

**1996 VALUATION ACTUARY
SYMPOSIUM PROCEEDINGS**

SESSION 8

Sources of Profit Statements

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MR. ROBERT J. LALONDE: I am going to be the moderator for this session entitled, Sources of Profit Statements. I am pleased to have some very competent people as our speakers. All of these people have been working on source of earnings (SOE) projects in their own company. This will be an opportunity to hear their thoughts and find out about the kind of things they have been addressing in their projects. Ken Klinger is with CNA. Yiji Starr is with Metropolitan Life and has been working on SOE from an international point of view. David Ricci is with Life Re and will talk about SOE from a reinsurance company's point of view. Let me turn it over to Ken to start us off.

MR. KENNETH A. KLINGER: I would like to share some of the experiences we have had at CNA in trying to implement SOE reporting. I will start out with a bit of a sales pitch as to why I think you will find SOE valuable in your company. As background, let me explain the area I work in. We are the life and health financial actuarial area in the company. CNA writes a large variety of different products through both its casualty and life companies. The casualty company writes group medical, long-term disability, and individual long-term-care insurance. In the life company, we write a fair amount of group business, as well as individual universal life, and lately, term insurance. Of course, the financial accounting statement presentation is quite different for different companies and different products.

One of our areas of responsibility is to report, at least quarterly, best-estimate earnings for the various business units the company is organized into. This is of general interest to management because they wish to know how the various operating units are doing. Moreover, the operating units' compensation is tied to those earnings, so naturally there is a very keen interest on their part as to their results from quarter to quarter. Part of our job is to calculate as accurate a value as we can. We have to explain the numbers to each business unit because we want them to buy into the numbers and accept them. In the years before we had SOE reporting, I can recall meetings where the business manager would ask if the reserve increase looked too large. It is hard to answer that

simple question accurately. I was even at one meeting where the business manager said the increase in deferred acquisition costs looked too large. He backed off a bit when someone pointed out that the increase helped earnings rather than hurt them.

My point is that the accounting statement's format of earnings is very difficult for a business person to follow and SOE is a much better way of trying to present earnings information to business people. It can decompose that mysterious increase in reserves into a comparison of actual-to-expected components that anyone familiar with an insurance product can understand.

We strive to provide product level SOE reports and actual versus estimated experience. The intent is to highlight areas where we see results deviating from expected. The next step is a more detailed review of what may be causing that deviation. SOE does not give you all the answers, but I think it brings to light problem areas or areas of opportunity on a regular basis. It can quantify the financial impact of those items in the current period. It moves us away from the accounting presentation of information to more of a business presentation. As you hear more about it later in this session and I hope to attend the workshop session later, I think you will appreciate that it can have great value for your company or for your clients.

Let me move now to some areas where we have had problems implementing SOE. The first thing you have to decide is what level of detail you want to track. Obviously the lower level details are of interest to the operating staff. The question is how low a level of detail remains credible? Things like expenses and investment income may not be available at the lowest level of detail someone would want. There you have to strike a balance.

For health insurance, we generally try to track nationwide experience by policy form, or, if the form is too small, by groupings of forms. We may compromise on run-off blocks where we take broader groupings. Generally, the interest is more on currently sold products.

Complex products are another source of logistical problems. For example, we have a universal life product that has a term insurance rider. The universal life reserves are calculated on a universal life

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reserving system, and the term insurance piece is handled on a *FAS 60* reserving system. There is a logistical effort to bring those two pieces of information together and present them.

Another area where you need to spend some time is actuarial assumption maintenance. You need to think about how long you keep assumptions current and when to update assumptions. Generally, we set our initial expected assumptions equal to pricing assumptions. If we have experience analysis that indicates these assumptions are no longer appropriate, we may shift our expected assumptions to what the experience study shows. So you need to have resources available to do that kind of work and try to make sure that your expected is really what's currently expected.

Another area that is a bit more mundane is reconciliation. I am not referring to a truce between the business units and the actuaries. I am referring to the problems that arise with the data and understanding how your administrative system operates versus how your accounting system and reserving system operate. For example, if you get into the SOE formulas, you will find you need reserves released by death or by lapse. You will not have exact valuation system reserves at every possible point for a reserves released value. You are going to need to use your SOE software to approximate the reserve, and you need to be aware of what difference can arise between your valuation reserve and your SOE reserve, and what the interpolations may be.

You can also run into problems from your administrative system if there are discrepancies in things like premium. One of our administrative systems books premiums daily, however commissions are booked every two weeks. There again you have to be careful when you are dealing with the information so that you understand the relationship due between the two. Your SOE software may put premiums back to the date. So as you rerun SOE for past periods of time, you will see premium changes. For policies that were either backlogged at issue or back dated to save age, for example, the premiums on those policies will now show up on the effective date of the policy rather than the accounting period that the premium was booked in your financial statement. It is a mundane item, but it is something you need to be aware of when you are trying to reconcile the financial statements with the sources of gain or loss.

