Estimating the Actuarial Value of the Connecticut Second Injury Fund Loss Portfolio

by Abbe Sohn Bensimon, FCAS, MAAA

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Biography

Abbe Sohne Bensimon, FCAS, MAAA is Vice President at General Reinsurance Corporation responsible for marketing, underwriting, and developing finite reinsurance. Since 1982, Ms. Bensimon has held several positions within General Re in the reserving, treaty pricing, and treaty underwriting areas. She was also Chief Actuary and Senior Vice President at Commercial Risk Re-Insurance Corporation from 1992 to 1995.

Ms. Bensimon is an active Casualty Actuarial Society member, and is currently chair of the Committee on Special Interest Seminars, which puts together the three special interest seminars sponsored by the CAS each year.

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Abstract

This paper describes a dynamic financial analysis model that General Re developed for the State of Connecticut to estimate its cost of the run-off loss and expense liabilities of the Connecticut Second Injury Fund (SIF), a statutorily-created entity that covers specified types of worker's compensation claims of injured workers. The chief obstacles for pricing this loss portfolio include unreliable, if not non-existent, historical data, a radically improved claims handling operation, and an uncertain future of the SIF. The model developed contains dynamic components to reflect the sensitivity of the ultimate value of losses to varying degrees of aggressive claims handling and successful integration of ancillary claim and legal services. The model simulates a population of claims based upon assumptions on claim counts, severities of the SIF individual claims, payout patterns, percentage of settlements achieved, and the amounts at which settlements occur as a percentage of discounted case value of claims. From this, we may directly value the loss portfolio and its cost sensitivity to the way claims may be managed, as well as unexpected loss emergence.

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Introduction

This paper describes a dynamic financial analysis model that General Re developed for the State of Connecticut to estimate its cost of the run-off loss and expense liabilities of the Connecticut Second Injury Fund (SIF or Fund), a statutorily-created entity that covers specified types of worker's compensation claims of injured workers. The Connecticut Second Injury Fund covers SIF claims prior to July 1, 1995, and the State of Connecticut was considering the privatization of the state-managed fund in run-off to minimize the cost of the Fund to Connecticut's employers who finance the Fund through quarterly "assessments" on a pay-as-you-go basis. The chief obstacles for pricing this loss portfolio include unreliable, if not non-existent, historical data, a radically improved claims handling operation, and an uncertain future of the SIF. The model developed contains dynamic components to reflect the sensitivity of the ultimate value of losses to varying degrees of aggressive claims handling and successful integration of ancillary claim and legal services (called claims handling scenarios). The model simulates a population of claims under each scenario based upon assumptions on claim counts, severities of the SIF individual claims, payout patterns, percentage of settlements achieved, and the amounts at which settlements occur as a percentage of discounted case value of claim (before settlement). From this simulation exercise, the model projects each scenario's ultimate liabilities as well as their payout over time, and from there, we may directly value the loss portfolio and its cost sensitivity to the way claims will be managed, as well as unexpected loss emergence.

Model inputs have been altered to protect the privacy rights of the Connecticut Second Injury Fund, as the State continues to address its liability run-off. Outputs of the model displayed in some of the exhibits of the appendix, are based on the revised inputs.

What Are Second Injury Fund Claims?

The Connecticut Second Injury Fund handles worker's compensation cases in which a previously injured employee sustains a new injury while at work that would have resulted in a substantially lesser disability were it not for the previous injury. Originally set up by the Connecticut in 1945 to encourage employers to hire disabled veterans, the Fund is an employer-funded plan to handle and pay second injury claims. The Connecticut Fund no longer covers new accidents occurring after June 30, 1995, because changing workplace hiring practices and attitudes towards the disabled greatly diminished the need for the Fund.

Many states have funds to cover second injuries. In Connecticut, the statute was broadened to cover other worker-related losses that either fell through the cracks in the worker's compensation system, or to shoulder a financial compromise with the industry to specific worker's compensation problems that arose.

SIF claims are non-catastrophic in nature. Because the second injury is deemed by definition to have triggered a disability made worse *only by virtue of a prior injury*, the second injury in all likelihood would not have resulted from a serious on-the-job accident. Consequently, a very large percentage of the second injuries are soft-tissue injuries, and, for the most part, back injuries. The Connecticut SIF claims reflect a smaller percentage of medical relative to the total claim cost, compared with the average worker's compensation claim.

The largest cost for the Connecticut SIF emanates from its indemnity payments. The SIF has a large number of claimants, disabled with back problems, receiving bi-weekly indemnity payments. Connecticut, prior to 7/1/93, was an escalating benefit state, and its worker's compensation benefits were relatively high. A lifetime claimant with escalating benefits may receive upward $3,000,000 over his or her lifetime.

In Connecticut, if the covered injury may be eligible for coverage under the SIF statute, the insurer or self-insurer pays the first two years of benefits to the claimant and service providers. The insurer or self-

insurer notifies the SIF that it has a claim it wants to transfer into the Fund. The SIF calls the claims at this point, "pending." Once the claim is deemed eligible for coverage (through a process involving the Office of the Attorney General and the Worker's Compensation Commission), it is "transferred" into the Fund, and becomes the liability of the Fund. The Fund is responsible for all worker's compensation costs after two years' of benefit payments. Once transferred, the insurer or self-insurer is no longer involved with the claimant.

A possibility exists to settle the SIF claim before or after it is transferred. If it is settled before transfer, the insurer or self-insurer may contribute to the cost of settlement. After it is transferred, the SIF would be responsible for the handling of the settlement, and its cost. Usually an attorney represents the claimant, and the settlement must be approved by the Worker's Compensation Commission. These settlements are called "stipulations."

The Importance of Stipulations in the DFA Model

Discussions with the SIF staff and study of the claim files reveals that the non-catastrophic, soft-tissue injury, long-term nature of a typical SIF claim makes it particularly conducive for settlement, as the claimant is looking for monetary inducement to return to work or simply to close out the claim. Claimants with back problems who are eligible for lifetime benefits, might be willing to take a lump sum settlement up front and be released to find other employment, rather than get a bi-weekly check and be prevented from earning a livelihood for the rest of their lives. ***Such a negotiated lump sum settlement may wind up being far less than the economic value of a lifetime benefit, even one not subject to a cost of living adjustment.*** Additionally, there are a number of SIF claims that can easily be closed out, because there hasn't been any activity on them in years.

The Worker's Compensation Commission and the Office of the Attorney General are supportive of the stipulation effort as well. Because most SIF claimants have non-serious, stabilized medical conditions, the Commission has been a supporter of *fair* stipulations for the good of the claimant. In addition, a large

percentage of the current claims are on demand by claimants to settle their claims. In short, there is interest on all sides of the transaction to settle a typical SIF claim.

Finally, Connecticut has the greatest interest in settling the SIF claims. If the SIF is able to rightfully settle a claim for a fraction of the net present value of the ultimate payout of a claim (before stipulation), then the cost of the SIF to the State's employers could be drastically reduced. The State would be in the position to reduce assessments at a much quicker pace (even if funding needs to be initially raised to finance the accelerated stipulation activity). The conclusion that may be reached is that if all parties are ready, willing and able to settle, then settlement activity by a professional claims staff should be brisk and economic for all concerned.

Stipulations differ from structured settlements, in that they are lump sums paid directly to the claimant by the SIF, and do not use annuity companies to finance future claimant payments. Generally, stipulations involve no future indemnity payments. Costs of stipulations versus structured settlements may differ widely, as well: the cost of structured settlements is more closely aligned to the economics of a claim over time which reflect ongoing indemnity payments, interest rates, and mortality. On the other hand, not only do lump sum stipulations take these three factors into account, but they also incorporate the actual willingness and the return-to-work capabilities of a claimant to accept a lump sum in lieu of indemnity checks, thereby bringing a very subjective element into the equation. Consequently, stipulations may result in much smaller ultimate claim costs than would be achievable in settlements involving payments over time, as is often done in structured settlement arrangements.

The model that is developed incorporates the liberal use of stipulations in closing out lifetime claims, as will be described in great detail later in this paper. Further, the model is able to measure the sensitivity of the ultimate value of the loss portfolio given changes in the expected probability of any one claim getting stipulated (*stipulation probability*, expressed as a percentage of ultimate count, in the model) and the

value at which a claim gets stipulated (*stipulation value*, expressed as a percentage of the net present value of the expected future payments on a claim, in the model).

A Model that Reflects a Changed SIF

In a projection exercise such as this, the actuary normally relies upon historical, by accident or fiscal year, movement in case liabilities, commonly known as "triangle data." The SIF has no triangle data, because it (1) had not until very recently a management information system and (2) did not reserve for active claims until 1995, two critical elements in the creation of loss triangle data used to project the future.

In fact, the entire day-to-day operation of the SIF changed. Prior to January, 1995, the SIF lacked professional claims management. The SIF of the past was a check-issuing organization. In essence, claims were treated as entitlements. So, not only was reserving not taking place, claim costs were escalating unchecked.

An essential underlying assumption in using triangle data is that the past repeats itself. Logically following, even if triangle data existed, its value would be limited since the operation of the SIF has been dramatically changed. A challenge to this analysis is to develop a meaningful model that reflects the new way claims are being handled.

First, there is now extensive reserving on the most costly known claims, representing over 70% of the SIF's active cases, as of the time of the original consulting report.

Second, a claims review is performed as input to the new model on the current SIF operation. The two individuals who undertake this review each have over twenty years of worker's compensation experience, especially in the kinds of claims typical to the SIF. They review case reserving adequacy, the claims handling techniques of the current SIF administration, the nature of the stipulation activity, and pending

claims. Their conclusions have significant impact on the assumptions selected in the projections for the various scenarios analyzed in the new model.

Third, a systems audit of the operation is performed. The systems audit allows for an insight into the limitations of claims handling in a state agency environment, provides elaboration on the procedures that the new SIF has put into place and evaluates the new management information system that the SIF is currently implementing.

