RECORD, Volume 25, No. 2*

Seattle Spring Meeting
June 16-18, 1999

Session 10PD
What Does Mortality "GATT" to Do with It?

Track: Pension
Key Words: Mortality, Legislation and Regulation, Pension Plans, Employee Benefit Plans, Funding of Pension Plans, Reserves

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Summary: Among other regulatory changes, the General Agreement on Tariffs and Trade Legislation required the use of a specified mortality table for the calculation of current liabilities. The SOA Retirement Plans Experience Committee has responded in part to this new requirement and in part to continually improving mortality trends to the possible need for a current Pension Plan Only Study to complement the 1994 Tables, which were based in large part on Insured Plan Experience.

Presenters provide an overview of the committee's work and discuss the status of the current draft report prepared. Attendees learn the various considerations that entered into the preparation of the current version(s) of mortality tables. The considerations in selecting the presentations for various authorities and the actuarial community are reviewed.

Mr. Lindsay J. Malkiewich: There will be two speakers. I work for New York Life Insurance Company in the company retirement plans area, working on employee benefit plans in general, but primarily on defined-benefit plans. My co-presenter is John Kalnberg, who is with PricewaterhouseCoopers. John is also a consultant working on employee benefit plans in general. Our session relates to the General Agreement on Tariffs and Trade (GATT) legislation. If you recall, back in 1994, the Retirement Protection Act (RPA 94) was passed as part of the GATT legislation. This codified into law certain mortality table requirements, as well as interest requirements for valuing current liability and cash distributions for lump sums from pension plans. We'll be going through a little bit of the history up to the current tables that we're working on with the Retirement Plans Experience Committee (RPEC). John will then be presenting the report side of what the RPEC will be

Note: The tables and charts referred to in the text are not available online. Please contact Linda Blatchford at lblatchford@soa.org or 847-706-3564 for a hard copy.

releasing later this year. I'll then follow with a few issues that have yet to be addressed, and open up the session for questions.
I'll start our presentation with a very recent history of group annuity mortality tables. In fact, I'm starting with the 1971 Group Annuity Mortality Table (GAM), in part, because it was a recent table (published only 25 to 26 years ago), but also because it's the first table that was labeled part of a Group Annuity mortality series. This is opposed to the 1951 Group Annuity Table, or even the 1937 Standard Annuity table.

The 1971 GAM had sex-distinct tables and they were generally used for funding purposes. Initially, however, they were to be used for reserving purposes. Certainly, the data were a base for future tables, or were used in producing future tables. The 1971 GAM was based primarily on the active experience of several large private pension plans.

As I mentioned, the table was initially used for group annuity reserves. However, it very rapidly became used for funding purposes as well. It also served to establish a starting point for projection of mortality. Various studies of how mortality might improve used these tables since all of the GAM tables were generally published with projection scales. Finally, the basic data centered around 1966 experience, which was used as a significant source for the 1983 GAM table, and other tables that we have been working on since that point.

The 1983 GAM was extrapolated from the 1971 GAM core 1966 base-year experience. It was initially designed, again, as a group annuity reserve table. Furthermore, it was stated in the 1983 GAM report that this was to be an interim table. In fact, the 1983 GAM Table Committee was requested to produce a GAM reserve table. However, the committee did not believe that they had collected significant or sufficient data and experience to publish a full, stand-alone group annuity table. Therefore, the committee extrapolated from the 1966 core experience year (of the 1971 GAM). They projected to 1983, and then published the 1983 Interim Annuity Reserve Table, which became known as the 1983 GAM.

Actuaries started using it in pension plan funding very soon thereafter. It was more recently referred to in RPA 94. It was indirectly referred to in the new Code section 412(l)(7)(C)(ii)(I), which references Code section 807(d)(5). The 807(d)(5) reference refers to the group annuity table that is adopted by at least 26 states as a tax reserve, or as a minimum reserve table for group annuity contracts. Consequently, those 26 states, by adopting that table as a minimum standard, move it over to be allowed as a tax reserve table. The 1983 GAM became the first tax reserve table, as adopted by 26 states, to which the GATT legislation makes reference in 807(d)(5) as the table to be used for cash distribution purposes.

Now, the uninsured pensioner and the group annuity reserving (GAR) tables will be discussed. The 1983 GAM, as I mentioned, had been a tax standard, and was published as an interim table. Therefore, the Group Annuity Experience Committee was expected to analyze ongoing group annuity experience data being collected and to report on the results. When they felt that they had collected sufficient experience to produce a full mortality table, they decided to replace that 1983 GAM table.

The Experience Committee collected information from 1986 to 1990, centering on 1988, and went to work on putting together a new group annuity mortality reserve table to replace the 1983 GAM table. To put this into perspective, the work started before the RPA 94 legislation was passed. When initially charged with the task, the Experience Committee did not envision the production of a table that would be used for lump-sum distributions, or, in fact, for the funding of pension plans. The sole purpose of the initial project was to produce a new Reserve Standard and an approach to follow up on the 1983 GAM was established.

However, before this process went too far, the 1984 Unisex Pensioner (UP) table, had been put together from 1976 experience referred to in old *Reports* volumes. The 1984 UP table was primarily designed as a pension plan funding table, and was also published in response to the Supreme Court decision in the Norris case. As a result of the need for unisex rates referred to in the Norris decision, the 1984 Unisex Pensioner table was produced. As many of us know, it became a very core table used by the PBGC along with the resulting rates used for cash distributions and similar purposes.

The data collected in developing replacements to the 1984 UP Table and the 1983 GAM Table were primarily collected by the aforementioned Group Annuity Experience Committee from insurance companies, such as New York Life, Prudential, John Hancock, Travelers, etc. It was intended to become, as I stated, a Reserve Standard. At the same time, the RPEC that I referred to earlier was conducting their ongoing quinquennial studies of mortality under uninsured plans.

It turned out that both committees happened to collect data that were very close in magnitude to each other. Since the uninsured experience, as well as the insured experience, was close to each other, it was agreed that a single UP 1994 base table (one without margins and equivalent to the base 1994 GAM Table) should be a sufficient starting point. It should also be appropriate for replacing a table which is primarily used for funding. It should be a sufficient base table to produce a reserve table with margins. The ultimate result would hopefully ease solvency concerns, which are present with the various insurance companies establishment of group annuity contract reserves.

Another important point is that this was to be the first reserve table to actually incorporate projection scales as part of the potential Minimum Reserve Standard. Previous tables such as the 1971 GAM and the 1983 GAM had projection scales. In fact, the 1983 GAM had scales G and H. I'll get into a discussion of those projection scales a little bit later.

The Experience Committee developed the 1994 Group Annuity Reserving Table (the 94 GAR). It is based on the 94 GAM table, with modifications to make it appropriate as a reserving table. While the previous GAM tables, including the 1951 Group Annuity table, had projection scales published along with them for consideration of mortality projection, the 1994 GAR table actually incorporated full generation projection as part of the proposed Reserve Standard. This was intended to recognize, as mortality continues to improve and as contracts continue to be sold over the years, the implicit mortality improvement incorporated as part of a Reserve Standard and would, hopefully, move in lock step with the increased mortality risk. Also, by bringing to the forefront the idea of associating mortality

improvement with a Reserve Standard, the exercise might help all of us to at least consider mortality improvement in funding and reserving, or, whatever studies might be undertaken in which such consideration would be appropriate.

