



Taylor & Mulder
Property and Casualty Consulting Actuaries

**SOUTH DAKOTA PETROLEUM RELEASE COMPENSATION
FUND**

**LOSS AND LOSS ADJUSTMENT EXPENSE
RESERVE ANALYSIS
AS OF APRIL 30, 2018 PROJECTED TO JUNE 30, 2018**

June 2018

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June 29, 2018

Mr. Alan W. Bakeberg
Director of Engineering
South Dakota Department of Environment and Natural Resources
Petroleum Release Compensation Fund Program
Foss Building
523 E. Capitol Avenue
Pierre, SD 57501

RE: ACTUARIAL ANALYSIS OF THE PETROLEUM RELEASE COMPENSATION FUND AS OF APRIL 30, 2018 PROJECTED TO JUNE 30, 2018

Dear Mr. Bakeberg:

Enclosed is the actuarial review of the loss and loss adjustment expense reserves of the South Dakota Petroleum Release Compensation Fund as of April 30, 2018 projected to June 30, 2018.

The first section in the text of our report is the Executive Summary section. This section presents our conclusions and recommendations. It also describes the purpose and scope of our report, explains the distribution and use of our report, and provides the conditions and limitations underlying our work. This section of our report includes the Background section which provides information about the PRCF program's history.

The next section of the text of our report is the Actuarial Analysis section that describes the sources of data, our overall methodology, the selection of factors and specific methodologies and considerations by line of business. It also describes the selection of ultimate losses, and loss reserve discounting. The Exhibits section of our report follows the text of the report and includes our analyses.

Please feel free to call if you have any questions regarding any aspect of our report.

Sincerely,

Daniel W. Lupton, FCAS, MAAA, CSPA, MBA

E. Toni Mulder, FCAS, MAAA, FCA

Bobby Jaegers

Enclosures

South Dakota Petroleum Release Compensation Fund Loss and Loss Adjustment Expense Reserve Analysis as of April 30, 2018 Projected to June 30, 2018

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Executive Summary

Purpose and Scope

Taylor & Mulder, Incorporated (“T&M”) was requested by the South Dakota Petroleum Release Compensation Fund (“PRCF”) to conduct an actuarial review of the PRCF's loss and loss adjustment expenses reserves as of April 30, 2018. This report contains our summary, conclusions and recommendations along with a description of the analysis underlying our conclusions.

Specifically, T&M was asked to conduct an actuarial analysis to include within its scope the following tasks:

TASK 1 – RESERVE ADEQUACY: A review of the adequacy of current claim reserves of the PRCF.

TASK 2 – UNREPORTED CLAIMS: An analysis of the current liability associated with unreported pollution in the state.

TASK 3 – FUTURE LIABILITIES: A projection of the PRCF's future claim liabilities, including an estimate on future claim severity and frequency.

TASK 4 – FINANCIALS: An estimation of the claims impact on PRCF's financial position.

TASK 5 – LARGE LOSSES: An analysis of PRCF's large loss claims.

This report presents the results of those analyses.

In accordance with the requirements of the Actuarial Standards of Practice in making statements of actuarial opinion, we provide the following statements:

I, Daniel W. Lupton, am an Officer and Consulting Actuary in the firm of Taylor & Mulder, Inc. I am a Fellow of the Casualty Actuarial Society in good standing and qualified to issue a Statement of Actuarial Opinion. I am also a Member of the American Academy of Actuaries.

Conclusions

TASK 1 – RESERVE ADEQUACY: Loss and Loss Adjustment Expense Reserve Adequacy

T&M reviewed the PRCF’s loss experience and split PRCF claims into four categories. First claims were split between abandoned tanks and non-abandoned tanks. Abandoned tank cleanup projects experienced significantly different costs than non-abandoned sites, and claims were divided accordingly.

Second, abandoned tanks were further split into those that were (1) associated with a commercial property and (2) those that were not, as commercial and non-commercial tanks appeared to have significantly different experience in the historical loss database. Non-abandoned tanks were split into two groups based on the believed cause of loss. In particular, it was determined that certain causes of loss were associated with comparatively low-cost remediation efforts, or low “severity” losses, while other causes of loss were associated with high-cost remediations, or high severity losses.

The following table depicts the average paid loss to date per release from each of these categories:

South Dakota Petroleum Release Compensation Fund Comparison of Proposed Claim Type Groupings	
Claim Type	Average Severity
Abandoned – Commercial	\$4,765
Abandoned - Other	\$2,867
Non-Abandoned – High Severity	\$65,798
Non-Abandoned – Low Severity	\$37,509

T&M analyzed loss and loss adjustment expense reserves based on these four categories of claims. The following table shows the results of our analysis:

South Dakota Petroleum Release Compensation Fund			
Undiscounted Unpaid Loss & LAE as of April 30, 2018 Projected to June 30, 2018			
Claim Type	Net Unpaid Loss	Net Unpaid ULAE	Total Net Unpaid
Abandoned – Commercial	37,631	33,366	70,998
Abandoned – Other	53,017	47,009	100,026
Non-Abandoned – High Severity	972,406	862,204	1,834,610
Non-Abandoned – Low Severity	87,744	77,800	165,545
Total	1,150,798	1,020,380	2,171,178

As reserves are held for a number of years, investment income has a measurable impact on needed funding. T&M used the investment yield equal to 2.61%, based on duration-matched investment yields. The following table shows the results of our analysis taking into account the effect of investment income:

South Dakota Petroleum Release Compensation Fund			
Discounted Unpaid Loss & LAE as of April 30, 2018 Projected to June 30, 2018			
Claim Type	Undiscounted Unpaid Loss & LAE	Discount	Discounted Unpaid Loss & LAE
Abandoned – Commercial	70,998	2,028	68,969
Abandoned – Other	100,026	2,576	97,449
Non-Abandoned – High Severity	1,834,610	133,671	1,700,939
Non-Abandoned – Low Severity	165,545	8,065	157,480
Total	2,171,178	146,340	2,024,838

Because claims are paid incrementally over an extended period, investment income can have a significant impact on the present value of ultimate losses. Projected investment income for this report was 2.61%, based on duration-matched investment yields. As a result, as shown in the second chart, above, investment income amounts to approximately 6.7% of undiscounted losses. Improvements in investment yield could increase this amount significantly.

These reserves do not include a provision for claims not yet reported to the PRCF as of April 30, 2018. The reserves listed in the above tables reflect the anticipated cost of closing all *currently reported* releases, as well as the administrative and overhead costs associated with those remediations.

TASK 2 – UNREPORTED CLAIMS: Unreported Claim Costs

As noted above, the reserve projections in the preceding section only account for anticipated unpaid losses and expenses associated with claims that have been reported to the PRCF. However, investigations within the industry have indicated that there may be a substantial lag between the occurrence of a petroleum release and its subsequent report. It is frequently assumed that as many as 20% of tanks may have releases that have not yet been detected.

Taylor & Mulder constructed a model to determine the anticipated number of such unreported releases based on historical data in South Dakota. Based on this analysis, we project that approximately 17% of tanks may have experienced leaks that have not yet been discovered. After adjustment for ongoing remediation projects, this corresponds to roughly 1,069 releases. The following table describes the mid, high, and low estimates for the cost associated with these claims:

South Dakota Petroleum Release Compensation Fund			
Projected Pure IBNR Loss and LAE as of April 30, 2018, Projected to June 30, 2018			
	Loss	Expense	Total Cost
Central Estimate	10,604,778	9,402,950	20,007,728
High Estimate	17,170,318	15,224,425	32,394,743
Low Estimate	8,241,753	7,307,724	15,549,477

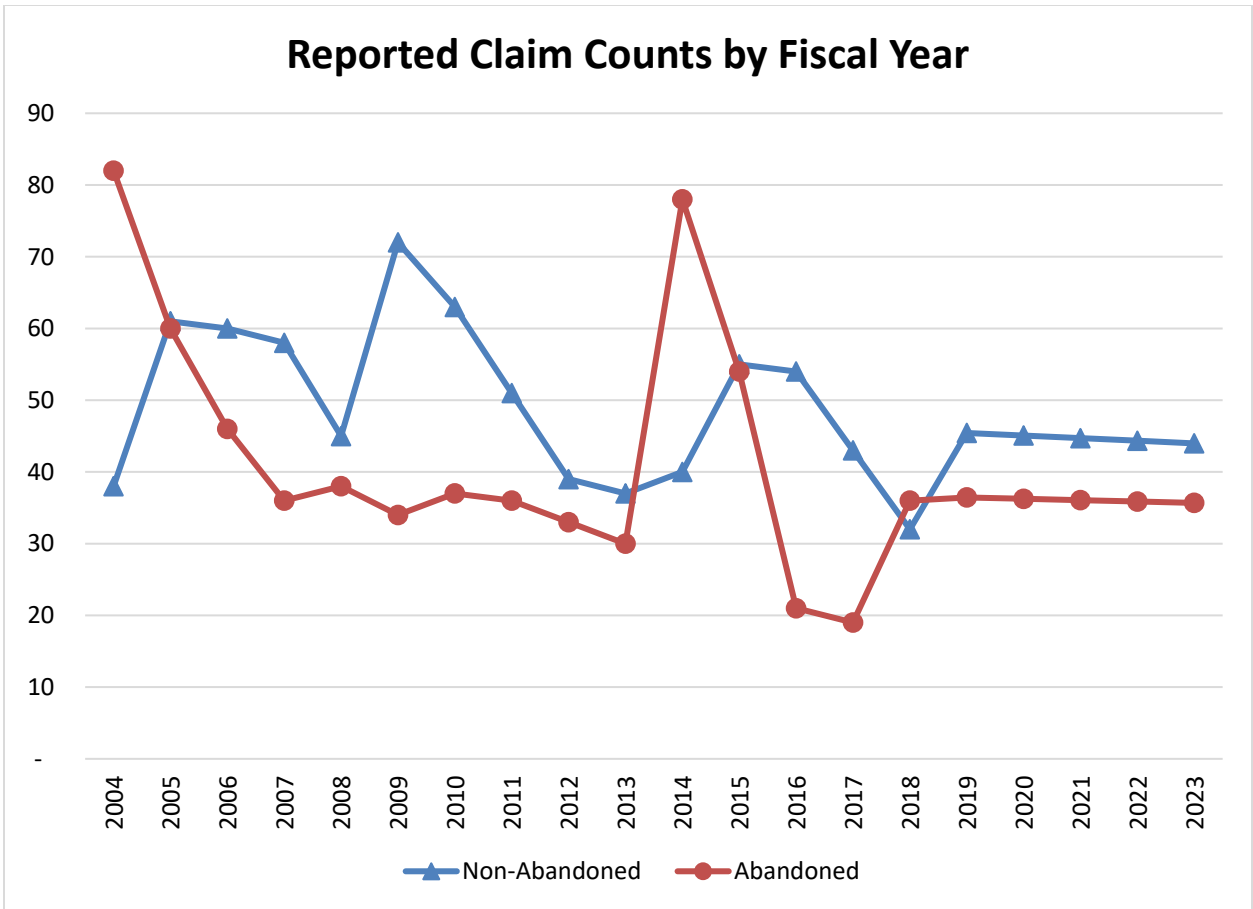
Note that this amount does not technically constitute a liability to the PRCF, as coverage is provided as releases are reported, not as they occur. In addition, it is important to recognize that this amount is subject to considerable uncertainty. Due to the difficulty of identifying when releases have occurred, the 17% figure may be high or low by a significant amount.

TASK 3 – FUTURE LIABILITIES: Projection of Future Claim Frequency and Severity

T&M was asked to estimate costs for claims to be reported in 2019 and subsequent years, i.e., claims that have not as yet been reported to PRCF. As part of projecting the financial condition of the PRCF through June 30, 2023, we estimated (1) future claims frequency and (2) future claim severity for each claim category.

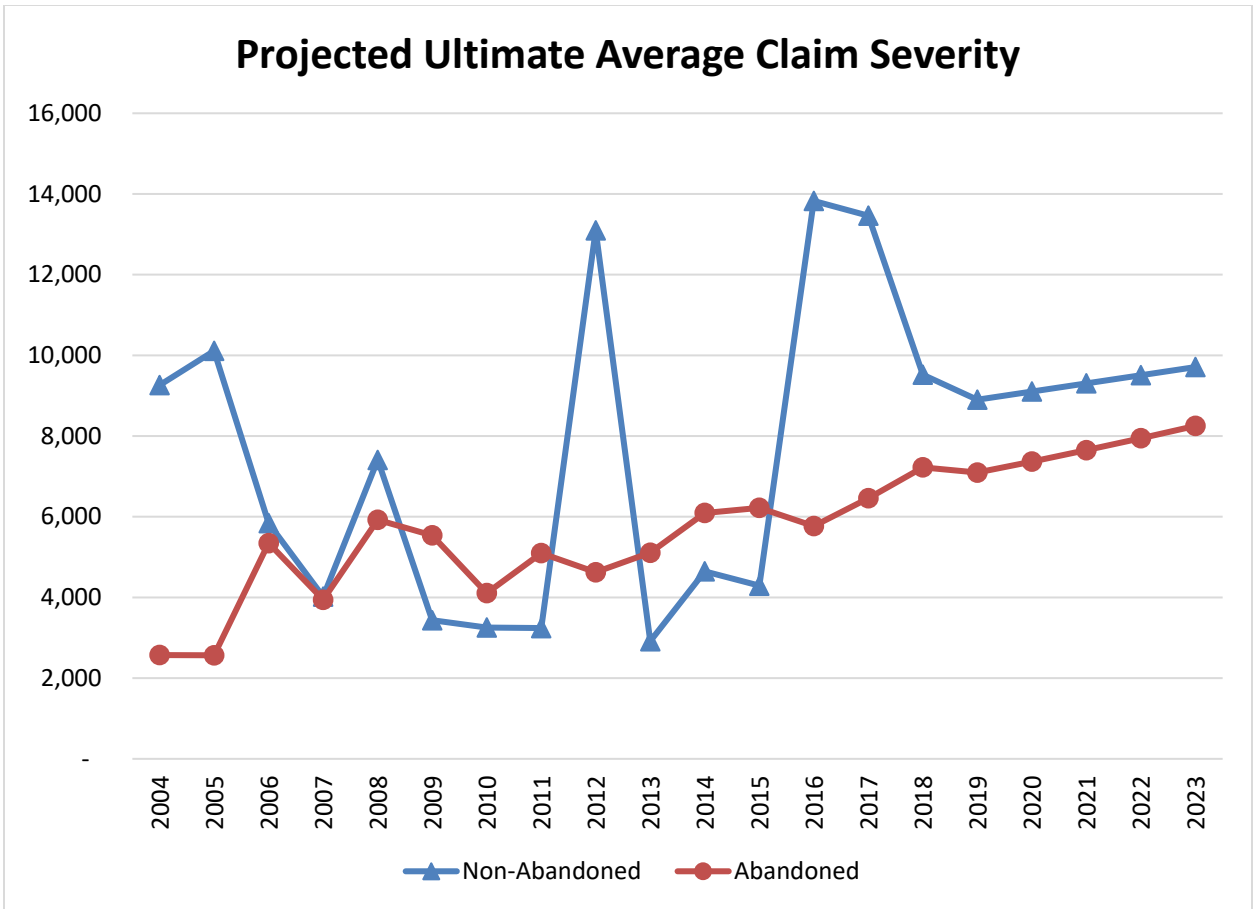
To project future reported claims counts, T&M used a variety of regression techniques. The results from those analyses led us to project a modest negative trend in claim counts for both abandoned and non-abandoned tank releases. A similar analysis showed a modest positive trend for claim severities over time.