The fourth and last piece of input that impacts the DFA model is the extensive discussion and resulting comfort level obtained with the SIF staff. We develop an understanding of the operation, the vision, the overall progress to date, and the information management that supplies us with meaningful data. This gives us a high level of familiarity with the Fund and enables us to build a unique model to help project the Fund's ultimate liability under various claims handling scenarios.

The Data Specifics[1]

At the time of the study in the December 1995, the SIF has 3,847 active claims, 2,476 of which are reviewed and reserved by the newly-hired SIF claims professionals (with initial help from the insurance community as well). Of those reserved and active, 365 claims are already closed through the SIF's extensive stipulation activity. It is the 2,476 reserved claims that provide much of the actuarial input to the model we develop.

The SIF staff provides us with an Excel spreadsheet, the rows of which are the individually reserved claims, and the columns of which were the fields that describe the attributes of these claims. The fields, as listed in their entirety on Exhibit I, include, but are not limited to, claim number, claimant name, date of loss, current age of claimant, whether it is a lifetime claim, the established medical, indemnity and "all

[1] Numbers in this section may have been altered from the original report to the State.

other" reserves, the discounted reserve (@6% per annum), whether it's been stipulated and the amount of that stipulation, and the recommended stipulated amount, if it's been recommended to be stipulated (most of them are).

Additionally, we receive another spreadsheet that provided a claimant list of those currently receiving indemnity benefits, and the latest amount of those benefits. As of December 1995, there are 1,187 claimants who are receiving indemnity benefits. We are able to match 687 of these claimants to the reserve database, and append the bi-weekly benefits to that database. A new spreadsheet is then created to distinguish those claimants who are on active pay, from those who are not. This becomes an important aspect of the new model, as will be further discussed in the section entitled Identifying Homogeneous Groupings. Three hundred and five (305) claimants of the 1,187 are not reserved. The remaining one hundred ninety-five (195) (that are reserved) are unable to be matched, but are appropriately taken into account in the new model we develop. Below is a recap of the claim counts used in the development of the dynamic financial analysis model:

Description:	Count:
Active Claims	**3,847**
Reserved, whether Closed or Open	**2,476**
• Closed	365
• Open	2,111
Reserved and Open, and Receiving Benefits	**882**
• Life	388
• Non-Life Category One	494
Reserved and Open, and Not Receiving Benefits	**1,229**
• Non-Life Category Two	1,140
• Medical Only	89
Receiving Benefits, whether or not Reserved	**1,187**
• Reserved	882
• Not Reserved	305

The actuarial inputs to the new model largely rely on the data provided to us by the SIF. While we do not audit their data, the claims reviewers compare some hard copy claim files to the information that is contained in the spreadsheet to verify the accuracy of the information being captured. Additionally, the claim reviewers observe that the reserves are established using insurance industry accepted practices.

Once we have a comfort level with the reasonableness of the reserves as established, we are able to use these reserves without alteration in some of the necessary calculations.

Developing the Structure of the Model

Given (1) the abundant reserving information, (2) the analysis of that information by the claims review, (3) the absence of triangle data, and (4) the significant changes made at the Fund, the DFA model helps project ultimate liabilities by incorporating simulation techniques. Simulation allows the modeler to project liabilities under conditions that depart from the past. Using the reserving spreadsheet and the extensive qualitative information we amass on the Fund, we are able to estimate (simulate) a population of claims that the SIF will ultimately pay. These claims are individually generated. Parameters determining the ultimate value and payout of the claim are based upon a series of distributions on duration and annual payout that are derived from the data provided.

We divide the claims into five homogeneous groupings that relate to a particular claim's expected severity. Each grouping, discussed in Identifying Homogeneous Groupings, has its own unique set of distributions for the parameters which project the ultimate liability and payout of a particular claim. Simulation allows for such a set of parameters to be selected with individual probability distributions assumed for each parameter. The parameters of a claim are assumed to be independent. The distributions are largely based upon the reserving and bi-weekly indemnity data provided to us from the Fund, and will be discussed in each section on the individual homogeneous groupings.

The simulation model develops five hundred (500) sets (one for each simulated claim) of parameter values per homogeneous grouping. This allows the simulation model to physically generate 500 claims in each of these groupings. Five hundred is determined to be a sufficient sample size to minimize fluctuation in the result if a different 500 claims following the same parameter distributions were generated.

Each claim's duration[2] parameter and annual payout parameter is determined based upon the distributions assumed for a particular category. Then, the model pays out these 500 claims over time according to the parameter values chosen by the model for each claim. Finally, each claim's net present value is calculated at a 6% discount rate, as of July 1, 1996, 1997 and 1998.

There are also two stipulation parameters per generated claim. The first stipulation parameter is whether and when a claim is stipulated, and is known as *stipulation probability*, expressed as a percentage of ultimate claim count. Each of the 500 claims is given a probability of being stipulated, the selection of the probability derived from a uniform distribution, with a mean dependent on the claims handling scenario being studied (see next section).

In the model, we assume that either a claim gets stipulated in fiscal years 1997 (i.e., the year beginning July 1, 1996), 1998 or 1999, if it gets stipulated at all. In the fiscal year of stipulation, the claim would get closed out with a lump sum payment (the value of which is described in the next paragraph), and the SIF would make no further payments on the claim.

The second stipulation parameter is the *stipulation value*. The stipulation value is expressed as a percentage of net present value of the claim (before stipulation). The stipulation value of a claim is probabilistically based on the historical stipulation values that the Fund has achieved. However, the mean of such distribution does differ by claims handling scenario. This will be elaborated upon in the next section. Since stipulation value is based on the net present value of the claim in the year of stipulation, the successively calculated net present values of a particular claim are important. To determine the stipulated value of the claim, we apply the stipulation value to the net present value of the claim at the year in which stipulation takes place.

[2] The life claims' duration parameter is effectively the age of the claimant; the non-life categories use number of annual payments as their duration parameter.

Once the claims that are projected to be stipulated within a homogeneous grouping get stipulated, the total paid loss by fiscal year is summed over all the 500 simulated claims in a homogeneous group. At this point, the 500 count is modified to reflect the projected claim count for this homogeneous group. The result is a paid loss projection by homogeneous grouping.

In summary, the above brief description discusses the structure of the actuarial simulation model. There are five homogeneous claims groupings, based upon the likely severity of a claim. Five hundred claims are simulated for each grouping, before stipulations take place. Then a stipulation module is imposed which adds two parameters to each claim: the stipulation value and the stipulation year (if the claim gets stipulated). A final adjustment is then made to reflect the projected claim count differences for each homogeneous grouping.

The Claims Handling Scenarios

In 1995 new SIF management was hired to bring the SIF liabilities under control through effective and economic claims handling and management. In one year significant progress was made. Continued success is the assumption underlying the *base-line scenario*. That is, the *parameters* contained in the base-line scenario are based upon the current operations of the Fund, with a continuance of success.

To the extent that the effectiveness of the management of the Fund changes, the SIF's future experience may adversely deviate from the experience of the past twelve months. The scenarios that the DFA model runs are selected to reflect the impact of changes in the way the Fund is managed. The parameters for these scenarios judgmentally deviate off the base-line case.

The model starts off with the ***same*** *500 claims per category (except for the medical life claim payments) for each claims handling scenario.*

Differences between the claims handling scenarios can be seen in the selection of the statistical means of the distributions of the stipulation probability and the stipulation value. The claims handling scenarios distinguish themselves by differing in the likelihood of any particular claim being stipulated, as well as differing in the expected stipulation value, as a percentage of the net present value of that particular claim. See The Scenarios and Anticipated Stipulation Activity for further discussion.

Finally, the different claims handling scenarios also are anticipated to have an impact on the ultimate claim count. (See Scenarios and Anticipated Claim Count). Each scenario will have different claim counts by homogeneous grouping.

Exhibit II displays the results of three scenarios studied for this paper, and the differences in assumptions between the scenarios.

Identifying Homogeneous Groupings[3]

In simulating claims generated from distribution-based parameters, it is desirable to group claims into homogeneous pools. Each homogeneous grouping had its own set of parameter distributions. If the entire population of SIF claims are simulated using one set of parameter distributions, these distributions would necessarily have relatively large standard deviations. The smaller the standard deviation of a particular parameter distribution is, the less variability in the results of a claim simulation. In other words, "process risk," i.e., the risk of a parameter's value deviating from expected, is reduced. This allows the model to project the claims population with more certainty.

However "parameter risk," the risk that the distribution for a parameter assumed in the model is not an accurate reflection of the parameter's actual expectation and variance, still exists to the extent that the reserving data and other information gleaned by the consortium do not give a total picture of a parameter's true distribution. In short, by separating these claims into more homogeneous groupings, the

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model is able to develop parameters with smaller standard deviations that reduces process risk, but not parameter risk.

Additionally, by identifying homogeneous groupings, the model is allowed to be flexible in the choice of parameters that are used to project claims for a particular grouping. Furthermore, parameter distributions could be developed in different ways, appropriate for each grouping under study.

From the reserving and payroll worksheets, we try to identify sets of claims with similar estimated case reserves. The task is to identify those claim attributes that would likely give rise to a particular size of claim reserve. Since the claim review essentially confirms the claim estimates of the reserved SIF claims, claim reserves help test the way in which the model partitions the total projected population of claims of the SIF. After performing an analysis of the data we decide to partition the claims in five relatively homogeneous groupings:

(1) Life Claims: Claims that are expected to last the lifetime of the claimant or survivor. These claims are the SIF's most expensive claims, and on average reserved (before stipulation) at $580,000 nominal, or $314,000 net present value (NPV). The average age of a current lifetime claimant is 55;

(2) Non-Life Category One: Claims that, when transferred, are active-paying claims of the Fund. These claims are identified by the spreadsheet as being on payment, yet are not lifetime cases. The average nominal reserve of these claims is $367,000, or $221,000 NPV, before stipulation;

(3) Non-Life Category Two: Claims that are not active-paying claims of the Fund, but that have a high likelihood of becoming so in the future. These are claims that the Fund is liable for (i.e., have been transferred into the Fund) and has reserved, but claims on which the Fund is not making current payments. Since the Fund focused on reserving its higher-valued claims, the model creates a special

category for these claims, differentiating them from the unreserved claims, that would fall into the next category;

(4) Non-Life Category Three: Claims that are not active-paying claims of the Fund, but are likely to result in insurance company reimbursement, or to be of short duration; and,

(5) Medical Only Claims: Claims that are anticipated to incur medical only payments by the SIF. There are very few claims in this category, and it is anticipated that relative to the other categories, it will remain the smallest liability of the Fund (both in claim count and amount).