Now to the associated projection scales published with some of the recent tables we have been discussing. Various tables have had projection scales. The 1951 GA started with scale B, the 1971 GAM had scale D, and the 1971 individual annuity mortality table had scale C. The 1983 GAM Table had scales G and H, but it used scales X, Y, and Z to project the 1966 core experience. As a result, we had all of these letters (up to Z) for scales associated with tables. When we decided to name the new GAR table's scale, we agreed to go with a double letter, thus we have scale AA.

Each of these scales can be used for future projections of mortality. However, scale AA is now required, as I stated, for actual use as part of the reserve standard. It was also suggested that it be considered for use with the UP 1994 base table, in which projections would potentially be assumed as part of the mortality expectations.

This brings up the point that there was a companion paper published along with the UP 1994 and the GAR 1994 table reports. It was intended to be a discussion about the pros and cons of using a Reserve Standard (with full mortality projection) or the UP 1994 table for different purposes. It was not, as previously stated, the intent that the GAR 1994 would be used for funding purposes, per se. However, in some cases, we suspect that it will be used as such. As long as one recognizes the characteristics of the table one is using and (if using the GAR) that there is a 7% margin built into the GAR Table q_xs, judgement of what mortality table should be used is rendered by the user.

I have also brought copies of the q_xs from some slides that were presented back at the San Antonio and Colorado Springs meetings. Table 1 is the 1994 UP table. This is the 1994 base table for the GAR, before the 7% margins. The q_xs are shown from age one through 30, 31-60, 61-90, and up through 120. The next set of tables can help us to take a step back (See Tables 2 and 3).

Let's take a look at a q_x for a given male age. In Table 1, at age 61, you've got about nine six to nine seven in the third place. If we now look at Table 3, which are now with the margins, you can see that the level has gone below 90%, that is below 0.09%. Again, these are the 7% margin q_xs whereas the prior ones were the UP 1994 basic funding q_xs. In both cases, as long as one understands what one is using, the q_xs may be used as appropriate.

Tables 2 shows scale AA, for both males and females. As you may notice, with scale AA, we do not exceed a 2% improvement in any one year. As I filter through some more ages, you'll see that the improvement rates go up and down through age 30, from ages 31-60, etc. The Task Force did not go below 0.5% improvement during these interim ages. This was by design. In fact, when the Task Force was producing scale AA, in companion with the GAR 1994 and the UP 1994 tables, this pattern was explicitly felt to be appropriate.

When the Task Force set out to produce scale AA, Civil Service retirement plan experience, Social Security population experience, insured plans' experience, and uninsured plans' experience were examined. All of this experience was compared and trends were developed to see differences between male and female mortality. The resulting scales are shown in Charts 1 and 2. They show the male and the female scales in graphic form. The variation in improvements was quite wide, depending on the ages in question. Those variations actually showed some mortality worsening in some ages, as well as accelerated mortality improvement in other ages. The Task Force did not believe it would be appropriate to have a very high mortality improvement scale, especially given that it would be used in conjunction with a potential Reserve Standard for projecting mortality many, many, many years into the future. Nevertheless, scale AA was felt to be appropriate as a projection standard. When John gets into his discussion a little bit later, on the RPEC work right now, we discovered and felt that it was still appropriate for projecting mortality in our current work.

Let's move on to the discussion of current studies that are being undertaken. As an introduction, RPEC is responsible for ongoing quinquennial studies of uninsured mortality, which is different from the insurance companies contributing insured mortality experience to studies. Uninsured experience is collected from private pension plans, consulting firms in general, and even other insurance companies that may be working on private pension plans. The current activity will be considered in a Report, with an exposure draft later this year, which will be sent to the various governmental bodies as well as the SOA population in general, for their comments and responses.

We'll be reporting on a table to replace, or at least to theoretically replace, the 807(d)5 section table The actual section of the Internal Revenue Code referred to here is Section 412(l)(7)(c)(ii)(I). It talks about the "Secretarial authority" to change tables for plan years beginning after 1999. We're coming very, very close to those first plan years in which such a table could be applicable.

The various key sections also refer to the 807(d)(5) table while the secretarial authority section states that in prescribing such tables, the Secretary shall take into account the results of available independent studies of mortality, of individuals covered by pension plans. That is, in large part, exactly what we felt had to be done with the Year 2000 experience table study and that is what the RPEC is working on. The 1983 GAM, while it's being used for some Section 412 and Section 417 purposes, might continue to be so used but it may also be changed. Ongoing studies will be addressing various issues that have been raised as a result of the information collected for this mortality study.

Because the RPA 94 requires specific mortality tables for current liability purposes, the 1983 GAM, which is used for healthy lives, and another table, for use with disabled lives, was published as required by the act and related regulations. It is hoped that the Secretary will look at the results of the RP-2000 study. We believe it brings to the forefront much information as to how mortality plans differ by industry, by collar (white or blue), by level of annuity income and the like. John will get into it in a little bit more detail.

The 1983 GAM, as stated earlier in the presentation, was initially worked on and intended to be presented as a potential Reserve Standard. As a result, it might or might not be an appropriate table for current liability purposes. But the RPEC is preparing a study of our current uninsured experience, and the Secretary will take a look at the results. At that point they will determine what they should, or should not do, with the information, as to whether it addresses the requests made in the Secretarial authority provision of the Code.

The first potential replacement for the 1983 GAM reference in the code will be the year 2000. It may be a different version of the same table. It may be the exact same table currently used, or it may be one totally unrelated to the study that is being produced by the RPEC right now. However, the RPEC is working on a potential replacement and will produce a study indicating their conclusions.

Mr. Colin England: Could you explain why, in projecting scale AA, the improvement is much higher at the younger ages than at older ages? I would have expected the opposite.

Mr. Malkiewich: I would suspect that there's a higher risk of accidental mortality for younger ages, an example would be the early driving ages, between 20 and 30. This may or may not be the specific ages that you're looking at, Colin, but in these young driving ages, the relative risk of accidental mortality is very, very high. For every one death that you have, or one death that is prevented at these same ages, from a given base of 1,000 or so exposed lives, a much greater impact on the mortality rate at that particular age is evident. Therefore, from just the general attention that is being paid to safety issues, it would appear to me that it is modifying that accidental death rate experience. That's what I suspect may be a part of the reason.

As for the relative mortality improvement in the life span at the upper ages, the RPEC has found that around ages 85–90, mortality improvement has apparently been decelerating over time. We would not have thought that would be the case because of the advances in mortality and health care. In fact, our keynote speaker made some interesting observations. Even with the advances of health care, the upper ages of the mortality spectrum are not experiencing as long an extension of the life span as we would have thought. Just because your life span has an increasing limit, to say 120 for example, we're still just modifying the in-between causes of mortality.

Mr. England: You're saying it's higher improvement at the low ages primarily because of an expected reduction in accidental deaths.

Mr. Malkiewich: Yes. As a result, there is an extension of these younger lives to middle ages, whereas, in the past, they may not have lived as long.

Mr. England: There is not much of a reduction in cancer deaths or whatever. We're not expecting further declines.

Mr. Malkiewich: There certainly is some of that, too, but I would think that is probably not hitting the younger ages as much as it is the middle ages. I'm not sure if we can go back to an earlier scale to check on this a little bit. I think you'll

find that the ages are probably between 50 and 65, and that both sexes, more than likely, are experiencing the highest rate of mortality improvement at those ages. I would suspect that that is where treatments for cancer and other health issues are elongating life more than the other areas.

Mr. John F. Kalnberg: The topic that I want to talk about is the RPEC, and the report that we've been working on for almost five years. Just to keep us honest, I would like to point out that Lindsay and I are both members of the RPEC. Tom Edwalds has been our SOA liaison. Judy Anderson has also been to many of our meetings.