The following chart shows claim frequencies over time:



In 2001-2003, there was a significant spike in reported abandoned tanks releases (too large to show on this graph). As a result, abandoned tank claim frequencies were projected based on the more recent period from 2007 to 2018. Although there was a more modest spike in 2014-15, we project that abandoned tank reporting frequency will stabilize in the future, consistent with the 2007-2013 period.

The following chart shows anticipated ultimate claim severities over time:



Note that the non-abandoned tanks have significantly greater volatility in claim severities over time.

Both abandoned and non-abandoned tanks appear to have a modest positive severity trend.

TASK 4 – FINANCIALS: Projection of Revenues and Future Cash Flows

T&M has relied on projections of future revenues provided by the PRCF. We have reviewed these projected revenues for reasonableness and found they are reasonable based on current economic conditions. However, T&M has not attempted to quantify the potential impact on PRCF revenue of the move to more fuel efficient vehicles and to alternative vehicle fuels.

T&M projected cash flows to the PRCF for a five-year time horizon. To perform this analysis, we combined projections of future claim frequencies and severities, projections of future revenues, and projections of future expenses associated with operations, training, and legal budgets.

The following chart shows the anticipated revenues, expenses, and beginning and ending fund cash balances through June 30, 2023:

South Dakota Petroleum Release Compensation Fund				
Pro Forma Financial as of April 30, 2018 Projected to June 30, 2018				
Fiscal Year	Revenues	Expenses	Beginning Balance	Ending Balance
2019	3,452,814	1,194,547	2,025,374	4,283,642
2020	3,341,702	1,317,712	4,283,642	6,000,000
2021	3,216,458	1,336,762	6,000,000	6,000,000
2022	3,046,458	1,338,878	6,000,000	6,000,000
2023	3,046,458	1,343,820	6,000,000	6,000,000

To the extent that corrective actions are completed more rapidly, and claims are submitted faster than they have been historically, the rate of expenses will increase by a commensurate amount.

Note that SDCL 34A-13 caps the fund balance at \$6,000,000, but also provides that if the balance of the PRCF falls below two million dollars and has additional accounts payable that exceed projected monthly deposits, a transfer shall be made from the State Highway Fund to the PRCF in an amount that brings the balance of the petroleum release compensation fund to five million dollars.

TASK 5 – LARGE LOSSES: Large Loss Claim Analysis

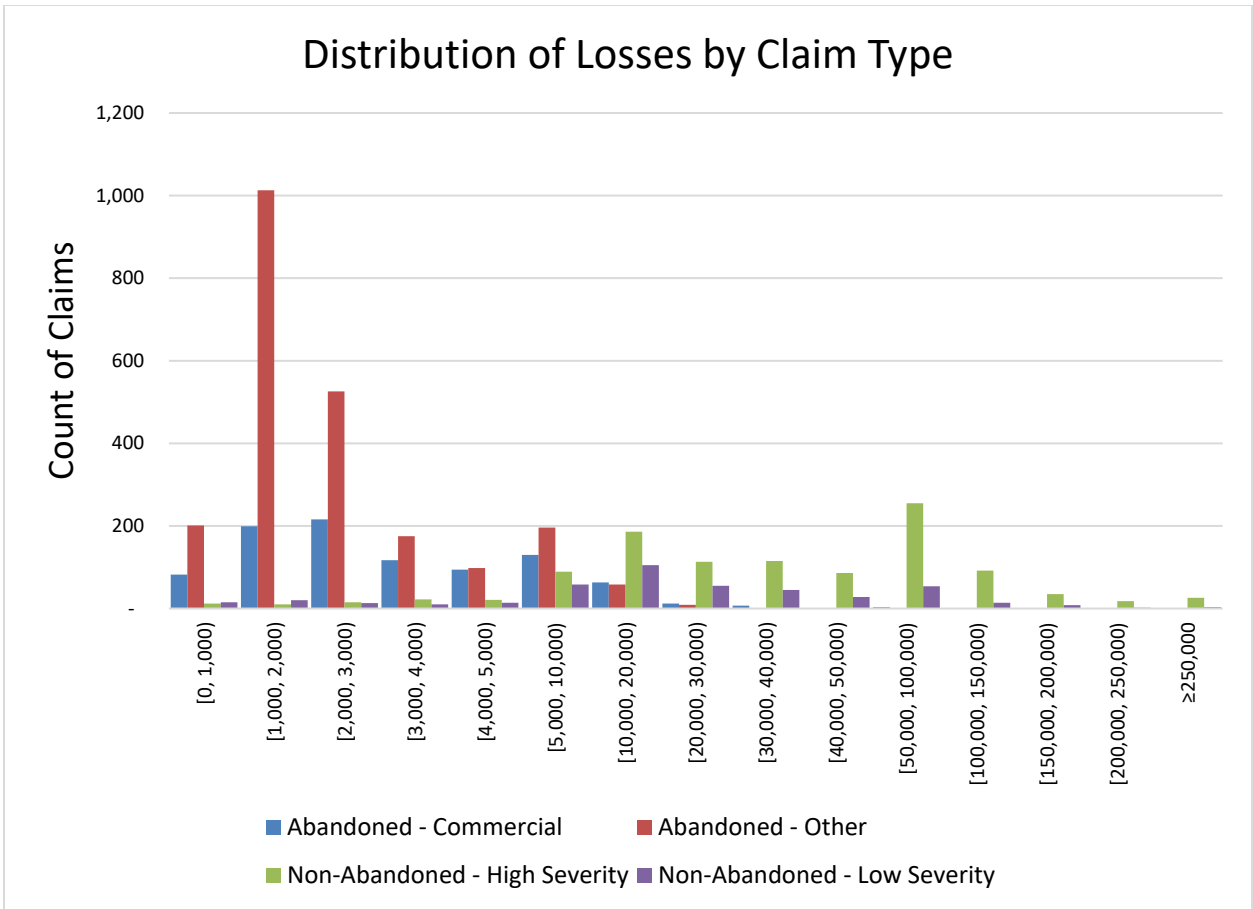
Although there is no formal definition of a “large loss claim,” many states define a “large loss” as a claim that exceeds \$250,000 in size. For the PRCF, the distribution of loss sizes is much lower than for many other states, so this definition is less useful. While many states have approximately 5% of claims in excess of \$250,000, the PRCF has had only 0.7% of claims for which the paid amount has currently exceeded that threshold.

The following chart shows the distribution of claim counts and paid losses to date at different claim sizes in the PRCF loss database. Note that the paid losses in this chart are stated net of deductible recoveries.

South Dakota Petroleum Release Compensation Fund				
Claim Statistics by Size				
Claim Size	Count	% of Count	Paid	% of Paid
[0, 1,000)	310	6.5%	186,660	0.2%
[1,000, 2,000)	1,242	26.2%	1,921,194	2.1%
[2,000, 3,000)	770	16.2%	1,882,484	2.1%
[3,000, 4,000)	324	6.8%	1,115,103	1.2%
[4,000, 5,000)	227	4.8%	1,016,836	1.1%
[5,000, 10,000)	473	10.0%	3,381,437	3.8%
[10,000, 20,000)	412	8.7%	5,974,583	6.7%
[20,000, 30,000)	189	4.0%	4,664,523	5.2%
[30,000, 40,000)	168	3.5%	5,823,803	6.5%
[40,000, 50,000)	115	2.4%	5,109,546	5.7%
[50,000, 100,000)	313	6.6%	22,222,449	24.8%
[100,000, 150,000)	107	2.3%	12,774,444	14.3%
[150,000, 200,000)	43	0.9%	7,460,716	8.3%
[200,000, 250,000)	20	0.4%	4,456,608	5.0%
≥250,000	29	0.6%	11,523,991	12.9%
Total	4,742	100.0%	89,514,376	100.0%

Although only 0.6% of claims exceed \$250,000, those claims account for 12.9% of the total paid losses to the PRCF since it began operations. Likewise, claims in excess of \$100,000 account for 4.2% of claims by number but 40.5% of claims by paid losses.

Different types of claims have significantly different risk of becoming large claims. The following graph shows the distribution of claim sizes split out by the four categories of claim type used in our analysis:



Note that abandoned tanks do not have many claims that exceed \$10,000, while non-abandoned tanks do not have many claims that are below this value.

As stated previously, the “High Severity” and “Low Severity” categories for non-abandoned tanks were determined based on the distribution of severities for different causes of loss. “High Severity” causes of loss include “equipment failure,” “leakage,” “leaks and spills,” “line leak,” “tank failure,” and “other.” All other causes of loss (e.g., “overflow,” “spillage,” “corrosion”) are considered “Low Severity.” Based on this analysis, it appears that the causes of loss associated with the “High Severity” category of claims are more likely to produce claims that exceed \$100,000.

Recommendations

1. Connection to Tanks Database

At multiple points in our analysis, it became useful to link remediation projects tracked by the PRCF to facilities tracked within the DENR tanks database. However, there is currently no easy method of linking the two databases. A facility number links more recent remediation projects to their associated facilities within the tanks database, but historical remediations cannot easily be tracked to the tanks where the leaks occurred.

For this purpose, we made extensive use of the latitude and longitude tracked by the PRCF database and the tanks database, and in many cases this was sufficient to link the two. However, such matching is not universally possible (due to missing data) or does not always produce reasonable matches. We would recommend that a systematic effort be undertaken to link historical releases treated by the PRCF to the associated facilities tracked in the tanks database.

2. Tanks Database Missing Elements

In many cases, the tanks currently eligible for coverage by the PRCF are not well-documented in the tanks database. As of April 30, 2018, the following items are not known:

Item	Records Missing from Active Tanks (Out of 6,149 Records Total)
Address	45
Tank Capacity	14
Installation Year	122
Product Stored	121
Tank Construction	63
Piping Material	232
Piping Type	1,755

Tracking these items (and connecting this database to petroleum release events) would help in determining whether particular tank systems or fuel types were particularly prone to releases. As

an example, some states have questioned whether ultra-low-sulfur gasoline and diesel products can be safely stored in fiberglass reinforced plastic tanks, or whether this poses a higher risk of tank failure. However, the risks relevant to one state are often not relevant to another state due to differences in tank demographics or for soil composition or geological reasons. Therefore, it may be useful for the PRCF to collect this data independently so that this could be studied further.

Background

The Petroleum Release Compensation Fund was established under the Petroleum Inspection and Release Compensation Act of 1988 as a state-operated fund that assists in the remediation of petroleum releases. Through this program, the PRCF reimburses reasonable expenses incurred by tank owners and operators in the remediation of petroleum releases subject to a deductible of \$10,000 and a limit of \$1 million per covered release and an aggregate limit of \$2 million per tank owner per year. In addition, the PRCF funds remediation efforts associated with petroleum releases from abandoned tanks, subject to a limit of \$1 million.

The PRCF is funded by a \$0.02 per gallon tank inspection fee, of which the PRCF has in recent years received 10.65%, or approximately \$1.8 million of the total \$17 million collected from this fee. Starting in Fiscal Year 2019, the PRCF allocation will increase. The following shows the PRCF allocation for 2018 through 2023 and beyond:

South Dakota Petroleum Release Compensation Fund Inspection Fee Allocation by Fiscal Year	
Fiscal Year	PRCF Allocation
2018	10.65%
2019	20.00%
2020	19.00%
2021	18.00%
2022	17.00%
2023 and Subsequent	17.00%

Terms Defined

Claims-Made Claims-made coverage is a type of insurance coverage that provides protection for the insured on claims reported during the coverage period given that the incident giving rise to the claim occurred on or after the Retroactive Date (“retro date”). The retro date is usually the date the first claims-made coverage was issued to the insured. Coverage provided by PRCF attaches on a claims-made basis.

Claims-made coverage may be contrasted to occurrence coverage, which responds to claims brought against the insured given that the incident giving rise to the claim occurred during the coverage period. Both private passenger automobile and homeowners’ policies are written on an occurrence basis.

Claim Frequency Claim frequency is the average number of claims per insured exposure. For PRCF, an insured exposure is one tank insured for one year. For example, if 250 claims are reported in a year with 10,000 insured tanks, the claim frequency (average number of claims per insured exposure) is $250 / 10,000$ insured tanks = 0.025 claim per tank.

IBNR Incurred But Not Reported (“IBNR”), strictly speaking, is a reserve derived by actuaries for claims not as yet reported to the insurer for which premium has been earned and for which the insurer is responsible. Under this narrow definition of IBNR, claims-made coverages would not have IBNR as all claims are known at the end of the coverage period (or soon thereafter). However, the term IBNR for claims-made coverage is used in a broad sense and includes changes in incurred amounts (i.e., paid plus case reserves) for known claims.

Claim estimates done by a claim department must rely on information about the claim at a point in time. The available information may be lacking in important details that will greatly impact the ultimate cost of the claim. Actuaries review the data from the aggregated claims data by year as it changes over time, from the first report of the claim to settlement. From these reviews, the actuary can calculate factors to apply to current case data to estimate the ultimate costs of a body of claims. The difference between estimated ultimate values and current case incurred is IBNR.

Because coverage provided by the PRCF is claims-made rather than occurrence, all references to IBNR in this report will typically refer exclusively to development on known claims unless otherwise noted.

LAE Loss Adjustment Expense (“LAE”) is the sum of Allocated Loss Adjustment Expense (“ALAE”) and Unallocated Loss Adjustment Expenses (“ULAE”) and represents the total costs of handling and defending claims.

LDM This is an abbreviation for “Loss Development Method.” In the context of this report, it refers to the use of the “Paid Development Method,” described in the **Actuarial Analysis** section of the report, below.

LDF A Loss Development Factor (“LDF”) is calculated by an actuary from historical claim data and applied to current paid or incurred values to estimate future claim costs for an insurer.

CDF A Cumulative Development Factor (“CDF”) is similar to an LDF. An LDF is calculated based on the difference in losses for a cohort of claims between two

subsequent evaluation dates, so applying an LDF to current paid or incurred losses for a given cohort will provide a projection of the paid or incurred losses expected in the subsequent period. By contrast, a CDF is a cumulation of all future LDFs until a claim is closed. Therefore, applying a CDF to the current paid or incurred loss for a given cohort of claims will provide a projection of the total amount anticipated to be required to close all claims in that cohort.

Pure Premium Pure Premium is the average cost of insurance per covered exposure. For PRCF, a covered exposure is one tank insured for one year. An example might help clarify the concept. If two tanks are covered and one has a claim for \$100, then the pure premium (average loss per covered exposure) is $\$100 / 2 \text{ covered tanks} = \50

Severity Severity is the average size of claim for a given collection of claims. For instance, if the total cost for three claims is \$45,000, the claim severity (average size of claim) is $\$45,000 / 3 \text{ claims} = \$15,000 \text{ severity}$.

Report Distribution and Use

This report has been prepared for use by the management of PRCF, their Board of Directors, their accountants, auditors, and attorneys. This report may be reproduced only in its entirety. The Exhibits are integral parts of this report. It is our understanding that this report will be presented in a public Board of Directors meeting by the PRCF management and that T&M will be available at that meeting to present the report and answer questions from the Board, The PRCF is not authorized to include this report in any marketing or request for proposal solicitations. In addition, it should be understood that T&M consultants are available to respond to any questions by authorized third parties with respect to this report.

Conditions and Limitations

The analyses contained in this report were performed using accepted loss and loss adjustment expense reserving methods adjusted to the special needs of the PRCF and in conformance with sound actuarial standards and principles. T&M introduced assumptions and judgments that we considered appropriate in the circumstances.

With regard to projections of ultimate values, it should be understood that the emergence and settlement of claims are subject to uncertainty. While we have used our best professional judgment in all instances, projections of future ultimate losses and loss expenses are inherently uncertain because of the random nature of claims occurrences. They are also dependent upon future contingent events and are affected by many additional factors.

