Estimation of the Number and Value of Pending and Future Asbestos-Related Personal Injury Claims: W.R. Grace

Prepared for WR Grace
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1.0 Background

ARPC, as asbestos claims consultant to WR Grace & Co. ("Grace"), was asked to prepare an estimate of the number and value of valid pending and future asbestos-related personal injury claims under assumptions regarding the evidence required to demonstrate the validity of the claims. The purpose of this report is to describe the data and methods that ARPC used in making those estimates.

Analysis Research Planning Corporation (ARPC) is an economic and management consulting firm that provides statistical, econometric and financial analysis to a wide variety of clients. We have experience in the area of valuing and estimating asbestos liabilities in connection with asbestos trusts and manufacturers. We have estimated current and future asbestos-related health claims and liabilities in connection with Babcock & Wilcox, 48-Insulations, Eagle-Picher Industries, A.P. Green, Federal Mogul, Flintkote Company, Halliburton, Kaiser, NARCO, Pittsburgh Corning, W.R. Grace, and Union Carbide. We have also estimated current and future asbestos-related health claims relating to the A-Best Products Asbestos Settlement Trust, Amatex Asbestos Trust, DII Asbestos Trust, Keene Creditor Trust, JT Thorpe Successor Trust, Manville Personal Injury Settlement Trust, Pacor Trust, Fuller-Austin Asbestos Trust, UNR Asbestos Disease Claims Trust, Celotex Asbestos Settlement Trust, and the Eagle-Picher Personal Injury Trust. The curriculum vita of Dr. B. Thomas Florence, president of ARPC, is attached as Exhibit 2 to this report.

1.1 History

ARPC staff began working for Grace in 1995. At that time, ARPC staff were members of KPMG Peat Marwick which was retained to estimate the cost of future property damage (PD) and bodily injury (BI) claims related to exposure to Grace's asbestos-containing products. Based on Grace's claims data as of May 31, 1995, ARPC/KPMG estimated that Grace's total liability in the tort system arising from personal injury and property damage asbestos claims would not exceed $1.1 billion dollars. This estimate was based solely on Grace's tort system experience.

In May of 1997, ARPC/KPMG was again asked to estimate the volume, cost and timing of pending and future claims for asbestos-related injuries filed against Grace. Based on Grace's claims data as of March 10, 1997, ARPC/KPMG estimated that the total pending and future liability of Grace was $994 million. As before, the estimate was based solely on Grace's tort system experience.

In August 1998, ARPC was again asked to analyze the Grace asbestos claims data and provide an estimate of current and future indemnity arising from asbestos personal injury claims. Based soley on Grace's tort system experience as of January 9, 1998, ARPC estimated that the total pending and future liability of Grace was $794 million.

In December 2000, ARPC was again asked by Grace to estimate the number of future asbestos-related personal injury claims. Based on Grace's claims data as of December 4, 2000, ARPC estimated that there would be approximately 320,000 asbestos-related personal injury claims

filed against Grace from 2001-2039. As with all of ARPC's pre-petition estimates on behalf of Grace, this estimate was also based solely on Grace's tort system experience.

1.2 Current

ARPC has now been asked to estimate the Grace pending and future asbestos personal injury claim liability under a specific set of assumptions. These assumptions are based on the premise that only claimants whose claims met the following criteria would be able to sustain their burden of proof that their claims against Grace are valid, and therefore, their claims should be valued as part of the estimation process:

1. A Proof of Claim ("POC")
2. Minimum exposure criteria:
   - Nature of exposure to Grace asbestos containing products must be one of the following types (as described in Part 3 of the Personal Injury Questionnaire ("PIQ")):
     o a worker who personally mixed Grace asbestos-containing products
     o a worker who personally installed Grace asbestos-containing products
3. Minimum causation criteria for Lung Cancer claims of:
   - Diagnosis of asbestosis based on the B-Reader report of a reliable B-Reader
   - Reproducible ILO score of 1/0 or greater
4. Minimum medical criteria for Other Cancer claims of:
   - Diagnosis of laryngeal cancer
5. Minimum medical criteria for all Nonmalignant claims of:
   - Diagnosis of asbestosis or diffuse pleural thickening based on the B-Reader report of a reliable B-Reader
   - ILO score of 1/0 or greater for asbestosis
6. Minimum impairment criteria for Severe Asbestosis claims of:
   - Diagnosis of asbestosis based on the B-Reader report of a reliable B-Reader
   - ILO score of 2/1 or greater and
   - Pulmonary Function Test ("PFT") results of TLC <65% or (FVC<65% and FEV1/FVC ratio >=65%) complying with American Thoracic Society ("ATS") standards
7. Minimum impairment criteria for Asbestosis claims of:
   - Diagnosis of asbestosis or diffuse pleural thickening based on the B-Reader report of a reliable B-Reader
   - ILO score of 1/0 or greater (for asbestosis) and
   - PFT results of TLC <80% or (FVC<80% and FEV1/FVC ratio >=65%) complying with ATS standards