When you tell somebody you've been working on the development of a mortality table, they say, "Oh, boy, that sounds like fun." In response to this, I'll talk about when I first got involved in the process. I guess it was in 1995 while the initial request for data had already gone out. This was at the very beginning of the process, so there was still an issue as to whether and what type of end product we were going to be producing. That is, what were we going to come out with? Was it going to be a mortality table or an experience study?

In response to this discussion, a few of the far more seasoned veterans said, "Don't do a mortality table unless you absolutely feel that you must because it's going to take at least five years to complete." And I remember sitting at a couple of those meetings saying to myself, "Yeah, right." It does take that long. There's a lot that goes into this type of a process. There is plenty of give-and-take and even some controversy.

We are all actuaries, and mortality analysis is what one thinks about when talking about actuaries. If you were to ask somebody on the street, what do actuaries do? I would think that this is one of the big things that everybody knows that we work on. Of course, every actuary feels that the process should be done his or her own way. As a result, there was a whole bunch of back-and-forth going on as to what is the best way to put this together.

As for background, about half of the committee was involved in the 1994 Group Annuity Study. The other half of us should be considered rookies to the process but we have now learned a whole lot more about it. However, the one big guiding light here has been to develop a table based only on private pension plan experience. Most of the group annuity tables released to this point have been based primarily on insured group annuity experience. The table, or tables, to be published, as a result of this process will be one based purely on uninsured pension plan experience. Furthermore, one of the concerns that has been kind of guiding us through this whole time is that we must make use of the various tables easy enough such that when published, people can readily figure out how to use it.

This last point is actually a big thing. I don't know how many times I've started in on something that I've had to do at work, saying to myself, "Who thought up this idea?" A published product to avoid that type of reaction has been a kind of guiding light in a lot of what we've been doing.

The RPEC has been an SOA committee for years. Up to this point, it has mainly been charged with doing experience studies of private pension plan mortality. In a

lot of cases, the experience hasn't been significantly different than much of what has come out of the previous group annuity tables. Remember that they were published from primarily insured experience. As a result, in response to the charge to the RPEC, a quinquennial experience study has been done every five years.

What happened next was that GATT was passed, and I'm not sure how many of you remember the political maelstrom surrounding that legislation. All the politics, the yelling, and screaming that went on about the whole thing seemed to be saying, "Oh my, you mean the IRS is going to tell us what table to use?" It was a very controversial act that passed. While ideas for it kind of went in and went out, in between, there was a whole lot of fighting that took place.

I realize that there have been various bits of information you may have heard about, or gathered, from reading about the GATT Legislation. You may have even heard, either from the information your company put out or from professional publications, that there was politicking taking place between a few of the large industrial clients. At least a few of the large industrial companies were afraid of the potential act's requirements. They may well have been thinking "Whoa! I have a bunch of hourly employees, and I'm not going to have my participants valued at the same rates that all of the other plans use. We don't compare to a company that's completely filled with white collar employees.

Furthermore, there was a lot of controversy about whether a single mortality table could fill the need for all plans. Part of the concern centered on the desire that a lot of the large employers wanted more flexibility. They wanted something that would allow the profession to have some say what the Internal Revenue Service or the Department of the Treasury is requiring us to use in valuing pension plans.

As part of that desire, the idea went out to let us collect some pension data. In implementation of this idea, back in September 1995, a letter went out to all of the Pension Section members. This request went out a little over four years ago. That following winter, a few of the large industrial companies who were really pushing for this data collection went a bit further. They got their own request together and went to some of their friends in business and said that this is something that would be better to do. They asked their friends to call up their actuaries and make sure that they send in the data.

Over the course of the next few months, we gathered a whole ton of data. You all know, that just like any other process, developing a mortality table consists of a lot of really cool theory, but you have to go slogging through tons of computer printouts. That's what we're going to have to do.

What has happened? Just to talk a little bit about the process, over the period of time since it was decided to collect this data, we have had a whole bunch of meetings, and all of these meetings have been open meetings. We've had, right from the very beginning, representatives from the IRS, the Treasury, the PBGC, and the Department of Labor informed of times and places. People like Dave Gustafson and Jim Holland have attended several of the meetings, so they are aware of what's going on.

The basic idea of this whole thing is that the SOA is the research body, in which this group, as a research committee, would put together the best mortality table that it felt that it was able to do. When we're finished, the baton will be passed to the Academy. Their goal, since they're the group that interacts with the government and the like, would be to go and present it to the government and to the government regulators. They would probably say something like, This is a really decent piece of research, and we think you should look at it." We've wanted to keep the important governmental people involved from the very beginning.

There's also probably a little bit of distrust between us, as actuaries, and the IRS. Every once in a while it tells us what interest rates and mortality tables to use, which makes some of us concerned. We wanted to make sure that everybody was involved right from the get-go. Hopefully, there won't be any opinion that we could be cooking the books, or trying to do something in order to get the best result for our clients. As an answer to this concern, we've had a lot of people involved in the meetings. We've had members of the Academy, other SOA Committee members, and the various governmental regulators present.

As the Retirement Plans Experience Committee, we are not the final presenter or approver of this kind of information. We have a couple of committees that we have to pass our research on to. It ultimately gets passed to the Board of Governors for their final approval. As a result, we've tried to have some representation from each of the higher levels involved. This way, when the whole thing is done, which is pretty much where we are right now, we don't get negative or surprise feedback. Hopefully, through this process, we have at least minimized that, although there's always some of that type of response.

We originally sent the data request out to the Pension Section. Then, this group of industrial clients encouraged some more people to send us data. After all of the requests, we closed the collection of data in June 1996, which seems like just yesterday.

As a part of the data request, we've asked for a whole bunch of things including valuation date. We were actually looking to collect experience for the 1990–94 plan years. As such, we asked for several items, including the valuation date (since we anticipated getting data cells for each of these groups by valuation date). We also asked for age nearest valuation date, sex, and status (which would be needed to keep similar experience grouped together). As for classifications, we collected employees, non-disabled retirees, disableds, and beneficiaries.

We also were looking for something in the data collection that's going to lead to a little bit of controversy that I'll talk about later, and that is annuity size. Basically, we tried asking for annuity size by using the PBGC definitions of small, medium, and large. We tried to have submitters classify their annuities, or people's benefits, that way. We looked at annual pay for each cohort of employees, and we looked for total annual benefits. With these couple of items, and I'll talk about these a little more as we go on, we had mixed success at getting the data.

I think that I can address what part of the problem was. In part, this is because I know how I was kind of involved on both sides of the process. I was involved with the committee as well as being involved in submitting data for a whole bunch of

clients. There were a lot of times in the past, when I was involved in addressing a given request, a question would be raised such as, "What do they want? Salary? I don't think so." But it does become much more important to the data collection process that we do get it. In fact, we do need it, and I think, going forward, that to make these studies better it's going to become more important that we have salary included in the collection process, along with the benefit amounts that we already have.

All of the clients from whom we received data were treated as confidential contributors. We don't have, at least nobody on Committee, the names of any of the companies. However, there was an independent researcher that was hired to work with the data. In addition, Tom Edwalds of the SOA knows a couple of the contributors.

After all of the data were received, we did a little bit of validity checking. A good actuary is one who looks at data and says, "Does this make sense?" The data were received and, as requested, submitted to Tom Edwalds at the SOA office where the data were collected to make sure that it was complete. Along with the data on people, we asked for things like a summary of plan provisions, so that we could make a decent effort at figuring out whether the data looked reasonable, given the constraints imposed.