PRCF claim reserving procedures and settlement philosophy, current and perceived social and economic inflation, current and future court and jury attitudes, legislative changes affecting the PRCF, improvements in technology, and many other economic, legal, political, legislative and social factors all can have

significant effects on ultimate claim costs. Therefore, we cannot warrant that actual developments will not differ from current projections. Such differences could be upward or downward and could be significant.

In summary, the ultimate loss and loss adjustment expense levels estimated in this report are subject to potential variations in estimation due to:

- (1) the fact that the ultimate liability of PRCF is subject to the outcome of events yet to occur;
- (2) the unanticipated changes in the legal, economic, legislative or claims adjudication environments;
- (3) statistical fluctuation in losses around the estimated or expected values when all other factors remain constant; and
- (4) the fact that the actual future loss and loss payment and reporting patterns may differ from those applied in the determination of the expected losses or there may be unanticipated changes in the loss and expense loss and expense payment and reporting patterns;

Accordingly no assurance can be given that future loss emergence will not deviate from the estimated ultimate loss and loss adjustment expenses. However, the ultimate loss and loss adjustment expense estimates were based on a reasonable application of generally accepted actuarial procedures and techniques applied to the information available.

T&M relied without audit or verification on historical loss, loss adjustment expense, exposure data, and other information provided by the PRCF and its employees. T&M has relied upon the data provided and on the oral and/or written statements made regarding the quality, accuracy, and completeness of the data and information supplied. Any inaccuracies or inconsistencies in the data could have a significant effect on the conclusions drawn.

Should any inaccuracies be found in the data, T&M should be notified immediately so that the analysis can be adjusted accordingly.

With regard to projections of estimated revenues, it should be understood that the revenue streams are subject to uncertainty. While we have used our best professional judgment in all instances, projections of future revenues are inherently uncertain due to potential changes in technology, the implementation of environmental requirements, the introduction of alternative vehicle fuels, and changes in the economy among others. While T&M has used its best judgment in selecting trend values for each category of revenue, actual revenue collected is dependent upon unknown future events and may be affected by additional factors outside of PRCF control.

T&M reflected anticipated investment income in the reserves assuming a 2.61% annual rate of return on investments. We did not independently verify the ability of the PRCF to match this assumed rate.

The analysis in this report was limited to the loss and loss adjustment expense items noted in the scope of this project. This report does not include an examination of the assets of the PRCF, nor did we form any opinion as to the value or validity of the assets. This report does not include a review or analysis of any income statement or other balance sheet items. This analysis with respect to loss and loss adjustment expense reserves is based upon the assumption that all reserves are backed by valid assets and that these assets reflect suitably scheduled maturities and/or sufficient liquidity to meet cash flow requirements.

This report is limited in scope to the estimate of the level of reserve adequacy at the evaluation date of the report. It also includes projections regarding cash flow of the operations of the PRCF under certain narrow assumptions and conditions.

This report was prepared for use by persons technically competent in insurance financial matters. Persons receiving this report should be made aware of the availability of T&M, Inc. personnel to answer questions and/or amplify on any matter addressed therein.

Actuarial Analysis

Sources of Data

Data from the PRCF was provided by Mr. John McVey and Mr. Alan Bakeberg in the form of several files.

The following is a list of the files and data sources used to develop this report:

- “Invoices.xlsx” – Database of Invoices for the PRCF as of April 30, 2018
- “PayRequests.xlsx” – Database of payment requests received by the PRCF as of April 30, 2018
- “Projects.xlsx” – Database tracking remediation projects as of April 30, 2018
- “TanksExcelExport_4-26-18.xlsx” – External tanks database
- “SpillsWithPrcfNo.xlsx” – External spills database
- “Revenue_Expenditures.xlsx” – Revenue and overhead expenses for 2012-2017 and projected for 2018-2023

In addition, we collected daily treasury yields as of 4/30/2018 from the US Treasury website.

Overall Methodology

Selection of Factors

In each of the methods described below, our selections of development factors were based on the evaluation of the predictive value of the various historical averages and the perceived presence or absence of trends and singularities. Apparent statistical aberrations were eliminated either judgmentally or by selecting a longer experience period to increase the credibility of the experience, whichever we believed more appropriate in the particular circumstances.

Paid Development Method

The paid development method uses historical loss payment patterns to project actual payments as of a given valuation date to ultimate. The PRCF's historical payment patterns or the fitted loss development factors were relied upon in selecting the expected payment patterns at each evaluation. The difference between the projected ultimate losses and the losses and allocated loss adjustment expenses paid through the evaluation date is the estimated reserve as of the evaluation date.

Estimates produced using the paid development method are not affected by changes in the case reserve position of the PRCF which might have occurred during the review period, but may be understated since they ignore large unpaid claims. Also, this method may be susceptible to any changes in case settlement philosophy and/or speed of payment.

In addition to the traditional Paid Development Method, we performed an additional variation on this development method that employs linear regression to project paid losses for the subsequent year for immature report years. This approach has several potential advantages over the traditional paid development method. Notably, if the paid loss in a comparatively immature report year is zero, this adaptation of the paid development method can nevertheless anticipate the projected ultimate loss, whereas the traditional paid development method will project an ultimate loss of zero.

Bornhuetter-Ferguson Method

Loss development methods may be affected by changes in the reporting and payment of claims. Random fluctuations in the reporting and payment of claims (such as those that may result from a single unusually large claim that could cause a significant fluctuation in the reporting pattern) are magnified by the development factors, potentially resulting in biased estimates and wide changes in the estimates from one evaluation to the next. To minimize such fluctuations, we applied the Bornhuetter-Ferguson

method to paid losses. The Bornhuetter-Ferguson method is particularly suited for projecting loss reserves for longer-tailed business with volatile or limited development patterns. The Bornhuetter-Ferguson method represents a compromise between traditional loss development methods such as the paid loss development method and an expected loss ratio method.

For the paid Bornhuetter-Ferguson method, initial expected losses are derived from projected pure premium amounts. These initial expected losses are then split into two components: expected paid losses and expected unpaid losses. The expected unpaid losses, which comprise the IBNR and case reserves for each accident year, are calculated as a function of the initial expected loss ratio, the initial expected ultimate losses, and the expected portion of ultimate losses that remains unpaid as of the evaluation date.

Selections of Ultimate Losses

Generally, the selection of ultimate losses was based on selecting incurred loss development method for older years, as this method seemed to give the best result. In years where there was great variability, particularly more recent Report Years, we selected a combination of methods (including the Bornhuetter-Ferguson method) to provide greater stability in results.

Any exceptions to the above description were based on our review of the methods combined with our knowledge of specific accident years and other considerations as described in the background section of our report.

Loss Reserve Discounting

T&M reflected anticipated investment income on reserves using an assumed discount rate of 2.61%. This rate was based on daily treasury yield curves as of April 30, 2018, duration matched to the liabilities of the PRCF. We did not independently verify the ability of the PRCF to match these rates at April 30, 2018.

The undiscounted reserves and the discounted reserves are shown in the summary section of our report. The future payout of the undiscounted recommended reserve from 2019 to 2027 separately and for years subsequent to fiscal year 2027 on a combined basis is also provided in this section.

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Ultimate Loss Net of Deductible Recoveries
All Claim Types

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Gross	Projected	Net	Net	Net	Net	Net	Deductibles	Uncollected
<u>RY</u>	<u>Ultimate</u>	<u>Deductible</u>	<u>Ultimate</u>	<u>Paid to</u>	<u>Unpaid</u>	<u>Unpaid</u>	<u>Unpaid</u>	<u>Collected</u>	<u>Deductibles</u>
	<u>Loss</u>	<u>Recoveries</u>	<u>Loss</u>	<u>Date</u>	<u>Loss</u>	<u>ULAE</u>	<u>Loss & ULAE</u>		<u>Deductibles</u>
Unknown	3,225,869	-	3,225,869	3,223,852	2,018	1,789	3,806	-	-
1985	-	-	-	-	-	-	-	-	-
1986	177,604	20,000	157,604	157,427	177	157	335	20,000	-
1987	714,950	20,000	694,950	694,236	714	633	1,348	20,000	-
1988	3,173,357	264,000	2,909,357	2,907,390	1,967	1,744	3,711	264,000	-
1989	4,624,969	570,000	4,054,969	4,050,545	4,424	3,922	8,346	570,000	-
1990	14,171,272	1,308,000	12,863,272	12,849,934	13,338	11,827	25,165	1,308,000	-
1991	19,314,168	1,048,526	18,265,643	18,243,793	21,849	19,373	41,223	1,048,526	-
1992	15,293,314	958,546	14,334,768	14,309,310	25,458	22,573	48,032	958,546	-
1993	4,584,292	782,000	3,802,292	3,798,123	4,169	3,697	7,866	782,000	-
1994	3,889,299	610,000	3,279,299	3,274,226	5,073	4,498	9,571	610,000	-
1995	2,587,232	410,000	2,177,232	2,173,477	3,755	3,329	7,084	410,000	-
1996	2,272,034	497,103	1,774,931	1,771,879	3,052	2,706	5,759	497,103	-
1997	3,583,297	670,000	2,913,297	2,907,169	6,128	5,434	11,562	670,000	-
1998	2,683,223	680,000	2,003,223	1,999,110	4,113	3,647	7,761	680,000	-
1999	3,873,559	1,012,000	2,861,559	2,852,229	9,331	8,273	17,604	1,012,000	-
2000	1,051,349	260,000	791,349	789,013	2,335	2,071	4,406	260,000	-
2001	1,276,003	100,000	1,176,003	1,173,661	2,342	2,076	4,418	100,000	-
2002	4,904,329	50,000	4,854,329	4,852,256	2,073	1,838	3,912	50,000	-
2003	1,160,834	90,000	1,070,834	1,068,068	2,767	2,453	5,220	90,000	-
2004	562,886	50,000	512,886	509,183	3,703	3,283	6,986	50,000	-
2005	770,799	102,809	667,990	661,511	6,479	5,744	12,223	102,809	-
2006	596,461	20,000	576,461	570,970	5,492	4,869	10,361	20,000	-
2007	375,097	50,000	325,097	323,456	1,641	1,455	3,096	50,000	-
2008	558,558	80,000	478,558	468,885	9,673	8,577	18,250	80,000	-
2009	435,702	80,000	355,702	346,235	9,466	8,394	17,860	80,000	-
2010	356,941	80,000	276,941	269,397	7,543	6,688	14,232	80,000	-
2011	348,831	60,000	288,831	283,719	5,112	4,533	9,644	60,000	-
2012	663,450	20,000	643,450	601,602	41,848	37,105	78,953	20,000	-
2013	261,169	40,000	221,169	211,075	10,095	8,951	19,045	40,000	-
2014	661,218	40,000	621,218	592,865	28,353	25,140	53,493	40,000	-
2015	572,003	60,000	512,003	455,258	56,745	50,314	107,060	50,000	10,000
2016	867,826	60,000	807,826	573,550	234,277	207,726	442,003	30,000	30,000
2017	701,570	70,000	631,570	356,476	275,094	243,918	519,012	40,000	30,000
2018	564,692	30,000	534,692	194,500	340,193	301,639	641,831	-	30,000
Total	100,858,158	10,192,984	90,665,174	89,514,376	1,150,798	1,020,380	2,171,178	10,092,984	100,000

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 ULAE Projection
 All Claim Types

(1) Fiscal Year	(2) Operating Budget	(3) Training	(4) Legal	(5) Total ULAE	(6) FY Paid Loss	(7) ULAE to Loss Ratio
2012	376,549	206,000	47,529	630,078	687,480	92%
2013	400,617	80,000	21,159	501,776	494,478	101%
2014	423,590	65,000	23,501	512,091	678,800	75%
2015	427,417	45,000	86,782	559,199	546,864	102%
2016	429,541	50,000	49,019	528,560	432,387	122%
2017	441,062	50,000	21,023	512,085	818,380	63%
Total	2,498,776	496,000	249,013	3,243,789	3,658,390	89%

(8)	Selected	89%		
(9)	Net Unpaid Loss	1,150,798		
(10)	ULAE Unpaid = (8) x (9)	1,020,380		
(11)	Total = (9) + (10)	2,171,178		
(12)	Pure IBNR	Mid 10,604,778	Low 8,241,753	High 17,170,318
(13)	ULAE Unpaid on Pure IBNR = (8) x (12)	9,402,950	7,307,724	15,224,425
(14)	Total = (12) + (13)	20,007,728	15,549,477	32,394,743

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Calculation of Pure IBNR Claims
 All Claim Types

(1)	DENR Open Tanks	6,924
(2)	Projected Leak Probability	17.0%
(3)	Projected IBNR Leaks = (1) x (2)	1,069
(4)	Projected Average Severity	9,919
(5)	Pure IBNR Reserve = (3) x (4)	10,604,778
(6)	Pure IBNR High Estimate	17,170,318
(7)	Pure IBNR Low Estimate	8,241,753

Notes: Row (1) from DENR Database
 Row (2) from T&M modeling analysis
 Row (4) from trended frequency and severity analysis
 Row (6) based on 25% leak probability
 Row (7) based on 12% leak probability

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Analysis of Deductible Loss Elimination Ratios
Non-Abandoned Claims

