25
 - (8) Simulated number of risks impacted based, Poisson with mean equal to (8) x (3)
 - (9) Percent of insured value damaged based upon a Beta distribution with mean and standard deviation from Exhibit 11 Col (11)
 - (10) (10) x limit of \$250,000
 - (11) Calculated flood loss

**Pennsylvania Mine Subsidence Insurance Fund
2007 Actuarial Review**

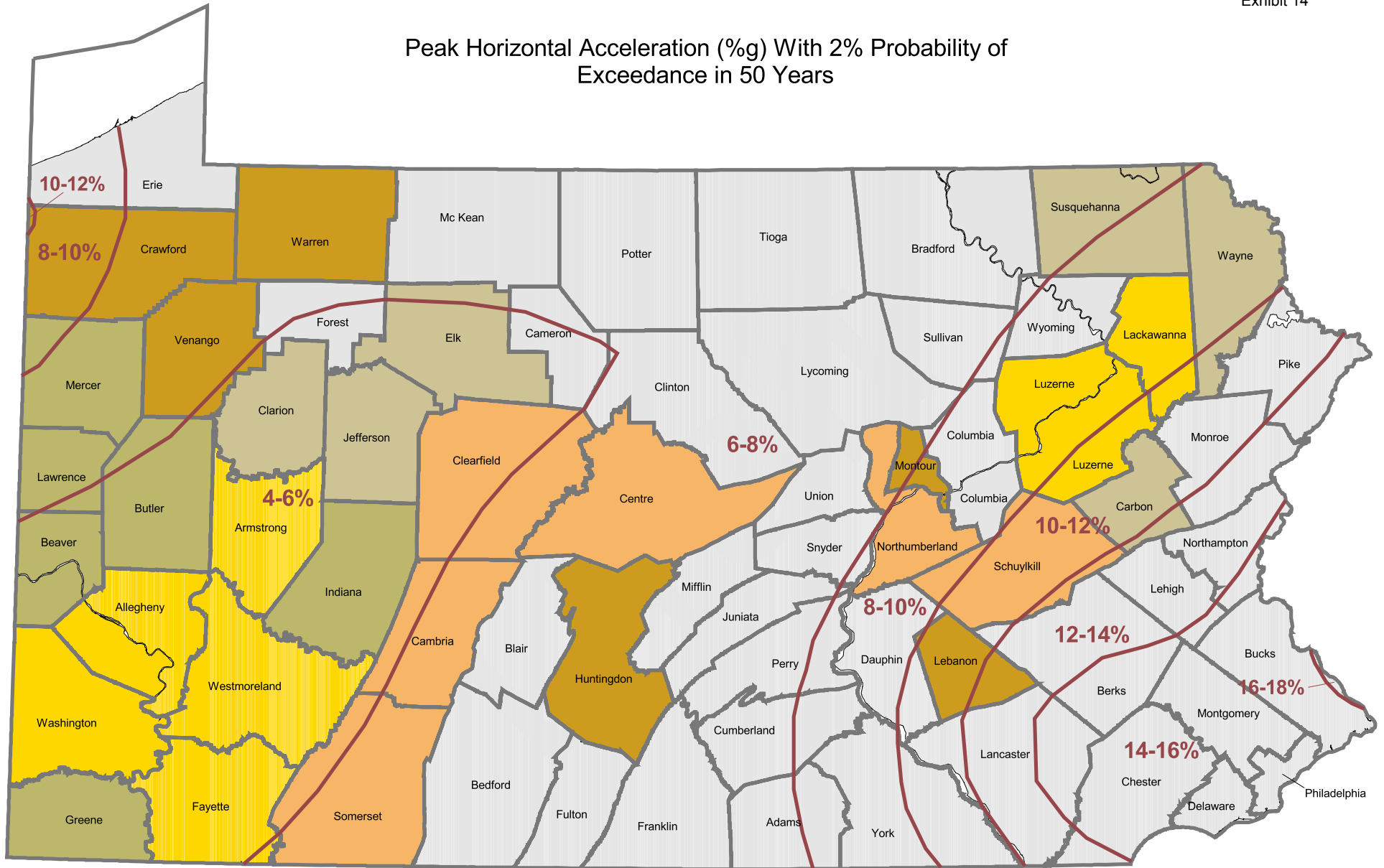
**Catastrophe Analysis
Flood - Scenario 2**

