Panel Session 4E

DISEASE AND TOXIC TORT CLAIMS

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This is the session on Disease and Toxic Tort Claims. I'm Bob Miccolis from TPF&C. I'm your moderator and also a speaker for today. The other speaker is Mr. Jim Tozzi here at the table. I looked at some of the transcripts from prior seminars on this topic, and they tended to concentate on what was happening in the legal area, what legal precedents were being set, what the overall scope of the problem was, and some of the medical research that had been done on some toxic substances. What both Jim and I are going to try to do is go a little bit further along those lines and talk about estimating the costs which comes closer to estimating the liabilities. So, Jim Tozzi will go first. Jim is currently a Director of Multi-national Business Service Corporation in Washington, D.C. and he's also an economic consultant for the law firm of Beverage and Diamond. His firm represents, his clients, which are mostly multi-national corporations, before federal government agencies in the U.S. and in foreign governments. He is also involved in joint ventures between U.S. companies and firms in the Far East. Jim has had an experience of over 20 years in the U.S. Government in the Department of Defense and just before he left the Government, in the Office of Management and Budget. And so, he has a lot of background on some of the legislation in the super fund area and the federal cause of action. So with that introduction, I'll have Jim come up.

Tozzi

Thank you, Bob. The last time somebody introduced me as having worked for the Government for 20 years was around three weeks ago. I was in Washington, I had to make one of those cream chicken speeches which I thought that when I left Government I wouldn't have to make anymore, and it happened to be that one of the many forecasts that I made in twenty years came out right. Not very many but one of them did. The Times asked me one time right before the transition from the Ford Administration to the Carter Administration what I thought was if there was a change in Administration what would happen on certain funding for some housing programs and I happened to guess right which was counter to the current economic trend. In any event, my recommendations got public and some people listened to it and some people didn't. So there was this meeting around three years later, or fours or eight years later, I guess it was a couple of months ago, and they introduced me and they said , "This is Jim Tozzi, twenty years of govenrment" and there was winners and losers in the audience. And after the introduction, one gentlemen in the back said (I think he was a loser, too), cause "Mr. Tozzi," he said, "if you're so damn smart, why did you work for the government for twenty years." So, you're going to have to take what I say in that light knowing that most economists and many economists miss as many things as we hit. If I were to put labels on things, you kow the decades of the sixties in terms of some social movements and movements to the judicial system, what might be characterized as a decade of Civil Rights. And we're somewhat in the mid-eighties and if I had to predict what one might term in the same analogy as a decade of the eighties, it might be the decade where you are going to see some substantial changes in tort law--both by statute and the way it's implemented. None, I think, affects the insurance industry any more than the topic Bob and I'll be discussing today. I'm sure you are all aware that the classic definition of tort would suggest some type of wrongdoing by which the injured party is permitted to seek through either administrative tribunals or through some judicial system some type of relief has its foundings in English common law. What has happened though and what is happening, is those very foundations have been changed and I think quite apart from hungry lawyers or hungry consultants, that part of the problem is that the national economic picture is changing. The very strong competitive position the United States has held for many years is dwindling and a number of people in society are taking relief in a variety of ways. Not the name of which is a neighborhood child came up to me the other day and he and some 19 year old teenager got in some raucus, I think it was really too much of that Canadian beer, and he approached me that the younger man had injured

his lip and that the parent of the, in this case, the alleged defendant, was going to compensate him for medical expenses. And the young chap, he was only 18 or 19, must be a follower of the newspapers, was extremely well-versed in the way that he was going to go for personal injury claims. And, after I drilled him a little bit more, I found out that the young man felt that he'd make a lot more in court than he did on his job as a night clerk. So, there is a lot in society that is moving toward all kinds of relief. And, right or wrong, the insurance industry, after five president that I worked for, is high on everyone's list, for whatever reasons, whether it's that one claim you didn't pay off for an automobile accident or the premium you lost for life insurance or that one thing. And then there's a lot of people, particularly , a lot in Washington, think you all hold deep pockets. So, there is a lot of people that feel there's virtually no cost associated with many of these pending judgments that are moving toward the insurance industry. Now, I would like to move for a few moments now in the area of toxic torts and some of the areas of estimation. The toxic torts have really come, as far as I can recall from the Federal Government side, started somewhat with super fund and before that was passed by President Carter or signed by President Carter in, I think December of 1980, there was a rather, in Washington in subterranian debate, over whether victims should be compensated for toxic injuries. And, during those debates, the OMB staff advised the President and a lot of other people that we thought the whole area of super fund should be used to clean up sites and not for an income redistribution program. However, once things start in Washington, they never die, they just slow down but they never die. And, what happened was that we compromised in super fund and we set up a 30le study, that the buzz words for whether we should have such a system. If you all want any reports, on that, give me your name and George Freeman and I, a big litigator in this area, have written some studies on that. But, the bottom line was out of that that maybe out of that study group we should have some type of administrative relief for victims of toxic compensaton. And I won't spend a lot of time, but the super fund that's is coming through authorization now that has been dropped with direct compensation but some demonstration programs are on the board and possible further federal cause of action which will discuss in a few minutes. In any event, as that issue stuck in Washington, what came out in the real world started to get more significant. And probably the most significant was the disaster that occurred in India. And, it wasn't days until after that occurred that I saw federal agencies cranking out all kind of task forces to solve this problem. And the State Department even got involved in it to chair a international task force _____for one client's and movements as to how Western Europe was going to have these type of activities. And, I mean, it just spread over Washington and, if you followed the alleged claims in that, I mean, they're in the multi-billions of dollars. If any of you are the primary carriers for that I hope you enjoy the reception this evening. But, in any event, that has sort of calmed down a little bit. And all at once, we had a few events in Institute in West Virginia. Now, let me tell you those aren't unusual. Before I had to get my economics creditials I was an engineer, and now I'm not, but there're releases from chemical plants all the time. I mean, that no big thing. The question is are they sudden, the question is what volumes, you just don't make chemicals forever and have no releases. We don't have any close system technology for many chemical engineering plants. And now what has happened you'll see more of. The slightest release, because there's going to be more state legislation for a toxic right to know, that small amounts are going to be emitted from these plants, they're going to be reported, and they're going to be taken outside the scientific area and individual plants are going to be under increasingly greater scrutiny. And, particularly, my friends, in the plaintiff bars, because they're going to be running around--they just love this data--and they act on it accordingly. Now, to get your attention, and I probably don't need too, by the fact that you are all in this room, we're talking about a reasonable amount of change in these developments. I mean, Love Canal, which started out as we had a little cleanup, we were going to move a few houses here and there, it's now $20 million in direct costs, and Lord

knows what the total outstanding liabilities are. Agent Orange, which the Federal Government is somewhat involved in, was at the last count, over $180-190 million. Bob can tell on the asbestos it's in the billions. This unbelievable action that a couple of people in the Justice Department and EPA took against one company ranges $300-400 million to $1.8 billion. It gets to be real money. Even in Washington, I think that tends to be a significant amount of money on a particular suit. Now, some of my former clients, multi-national clients, which some of you all are, has started to ask the question, "Well, really what's out there, and what is our liability?" And, "Why don't you people do some do some work on estimating these liabilities?" Well, if you've ever tried to project GNP or the employment cycle over a period of twenty or thirty quarters, this here is really an art what I'm going to give you now because the range of uncertainties in what I'm going to discuss there are unbelievable compared to any typcial type of economic projection one would make. But let's just go over of the uncertainties that come out really big and have huge impacts on any analysis you all do. One the uncertainty the link between a specific substance and the disease it's going to cause. Does ethylene oxide at 5 parts per million induce some kind of angio sarcomas? Does lead acetate or foot or dermal exposure relate to some type of neural disorder. The links, one certainty you have a chemical exposure and you have some cause of disease incidence. A very difficult, as Bob will tell you, asbestos is probably one of the most cleanest, but that's somewhat unusual. The second, is pathway of exposure. How did it get to the alleged injured party? Was it through air. Was it through water. Was it through a combination of above. Was it through synergy of several elements that he or she was exposed to in the house as opposed to some environmental aspect. And the fourth, is more of the global synergy, meaning has that individual not only been exposed to chemical reactants directly but was there some exposure outside the house in an environment that he only frequents once in many years that he had such an exposure that that in itself induced some kind of reaction in the individual. These are very difficult questions to find. And as we get into this methodology, you will see that answers to those are pretty important. Now, what we've been asked to do for some individuals, was to look at, there's two really types of liability one could look at. One, the number of hazardous waste dumps that are around the country depends on who does the accounting whether it's 2,000 or 20, but most certainly upwards to 1,000 of them are going to be on EPA's "NPL" (National Priorities List). And, insurance companies, private companies, Fortune 500 companies ask what is our outstanding liability at these sites. They're all interested in those numbers for a different reason, I think. Some of the corporations have an aspect of they may go into litigation on these sites or just steps away and they want to start developing a litigating strategy. The insurance companies, I guess in part, are getting a little concerned on whether in fact or whether these reserves you are calculating today or not, or really how big that pie is and what their outstanding liabaility is and when such liability will occur. And another group that's asking for it are the investment bankers. Those are a very unusual group. They don't fit either the category of a Fortune 500 or an insurance company. And when they get conerned, you know that is one of the bell weathers around. When the investment bankers finally look for anything over 3 months, and I can say this on the record because I have a number of them as my clients, when they look at anything over 3 months or 3 quarters, which is somewhat about the length that many CEOs look, that you have a problem. And they are starting to look at these. Why? On mergers and acquisitions, you know you can see this aspiring MBA on the street who crunches number 80 hours a week and does a good job. And after the merger comes through, there's one dump in the place and this sort of is not the best thing for your career, and he, too, may end up working for the government for twenty years. Now, let's go into.....I can't give you numbers because not one client allows me to give numbers. Isn't this an open society but no one wants to give numbers? In any event, there three determinations that is really key to any of the technical determinations. Now, those others I gave you some policy choices. But, there's three number crunching activities