As the SOA staff gathered the data together, we contracted with a researcher, Kathleen Elder, at Frostburg State University, to go through it and do the analysis to boil this stuff down into something from which one could develop mortality rates. The data were taken, the names were stripped off, and everybody was assigned a plan number. At this point, there was one other wrinkle to take care of, which involved the three major auto makers: Chrysler, GM, and Ford.

These three large corporations were very interested in participating in the study, but were also very concerned that because of the size of their data, it would be very easy to pick out who they were from looking at the data. To address these concerns, some extra steps were taken with the automakers' data. Their plans were split into 6,000–7,000 life cohorts. The data from each of the three automakers were lumped together. By the time we got through all of the data, it was very difficult for anybody to figure out from whom or from where the data originally came.

After all of this effort, the total data collected wound up with Kathleen Elder at Frostburg State. They took it and boiled it all down into a database. Then at this point, they looked into doing some of their own reasonability checks. Some of the checks that they looked into included looking for the aging of the population. Remember, we had five separate year's worth of data. As an example, if you have 1,000 active employees in 1990, you should have around 1,000 active employees in 1991. You should be able to map it. If you suddenly wind up with 100,000 people in 1992, you know something funky is going on.

In addition to these checks, we looked at changes in overall participant counts. We looked at unusual ages, and we investigated whether it was reasonable for people to be three years old at hire or still active at age 110. We also looked at the old population, since, after all, it was intended that collections be through

1994. Therefore, we looked into how many 94-year-old people there were and all these other kinds of issues.
We also looked at the proportions of groups, like the proportion of men vs. women, and whether they stayed relatively constant from year to year. Basically, we were also looking at increases in salary to make sure that the information looked pretty reasonable. When you get this much data from various places, it is difficult to find good ways of going into it and verifying its accuracy, but were trying to make these really high-level reasonability checks to make sure that data looked somewhat consistent.

Then the last test that we did was to develop a general set of rates for the database as a whole. We then looked at the mortality rates for each of the participating companies, and we tried to develop a 95% confidence interval around the average rates for the entire population. The plans that fell outside of that 95% confidence interval were looked into some more. Kathleen Elder, or somebody working with her, went back to the individual responsible for submitting the data and inquired as to whether it made sense.

In many of the cases, those who submitted the data were able to say, "Yes, your question is true, but they had an early retirement window in 1992." Or, "Yes, but they acquired some group at that time," or "They merged." In a couple of cases, the actuary who got to look over the data said, "Oh yes, that is right, it looks wrong because we goofed." Of course, in that type of case, they resubmitted the data. In fact, that happened in the case of one of the auto workers' data. There was something wrong with part of their data, and it was resubmitted, because, in going through the basic analysis, a couple of strange things were spotted.

We got all the data boiled down, and we started looking at the whole database. Once you have all of the data together like that, we started right from the top and we started excluding some people. This first point is an example of where it got a little bit tricky.

I was kidding a bit before with Lindsay in that when you think of something like developing a mortality table, as a science, you should realize that it's also kind of an art. Supposedly, that is why they have professionals doing these things. After all, it's not just a matter of applying formulas. There should at least be a little bit of that process at this stage.

In following through this observation, we tried to take out data that had incomplete information. This would include looking into things like where a few companies submitted data without breaking down participants between actives and retirees. There really was no place to put them into our mix where they wouldn't skew the remaining data. They were excluded, and in most cases, for only a very small number of people. In fact, not in most cases, but in all cases, this was a very small number of exposed lives that were excluded this way. We also excluded retirees under 28, out of jealousy. We excluded active employees under 16 out of sympathy.

Then there were also a couple of plans that were not subject to ERISA. In this we mean that one of the goals behind this table, or at least behind this study right from the very beginning, was to develop a response to the request for tables

required by the GATT legislation. A big driving force in this effort was we were developing a table that could potentially be used for measuring current liability. The committee thus agreed that, while we were given a submission of data from a multiemployer plan and from a decent-sized governmental plan that they should both be excluded from the database. Neither one of these plans are directly subject to the current liability rules within the context of a standard corporate employer plan. By this exclusion, we would preserve the potential for this table to be made to look very much like, and to possibly be used as similar to, your typical, run-of-the-mill corporate pension plan.

One of the things that struck me as interesting when we got to this point was the actual accumulation of information for this group annuity table. As you know, group annuity tables have kind of been around for awhile, but certainly not forever. It had always struck me that these group annuity tables kind of just happened. It would seem that one of the typical situations surrounding the collection of data for these group annuity tables is that you get a hold of a handful of insurance companies, you deal with about seven or eight different people, and they all can submit the data. There may be some kicking and screaming involved in getting that data together, but it's a limited group of people that you have to deal with.

Then this process rolls around and we windup getting data from 113 different plans. When we looked at all of the data, before we started the exclusions, we had over 13 million life years of exposure involved. This is about three times the exposure collected in the typical group annuity table collection; this just gives you some idea of the scale that we're dealing with. This turned out to be really big. It was one of the bigger mortality studies that I am aware of for this type of a process. From what I've heard, this was one of the largest group annuity actuarial studies that has been done.

In addition, we had 250,000 deaths exposed, which is really extensive. While 13 million exposure years sounds great, the 250,000 number death count is what's really important. As part of this large database, we also included data on sex, type of participant, industry, whether the participant was white or blue collar, and annuity size. The annuity size information is what I was talking about earlier with the PBGC definitions of small, medium, and large.

The white or blue collar refers to a distinction that was made in analyzing the data, since we asked for items like hourly, salaried, union, or nonunion. If 70% or more of a population was hourly or union, they were considered blue collar. If 70% or more was given to us as being salary or nonunion, they were considered white collar. If the distinction couldn't be made, there was a third classification that we used here, which we called mixed collar.

For the classification of industry, we used the standard industrial classification (SIC) codes, and primarily, the first two digits of the SIC codes. This helps you to get across broad industries, as opposed to drilling down and trying to figure out the basic underlying industry. I know from completing the government's form 5500, that sometimes figuring out the right SIC code can take you almost half an afternoon. Since we're dealing with just the really high-level SIC code, we could make some general groupings for anticipated mortality.

We wanted to be able to look at all of these things because, deep down, and I don't think many people would disagree, we know there are things that cause mortality to vary. But being able to quantify them and move them into a workable model that everybody can use, and applying it, gets kind of tricky. We wanted to look at all of these different kinds of features, and see if we could boil them down into some kind of formula. Hopefully, it would be a formula that could work in a general format.

Table 4 is sum total of the information that what we got. Just to give you an idea of the data breakdown, we grouped people into employees, healthy retirees, beneficiaries, and disabled retirees. We did a decent amount of analysis based on the number of people in comparison to the number of people that we received information on with an amount listed. We also had active employees for whom we had been given salary. We did some analysis of the different amounts levels, too. We will talk about that in a couple of minutes because the analysis concerning amounts became very important in actually developing the table.

The ratios shown here give you an idea of the percentage of people with data in total compared to the percentage of people in which amounts were contributed. Please notice that all of the amounts are shown in thousands. We have a good amount, but as you can see, a large number of people didn't give us amounts. That is something that I hope we're able to rectify the next time we go through this whole process.

We looked at all of the data that we collected and said to ourselves, "Well, what do you think?" Now was the moment of truth. Were we looking at a mortality table or did we think that we were looking at an experience study? The committee looked at the information and the volume of data that people contributed, and we came to the decision that we were looking at a mortality table. This was in large part because there was the possibility of it being used to respond to the GATT requirements. There has never really been a project done of this size, at least not one that looks at qualified pension plan mortality only.