I'd like to discuss a couple of other items. How should you treat developmental expenses? For GAAP, developmental expenses are generally just period costs. You may wish for internal management reporting to capitalize and amortize some internal development costs, especially if you feel that is the most appropriate way to measure a business unit's performance. If you do, then it is helpful to have some rules as to who will determine if the asset should be written down at some point.

Investment income could be another area where you may want to treat things differently than your GAAP accounting system. Do you use actual investment results, or do you take some longer-term average? For products that are general account products where investment performance is not directly under the business manager's control, we tend to take a longer-term average yield and use that as our expected investment income. For products that are heavily investment oriented, like universal life and annuities, and that tend to have a segment or a dedicated asset portfolio, there you would use the actual investment performance, because that is presumed to be under the investment manager's or business manager's control. Again, you have to decide how you would treat the various items and what the most appropriate method is for your situation.

These are just some of the examples of the kinds of issues you face. I think there are some other good questions that will be discussed in the workshop, so I encourage everyone to attend. I will summarize by saying we are very pleased with SOE. We found it to be a great bridge between the traditional actuarial presentation of results and dealing with business people on a business basis. We still have a way to go. We are not fully implemented for all product lines, but we think we have made a lot of progress, and I heartily encourage you to use it if you have the opportunity.

MS. YIJI S. STARR: There are two parts to my presentation. In the first part I will discuss, in general, how we use earnings by source (EBS) as a management tool. In the second part I will discuss why having EBS is particularly useful for international operations.

About seven months ago, I was assigned to be the project leader for implementing EBS for Met Life's International Operations. At first I thought it was just a very simple concept; it is just a technical exercise of breaking up the increase in reserves. However, what I have learned over the last several

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months is it is a much more comprehensive concept. It is actually a high-tech financial tool. It involves a disciplined approach to pricing, a systematic approach to analyze the earnings, and a profound understanding of the main drivers of the business.

I recently read an article that discussed new paradigms of the financial intermediation industry. It argued that in order to be successful into the next century, companies must be market driven instead of product driven, customer oriented instead of distribution oriented, and capital focused instead of sales focused. This last item of capital focus implies that we need to generate superior returns for a given amount of capital. In other words, we have to focus on earnings, not sales.

Insurance executives are typically comfortable with managing sales. If we reduced the price of our product or increased the agent's compensation, these are typical ways to increase sales. However, we are less comfortable with managing earnings.

The first step to manage earnings is to understand earnings, and I believe EBS is a tool that can help us understand earnings. As Ken has mentioned, the traditional income statement does not present a business dynamic. It especially does not show how an operation actually performs against our expectations. EBS is a tool that presents our actual results compared to expectations. It is what I call an actual-versus-expected earnings analysis for each of the sources that contributed to earnings. At this point, one might raise the question, is the business plan versus actual results also our actual-to-expected type of analysis? Yes, but there is a difference from traditional types of actual-to-expected analysis.

When we compare business plans to actual results, the difference is typically attributed to two components. The first component is the difference in production. If the assumed level of production is different, then the actual earnings will be different from planned even if everything else is the same. The other component is the difference in the actual experience from the expected experience. Even if the amount of new business is the same between actual and planned, our actual earnings will still be different from the plan, if, for example, more deaths or lapses occur as expected or less interest

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is earned. EBS is a tool that amplifies the second component. It focuses on the difference in experience. It compares the actual-to-expected experience.

In order for us to fully understand our actual-to-expected analysis, we must understand the three components involved. The first is, what are our expectations? Second, what are actual results? Third, why do our actual results deviate from our expectations? Typically, most analysis is done on the third element. However, to me the first two, managing our expectations and managing actual results are the most critical ones. By the time we get to the third one, we are analyzing our results. It takes away the most important type of analysis, in that we ask the question, what went wrong?

To begin, let's focus on the first component, managing our expectations. Our expectations must represent our objectives in earnings. Our expectations must be realistic. If we pause and look at these two criteria for a minute, we would realize that a disciplined pricing process shares these two criteria. For this very reason, we choose to use pricing assumptions as our expectation, and it is summarized in one phrase that we use often at Met Life: "Pricing is the plan."

The pricing methodology plays a very important role in measuring the objectives in pricing assumptions. If pricing methodology and earnings objectives are inconsistent, earnings objectives would not be met even when the company's experience is in line with pricing assumptions. As a result, we must have a disciplined pricing process which reflects our earnings objectives. The ultimate profit level depends on how we perform compared to underlying pricing assumptions. Obviously, one way to ensure high probability of achieving pricing assumptions is to incorporate conservative assumptions. However, competition must be considered. On the other hand, optimistic assumptions in pricing may make the products very competitive, so as to not achieve the company's earning objectives. The company must maintain a delicate balance between the two.

Pricing actuaries typically separate assumptions into mortality, interest, and expenses. Unsurprisingly, these are the three sources for earnings by source analysis. EBS analysis, in which the actual results are broken down into sources, provides a built-in check for the reasonableness of the assumptions used in pricing. If the pricing assumptions are consistently out of line with actual results, then it

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should be corrected. In other words, by looking at this presentation, the actual results can serve as a feedback for pricing.