that is common to all these. At least, common to all the things we do. Whether it's common to litigators on the other side, I don't know and I think I have a liberty.....In fact, who in the hell can sue Multi-National Business Services Corporation. It ain't been around for 2-1/2 years. They hardly think we're deep pockets, so I can go over some of the methodology. One, and a driving force in all our analyses, is what you might expect, is the total population exposed to the hazardous waste site. And that, in general, may look like the easiest thing to get, but I'll go over in summary to you. That is the first thing we have to come up with. What is the population exposed. And the term "exposed" is an extremely important term. The second determination is a combination of the projected lawsuits around the site and those numbers of which would be successful. Combine sort of a propensity to sue. When we look at the site, we look at the population around it, what is the propensity that there's going to be lawsuits from that site. And by the way, that's the first area, the population projection, is probably the driving thing that drives the whole equation, but the greatest variability will probably be in the second area that I just discussed, the propensity to sue. What type of litigation is going to take place given that profile of that site. And the third is the average award per successful suit. Now, there is a lot of intermediate calculations and things but the three things we look at is: total population exposed, propensity to sue, and the average award per successful suit. Now, I needn't tell you all the big, great uncertainties in trying to quantify any of these. And so, for many of our activities, we will present a range of vestments to the person who has asked to do the analysis. However, a bad as the range is, it's somewhat more accurate than zero of people that don't do it at all, and there's many people, and particularly when you give these numbers in front of a board of directors, and particularly when they have to sign the little sheets that they are liable, and the SEC rules are really getting ugly, too, you know, in fact, they don't let me brief them anymore, they'd rather me brief them on my twenty years in Washington, not what I'm doing now, you see. But, we will get with you. There's a conern then, on how these nunmbers we'll use and what. Now, let me go over those just those three main areas. Robert, I won't take too much of your time. I'll move on.

On the population exposed. When we go in to look at a site, there is a lot of data around. The real question is how does somebody give it to you. It's not the fact that you haven't paid for it as taxpayers, it's a lot of people don't want you to have it. Or, it's buried down in some office of some bureau. A lot of times it's EPA, but a lot of times it's the state. One of the big things in doing population profiles around sites is knowing how to get the date and where to get the date. The fact that you are going to create the data, that's somewhat a herculean, impossible job. So, one of the things you want to do on population exposure is you have the site and we draw population contours. And I hired somebody from MIT who has one of those fancy computer degrees and he drafts them, but the answers are the same, it just's a different print. I hope he doesn't read this transcript. Anyway, now, so we would look at population profiles around the site. Then you come up with a real difficult question. Where are you going to draw the line. How far are you going to take potential population exposures to the site. Well, EPA has taken a couple of rules. They've taken a four-mile contour from the center of the site for exposure, was it to air, yeah, air emissions were four miles from the center of the site and three miles were for ground/water to surface/water as just a general way of putting some limits on the population. Now, the statistical data behind those two points are somewhat sparse. In fact, I'm more apt to give you the variability around those two points because in most of the sites that we looked in detail, the range goes one mile to seventy miles. So within tha 3 and 4, there is a little of variability. And those of you all statisticians shows what two points--there's a lot of degrees of freedom there, you know. But in any event, the government uses those parameters to come around with numbers around the site. However, when you look at an individual site for your company, it's a little bit more different to you because EPA is looking at macro across the whole

United States, and you're looking at some point estimate of a particular site. So what we generally do, we'll start those population profiles of contours and then we will relate after we do the next two steps, sort of an innertive process, we'll start with a 4 and 3 and then we'll find out through the next steps what's unique to that site. And there's a series of, and this is not done on computer, this is just by looking at the site by looking at the exposure and a few other things that I am going to discuss with you.

Second, on propensity to sue. This is the biggest variability, not that the other was small. When you look at a particular site, generally many times we have a catalog of some chemicals tha were put in there, and we have some relationship as to what those chemicals known in the literature what kind of disease they have done and also not too scientific, what the general public thinks when they hear of certain of those chemicals. We also, depending on how big the site is and how big the litigation is, will have some idea of any potential suits in that area that's been taken place and other litigation in the general area. And finally, and this is very subjective, I;ll be very explicit with you, are the presence of the plaintiff bar and their activity in that area. Now, this may not sound scientific but those are very key factors, and this is the big uncertainty. To come up then with some idea of the probability of the propensity to sue. And there's were there will be extreme disagreements.

And the the third area that we look at to then, the key other variable, is the cost per successful claim. And, depending on how much detail the person wants, there's four areas we quantify now and two or three that we do on select basis and the uncertainty increases as you go down the line. First, medical payments. This is not medical payments for personal injury but medical payments just for compensation for the medical bills. And that is derived by taking the chemical profile of the site, which will have, by and large, depending on the site, a number of chemicals and some idea of the volumes that are in the site. We then, we work with NIH, and back in Washington we have a huge data base and it's pretty well cut and dry now on certain chemicals, what was known to be which chemicals induce what kind of illnesses. For example, it's not a very big science, but I mean, if you see arsenic in a site, you will relate it to skin cancer, that what the great chance it will be. At any levels of emissions there will be skin cancer. Ethylene oxide you'll get certain leukemias, and so forth. Chromium usually has a respiratory--lesions in the lungs. So, there is enough of that established. Once we get that, we will link some idea of the volume of those and the nature of the illness. Next, we have to then go to another thing we quantify is lost income. And, that is, people can disagree, but that is usually straight forward. It's the expected disability from the disease and the average annual salary of injured times some degree of what we feel or what state law or what their compensations allow for on lost income. Survivor benefits are not too difficult to get, as well as burial payments. Now, those are sort of the easier ones to quantify. So, once you have the population exposed and you have these elements, you can start to work on the cost of a successful claim. The three areas that we don't quantify that could mask those costs that I just put, are three areas that are growing in interest and will be moving into litigation. One is property damage. Second, damage in natureal resources (that's the environment where not under the statute you can claim injuries to the environment if you have to restore the environment). And third, pain and suffering. These three in many areas will mask the other costs that we estimated, and generally those are not done unless the site, the contour and profile of the site, is in a very huge, large population area or near it or there is unbelievable amounts ground/water contamination. Now, if you look at all of this, the methodology, once you get those three things, you can play with them and come up with some liability and the real problem is the data. You make a lot of assumptions and those are variable. Not only the data, the interpretation of the data, because once you go into court there'll be somebody on the other side that may not have the same or different data that will interpret it different.

Now, let's say we do all that, and you go to your own individual company, the question is what do they do with these estimates after you get them. However uncertain and how big the range, do they use them for setting reserves. Just what do they use them for. Well, that is a thing tha a lot of people are starting to look at in both, not only the insurance industry, but also the companies. I've not yet known one that established reserves based on these numbers. Of course, I'm not in whatever department of the insurance companies that do that. However, I can tell you one thing that does get their attenion. If you give a range, the upper range would generally scare anyone, but the lower range, which is the lower bound of the estimate, which is done very conservatively, extremely conservatively, is so large in some instances that it really gives you concern. Even if you tighten down about every assumption. And, it's the lower bounds that are starting to perk around that people are starting to get very concerned about. And they are getting very large. Now, what do I predict is going to occur in this area. I attended a session this morning, it was excellent, on torts, and they addressed, in part, the environmental area, and I wouldn't say that it's Dooms Day, but, I mean, people are starting to get conerned for these big awards. I think, and that group this morning identified in general terms, they said maybe we need a new way to have conflict resolution. I mean, the idea of getting lawyers and consultants on both sides fighting. And on one sight that I had worked on, but I wasn't the main perpetrator, I think the fees were $7 million and the cleanup was $3 million. That's at one site. I mean, no one got any the better. I mean, people sat in big rooms and argued the apportionment of liability and bad PR for all the firm and Lord knows. So, what were starting to do, and when I say starting, we are just in the initial stages, what a number of Fortune 500 companies are doing, they are going to hire a third party to do the following things: (1) in our case we're the third party, we're going to hire, not out of our firm, lawyers, the engineers, the economists and the negotiators. We'll assemble the team. We will control the budgets and we will control the time schedule. They will be put on budget targets and time targets to deliver certain products. At the end of those time targets, this third party group (our group) will come in and if there are issues that are unresolved, we will, based on the available data, generated by the experts. We have no control over what they say, just the timing and what they do. We have no control over findings that these groups make. We will then come up and give our views on the apportionment of liability and any unanswered questions. Then, the question is what do you do with our opinino. Well, we are putting together, as part of the third-party advisors a number of ex-federal current employees and current employees who have stature and are not with our firm that are in or out of government, and those reports are going to be filed with EPA, OMB in the courts. And the thrust of this is the idea to cut time,expense and some of these liabilities. Now, finally with terms of the insurance industry, I think you might start thinking about what these Fortune 500 companies are doing. They're coming to the conclusion, at least some of them, that the best way to reduce liability is to clean up the site, and the earlier you clean up the site the faster your liability goes down, particularly if you get a concent order saying it's clean. And, it may be to your advantage, in all the sites that I'm working on, the insurance industry is never around the table. It's never there, and so when you determine how clean is clean, will you put $8 million or $108 million. The company is around there but the insurance aren't. And, I think you might want to consider the idea of, in certain site cleanups where you are really potentially liable, that you work with EPA, or the state, or whoever is cleaning up, to move into that process a little earlier. For one, you'll get your point of view across with a lot of "need to know" that the insurance company is not an insatiable tank of wealth. And, second, that you come from maybe a little different standpoint, but you're equally concerned about the viability of your company and the country as they are. And I think that dialogue earlier in these sites, not in the macro world, earlier in these big litigations and these big cleanups, might tend to decrease the adversity which I see is taking place at an increasingly greater rate between the generators and the owners of the sites and the insurance industry. Thank you.