RY	Total Paid to Date			Deductible Recoveries to Date			Loss Elimination Ratio			Gross Ultimate Loss			Projected Ultimate Deductible Recoveries			
	High Severity	Low Severity	Total	High Severity	Low Severity	Total	High Severity	Low Severity	Total	High Severity	Low Severity	Total	High Severity	Low Severity	Total	
Unknown	2,017,500	-	2,017,500	-	-	-	0%	0%	0%	2,019,518	-	2,019,518	-	-	-	
1985	-	-	-	-	-	-	0%	0%	0%	-	-	-	-	-	-	
1986	177,427	-	177,427	20,000	-	20,000	11%	0%	11%	177,604	-	177,604	20,000	-	20,000	
1987	714,236	-	714,236	20,000	-	20,000	3%	0%	3%	714,950	-	714,950	20,000	-	20,000	
1988	1,967,047	1,204,343	3,171,390	184,000	80,000	264,000	9%	7%	8%	1,969,014	1,204,343	3,173,357	184,000	80,000	264,000	
1989	3,837,386	783,159	4,620,545	390,000	180,000	570,000	10%	23%	12%	3,841,810	783,159	4,624,969	390,000	180,000	570,000	
1990	10,849,892	3,308,042	14,157,934	878,000	430,000	1,308,000	8%	13%	9%	10,863,230	3,308,042	14,171,272	878,000	430,000	1,308,000	
1991	14,122,675	5,164,457	19,287,132	643,835	404,691	1,048,526	5%	8%	5%	14,144,524	5,164,457	19,308,981	643,835	404,691	1,048,526	
1992	12,630,163	2,596,343	15,226,506	646,000	312,546	958,546	5%	12%	6%	12,655,621	2,596,343	15,251,965	646,000	312,546	958,546	
1993	3,391,549	1,188,573	4,580,123	522,000	260,000	782,000	15%	22%	17%	3,395,719	1,188,573	4,584,292	522,000	260,000	782,000	
1994	3,434,705	446,166	3,880,871	500,000	110,000	610,000	15%	25%	16%	3,439,778	446,166	3,885,944	500,000	110,000	610,000	
1995	2,469,078	110,949	2,580,027	370,000	40,000	410,000	15%	36%	16%	2,472,833	110,949	2,583,782	370,000	40,000	410,000	
1996	1,915,051	344,270	2,259,321	437,103	60,000	497,103	23%	17%	22%	1,918,103	344,270	2,262,374	437,103	60,000	497,103	
1997	3,487,807	89,362	3,577,169	630,000	40,000	670,000	18%	45%	19%	3,493,935	89,362	3,583,297	630,000	40,000	670,000	
1998	2,325,970	353,140	2,679,110	560,000	120,000	680,000	24%	34%	25%	2,330,083	353,140	2,683,223	560,000	120,000	680,000	
1999	3,576,391	284,412	3,860,803	880,000	132,000	1,012,000	25%	46%	26%	3,585,721	284,412	3,870,133	880,000	132,000	1,012,000	
2000	898,170	21,655	919,826	250,000	10,000	260,000	28%	46%	28%	900,506	21,655	922,161	250,000	10,000	260,000	
2001	346,292	-	346,292	100,000	-	100,000	29%	0%	29%	348,634	-	348,634	100,000	-	100,000	
2002	141,307	29,966	171,273	40,000	10,000	50,000	28%	33%	29%	142,273	29,966	172,239	40,000	10,000	50,000	
2003	279,808	28,882	308,690	80,000	10,000	90,000	29%	35%	29%	282,575	28,882	311,457	80,000	10,000	90,000	
2004	319,461	28,784	348,244	40,000	10,000	50,000	13%	35%	14%	323,163	28,784	351,947	40,000	10,000	50,000	
2005	485,864	124,455	610,319	72,809	30,000	102,809	15%	24%	17%	492,342	124,455	616,797	72,809	30,000	102,809	
2006	319,847	25,138	344,985	10,000	10,000	20,000	3%	40%	6%	325,338	25,138	350,477	10,000	10,000	20,000	
2007	70,548	160,972	231,520	30,000	20,000	50,000	43%	12%	22%	72,189	160,972	233,161	30,000	20,000	50,000	
2008	271,947	51,808	323,755	70,000	10,000	80,000	26%	19%	25%	281,620	51,808	333,428	70,000	10,000	80,000	
2009	237,892	-	237,892	80,000	-	80,000	34%	0%	34%	247,358	-	247,358	80,000	-	80,000	
2010	182,507	14,944	197,452	70,000	10,000	80,000	38%	67%	41%	190,051	14,944	204,995	70,000	10,000	80,000	
2011	78,848	81,284	160,132	30,000	30,000	60,000	38%	37%	37%	83,960	81,284	165,244	30,000	30,000	60,000	
2012	468,963	-	468,963	20,000	-	20,000	4%	0%	4%	510,811	-	510,811	20,000	-	20,000	
2013	70,500	27,303	97,803	20,000	20,000	40,000	28%	73%	41%	80,146	27,751	107,897	20,000	20,000	40,000	
2014	69,277	94,415	163,693	20,000	20,000	40,000	29%	21%	24%	84,839	101,065	185,904	20,000	20,000	40,000	
2015	127,163	46,403	173,566	30,000	20,000	50,000	24%	43%	29%	175,059	61,028	236,086	30,000	20,000	60,000	
2016	483,268	2,209	485,478	30,000	-	30,000	6%	0%	6%	739,074	7,615	746,689	50,000	-	60,000	
2017	256,482	27,854	284,336	30,000	10,000	40,000	12%	36%	14%	518,201	60,664	578,865	50,000	10,000	70,000	
2018	-	-	-	-	-	-	0%	0%	0%	276,843	27,805	304,649	20,000	-	30,000	
Total	72,025,021	16,639,290	88,664,311	7,703,748	2,389,236	10,092,984	11%	14%	11%	73,097,427	16,727,034	89,824,461	7,763,748	2,389,236	10,192,984	
							2008-2017 Weighted Average	18%	35%	20%						
							1998-2007 Weighted Average	24%	33%	25%						
							1988-1997 Weighted Average	9%	13%	10%						
							Selected	9%	13%	10%						

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Range of Ultimates

Percentile	Projected Ultimate Losses					Unpaid Losses				
	Abandoned		Non-Abandoned		Total	Abandoned		Non-Abandoned		Total
	Commercial	Other	High Severity	Low Severity		Commercial	Other	High Severity	Low Severity	
50.0%	4,419,948	6,577,687	72,936,585	16,681,885	100,616,105	7,672	46,914	911,564	42,595	1,008,745
75.0%	4,432,451	6,610,396	73,144,781	16,704,260	100,891,887	20,174	79,623	1,119,760	64,970	1,284,527
90.0%	4,446,295	6,646,240	73,364,145	16,728,047	101,184,727	34,019	115,468	1,339,124	88,757	1,577,367
95.0%	4,455,951	6,668,530	73,509,222	16,743,630	101,377,333	43,675	137,757	1,484,201	104,340	1,769,973
99.0%	4,474,643	6,718,530	73,788,832	16,776,999	101,759,004	62,367	187,757	1,763,811	137,709	2,151,645
Mean	4,422,440	6,584,829	72,966,706	16,685,697	100,659,672	10,164	54,056	941,685	46,407	1,052,312
Selected	4,449,907	6,583,790	73,097,427	16,727,034	100,858,158	37,631	53,017	1,072,406	87,744	1,250,798

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Ultimate Loss Projection Summary
All Claim Types

<u>RY</u>	<u>LDM</u> <u>Ultimate</u>	<u>Adjusted</u> <u>LDM</u> <u>Ultimate</u>	<u>Bornhuetter-</u> <u>Ferguson</u> <u>Ultimate</u>	<u>Selected</u> <u>Ultimate</u>	<u>Paid to</u> <u>Date</u>	<u>Unpaid</u> <u>Loss</u>
Unknown	3,225,869	3,225,869	3,237,121	3,225,869	3,223,852	2,018
1985	-	-	-	-	-	-
1986	177,604	177,604	177,551	177,604	177,427	177
1987	714,950	714,950	714,326	714,950	714,236	714
1988	3,173,357	3,173,357	3,172,322	3,173,357	3,171,390	1,967
1989	4,624,969	4,624,969	4,622,241	4,624,969	4,620,545	4,424
1990	14,171,272	14,171,272	14,164,303	14,171,272	14,157,934	13,338
1991	19,314,168	19,314,168	19,300,263	19,314,168	19,292,319	21,849
1992	15,293,314	15,293,314	15,275,307	15,293,314	15,267,856	25,458
1993	4,584,292	4,584,292	4,582,953	4,584,292	4,580,123	4,169
1994	3,889,299	3,889,299	3,887,210	3,889,299	3,884,226	5,073
1995	2,587,232	2,587,232	2,586,519	2,587,232	2,583,477	3,755
1996	2,272,034	2,272,034	2,272,038	2,272,034	2,268,982	3,052
1997	3,583,297	3,583,297	3,581,487	3,583,297	3,577,169	6,128
1998	2,683,223	2,683,223	2,682,642	2,683,223	2,679,110	4,113
1999	3,873,559	3,873,559	3,871,020	3,873,559	3,864,229	9,331
2000	1,051,349	1,051,349	1,052,425	1,051,349	1,049,013	2,335
2001	1,276,003	1,276,003	1,276,872	1,276,003	1,273,661	2,342
2002	4,904,329	4,904,329	4,904,714	4,904,329	4,902,256	2,073
2003	1,160,834	1,160,834	1,163,313	1,160,834	1,158,068	2,767
2004	562,886	562,886	563,084	562,886	559,183	3,703
2005	770,799	770,799	770,725	770,799	764,321	6,479
2006	596,461	596,461	595,523	596,461	590,970	5,492
2007	375,097	375,097	381,264	375,097	373,456	1,641
2008	558,558	558,558	561,128	558,558	548,885	9,673
2009	435,702	435,702	442,621	435,702	426,235	9,466
2010	356,941	356,941	365,393	356,941	349,397	7,543
2011	348,831	348,831	368,076	348,831	343,719	5,112
2012	663,450	663,450	641,161	663,450	621,602	41,848
2013	261,169	261,169	282,672	261,169	251,075	10,095
2014	661,218	661,218	671,742	661,218	632,865	28,353
2015	572,003	572,003	570,778	572,003	505,258	66,745
2016	935,986	935,986	731,660	867,826	603,550	264,277
2017	881,143	688,539	535,027	701,570	396,476	305,094
2018	272,408	593,794	376,627	564,692	194,500	370,193
Total	100,813,607	100,942,390	100,382,106	100,858,158	99,607,360	1,250,798

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Ultimate Loss Projection Summary
Abandoned - Commercial

<u>RY</u>	<u>LDM</u> <u>Ultimate</u>	<u>Adjusted</u> <u>LDM</u> <u>Ultimate</u>	<u>Bornhuetter-</u> <u>Ferguson</u> <u>Ultimate</u>	<u>Selected</u> <u>Ultimate</u>	<u>Paid to</u> <u>Date</u>	<u>Unpaid</u> <u>Loss</u>
Unknown	462,474	462,474	462,474	462,474	462,474	-
1985	-	-	-	-	-	-
1986	-	-	-	-	-	-
1987	-	-	-	-	-	-
1988	-	-	-	-	-	-
1989	-	-	-	-	-	-
1990	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	41,349	41,349	41,349	41,349	41,349	-
1993	-	-	-	-	-	-
1994	3,355	3,355	3,355	3,355	3,355	-
1995	3,450	3,450	3,450	3,450	3,450	-
1996	9,661	9,661	9,661	9,661	9,661	-
1997	-	-	-	-	-	-
1998	-	-	-	-	-	-
1999	-	-	-	-	-	-
2000	118,726	118,726	118,726	118,726	118,726	-
2001	424,508	424,508	424,508	424,508	424,508	-
2002	2,152,886	2,152,886	2,151,779	2,152,886	2,151,779	1,107
2003	275,588	275,588	275,588	275,588	275,588	-
2004	84,780	84,780	84,780	84,780	84,780	-
2005	63,244	63,244	63,244	63,244	63,244	-
2006	149,090	149,090	149,090	149,090	149,090	-
2007	82,281	82,281	82,281	82,281	82,281	-
2008	41,288	41,288	41,288	41,288	41,288	-
2009	47,853	47,853	47,853	47,853	47,853	-
2010	31,911	31,911	31,911	31,911	31,911	-
2011	47,451	47,451	47,451	47,451	47,451	-
2012	36,584	36,584	36,584	36,584	36,584	-
2013	33,873	33,873	33,873	33,873	33,873	-
2014	126,009	126,009	121,894	126,009	121,403	4,606
2015	65,366	65,366	64,936	65,366	64,076	1,290
2016	9,244	9,244	9,398	9,244	8,833	411
2017	47,960	47,003	47,795	47,586	43,837	3,748
2018	94,787	101,636	77,625	91,349	64,880	26,469
Total	4,453,719	4,459,611	4,430,895	4,449,907	4,412,276	37,631

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Ultimate Loss Projection Summary
Abandoned - Other

<u>RY</u>	<u>LDM</u> <u>Ultimate</u>	<u>Adjusted</u> <u>LDM</u> <u>Ultimate</u>	<u>Bornhuetter-</u> <u>Ferguson</u> <u>Ultimate</u>	<u>Selected</u> <u>Ultimate</u>	<u>Paid to</u> <u>Date</u>	<u>Unpaid</u> <u>Loss</u>
Unknown	743,878	743,878	743,878	743,878	743,878	-
1985	-	-	-	-	-	-
1986	-	-	-	-	-	-
1987	-	-	-	-	-	-
1988	-	-	-	-	-	-
1989	-	-	-	-	-	-
1990	-	-	-	-	-	-
1991	5,187	5,187	5,187	5,187	5,187	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998	-	-	-	-	-	-
1999	3,426	3,426	3,426	3,426	3,426	-
2000	10,462	10,462	10,462	10,462	10,462	-
2001	502,861	502,861	502,861	502,861	502,861	-
2002	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	-
2003	573,789	573,789	573,789	573,789	573,789	-
2004	126,158	126,158	126,158	126,158	126,158	-
2005	90,757	90,757	90,757	90,757	90,757	-
2006	96,894	96,894	96,894	96,894	96,894	-
2007	59,655	59,655	59,655	59,655	59,655	-
2008	183,842	183,842	183,842	183,842	183,842	-
2009	140,490	140,490	140,490	140,490	140,490	-
2010	120,034	120,034	120,034	120,034	120,034	-
2011	136,135	136,135	136,135	136,135	136,135	-
2012	116,055	116,055	116,055	116,055	116,055	-
2013	119,400	119,400	119,400	119,400	119,400	-
2014	349,305	349,305	347,769	349,305	347,769	1,536
2015	270,550	270,550	270,129	270,550	267,615	2,935
2016	111,704	111,704	112,273	111,893	109,238	2,655
2017	75,380	78,437	71,539	75,119	68,302	6,816
2018	177,622	177,008	151,455	168,695	129,620	39,075
Total	6,592,788	6,595,231	6,561,394	6,583,790	6,530,773	53,017

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Ultimate Loss Projection Summary
Non-Abandoned - High Severity

<u>RY</u>	<u>LDM</u> <u>Ultimate</u>	<u>Adjusted</u> <u>LDM</u> <u>Ultimate</u>	<u>Bornhuetter-</u> <u>Ferguson</u> <u>Ultimate</u>	<u>Selected</u> <u>Ultimate</u>	<u>Paid to</u> <u>Date</u>	<u>Unpaid</u> <u>Loss</u>
Unknown	2,019,518	2,019,518	2,030,769	2,019,518	2,017,500	2,017
1985	-	-	-	-	-	-
1986	177,604	177,604	177,551	177,604	177,427	177
1987	714,950	714,950	714,326	714,950	714,236	714
1988	1,969,014	1,969,014	1,967,979	1,969,014	1,967,047	1,967
1989	3,841,810	3,841,810	3,839,082	3,841,810	3,837,386	4,424
1990	10,863,230	10,863,230	10,856,262	10,863,230	10,849,892	13,338
1991	14,144,524	14,144,524	14,130,618	14,144,524	14,122,675	21,849
1992	12,655,621	12,655,621	12,637,614	12,655,621	12,630,163	25,458
1993	3,395,719	3,395,719	3,394,379	3,395,719	3,391,549	4,169
1994	3,439,778	3,439,778	3,437,688	3,439,778	3,434,705	5,073
1995	2,472,833	2,472,833	2,472,120	2,472,833	2,469,078	3,755
1996	1,918,103	1,918,103	1,918,107	1,918,103	1,915,051	3,052
1997	3,493,935	3,493,935	3,492,124	3,493,935	3,487,807	6,128
1998	2,330,083	2,330,083	2,329,502	2,330,083	2,325,970	4,113
1999	3,585,721	3,585,721	3,583,182	3,585,721	3,576,391	9,331
2000	900,506	900,506	901,583	900,506	898,170	2,335
2001	348,634	348,634	349,503	348,634	346,292	2,342
2002	142,273	142,273	143,765	142,273	141,307	966
2003	282,575	282,575	285,054	282,575	279,808	2,767
2004	323,163	323,163	323,362	323,163	319,461	3,703
2005	492,342	492,342	492,268	492,342	485,864	6,479
2006	325,338	325,338	324,400	325,338	319,847	5,492
2007	72,189	72,189	78,356	72,189	70,548	1,641
2008	281,620	281,620	284,190	281,620	271,947	9,673
2009	247,358	247,358	254,278	247,358	237,892	9,466
2010	190,051	190,051	198,503	190,051	182,507	7,543
2011	83,960	83,960	103,205	83,960	78,848	5,112
2012	510,811	510,811	488,522	510,811	468,963	41,848
2013	80,146	80,146	101,651	80,146	70,500	9,646
2014	84,839	84,839	105,214	84,839	69,277	15,562
2015	175,059	175,059	179,765	175,059	127,163	47,895
2016	811,722	811,722	593,776	739,074	483,268	255,805
2017	685,484	501,755	367,366	518,201	256,482	261,720
2018	-	276,843	130,244	276,843	-	276,843
Total	73,060,515	73,153,629	72,686,306	73,097,427	72,025,021	1,072,406

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Ultimate Loss Projection Summary
Non-Abandoned - Low Severity