Now we have our expectations. What can we do to match or exceed our expectations? Two critical steps in managing actual results are connecting actions with results, and second, aligning management responsibilities with management accountability. How can we achieve these two steps? In a typical insurance company, each SOE may be controlled or managed by a different area. We also tend to have a different mind-set for how to manage each of these sources. For example, for expenses, we manage to be more cost efficient than the budget, or the pricing expectations for expenses. For mortality, actuaries are very good at projecting the expected death claim, assuming we have a large amount of policies to be fiscally credible. We then add a margin for adverse deviation or perhaps a contribution to profit. For investments we manage the spread. If we manage the sources differently, it is very logical to show the results by source as well, and this is another reason why the EBS presentation is very helpful.

In summary, the way we like to use earnings by source as a financial management tool is to show actual results versus expectations. Also we want to instill a disciplined approach to pricing so that we have a very well managed expectation. Last, it gives management incentives to meet expectations, because we identify results by area. These are the general thoughts we have for earnings by source.

I have only been international for a short period of time, and I have found that many of the problems and challenges faced by international operations are similar to other operations, perhaps with a twist. One of the most difficult challenges we face is the communication, and for this, I believe the SOE presentation can serve as a communication tool.

There are typically two problems associated with communication. One is the lack of communication, and the second is the communication of irrelevant information. In the past, at Met Life International, there has been lack of communication of country operations. In the past, the company was organized where all the local operations reported to the head office in New York. We are currently working

on leveraging the knowledge and expertise that exists in the local operation to utilize their knowledge and expertise in all of our country operations. This concept is what we call a transnational concept.

An analogy to look at this is to think of the enterprise as a family. The home office represents the parents, each local operation a child. When a child is young, it takes a lot of nurturing and care, usually from the parents. Naturally the child comes to the parents for advice. The older children also share in the role of parenting. It is not unlikely the children will go to one another for support and advice, and at least the children will speak to each other. But in a typical corporate structure -- the country operations do not speak to each other! In this transnational concept, we have drawn a line connecting country A to country B, and we are trying to facilitate conversations and communication between countries, so that each country will operate with enterprising minds by sharing knowledge and expertise with each other.

A key to make this concept a reality is the ability of the country operations to communicate with each other effectively. Going back to the analogy of the family, imagine you have a family with many children, but for whatever reason, each of these children speak a different language, grew up in a different country, and is accustomed to a different culture. How can we facilitate communications among them? First and foremost there is the challenge of the language: English, Spanish, Chinese, Portuguese, etc. What is even more difficult is the communications barrier created by the vastly different environments in which each country operates. For example, look at earnings and ask the question, what is earnings? A country could give you one of four possible answers. First, there's the local statutory earnings; second, there's the U.S. statutory earnings; third, there's international GAAP earnings; and finally there's U.S. GAAP. If we want a common earnings measure, our choices are limited. There are still communication barriers when we are looking at these income statements because these income statements do not necessarily tell the whole story of how a country is operating.

Two of the more common differences among countries are the products offered and local competition. Many products offered in the overseas environment are not offered in the U.S. For example, in many countries, the most popular products may be a tradition product with substantial savings components such as endowments, which due to past regulations are not sold in the U.S.

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These products tend to have a larger premium, as well as a larger increase in the reserves. We typically do not know the impact on earnings by just looking at an income statement. Higher premiums do not necessarily translate into higher earnings. Competitive environments may also be very different. Some countries can't compete on prices, either due to regulations or due to the dominance of a few large companies. The competition is therefore on other items such as services. We cannot tell from the income statements whether we are providing excellent services, as well as satisfying customers' expectations. Most of these examples illustrate the things that are not apparently clear in the income statement, and therefore making communications using these income statements very difficult.

An EBS presentation may serve as a common language on earnings that everybody can understand. The reason it can serve as a common language is because it explains earnings in two simple ways. First, it separates earnings into sources, and it explains expense control, underwriting, investment selection. Second it shows how the actual results are matched up against our expectations. Differences in product design on competition may be reflected in these EBS statements. Savings oriented products may generate higher premium income and the higher increases in reserve. EBS breaks down these components, and we can see the impact on our bottom line by examining how we perform against our expectation in each of these sources. Competition may dictate that we provide services, and we may look at the income expenses to see if we were able to provide services at an acceptable price and to see if we have met our customers' expectations.

There are many other ways EBS can help us understand our earnings products. These two simple ways, by breaking down the EBS and by comparing actual results to expectations as a basis for which this tool is a very useful financial tool.

MR. LALONDE: Let's look at some possible real life numbers.

TABLE 1
The Problem FAS 60 Product

	Period 1	Period 2	Difference
Premium	\$168,421	\$161,432	(\$6,989)
Interest	73,087	75,894	2,806
Subtotal	\$241,508	\$237,325	(\$4,183)
Death Claims	15,000	12,000	(3,000)
Surrenders	50,000	60,340	10,340
Change in Reserves	125,859	119,034	(6,825)
Expenses	44,000	43,133	(868)
Subtotal	\$234,859	\$234,507	(\$352)
Earnings	\$6,650	\$2,818	(\$3,831)

Few people are very adept at being able to explain what goes on with their financials. Here is a problem for you. Let's say that the product we are working with happens to be a *FAS 60* product. We have two successive accounting periods. I will let you study this for a moment, because I want you to think in your own mind how you would explain that earnings went down from \$6,650 to \$2,818. What is there that could be used to explain to senior management what happens in the two periods? Why did earnings go down?