Exhibit III shows average case reserves on non-stipulated cases for each of the above categories, except Non-Life Category Three. Non-Life Category Three claims are largely drawn from currently pending claims that are expected to become active. Transferred claims in this category are assumed to be insurance company reimbursements and small liabilities of the Fund.

By partitioning the claim reserve worksheet into these groupings, distributions for duration and annual payment can be directly derived from the partitioned groups.

The Scenarios and Anticipated Claim Count[4]

Claim count for the Second Injury Fund is dependent on how many of the current and future pending claims, i.e. those claims that insurance companies have filed or will file for transfer to the Second Injury Fund under the statutes, will ultimately become liabilities of the Fund. While many claims are legitimately "second injuries" and indisputably belong in the Fund, there are many questionable claims, a situation that is not uncommon for insurance operations in general. To the extent that the Second Injury Fund has top quality staff with the ability to identify those aspects of a pending claim that should allow for a proper coverage decision from the Second Injury Fund and that staff is allowed to participate in the

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transfer activity at the earliest possible date, the amount of claims ultimately transferred to the Fund will be reduced. Once a claim is transferred and, until it is stipulated, a claim is a potential liability for the Fund forever. Any transferred claim can easily turn into a lifetime of payments. The SIF could potentially pay out over $1,000,000 or more for such a claim due to Connecticut's legislated weekly benefit levels.

Before 1995, the Fund has historically allowed the transfer activity to reside in the Office of the Attorney General. There is very little data on how successful the Office of the Attorney General has been in properly evaluating the propriety of transferred claims. Between scenarios, the DFA model allows for a differing amount of claims that will transfer into the Fund, reflecting different levels of claims management expertise, the familiarity with the entire process of transferring a claim into the Fund, and the involvement in a claim's transfer process. Exhibit II shows the percentage difference between scenarios of pending cases that have become active claims of the Fund, as well as the projected ultimate claim count by scenario.

The statute effective July 1, 1995 cuts off SIF liability of a claim if it is not filed within three years from the date of occurrence of the accident. "True" second injury claims (vs. other liabilities statutorially imposed upon the SIF) whose accident date is on or after July 1, 1995 are no longer liabilities of the Fund. The model judgmentally adds 20% of the currently pending claims to account for "true" second injury fund claims not yet reported to the SIF, but will emerge as pending claims that may or may not transfer into the Fund. These pure incurred-but-not-reported claims are assumed to have the same probability of transfer as the claims currently pending.

With respect to the other scenarios, the model assumes that the same percentage of pending claims will transfer.

Claim Count by Homogeneous Grouping[5]

After the DFA model projects ultimate claim counts for the different scenarios under study, it then segments them into fairly homogeneous severity groupings as described in the section, Identifying Homogeneous Groupings. Exhibit IV displays the assumptions underlying the model's partitioning of claims into groupings by scenario.

Partitioning is largely based on the reserved claims we know about. Based on the claim review, the model assumes that 20% of the pending claims that are anticipated to turn into SIF liabilities will be lifetime claims. An additional 25% are projected to be Non-Life Category One, that is, claims that will immediately be paid on when transferred. This selection is based on the activity of the SIF and this category's size relative to the life category. The remaining claims (besides a modest amount allocated to Medical Only) are anticipated to be Non-Life Category Three, based on the claim review.

It should be noted that there is an inherent assumption in Non-Life Category Three that active claims management will take place, for these claims are viewed as marginal liabilities of the SIF by experienced claims professionals. For the purposes of this projection exercise, there is no difference among the scenarios with respect to their homogeneous groupings split.

Once projected claim count is established for each homogeneous grouping within a scenario, it gets incorporated by grossing up or down the fiscal year outflows of the 500 claims simulated in that grouping. For instance, if the homogeneous grouping were projected to ultimately pay on 1,000 claims, the annual outflow of the 500 simulated claims would be doubled in the model. The underlying assumption is that the distribution of claim severities, payouts and stipulation activity for the 500 simulated claims would be identical to the 1,000 projected claims.

Exhibit V displays the Expected Claim Counts by Category and Scenario.

[5] Numbers in this section may have been altered from the original report to the State.

While the model's assumptions relating to allocating claim count among claim categories are based upon the data provided, they are subject to great variability largely due to parameter risk. Furthermore, a small change in the allocation parameter may impact the ultimate liability of the Fund greatly. In particular, the higher the percentage of claims that ultimately fall into the life claim category, the Fund's highest severity claim category, the higher the nominal and net present value projection of the ultimate cost for a given scenario. For example, under the base-line scenario, if there were a 13% increase (150) claims over expected in the life category, the net present value of the SIF's ultimate liabilities would be projected to increase by $43 million, or 6.4% (See Exhibit VI).

Cost of Living Adjustments[6]

Benefits in the State of Connecticut are subject to cost of living adjustments (COLA's), if the claim occurred prior to July 1, 1993. Based on NCCI data, we project the annual cost of living adjustment to be 4.5% per annum.

Since the model projects a historical book of claims, it is important to identify in the simulation exercise whether a claim is going to be affected by COLA adjustments. This translates into determining whether claims occurred prior to July 1, 1993. At this point in time, we only have information on 2,476 claims of the over 6,000 we are projecting. Additional modeling is required to project the accident dates of the total anticipated population.

The model sets the COLA vs. non-COLA split differently for lifetime and for non-life claims. Because the duration of a lifetime claim is longer, it will have a higher percentage of older claims on the SIF books. The model projects on Exhibit VII, Sheet 1 that 75% of the life claims will have a COLA, and 25% of the life claims will not. On Sheet 2, we select for Non-Life Categories One and Two to have a 65%/35% split COLA/non-COLA. For Non-Life Category Three we select a 50%/50% split.

[6] Numbers in this section may have been altered from the original report to the State.

Life Parameters[7]

Besides whether it has a COLA, a life claim's ultimate payout is largely dependent on three parameters: the age of the claimant, the bi-weekly indemnity payment and the medical costs. The model generates 500 claims in the life group, using the above four parameters. By using a life table (See footnote 8 on page 20), and the 4.5% COLA assumption, the model simulates the expected payout of a claim of a worker of a certain age, receiving a certain bi-weekly benefit, and some medical benefits. Parameters are selected according to a distribution based on the reserving and payroll data given to us by the SIF.

Exhibit VIII, Sheet 1, illustrates the model's projection of the distribution of the ages of claimants who currently are receiving or who are anticipated to receive lifetime benefits. The first shown distribution is based on the currently reserved data. The average age of a claimant currently receiving life benefits is 55 years old. However, these individuals are assumed on average to have been receiving benefits for some time. It would be expected that new life claimants would have a lower average age. The second distribution uses the age of the current claimants when they *started* to receive SIF benefits. This average age is 46 years old. This is a slightly conservative assumption, for it is probable that the older claimants are less represented due to their heightened mortality risk between the time they began receiving benefits and the present time. The third distribution is a weighted average of the two prior distributions, based on the anticipated split of old and new life claims that the SIF will be encountering. The average age of the life claimants used in the model is 49 years old.

Exhibit VIII, Sheet 2, displays the bi-weekly wage distribution used in the model for life claimants. Even though it has little impact, we took into account the change in maximum weekly wage that took place on October 1, 1987. The average bi-weekly wage used in the model is $977, in July 1, 1996 dollars. If a COLA applies to a claim, then the model increments the bi-weekly wage over time.

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Below is a table of severities of a life claimant, with an average age of 55 years, that the model generates for COLA and non-COLA claims, comparing them with the actual average SIF estimate of the same claim:

Source of Calculation	Nominal	Net Present Value
Model: COLA applied	$1,820,925	$629,000
Model: no COLA applied	$ 752,000	$373,000
Actual Reserving	$ 581,000	$315,000

The above differences may seem surprising, but it is quite common for an actuarial estimate of a lifetime claim to be higher than a claims professional's estimate, given the same parameters. In this case, the difference between the model's average loss and the carried reserve average loss are due to life table differences (the model's is more conservative[8]) and the compounding effect of COLA's. Since the stipulation value parameter is based on historical stipulation performance as a the percentage of the NPV case reserve, this difference needs to be reflected in estimating the expected stipulation values based on actual data, as applied in the model. For further discussion, see the section entitled, Stipulation Value.

Exhibit VIII, Sheet 3, displays the medical payout distributions used in the model. Currently, the average medical reserve is $28,852 per reserved claim. Assuming that there have been some payouts (remember, we do not have historical claim payments due to incomplete record keeping at the Fund in the past; as well, the spreadsheet information on paid loss data is incomplete), and that there will be some medical inflation through July 1, 1996 when the model begins projecting, we judgmentally augmented the distribution by 50%. Future medical inflation as the medical pays out is assumed to be 5.5% a year. While the model minimally takes into account the usage of medical utilization analysis and medical

[8] The model uses a mortality table based upon the middle series future mortality estimates underlying the U. S. Bureau of the Census's Current Population Reports, Series P25-1092 (population projections). Although the base year underlying Census Bureau estimates is 1990, the table is derived from the Bureau's projected tables for 2000 and 2050. A 80% male/20% female distribution underlies the model's mortality table.

procedural reviews to reduce costs (because the Fund is still in the process of developing regular procedures in this area), this distribution may be conservative if such claims handling techniques are implemented in the future. The other scenarios anticipate even higher projections of medical costs. Medical cost projections are not discounted for mortality.

