1987 VALUATION ACTUARY
SYMPOSIUM PROCEEDINGS

SESSION 4A

CASE STUDY USING CASH FLOW ANALYSIS

(TEACHING SESSION)

GENERAL COMMENTS

MS. DONNA R. CLAIRE: It's hard to believe that Regulation 126, barely started just two years ago, is now one of the most famous (or infamous) regulations going. For the benefit of those not familiar with the regulation, it requires actuarial opinions and memoranda to be prepared when certifying as to the asset/liability management of all annuities, GICs, and related products. If such documentation is not submitted by a company which is doing business or which is an authorized reinsurer in New York, additional reserve's liabilities have to be set up. These additional reserves would be 15 to 20% of the otherwise minimum reserves allowed by law. Year end 1986 was the first shakedown of the regulation and I congratulate the insurance companies, especially those in the New York State Insurance Department, for surviving this first year. Warning: Just when you thought you understood what was happening, a new law was passed in 1987 expanding the coverage of Regulation 126. I'll talk more about that later.

About 60% of the companies which do business or are authorized reinsurers in New York chose not to file an opinion at the end of 1986, and instead held the penalty reserves which at that time were

only 5% of the otherwise minimum reserves. Several insurance companies' opinions were rejected, and a number of other insurance companies received letters from the insurance department questioning various aspects of the opinion.

The length of the opinions that were received ranged from several pages to a little over three hundred pages, with an average submission at about 75 pages. Because of this volume, some of the actuarial memoranda were not read until a couple of months later. I congratulate both Robert J. Callaghan and, his assistant in this area, Peter Smith, for surviving the task of going through all of this paper.

I will be speaking from a sample actuarial opinion and memoranda on the business that we have been discussing, on the Single Premium Deferred Annuities (SPDA) side only, considering the regulation does not cover universal life. This sample opinion looks wonderful, because two of the premier consulting firms, Milliman, Robertson & Tillinghast had a hand in it; however, this also makes it a fairly boring opinion and memoranda to discuss in that everything was properly done. Therefore, I'd like to spend time on some of the areas of concern to the New York State Insurance Department.

TEN AREAS OF CONCERN

In talking to the New York State Insurance Department, there were ten areas of general concern which they have looked at in 1987. The

first area was that of completeness. For the opinion, one had to include all appropriate types of business. For 1986, that meant all 1986 business, for 1987, that means 1986 and 1987 business, and any business on which a high interest rate had been used, which means that anything on a change in fund basis should be covered as well as anything covered by Old Circular Letter 33. By 1988, all business written in 1982 and later must be included, and under the new law, by 1989, all annuity and related business must be covered by the actuarial opinion and memorandum. The products to be covered include the deferred and immediate annuities, the GICs, and supplementary contracts, which involve life contingencies or provide substantial interest guarantees. Funding agreements, deposit administration contracts, lotteries, structured settlements, and any annuities or annuity type products with substantial interest guarantees should be included no matter where they appear in the annual statement.

Some companies have wondered whether the present regulation would allow pre-1982 business to be included with post-1981 business. The answer is yes. In fact, the pre-1982 business may contain some margins which can be used for the post-1981 business. This of course only applies until 1989, after which all businesses have to be covered.

A second area of concern is that of calls and prepayments on assets. Most assets do have some sort of prepayment provision. If that information was not included in your investment information it is not

because there were no calls or prepayments, it is probably because the investment department forgot to include it. I strongly urge you to check with your investment department or whichever investment firm you are dealing with as to the call provision on your bonds for the prepayment provision on your mortgages. It makes a substantial difference in your results if prepayments are modeled: It makes results which are a lot more accurate look a lot worse in low interest rate environments, where the prepayments will occur, to have the proper prepayment provisions in.