Miccolis

Okay, for the next part of this presentation I'm going to go through in a bit more detail, some examples of actual numbers. Basically working off the we actually did some work and produced estimates, so you will actually be able to see some estimates. All of these slides are in your handouts. Over the past few years, we have seen, as Jim described it, drastically increasing numbers of toxic situations, both of which have caused personal injury and property damage. Generally unique to these situations, is that the injury or damage is not manifested for many years. We now need to think in terms of things like manifestation, latency period, period of exposure and a new term that I learned was "in resident exposure", which means that a chemical substance is in the person's body and therefore is causing further damage, rather than things we're used to, incident date and report date, and evaluation date, those don't have any meaning in these estimates. One of the most well-known toxic problems has been in the asbestos area. It first developed by asbestos workers in the mining and manufacturing an in the use of the products and then later in insulators, shipbuilders and auto brake maintenance because of the asbestos in the lining material. And now, we're seeing the problem in schools and public buildings because of in-place materials. This has led to a number of economic manifestations. Of course, you have the hardships of those who've become disabled or died because of exposure to asbestos and the resultant claims against their employers or the manufacturers of the product, which then has led to the bankruptcy of some of the manufacturers.

Now, in looking at these areas, several researchers have tried many different approaches to estimating the economic costs of this problem. And, they've done so from different points of view. For example, one estimate was made on the cost to society, so numbers and methodologies such as Jim described in terms of propensity to sue and the average cost. In this case the average costs they would use was the cost of a life or the value of life. And so, the resulting numbers were very, very large. Another estimate was based on the cost to the insurance industry. And I'll talk a little bit about that later. And, the third area, or third point of view, would be the costs to the actual producer, the asbestos producer. My presentation will describe a particular actuarial model that I worked on for estimating asbestos claims for one particular manufacturer. So, it's very unique to that particular situation.

UNR Industries is a company has been operating under Chapter 11 since 1982 when they filed for bankruptcy. One of the major factors leading to the bankruptcy was the uncertainty regarding the costs of their asbestos claims, and the associated litigation costs. In order for the court to decide on how these asbestos claims were going to be handled in the bankruptcy proceedings, a study was commissioned to have an independent firm estimate UNR's liability for both the existing claims, as of July 1982, and all future, pending and future claims against the company. By July 1982, over 14,000 cases had been filed against UNR, representing about 18,000 claimants. By that same date, approximately 3,500 were closed and the amount paid on those, and they were mostly all settled out of court, was $13.6 million, excluding legal expenses. The facts leading up to those numbers are shown on these graphs. There was a steady increase in the claims filed per month. These are the number of claims for each month. It's not a cumulative figure, it's the figure in each month. So you see, it was going from a flurry of activity in early 1979 and then increasing during 1980 and somewhat peaking in 1981, but staying at a relatively high level into 1982, and through by the middle of 1982. After that time, with the bankruptcy proceedings, the number of claims that were being filed was reducing. Also, the closed claim activity, which is on Figure 2, on the basis of the month closed, showed a dramatic increase in 1980 and 1981 until late 1981 where it just

completely dropped off at very low levels of closing activity. The definition of a closed claim for these purposes would be from the standpoint of view of UNR, there might be other defendants on a case, so this is only as far as UNR's liability is concerned. UNR settled on their liability. These were personal injury cases. There were a few workers compensation cases in here, but they are predominantly personal injury cases.

Figure 3 shows the cumulative numbers. It just an accumulation of the other two exhibits. So, you can see the spread. The top line is the number of claims filed and the bottom line is the number of claims closed. So on a cumulative basis, it just completely flattened off by the beginning of 1982. So, obviously, these trends showed a dramatic increase in activity over a relatively short period of time.

Almost all these cases involve 10 to 20 defendants in addition to UNR Industries. In fact, as some of you might know, the plaintiffs' attorneys developed lists of companies to file against, because no one knew which companies' products was the cause of a particular injury. So they developed these lists and just named everyone on the list. There were a few multiple plaintiff cases which could represent hundreds of claimants, but in the case of UNR, there were 31 of those multiple plaintiff cases closed, and 184 open. The 184 open cases represented about 3,500 claims. Many cases, approximately 15% overall, were closed with no payment at all. These were primarily where UNR was on the list but made no product that would have caused the disease that the individual; had so UNR was were able to settle the case without any payment. We also found that there were significant differences among the closed cases, depending on what type of court they were in, whether it was a state court or federal court, and in which state the suit was filed. For example, in New York, there was a legal precedent set which interpreted the statute of limitations in New York such that no claims made against UNR were ever successful because the exposure happened many years ago and therefore had exhausted the statute of limitations. So, in the case of New York the activity slowed down and people were just taking their cases to other states to sue.

In trying to determine a methodology to estimate the potential liabilities in this situaion, we looked at several different approaches. The first one was to take the past claims and trend them, or make some kind of trend projection from the post activity. But, as we saw in the figures, there was nothing to indicate that those trends would ever come down. There was no way to make a projection based on the simple filings and closings. The second approach was to try to estimate, on some basis, the total universe of claims and then apportion to UNR based on their marketshare. Well, we had two problems there. One was trying to get the total universe. And the second was that marketshare changed. Since many of these claims come from first exposure to the product as far back as the forties and fifties, and there just weren't enough records kept to know what the marketshares were.

The third approach was to estimate claims as a function of the morbidity and the mortality of the asbestos workers. And this seemed the most promising. I hadn't prepped Jim Tozzi on his presentation, and he pretty much came up with the same kind of approach, of taking something that related to the individual workers, based on some estimate of population and other estimates. Unfortunately, much of the prior work that had been done and had been written up was concentrated strictly on mortality, strictly on the number of deaths caused by the exposure. And later we'll see that this became a problem which we had to solve. In terms of the actual data, and other quantitative information, and the studies I was referring to, the major sources came from these six areas: epidemiological studies (and you have to say that several times before you can say it smoothly). Two of the men that have done a lot of this work, Dr. Irving Selicoff, and I think he's informally known as the grandfather of asbestos-related disease research, he

and Dr. Nicholson are both at the Mt. Sinai School of Medicine in New York, part of the City University of New York, and they've been doing research on this problem from a disease standpoint for many, many years. The second area was some economic evaluations, MacAvoy, etc., etc., etc., from the Yale Management School, did a study, and Walker, who really should fall into the epidemiology studies area, did some work to address the economic costs in the Manville case. And we had access to that work. The third area was some legal reasearch, and some of it was very recent, just released in the middle of last year from the Rand Institute; this was based on actual asbestos claims that were sampled from attorneys' files and from insurance files. They collected and analyzed all kinds of characteristics of the claims and of the costs associated with the claims. In the fourth area there was the only one insurance research study that we could find, which was a report issued by Conning and Co., which was a very, very macro approach, just trying to get some idea what the overall possible costs would be. The fifth area was what is called the claims information system, which is specifically designed for asbestos cases, maintained by Alexander Grant & Co., accountants for Lloyds and other insurers. And, we thought this system might be available to us, but we ran into confidentiality problems in terms of releasing any information on the cost of the claims. And so, that didn't pan out. The sixth area was that UNR had all of its claims on a computerized data base. From this, we actually could get certain kinds of information from their own claims history. And, we also had access to their claim files, and we took random samples out of those claims file to get additional information that wasn't recorded on the data base.

Now using all this data and information and background, the first thing we approached was to estimate the cost of the open claims. While we knew the number of cases but we didn't know the costs. There were no individual case reserves. All that we knew was that there was a case. And based on the closed claims, we found some key characteristics affecting costs. The first one was multiple plaintiff cases versus the single plaintiff cases just because of the number of individuals; state of jurisdiction and court type were also important, which I mentioned before. These three factors were available in the data base, and all of them, when we looked at them, were significant in the determination of costs. So, the first thing that we wanted to do was to estimate the cost of the number of successful claims, and by successful I mean the plaintiff was succcessful in receiving compensation from UNR. The second was to estimate the average cost per successful claim and that had to be adjusted for inflation. And the third was to take these estimates and compute them, by state, by court type, and separately for single versus multiple cases. And, in those instances where the number of cases in a particular state were very small, we had to combine states together. For this we used UNR's own claim history, and estimated the success ratios and the average cost per case, based on UNR's closed claims. And the next chart gives the examples, and this is for open cases, of how this was done. For example, let's take the State of California, there were 1,700 closed cases, of which 1,658 were successful, giving us a success ratio of 95.7%. We took that percent, for projection purposes, and applied it to 2,611 open cases, to get an estimate of 2,498 successful cases of the ones that were open. Going down to the bottom section, for California, we looked at the total amount that UNR paid on the closed claims, got the historical average cost, and then used that historical average cost, this is before inflation adjustments, and multiplied by the number of successful cases to get the estimated total cost from those cases in that state. We did this for several different combination of looking at federal courts versus state courts, combining the states in different ways. This particular total, the $57 million was based on this particular set of assumptions. The alternative estimates, after inflation adjustments for open cases, ranged from $60 to $75 million. And the inflation adjustments turned out to be not that significant because the cases closed very fast. From the time they were filed to the time closed, I think, averaged two years. So we didn't have a long inflation period.