Non-Life Categories' Parameters[9]

Exhibit IX, Sheets 1 through 3, display the distributions used in the non-life categories for duration and for annual payment (including medical). These are based on actual reserves, the discounting of those reserves, and the claims review. It should be noted that the average projection tracks well with the observed statistics found on Exhibit III for non-stipulated claims (the bottom-half of the exhibit).

Medical Only[9]

The average carried reserve for this category is $8,200. There are currently 89 claims in this category. The model projects an average of $20,000 (July 1, 1996 dollars) to reflect past paid losses, inflation through July 1, 1996, and an extra cushion for reported-but-not-enough (i.e. adverse development on the average claim).

Stipulation Parameters[9]

Extensive study is performed on the stipulation activity of the SIF operation. The stipulation results over the past year were impressive: 365 appropriately reserved active (as distinguished from pending) claims were being settled on average for about 35% of the net present value of that reserve. The first question that comes to mind is: were these the easiest, least expensive claims that the SIF had that were most conducive to settlement? The answer appears to be "no."

Exhibit X Sheet 1 displays a bar chart of the percentage of reserved claim count that settled, by size up to $1,000,000 net present value. Each bar represents the number of claims that have been stipulated divided

[9] Numbers in this section may have been altered from the original report to the State.

by the total number of claims, at the average net present value reserve (before stipulation) indicated on the x-axis below. As can be seen there have been a significant number of the larger claims which have settled. Of the 365 claims that were stipulated, 90 of them were life claims with an average net present value reserve of $368,000. Stipulated life claims represent 25% of all stipulated claims, compared with non-stipulated life claims being 24% of the total reserved claims.

Life claims settled on average at 32% of NPV; non-life claims at about 38% of NPV. Exhibit X Sheet 2 is a scatter chart displaying the range of stipulation value expressed as a percent of case reserve NPV shows stipulation values to be relatively constant over claim size. Each point on the scatter chart represents a stipulation: the location of the point along the x-axis is the estimated net present value of the claim (before stipulation), and along the y-axis is the ratio of stipulation settlement amount divided by the NPV of the claim.

Additionally this graph gives support for the assumption of the stipulation parameter following a uniform distribution.

The Scenarios and Anticipated Stipulation Activity

This DFA model is designed to measure potential differences in net present value and nominal value of the SIF liabilities under various scenarios. The inputs to the model are based largely on the twelve month history of the SIF results under the current management. As is revealed in the claims review and management interviews, current management is top-quality and has strategically positioned the SIF into settling many claims as efficiently as possible and at economically reasonable amounts. The principal constraint on the staff in 1995 in settling claims is the staff workload and the cash available to close claims. As there are no performance incentives for the staff (at the time of this study), and the SIF is essentially in runoff, it could be increasingly difficult to retain top quality staff, or to attract other qualified applicants to help manage the claims of the Fund.

The dilemma faces the Fund to keep the same improved quality of claims handling so that the State is in a position to dramatically reduce future assessments. If (1) performance incentives were firmly in place, (2) the staff were thoroughly qualified in worker's compensation claims management, and (3) the staff were completely attuned to the nuances of the SIF claims in particular and the SIF's interaction with the various governmental agencies (e.g., the Office of the Attorney General, the Worker's Compensation Commission) that are involved, the net present value of the SIF liabilities would be minimized.

Stipulation parameters are measured by the achievements made by the SIF staff in the past year. It is assumed (based upon a study of the stipulated claims, and the claim review, itself) that as long as the staff is bolstered with quality claims handlers to support the SIF case load and if cash resources are available, the pace of claim settlements will be maintained and should result in a continuing level of savings. These stipulation parameters are used for the base-line scenario.

To the extent that the claims handling operation of the SIF is either less familiar with the SIF process, has less of an incentive to settle the claims (for whatever reason), or has less claims expertise handling the SIF claims, the stipulation parameters will necessarily be affected. We've adjusted the parameters in the other two scenarios reflecting a staff less familiar with the SIF process.

SIF claims expertise is a real issue. Many firms that handle claims typically do not settle as many worker's compensation claims as the Fund has done in its historically recent past. One reason is that a smaller percentage of the WC claims handled by insurers and TPA's are not as readily settleable as those found in the SIF, whose claims are largely comprised of non-catastrophic, soft-tissue injuries. A second reason is that typical settlements made by insurers and TPA's often involve "structured settlements," whereby a premium, closing the claim for the insurer, is paid by the insurer for an annuity sold by a life insurance company. The purchased annuity usually mirrors the anticipated cash flow of the claim being structured, and therefore, its cost approximates the claim's value discounted for interest and mortality. Settlements like this are used by the carrier to remove the uncertainty of future claims payments and to

reduce claims handling costs. As a result, under normal circumstances, there is less economic benefit for an insurer or TPA to settle a claim.

For these reasons, it is important to see how the ultimate value changes as a result of changes in the stipulation parameters from the base-line scenario. These changes affect both the number of stipulations that the Fund could achieve and the average value of each of those stipulations. Stipulation parameter changes reflect directly on the claims handling staff's ability to settle claims quickly and economically.

On Exhibit II, the differences in the scenarios' parameters with regard to stipulation probability and stipulation value are displayed, along with a comparison of the differing projected nominal and net present values of ultimate SIF costs (which also reflect ultimate claim count differences by scenario).

Stipulation Probability[10]

The model incorporates stipulation probability by fiscal year, using a percentage of projected ultimate claim count. The sum of the fiscal year probabilities equals the total probability of any one claim being stipulated. The model reasonably assumes under all scenarios that there will be a certain percentage of claims that cannot be settled; that is, they will only settle at 100% of the net present value of the claim.

As was discussed in Developing the Structure of the Model if a simulated claim is deemed to be stipulated in a particular year (and this determination is patterned after an assumed fiscal year stipulation distribution), a lump sum payment is made in the year of stipulation and no further payments are made on the claim.

It is assumed in the base-line scenario, that 70% of the claims will close at an average of 35% of the claims' net present values. This is based on the statistic that 78% of the active claims are recommended by the SIF staff (and, initially, by the insurance company claims professionals who helped the SIF in the

[10] Numbers in this section may have been altered from the original report to the State.

reserving process) for stipulation. The basic philosophy of the current SIF is that any legitimate claim against the SIF can be settled at similar amounts as the other similar claims they've already settled. Some of the remaining 22% of claims, in the SIF's view, should not settle because they may be of questionable liability to the Fund (e.g. fraud claims), and should instead be handled as aggressively as possible. However, for the model's application, most of these remaining claims are assumed not to be conducive for settlement due to the claimants' refusal to settle. Our model assumes for the base-line scenario, based on our knowledge of worker's compensation and the nature of the SIF claims that 70% are projected to settle at 35% NPV and 30% could only settle at 100% of NPV.

The stipulation probability parameter has the single most potent impact in differentiating estimates in ultimate liabilities among the scenarios. Changes in this assumption under the model by varying the percentage expected to be stipulated from 70% to 80% will decrease the projected liability on a net present value basis (at a 6% discount rate) by $81 million, or 12%. Conversely, if the stipulation probability lowers to 60%, the net present value projection increases by $95 million or 14%. (See Exhibit XII). This demonstrates the model's extreme sensitivity to parameter risk for this variable. While the base-line scenario is based upon the performance of the Second Injury Fund this past twelve months, it is not certain that the rate of stipulation activity will continue.

Implicitly assumed by the model is that this parameter applies equally to small and large claims of the Fund. Given the prior discussions on this subject that describe the non-catastrophic, long-term nature of typical SIF claims, the interest of all parties to settle, and the actual stipulation experience of the Fund as depicted on the bar graph of Exhibit X Sheet 1, this is not unreasonable.

Exhibit XII displays the differences in the distribution of stipulation activity between the scenarios. It is assumed that the unstipulated claims could only be settled at 100% of the claims' net present values. The base-line distribution is based on a determination of case load capabilities among the SIF's claims professionals in stipulating these claims (while actively managing the others).

Stipulation Value[11]

The DFA model simulates a population of claims under each scenario, *before* stipulations take place. Then the model calculates the net present value of each simulated claim, along with whether (and when) it gets stipulated (according to the parameter distribution). Stipulation value, the amount that a claim if stipulated will settle at, is based upon a percentage of the net present value of the claim. The more effective the claims handler and the more known about a claim, the better the economic outcome for claim settlement, as a more accurate assessment of worth is apt to be made.

Underlying the model's projected stipulation values is the historical performance of the Fund. However, *for life claims*, the historical ratio of stipulation amount divided by claim net present value needs to be adjusted downward before being applied in the model. As was noted in the section entitled Life Parameters the model projects higher life claim values than the SIF, given approximately the same parameters.[12] Actuarial models are expected to project higher claim projections than those estimated by claims professionals using insurance industry accepted case reserving methodologies. What needs to be considered for model purposes is that the SIF staff is stipulating the claims at an average 32% on ***their*** NPV of case reserves (Exhibit XIII). If the model projects higher reserves (all things being equal), then the stipulation value assumed in the model will need to be adjusted downward.

On Exhibit XIV Sheet 1, in 2(a), the severity differences for non-COLA claims as respects actual case reserves and the model's simulation of case reserves, both nominal and discounted, are displayed. On Exhibit XIV Sheet 2, in 2(b), the same is displayed for COLA claims.

[11] Numbers in this section may have been altered from the original report to the State.
[12] Although the claim reviewers verified the professionalism of the case reserving, there were two observed differences: the life table used in the model is more conservative (it reflects projected mortality in the year 2030, as described in footnote 2 on page 20) and, for COLA claims, benefits are continually compounded.