The third area of concern to the New York State Department of Insurance is that a number of companies assumed that there would be absolutely no defaults. This is an unrealistic assumption regardless of the quality of assets you have unless they happen to be in all treasury issues. Some companies argue that there is no need to have a separate default charge because the Mandatory Securities Valuation Reserves (MSVR) will cover any defaults. One problem is that some companies, in their testing, neglected to do any subtractions for yearly contributions to the MSVR. A second problem with this is that the MSVR is viewed by many as a surplus item rather than as a true liability. A third problem is that there is no specific MSVR for commercial mortgages and real estate.

One possible solution to this is to treat the contribution to the MSVR and an equivalent contribution for types of assets not covered by the MSVR as annual expense charges for the replacement of any defaulting

assets, as well as to build a separate reserve such as the MSVR deferred for future defaults. If there is an explicit provision for defaults in the interest rate reduction in both interest and principal, then the assets belonging to the MSVR of equivalent reserve can be used in the projection, but the Insurance Department suggests that such assets be used only to the extent that the present value of assets from the MSVR equal the amount needed to cover default.

Roughly translated, the contribution to the MSVR and related reserves should only be used to support the C-1 risk. If the MSVR is included, defaults must be modeled in the testing. It is probably easier to treat the deduction needed for default as an expense charge. A reduction equal to the amount needed for the MSVR is probably a reasonably conservative figure for most assets; for commercial mortgages, deductions should be the same as similarly rated bonds.

For junk bonds, the Regulation 126 suggests a 2.5% annual deduction from the principal; this is probably reasonable since the factor is in line with the annual contribution to the MSVR of 2% for most junk bonds. There has been a question as to whether the default rate should vary with the scenario. The answer is probably yes as more defaults occur in very high interest environments.

The fourth area of major concern to the New York State Insurance Department was the very low surrender percentages that a number of companies used for modeling their SPDA. For example, one company

assumed that under virtually all economic environments only 5% of the people will surrender each year, with the maximum lapse rates of 15%. This is probably unrealistic. The last few years' interest rates have trended down, which have caused very low surrender percentages in most companies. However, one of these days rates are going to go back up. There were a number of companies in the SPDA market which sold policies in the 1970s, which experienced 50% and 60% surrenders when the interest rate peaked in 1980 and 1981. This really should be the types of maximum surrenders you should be looking at if the environment turns very much against you. In certain environments high lapses may not hurt you because of the surrender charges, however, sensitivity analysis is needed in order to prove this out.

Among the characteristics of the business that may make you more vulnerable to surrenders are loyalty of the agents, and a lack of surrender charges. Also, the SPDA business which has been sold is for the most part fairly new business (within the last one to eight years). The average age of people buying annuities is in their fifties, so if you do not have explicit maturity assumptions built in, you should, and your lapse function should reflect the maturing of the business which will increase the demand for cash.

The fifth issue which the Insurance Department noticed was that a number of companies did not reflect taxes in their test. The regulation specifically calls for this. The best way to reflect taxes is to do

it the same way that taxes are actually allocated to your product. Most companies treat each product line like a separate company in allocating taxes. This creates the possibility of negative taxes in the early years of a product when the net gain from operations is probably negative. If your company allocates negative taxes, it is probably reasonable to take the negative tax credit while doing modeling. If your company does not give the tax advantage to the negative tax-payers, it should not be reflected in the modeling. Taxes become more important when modeling long-term products such as structured settlements in which the taxes may become more substantial. Mutual companies should reflect surplus tax, since many of the scenarios tested are probably accumulating surplus. This makes the modeling more complicated. When we were coming up with Case Study Life's results we solved this problem by making Case Study Life a stock company so we did not have to calculate surplus taxes.

Reflecting surplus taxes is somewhat an issue related to how complicated your program is and how surplus taxes are viewed by your company. One caveat: It is probably not that accurate to assume that your negative tax benefits offset your positive tax benefits to the extent that you won't have to model taxes. The taxes paid will have different impacts under different economic scenarios.