For future claims, the methodology gets a lot more complicated. It's got the same basic elements, estimate the number of claims, estimate the average cost per claim, and to project the total cost. But to estimate the number of claims we have to get some estimate of the propensity to sue or something of that ilk, and in actuarial terms, we used what I call "claim frequency rates" against the population. The rates are the number of claims per unit of exposure. To get the average cost per claim, we looked at the cost estimates we were using for the open claims and adjusted those for inflation based on when we expected the future cases to close. And then, by adding these up and projecting them, we get the total cost. Now, the average cost per claim was, as was given on the last chart, somewhere around $6,000 to $7,000. So, it wasn't a very big average cost. We looked at the distribution by size, and we found that the costs were heavily concentrated around the average, so that there wasn't a lot of variance that was going to be generated by size of claim. So, it mostly came from frequency. In order to estimate the future claims, we developed some claim frequency rates and we defined a claim frequency rate as a rate of claim filing, and I use 1,000 here per unit of exposure, it could be 1,000, it could be 100,000, but some unit of exposure.

The selected exposures had to be measurable, both in the past when we had closed claim history and going into the future. So, we had to have some basis for looking at the past and going into the future. And they had to relate reasonably well to the claims and they should reflect the characteristics of asbestos-related diseases. So, the next step was to look at what those characteristics were. And as Jim Tozzi pointed out, of all the toxic substances that we know about to date, asbestos is probably the cleanest in that of the four major types of diseases, the first two--asbestosis and mesothelioma--can only be caused by exposure to asbestos. There is no other known cause. Most of the major claims came from those two types of diseases. The other two--lung cancer and other cancers--and there's some other illnesses that also can be caused by asbestos, were basically the four categories we used to classify the disease types. Asbestosis is generally non-fatal. The increased mortality from the the epidemiology studies just doesn't show a significant increase in mortality from someone that has been diagnosed as having asbestosis. However, mesothelioma, and there's a couple different types of it, is really a type of cancer, and it's always fatal, and it's fatal within a short time period after diagnosis. So, somebody, once they find out, it's a very quick, terminal disease. Lung cancer caused by exposure to asbestos can be fatal, and, as I'll explain later, the shortened lifespan means that, and it's not as terminal a disease. Someone can live for several years, but they do have their lifespan shortened. From the information contained in the samples from the Rand study and from UNR's own data base, 80 to 90% of the claims were categorized as asbestosis; 5% mesothelioma; and then the remainder were the other diseases. Also 7-15% were from a claimants that were deceased and 85-93% were from claimants still alive. This gave us basic parameters to pursue estimating the distribution of claims. Consequently, we assumed that, for asbestosis, the claimant was living when the claim was filed. For mesothelioma, we assumed that the claimant was deceased. For lung cancer, we assumed that the claimant could be living but we made some assumptions as to when the death would occur from the time the claim was made. And for othe cancers, we assumed the claimant was deceased.

Now, that gives the basic claim characteristics. Next, we had to define the population base to use as our exposure base. And that population base had to have the required relationships. We had to be able to break down the population to fit all these characteristics. The research that was conducted by Nicholson, Perkel and Selikoff we used as our primary souce. Dr. Nicholson gave a presentation at this seminar, I think two years ago, where he discussed his population. That was a highly defined, high-risk population exposed to asbestos, by industry. He developed mathematical models to

predict the excess deaths caused by the asbestos-related diseases. These models were created by their research into the causes of death, by looking at death records and family statements. It was a very in-depth study of mortality statistics. They also studied fiber concentrations in typical workplace situations. So, they actually measured parts per million in the environment. They provided workplace estimates, by industry, by year of entry into the industry (new people entering the workforce in each industry), and compiled these statistics from government records, from the census, from the Navy, from trade associations, trade unions, and from industry groups. And, as Jim Tozzi pointed out, it's one of the hardest parts of the reseach to go find out where this data exists, because you can't create it from scratch. We did find some other population estimates from some other researchers, and they came up with a lot different results than Nicholson and his group. In 1982, MacAvoy, et al., reviewed three of the main population research papers and their conclusion was that Nicholson was the most likely to be accurate of the ones that had been reviewed. In 1983, Walker used another approach in the Manville case. However, Dr. Nicholson published some comments on the Walker approach raising a lot of technical issues about how those estimates were created and concluded that the Walker estimates were just too low. So, for these reasons, and other reasons related to the technical value that we saw in using the Nicholson population, we chose to use it.

The industries that were identified are shown on this slide. Surprisingly, out of all these, really the key ones were the insulation workers and the shipbuilders. The other ones had some impact, but very little. For each of these industries, we obtained the workforce as of 1940, the new entrants into each industry for each decade subsequent to 1940, the age distribution of the new entrants and the original workforce, the average duration of employment, by decade, and the relative risk of each occupation in terms of the relative risk to disease from exposure to asbestos. So, for example, insulation workers were taken as unity, and automobile maintenance was 0.1. That is, it was only 10% of the exposure of insulation worker. Now, for UNR, we had to make some assumptions about how to use this population. The one of those was that the construction trades and the automobile maintenance had very large populations and the construction trade exposure was from primarily wallboard, gypsum wallboard, but UNR didn't make any of that through their whole history of manufacturing. Consequently, we assumed no exposure to that particular product. For automobile brake linings, UNR wasn't involved in this product either. Therefore, those populations were excluded. UNR discontinued making asbestos products in the early sixties, and so, the population that would be exposed to UNR products after 1964 would be limited to removal, maintenance and repair type operations. Dr. Nicholson was kind enough to give us estimates of how much of the population, by industry, would be in this limited grouping. For example, insulation workers would drop to 10% for the removal, maintenance and repair, because most of the insulation workers are putting in new products. On the other hand, marine engine room personnel, where all the exposure is from old ships and the deterioration of insulation materials, were kept in at 100%.

Another area that we had to make an assumption about is that there were 4.3 million temporary , World War II, shipyard workers, with an average employment of less than one year--typically 4 or 5 months. And during that period, there was a lack of dust control, and everybody working in the shipyard would have a significant exposure to asbestos fibers. This was a problem in the population because this exceeded all the other population estimates. However, in looking at UNR's actual claims, the actual number where the only exposure was World War II, was extremely small, and the period of time has been over 40 years since that exposure, so therefore, given the disease latency, those people would be very old and would have gone through the typical manifestation period. What we did find was that a lot of claims from World War II shipyard workers who subsequently went to work in the asbestos industry, either in shipbuilding or in insulation.

The fourth assumption was that, according to Nicholson's research, there was a certain percentage of the population that was at a lower risk. So, a certain percentage in each industry had a lower risk. Low risk was defined as the equivalent of two months' exposure as an insulation worker, which was measured in terms of air concentration. In order to try to limit our population to strip out the low risk people, required some more estimates, and what we found would was it was not expected that the percentage would change over time. And since all the rates we were computing were relating claims to exposures, if the exposures were the same percentage were low of the total, it didn't make any difference, because it would have been the same multiplier applied to every rate.

The last assumption was that people that had their first exposure from 1972 to 1984 would not have the same exposures because of more attention to the industrial hygiene and safety standards and the use of masks and other control of dust conditions. For this we estimated a drop off in intensity after 1972.

Because of the nature of the claims, we separated out the exposures into two types: non-fatal claims and fatal claims. For non-fatal claims we worked with the number of survivors that were projected from the population in each 5-year period, going from 1940 to the year 2050. Now, these were actually computed as survivor-years, because we were our computations in 5-year increments. So, we had a survivor-year as our exposure unit. For projection purposes we assumed that no one would be exposed to an UNR product after 1979. Therefore no new workers were added to the population after that date. Because of that assumption, the selected population would eventually die. The population base had a normal end to it. And what we computed from this is a claim rate or claim frequency rate per 100,000 survivor years. For fatal claims we used excess deaths that were predicted by the epidemiological models and we applied the excess mortality rates against that same population base. And there we developed a claim rate per 1,000 deaths and those were computed separately for each of the three types of death-causing diseases: mesothileoma, lung cancer, and other cancers. As you would expect, mesothileoma has the highest rate per death because of the link with the disease. It was not, however, 100%, so, some of that's related to the fact that UNR was not manufacturing in every instance of a death case. And lung cancer was second, and other cancers were third.

We further had to divide the exposure base up between period of first exposure. And to do that we grouped the population into what we called "entry" groups based on the year that the people entered the workforce, which would be their first contact with asbestos, and by age. And age, as it turned out to be a significant element in determining propensity of making a claim. Obviously, it's not independent of the period of first exposure because the disease has a latency period of about 20 years. And so, everybody that entered during a certain period would be within certain age groups at the same time, so there was a strong correlation between those two elements.