Once we got through that decision, we fell into some of the old standard approaches. We decided that we were going to publish sex-distinct tables, in part, because half the people we sent the request to, as you know, wouldn't even recognize the word *Gompertz*. Nevertheless, we decided to come up with sex-distinct tables, which is kind of standard these days.

We were also looking at a combined table for retirees and beneficiaries, a table for active employees, and a table for disableds. While I'll talk a little bit more about the disabled table later, right now I just want to point out that what we're looking at here is a disabled life mortality table suitable for use in a qualified pension plan valuation. This is not the kind of disabled life mortality table you might use for determining premiums for an LTD type of program. It is also something very different than the kind of input that you would use to determine a five-year select and ultimate period for disability. This table would hopefully be something more fitting to be used in actually doing a qualified pension plan valuation for disabled participants.

Once we got to that stage, we kind of sat back and said to ourselves, "Now that we've gotten the table to this point, what do we do with it?" The first part of that decision was to look at what kind of q_x to develop. What kind of probability of death are we going to look at? The method that first came to our minds was to take the actual over the exposed to produce the q_x. The problem with that approach is that it is generally not what happens in the valuations that we are doing. We're not looking at the number of people that die. We're much more discerning than that. We care about who they are, how large a benefit these people will have, and other such items. We are concerned with the overall impact of the potential benefit's liability on our results.

We care about who has died. As an example, let's say you have 100 people in a plan. Ninety of them are 20-years old, each earning $20,000. One of them is 65-years old, making $1 million. That's the guy that you're really going to care about because he has a much greater impact on your liabilities, if all of our liabilities are dollar-weighted. One of the first determinations that we came to is that using q_xs based on lives may not really be appropriate for the various valuations that we're doing.

If you were to go back and look at the existing group annuity tables, you would probably notice that they're not using q_xs based on lives. The q_xs are generally based on amounts. In fact, that is what led us to the first fork in the road of decision making. We had to figure out how we were going to modify our q_xs based on lives into q_xs based on amounts.

Following this decision, and given what I just spoke about regarding the basic data that we collected, you might notice that many contributors never sent information based on amounts. As a side concern for the future, this presents my first opportunity to really get up on my soap box. I would like to tell you that when we come around and ask you for data again, it is truly important that we're able to work with amount-based q_xs. It is important to be able to do so if we are to produce a product that's going to truly be helpful for those of you working in the trenches.

In order to address the desire to produce q_xs by amount, we looked at the data from those who did in fact send us amount information. We then did some analysis to determine if there was any bias in the data, of those contributors that sent us amounts. As it turned out, it wasn't just coal miners or white-collared employees making $500,000-a-year that sent us amounts. It was more of a random distribution of contributed information that was sent to us with amount-based information.

Given the conclusion that amount-based information was forwarded to us randomly, we decided to work towards an adjustment, which would change the typical life q_x into an amount-adjusted q_x. We determined q_xs based on the number of lives and then determined the q_xs based on amounts. This was done for the data that provided information on both lives and on amounts. We looked at the amount of annuity, or the salary of participants who were still active at the time and the people who died. We compared this to the amount of annuity or salary of the various participants exposed to the probability of death. From this comparison, we were able to develop a ratio of what we were to call our amount

adjustment factor. What we basically did was to take these numbers, do some analysis for the people who gave us amount data, and then adjust these numbers to get something that looked, felt, and behaved like an amount-based probability of death. Finally, once we got to that point, we began to look at all of the retiree and the beneficiary data.

Mr. England: By amount, you mean salary for employees and the benefit for retirees and beneficiaries?

Mr. Kalnberg: Yes. That's right, amount is to mean salary for employees and benefits for retired lives.

Once we had the amount-adjusted q_xs, we stepped back and looked at all of our data. We noticed that one of the places where there was a bit of a problem was in the beneficiary data. The problem existed because we had a lot of exposure with a lot of submissions involving female beneficiaries, but not with a whole lot of information on male beneficiaries. Of course, this is primarily because of the demographics of what has happened in this area. There just aren't as many male beneficiaries in the retiree pool, at least at this point in time. Because of this, we took a good look and we thought about the way you are really going to use these tables. The committee then reached the conclusion to blend the healthy retiree and the beneficiary rates so that we could come up with one table that covered both blocks of lives.

In thinking about this, we were trying to figure out how people track their data and how people actually perform their valuations. We felt that the distinction between beneficiary and retiree mortality might be a tricky distinction for some people to measure. It would be a lot of work to make such a distinction in rates, in which there would be a very strong possibility that we would not gain a whole lot as a result. In relaying this concern to you, you now know some of the problems and decisions that we encountered. I'm thus giving you some information so that in six months when you get these tables, you'll be able to at least remember that we tried to do something with this information. You may not agree with what was done or concluded, but at least you'll be able to remember why it was done.

We processed the retiree and beneficiary data, we blended the information, and then we looked at the results of the three pieces. We had employees, disabled lives, and annuitants. For each of the pieces, we performed two different kinds of graduation. One of the things that happened with the amount-adjusted q_xs, in part because of the amounts and the size of the contributed data that had amounts, is that they tended to vary from one year to the next. Or they varied from one age to the next. As a consequence, we decided that we would graduate the amount-adjusted q_xs before applying them. In this way we anticipated the production of a smoother pattern.

Once we had the q_xs graduated, we applied them to the regular experience q_xs, before we graduated the entire table. This way we would produce a smoother table going through the full range of ages, and it would help to eliminate some of the static from age to age. Once that graduation was completed, the tables were extended to the extreme ages. For ages under 30, which is one of the items that is still under a little bit of debate at the time of this session, we looked at using

Social Security rates or using the UP 1994 rates as some kind of proxy. The problem with using Social Security rates is that they were much higher than the observed rates we collected, and as a result, it was very hard to grade into them. The one good point about the decision is that ages under 30 don't make a lot of difference in the liabilities that we would be valuing. While there will be participants at the younger age ranges, it is not expected that they would be a large group and that's not where the bulk of the liability is found.

At the very old ages, we also had some problems. In this context, what was kind of interesting, but it does make some sense, is that even Social Security records are not always very complete for people over 100 years of age. We would think that, at the very least, they have accurate records. But that is not always the case because of the records produced from about 100 years ago. Our society wasn't quite as rigorous in recording births. As a result, many records for people who are about 100 are not quite what we would anticipate them to be. From personal experience, a lot of people who are well into their 80s and 90s would tell me things like, "My mother-in-law is celebrating a birthday on either January 12 or the 21, but I'm not sure which one it is."

Finally, additional issues similar to these had to be addressed. Since the Social Security Administration doesn't necessarily have complete data going back over 100 years ago, we wound up reaching some of the same conclusions that were reached by the UP group, which put together the UP 1994 Table. Similar to what has been done traditionally, we settled on a final mortality rate of 100% because, in the end, everybody dies. While this appears obvious and clearly makes sense, if you look at some of the more current studies of old-age mortality, an ultimate mortality rate of 100% is not necessarily indicated.

Mortality tables, which typically look nice and smooth, from ages 20 through 32, 42, 52, etc., and then end at an upper age or 100–120, are pretty standard. There seems to always be a kind of big jump up to this limiting age. When you look at it, we felt that it was really much more appropriate that the rate of mortality winds up peaking somewhere in the 30–40% range. You never have a day when the mortality rate actually shoots up to 100. That would be kind of scary, and I'm not sure what it would mean! The committee decided that we would maximize the table at a 40% probability of death, so that, at least this way, you have a fighting chance at life. At age 120, we artificially limited the table at a 100% probability, in part, since many computer systems still cannot readily handle an open-ended ultimate mortality age.