The sixth area that the Insurance Department noticed was the communication between the actuary and investment department. In the past few years, the investment and pricing people got together; however,

the valuation people are still out in left field in many companies. It would be better for the valuation people to be in on the discussions of assets so that they will not discover any problems caused by the investments at year end, but can contribute their input as the assets are being bought. In some cases it appears that the chief investment officer had provided the entire asset and investment cash flow information while not consulting the actuary. Some actuaries may have taken the information from the investment department and plugged it into the model to come up with results. However, one of the purposes of Regulation 126 is to increase the communication between the valuation pricing and investment people. To have these people working separately results in many models being produced, but it does not show that the business is being run properly. First, I recommend that the valuation people communicate with the investment people and pricing people. Second, I recommend that in your actuarial memoranda you mention the way this communication takes place, for example, in formal meetings twice a month wherein information is exchanged between the various areas, with more frequent telephone calls as necessary on specific investment and liability questions.

The seventh area of concern to the Insurance Department is the length of the projections. This is especially important where aggregate reserves are being used. The Department would like to see the shortest meaningful period for reserves. For the GICs and the SPDA, this probably means 5 to 10 years, while for structured settlements this may mean 30 to 40 years. It is not very informative to the Department

to show the GICs and structured settlements aggregated to the end of a certain period, such as 20 years.

The Insurance Department would like to see the results of business at the end of 5 and 10 years since these numbers may have more meaning because the asset currently being held may still be around at that time. However, I also think it's important with a business such as structured settlements, where you've guaranteed payments for up to 100 years or so, to also project the business to the end of the period in which the majority of the liabilities run out. Many of the structured settlement contracts that are currently being written have substantial interest guarantees going out a number of years, and it is quite possible that the reserve levels may not be adequate under that business. I recommend that the insurance cash flows on different types of products be shown separate if you are offsetting reserves between two products; it would be more useful to the Insurance Department to show the more than adequate reserve on one product offsetting the inadequate reserve on the other product.

The eighth area in which the Insurance Department would like to see more work involves the use of varying yield curves. This could be a separate test, or within the scenarios you could have variances in the yield curves. Right now, maybe 50% of the companies have totally ignored the yield curve question, even though yield curves may have a fairly substantial impact on such businesses as the SPDA.

The ninth concern involves the most common reason opinions were rejected. It is required that assets used in the calculation to be equal to or less than the actual reserve being held. However, there were several companies which also included some surplus in their testing of the reserve adequacy. Again, the point is to have the present value of the liabilities adequately covered by reserves. Surplus should be limited to covering unexpected occurrences or occurrences somewhere between the reasonable and plausible scenarios, but should not be used to cover expected liabilities.

The last issue the Insurance Department raised was reinsurance. This is probably one of the toughest issues to cover. The general feeling of the Department is that whoever has the investment risk should recognize the liabilities. This has presented a problem for some reinsurers since their clients may not have needed to comply with the New York requirements, and therefore the reinsurers did not get the information regarding the cash flow that they needed in the form that they needed it. I recommend that reinsurance agreements include the information necessary to do the New York Regulation 126 testing and that such information be given to the reinsurer on a yearly basis.

EXAMPLES OF BAD OPINIONS AND MEMORANDA

Now let me go through some examples of things that shouldn't be done in actuarial opinions and memoranda that were submitted to New York. In all these examples, companies will remain nameless since my purpose

is not to find fault with specific companies but to suggest ways to get a better handle on what you really should do. Of course another important reason is that I don't want to be sued for libel. Let me go through an example of a bad actuarial opinion and memorandum.

The actuary submitting this opinion is not an FSA, but instead took his exams in a foreign country. He is not a Member of the American Academy of Actuaries because he is politically opposed to it. Because of both of these factors, the New York State Insurance Department would like to examine more closely the qualifications of the actuary. However (and this is based on an actual case), the actuary did not file a letter outlining his qualifications prior to filing the actual opinion and memoranda, and thus caused a delay in the state certification of reserve adequacy for the company.