Now that we had the population broken up, we had to break up the claims. For this, we took the total claims and allocated them based on the sample studies to correspond to the various groupings of fatal versus non-fatal with the percentages that are shown on the slide; the decade of first exposure based on the UNR claims data and the percentages are shown up there; the age of the claimant, and interestingly enough even though the average latency period is something like 20 years, 6.6% still came from claimants under 40 years old. And that's just a variability element. It means that the average latency is 20 years but not necessarily. It could be 10 years; it could be 5 years.

Question: Did you check out how many those people had a history of smoking?

When we first started the sample research, we looked into smoking versus non-smoking as an ancillary cause or as a problem in the lung cancer and in the seriousness of asbestosis, and what the Rand Institute found in their report, is that everybody smoked. Approximately 98% of the claims came from people who smoked. And so, it didn't have any value as a variable.

Question: (could not hear at all)

Right, right it does greatly raise the propensity. But in the claims that have been filed in this particular case, and in the Rand sample, the majority of them were smokers.

And then we had to divide up the claims by industry and occupation. And, based on UNR's information, 55% were in that shipbuilding repair and marine engine room, and 30% were in the insulation workers. So now that we had the claims divided up and we had the exposure divided up, it should be a simple matter as to just divide the claims by the exposures and come up with a projection. Unfortunately, it didn't work that well, or that simply. We had to consider another factor and reflect it in the methodology. I call it "backlog". As you saw in the figures on the graphs, there was an increase claim frequency for 1977-1982 and in looking at this and in questioning people about it, we surmised that most of it came from an increase in awareness of the claimants that they had the disease and that there was availability of compensation through product liability actions. And also, the plaintiffs attorneys were becoming more sophisticated, more knowledgeable and knew exactly what to do. So, we were looking at a situation where we had a bunch of claims in a short period of time, and if we just took all of those claims related to exposures it would be out of balance. This is because we had claims that normally, if the medical and legal conditions had been leveled, the claims would have come in over a longer period of time. They wouldn't have come in all bunched up in a 5-year period. They may have come in over a 10-year period, or a longer period. Consequently, we wanted to make an adjustment to account for this backlog for those claimants that would, at least conceptually, filed earlier. So rather than decrease the claims somehow, we just increased the denominator. Since the numerator was the number of claims, we had to get the corresponding exposures over a longer period of time that corresponded to those claims. We determined these exposures by taking them as a multiple of the survivors in the 1977-1982 period. On the low end it may be, I don't know what the exact figures were but, 1-1/2 times the people exposed during that 5-year period. In the moderate, the multiplier would be higher. And in the high backing, the multiplier's higher than that. For death claims, we knew we could predict the number of deaths from the models, so all we simply did was add more deaths to the exposure base, just by taking more years of expected excess deaths.

This is an example out of a large three-dimensional matrix of all the calculations. This is only insulation workers and only for survivor claims. The exposures are at the moderate backlog assumptions. What we have done is take the period of first exposure, pre 1940, 1940-1949, 1950-1959, 1960-1964, and then broke it down by age. Now, I was looking at this on the plane yesterday, and I looked at the total total number of exposures, and I said, If this is survivors in thousands, or even if it is survivor years, that would be 200,000,000 total total. Well, it's not survivors in thousands, it's in hundreds. So, there is an error on the sheet there. So,
it would be 20,000,000 survivor years, not 200,000,000. The initial allocation of claims as shown there totalling 4,581 claims. We allowed the claims to be broken into partial claims because we wanted to get the rates in more significant digits. So, the historical frequency rates per 100,000 survivors are given below with an overall average of 22.9.

And, if we look at the spread there, there's a lot of variation depending on the year of first exposure, the age, as to how the claim rates varied. And so, what we did is we used this information and then selected mature rates. Now, if you look back down the 60-64 column, you'll see that those rates are very low compared to the earlier periods. Well, we expect that because the people that were first exposed in 1960-64 by 1980, they would have just reached the 20-year point in terms of the period of exposure, since first exposure. And, it will probably take another 5 to 10 years before the claims will really start to develop. So, that the latency period really hadn't gone far enough and you'd expect lower claim rates. So, when I say mature rates here, when we make projections going forward, we had to make assumptions about immature rates because the people exposed in 1965 to 1979 would be phased in.

The total projected number of claims, all groups, all industries, using moderate backlog assumptions, for survivors, is broken down this way. And so, you see the calendar year projections is based on the year filed. And incidentally, I said we had multiple-plaintiff cases, what we did for the history that we used to develop the claim rates, we didn't count each case as one claim, we counted each plaintiff as a claim. So, these are projections of claimants into the future. And, you see that it has to go out pretty far for everybody to die off and all the claims to be made.

Question: Inaudible

Right. This is the population all isolated to UNR and the claim rates developed from the UNR claims. And so, we just took the population and pushed it out using the mortality, and used those claim rates that were developed and multiplied everything out and added it up. So overall, with this moderate assumption, we had 56,000 future claims.

To estimate the cost we had several base assumptions as to what average cost we were starting from. This was the low estimate. And, at the low estimte, we used a 5% inflation based on the average cost of the analysis we did with the open claims. And then we projected when the claims would settle. Now, one assumption here was that if you look at the number of claims settled in 1985, we were estimating that all claims from 1982, the bankruptcy date, to 1985 would all be filed in 1985, and at that average cost. And then we inflated the average cost out to the final year. All the years aren't shown here. You come up with the 50,000 claims and a total inflated cost of $624,000,000. The present value of that flow at a 7% discount rate was a little under $200,000,000. The overall range of the final projections with all the various assumptions for open claims there were 14,000 claims, average cost $4,000-$5,000, total cost $60-$75,000,000. For future claims the number of claims ranged from 48,000-68,000 claims, average claim, this is the average over that whole period, so it's the average claim over the whole inflated period, of $10,000-$12,000 per case, for a total of $500,000,000-$800,000,000. And then for a grand total of $560,000,000-$875,000,000, or in present value terms, 210 to 325 million.

That takes you all the way through, without showing you every detail, of one methodology of extrapolating from a population and from actual claims statistics and making, a final projection of a final liability.

So, I open up for questions, we're at just the 5 o'clock mark.

Mr. Tozzi: Does the inference you draw from this is a Class A analysis like you've done, that the firm goes into bankruptcy when they see the numbers? What was management's reaction when
you gave them this. For a lot of companies, $200,000,000 ...

Mr. Miccolis:
Well, in this case, there was an anticipation that the company did not have enough assets to meet all the claims. And so, once the number reached a fairly low level of size, the number didn't matter, in terms of the company management.
What mattered though, is in the actual bankruptcy proceedings. What happens now? Because now they have divide the assets of the company. And what happens with respect to future claims.

Question: Bob, just very quickly maybe you want to address how those who might want to adapt this methodology to their situation and try to look at the number of cases that their company's is on, the adjustment they have to make to that average cost. I mean, $4,000-$5,000 is not the total cost of the claim. Maybe you want to talk about that.

Miccolis:
Okay. That's only the cost of the claim and it doesn't include any legal expenses. And, in the case of, for defense costs, you know, the cost to just defend the case can exceed the average cost of the claim. It also doesn't include, the total, average cost, which includes all the payments from all the manufacturers. According to the Rand study, I think it averaged in the range of $45,000 to $50,000 a case. And for cases that were litigated, it was over $100,000 a case. So, for an insurer, that may have insured UNR, they may also have insured Manville, or five or six other ones of defendants, on a particular case. So the average cost of the case would be much, much higher.

Question: What did you do about the mesothelioma?

In terms of?

Well, there doesn't seem to be any minimum exposure causing the disease.

Miccolis:
From what I've read about the disease,if it's a pecularity in terms of peoples propensity to get the disease. In other words, everybody that is exposed to it isn't necessarily going to get mesothelioma. But a certain segment of the population will get it. And that percentage of the population that get is doesn't have to have a lot of exposure. It doesn't have to have a lot of inhalation.

Question: Inaudible

No, in the case of UNR, they didn't make any spray insulation. They didn't make any building insulation. So their products never went into public buildings. In the case of Manville, it's a "who knows" situation. In talking to Dr. Nicholson about public building exposures, their research has shown and their other information has shown that the risk, in terms of the air concentration levels to residual exposure coming out of the ceiling is lower than the low-risk population that they were estimating. However, the span of exposure is extreme. In other words, it's in the less than 1% category. And the concern that some researchers have is that they generate more exposure by removing the material than in keeping it in place. The risk here is that the procedures that are being used to rip it out is actually causing more exposure than other procedures to seal it up. So, there's sort of a mass attempt to get rid of the material, and in getting rid of it they are actually creating more exposure, at least temporarily until the dust settles. And if they had used other methods to seal up the material they would have eliminated that additional exposure.