Exhibit XIII helps develop a distribution for the stipulation value. The model selects a uniform distribution. This is additionally supported by the scatter chart on Exhibit X Sheet 2, described in the section entitled, Stipulation Parameters.

While, such a selection is justified by the observed distribution, there is a qualitative justification as well: since many related factors go into the determination of the settlement value, the actual settlement may range greatly (in a uniform way) about an expectation. However, the observed distribution does appear skewed at the low end. The uniform distribution is conservative in that it removes this skewness; however this elimination is compensated for to retain the previously mentioned historical 32% average. The shape of the distribution is not crucial to the outcome; however the expected stipulation value certainly is. Later in this section we will discuss the sensitivity of this value to the outcome.

Exhibit XIV Sheets 1 and 2 adjust the expected 32% of SIF NPV case to the model's projection of NPV case under non-COLA and COLA claims. The new averages form the expectations of two uniform distributions on life claims: one for non-COLA claims and one for COLA claims.

Exhibit XV displays the observed distribution of stipulation value for non-life claims. Since the model's projection of these case reserves is similar to the SIF's, the observed stipulation value average is used without adjustment. Again, a uniform distribution about this expected value is assumed.

Exhibit XVI shows the model ranges, model average and equivalent case average for stipulation value by life (non-COLA vs. COLA) and non-life under the various scenarios under study.

There is great uncertainty over the projection of stipulation values. Stipulation values are not only dependent upon the expertise of the claims handlers, but are also based upon the needs of the claimant, perceptions in the marketplace and economy in general. At this time, there is a strong claimant demand to settle transferred claims. That should serve to suppress stipulation values. Conversely, if it is known

that there exists a huge pool of money reserved for stipulating cases, the potential effect could push awards upwards.

Exhibit XVII shows how an increase in the average stipulation value in the base-line scenario, from 35% to 40% of net present value, may result in a $26 million, or 3.8% increase in the projected net present value of the SIF's total liabilities.

The base-line model assumes that stipulations can continue as they have in the past. This reflects an anticipation of continued strong claims handling discipline that the SIF has exhibited this past year. To the extent that the SIF claims handlers under the varying scenarios (1) cannot correctly identify those aspects of a claim which would properly reduce its value, and/or (2) is not as effective in or familiar with handling the typical SIF claim (non-catastrophic in nature but still has potential for long-term payments), the stipulation values will push upwards.

Delay in Claim Emergence[13]

Currently 1,187 claims are actively being paid by the Fund. It is anticipated that the Fund will have ultimate responsibility for over 6,000 claims. However, these claims will only emerge over time as SIF-paying liabilities. To create a realistic payout projection, the model should start paying on these 6,000 claims over time.

Loosely based on the past emergence activity of the SIF claims, the model delays paying on a percentage of claims according to another distribution. On Exhibit XVIII, the delay distributions that the model uses are shown.

Even though the claim is delayed in payment, medical and COLA factors still apply. Additionally, for life claims, claimants are not "aged" until the first payments are made on the claims. For example, if a

[13] Numbers in this section may have been altered from the original report to the State.

claimant is assumed to be 45 years old in the model and the claim emerges in two years, the claimant is assumed to be 45 years old, two years from now.

The delay distributions appear reasonable and have little effect on the projected net present value of the SIF's ultimate liability.

Model Projections

Exhibit XIX displays the claim count, nominal and net present value of the total projected liabilities under the studied scenarios that reflect the simulation modeling techniques and reflecting the parameter distributions as discussed in this section of the Appendix. Additionally, the exhibit displays ten years of projected payments.

In large measure, the differences between the scenarios reflect the differences in expectations about stipulation probability and stipulation value. To a lesser degree, further differences can be seen by comparing the scenarios' claim count projections. To the extent that a scenario in reality will exceed or fall short of the stipulation expectations and claim count projections, the scenarios will trend closer or further apart from each other.

In comparing the scenarios, we are sensitivity testing the parameters for the SIF. As was often mentioned, the projections may change significantly if the variables' actual values are even slightly changed from expected. Parameter risk (that is, the risk that the distribution for a parameter assumed in the model is not an accurate reflection of the parameter's actual expectation and variance) is significant, because most of the model's variables are based on one year's observed claims management experience. The underlying assumption is that the past twelve months will repeat itself. However since the SIF is at a crossroads, the future is uncertain.

This base-line model assumes the best outcome. The parameters underlying this scenario are our best projections, and are based on historical data. To the extent that stipulation activity cannot continue as it had in the past, or that the transfer process for pending claims turning active does not go as expected due to unanticipated changes, the projections for this scenario will push upwards.

Conclusion

In conclusion, the DFA model projects the liabilities of the Second Injury Fund under various scenarios which are selected to reflect the variability of ultimate cost for the State of Connecticut, and to help price the loss portfolio, should the State decide to transfer it. The parameters for these scenarios judgmentally deviate off the base-line scenario.

We've shown how the model demonstrates how small negative changes in the actual values of the parameters from expected have the potential to deliver an adverse economic impact on SIF liabilities. Additionally, the model could be used by the State in an alternative way: the model will help the State detect unexpected changes in payout, and potentially identify the source of such deviation. In short, the model may be used for retrospective analysis (i.e., "keeping score") thereby helping the State evaluate the effectiveness of ongoing SIF management.

Estimating the Actuarial Value of the

Connecticut Second Injury Fund Loss Portfolio

APPENDIX

Connecticut Second Injury Fund

Fields Captured by SIF in Database

1 Date Reviewed
2 Carrier Name
3 File Type
4 District #
5 New
6 Reviewer
7 Last Name
8 First Name
9 Occupation
10 Claim #
11 Statute
12 Injury Date
13 Liability Date
14 Compensable Injury
15 Maximum Medical Improvement Date
16 On Indemnity
17 Active Medical
18 Medical Only
19 Age
20 Life Expectancy
21 Reduced Life
22 Work Life Expectancy
23 Attorney Involved
24 Obesity
25 Emotional Overlay
26 Substance Abuse
27 Casual Relationship
28 Pre-Existing Condition
29 Eductional Background
30 Return to Work Potential
31 Permanent Total (Statutory)
32 Temporary Total Disability - Lifetime Claim
33 Medical Carrier Paid
34 Indemnity Carrier paid to Date
35 Medical SIF Paid to Date
36 Indemnity SIF Paid to Date
37 Carrier Paid to Date
38 SIF Paid to Date
39 Medical/Indemnity Paid to Date
40 Reserve-Medical
41 Reserve-Indemnity
42 Reserve-Other
43 Total Reserve
44 Total Reserve Paid + Outstanding
45 Present Value @ 6% Discount
46 M&R Life
47 Recommendation for Stipulation
48 Proposed Settlement - Minimum Value
49 Proposed Settlement - Maximum Value
50 Average Recommended Stipulation
51 Resolution of Stipulation
52 Nominal Savings vs. M&R
53 Savings vs.Nominal Reserve
54 Savings as a % of Nominal Reserve
55 Savings vs. Average Recommended Stipulation
56 Outstanding Reserve
57 Whether this claim has been stipulated
58 Recommended for Stipulation Indicator

Connecticut Second Injury Fund

Valuating the Loss Portfolio as of the Beginning of Fiscal Year 1997

Comparison of Model Results and Important Parameters by Scenario

	Projected Claim Count	Projected Nominal Value	Projected (1) Present Value	% of Pending turned Active	Assumed Stipulation Value (2)	Assumed Percent of Claims Not Stipulated
Scenario 1: Base-line	6,256	1,493,122,516	675,365,496	40%	35%	30%
Scenario 2	6,829	2,613,072,285	1,023,990,931	50%	45%	55%
Scenario 3	7,423	3,199,068,428	1,280,220,427	60%	50%	60%

(1) @ 6% p.a.
(2) As a % of SIF NPV (@6%) Claims Estimation

Connecticut Second Injury Fund

Statistics on Stipulated Active Cases

Category	Average Case Reserve Nominal	Average Case Reserve Discounted	Average Stipulation	Average Discounted Case Reserve
Average Case- All	$ 310,245	$ 176,659	$ 61,977	35.1%
Average Case Lifetime	$ 740,219	$ 367,693	$ 118,589	32.3%
Average Case-NL not Active Pay	$ 297,848	$ 170,819	$ 60,387	35.4%
Average Case RTW	$ 151,779	$ 104,126	$ 42,424	40.7%

Statistics on Non-stipulated Cases

Category	Average Case Reserve Nominal	Average Case Reserve Discounted
Average Case- All	$ 261,334	$ 158,115
Average Case Lifetime	$ 580,517	$ 314,654
Average Case-Non-Life Active Pay (Non-Life Category One)	$ 367,053	$ 221,255
Average Case-Non-Life not Active Pay (Non-Life Category Two)	$ 100,319	$ 75,809
Medical Only	$ 8,181	$ 8,181
Average Case Return to Work	$ 143,303	$ 100,282

N.B. Reserves discounted at 6% p.a.

Connecticut Second Injury Fund

Development of Claim Count by Category and Scenario

Parameters Affecting Total Count

Pending Count	5,000
IBNR	20% of Pending
Total Active Claims	3,847
Total Reserved and Open	2,111

	Scenarios		
	Base Line	*1*	*2*
% of Pending/IBNR that are expected to become active	40%	50%	50%

1. Life Claims

Claims that are expected to last the lifetime of the claimant or survivor

Reserved 388

	Scenarios		
	Base Line	*1*	*2*
% of Pending/IBNR that are expected to become life claims	20%	20%	20%

2. Non-Life Category One

Claims that, when transfered, are active-paying claims of the Second Injury Fund

Reserved 494

	Scenarios		
	Base Line	*1*	*2*
% of Pending/IBNR that are expected to become NL Category One claims	25%	25%	25%

3. Non-Life Category Two

Claims that are not active-paying claims of the Second Injury Fund, but have a high likelihood that payments will be made on such claims in the future

Reserved 1,140

4. Non-Life Category Three

Claims that are not active-paying claims of the Second Injury Fund, but are likely to result in insurance company reimbursement, or to be of short duration

The claim count for this category is the remaining count left after the other categories' claim count projections are subtracted from the projected ultimate count for each scenario.