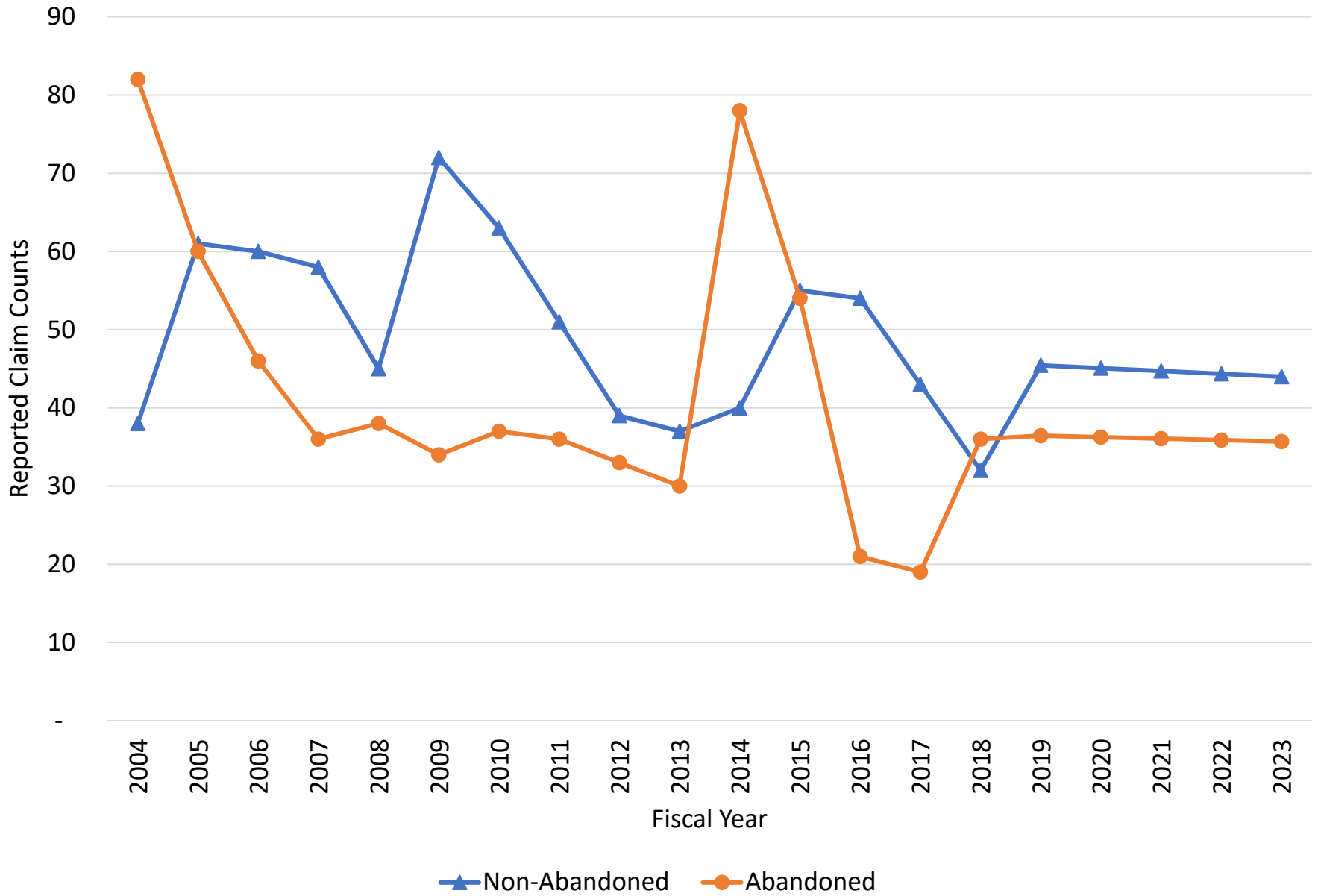
<u>RY</u>	<u>LDM</u> <u>Ultimate</u>	<u>Adjusted</u> <u>LDM</u> <u>Ultimate</u>	<u>Bornhuetter-</u> <u>Ferguson</u> <u>Ultimate</u>	<u>Selected</u> <u>Ultimate</u>	<u>Paid to</u> <u>Date</u>	<u>Unpaid</u> <u>Loss</u>
Unknown	-	-	-	-	-	-
1985	-	-	-	-	-	-
1986	-	-	-	-	-	-
1987	-	-	-	-	-	-
1988	1,204,343	1,204,343	1,204,343	1,204,343	1,204,343	-
1989	783,159	783,159	783,159	783,159	783,159	-
1990	3,308,042	3,308,042	3,308,042	3,308,042	3,308,042	-
1991	5,164,457	5,164,457	5,164,457	5,164,457	5,164,457	-
1992	2,596,343	2,596,343	2,596,343	2,596,343	2,596,343	-
1993	1,188,573	1,188,573	1,188,573	1,188,573	1,188,573	-
1994	446,166	446,166	446,166	446,166	446,166	-
1995	110,949	110,949	110,949	110,949	110,949	-
1996	344,270	344,270	344,270	344,270	344,270	-
1997	89,362	89,362	89,362	89,362	89,362	-
1998	353,140	353,140	353,140	353,140	353,140	-
1999	284,412	284,412	284,412	284,412	284,412	-
2000	21,655	21,655	21,655	21,655	21,655	-
2001	-	-	-	-	-	-
2002	29,966	29,966	29,966	29,966	29,966	-
2003	28,882	28,882	28,882	28,882	28,882	-
2004	28,784	28,784	28,784	28,784	28,784	-
2005	124,455	124,455	124,455	124,455	124,455	-
2006	25,138	25,138	25,138	25,138	25,138	-
2007	160,972	160,972	160,972	160,972	160,972	-
2008	51,808	51,808	51,808	51,808	51,808	-
2009	-	-	-	-	-	-
2010	14,944	14,944	14,944	14,944	14,944	-
2011	81,284	81,284	81,284	81,284	81,284	-
2012	-	-	-	-	-	-
2013	27,751	27,751	27,750	27,751	27,303	449
2014	101,065	101,065	96,865	101,065	94,415	6,650
2015	61,028	61,028	55,947	61,028	46,403	14,625
2016	3,316	3,316	16,213	7,615	2,209	5,406
2017	72,319	61,345	48,327	60,664	27,854	32,810
2018	-	38,308	17,303	27,805	-	27,805
Total	16,706,585	16,733,919	16,703,511	16,727,034	16,639,290	87,744

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Pro Forma Financial Projections

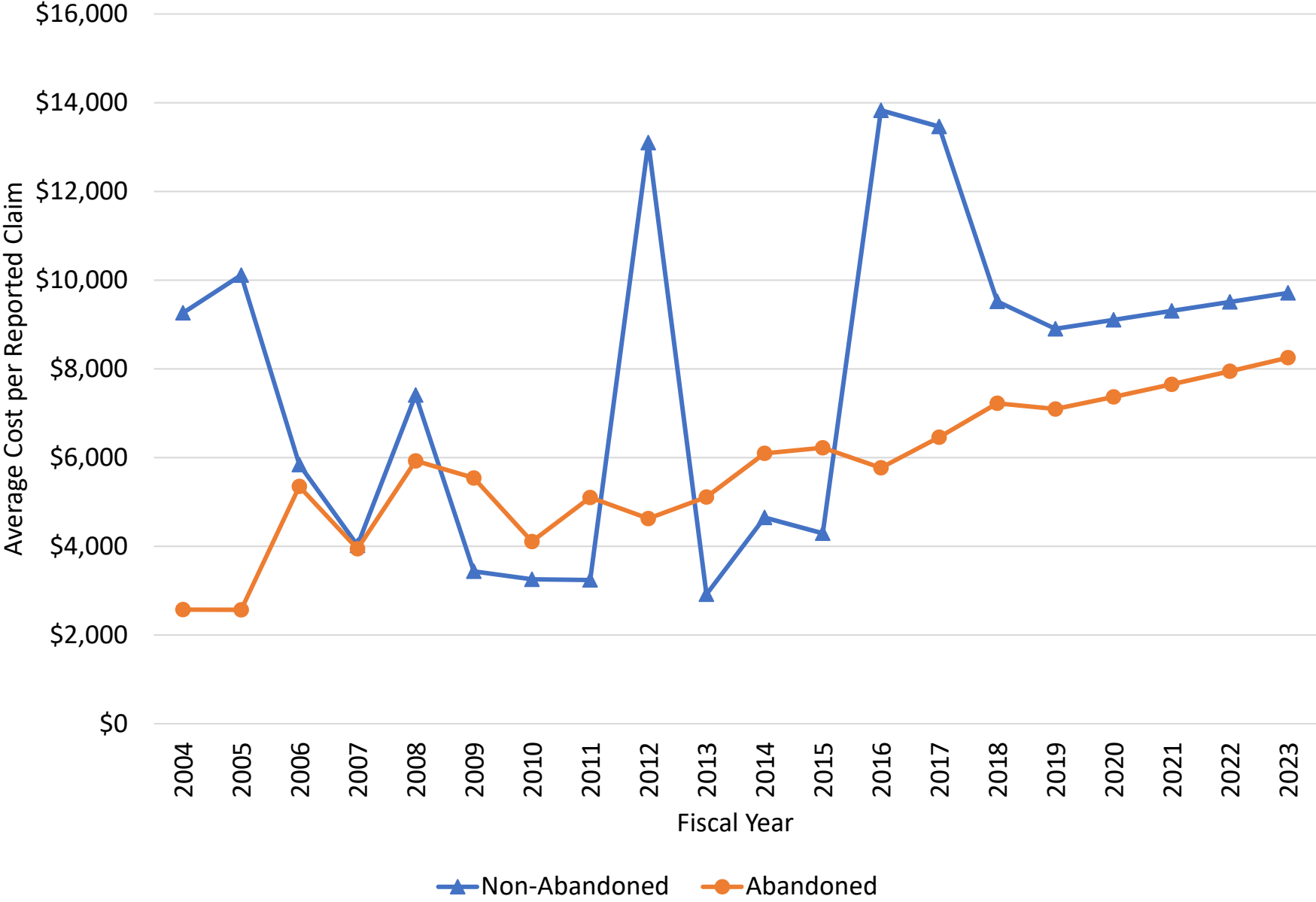
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fiscal Year	Cleanup Expense	Non-Cleanup Expenses = (2) x 89%	Total Expense = (2) + (3)	Fee Collected	PRCF Allocation	PRCF Deposits = (5) x (6)	Interest = (9) x 2.61%	Beginning Balance	Ending Balance
2019	633,150	561,396	1,194,547	17,000,000	20%	3,400,000	52,814	2,025,374	4,283,642
2020	698,432	619,280	1,317,712	17,000,000	19%	3,230,000	111,702	4,283,642	6,000,000
2021	708,530	628,233	1,336,762	17,000,000	18%	3,060,000	156,458	6,000,000	6,000,000
2022	709,651	629,227	1,338,878	17,000,000	17%	2,890,000	156,458	6,000,000	6,000,000
2023	712,271	631,550	1,343,820	17,000,000	17%	2,890,000	156,458	6,000,000	6,000,000

Notes: Column (3) from ULAE analysis
 Columns (5) - (7) provided by PRCF
 Column (8) based on duration-matched treasury yield as of April 30, 2018
 Column (10) = (9) - (4) + (7) + (8)

Reported Claim Counts by Fiscal Year



Projected Ultimate Average Claim Severity

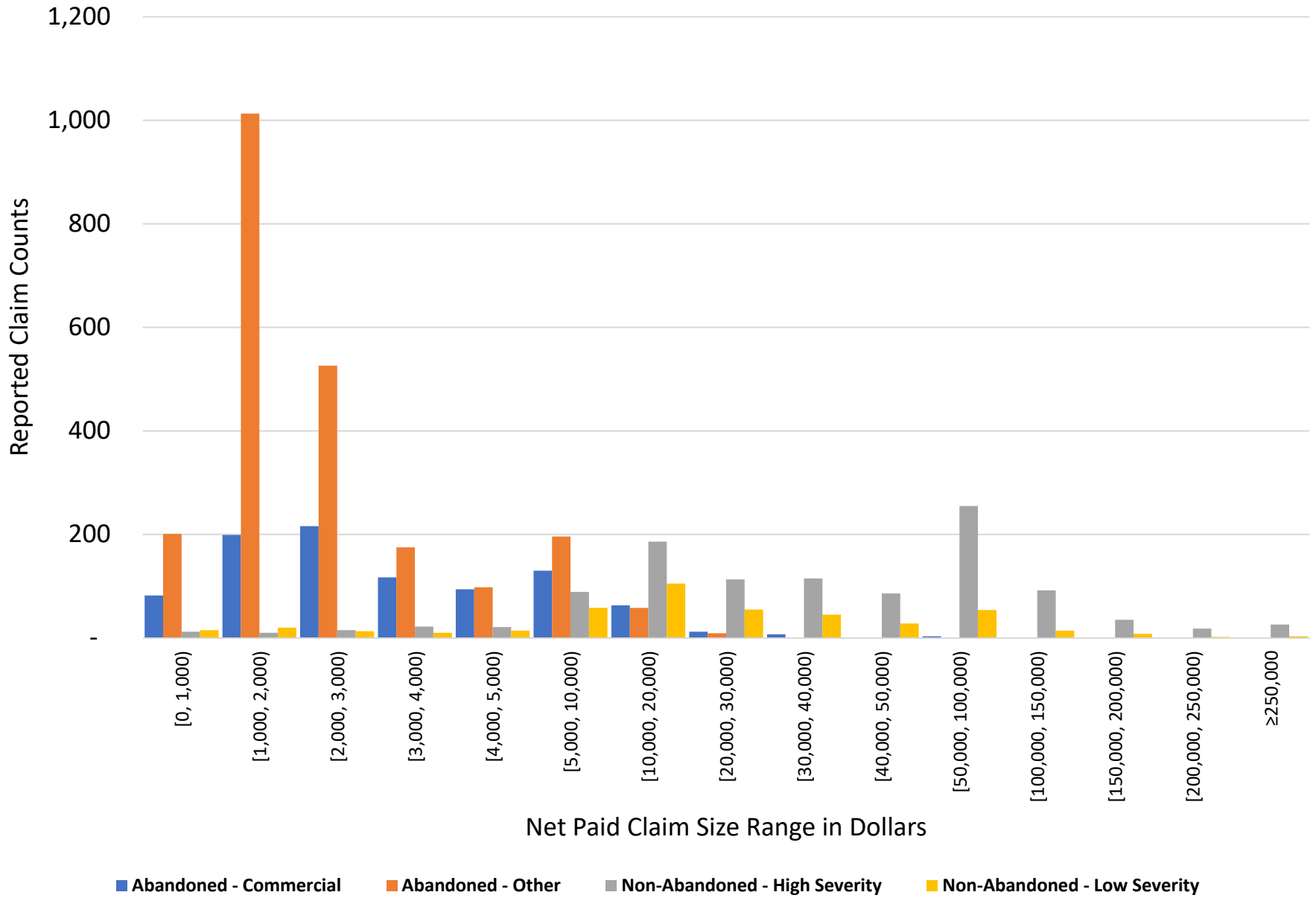


South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Frequency and Severity Analysis
All Claim Types