Something that looks obvious is a rather dramatic \$6,989 drop in premium income. Offsetting that was an increase in interest income and death claims going down, so that helped us. We had a rather large increase in cash values paid on surrenders, but we had a change of reserve that decreased. Sometimes I like to net those two, surrenders and change in reserves, so we have about a \$3,500 increase in that net component there. Our expenses actually went down, so that is good. It seems to be that the major contributor to our drop of earnings, at least from my perspective, appears to be the premium component and the increase in surrenders, with some decrease in expenses and higher interest income offsetting that.

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This is where SOE comes into play, because we are going to see that I am way off-base in my analysis.

To help guide us through SOE, let's see how we can take a presentation of the income statement and its components of premium, interest, deaths, and surrenders and represent them symbolically.

Standard Presentation (Formula A)

Premium:	GP
Interest:	$+ i^a ({}_0V + GP - \text{Exp}^a)$
Deaths:	$- q^a DB$
Surrenders:	$- w^a CSV$
Change in Reserves:	$- (p^a {}_1V - {}_0V)$
Expenses:	$- \text{Exp}^a$
Earnings:	$= E^a$

$a = \text{actual}$

For premium we would have GP or gross premium. Our interest would be an actual interest rate applied to our opening reserves for the period, plus gross premiums minus expenses. Deaths would be our actual death rates for the face amount in force. Surrenders would be our actual payment for the amount of cash surrenders paid out. Our change in reserve would be the survivors at the end of the period for the reserve that is there at the end of the period minus the opening reserve. Our expenses would be our actual expenses. Earnings would be the subtraction of deaths, surrenders, and other expenses from premium and interest. That is that notation that we will keep track of.

Let's take a look at the standard reserve formula (Formula B).

$$({}_0V + NP - \text{Exp})(1 + i) - q(DB) - w(CSV) = P_1V$$

Premium:	NP
Interest:	$+ i ({}_0V + NP - \text{Exp})$
Deaths:	$- q(DB)$
Surrenders:	$- w(CSV)$
Change in Reserves:	$- (p_1V - {}_0V)$
Expenses:	$- \text{Exp}$
Earnings:	$= 0$

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We are familiar with this formula as a formula that connects an initial reserve to a final reserve. There is an equality there. If I rearrange those terms to kind of look like our standard income statement format, I will have a net premium for premium. I have interest which would be my expected interest rate or my GAAP interest rate or my pricing interest rate times my initial reserve. Deaths would be my expected death rate times the death amount. Because the earnings on that is zero, what I want to do is subtract this component from Formula A.

Formula A - Formula B Stage 1

Premium:	$GP - NP$
Interest:	$+ i^a ({}_0V + GP - \text{Exp}^a) - i ({}_0V + NP - \text{Exp})$
Deaths:	$- (q^a - q) (DB)$
Surrenders:	$- (w^a - w) (CSV)$
Change in Reserves:	$- (p^a - p) {}_1V$
Expenses:	$- (\text{Exp}^a - \text{Exp})$
Earnings:	$= E^a$

I will then have something that starts to look like SOE. The premium component now becomes gross premium minus net premium. The interest is the actual interest on the reserve minus my expected interest, so it looks like there is an interest margin that is identifiable. Deaths are starting to show up as a difference between expected and actual deaths. We have surrenders and then we have change in reserve. Expenses are actual expenses minus expected. We have the same earnings number as before. We have not done anything to our earnings. We need to eliminate the change in reserves.

We can eliminate the reserve formula in the following formula.

Elimination of V

$$\begin{aligned}
 & (p^a - P) {}_1V \\
 &= (1 - q^a - w^a) {}_1V - (1 - q - w) {}_1V \\
 &= (q - q^a) {}_1V + (w - w^a) {}_1V
 \end{aligned}$$

I am going to take the change in reserve components, expand it and then bring it back into Formula B. That brings me to a stage two type of formula.

**Formula A - Formula B
Stage 2**

$$\begin{aligned}
 \text{Premium:} & \quad GP - NP \\
 \text{Interest:} & \quad + i^a ({}_0V + GP - \text{Exp}^a) \\
 & \quad - i ({}_0V + NP - \text{Exp}) \\
 \text{Deaths:} & \quad + (q - q^a)(DB - {}_1V) \\
 \text{Surrenders:} & \quad + (w - w^a)(CSV - {}_1V) \\
 \text{Expenses:} & \quad + (\text{Exp} - \text{Exp}^a) \\
 \text{Earnings:} & \quad = E^a
 \end{aligned}$$

SOE Format

I am starting now to get closer to a true SOE format. I have premium as gross premium minus net premium. I have interest as interest earned on the reserves minus the interest expected to be earned on the reserves. I have death as the expected death minus the actual death on the net amount at risk. I have surrenders, which are expected surrenders minus actual surrender rates, based on the excess of the cash value minus the reserve. Expenses are expected expenses over actual. I will have a gain from the expense component if my actual expenses are less than my expected. I will have a gain from the premium component due to the premium loadings. Remember, we are coming back to the same earnings number that we started off with. I have not changed that at all. We are working with some very simple formulas so that we can follow the concept here.