A similar problem that has occurred is stated in the second part of the first paragraph of Bad Example's submission. The paragraph stated that the actuary will be appointed by the Board of the insurance company at the March or April 1987 Board meeting, however, the actuarial documents were filed before that time. One really should be appointed by the Board before signing the actuarial opinion. Because of the timing this year it was presumed that appointment by the Board was a problem in terms of getting the things to the Board, but as far as I know, no opinion was rejected because of this. Anyone who is going to be signing opinions in 1987 should try to have Board approval of their appointment sometime before filing.

The question is what products were covered by the actuarial opinion? In this company the actuarial opinion covered 1986 issues of group guaranteed interest contracts, structured settlements and the SPDA. However, (and you can't tell this from the actuarial opinion or memorandum) they were also holding the lower reserves or using the higher interest rates on all issues from 1982 and later. Regulation 126 replaces the old Circular Letter 33 on this subject so that any high interest reserves must be covered by the actuarial opinion. The second area in which mistakes have been made is supplementary contracts. Supplementary contracts with or without life contingencies which have any interest guarantees, have to be covered by the opinion.

The next problem with the actuarial opinions that I've seen regards reliance on others. A number of companies relied on their chief investment officer or someone in their investment department to provide some or all of the asset information. However, the Insurance Department was not able to tell the frequency of interaction between the valuation and investment people and how thoroughly the investment department really looked at the data. This again didn't cause any opinions to be rejected, but probably a couple of you got a letter asking for further details. In order to avoid this, have the investment officer write down the things you relied on him for and keep this letter on file in case you're called in. State in the actual opinion or memorandum that this letter is on file. It would be helpful to tell the Insurance Department about the frequency of meetings

between the actuaries and the investment people. An answer of zero is not going to be a very popular one.

There were several cases in which questions were raised as to whether major changes took place between December 31, 1986 and the date. In filing the opinion, some major changes would include having the company bought out, buying out another company, or having major defaults in a portion of the assets. The valuation actuary's job is yearround job, and if something major does happen within the year, the valuation actuary should be aware of the impact it may have on the level or reserves needed.

THE ACTUARIAL MEMORANDUM

One of the big problems with the memoranda from a couple companies was that they didn't say enough. Basically, from the memorandum no one could really judge whether the reserves were sufficient. If getting information on reserves raises the issue of a company's confidentiality, companies can request that the actual memorandum itself become a confidential document.

Product descriptions should be extensive enough to present a clear picture of the risks involved in the product. These descriptions should go into the interest crediting strategy, surrender charges, and any possible open windows on the GICs, and so forth.

When describing the interest crediting philosophy, test the crediting philosophy the company is actually using, not the one which, as one company calls its reasonably optimistic assumption for margins which were used in pricing, but the interest crediting philosophy strategy that is used to set the competitive rates. If at the end of the year on your SPDA you have 25 basis point margin between earned and credited rates, use that in your testing: Do not assume that on January 1, 1987 you'll hold a 200 basis point margin and the reserves would then be adequate.

Another problem involves the assets used in relation to the reserves. Bad Example Life did a few things wrong. Similar to one company which had their opinion rejected, they did the testing using "assets in the line," and the "assets in the line" included surplus. All that is being tested is the adequacy of reserves. You don't want to include surplus because surplus has this terrible tendency of being spent for such things as stockholder dividends, new subsidiaries, pensions, and salary bonuses, and so on. Like some other companies, Bad Example Life counted the MSVR in its reserves. Again, it is probably all right to use the MSVR if you're also modeling the C-1 risk, but those two should be offset. It is probably easier to use the MSVR as a deduction, like an expense charge, and not necessarily do any additional modeling for defaults. Again, the MSVR only covers bonds. If your company has mortgages and real estate, those would also need to have a deduction for the C-1 risk.