5. Medical Only Claims

Claims that are anticipated to incur medical only payments by the SIF

Reserved 89

The claim count for this category is the developed by taking the proportion of reserved medical only claims to total reserves, and applying this ratio to the projected ultimate count for each scenario.

Connecticut Second Injury Fund

Exhibit V

Expected Claim Counts by Category and Scenario

Scenarios	Total Claims	Life	Non-Life Categories One	Non-Life Categories Two	Non-Life Categories Three	Medical Only
Base-line	6,256	1,190	1,425	1,140	2,235	265
2	6,829	1,305	1,571	1,140	2,524	289
3	7,423	1,425	1,719	1,140	2,825	315

Categories are described as follows:

Total Claims
Expected number of claims to transfer into the Second Injury Fund

1. Life Claims
Claims that are expected to pay out over the lifetime of the claimant or survivor

2. Non-Life Category One
Claims that, when transferred, are active-paying claims of the Second Injury Fund

3. Non-Life Category Two
Claims that are not active-paying claims of the Second Injury Fund, but have a high likelihood that payments will be made on such claims in the future

4. Non-Life Category Three
Claims that are not active-paying claims of the Second Injury Fund, but are likely to result in insurance company reimbursement, or to be of short duration

5. Medical Only Claims
Claims that are anticipated to incur medical only payments by the Second Injury Fund

Connecticut Second Injury Fund

Model Sensivity of Nominal and Discounted Liability from Parameters in Base-line Scenario

Claim Count

Base-line Scenario: Expected

	Count	Nominal Liability	Discounted Liability (1)
Life	1,190	1,009,599,022	342,149,996
Total	6,256	1,493,122,516	675,365,496

Revised Base-line Scenario: Increase life claim count by 150 claims

	Count	Nominal Liability	Discounted Liability
Life	1,340	1,136,809,187	385,261,129
Total	6,406	1,620,332,681	718,476,629

Change in Base-line Scenario due to increase in life claims

	Count	Nominal Liability	Discounted Liability
Life	150	127,210,165	43,111,133
Total	150	127,210,165	43,111,133
Increase		8.5%	6.4%

(1) @ 6% p.a.

Connecticut Second Injury Fund

Development of Claim Count Split Between COLA and Non-COLA Claims

(a) Lifetime

Date of Loss				Known Open Life Claims	Approximate to-ultimate factor (1)	Approx. Ult. Count Through 6/30/90	Historical and Projected Projected Annual Claim Count Growth	Life Claim Approximate Ultimate Count
On or before			6/30/80	67	1.150	77		77
Later than	6/30/80	and on or before	6/30/81	21	1.200	25		25
Later than	6/30/81	and on or before	6/30/82	20	1.250	25	1.6%	25
Later than	6/30/82	and on or before	6/30/83	27	1.300	34	37.8%	34
Later than	6/30/83	and on or before	6/30/84	31	1.350	42	21.5%	42
Later than	6/30/84	and on or before	6/30/85	31	1.400	43	3.7%	43
Later than	6/30/85	and on or before	6/30/86	27	1.450	39	-9.8%	39
Later than	6/30/86	and on or before	6/30/87	25	1.600	40	2.2%	40
Later than	6/30/87	and on or before	6/30/88	37	1.750	65	61.9%	65
Later than	6/30/88	and on or before	6/30/89	41	2.000	81	25.1%	81
Later than	6/30/89	and on or before	6/30/90	30			12.5%	91
Later than	6/30/90	and on or before	6/30/91	18			12.5%	103
Later than	6/30/91	and on or before	6/30/92	10			10.0%	113
Later than	6/30/92	and on or before	6/30/93	4			10.0%	124
Later than	6/30/93	and on or before	6/30/94	2			10.0%	136
Later than	6/30/94	and on or before	6/30/95	0			10.0%	150
				388				

Total Projected Claims (Approximate)	1,188	
Claims with DOL before 7/1/93	902	76%
Claims with DOL on or after 7/1/93	287	24%

(1) To-ultimate count, along with selected life claim count growth factor, was selected to tie to the average life claims projected for the three scenarios under consideration in this paper.

Life Claims **Select 75% COLA Claims; 25% non-COLA Claims**

Development of Claim Count Split Between COLA and Non-COLA Claims

(b) Non-Lifetime

Date of Loss			Known Open Non-Life Claims	Approximate to-ultimate factor (1)	Approx. Ult. Count Through 6/30/90	Historical and Projected Projected Annual Claim Count Growth	Non-Life Claim Approximate Ultimate Count
On or before		6/30/80	62	1.000	62		62
Later than	6/30/80 and on or before	6/30/81	27	1.000	27		27
Later than	6/30/81 and on or before	6/30/82	27	1.000	27	0.0%	27
Later than	6/30/82 and on or before	6/30/83	40	1.000	40	44.4%	40
Later than	6/30/83 and on or before	6/30/84	58	1.000	58	47.7%	58
Later than	6/30/84 and on or before	6/30/85	84	1.000	84	44.8%	84
Later than	6/30/85 and on or before	6/30/86	98	1.000	98	15.8%	98
Later than	6/30/86 and on or before	6/30/87	129	1.000	129	31.7%	129
Later than	6/30/87 and on or before	6/30/88	198	1.000	198	53.8%	198
Later than	6/30/88 and on or before	6/30/89	221	1.100	243	22.5%	243
Later than	6/30/89 and on or before	6/30/90	243	1.300	315	29.9%	315
Later than	6/30/90 and on or before	6/30/91	227	1.750	397	25.8%	397
Later than	6/30/91 and on or before	6/30/92	146			30.0%	516
Later than	6/30/92 and on or before	6/30/93	61			30.0%	670
Later than	6/30/93 and on or before	6/30/94	9			30.0%	872
Later than	6/30/94 and on or before	6/30/95	4			25.0%	1,090
		Total Known	1,634			Total Projected Claims (Approximate)	4,826

(1) To-ultimate count, along with selected non-life claim count growth factor, was selected to tie to the average non-life claims projected for the three scenarios under consideration in this paper.

Claims with DOL before 7/1/93	2,865	59%
Claims with DOL on or after 7/1/93	1,961	41%

Non-Life (exc. Non-Life Category Three Claims) **Select 65% COLA Claims; 35% Non-COLA Claims**
Non-Life Category Three Claims **Select 50% COLA and 50% Non-COLA**

Connecticut Second Injury Fund

Exhibit VIII
Sheet 1

Development of Age Distribution of Claimants Projected to Receive Lifetime Benefits

	Known Open Life Claims		Projected Distribution on New Life Claims		Combined Projected Distribution of All Anticipated Life Claims	
	Age	Observed Frequency	Age	Projected Frequency	Age	Projected Frequency
	35	8.09%	35	24.92%	35	19.87%
	40	7.43%	40	13.29%	40	11.53%
	45	11.20%	45	16.61%	45	14.99%
	50	13.64%	50	16.06%	50	15.33%
	55	14.86%	55	16.94%	55	16.32%
	60	20.29%	60	10.52%	60	13.45%
	65	14.41%	65	1.22%	65	5.18%
	70	7.98%	70	0.22%	70	2.55%
	75	2.11%	75	0.00%	75	0.63%
Weighted Average	**55**	*Weight* **30%**	**46**	*Weight* **70%**	**49**	

Connecticut Second Injury Fund

Development of Projected Bi-Weekly Distribution for Life Claims

(In July 1, 1996 dollars)

	Observed Bi-Weekly Distribution of Claims occurring after 10/1/87		Observed Bi-Weekly Distribution of Claims occurring before 10/1/87		Weighted Distribution of Bi-Weekly Wages	
	Bi-Weekly Wage	Observed Frequency	Bi-Weekly Wage	Observed Frequency	Bi-Weekly Wage	Projected Frequency
	$250	1.7%	$250	2.0%	$250	1.8%
	$500	17.0%	$500	15.7%	$500	16.6%
	$750	24.8%	$750	22.7%	$750	24.2%
	$1,000	22.9%	$1,000	27.4%	$1,000	24.3%
	$1,250	16.4%	$1,250	23.7%	$1,250	18.6%
	$1,500	10.3%	$1,500	5.3%	$1,500	8.8%
	$1,750	6.9%	$1,750	3.3%	$1,750	5.8%
		100%		100%		100%
Weighted Average	**$985**	*Weight (1)* **70%**	**$960**	*Weight (1)* **30%**	**$977**	

(1) Weight approximately based on anticipated ultimate claims' date of loss distribution

Connecticut Second Injury Fund

Development of Total Medical Payout (7/1/96 dollars) for Life Claims

			Scenarios 1 and 2		*Scenario 3*	
	Observed Medical Reserve	Observed Frequency	Developed Medical Projection	Projected Frequency	Developed Medical Projection	Projected Frequency
	$0	3.2%	$0	3.2%	$0	3.2%
	$5,000	42.3%	$7,500	42.3%	$11,250	42.3%
	$25,000	37.7%	$37,500	37.7%	$56,250	37.7%
	$50,000	8.0%	$75,000	8.0%	$112,500	8.0%
	$100,000	6.5%	$150,000	6.5%	$225,000	6.5%
	$200,000	1.3%	$300,000	1.3%	$450,000	1.3%
	$300,000	0.5%	$450,000	0.5%	$675,000	0.5%
	$400,000	0.0%	$600,000	0.0%	$900,000	0.0%
	$500,000	0.1%	$750,000	0.1%	$1,125,000	0.1%
	$540,000	0.4%	$810,000	0.4%	$1,215,000	0.4%
Expected Cost per Claim	**$28,852**	100.0%	**$43,277**	100.0%	**$64,916**	100.0%