As for the actual choice of 40%, we arrived at it somewhat mathematically. We arrived at that rate by developing a cubic polynomial that fit specific parameters we set, and, that worked from the ages in the late 90s. As a result, we reached a maximum of 40% for men, about age 106 and for women at about age 109-110. Again, these are not the ages, or the places in the table, where we have to be very exacting, despite the fact that we have to fill in some of these holes. This is not where the real bulk of our liabilities are. The real bulk is probably between ages 50 and 80 or ages 50 and 90.

We were set to do our graduation (the really cool part) of our table. We probably studied it back when we were taking the actuarial exams, then we forgot about it.

When I first started working on this, it was the way any of us might start working on it. If you ever have to actually graduate something, you get a student to do it because they've just finished studying how it is done.

If you want a prep course on graduation, find someone who's still sitting for exams, or look at some of your old monographs. For the RP-2000 development, we decided to use a Whittaker-Henderson Type B Method. And, if any of you have those old maroon monographs and you look this method up in that book, it says something like, "Type B graduations are too complicated to be practically used and should only be tried when the most rigorous techniques are necessary." Unfortunately, it is one sentence, and the method is left alone. To use some of these methods, you may have to look at some of the newer books.

Basically, the method makes use of two factors, which help to address the two items that we are concerned about in a given graduation. We are concerned about the smoothness of the graduation and the closeness of the fit. When graduating, we're always walking a bit of a fine line. We like smooth lines, because, even though we're all mathematically inclined, we have this artsy part about our craft. We don't like to see things that go in different directions, we prefer straight lines, and that's where the smoothness issue comes into play. The smoother the table becomes, the greater the chance that we lose the "fit" properties of the table.

We graduated the amount adjustment tables and separately graduated the final rates. The method that we used for the amount adjustment tables resulted in a pretty heavy graduation because we wanted to really smooth out the amount adjustment factors. We did that by using two parameters, the number of the differences and the H coefficient. We used a very high H coefficient, which turned out to be 100 million, in order to graduate the amount adjustment factors and get something that behaved smoothly. We applied those results to the rates, and then we used a sufficient number of differences that allowed us to keep the appropriate form (that is, the fit) in the final graduated rates.

When we finally got to look at the graduated results, we had a couple of issues with some criteria items that we had established to decide whether or not the graduation worked. There were some reasonable things, like the idea that any mortality rate should probably never be lower than the rate at the age before. At least this condition should exist in most of the normal age ranges that we would be using, it is not in the low 20s, but in the heart of the ages used in our table. It was agreed that our preference was to never have the change in the rates of mortality decrease, at least for the various age ranges that we were looking at.

You should probably never have too large an increase in absolute levels of the mortality rates either. That type of thinking was probably one of the bigger concerns that we had. We were concerned not only with the change in the rates of mortality, but also in how close the eventual graduated rates are to the observed mortality experience. Therefore, we did some "look-and-feel kind of tests" on the results to make sure that we were maintaining the slope of what we were actually getting from the data, or we would look to maintain the slope that was inherent in the underlying data.

We now had some graduated rates, and we were now in a position to actually look at what we had. We looked at the results of this data collection and modification process and recognized that we received data from years 1990 through 1994. We concluded that the data was pretty evenly distributed within this five-year period. As a result, we determined that the central year of the collected experience should be 1992. We set 1992 as the base year for the table. The process that we would follow next required that we project the 1992 table to a year in the future, which relates to when we should be ready to publish the finished table and report. We have the RP-2000 Table, and, hopefully, it'll be finished in 2000. At the same time, we should at least have a beta release out.

We looked at this mortality table data, with a base year of 1992, and we tried to figure out what kind of mortality improvement to reflect, in order to project it to a point in time where people would actually start using it. Thus, one of the first conclusions that everybody made was that there are really two kinds of projections that we're interested in. There's a short-term projection, which would move the tables from 1992 to 2000, and then there's the long-term projection, which pertains to how the projection should be handled after that. In order to address this, we essentially did two separate pieces of analysis.

For the short-term mortality projections, we actually looked at three different sets of data. We looked at Social Security Administration studies, the Civil Service Retirement System studies, and the group annuity studies that formed the improvement scales for the new Group Annuity table. However, even with this information, there are some problems in trying to determine an appropriate projection to a future year. When you boil things down to the level of each age cohort, for up to five experience years (or even for several grouped years), in order to determine a realistic projection of a mortality rate, the data are not necessarily as extensive as one would imagine. While we had over 10 million life years of exposure, an average of 2 million per year, and given all the different ages and information (amounts, sex, etc.) we wanted to work with, some of the critical cells just didn't have enough exposure.

It has been hard to make use of our data for determining an appropriate mortality projection to the year 2000. The changes in mortality, from age to age, vary quite a bit, and are actually kind of wild. You know how it is when you start looking at data with that level of detail. Even with the Social Security Administration and Civil Service Retirement Systems, it's very hard to project appropriate mortality improvement because when you start breaking down the data into these tiny groups, you get very small changes in the data.

What we did was to group the data into five-year cells and tried to determine what kind of improvement there was over these quinquennial age groupings. The Civil Service Retirement System was especially nice to look at because the Civil Service data had been looked at in several of the recent mortality studies that have been done. Furthermore, it tends to track pretty closely to qualified plan mortality. The data consists of a large number of people, as well as a very homogeneous group that stays pretty consistent from one year to the next. Finally, the data have been available to us on a regular basis, so it's kind of a good benchmark to check other information against. As an example of why this is worthwhile, Social Security data, while consisting of a large number of people, has mortality rates that tend to

vary much more so from the kind of data groupings that we were looking at in qualified pension plans.

We tried to look at the Social Security data from 1990 to 1994 along with the Civil Service Retirement System data from 1988 to 1996. Our goal was to gauge mortality improvement within ranges produced by the actual data groupings that we were able to arrive at, and that centered on the 1992 data year. Basically, what we saw when we looked at the results was that there really wasn't any measurable female short-term mortality improvement.

As for the male mortality improvement, we decided that there is some measurable improvement for males, when we took a close look at each of the various age groupings. When we started doing the final analysis, we chose an estimate of about 1% per year between ages 55 and 80, and then, just at the extreme ages, we graded down to a zero improvement. After about age 89 and before age 46, there was no mortality improvement reflected, and in combination with the base year q_xs, we moved the compiled mortality q_xs from 1992 to 2000.

Once the projection magnitude issue was addressed, the process gave us the pieces that we needed to complete the tables, as of year 2000. At this point, we looked at the results and noticed that we had an active and a retiree table. In addition, we knew that there are still many practitioners out there who are using computer systems that have a hard time making a distinction between active mortality and retired mortality assumptions. Therefore, we wanted to produce some kind of combined mortality table to help make it easier to compare with results of past studies, as well as make use of them on a broad basis. This way, when you compare such tables, you would be able to compare them on an apples-to-apples basis.

A problem with using such a combined table is that, for ages 50–60, there's a huge difference in mortality between active and retired lives. If people retire at these ages, especially closer to 50, the data show a tendency towards higher mortality than that experienced by those people who continue to work. Even though we all think we're going to change the model, retire at 50, and stick our companies for 50 years of having to pay our pensions, that does not seem to be the case. There tends to be, and it has been an observed trend over some time, a higher probability of mortality at these earlier retirement ages. When using a blended table, you should be very careful with it, because the table reflects the blend that went into its development. If that blend is different than your plan's population, you may be misstating the anticipated mortality that will occur.