Another question that companies face is which assets to choose for the testing. The assets that should be chosen are those used to back the products. If you are on a segmented basis, it's the assets in the segmented portfolio. If it's not, it should be the prorated share of all assets of the company. Again, you should be consistent with the investment philosophy of the company which is filed with your state insurance departments. Bad Example Life showed that all their assets were 5-year bonds. This result probably followed from one of two assumptions: Either they made up the assets completely, or they picked the most appropriate assets from their current pool of assets. Neither is acceptable.

Even if you do have a segmented portfolio, many times the dedicated assets are somewhat less than the reserves, with the rest of the money from the reserve coming from corporate type assets. If it's not that much money, say 5 or 10% of your portfolio, you're probably okay using some simplifying assumption as to these assets. One company, for example, assumes that these unspecified assets are all in the short-term account. If, however, it is a larger amount of your asset that backs the reserve, a more thorough study should be done to determine a more appropriate assumption as to how much can be expected to be earned from these assets. For example, if the assets are in the common stock of a subsidiary, the cash flow for that is probably expected to be low or zero for a number of years before the subsidiary returns anything to the parent. If this is the case, the cash flow should also be zero for that period of years.

Another principle should be that the more uncertain the cash flow from the assets is, the more conservative you should be with your projection of the future investment cash flow. This would apply to assets such as real estate, junk bonds or agricultural mortgages.

The most accurate way to project investment cash flow is to model each asset separately; this is the suggested method if you don't have that many assets. If you do have a number of assets and lack the computer capacity to model them separately, some combining of the assets can be done; however, do not reduce your modeling to a point where the results are suspect. Bad Example Life's portfolio of all 5-year bonds did not appear to have any great relationship to what they were actually invested in according to their NAIC Annual Statement Schedules. This is not a recommended approach.

Bad Example Life and a number of other companies did their analysis assuming no calls or prepayments. This may be valid if you're investing all in new 5-year bonds, but other than that, it is doubtful that this is the real case. It is one of the areas that the Insurance Department has been looking at closely.

For prospecting insurance cash flows, Bad Example Life here used what several other companies used on their SPDA in terms of lapse rates. Right now, the lapses that companies are experiencing are probably very low. This is reasonable because interest rates since the early 1980 rates have generally trended downward. However, this

downward trend will not always be the case. I would strongly recommend using formulas such as Gregory D. Jacobs and Douglas C. Doll have discussed in Cash Flow Analysis Techniques to model your lapses. As I mentioned before, in real life, as with a number of companies who lived through the 1980s know, ties lapse percentage could be 50 to 60% or more on the SPDA.

A number of companies like Bad Example Life, which modeled the SPDA in structured settlements, and other businesses where mortality is a much more important factor, did not test variances in mortality. This should be done by the qualified actuary.

Taxes were ignored by Bad Example Life and a number of other companies. This should not be the case. The most accurate way to model is to determine the actual federal income tax to be paid on the products; if this proves to be extremely difficult, a shortcut may be to treat the federal income tax as an interest rate hold back.

Bad Example Life and several other companies did not do testing of yield curves. This is important on the SPDA and the GICs in order to model surrenders. Testing is also needed on flexible payment products in order to determine how much new premium would be coming in. If your credited rate is dependent on longer assets, surrenders may increase and renewal considerations decrease in an environment where the yield curve is inverted.

Bad Example Life also started their variations in interest rates not in 1987 but in 1988 presuming that they could successfully predict the interest rates for 1987 considering that they were already two months into that year. This is not the correct approach considering the variation in interest rates that has occurred in the single year. For example, in 1986 alone, the interest rates dropped by over 300 basis points. If you assume that, should the first year have a steady interest rate, you will alleviate some of the possible adverse deviations in future interest changes, but this should not be done.

Another thing Bad Example Life, and unfortunately some real companies did, was to take assets greater than the reserves and then offset that by assuming that they'd borrowed or had negative assets so that the total assets would equal the reserves. On the surface, this doesn't appear to be a bad assumption. However, what happened was that Bad Example Life invested in long assets and assumed that they could borrow at the short-term asset rate, so of course the overall result was that they were earning more money. The more they borrowed in the normal yield environment, the better the picture was, but this is not the correct way to model.