Connecticut Second Injury Fund

Distribution of Non-Life Claims for Duration and Annual Payout

Non-Life Category One

Claims that, when transferred, are active-paying claims of the Second Injury Fund

Distributions based upon current nominal and discounted non-life reserve values

	Duration (Years)	Projected Frequency		Annual Payment (incl. Medical)	Projected Frequency
	1	8.0%		$2,500	5.2%
	2	1.9%		$7,500	7.6%
	4	14.0%		$12,500	8.5%
	8	25.7%		$17,500	10.5%
	13	18.2%		$22,500	12.1%
	18	13.1%		$27,500	11.1%
	23	8.9%		$32,500	9.2%
	28	5.2%		$37,500	9.7%
	33	2.4%		$42,500	7.9%
	38	1.6%		$47,500	4.1%
	43	1.0%		$52,500	1.6%
				$60,000	12.6%
Average	12.81	100.0%		$29,689	100.0%
Expected Loss in this Category (7/1/96 dollars)			380,363		

Connecticut Second Injury Fund

Distribution of Non-Life Claims for Duration and Annual Payout

Non-Life Category Two

Claims that are not active-paying claims of the Second Injury Fund, but have a high likelihood that payments will be made on such claims in the future

Distributions based upon current non-life nominal and discounted reserves values

	Duration (Years)	Projected Frequency		Annual Payment (incl. Medical)	Projected Frequency
	1	27.0%		$2,500	15.6%
	2	7.1%		$7,500	11.1%
	4	28.4%		$12,500	11.6%
	8	20.3%		$17,500	11.8%
	13	8.8%		$22,500	11.8%
	18	3.9%		$27,500	10.1%
	23	1.8%		$32,500	7.5%
	28	1.3%		$37,500	4.5%
	33	0.8%		$42,500	3.3%
	38	0.2%		$47,500	1.8%
	43	0.2%		$52,500	2.0%
				$60,000	9.0%
Average	6.22	99.7%		$22,977	100.0%

Expected Loss in this Category (7/1/96 dollars) 142,838

Connecticut Second Injury Fund

Distribution of Non-Life Claims for Duration and Annual Payout

Non-Life Category Three

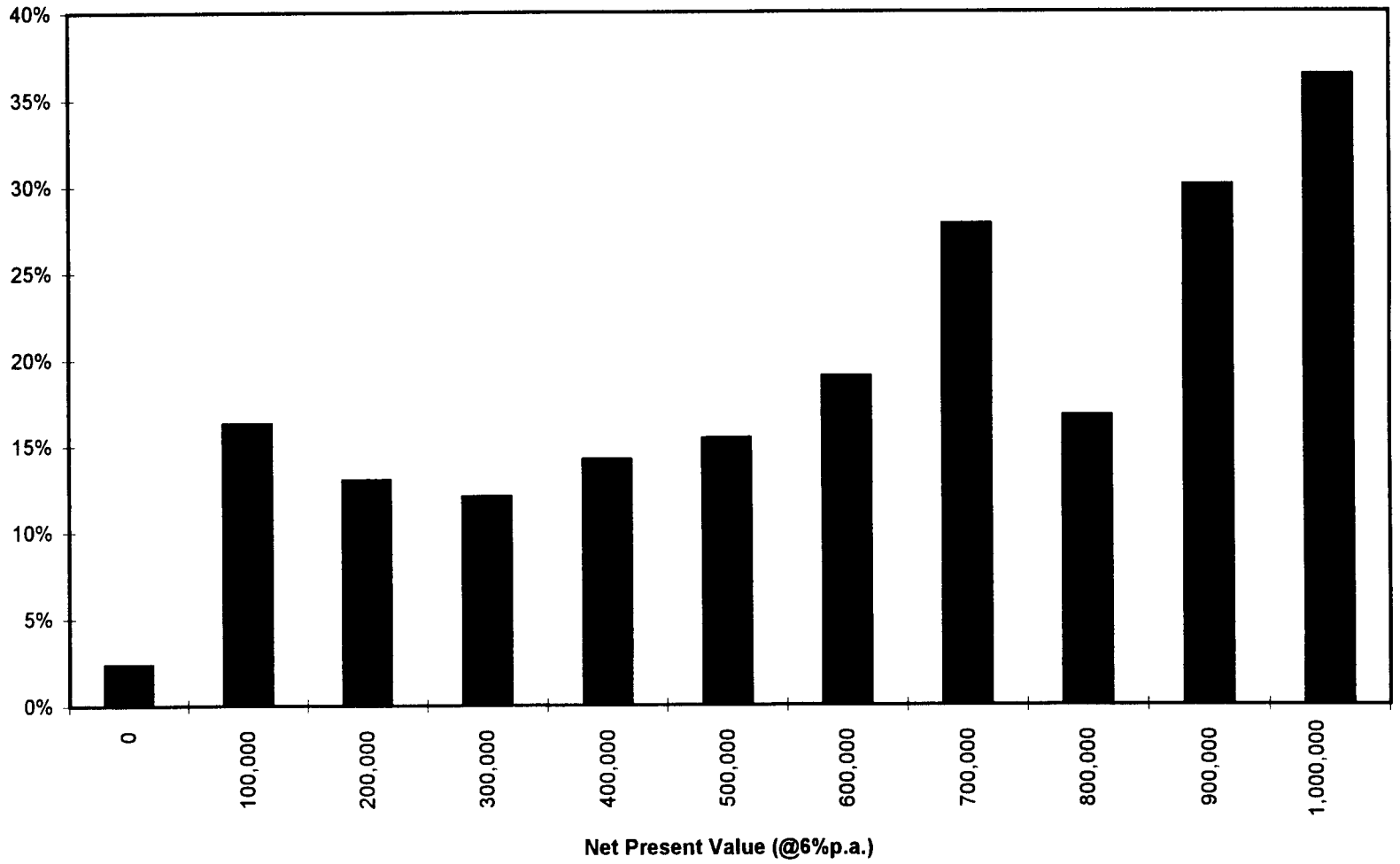
Claims that are not active-paying claims of the Second Injury Fund, but are likely to result in insurance company reimbursement, or to be of short duration

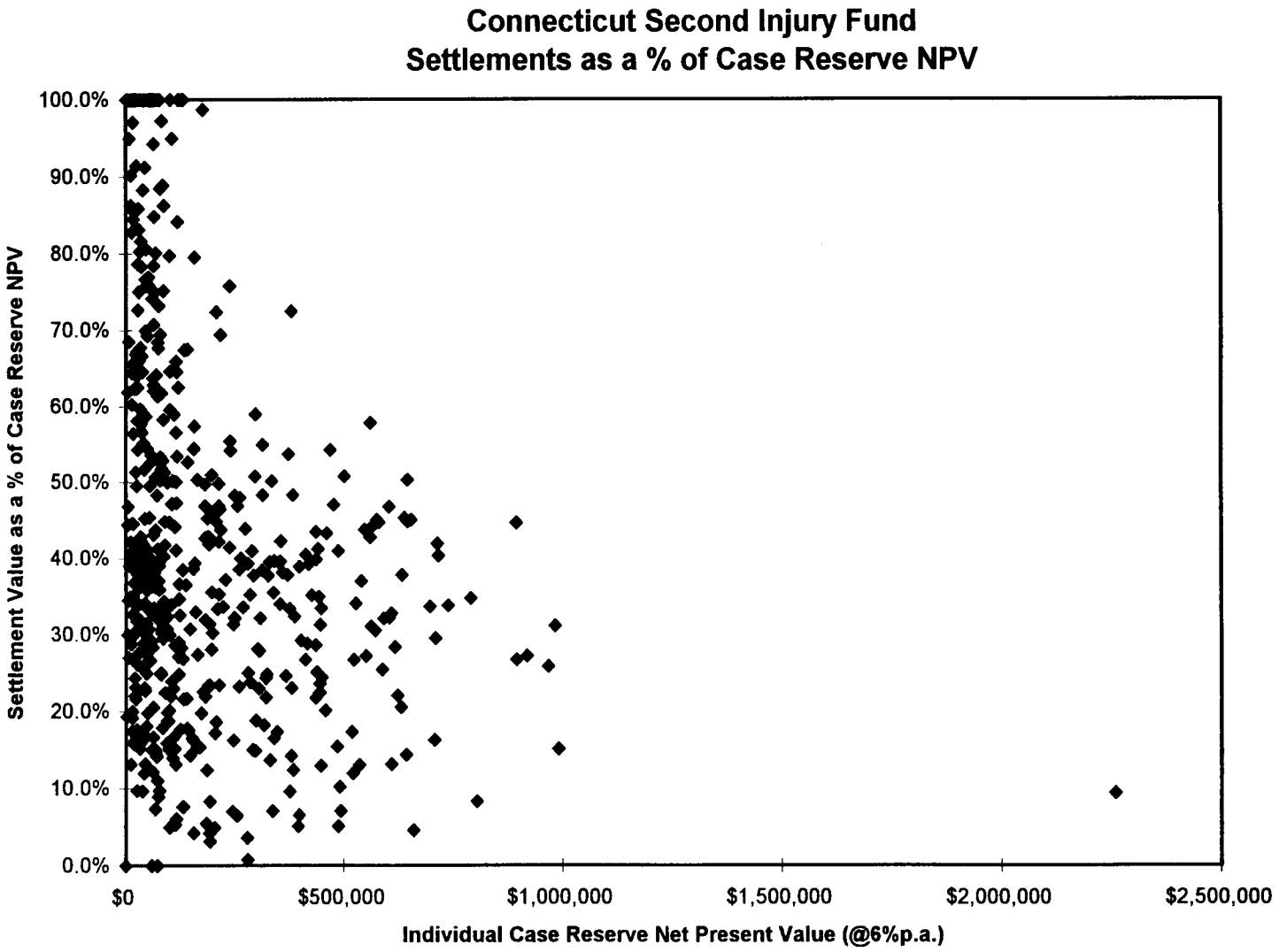
Distributions based upon Non-Life Category Two Annual Payment Distribution, and the claim review opinion on pending cases

Duration (Years)	Projected Frequency	Annual Payment (incl. Medical)	Projected Frequency
1	25.0%	$2,500	15.6%
2	25.0%	$7,500	11.1%
4	25.0%	$12,500	11.6%
8	25.0%	$17,500	11.8%
		$22,500	11.8%
		$27,500	10.1%
		$32,500	7.5%
		$37,500	4.5%
		$42,500	3.3%
		$47,500	1.8%
		$52,500	2.0%
		$60,000	9.0%
Average			
3.75	100.0%	$22,977	100.0%

Expected Loss in this Category (7/1/96 dollars) 86,164

Connecticut Second Injury Fund
Percentage of Reserved Claims Settled by NPV Size




Connecticut Second Injury Fund
Settlements as a % of Case Reserve NPV
Settlement Value as a % of Case Reserve NPV
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
$0
$500,000
$1,000,000
$1,500,000
$2,000,000
$2,500,000
Individual Case Reserve Net Present Value (@6%p.a.)