Another look at this formula takes the surrender piece and breaks it into a surrender component and a persistency component. Let's take another look:

$$\begin{aligned}
 \text{Premium:} & \quad GP - NP \\
 \text{Interest:} & \quad + i^a ({}_0V + GP - \text{Exp}^a) - i ({}_0V + NP - \text{Exp}) \\
 \text{Deaths:} & \quad + (q - q^a)(DB - {}_1V) \\
 \text{Surrenders:} & \quad + (w - w^a) CSV \\
 \text{Persistency:} & \quad + (w^a - w) {}_1V \\
 \text{Expenses:} & \quad + (\text{Exp} - \text{Exp}^a) \\
 \text{Earnings:} & \quad = E^a
 \end{aligned}$$

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It says that when our expected surrenders are less than actual surrenders, we have a gain. The persistency component says that, if our actual lapses are less than expected, then we are going to get a release of reserve. That is what we are measuring. The reserve can be a positive number. Whole life policies often have a net GAAP reserve which is positive. If we thought about term insurance, which does not have any cash surrender value and probably has a net negative GAAP reserve, then we can use this to evaluate what is happening when we have persistency that is better than expected or worse than expected, because the results can be contrary to what one might expect.

If we apply those simple applications to the results that we are looking at and show the period-by-period SOE components, we see a different picture explaining what happened between those two periods (Table 2).

If you remember, we said there was a significant drop off in premium and maybe that was the cause of our decrease in earnings; actually, we just had a decrease in loading that only amounted to \$349. Remember we said that interest was larger than it was the prior period and that offset premium losses, but, in fact, there is an interest loss here! The interest margin went down quite a bit. It went down about 40 basis points in my example. We are now getting a different picture about the course of the earnings in these two periods.

The deaths did go down. We did not get misled by that. The combined surrender persistency component was worth about a net \$669. Look at the expenses. We said that the expenses in our early analysis went down, but this says that the expense component actually went up! The margins that we are working with in the expense component went down.

Now we have a much different picture about the earnings decrease. It appears to be more attributable to the decrease in interest margin than what we had previously thought. We had a loss from the expense component where we thought we actually had a decrease in expenses!

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TABLE 2
The Solution
Gains by Source

	Period 1	Period 2	Difference
Premium Loading	\$8,421	\$8,072	(\$349)
Interest	5,887	1,441	-4446
Deaths	(4,413)	(2,086)	2327
Surrender	12,500	6,755	-5745
Persistency	(11,746)	(6,570)	5176
Expenses	(4,000)	(4,793)	-792
Earnings	\$6,650	\$2,818	(\$3,831)

I am talking about a tool that can help explain to senior management what is going on with the business. They look at the financials, and the numbers seem to be going much differently than what is actually happening. This format allows you to be more exacting in how you can present the changes or earnings from period to period.

I put together some fairly simple formulas that showed how we could take a standard presentation and bring it into an SOE format. What is involved in actually trying to make this work?

One thing we might start to do is to have a program that does projections of SOE. That might be fairly easy to do, and then, as each quarter clicks off or each month clicks off, we could compare our actual earnings to the expected earnings. A problem will start to emerge almost right away. As you make your projections you make assumptions about new business, persistency, and lapse rates, and those assumptions carry forward. So you need to normalize each accounting period's results so that you do not have cumulative effects rolling in. The best example is if you did a projection in December 1996 and you are projecting 12 months forward. You would project December 1997 earnings. A great deal will happen between now and then, so when you are trying to explain the differences, there will be a rate versus volume situation that you need to take a look at.

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Another item you are going to want to think about is the precision you want to achieve. Do you want to use SOE as a tool or do you want to use it to reconcile back exactly to the reported earnings? If you started with the concept of a tool, then you are going to use it to explain what is going on. There is a time problem working against you which must be considered. If you are using it as a tool, you are probably thinking you have a lot of time to measure mortality and measure lapse rates and then bring them into play. Senior management will not have any patience. They will want to know what is going on in a couple of days. So you do not have the luxury of being able to use it as a tool. If you cannot explain, to the dollar, what is happening, they may become a little suspicious of the whole analysis.

You must start thinking of being able to get right back to them with results that reconcile from period to period. The analysis has to take into account how much time is in a reporting period. The reserve formulas themselves have an impact. If you are using mean reserve formulas or reserves interpolated for the day, there has to be a consistency in your SOE analysis breakdown between what you are reporting so that you do not get errors in your analysis because of the differences in the formulas.