In order to arrive at how we should blend the two groups, we first looked at the data that was submitted. It turned out that many of our data submitters did not send us active data. Similarly, many of our data submitters only sent us retiree data. Of course, we used it because we knew what type of data it was. However, because of the differences in submissions, we felt that we couldn't just look at the breakdown between actives and retirees in the full study. We stepped back and looked at the breakdown between actives and retirees for those companies that submitted both. Based on that, we developed a ratio between ages 50 and 70, that gives the appropriate percentage of people in each age group, and produced a combined mortality rate for each of these ages. The resulting grouped data,

including ages before 50, produced a combined table of essentially all active lives. After age 70, the blended table is essentially all retired lives. The ultimate result, which we had pretty much settled on about a year ago, was a complete mortality table for comparison with previous mortality studies.

At this point, we had a complete mortality table throughout the age spectrum. We reviewed what we wanted to accomplish and realized that we would have to look at what variations we could produce that we could actually hang our hats on, as making a difference. After all, the results of our study would be given to people like actuaries who would actually apply and use them. We looked again at the information that we asked for and collected. We started looking more closely at collar at industry classification and annuity size. However, the first item that I'll deal with is industry classification, in part because that is an easy one to slice off.

When we took a close look at industry, we couldn't always find a lot of rationale behind some of the underlying effects on mortality within each industry. We found things, such as, petroleum workers displaying much lower rates of mortality than communications workers did, which didn't seem to make sense. Metal workers, on the other hand, had much higher mortality experience. Part of the overall impact that takes place, when you start looking at industry classification, is that many things that influence the conclusions are buried in the results. As an example, just because Ford makes automobiles doesn't mean that all of the jobs in Ford are directly assigned to that task. There are a whole bunch of other tasks and jobs that Ford has people doing. I think when you look at the high-level industry classifications of the SIC code, it actually brings a whole slew of other classifications into the mix. When we looked to incorporate industry as a legitimate classification, we decided that it was not going to be helpful enough.

Then we started looking into collar color and annuity size. We debated many aspects of each choice back and forth. Eventually, it was decided that we should bring in some additional researchers to do some more statistical analysis on the data. Our goal was to see if the researchers could find any more underlying trends to focus on in categorizing mortality changes. We put out a contract for bids, and Dr. Charles Vinsonhaler of the University of Connecticut received a contract and did some more analysis with the data. The net result of the research and our final determination was that collar color and annuity size did indeed have some predictive value. Furthermore, they weren't independent variables, although some of us thought that they might be. As a result, this was the first problem that we had to resolve. Both variables had their own inherent problems.

Thus annuity size was looked into first. For a classification by annuity size, we used definitions from the early 1990s. That classification incorporates a whole bunch of other issues in pension plans. When you group data in the way that we have done, it means that you could be mixing in somebody who made $10,000 with 40 years of service from Plan A, with somebody who was earning $200,000 a year with five years of service from Plan B. If you start mixing in deferred vesteds with short service, you create more concerns. Thus, there are many issues that get wrapped up into annuity size. Furthermore, when you project it forward to make a determination of mortality, and some of the periods we're looking at are 50–60 years from now, what do you use for annuity size then, and where do you

draw the line? As you can see, we had to deal with several of these types of issues.

When we started looking at collar color, we were presented with other issues. As an example, just because somebody is considered a blue-collar worker, it is not appropriate to think that they were always a blue-collar worker, or will continue to be a blue-collar worker. We had some groups, with heavy blue-collar classifications, in certain industries, and, in general, the blue-collar workers had higher mortality rates. But some groups in the blue-collar classification, in certain industries, had lower mortality rates. And, this kind of made it hard to arrive at a rationale, or come up with a recommended application that could be used in practice. The committee has decided, for now, that there won't be any specific recommendation made in the report, as to the kind of adjustment to use, or how to go about adjusting mortality rates, in order to reflect these differences.

However, classification by collar color is something that we think could be considered, and probably should be considered, but we haven't really been able, at this point, to come up with something worthwhile for use. The strongest point, I think, that has come out of this analysis is that further research is needed. It is important for those of us collecting data for the next table and it is important whenever it is appropriate to start generating the next one. You will get the eventual request letter a few years from now asking for data. Remember these issues and questions, because, truly, the more data we are able to collect, the better our results will be.

After we have done all this analysis, we had a base table to work with. Back in the supposed simpler days of yesteryear, we would have been done with the table at this point. Unfortunately, nothing is that simple now. As an example, we now need ways of projecting the table. To this direction, we did a lot of analysis. As before, we looked at Social Security and the Civil Service Retirement System. We looked at group annuity experience. We even looked at railroad retirement as well as the scale AA that was published with the 1994 mortality tables. However, with this experience, we were looking at a much wider range of years.

For example, for Social Security, as I stated before, we were originally looking at data from 1990 to 1994. From the Civil Service Retirement System, we were looking at data from 1988 to 1996. And now, we were looking at data from years that included all of the 1980s. We had a much longer period that we were looking at, and we determined that the observed trends were not significantly different from those that were incorporated into projection scale AA. The Committee decided to recommend that projection scale AA is an appropriate scale for publication with this table.

As part of that recommendation, we are also suggesting that you consider reflecting some kind of mortality improvement when doing a valuation. A fully generational table incorporating projection could be very appropriate in some cases. But I know that many firms' software packages do not reflect a fully generational table. However, I think that's where our industry is going. That's at least the direction that technology is moving toward. I know of at least a couple of the big consulting firms right now that are moving to make their software capable

of processing these fully generational tables. I think that's what the practice is moving toward at this time.

However, if you can't yet consider the use of a fully generational table, it's important that you at least reflect some kind of mortality improvement. For example, if you're doing a 2000 valuation, you could project it, look at any mortality improvement that has taken place under your plan in the last few years, if available, and try to make some kind of mortality projection going forward. The goal is to figure out what might happen and at least try to reflect a part of that.

There are other nice parts in doing this. In a lot of ways, we've been given a free ride up to now on the issue of mortality improvement. I guess it's not quite as bad as it used to be, but, a while ago, nobody ever reflected mortality improvement in calculations. Every time you wanted to make a change in mortality tables, clients would have a fit because it was raising costs. However, if you reflect mortality improvement properly, and if you even use things like a fully generational table, you may reach the glorious day where you change a mortality table and the clients' costs go down. Of course, those are always good things. Nobody asks you a question when costs go down; they only ask when the costs go up. I think it is important to consider whether to incorporate a fully generational table.

Table 4 shows sample rates from the table that is being worked on for the report. The table is going to be called RP 2000, which, like any good actuarial discourse, took half of one meeting to decide. It will be called the RP 2000 to distinguish it from all the other tables that have been published before. In a way, it is because there has never really been a table like this before.

We have also compared rates to the RP 2000 projected to 2010, just to give you some idea of the implied mortality improvement. You'll see this improvement in a lot of ways. The first set rates are for males. Table 5 shows the comparable female rates. Charts 3 and 4 show the deferred annuity rates now? Charts 5 and 6 look back at some of the immediate annuity rates.

These rates are behaving largely the way that you would expect them to behave. I don't have a lot of the annuity rates in there, so they're pretty straight lines. We're also coming out with the generational trend lines, which will give you the highest rates. There's a little bit of a crossover that goes on here because that is where projection scale AA stops reflecting any projected mortality improvement. The biggest difference in rates between the UP 1994 table projected to 2000 is not so much in the relative rates. There's not a tremendous difference between the mortality rates; that is, you can't say that this table represents something like 5% more mortality improvement. However, the slope is very different in some spots. This table and study are still a worthwhile improvement from what we currently have.