County (1)	Insured Value (000's) (2)	Number of Policies (3)	Average Value (4)	Flood Probability (5)	Flood Occur (6)	Freq in Flood (7)	# of Risks Impacted (8)	Severity Percent (9)	Loss (10)	Sum Loss (11)
Carbon	1,697	22	77,145	10.0%	0	0.032%	0	0.00	0	1,118,307
Columbia	0	0	0	10.0%	0	0.032%	0	0.00	0	
Unknown	0	0	0	10.0%	0	0.032%	0	0.00	0	
Huntingdon	81	1	81,200	10.0%	1	0.032%	6	0.43	208,370	
Lackawanna	417,555	4,284	97,468	10.0%	0	0.032%	0	0.00	0	
Lebanon	184	1	183,700	10.0%	0	0.032%	0	0.00	0	
Luzerne	461,553	5,125	90,059	10.0%	0	0.032%	0	0.00	0	
Montour	250	1	250,000	10.0%	0	0.032%	0	0.00	0	
Northumberland	11,295	93	121,447	10.0%	0	0.032%	0	0.00	0	
Schuylkill	12,471	128	97,427	10.0%	0	0.032%	0	0.00	0	
Susquehanna	1,845	20	92,230	10.0%	0	0.032%	0	0.00	0	
Wayne	669	6	111,500	10.0%	0	0.032%	0	0.00	0	
Adams	0	0	0	10.0%	0	0.032%	0	0.00	0	
Allegheny	3,613,975	28,420	127,163	10.0%	1	0.032%	27	0.22	738,380	
Armstrong	53,637	492	109,017	10.0%	0	0.032%	0	0.00	0	
Beaver	48,247	363	132,912	10.0%	0	0.032%	0	0.00	0	
Butler	18,777	137	137,058	10.0%	0	0.032%	0	0.00	0	
Cambria	15,351	137	112,050	10.0%	0	0.032%	0	0.00	0	
Centre	2,180	18	121,089	10.0%	0	0.032%	0	0.00	0	
Clarion	1,529	15	101,960	10.0%	0	0.032%	0	0.00	0	
Clearfield	8,817	98	89,972	10.0%	0	0.032%	0	0.00	0	
Crawford	280	2	140,000	10.0%	0	0.032%	0	0.00	0	
Elk	1,006	6	167,583	10.0%	0	0.032%	0	0.00	0	
Fayette	203,356	2,064	98,525	10.0%	0	0.032%	0	0.00	0	
Greene	27,121	262	103,516	10.0%	0	0.032%	0	0.00	0	
Indiana	24,914	184	135,403	10.0%	0	0.032%	0	0.00	0	
Jefferson	1,290	13	99,231	10.0%	1	0.032%	3	0.58	171,557	
Lawrence	26,992	167	161,631	10.0%	0	0.032%	0	0.00	0	
Mercer	19,357	138	140,270	10.0%	0	0.032%	0	0.00	0	
Somerset	6,007	51	117,784	10.0%	0	0.032%	0	0.00	0	
Venango	195	2	97,500	10.0%	0	0.032%	0	0.00	0	
Warren	134	1	134,100	10.0%	0	0.032%	0	0.00	0	
Washington	1,157,594	8,368	138,336	10.0%	0	0.032%	0	0.00	0	
Westmoreland	925,382	7,115	130,061	10.0%	0	0.032%	0	0.00	0	

Column

- (1) - (3) Provided by PA MSI
- (4) (2) / (3)
- (5) Assumes 1 in 100 year flood
- (6) Equals 1 when uniform random number is less than 10.0 %
- (7) Exhibit 11 Col (7) Average x Frequency factor
Freq Factor 1.25
- (8) Simulated number of risks impacted based, Poisson with mean equal to (8) x (3)
- (9) Percent of insured value damaged based upon a Beta distribution with mean and standard deviation from Exhibit 11 Col (11)
- (10) (10) x limit of \$250,000
- (11) Calculated flood loss

Peak Horizontal Acceleration (%g) With 2% Probability of Exceedance in 50 Years



LEGEND

Total Amount	
	80,000 - 660,000
	660,001 - 2,000,000
	2,000,001 - 18,000,000
	18,000,001 - 50,000,000
	50,000,001 & Up
	N/A

- } Earthquake Percentages
- County Boundaries



*Preliminary National Seismic Hazard Maps - 2007 (USGS)