Another important difference is formula versus real life timing differences. I like to think of earnings as being cash flow minus the change in accruals. Yiji had four different accounting bases that she wanted to work with: U.S. GAAP, Met GAAP, local statutory, and U.S. statutory. The earnings emanating from those are really working under the same formulas, and that is the cash flow is the starting basis in all cases. Only the accruals are different. There can be timing differences between assumed cash flows and actual cash flows, even though the amounts are correct. The same applies to accruals.

This is a point Ken alluded to. When we make projections about premiums to be collected and death claims to be paid, the projections assume that they are going to be received or paid exactly on the date of incurral. Projections assume that premiums are going to be collected on the due date. But, in fact, some premiums are not really collected on the day that you think they are going to get collected. If a policy is lapsing, there is usually a 30-day or 60-day period that the books are held open on that policy, and then there is the actual physical lapse that occurs. That is when it goes

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through your financials. On those policies the reserve released is for the duration of the physical lapse, not the effective date. There is offsetting from period to period, and it may be minor. As you try to take your analysis and drill down into specific plans or durations, this fact becomes important. If you want to do SOE by writing agent or SOE analysis by plan and by year of issue, those things become more important, because they tend to create reconciliation problems.

Consider how projection systems apply lapse rates. If you have a 20% lapse rate, the system typically will reflect 20% of the business terminating, right now. In fact, it does not really go off our books like that. It really terminates two or three months later. There has to be something in your system to be able to account for that, otherwise you will have differences that will make life very annoying when you are trying to explain it to somebody.

If you are going to track SOE, then riders, miscellaneous coverages, and supplemental benefits may have to be brought into the picture because of their materiality. Sometimes those coverages can make major contributions to the bottom line, and they just cannot be ignored. If you are a company that pays dividends, then you may want to bust up the dividend scale and break that into the various sources. Alternatively, you can have the sources of profits be reported on a gross basis, with the dividends being shown as a line entry item.

Reinsurance is another component requiring some thought. We did not put those into the formulas, but some people would like to have the reinsurance components brought into the mortality piece rather than as a separate line item which shows merely the reinsurance premiums paid compared to the recoveries.

I have spoken about the ability to drill down into the system and to be able to analyze if the sources of profits were coming from specific plans or a specific business source. As you do that, the formulas and the tracking of that has to take into account some of the timing differences that we discussed here.

I am going to close with the thought that the formulas we discussed apply to traditional insurance. There are similar formulas for other kinds of insurance. Every little piece of business has its own little nuances that must be carefully taken care of.

Universal life has different items to be measured and monitored. Annuities are another special case, either in the deferred states or the income pay states status. Disability income policies can be very complex, especially if you want to drill down into that business to find out where your losses are coming from by classification or elimination period or by benefit period. Each category has common components that we have to consider, but if we are going to implement SOE, we have to take a look at the coverages for their own specific and unique actuarial needs.

MR. DAVID A. RICCI: I am going to give you more of a practical point of view on the analysis of the gain by source, as well as a reinsurance perspective. There's an emphasis I want to put on the whole issue. When you talk about source of profit statements, I am concentrating on the word *statement*. In other words, this is really a communication device, a report card, and it is also a way for the corporate planner or actuary to survive; i.e., if you cannot explain what is responsible for the bad results, then you become part of the problem. Much of this has to do with being able to make it abundantly clear that you have a clear message to give. It must be accurate. You must adequately explain where the sources or problems are coming from.

I consider the main role in my company as being the planning coordinator and the chief staff resource for the explanation of earnings. I am an internal consultant as to what might be done in order to get a better grasp on where earnings are going, helping other people do their plans effectively. We all know that as technicians, our key role is to facilitate an understanding of dynamics. A detailed income statement can provide the raw data. Other information that is necessary to produce the end product for management must be considered.

Before I do that, I would like to comment on some of the purposes of doing the source of profit analysis. One important objective is to link results with pricing and competitive strategy. I will finish my presentation with that aspect of it, because the current reinsurance world is quite competitive, and

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it is very important to be able to directly connect whatever you are doing out there with marketing efforts. We must compare the profitability measures being employed to develop an appropriate price with the actual financials that roll out.

Another reason for doing the sources of profit analysis is to provide a rational explanation of results. As Bob showed you, if you look at actual to expected, have very little information as to the dynamics in the underlying source of profit.

Before I discuss the critical missing piece, I would like to discuss the planning cycle. Presumably some time in the fourth quarter, an agreed upon corporate plan is developed, and is profit-center specific. Critical assumptions are explicitly provided. The strategy drivers should be clearly expressed and there should be an exact understanding between all parties as to what the real source of gains are. Production and persistency goals should be defined and trackable. Your presentation of gain by source should be tied to actual versus expected (planned for) performance, as derived in the following formulas:

Formula Development

$$\begin{aligned} \text{Total Variance (\$\$\$)} &= \text{Actual Earnings (AE) - Plan Earnings (PE)} \\ &= \text{Actual Excess Investment Income - Plan Excess Investment Income} \\ &\quad \text{(#1)} \\ &+ \text{Actual Underwriting Income (AUI) - Plan Underwriting Income (PUI)} \\ &\quad \text{(#2)} \end{aligned}$$