RY	Abandoned Tanks			Non-Abandoned Tanks		
	Reported Claims	Ultimate Loss	Ultimate Severity	Reported Claims	Ultimate Loss	Ultimate Severity
1985	-	-	-	-	-	-
1986	-	-	-	5	177,604	35,521
1987	-	-	-	5	714,950	142,990
1988	-	-	-	44	3,173,357	72,122
1989	-	-	-	110	4,624,969	42,045
1990	-	-	-	318	14,171,272	44,564
1991	1	5,187	5,187	483	19,308,981	39,977
1992	2	41,349	20,675	465	15,251,965	32,800
1993	1	-	-	193	4,584,292	23,753
1994	2	3,355	1,677	181	3,885,944	21,469
1995	1	3,450	3,450	145	2,583,782	17,819
1996	1	9,661	9,661	145	2,262,374	15,603
1997	-	-	-	160	3,583,297	22,396
1998	-	-	-	171	2,683,223	15,691
1999	2	3,426	1,713	298	3,870,133	12,987
2000	25	129,188	5,168	116	922,161	7,950
2001	341	927,369	2,720	53	348,634	6,578
2002	1,684	4,732,090	2,810	33	172,239	5,219
2003	345	849,377	2,462	46	311,457	6,771
2004	82	210,938	2,572	38	351,947	9,262
2005	60	154,002	2,567	61	616,797	10,111
2006	46	245,985	5,347	60	350,477	5,841
2007	36	141,936	3,943	58	233,161	4,020
2008	38	225,130	5,924	45	333,428	7,410
2009	34	188,343	5,540	72	247,358	3,436
2010	37	151,946	4,107	63	204,995	3,254
2011	36	183,587	5,100	51	165,244	3,240
2012	33	152,639	4,625	39	510,811	13,098
2013	30	153,272	5,109	37	107,897	2,916
2014	78	475,313	6,094	40	185,904	4,648
2015	54	335,916	6,221	55	236,086	4,292
2016	21	121,138	5,768	54	746,689	13,828
2017	19	122,705	6,458	43	578,865	13,462
2018	36	260,044	7,223	32	304,649	9,520
2019	36	258,520	7,095	45	404,444	8,901
2020	36	267,077	7,368	45	410,340	9,104
2021	36	275,910	7,651	45	416,090	9,306
2022	36	285,027	7,945	44	421,692	9,509
2023	36	294,437	8,251	44	427,147	9,711

Notes: 2018 Claim counts are grossed up to account for reports between 4/30/18 and 6/30/

Distribution of Losses by Claim Type



South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Large Claim Statistics
 All Claim Types

<u>RY</u>	<u>Total Count</u>	<u>Count ≥100K</u>	<u>Count ≥250K</u>	<u>RY</u>	<u>Total Count</u>	<u>Count ≥100K</u>	<u>Count ≥250K</u>	<u>RY</u>	<u>Total Count</u>	<u>Count ≥100K</u>	<u>Count ≥250K</u>
1986	2	1	-	1997	68	7	-	2008	44	1	-
1987	2	1	1	1998	68	3	-	2009	42	-	-
1988	28	10	4	1999	103	4	-	2010	44	-	-
1989	57	12	3	2000	50	1	-	2011	41	-	-
1990	199	38	5	2001	342	-	-	2012	34	2	1
1991	359	46	7	2002	1,658	1	-	2013	34	-	-
1992	287	37	2	2003	346	-	-	2014	81	-	-
1993	79	8	-	2004	89	1	-	2015	61	-	-
1994	63	10	1	2005	71	1	-	2016	25	2	1
1995	42	5	2	2006	48	1	1	2017	23	1	-
1996	51	5	-	2007	40	-	-	2018	27	-	-
								Total	4,508	198	28

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Large Claim Statistics
 All Claim Types

<u>Claim Size</u>	<u>Count</u>	<u>% of Count</u>	<u>Paid</u>	<u>% of Paid</u>
[0, 1,000)	310	6.5%	186,660	0.2%
[1,000, 2,000)	1,242	26.2%	1,921,194	2.1%
[2,000, 3,000)	770	16.2%	1,882,484	2.1%
[3,000, 4,000)	324	6.8%	1,115,103	1.2%
[4,000, 5,000)	227	4.8%	1,016,836	1.1%
[5,000, 10,000)	473	10.0%	3,381,437	3.8%
[10,000, 20,000)	412	8.7%	5,974,583	6.7%
[20,000, 30,000)	189	4.0%	4,664,523	5.2%
[30,000, 40,000)	168	3.5%	5,823,803	6.5%
[40,000, 50,000)	115	2.4%	5,109,546	5.7%
[50,000, 100,000)	313	6.6%	22,222,449	24.8%
[100,000, 150,000)	107	2.3%	12,774,444	14.3%
[150,000, 200,000)	43	0.9%	7,460,716	8.3%
[200,000, 250,000)	20	0.4%	4,456,608	5.0%
≥250,000	29	0.6%	11,523,991	12.9%
Total	4,742	100.0%	89,514,376	100.0%

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Cash Flow Summary
All Claim Types

Undiscounted (Nominal) Paid Losses by Fiscal Year

<u>Category</u>	<u>Total</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>After 2027</u>
Abandoned - Commercial	37,631	25,749	6,545	1,795	203	3,339	-	-	-	-	-
Abandoned - Other	53,017	33,524	14,184	3,149	1,419	742	-	-	-	-	-
Non-Abandoned - High Severity	1,072,406	327,956	207,298	155,583	118,609	72,925	51,580	26,958	20,170	20,351	70,976
Non-Abandoned - Low Severity	87,744	17,950	28,495	28,652	9,323	2,748	576	-	-	-	-
Total	1,250,798	405,179	256,522	189,179	129,554	79,753	52,156	26,958	20,170	20,351	70,976

Discounted Paid Losses by Fiscal Year

<u>Category</u>	<u>Total</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>After 2027</u>
Abandoned - Commercial	36,556	25,420	6,297	1,683	186	2,974	-	-	-	-	(3)
Abandoned - Other	51,651	33,095	13,646	2,953	1,297	660	-	-	-	-	-
Non-Abandoned - High Severity	994,270	323,762	199,446	145,886	108,390	64,948	44,771	22,805	16,629	16,352	51,282
Non-Abandoned - Low Severity	83,470	17,721	27,416	26,866	8,519	2,447	500	-	-	-	-
Total	1,165,947	399,997	246,805	177,388	118,392	71,030	45,271	22,805	16,629	16,352	51,279

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Summary of Loss Development Method
Abandoned - Commercial

<u>RY</u>	<u>Paid to Date</u>	<u>Paid to June 30</u>	<u>CDF</u>	<u>LDM Ultimate</u>	<u>LDM Unpaid</u>	<u>Adj Paid to Date</u>	<u>CDF</u>	<u>Adj LDM Ultimate</u>	<u>Adj LDM Unpaid</u>
Unknown	462,474	462,474	1.0000	462,474	0	462,474	1.0000	462,474	0
1985	0	0	1.0000	0	0	0	1.0000	0	0
1986	0	0	1.0000	0	0	0	1.0000	0	0
1987	0	0	1.0000	0	0	0	1.0000	0	0
1988	0	0	1.0000	0	0	0	1.0000	0	0
1989	0	0	1.0000	0	0	0	1.0000	0	0
1990	0	0	1.0000	0	0	0	1.0000	0	0
1991	0	0	1.0000	0	0	0	1.0000	0	0
1992	41,349	41,349	1.0000	41,349	0	41,349	1.0000	41,349	0
1993	0	0	1.0000	0	0	0	1.0000	0	0
1994	3,355	3,355	1.0000	3,355	0	3,355	1.0000	3,355	0
1995	3,450	3,450	1.0000	3,450	0	3,450	1.0000	3,450	0
1996	9,661	9,661	1.0000	9,661	0	9,661	1.0000	9,661	0
1997	0	0	1.0000	0	0	0	1.0000	0	0
1998	0	0	1.0000	0	0	0	1.0000	0	0
1999	0	0	1.0000	0	0	0	1.0000	0	0
2000	118,726	118,726	1.0000	118,726	0	118,726	1.0000	118,726	0
2001	424,508	424,508	1.0000	424,508	0	424,508	1.0000	424,508	0
2002	2,151,779	2,152,886	1.0000	2,152,886	1,107	2,152,886	1.0000	2,152,886	1,107
2003	275,588	275,588	1.0000	275,588	0	275,588	1.0000	275,588	0
2004	84,780	84,780	1.0000	84,780	0	84,780	1.0000	84,780	0
2005	63,244	63,244	1.0000	63,244	0	63,244	1.0000	63,244	0
2006	149,090	149,090	1.0000	149,090	0	149,090	1.0000	149,090	0
2007	82,281	82,281	1.0000	82,281	0	82,281	1.0000	82,281	0
2008	41,288	41,288	1.0000	41,288	0	41,288	1.0000	41,288	0
2009	47,853	47,853	1.0000	47,853	0	47,853	1.0000	47,853	0
2010	31,911	31,911	1.0000	31,911	0	31,911	1.0000	31,911	0
2011	47,451	47,451	1.0000	47,451	0	47,451	1.0000	47,451	0
2012	36,584	36,584	1.0000	36,584	0	36,584	1.0000	36,584	0
2013	33,873	33,873	1.0000	33,873	0	33,873	1.0000	33,873	0
2014	121,403	125,412	1.0048	126,009	4,606	125,412	1.0048	126,009	4,606
2015	64,076	64,076	1.0201	65,366	1,290	64,076	1.0201	65,366	1,290
2016	8,833	8,833	1.0465	9,244	411	8,833	1.0465	9,244	411
2017	43,837	44,703	1.0728	47,960	4,122	44,913	1.0465	47,003	3,165
2018	64,880	77,856	1.2175	94,787	29,907	97,118	1.0465	101,636	36,756
Total	4,412,276	4,431,234		4,453,719	41,442	4,450,707		4,459,611	47,334

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Loss Development Factor Selection
 Abandoned - Commercial

RY	Development Period in Months																														
	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360		
1985																															
1986																															
1987																															
1988																															
1989																															
1990																															
1991																															
1992																															
1993											1.000	1.000	1.244	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
1994																															
1995										1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
1996									1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
1997																															
1998																															
1999																															
2000	1.176	1.090	1.000	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
2001	2.177	1.120	1.087	1.054	1.004	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
2002	1.096	1.122	1.018	1.005	1.007	1.000	1.008	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.003															
2003	1.385	1.048	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
2004	1.628	1.000	1.101	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
2005	1.196	1.025	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
2006	1.171	1.020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
2007	1.074	1.000	1.160	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
2008	1.184	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
2009	1.311	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.003	1.000																					
2010	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
2011	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
2012	1.085	1.000	1.000	1.000	1.000	1.000	1.000																								
2013	1.000	1.000	1.000	1.000	1.000	1.000																									
2014	1.027	1.000	1.046	1.237																											
2015	1.000	1.000	1.000																												
2016	1.000	1.000																													
2017	1.132																														
VOL WTD 3	1.039	1.000	1.023	1.117	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	NA	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	
VOL WTD 4	1.033	1.000	1.019	1.091	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	
VOL WTD 5	1.029	1.000	1.016	1.080	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	
VOL WTD 6	1.036	1.000	1.014	1.067	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	
VOL WTD ALL	1.186	1.088	1.026	1.015	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.003	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA
ARITH 3	1.044	1.000	1.015	1.079	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	NA	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	
ARITH 4	1.040	1.000	1.012	1.059	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	
ARITH 5	1.032	1.000	1.009	1.047	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	
ARITH 6	1.041	1.000	1.008	1.040	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	
ARITH ALL	1.205	1.025	1.026	1.020	1.001	1.000	1.001	1.000	1.000	1.000	1.000	1.024	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA
5 YR x HI/LO	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.000	
5 YR x 2 HI/LO	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA	
ALL x HI/LO	1.157	1.020	1.018	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.000
ALL x 2 HI/LO	1.135	1.014	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	NA	NA	NA
SELECTED	1.135	1.025	1.026	1.015	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
CUMULATIVE	1.217	1.073	1.047	1.020	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Cumulative Paid Losses
 Abandoned - Commercial

RY	Development Month																																
	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360			
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	33,249	33,249	33,249	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	41,349	
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355		
1995	0	0	0	0	0	0	0	0	0	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450	3,450		
1996	0	0	0	0	0	0	0	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661	9,661		
1997	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1998	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2000	92,339	108,550	118,331	118,376	118,376	118,376	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726	118,726		
2001	151,163	329,006	368,356	400,228	421,713	423,391	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508	424,508		
2002	1,681,292	1,842,871	2,066,949	2,104,244	2,113,999	2,129,191	2,129,191	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245	2,146,245		
2003	189,896	262,921	275,443	275,443	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513	275,513		
2004	47,280	76,995	76,995	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780	84,780		
2005	51,564	61,687	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244	63,244		
2006	124,793	146,120	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090	149,090		
2007	66,089	70,951	70,951	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281	82,281		
2008	34,858	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288	41,288		
2009	36,259	47,553	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703		
2010	30,381	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911	31,911		
2011	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451	47,451		
2012	33,709	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584	36,584		
2013	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873	33,873		
2014	94,302	96,867	96,867	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356	101,356		
2015	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076	64,076		
2016	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833	8,833		
2017	39,507	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837	43,837		
2018	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880	64,880		

RY 1900
 Losses
 462,474

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Bornhuetter-Ferguson Method
 Abandoned - Commercial

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<u>RY</u>	<u>LDM</u>	<u>Adj. LDM</u>	<u>A Priori</u>	<u>Reported</u>	<u>Average</u>	<u>Trended</u>	<u>Detrended</u>	<u>Expected</u>	<u>Percent</u>	<u>Indicated</u>	<u>Paid to</u>	<u>Indicated</u>
	<u>Ultimate</u>	<u>Ultimate</u>	<u>Ultimate</u>	<u>Claims</u>	<u>Severity</u>	<u>Severity</u>	<u>Severity</u>	<u>Ultimate</u>	<u>Unpaid</u>	<u>Unpaid</u>	<u>Date</u>	<u>Ultimate</u>
Unknown	462,474	462,474	462,474	162	2,855	5,709	3,304	535,176	0%	-	462,474	462,474
1985	-	-	-	-	-	-	3,437	-	0%	-	-	-
1986	-	-	-	-	-	-	3,506	-	0%	-	-	-
1987	-	-	-	-	-	-	3,576	-	0%	-	-	-
1988	-	-	-	-	-	-	3,647	-	0%	-	-	-
1989	-	-	-	-	-	-	3,720	-	0%	-	-	-
1990	-	-	-	-	-	-	3,795	-	0%	-	-	-
1991	-	-	-	-	-	-	3,871	-	0%	-	-	-
1992	41,349	41,349	41,349	2	20,675	34,597	3,948	7,896	0%	-	41,349	41,349
1993	-	-	-	1	-	-	4,027	4,027	0%	-	-	-
1994	3,355	3,355	3,355	2	1,677	2,698	4,108	8,215	0%	-	3,355	3,355
1995	3,450	3,450	3,450	1	3,450	5,440	4,190	4,190	0%	-	3,450	3,450
1996	9,661	9,661	9,661	1	9,661	14,935	4,273	4,273	0%	-	9,661	9,661
1997	-	-	-	-	-	-	4,359	-	0%	-	-	-
1998	-	-	-	-	-	-	4,446	-	0%	-	-	-
1999	-	-	-	1	-	-	4,535	4,535	0%	-	-	-
2000	118,726	118,726	118,726	17	6,984	9,975	4,626	78,638	0%	-	118,726	118,726
2001	424,508	424,508	424,508	113	3,757	5,260	4,718	533,166	0%	-	424,508	424,508
2002	2,152,886	2,152,886	2,152,886	490	4,394	6,032	4,813	2,358,200	0%	-	2,151,779	2,151,779
2003	275,588	275,588	275,588	70	3,937	5,299	4,909	343,623	0%	-	275,588	275,588
2004	84,780	84,780	84,780	26	3,261	4,303	5,007	130,184	0%	-	84,780	84,780
2005	63,244	63,244	63,244	22	2,875	3,719	5,107	112,359	0%	-	63,244	63,244
2006	149,090	149,090	149,090	15	9,939	12,605	5,209	78,141	0%	-	149,090	149,090
2007	82,281	82,281	82,281	14	5,877	7,308	5,314	74,390	0%	-	82,281	82,281
2008	41,288	41,288	41,288	10	4,129	5,033	5,420	54,198	0%	-	41,288	41,288
2009	47,853	47,853	47,853	9	5,317	6,354	5,528	49,754	0%	-	47,853	47,853
2010	31,911	31,911	31,911	8	3,989	4,674	5,639	45,110	0%	-	31,911	31,911
2011	47,451	47,451	47,451	11	4,314	4,955	5,752	63,267	0%	-	47,451	47,451
2012	36,584	36,584	36,584	10	3,658	4,120	5,867	58,666	0%	-	36,584	36,584
2013	33,873	33,873	33,873	8	4,234	4,675	5,984	47,871	0%	-	33,873	33,873
2014	126,009	126,009	126,009	17	7,412	8,023	6,104	103,761	0%	491	121,403	121,894
2015	65,366	65,366	65,366	7	9,338	9,910	6,226	43,580	2%	860	64,076	64,936
2016	9,244	9,244	9,244	2	4,622	4,809	6,350	12,700	4%	564	8,833	9,398
2017	47,960	47,003	47,481	9	5,276	5,381	6,477	58,295	7%	3,958	43,837	47,795
2018	94,787	101,636	98,211	9	13,095	13,095	6,607	71,353	18%	12,745	64,880	77,625
Total	4,453,719	4,459,611	4,456,665	1,037				4,885,569		18,618	4,412,276	4,430,895