Bad Example Life just showed the results at the end of twenty years on all their businesses. This is probably too long a period on the GICs and the SPDA. For those products, it would be very useful to show at least 10-year results, since many of the in force contracts will no longer be around after a 10-year period, so some of the changes

between years 10 and 20 may be spurious. For the structured settlements, 20-year results should be shown, but showing only 20 years may not be enough. The reason is that a number of companies in this market have made guarantees going up to a hundred years. The assets run out after 20 years or less. Depending on the economic environment, the results could be substantially different in terms of the reserves needed; therefore, the tests should probably extend beyond 20 years.

When modeling structured settlements, Bad Example Life assumed level payouts. Many structured settlements have lump sum payments at the end of, for example, 5, 10, 15 and 20 years. The law states that if these payments are more than 10% on an aggregate basis or 15% on a seriatim basis, these extra payouts should be treated as deferred annuities and reserved for accordingly.

Bad Example Life and a company that got its opinion rejected assumed at the end of 20 years that the reserves calculated at the original issue year interest rate (which in 1986 was 9.25%) was the rate used to determine the present value of the liabilities after the 20-year period. This does not make sense. If the economic environment that actually exists in 20 years is 4%, to be able to calculate the present value of future assets at 4% and the remaining liabilities at 9.25% is extremely misleading, since you get a much lower number on the reserves needed. Therefore, if a company is in the structured settlement market, and is showing the results at the end of twenty

years, the proper number for the present value of liabilities is found by discounting the future benefit stream at the interest environment in effect at that time.

Another issue the Insurance Department has been struggling with is reinsurance. Bad Example Life just states that XYZ Insurance Company has reinsured some of their annuities with them and states that no further testing was done, since XYZ was not a New York domiciled company. This does not matter; the authorized reinsurer is required to file in New York. They must get the information needed to certify the reserves that they are holding on annuities even though XYZ would not have to file a similar statement.

PROBLEM WITH CAPITAL GAINS

Many companies took capital gains in 1986. Some of it was deliberate; much of it was because callable and prepayable assets got called and prepaid. Warning: If you did not transfer some of those gains to reserves, you may find out that assets would be inadequate in future years (especially for contracts with long guarantees such as the SPDA) because assets backing these reserves are earning less money than originally predicted. For example, if you had a $100 million earning over 12% backing your Immediate Annuity Line, you may now need $120 million in new assets if they were earning 10% to back this line.

Some companies are holding 13.25% reserves on Single Payment

Immediate Annuities. It is unusual if you have enough high-yielding assets to support those rates. Therefore, these reserves should be examined for adequacy. It is still possible that aggregating these reserves with others will allow the company to continue holding 13.25% reserves on some issues, but it does merit some research.

CHANGES IN REGULATION 126

There will be some modifications to Regulation 126. A law passed in 1987 makes some changes. One change requires all annuity business to be included in actuarial opinions and memoranda by 1989. Another change requires getting rid of the requirement for Macaulay Duration testing in 1989 and later. The third, and perhaps most substantial change, is to bring interest sensitive single premium life insurance issued after 1982 under the same law as annuity products. There may be changes in such areas as treatment of quality of assets, economic scenarios, lapse assumptions, and reserving for structured settlements.

Two groups have been set up -- one to examine the changes needed in Regulation 126 for annuities and the GICs, and another to establish the rules needed for Single Premium Life Insurance.

Both groups met for the first time recently and some pretty lively discussion ensued. We are hoping to have our work complete by year end. These are the advisory groups to the New York Insurance

Department, which consist of people from companies both inside and outside of New York. The Insurance Department will of course have the final say in what the regulation will look like. We will try to keep you informed as to the progress of these regulations.