Connecticut Second Injury Fund

Model Sensivity of Nominal and Discounted Liability from Parameters in Base-line Scenario

Stipulation Count

Base-line Scenario: Expected:

	Count	Nominal Liability	Discounted Liability (1)
Total	6,256	1,493,122,516	675,365,496

Revised Base-line Scenario: Decrease stipulation count from 70% to 60%

	Count	Nominal Liability	Discounted Liability
Total	6,256	1,826,091,972	770,401,981

Change in Base-line Scenario due to stipulation count decrease

	Count	Nominal Liability	Discounted Liability
Total	0	332,969,456	95,036,485
Increase		22.3%	14.1%

(1) @ 6% p.a.

Connecticut Second Injury Fund

Exhibit XII

Developing the Stipulation Count Activity by Fiscal Year: Differentiating Between Scenarios

Percentage of Ultimate Claims that are Stipulated By Fiscal Year

Category	1997	1998	1999	No Stipulation
Base-line	30%	25%	15%	30%
2	10%	15%	20%	55%
3	20%	15%	5%	60%

Connecticut Second Injury Fund

Exhibit XIII

Development of Life Claim Stipulation Value Percentage

Base-line Scenario

Step 1. Determine the projected distribution of stipulation value to net present value of SIF's case life reserves

Percentage of Stip Value to NPV Case	Observed Count	Observed Frequency
0%	4	3.0%
2.5%	5	3.8%
7.5%	6	4.5%
12.5%	5	3.8%
17.5%	8	6.1%
22.5%	11	8.3%
27.5%	14	10.6%
32.5%	11	8.3%
37.5%	18	13.6%
42.5%	14	10.6%
47.5%	15	11.4%
52.5%	10	7.6%
57.5%	2	1.5%
62.5%	4	3.0%
67.5%	1	0.8%
72.5%	1	0.8%
77.5%	1	0.8%
82.5%	0	0.0%
87.5%	1	0.8%
92.5%	1	0.8%
97.5%	0	0.0%
Total Count	132	**32%** (Actual)

Connecticut Second Injury Fund

Development of Life Claim Stipulation Value Percentage

Base-line Scenario

2. Adjust expected stipulation value to reflect the actuarial model's difference in computing life claims' severities.

(a) Non-COLA Claims

	Nominal	Discounted (2)	Ratio of Disc. to Nom.
Actual Case	$580,517	$314,654	54.2%
Model's Case (1)	$751,862	$372,545	49.5%

Compute the New Stipulation Average, taking into account the relationships between the actual reserve and model's nominal and discounted reserve:

(a) Actual Case Ratio of Disc. to Nominal/Model's Case Ratio of Disc. to Nominal	1.094
(b) Ratio of Actual Case Nominal to Model's Case Nominal	0.772
(c) Stipulation Amount on Actual Discounted Case	32%
(d) Adjusted Average Stipulation Amount on Model Discounted Case ((a)*(b)*(c))	27%

Select Uniform Distribution Between 18% and 38% on Model's Non-COLA Claims

(1) The calculations above use the same age/biweekly age/medical information as is reflected in the case reserves
(2) @ 6% p.a.

Connecticut Second Injury Fund

Development of Life Claim Stipulation Value Percentage

Base-line Scenario

2, (continued). Adjust expected stipulation value to reflect the actuarial model's difference in computing life claims' severities.

(b) COLA Claims	Nominal	Discounted (2)	Ratio of Disc. to Nom.
Actual Case	$580,517	$314,654	54.2%
Model's Case (1)	$1,820,925	$628,639	34.5%

Compute the New Stipulation Average, taking into account the relationships between the actual reserve and model's nominal and discounted reserve:

(a) Actual Case Ratio of Disc. to Nominal/Model's Case Ratio of Disc. to Nominal	1.570
(b) Ratio of Actual Case Nominal to Model's Case Nominal	0.319
(c) Stipulation Amount on Actual Discounted Case	32%
(d) Adjusted Average Stipulation Amount on Model Discounted Case ((a)*(b)*(c))	16%

Select Uniform Distribution Between 10% and 26% on Model's COLA Claims

(1) The calculations above use the same age/biweekly age/medical information as is reflected in the case reserves
(2) @6% p.a.

Connecticut Second Injury Fund

Exhibit XV

Development of Non-Life Stipulation Value Percentage

Base-line Scenario

Determining the projected distribution of stipulation value to net present value of SIF's case non-life reserves

Percentage of Stip Value to NPV Case	Observed Count	Observed Frequency
0%	2	1.5%
2.5%	5	3.8%
7.5%	15	11.4%
12.5%	19	14.4%
17.5%	37	28.0%
22.5%	27	20.5%
27.5%	29	22.0%
32.5%	45	34.1%
37.5%	37	28.0%
42.5%	33	25.0%
47.5%	12	9.1%
52.5%	20	15.2%
57.5%	14	10.6%
62.5%	14	10.6%
67.5%	15	11.4%
72.5%	7	5.3%
77.5%	10	7.6%
82.5%	9	6.8%
87.5%	6	4.5%
92.5%	5	3.8%
97.5%	7	5.3%
Total Count	368	**38%**

Select Uniform Distribution Between 18% and 58% on Model

Developing the Stipulation Value Range: Differentiating Between Scenarios

Life Claims

Non-COLA Claims

Category	Range (as a % of disc. model severity)	(Average as a % of Disc. Model Severity)	(Avg. as a % of Actual Disc. Case Severity)
Baseline	Between 18% and 38%	28%	33%
2	Between 28% and 48%	38%	45%
3	Between 32% and 52%	42%	50%

COLA Claims

Category	Range (as a % of disc. model severity)	(Average as a % of Disc. Model Severity)	(Avg. as a % of Actual Disc. Case Severity)
Baseline	Between 10% and 26%	18%	36%
2	Between 15% and 30%	23%	45%
3	Between 17% and 33%	25%	50%

All Non-Life Claim Categories

Category	Range (as a % of disc. model severity)	(Average as a % of Disc. Model Severity)	(Avg. as a % of Actual Disc. Case Severity)
Baseline	Between 18% and 58%	38%	38%
2	Between 18% and 58%	38%	38%
3	Between 40% and 60%	50%	50%

N.B. Discounted severities are @ 6% p.a.

Connecticut Second Injury Fund

Model Sensivity of Nominal and Discounted Liability from Parameters in Base-line Scenario

Stipulation Value

Base-line Scenario: Expected:

	Count	Nominal Liability	Discounted Liability (1)
Total	6,256	1,493,122,516	675,365,496

Revised Base-line Scenario: Increase stipulation value from 35% to 40% of Net Present Value of Reserve

	Count	Nominal Liability	Discounted Liability
Total-Using Projected	6,256	1,519,998,722	701,029,385

Change in Base-line Scenario due to stipulation count decrease

	Count	Nominal Liability	Discounted Liability
Total	0	26,876,205	25,663,889
Increase		1.8%	3.8%

(1) @ 6% p.a.

Connecticut Second Injury Fund
Claims-Paying Delay Distributions Used In Actuarial Model

Life Claims
All Scenarios

Delay (yrs)	Probability
0	40%
1	15%
2	15%
3	10%
4	10%
5	10%

Non-Life Category One
Scenarios 1 and 2

Delay (yrs)	Probability
0	20%
1	20%
2	20%
3	15%
4	15%
5	10%

Scenario 3

Delay (yrs)	Probability
0	10%
1	25%
2	25%
3	15%
4	15%
5	10%

Non-Life Category Two
All Scenarios

Delay (yrs)	Probability
0	10%
1	20%
2	20%
3	20%
4	15%
5	15%

Non-Life Category 3
All Scenarios

Delay (yrs)	Probability
0	0%
1	15%
2	25%
3	20%
4	20%
5	20%

Exhibit XIX

Connecticut Second Injury Fund

(Excludes Administrative Costs and Ancillary Statutes)

Valuating the Loss Portfolio as of Beginning of Fiscal Year 1997

	Baseline	Scenario 2	Scenario 3
Ultimate Claim Count	6,256	6,829	7,423
Ultimate Nominal Value	1,493,122,516	2,613,072,285	3,199,068,428
Ultimate Present Value	675,365,496	1,023,990,931	1,280,220,427

	Projected Payments by Fiscal Year (10 Years out, only)		
Fiscal Year			
1997	133,920,735	106,731,123	183,362,292
1998	134,484,823	114,453,568	129,999,935
1999	90,230,740	132,286,820	143,488,252
2000	33,333,694	63,901,517	86,026,511
2001	34,498,168	69,685,816	91,764,184
2002	38,172,793	79,241,020	103,457,743
2003	30,404,988	66,629,258	80,112,067
2004	28,836,429	62,532,562	74,684,178
2005	27,817,980	61,246,354	72,955,251
2006	26,053,704	56,051,071	66,905,970

N.B. NPV @ 6% p.a.