<u>Period</u>	<u>Trend</u>	<u>Pure Prem.</u>
5-Year	5.8%	8,244
10-Year	8.7%	6,600
19-Year	2.8%	6,607
Selected	2.0%	6,607

Notes: Column (2) and (3) are from loss development method analysis
 Column (4) = Estimate of ultimate loss selected based on columns (2) and (3)
 Column (6) = (4) / (5)
 Column (7) = (6) x (1.0 + Selected Trend Factor) ^ (2018 - Report Year)
 Column (8) = Average Pure Premium / (1.0 + Selected Trend Factor) ^ (2018 - Report Year)
 Column (9) = (8) x (5)
 Column (10) calculated based on CDF from Loss Development Method, where % Unpaid = [1 - (1 / CDF)] for the corresponding report year.
 Column (11) = (9) x (10)
 Column (13) = (11) + (12)

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Summary of Loss Development Method
Abandoned - Other

<u>RY</u>	<u>Paid to Date</u>	<u>Paid to June 30</u>	<u>CDF</u>	<u>LDM Ultimate</u>	<u>LDM Unpaid</u>	<u>Adj Paid to Date</u>	<u>CDF</u>	<u>Adj LDM Ultimate</u>	<u>Adj LDM Unpaid</u>
Unknown	743,878	743,878	1.0000	743,878	0	743,878	1.0000	743,878	0
1985	0	0	1.0000	0	0	0	1.0000	0	0
1986	0	0	1.0000	0	0	0	1.0000	0	0
1987	0	0	1.0000	0	0	0	1.0000	0	0
1988	0	0	1.0000	0	0	0	1.0000	0	0
1989	0	0	1.0000	0	0	0	1.0000	0	0
1990	0	0	1.0000	0	0	0	1.0000	0	0
1991	5,187	5,187	1.0000	5,187	0	5,187	1.0000	5,187	0
1992	0	0	1.0000	0	0	0	1.0000	0	0
1993	0	0	1.0000	0	0	0	1.0000	0	0
1994	0	0	1.0000	0	0	0	1.0000	0	0
1995	0	0	1.0000	0	0	0	1.0000	0	0
1996	0	0	1.0000	0	0	0	1.0000	0	0
1997	0	0	1.0000	0	0	0	1.0000	0	0
1998	0	0	1.0000	0	0	0	1.0000	0	0
1999	3,426	3,426	1.0000	3,426	0	3,426	1.0000	3,426	0
2000	10,462	10,462	1.0000	10,462	0	10,462	1.0000	10,462	0
2001	502,861	502,861	1.0000	502,861	0	502,861	1.0000	502,861	0
2002	2,579,204	2,579,204	1.0000	2,579,204	0	2,579,204	1.0000	2,579,204	0
2003	573,789	573,789	1.0000	573,789	0	573,789	1.0000	573,789	0
2004	126,158	126,158	1.0000	126,158	0	126,158	1.0000	126,158	0
2005	90,757	90,757	1.0000	90,757	0	90,757	1.0000	90,757	0
2006	96,894	96,894	1.0000	96,894	0	96,894	1.0000	96,894	0
2007	59,655	59,655	1.0000	59,655	0	59,655	1.0000	59,655	0
2008	183,842	183,842	1.0000	183,842	0	183,842	1.0000	183,842	0
2009	140,490	140,490	1.0000	140,490	0	140,490	1.0000	140,490	0
2010	120,034	120,034	1.0000	120,034	0	120,034	1.0000	120,034	0
2011	136,135	136,135	1.0000	136,135	0	136,135	1.0000	136,135	0
2012	116,055	116,055	1.0000	116,055	0	116,055	1.0000	116,055	0
2013	119,400	119,400	1.0000	119,400	0	119,400	1.0000	119,400	0
2014	347,769	349,305	1.0000	349,305	1,536	349,305	1.0000	349,305	1,536
2015	267,615	268,430	1.0079	270,550	2,935	268,430	1.0079	270,550	2,935
2016	109,238	109,238	1.0226	111,704	2,465	109,238	1.0226	111,704	2,465
2017	68,302	72,201	1.0440	75,380	7,078	76,706	1.0226	78,437	10,134
2018	129,620	155,544	1.1419	177,622	48,002	173,101	1.0226	177,008	47,387
Total	6,530,773	6,562,946		6,592,788	62,016	6,585,008		6,595,231	64,458

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Cumulative Paid Losses
 Abandoned - Other

RY	Development Month																														
	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	6,508	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	10,462	
2001	185,427	445,797	458,566	486,090	502,239	502,239	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	502,261	
2002	2,182,238	2,470,531	2,530,813	2,558,052	2,577,262	2,579,054	2,579,054	2,579,054	2,579,054	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	2,579,204	
2003	511,870	557,649	557,859	573,642	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	573,789	
2004	103,240	117,886	125,785	125,858	125,858	125,858	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	126,158	
2005	82,964	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	90,757	
2006	72,959	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	
2007	39,082	59,580	59,580	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	59,655	
2008	127,424	164,432	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	183,842	
2009	126,907	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	140,490	
2010	108,706	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	120,034	
2011	123,105	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	136,135	
2012	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	116,055	
2013	106,099	111,690	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	119,400	
2014	332,734	337,854	337,854	340,092	347,769																										
2015	259,553	263,537	263,537	267,615																											
2016	109,238	109,238	109,238																												
2017	46,812	68,302																													
2018	129,620																														

RY 1900
 Losses
 743,878

South Dakota Petroleum Release Compensation Fund
 Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
 Bornhuetter-Ferguson Method
 Abandoned - Other

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<u>RY</u>	<u>LDM</u> <u>Ultimate</u>	<u>Adj. LDM</u> <u>Ultimate</u>	<u>A Priori</u> <u>Ultimate</u>	<u>Reported</u> <u>Claims</u>	<u>Average</u> <u>Severity</u>	<u>Trended</u> <u>Severity</u>	<u>Detrended</u> <u>Severity</u>	<u>Expected</u> <u>Ultimate</u>	<u>Percent</u> <u>Unpaid</u>	<u>Indicated</u> <u>Unpaid</u>	<u>Paid to</u> <u>Date</u>	<u>Indicated</u> <u>Ultimate</u>
Unknown	743,878	743,878	743,878	290	2,565	19,716	1,058	306,857	0%	-	743,878	743,878
1985	-	-	-	-	-	-	1,189	-	0%	-	-	-
1986	-	-	-	-	-	-	1,260	-	0%	-	-	-
1987	-	-	-	-	-	-	1,336	-	0%	-	-	-
1988	-	-	-	-	-	-	1,416	-	0%	-	-	-
1989	-	-	-	-	-	-	1,501	-	0%	-	-	-
1990	-	-	-	-	-	-	1,591	-	0%	-	-	-
1991	5,187	5,187	5,187	1	5,187	25,014	1,686	1,686	0%	-	5,187	5,187
1992	-	-	-	-	-	-	1,788	-	0%	-	-	-
1993	-	-	-	-	-	-	1,895	-	0%	-	-	-
1994	-	-	-	-	-	-	2,009	-	0%	-	-	-
1995	-	-	-	-	-	-	2,129	-	0%	-	-	-
1996	-	-	-	-	-	-	2,257	-	0%	-	-	-
1997	-	-	-	-	-	-	2,392	-	0%	-	-	-
1998	-	-	-	-	-	-	2,536	-	0%	-	-	-
1999	3,426	3,426	3,426	1	3,426	10,366	2,688	2,688	0%	-	3,426	3,426
2000	10,462	10,462	10,462	8	1,308	3,733	2,849	22,794	0%	-	10,462	10,462
2001	502,861	502,861	502,861	228	2,206	5,939	3,020	688,619	0%	-	502,861	502,861
2002	2,579,204	2,579,204	2,579,204	1,194	2,160	5,488	3,201	3,822,561	0%	-	2,579,204	2,579,204
2003	573,789	573,789	573,789	275	2,087	5,000	3,394	933,230	0%	-	573,789	573,789
2004	126,158	126,158	126,158	56	2,253	5,093	3,597	201,442	0%	-	126,158	126,158
2005	90,757	90,757	90,757	38	2,388	5,094	3,813	144,894	0%	-	90,757	90,757
2006	96,894	96,894	96,894	31	3,126	6,289	4,042	125,295	0%	-	96,894	96,894
2007	59,655	59,655	59,655	22	2,712	5,147	4,284	94,255	0%	-	59,655	59,655
2008	183,842	183,842	183,842	28	6,566	11,758	4,541	127,158	0%	-	183,842	183,842
2009	140,490	140,490	140,490	25	5,620	9,494	4,814	120,346	0%	-	140,490	140,490
2010	120,034	120,034	120,034	29	4,139	6,597	5,103	147,977	0%	-	120,034	120,034
2011	136,135	136,135	136,135	25	5,445	8,188	5,409	135,221	0%	-	136,135	136,135
2012	116,055	116,055	116,055	23	5,046	7,158	5,733	131,867	0%	-	116,055	116,055
2013	119,400	119,400	119,400	22	5,427	7,263	6,077	133,702	0%	-	119,400	119,400
2014	349,305	349,305	349,305	61	5,726	7,229	6,442	392,962	0%	-	347,769	347,769
2015	270,550	270,550	270,550	47	5,756	6,856	6,829	320,940	1%	2,515	267,615	270,129
2016	111,704	111,704	111,704	19	5,879	6,606	7,238	137,526	2%	3,035	109,238	112,273
2017	75,380	78,437	76,909	10	7,691	8,152	7,673	76,725	4%	3,237	68,302	71,539
2018	177,622	177,008	177,315	18	11,821	11,821	8,133	175,670	12%	21,835	129,620	151,455
Total	6,592,788	6,595,231	6,594,010	2,451				8,244,417		30,621	6,530,773	6,561,394

<u>Period</u>	<u>Trend</u>	<u>Pure Prem.</u>
5-Year	19.0%	8,133
10-Year	7.5%	7,936
20-Year	8.6%	7,164
Selected	6.0%	8,133

Notes: Column (2) and (3) are from loss development method analysis
 Column (4) = Estimate of ultimate loss selected based on columns (2) and (3)
 Column (6) = (4) / (5)
 Column (7) = (6) x (1.0 + Selected Trend Factor) ^ (2018 - Report Year)
 Column (8) = Average Pure Premium / (1.0 + Selected Trend Factor) ^ (2018 - Report Year)
 Column (9) = (8) x (5)
 Column (10) calculated based on CDF from Loss Development Method, where % Unpaid = [1 - (1 / CDF)] for the corresponding report year.
 Column (11) = (9) x (10)
 Column (13) = (11) + (12)

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Summary of Loss Development Method
Non-Abandoned - High Severity

<u>RY</u>	<u>Paid to Date</u>	<u>Paid to June 30</u>	<u>CDF</u>	<u>LDM Ultimate</u>	<u>LDM Unpaid</u>	<u>Adj Paid to Date</u>	<u>CDF</u>	<u>Adj LDM Ultimate</u>	<u>Adj LDM Unpaid</u>
Unknown	2,017,500	2,017,500	1.0010	2,019,518	2,017	2,017,500	1.0010	2,019,518	2,017
1985	0	0	1.0010	0	0	0	1.0010	0	0
1986	177,427	177,427	1.0010	177,604	177	177,427	1.0010	177,604	177
1987	714,236	714,236	1.0010	714,950	714	714,236	1.0010	714,950	714
1988	1,967,047	1,967,047	1.0010	1,969,014	1,967	1,967,047	1.0010	1,969,014	1,967
1989	3,837,386	3,837,972	1.0010	3,841,810	4,424	3,837,972	1.0010	3,841,810	4,424
1990	10,849,892	10,849,892	1.0012	10,863,230	13,338	10,849,892	1.0012	10,863,230	13,338
1991	14,122,675	14,127,157	1.0012	14,144,524	21,849	14,127,157	1.0012	14,144,524	21,849
1992	12,630,163	12,640,082	1.0012	12,655,621	25,458	12,640,082	1.0012	12,655,621	25,458
1993	3,391,549	3,391,549	1.0012	3,395,719	4,169	3,391,549	1.0012	3,395,719	4,169
1994	3,434,705	3,435,554	1.0012	3,439,778	5,073	3,435,554	1.0012	3,439,778	5,073
1995	2,469,078	2,469,078	1.0015	2,472,833	3,755	2,469,078	1.0015	2,472,833	3,755
1996	1,915,051	1,915,051	1.0016	1,918,103	3,052	1,915,051	1.0016	1,918,103	3,052
1997	3,487,807	3,487,807	1.0018	3,493,935	6,128	3,487,807	1.0018	3,493,935	6,128
1998	2,325,970	2,325,970	1.0018	2,330,083	4,113	2,325,970	1.0018	2,330,083	4,113
1999	3,576,391	3,578,473	1.0020	3,585,721	9,331	3,578,473	1.0020	3,585,721	9,331
2000	898,170	898,170	1.0026	900,506	2,335	898,170	1.0026	900,506	2,335
2001	346,292	346,906	1.0050	348,634	2,342	346,906	1.0050	348,634	2,342
2002	141,307	141,307	1.0068	142,273	966	141,307	1.0068	142,273	966
2003	279,808	279,808	1.0099	282,575	2,767	279,808	1.0099	282,575	2,767
2004	319,461	319,461	1.0116	323,163	3,703	319,461	1.0116	323,163	3,703
2005	485,864	485,864	1.0133	492,342	6,479	485,864	1.0133	492,342	6,479
2006	319,847	319,847	1.0172	325,338	5,492	319,847	1.0172	325,338	5,492
2007	70,548	70,548	1.0233	72,189	1,641	70,548	1.0233	72,189	1,641
2008	271,947	272,170	1.0347	281,620	9,673	272,170	1.0347	281,620	9,673
2009	237,892	238,861	1.0356	247,358	9,466	238,861	1.0356	247,358	9,466
2010	182,507	182,507	1.0413	190,051	7,543	182,507	1.0413	190,051	7,543
2011	78,848	79,252	1.0594	83,960	5,112	79,252	1.0594	83,960	5,112
2012	468,963	468,963	1.0892	510,811	41,848	468,963	1.0892	510,811	41,848
2013	70,500	70,500	1.1368	80,146	9,646	70,500	1.1368	80,146	9,646
2014	69,277	69,457	1.2215	84,839	15,562	69,457	1.2215	84,839	15,562
2015	127,163	127,163	1.3766	175,059	47,895	127,163	1.3766	175,059	47,895
2016	483,268	483,772	1.6779	811,722	328,454	483,772	1.6779	811,722	328,454
2017	256,482	265,305	2.5838	685,484	429,002	299,037	1.6779	501,755	245,273
2018	0	0	13.8545	0	0	164,994	1.6779	276,843	276,843
Total	72,025,021	72,054,656		73,060,515	1,035,494	72,253,382		73,153,629	1,128,608