ESTIMATING THE COST OF DISEASE & TOXIC TORT CLAIMS

- INCREASING NUMBER OF TOXIC SITUATIONS
- PERSONAL INJURY & PROPERTY DAMAGE
- ONE OF THE MAJOR TOXIC PROBLEMS - ASBESTOS
- ECONOMIC MANIFESTATIONS - BANKRUPTCY OF MANUFACTURERS
- ACTUARIAL MODEL FOR ESTIMATING ASBESTOS CLAIMS FOR ONE PARTICULAR MANUFACTURER

CASE OF UNR INDUSTRIES, INC.
BACKGROUND

- JULY 29, 1982 UNR INDUSTRIES, INC. FILES BANKRUPTCY

- UNCERTAINTY REGARDING COST OF ASBESTOS CLAIMS

- TPF&C STUDY TO ESTIMATE UNR'S LIABILITY FOR:

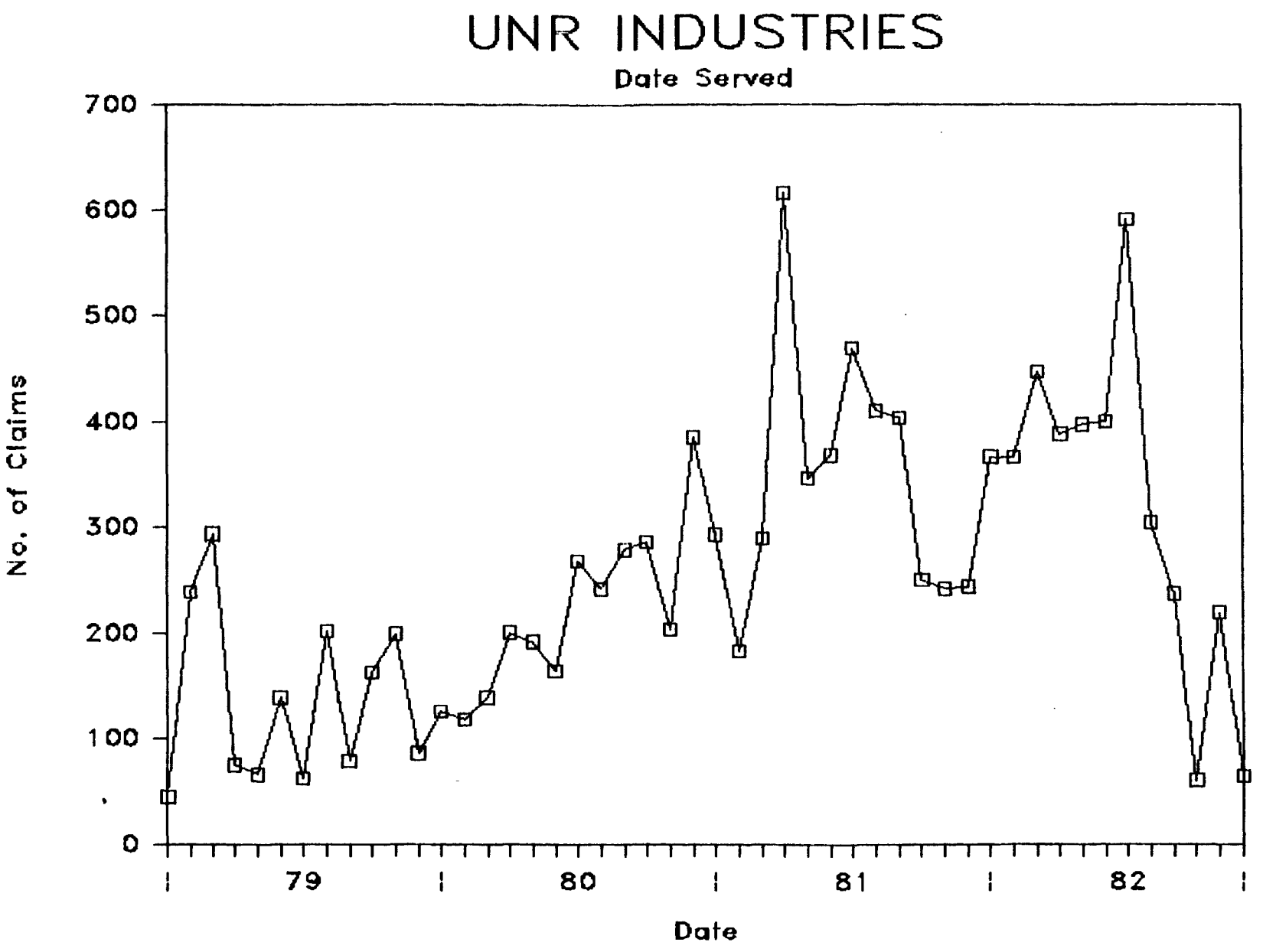
    1) EXISTING CLAIMS

    2) FUTURE CLAIMS

UNR ASBESTOS CLAIMS
1975 - JULY, 1982

- Over 14,000 Cases Filed for Approx. 18,000 Claimants
- By July, 1982 Almost 3,500 Cases Closed for $13.6 million (Excluding Legal Expenses)
- Steady Increase in Cases Filed per Month from Late 1980
- Drop Off in Claims Closed per Month in Early 1981
- Almost All Cases Involved 10 to 20 Defendants Other Than UNR
- A Few Multiple Plaintiff Cases Represented Hundreds
- Many Cases Were Closed by UNR with No Indemnity Payments
- Significant Differences Among Cases Were Found Between:
    1) Type of Court - State vs. Federal
    2) State Where Suit Was Filed

Figure 1


UNR INDUSTRIES
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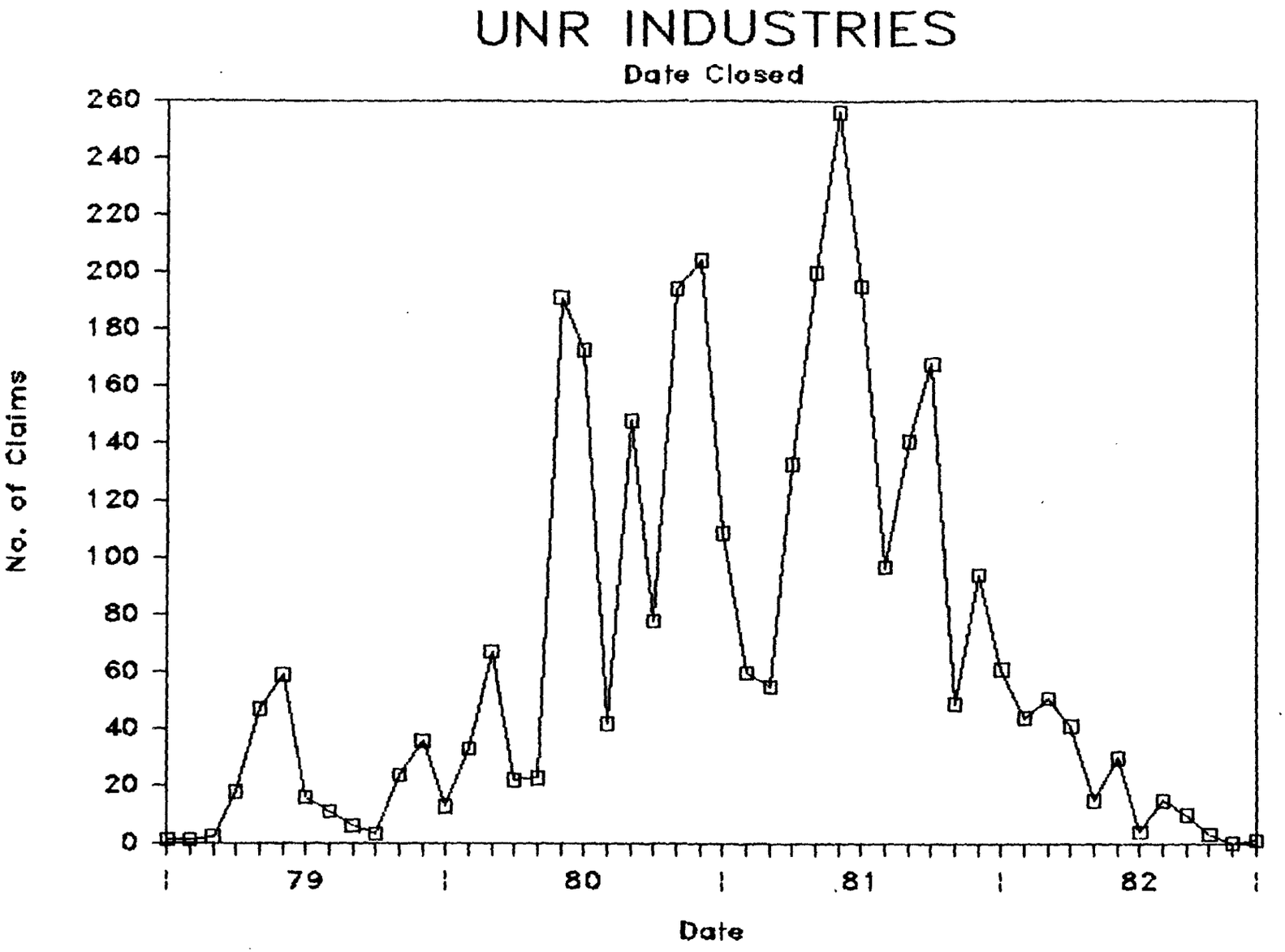
500
400
300
200
100
0
No. of Claims
79
80
81
82
Date