Let me finish my portion of the session by talking about what our committee is doing now. What happens next is that there is going to be an exposure draft. In many ways, we first have a draft, and then we have an exposure draft squared, and finally a draft, of an exposure draft, which is what we are debating about right now. With any luck, and if all the actuarial gods are willing, it will be presented to the Board of Governors in the fall for their approval. Because mortality tables are

something that's very basic to what we do as actuaries, it is something that the Board of Governors will be interested in. Everybody wants to make sure that there's a real need for the table and that it is given an appropriate benediction before anything gets published.

Given all of the above, we should be able to release an exposure draft in the fall. There will probably be a three- or four-month comment period after the exposure draft is published. I ask that each of you read the exposure draft.

Do you ever borrow a copy of the *Transactions* because you need rates, and you are always the first one that opened the book? This type of release is real basic to what we do as actuaries. It isn't the government, nor is it basic to what we do as accountants, or even basic to doing a Schedule B. In a lot of ways, it's just basic to what we do as actuaries. This is how we determine liabilities you know. If somebody asks you what you do, or comes up to you on the street and says to you, "You're an actuary? What do you do?" You don't say something like, "I complete a Schedule B." Right? You say things like, "I look at the percentage of people doing different things to figure out what the costs for the plans are." This is basic to what we do. It's real important that we have at least a basic knowledge of these mortality tables.

This report is written in a way that I think will help expand our knowledge a little bit and give you some background as to the why and how we came to some of our decisions. Hopefully, it will show you, in sufficient detail, how some of these things were arrived at, so you're not stuck in a position where a client asks you a question you can't respond to. You might receive inquires like, "Why did the government say to use RP 2000?", to which you would not respond "Because they said now." Instead, you would be able to give them a little bit of the background, some of the history, and where the information actually came from.

Mr. John R. Kaleas: Currently, the 1983 GAM table we have to use for Code Sections 412 and 417 for various purposes does not include a projection. You mentioned that you'd met with Jim Holland and other IRS personnel, and in this presentation, you've indicated that you favor a projection. Do you have any insight into whether the IRS would agree to a projection in the future, as a requirement of the Code sections 412 and 417?

Mr. Malkiewich: A few of the slides that we haven't gotten to yet are going to be addressing the actual presenting of that type of information. The GAR table, right now, has been adopted by 22 states. The GAR 1994 table has, as you recall from our presentation earlier, a fully projected scale as part of that Minimum Reserve Standard. Section 417 refers to 807 (d)(5) as the table on which to base mortality for lump-sum cash distributions, should 26 states adopt that table. Of the total required, since 22 right now have adopted the GAR 1994 as a minimum Reserve Standard, we only need four more states to say yes to GAR 1994. At that point, the GAR 1994 table becomes the 807 (d)(5) Tax table, automatically. Theoretically, while there should be some kind of legislation, ruling, or procedure confirming, or changing the GAR 1994 (with full projection), this 807 (d)(5) table would then be the table used to base mortality on and applicable for the determination of cash distributions.

We don't know whether that table will actually be used in this way for lump sums, for current liability calculations, or not be used at all. As we mentioned, it's delivered to the secretarial authority, where they will take this experience study and report that we have developed and they will determine whether they should or should not change the 1983 GAM table for years beginning in 2000. They may or they may not. They may choose to use what we've done, and they may choose to use a variety of tables, or they may choose to do nothing different at all. Every five years, theoretically, they will at least review and then choose to change or not to change. But the 807 (d)(5) table, which is to be used as a base for the Section 417 mortality assumption, unless they change that legislation or modify it in some kind of ruling, will become the cash distribution table. If it is taken as such without change, that mortality table fully projects mortality.

Mr. Kalnberg: Based on the meetings at which we've had representatives from the government attending, I'm not so sure that we have any kind of feel for how they might be thinking. I'm not sure any of us have any kind of feeling about what they think they are going to do with this study, once they get it. I think we've had them in there, in part, to be aware of what we're doing and to see if it is logical, if it makes sense, and that we're not going to bias the results. They haven't tipped their hands to us. I also think they've gotten a little concerned about what they might say and how we might react to it. I think somebody like Jim Holland, who early on, posed some questions, might be afraid to say too much. It is possible that anything they could say like that would probably get them into nothing but trouble. I don't think they've given any clues about their thoughts.

Mr. Malkiewich: We are also trying very hard to not tell them what to do. We are very specific, in that we are just giving them an experience study, information, and a table that we have developed from this experience study. We are saying, in a way, "Here's the information that you've requested in the legislation," and then they'll come back to us as to what they feel they should or shouldn't do with it.

Let's discuss future study issues. John has already mentioned how we have annuity amounts, blue-collar differences, and industry differences, but we do not have, nor have we made, any explicit recommendation on what should or shouldn't be done to compare these differences in mortality and to incorporate them into your pending projections. That is information that we would love to see studied in the future. These trends require further research. We do not have anywhere near the resources or manpower to do that kind of involved study, which is very, very much in need. How do you reflect the interaction of blue collar versus amounts, when both of those influences are changing over time? Furthermore, they have a different influence on mortality over time. You can't just add them together, and you can't just multiply them together. That is the kind of activity, while obviously there are some cross-parallels that will cause the numbers to change, that you just can't readily reflect.

Finally, we have not really looked at small-plan experience. We strongly suspect that small-plan experience is very, very different from large-plan experience, and the homogeneity and extensiveness of the data are very different. To say the least, studies have just not been done on that experience. It would be great to see them. If anyone wants to do something like that, please do so. If you have suggestions, by all means, bring them to the Pension Section Council or others on

this committee, and it will be brought to the people that maybe can do something with it.

Mr. Kalnberg: There's just one other thing I wanted to add. When you do get the table and look at these slides and then look at the exposure draft, keep in mind that this table is a beginning. This is the first time we've ever done anything like this, with this quantity of experience. This isn't an end. There are a whole lot of things that had to be designed to enable us to do this. Going to this many different companies, trying to get data, and then boiling it down into something that is usable is really a massive undertaking. These studies will only get better. If you feel inclined to comment on it, any kind of comments that are added will help develop a better database and develop better information, which would surely be helpful to everybody involved.

Mr. Colin E. Southcote-Want: Is it true, with a lot of small plans, that people take a cash distribution from the plan when they retire? I presume that there's nothing in this study at all that relates to actually how long those people live, or, as an example, who might have taken a cash distribution from their plan.

Mr. Kalnberg: It's very hard to track down those people who've taken lump sums because, in a lot of cases, once they take the lump sum, their connection with the plan has ended, so you don't really have any follow-up history of that. I think that is true.

Mr. Malkiewich: That was a concern on the study that we're looking at here. What kind of experience analysis on lump-sum distributions have we been able to make? The answer, unfortunately, was not much. That is because we just didn't get that data. Again, it's another future issue that we would love to see studied.

John had made an observation earlier that the committee was talking about fully projecting mortality. I do want to make an observation and note that not every circumstance and not every situation really does demand full projection of mortality. It's something you should be considering with each individual case or situation. You must make an appropriate observation and decide how much and whether you should project mortality. There are certainly industries and plans out there that have individual experience that might give you some cause to consider, or to not consider, how much you should project mortality. Without a doubt, it should at least be considered, and up to this point, it has not been. The 1994 GAR now requires it as part of the minimum reserve standard. We believe it should be considered as part of your projection for mortality from 2000 forward.