Formula #1:

$$\begin{aligned} \text{Investment Income Variance} &= \text{Actual Assets (AA) * Actual Yield (AY)} \\ &- \text{Plan Assets (PA) * Plan Yield (PY)} \\ &= \text{AA * AY - (PA + AA - AA) * PY} \\ &= \text{AA * (AY - PY) [Excess Investment Income Variance from} \\ &\quad \text{Yield]} \\ &+ \text{(AA-PA) * (PY - Required Interest Rate) \{Excess Investment} \\ &\quad \text{Income Variance from Assets\}} \\ &+ \text{(AA-PA) * (Required Interest Rate) - "explainable" variance} \\ &\quad \text{from reserve difference} \end{aligned}$$

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For investment income performance, there are two major equations here. One has to do with just the yield performance; i.e., variation between actual yield and planned yield. The other equation is a variance from asset size, which may be separated into two pieces. One is a reserve piece, and the other one is excess investment income above and beyond the reserve as a result of changes in the market.

The other set of formulas deals with underwriting income. As with investment income, they are separated into two components. One component deals with a gain from production. Perhaps there was a certain amount of business you had planned for, and that business may be a result of certain persistency and sales assumptions. Now you most definitely will have a variance between the actual production and what you have in the plan. The difference between those values times the plan percentage margin gives you some indication of the gain or loss from production variances. You can split that out between persistency (renewal) and production (first year) if you need to.

The other part of the equation deals mostly on a rate basis and primarily performance gain. In other words, you take the actual production that you have and multiply it by the difference of the plan and actual value.

There are some practical considerations. I have never met an accountant that would allow for the fact that you could have more overhead because you have more production. Most likely they will basically have an actual dollars budget versus actual dollars comparison for your overhead costs, and then they will explain any kind of variation in a footnote to the analysis. You will not be able to get away with a pure gain measurement in that instance.

What does this do for you? Basically you are now able to present to management, in a fairly concise form on a quarterly basis, or more often than that if you have the information available, the various sources of variance in the earnings, presumably GAAP. You can also do a statutory strain comparison between what happened and what you planned. You should be able to, before you send this up to the board room, put your finger on all the various causes of any reporting anomalies. In

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many ways, analysis gains by source or variance will ease a lot of tension between management people looking for results and those who have to provide them with the results.

I will discuss briefly some of the reinsurance issues. There is always an intense desire to get data as a reinsurer and you can get a great deal of data. There is no problem in doing that. The problem is the timing of various clients because there are three different client departments that are giving you information. There is the claims department that wants everything sent immediately, a natural motivation. Then there are the people paying the reinsurance premiums, and then there is the valuation area which is providing you with in-force information and reserves. I would say that the claims data are very current. The other two almost certainly require adjustment. You have to be in the position to understand the dynamics of every particular major client. When are the premiums coming in? What are the timing problems? What are the problems in the in force? How often do you get updates that are reasonable? How can you come up with true mortality studies, given exposures that are out of date? There is definitely a major issue in reinsurance.

Another issue for reinsurers is retrocession costs, which are the costs to reinsure our business. We generally learn to cope with this because our accounting systems are separated into three components. We have accepted business, we have retro and we have net. We can do a source of gains analysis on a gross basis and on a net basis to determine exactly what retrocession costs are.

Finally, there's communication. A good source of gains analysis will not only serve management, but it will also serve the client. It will give the marketing people a reasonable amount of ammunition to deal with the clients in future negotiations. It is always better to negotiate with the true historical experience of an account.

I have seen an explosion of profit centers in reinsurance. We have 12 major profit centers in our company. We have one group profit center and one special risk center. Ten profit centers are associated with the ordinary life line. This presents a problem in terms of the data gathering process, and in terms of our ability to measure this information. But we have been able to cope with those successfully.

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Finally, let's get back to the statement I made a little earlier about pricing. The way pricing works for reinsurance is there's a group of marketing representatives that go out and talk with the clients. There's an actuarial group that supports them and they come up with appropriate measurements to cope with the day-to-day competition, which is ferocious at this point. We would be remiss on the financial end if we did not keep our eye on what was going on, not only because management should be aware of the kind of reduction in margin that we might experience, but also because we must be able to explain the inevitable volatility when it strikes. It is very important to be able to connect the profitability measures to what we are trying to do in financials so that we have a running start on developing the plan and then eventually coming up with the actuals and measuring them on sources of gain.

MR. MICHAEL G. REILLY: I'd like to ask the panelists about their own experiences in this source of earnings analysis. In your own companies, do you do this source of earnings analysis on a statutory basis, GAAP basis, or management reporting basis, and which basis do you use more frequently? How frequently do you do this variance analysis? Do you do it on a quarterly basis? What is the frequency?

MR. KLINGER: We do ours on an internal management reporting basis. It is like a variation of GAAP but without some of the GAAP rules. We do it quarterly. We are looking to do more with statutory and GAAP as well in some lines where the operating people have an interest in statutory and GAAP. For the most part, the business managers are interested primarily in what we refer to as economic value, our best-estimate earnings, because that is what drives their compensation. That is what they tend to focus on and that is where we are putting the most effort into by providing an explanation of earnings.