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Bornhuetter-Ferguson Method
Non-Abandoned - High Severity

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
RY	LDM	Adj. LDM	A Priori	Reported	Average	Trended	Detrended	Expected	Percent	Indicated	Paid to	Indicated
	<u>Ultimate</u>	<u>Ultimate</u>	<u>Ultimate</u>	<u>Claims</u>	<u>Severity</u>	<u>Severity</u>	<u>Severity</u>	<u>Ultimate</u>	<u>Unpaid</u>	<u>Unpaid</u>	<u>Date</u>	<u>Ultimate</u>
Unknown	2,019,518	2,019,518	2,019,518	391	5,165	1,779	33,970	13,282,416	0%	13,269	2,017,500	2,030,769
1985	-	-	-	-	-	-	31,963	-	0%	-	-	-
1986	177,604	177,604	177,604	4	44,401	16,753	31,004	124,015	0%	124	177,427	177,551
1987	714,950	714,950	714,950	3	238,317	92,700	30,074	90,221	0%	90	714,236	714,326
1988	1,969,014	1,969,014	1,969,014	32	61,532	24,675	29,172	933,489	0%	933	1,967,047	1,967,979
1989	3,841,810	3,841,810	3,841,810	60	64,030	26,471	28,296	1,697,782	0%	1,696	3,837,386	3,839,082
1990	10,863,230	10,863,230	10,863,230	189	57,477	24,497	27,447	5,187,574	0%	6,370	10,849,892	10,856,262
1991	14,144,524	14,144,524	14,144,524	243	58,208	25,575	26,624	6,469,645	0%	7,944	14,122,675	14,130,618
1992	12,655,621	12,655,621	12,655,621	235	53,854	24,394	25,825	6,068,953	0%	7,452	12,630,163	12,637,614
1993	3,395,719	3,395,719	3,395,719	92	36,910	17,236	25,051	2,304,653	0%	2,830	3,391,549	3,394,379
1994	3,439,778	3,439,778	3,439,778	100	34,398	16,560	24,299	2,429,906	0%	2,984	3,434,705	3,437,688
1995	2,472,833	2,472,833	2,472,833	85	29,092	14,439	23,570	2,003,457	0%	3,042	2,469,078	2,472,120
1996	1,918,103	1,918,103	1,918,103	84	22,835	11,683	22,863	1,920,491	0%	3,056	1,915,051	1,918,107
1997	3,493,935	3,493,935	3,493,935	111	31,477	16,603	22,177	2,461,657	0%	4,318	3,487,807	3,492,124
1998	2,330,083	2,330,083	2,330,083	93	25,055	13,625	21,512	2,000,596	0%	3,532	2,325,970	2,329,502
1999	3,585,721	3,585,721	3,585,721	161	22,272	12,486	20,866	3,359,495	0%	6,791	3,576,391	3,583,182
2000	900,506	900,506	900,506	65	13,854	8,007	20,240	1,315,628	0%	3,412	898,170	901,583
2001	348,634	348,634	348,634	33	10,565	6,295	19,633	647,896	0%	3,211	346,292	349,503
2002	142,273	142,273	142,273	19	7,488	4,600	19,044	361,840	1%	2,458	141,307	143,765
2003	282,575	282,575	282,575	29	9,744	6,170	18,473	535,714	1%	5,245	279,808	285,054
2004	323,163	323,163	323,163	19	17,009	11,104	17,919	340,455	1%	3,901	319,461	323,362
2005	492,342	492,342	492,342	28	17,584	11,834	17,381	486,672	1%	6,404	485,864	492,268
2006	325,338	325,338	325,338	16	20,334	14,108	16,860	269,755	2%	4,554	319,847	324,400
2007	72,189	72,189	72,189	21	3,438	2,459	16,354	343,432	2%	7,808	70,548	78,356
2008	281,620	281,620	281,620	23	12,244	9,029	15,863	364,856	3%	12,243	271,947	284,190
2009	247,358	247,358	247,358	31	7,979	6,066	15,387	477,010	3%	16,386	237,892	254,278
2010	190,051	190,051	190,051	27	7,039	5,517	14,926	402,996	4%	15,995	182,507	198,503
2011	83,960	83,960	83,960	30	2,799	2,261	14,478	434,340	6%	24,357	78,848	103,205
2012	510,811	510,811	510,811	17	30,048	25,029	14,044	238,742	8%	19,559	468,963	488,522
2013	80,146	80,146	80,146	19	4,218	3,622	13,622	258,825	12%	31,151	70,500	101,651
2014	84,839	84,839	84,839	15	5,656	5,007	13,214	198,205	18%	35,936	69,277	105,214
2015	175,059	175,059	175,059	15	11,671	10,651	12,817	192,259	27%	52,601	127,163	179,765
2016	811,722	811,722	811,722	22	36,896	34,716	12,433	273,521	40%	110,507	483,268	593,776
2017	685,484	501,755	593,619	15	39,575	38,387	12,060	180,897	61%	110,884	256,482	367,366
2018	-	276,843	138,422	10	16,611	16,611	11,698	140,376	93%	130,244	-	130,244
Total	73,060,515	73,153,629	73,107,072	2,337				57,797,771		661,285	72,025,021	72,686,306

Period	Trend	Pure Prem.
10-Year	19.2%	14,787
20-Year	1.0%	11,698
30-Year	-5.3%	14,168
Selected	-3.0%	11,698

Notes: Column (2) and (3) are from loss development method analysis
Column (4) = Estimate of ultimate loss selected based on columns (2) and (3)
Column (6) = (4) / (5)
Column (7) = (6) x (1.0 + Selected Trend Factor) ^ (2018 - Report Year)
Column (8) = Average Pure Premium / (1.0 + Selected Trend Factor) ^ (2018 - Report Year)
Column (9) = (8) x (5)
Column (10) calculated based on CDF from Loss Development Method, where % Unpaid = [1 - (1 / CDF)] for the corresponding report year.
Column (11) = (9) x (10)
Column (13) = (11) + (12)

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Summary of Loss Development Method
Non-Abandoned - Low Severity

<u>RY</u>	<u>Paid to Date</u>	<u>Paid to June 30</u>	<u>CDF</u>	<u>LDM Ultimate</u>	<u>LDM Unpaid</u>	<u>Adj Paid to Date</u>	<u>CDF</u>	<u>Adj LDM Ultimate</u>	<u>Adj LDM Unpaid</u>
Unknown	0	0	1.0000	0	0	0	1.0000	0	0
1985	0	0	1.0000	0	0	0	1.0000	0	0
1986	0	0	1.0000	0	0	0	1.0000	0	0
1987	0	0	1.0000	0	0	0	1.0000	0	0
1988	1,204,343	1,204,343	1.0000	1,204,343	0	1,204,343	1.0000	1,204,343	0
1989	783,159	783,159	1.0000	783,159	0	783,159	1.0000	783,159	0
1990	3,308,042	3,308,042	1.0000	3,308,042	0	3,308,042	1.0000	3,308,042	0
1991	5,164,457	5,164,457	1.0000	5,164,457	0	5,164,457	1.0000	5,164,457	0
1992	2,596,343	2,596,343	1.0000	2,596,343	0	2,596,343	1.0000	2,596,343	0
1993	1,188,573	1,188,573	1.0000	1,188,573	0	1,188,573	1.0000	1,188,573	0
1994	446,166	446,166	1.0000	446,166	0	446,166	1.0000	446,166	0
1995	110,949	110,949	1.0000	110,949	0	110,949	1.0000	110,949	0
1996	344,270	344,270	1.0000	344,270	0	344,270	1.0000	344,270	0
1997	89,362	89,362	1.0000	89,362	0	89,362	1.0000	89,362	0
1998	353,140	353,140	1.0000	353,140	0	353,140	1.0000	353,140	0
1999	284,412	284,412	1.0000	284,412	0	284,412	1.0000	284,412	0
2000	21,655	21,655	1.0000	21,655	0	21,655	1.0000	21,655	0
2001	0	0	1.0000	0	0	0	1.0000	0	0
2002	29,966	29,966	1.0000	29,966	0	29,966	1.0000	29,966	0
2003	28,882	28,882	1.0000	28,882	0	28,882	1.0000	28,882	0
2004	28,784	28,784	1.0000	28,784	0	28,784	1.0000	28,784	0
2005	124,455	124,455	1.0000	124,455	0	124,455	1.0000	124,455	0
2006	25,138	25,138	1.0000	25,138	0	25,138	1.0000	25,138	0
2007	160,972	160,972	1.0000	160,972	0	160,972	1.0000	160,972	0
2008	51,808	51,808	1.0000	51,808	0	51,808	1.0000	51,808	0
2009	0	0	1.0000	0	0	0	1.0000	0	0
2010	14,944	14,944	1.0000	14,944	0	14,944	1.0000	14,944	0
2011	81,284	81,284	1.0000	81,284	0	81,284	1.0000	81,284	0
2012	0	0	1.0000	0	0	0	1.0000	0	0
2013	27,303	27,303	1.0164	27,751	449	27,303	1.0164	27,751	449
2014	94,415	94,415	1.0704	101,065	6,650	94,415	1.0704	101,065	6,650
2015	46,403	50,950	1.1978	61,028	14,625	50,950	1.1978	61,028	14,625
2016	2,209	2,281	1.4540	3,316	1,107	2,281	1.4540	3,316	1,107
2017	27,854	33,425	2.1636	72,319	44,465	42,191	1.4540	61,345	33,491
2018	0	0	4.5664	0	0	26,347	1.4540	38,308	38,308
Total	16,639,290	16,649,479		16,706,585	67,295	16,684,592		16,733,919	94,629

South Dakota Petroleum Release Compensation Fund
Actuarial Reserve Study as of April 30, 2018, Projected to June 30, 2018
Bornhuetter-Ferguson Method
Non-Abandoned - Low Severity

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<u>RY</u>	<u>LDM</u>	<u>Adj. LDM</u>	<u>A Priori</u>	<u>Reported</u>	<u>Average</u>	<u>Trended</u>	<u>Detrended</u>	<u>Expected</u>	<u>Percent</u>	<u>Indicated</u>	<u>Paid to</u>	<u>Indicated</u>
	<u>Ultimate</u>	<u>Ultimate</u>	<u>Ultimate</u>	<u>Claims</u>	<u>Severity</u>	<u>Severity</u>	<u>Severity</u>	<u>Ultimate</u>	<u>Unpaid</u>	<u>Unpaid</u>	<u>Date</u>	<u>Ultimate</u>
Unknown	-	-	-	2	-	-	3,830	7,659	0%	-	-	-
1985	-	-	-	-	-	-	3,603	-	0%	-	-	-
1986	-	-	-	1	-	-	3,495	3,495	0%	-	-	-
1987	-	-	-	2	-	-	3,390	6,781	0%	-	-	-
1988	1,204,343	1,204,343	1,204,343	12	100,362	40,246	3,289	39,463	0%	-	1,204,343	1,204,343
1989	783,159	783,159	783,159	50	15,663	6,475	3,190	159,495	0%	-	783,159	783,159
1990	3,308,042	3,308,042	3,308,042	129	25,644	10,929	3,094	399,151	0%	-	3,308,042	3,308,042
1991	5,164,457	5,164,457	5,164,457	240	21,519	9,455	3,001	720,329	0%	-	5,164,457	5,164,457
1992	2,596,343	2,596,343	2,596,343	230	11,288	5,113	2,911	669,606	0%	-	2,596,343	2,596,343
1993	1,188,573	1,188,573	1,188,573	101	11,768	5,495	2,824	285,223	0%	-	1,188,573	1,188,573
1994	446,166	446,166	446,166	81	5,508	2,652	2,739	221,881	0%	-	446,166	446,166
1995	110,949	110,949	110,949	60	1,849	918	2,657	159,425	0%	-	110,949	110,949
1996	344,270	344,270	344,270	61	5,644	2,888	2,577	157,220	0%	-	344,270	344,270
1997	89,362	89,362	89,362	49	1,824	962	2,500	122,503	0%	-	89,362	89,362
1998	353,140	353,140	353,140	78	4,527	2,462	2,425	189,154	0%	-	353,140	353,140
1999	284,412	284,412	284,412	137	2,076	1,164	2,352	322,266	0%	-	284,412	284,412
2000	21,655	21,655	21,655	51	425	245	2,282	116,368	0%	-	21,655	21,655
2001	-	-	-	20	-	-	2,213	44,266	0%	-	-	-
2002	29,966	29,966	29,966	14	2,140	1,315	2,147	30,056	0%	-	29,966	29,966
2003	28,882	28,882	28,882	17	1,699	1,076	2,082	35,402	0%	-	28,882	28,882
2004	28,784	28,784	28,784	19	1,515	989	2,020	38,380	0%	-	28,784	28,784
2005	124,455	124,455	124,455	33	3,771	2,538	1,959	64,660	0%	-	124,455	124,455
2006	25,138	25,138	25,138	44	571	396	1,901	83,627	0%	-	25,138	25,138
2007	160,972	160,972	160,972	37	4,351	3,112	1,844	68,213	0%	-	160,972	160,972
2008	51,808	51,808	51,808	22	2,355	1,737	1,788	39,342	0%	-	51,808	51,808
2009	-	-	-	41	-	-	1,735	71,120	0%	-	-	-
2010	14,944	14,944	14,944	36	415	325	1,683	60,574	0%	-	14,944	14,944
2011	81,284	81,284	81,284	21	3,871	3,127	1,632	34,275	0%	-	81,284	81,284
2012	-	-	-	22	-	-	1,583	34,830	0%	-	-	-
2013	27,751	27,751	27,751	18	1,542	1,324	1,536	27,642	2%	447	27,303	27,750
2014	101,065	101,065	101,065	25	4,043	3,579	1,490	37,240	7%	2,450	94,415	96,865
2015	61,028	61,028	61,028	40	1,526	1,392	1,445	57,796	17%	9,544	46,403	55,947
2016	3,316	3,316	3,316	32	104	97	1,402	44,850	31%	14,004	2,209	16,213
2017	72,319	61,345	66,832	28	2,387	2,315	1,360	38,066	54%	20,473	27,854	48,327
2018	-	38,308	19,154	14	1,642	1,642	1,319	22,155	78%	17,303	-	17,303
Total	16,706,585	16,733,919	16,720,252	1,767				4,412,514		64,221	16,639,290	16,703,511

<u>Period</u>	<u>Trend</u>	<u>Pure Prem.</u>
10-Year	-1.7%	1,380
20-Year	-1.2%	1,319
30-Year	-8.3%	2,457
Selected	-3.0%	1,319

Notes: Column (2) and (3) are from loss development method analysis
Column (4) = Estimate of ultimate loss selected based on columns (2) and (3)
Column (6) = (4) / (5)
Column (7) = (6) x (1.0 + Selected Trend Factor) ^ (2018 - Report Year)
Column (8) = Average Pure Premium / (1.0 + Selected Trend Factor) ^ (2018 - Report Year)
Column (9) = (8) x (5)
Column (10) calculated based on CDF from Loss Development Method, where % Unpaid = [1 - (1 / CDF)] for the corresponding report year.
Column (11) = (9) x (10)
Column (13) = (11) + (12)