Figure 2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No. of Claims
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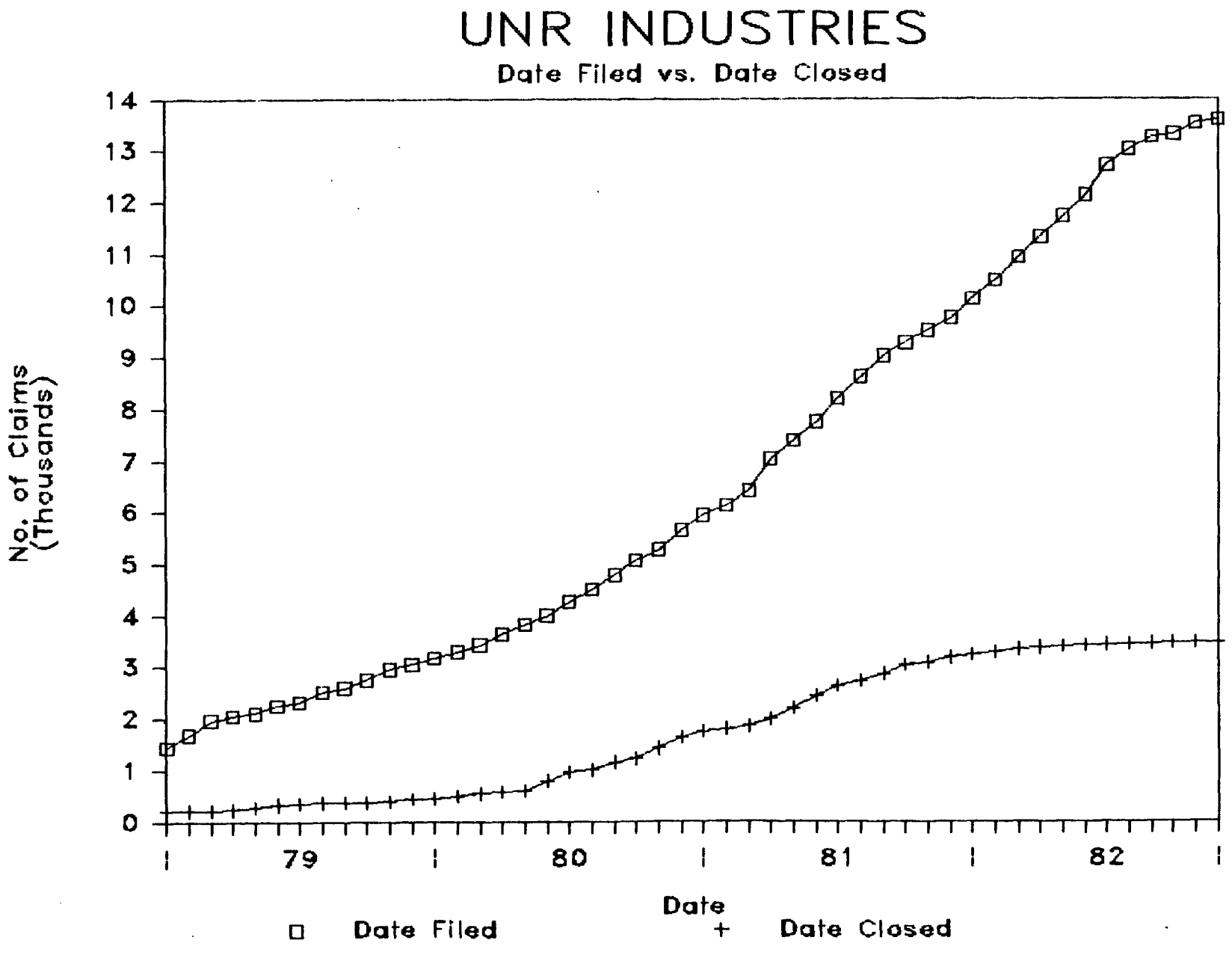
160
140
120
100
80
60
40
20
0
79
80
81
82
Date

Figure 3


UNR INDUSTRIES
Date Filed vs. Date Closed
No. of Claims (Thousands)
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1
2
3
4
5
6
7
8
9
10
11
12
13
14
79
80
81
82
Date
Date Filed
Date Closed

ACTUARIAL METHODOLOGY

SEVERAL DIFFERENT APPROACHES WERE EXPLORED AND RESEARCHED

1) Project UNR Claims from Past Claim Trends

2) Estimate Total Universe of Claims and Apportion to UNR based on Market Share

3) Estimate Claims as a Function of the Morbidity and Mortality of Asbestos Workers

DATA AND OTHER QUANTITATIVE INFORMATION WERE SOUGHT FROM:

1) Epidemiological Studies - Selikoff, Nicholson

2) Economic Evaluations - McAvoy, Walker

3) Legal Research Reports - Rand Institute

4) Insurance Research - Conning & Company

5) "Claims Information System" (A. Grant & Co./Lloyd's)

6) UNR's Claims Data Base and Claims Files

ACTUARIAL METHODOLOGY
OPEN CLAIMS

- NUMBER OF CASES KNOWN BUT COST NOT

- KEY CHARACTERISTICS AFFECTING COST
  - Multiple vs. Single Plaintiff
  - State of Jurisdiction
  - Court Type (State vs. Federal)

- ESTIMATE NUMBER OF SUCCESSFUL CLAIMS
  - Successful = Plaintiff Paid by UNR

- ESTIMATE AVERAGE COST PER SUCCESSFUL CLAIM
  - Adjusted for Inflation

- ESTIMATES COMPUTED BY STATE BY COURT TYPE AND BY SINGLE VS. MULTIPLE PLAINTIFF CASES
  - States Combined Where Numbers Too Small

- UNR'S OWN CLOSED CLAIMS HISTORY USED FOR ESTIMATING
  - Success Ratios
  - Average Costs per Case

UNR INDUSTRIES, INC.

EXAMPLE OF COST PROJECTIONS FOR OPEN CLAIMS

SINGLE PLAINTIFF CASES

ESTIMATED NUMBER OF SUCCESSFUL OPEN CLAIMS	TOTAL ALL STATE	CALIF (STATE)	PENNA (STATE)	TEXAS (FED.)	S.C. (STATE)
1. TOTAL NO. CLOSED CLAIMS	3,431	1,733	104	205	150
2. SUCCESSFUL NO. CASES	2,891	1,658	93	161	125
3. HISTORICAL SUCCESS RATIO	84.3%	95.7%	89.4%	78.5%	83.3%
4. PROJECTED SUCCESS RATIO	80.6%	95.7%	89.4%	78.5%	83.3%
5. NO. OPEN CASES	10,628	2,611	1,590	736	127
6. EST. CASES SUCCESSFUL	8,570	2,498	1,442	578	106
ESTIMATED COST OF SUCCESSFUL OPEN CLAIMS					
1. AMOUNT UNR PAID (000)	12,613	5,097	1,178	1,621	329
2. HISTORICAL AVERAGE COST	4,363	3,075	12,664	10,066	2,635
3. PROJECTED AVERAGE COST	6,699	3,075	12,664	10,066	2,635
4. EST. TOTAL COST (000)	57,409	7,680	18,005	5,818	279

ACTUARIAL METHODOLOGY
FUTURE CLAIMS

BASIC APPROACH:

1) **ESTIMATE THE NUMBER OF FUTURE CLAIMS**

   By Applying Selected Claim Frequency Rates

   to the Exposed Population

2) **INFLATE THE AVERAGE COST PER CLAIM**

   For Each Future Period Starting from the

   Open Claims Projections for Inflation

3) **PROJECT THE TOTAL COST OF FUTURE CLAIMS**

   By Applying the Inflation-Adjusted Average Cost

   to the Estimated Number of Future Claims

ACTUARIAL METHODOLOGY
CLAIM FREQUENCY RATES

- RATE OF CLAIM FILING PER 1,000 "EXPOSURES"
- EXPOSURES MUST BE MEASURABLE FOR PAST AND FUTURE
- EXPOSURES MUST RELATE REASONABLY WELL TO CLAIMS
- EXPOSURES MUST REFLECT CHARACTERISTICS OF ASBESTOS-RELATED DISEASES

ACTUARIAL METHODOLOGY
CLAIM CHARACTERISTICS OF ASBESTOS-RELATED DISEASES

DISEASES:

Asbestosis - Generally Non-Fatal

Mesothelioma - Always Fatal

Lung Cancer - Can Be Fatal

Other Cancers & Illnesses - Can Be Fatal

CLAIMS:

80% - 90% Asbestosis

5% Mesothelioma

7% - 15% Claimant Deceased

85% - 93% Claimant Living

MODEL ASSUMPTIONS:

Asbestosis - Claimant Living

Mesothelioma - Claimant Deceased

Lung Cancer - Claimant Living or Deceased

Other Cancer/Illness - Claimant Deceased

ACTUARIAL METHODOLOGY
EXPOSURE BASES

EPIDEMIOLOGICAL RESEARCH BY NICHOLSON, PERKEL & SELIKOFF

- **Defined High-Risk Population Exposed to Asbestos by Industry or Occupation**

- **Developed Mathematical Models to Predict Excess Deaths Caused by Asbestos-Related Disease**

- **Provided Population Estimates for Each Industry by Year of Entry into Industry**

ACTUARIAL METHODOLOGY
POPULATION AT RISK TO ASBESTOS-RELATED DISEASE

Certain Industries/Occupations with Significant Exposure

Primary Asbestos Manufacturing

Secondary Asbestos Manufacturing

Insulation Workers

Shipbuilding and Repair (excl. WWII)

Temporary WWII Shipyard Workers

Construction Trades

Railroad Steam Locomotive Engine Repair

Utility Services

Stationary Engineers and Firemen

Chemical Plant and Refinery Maintenance

Automobile Maintenance

Marine Engine Room Personnel

SOURCE: Nicholson, Perkel, and Selikoff, "Occupational Exposure to Asbestos: Population at Risk and Projected Mortality - 1980 - 2030," American Journal of Industrial Medicine, 1982.