MR. RICCI: We have no compensation linked to economic value, and being a public company, we are trying to get most of our information linked to the GAAP results. That has some problems associated with it, not the least of which deals with the timing of those results versus the actual profitability of the business; we also need to keep our finger on the amount of capital usage that we have. We usually do an actual versus expected statutory analysis of the strain on new business. I am

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talking about just capital spent in the acquisition of business. You get into a situation where you have to keep your finger on that.

MS. STARR: For Met Life domestic business within the United States, we have been doing SOE on a Met GAAP basis, which is a GAAP-like internal management reporting system. We have reported on a quarterly basis. We are just starting for international business. We will do a Met GAAP basis for the time being until we all move to U.S. GAAP. We try not to define the reporting frequency, because we feel that just reporting the number but not doing an analysis of the number is meaningless. We have not defined the reporting frequency, but we expect it to be semiannual or annual, with naturally the analysis being more often.

FROM THE FLOOR: The first question is for Bob regarding the standard *FAS 60* SOE formulas, and I guess for all other standard formulas. Have you noticed that some SOEs are not independent from others and does that disturb you? For example, death rate experience would affect the asset base, which would affect investment income. It also would affect transaction costs through expenses.

MR. LALONDE: That is a perceptive question. I have used formulas that are simple and straightforward. For example, I used $(1 - qw - qd)$ to connect survivors. Others might use the $(1 - qw)(1 - qd)$. This would create interrelationships that just makes the mathematics more complicated. I think you have to decide at what level in the reconciliation process you are going to. You must understand the construction of reported reserves -- are they GAAP formulas, statutory formulas, or embedded-value formulas. In my formulas, I put all the deaths at the end of the period. GAAP formulas will often have deaths incurring in the middle of a period. The timing of the payment can either be in the intact component or death component. Withdrawals occur more frequently with the premium payment timing, semiannual versus quarterly, and that should get into your analysis, because if you are using lapse ratios and only applying them at the end of the anniversary, then that has to be accounted for in reconciling items. Remember your objective is to respond to senior management who said they do not understand what happened between the earnings in these two periods. The interrelationships are often difficult to explain even at an actuarial level, so try to keep it simple.

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MR. JAMES P. A. KNIGHT: I have two questions. One is what do you do about estimating the base line of expected profitability? Second is a question on the computation of the gain from persistency. How do you adjust your reports to reflect the long-term gain or loss on persistency as opposed to the short-term gain or loss? If you have a deferred annuity product and you built in a 200-basis-point margin to cover everything, one way to look at it is you have an expected gain of 200 basis points, maybe 50 points or so is for actual profit. Where do you take the 50 basis points out?

MR. RICCI: Are you talking about an absolute measurement of earnings, so everything has to add up to an earnings bottom line? Is that what you are saying?

MR. KNIGHT: Yes.

MR. RICCI: I tried to allude to that in my presentation. Basically you only have half of the issue when you are dealing with something that adds to the total earnings. You have a base line expectation. That is why the sheets that are in my presentation have to do with an analysis of variance gain by source, not just a pure analysis of gain by source. If you have an expectation that you are going to get a certain amount of interest income, then that would not necessarily give you any kind of positive indication on that kind of report.

To measure the future loss you have to go to a different type of analysis rather than the GAAP or statutory. You really have to go to some kind of economic value, where you are analyzing present values, and changing the present value of distributable cash flows over a long-term period. Then you say basically what is my base line persistency assumption and how should I be changing it for the year or the quarter based upon the experience that I had in that quarter. That change in value should show up as your gain or loss from persistency.

MR. STEVEN A. SMITH: Many interest-sensitive products may have a gross spread of 200 basis points. Many have reinsurance. There is more than one way to analyze these things and sometimes you do it in more ways than one. Consider trying to figure out what is the gain or loss from reinsurance. One approach is to say you have direct premiums, and you have reinsurance premiums,

and this yields net premiums. Likewise, you have direct death benefits, and you have reinsurance death benefits and net. You can measure gain or loss for mortality and you can bring in the expected, but then you can also look at reinsurance from a totally different perspective. To the extent that any policy is reinsured, you are paying reinsurance premiums, and you do not care what the actual death claims are. Hopefully you and the reinsurer will care, but you have a fixed reinsurance cost. What you really need to compare that to is the expected reinsurance death claims. There is more than one way to mix and match these things.

MS. STARR: We have always emphasized using SOE as the actual-to-expected analysis. In this instance, if we knew that 150 basis points was supposed to be used to cover expenses, we will move that into the gain from expense analysis. The 50 basis points were designed to be a contribution towards profit; we will move that out and separately identify it. So all you have left is pure actual expected variation type analysis.

MR. RICCI: I was talking about rate versus volume. If you are a direct company and you find that you have a volume plus and a rate minus, you might seriously consider sending more of that out to the reinsurer if you can do it. If you have a volume negative, which means you are not producing business and you are doing real well in the administration and management of it, then you want to think about accepting more.