ACTUARIAL METHODOLOGY
POPULATION AT RISK ASSUMPTIONS FOR UNR

- Construction Trades and Automobile Maintenance Excluded
  - UNR Products Not Used in These Occupations
- Population After 1964 Limited to Removal, Maintenance, Repair
  - UNR Discontinued Asbestos Manufacturing in Early 60's
- 4,325,000 Temporary World War II Shipyard Workers Excluded
  - Number of UNR Claims Small and Over 40 Years Since Exposed
- Percentage of Population at Low Risk Assumed Constant Over Time
  - Low Risk Equivalent to 2 Months as Insulation Worker
  - Projections Include Low Risk Population
- Population First Exposed 1972 - 1979 at Lower Intensity
  - Reflect Impact of Reduced Dust Conditions
  - Establishment of Safety Standards (Masks, etc.)

ACTUARIAL METHODOLOGY
EXPOSURE BASES

TWO SEPARATE SETS OF EXPOSURES WERE DEVELOPED

- **NON-FATAL CLAIMS**

  Number of Workers Living (Survivors) Projected for Each Five-Year Period from 1940 to 2050

  No New Workers Added to Population Base after 1979

  Selected Population Eventually Dies from Normal or Asbestos-Related Mortality by 2050

  Rate of Claims per 100,000 Survivors

- **FATAL CLAIMS**

  Excess Deaths Predicted by Epidemiological Models

  Excess Mortality Rates Applied to Population Base

  Rate of Claims per 1,000 Excess Deaths Computed Separately for:

  - **Mesothelioma**
  - **Lung Cancer**
  - **Other Cancers**

ACTUARIAL METHODOLOGY
EXPOSURE BASES

- **PERIOD OF FIRST EXPOSURE**

  All of the Selected Population Were Divided into "Entry Groups" Based on the Year Entering the Workforce in an Asbestos-Exposed Industry or Occupation (First Contact with Asbestos).

- **AGE OF CLAIMANT**

  Studies Indicate a Substantially Higher Propensity of Claims from Claimants Aged 50 to 69. This Characteristic Was Strongly Related to the Period of First Exposure.

ACTUARIAL METHODOLOGY
ALLOCATION OF HISTORICAL CLAIMS

CLAIM FREQUENCY RATES - Required an Allocation of the Total Number of Claims to Correspond to the Relevant Exposures.

FATAL VS. NON-FATAL - Derived from Sample Studies

- **5% - Mesothelioma Deaths**
- **10% - Lung Cancer Deaths**
- **2% - Other Cancer Deaths**
- **83% - Asbestosis & Other Non-Fatal (Survivors)**

DECADE OF FIRST EXPOSURE - Based on UNR Data Base

- **12% - Pre 1940**
- **48% - 40's**
- **25% - 50's**
- **13% - 60's**
- **2% - 70's**

ACTUARIAL METHODOLOGY
ALLOCATION OF HISTORICAL CLAIMS

AGE OF CLAIMANT (AT TIME OF CLAIM OR DEATH)

6.6% - Under 40

13.1% - 40 to 49

39.3% - 50 to 59

34.3% - 60 to 69

6.6% - 70 and Over

INDUSTRY OR OCCUPATION

55% - Shipbuilding & Repair and
Marine Engine Room Personnel

30% - Insulation Workers

10% - Chemical Plant / Refinery Maintenance

3% - Railroad Engine Repair and Utility Services

2% - Asbestos Manufacturing

ACTUARIAL METHODOLOGY
BACKLOG ASSUMPTIONS

INCREASED CLAIM FREQUENCY FROM 1977 TO 1982 INFLUENCED BY:

1) Increasing Awareness by Claimants of Asbestos-Related Diseases and Availability of Compensation

2) Increased Sophistication and Specialization of Plaintiffs' Attorneys

ADJUSTMENT NEEDED TO ACCOUNT FOR POTENTIAL BACKLOG EFFECTS OF CLAIMANTS WHO WOULD HAVE FILED EARLIER

THREE LEVELS OF BACKLOG ASSUMED FOR SURVIVORS:

1) Low, Moderate, High

2) As a Percentage of Survivors (1977 - 1982)

BACKLOG FOR DEATH CLAIMS ASSUMED BY INCLUDING EXCESS DEATHS FROM YEARS PRIOR TO 1977

UNR INDUSTRIES, INC.

EXAMPLE OF CALCULATIONS OF SURVIVOR CLAIM FREQUENCY RATES

INSULATION WORKERS

A. EXPOSURES (MODERATE BACKLOG)
(number of survivors in thousands)

	FIRST EXPOSURE				
AGE	1940	40-49	50-59	60-64	TOTAL
UNDER 40	-	-	3,966	12,288	16,254
40-49	-	3,562	35,973	13,508	53,043
50-59	585	30,533	26,266	6,892	64,276
60-69	5,684	19,641	12,522	3,949	41,797
OVER 70	5,975	8,877	7,338	2,532	24,722
TOTAL	12,244	62,613	86,065	39,169	200,092

B. CLAIMS (INITIAL ALLOCATION)

UNDER 40	-	-	91.4	78.7	170.1
40-49	-	141.0	345.6	85.0	571.6
50-59	113.2	1181.7	473.0	101.8	1869.7
60-69	315.2	939.8	329.1	70.8	1655.0
OVER 70	59.9	178.7	62.6	13.5	314.6
TOTAL	488.3	2441.2	1301.7	349.8	4581.0

C. HISTORICAL CLAIMS FREQUENCY RATES
(per 100,000 survivors)

						SELECTED MATURE RATES
UNDER 40	-	-	23.0	6.4	10.5	10.82
40-49	-	39.6	9.6	6.3	10.8	12.31
50-59	193.5	38.7	18.0	14.8	29.1	29.13
60-69	55.5	47.8	26.3	17.9	39.6	39.45
OVER 70	10.0	20.1	8.5	5.3	12.7	9.07
TOTAL	39.9	39.0	15.1	8.9	22.9	

UNR INDUSTRIES, INC.

TOTAL PROJECTED CLAIMS

ALL GROUPS, ALL INDUSTRIES

(MODERATE BACKLOG)

CALENDAR PERIOD	SURVIVOR CLAIMS	LUNG CANCER CLAIMS	OTHER CANCER CLAIMS	MESOTHELIOMA CLAIMS	TOTAL
1982-84	4,919	1,005	171	362	6,457
1985-89	5,962	1,515	248	1,064	8,789
1990-94	6,004	1,725	280	1,258	9,267
1995-99	5,316	1,663	266	1,298	8,543
2000-04	4,430	1,453	231	1,276	7,390
2005-09	3,502	1,142	179	1,115	5,938
2010-14	2,413	778	118	789	4,099
2015-19	1,574	468	68	503	2,613
2020-24	979	249	35	294	1,557
2025-29	525	114	15	148	802
2030-34	257	43	6	64	370
2035-39	123	13	2	24	161
2040-44	50	3	-	7	60
2045-49	11	-	-	1	13
TOTALS	36,062	10,171	1,619	8,205	56,057

UNR INDUSTRIES, INC.

LOW COST ESTIMATES

MODERATE BACKLOG

YEAR SETTLED	INFLATED (5%) AVERAGE COST	NUMBER OF CLAIMS	TOTAL INFLATED CLAIM COSTS (000)
1985	4,604	6,457	29,728
1986	4,834	1,758	8,499
1987	5,076	1,758	8,923
1988	5,330	1,758	9,370
1989	5,596	1,758	9,838
1990	5,876	1,758	10,330
1991	6,170	1,853	11,433
1992	6,478	1,853	12,004
1993	6,802	1,853	12,604
1994	7,142	1,853	13,235
1995	7,499	1,853	13,896
1996	7,874	1,709	13,457
1997	8,268	1,709	14,130
1998	8,682	1,709	14,837
1999	9,116	1,709	15,579
2000	9,571	1,709	16,357
2001	10,050	1,478	14,854
2002	10,552	1,478	15,597
2003	11,080	1,478	16,376
2004	11,634	1,478	17,195
2005	12,216	1,478	18,055
2006	12,827	1,188	15,238
2007	13,468	1,188	16,000
2008	14,141	1,188	16,800
2009	14,848	1,188	17,640
2010	15,591	1,188	18,522
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TOTAL		56,062	624,715

PRESENT VALUE OF CLAIM COSTS AT 7% - $194.5 MILLION.

UNR INDUSTRIES, INC.

SUMMARY OF LIABILITY PROJECTIONS

	NUMBER OF CLAIMS	AVERAGE COST PER CLAIMANT	ESTIMATED TOTAL COST (millions)	PRESENT VALUE COST (millions)
OPEN CLAIMS	14,116	$ 4,250 - $ 5,313	$ 60 - $ 75	-
FUTURE CLAIMS	48,020 - 68,389	10,412 - 11,698	500 - 800	-
TOTAL	62,136 - 82,505	9,012 - 10,065	560 - 875	$210 - $325

INFLATION 5%

DISCOUNT RATE 7%