In a typical asbestos bankruptcy estimation, the information necessary for determining which claims would meet these criteria would not be available. However, in this case the Court approved the use of a Personal Injury Questionnaire ("PIQ") for the purpose of gathering demographic, medical and exposure information concerning all claims pending against Grace at the time of the bankruptcy ("pending claims"). The Court also required all pending claimants to file a timely Proof of Claim ("POC") or the claim would be forever barred from being filed

against a Trust in the future. The data gleaned from these two requirements allowed the estimation of valid Grace claims based on the above criteria.

2.0 Opinion

ARPC estimated the Grace pending and future asbestos personal injury claim liability under the specified assumptions. The estimated value of the pending claims that met the evidentiary criteria ranges from $83 million to $173 million with a median value of $128 million. The estimated present value of the future claims that would meet the evidentiary criteria ranges from $303 million to $1,141 million with a median value of $585 million. The total estimated present value of the pending and future claims ranges from $385 million to $1,314 million, with a median value of $712 million. The basis for these opinions is described below.

3.0 Data on Which Analyses Were Based

ARPC's analyses of Grace's pending and future liability for asbestos personal injury claims were based on the following sources of data:

1. Grace's historical claims database as of June 14, 2002,
2. Grace's Personal Injury Questionnaire and Proof of Claim database prepared by Rust Consulting as of April 30, 2007,
3. A random sample of pending claims for which information gathered from attachments to the Personal Injury Questionnaires was entered into a database by the Celotex Asbestos Settlement Trust,
4. A random sample of claims closed by Grace prior to the bankruptcy for which available claims information was entered into a database by the Celotex Asbestos Settlement Trust,
5. Manville Trust Claims Database as of September 30, 2006,
6. A random sample of Lung Cancer and Other Cancer claims for which x-rays were reviewed, and
7. A random sample of Nonmalignant claims for which pulmonary function test ("PFT") results were reviewed for adherence to ATS standards.

3.1 Grace Historical Database as of June 14, 2002

The initial data source provided by Grace was the June 14, 2002 database of claims maintained by Grace's legal department in a Claims Management System ("CMS") and used by the department for administrative and management purposes.

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3.2 Grace Personal Injury Questionnaire ("PIQ") and Proof of Claim ("POC") Data

3.2.1 Proof of Claim Data

In August 2006, the Court ordered that each claimant with a pending asbestos-related personal injury claim against Grace at the time of the bankruptcy was required to file a Proof of Claim with the Court by the Bar Date. The information in the returned POCs was entered into a database by Rust Consulting, Inc. and made available to all of the parties along with images of the POCs.

3.2.2 Personal Injury Questionnaire Data

The Court approved the use of a Personal Injury Questionnaire ("PIQ") for the purpose of gathering information concerning the claims pending against Grace at the time of the bankruptcy. A fourteen-page questionnaire was developed and approved by the Court and sent to all claimants who had an asbestos-related personal injury claim pending against Grace at the time of the bankruptcy. Questionnaires were sent out in September of 2005 and after several extensions of the deadline for returning questionnaires, a deadline was set: July 12, 2006. Approximately 60,000 questionnaires were returned by the July 12th deadline.

After many of the PIQs submitted were not fully completed and many had objections or stated "See attached", the Court ordered in October 2006 that the claimants must supplement their PIQs. The deadline for supplementation of the PIQs was January 12, 2007 and Rust received approximately 30,000 additional PIQs and over 100,000 supplemental submissions. Also, several plaintiff law firms again asked for extensions on behalf of their claimants and their supplemental information was received through the end of February 2007. The information in the returned questionnaires was entered into a database by Rust Consulting, Inc. and made available to all of the parties along with images of the PIQs.

3.3 PIQ Attachment Sample Data

Even after the Court's orders, many of the claimants did not fill out their PIQs, but instead continued to respond "See attached" and submitted attachments. Due to time constraints and the volume of responses, it was not feasible to have all the data coded in the attachments. However, a random sample of over 5,000 claims was selected from the approximately 120,000 claims pending at the time of the bankruptcy (see Appendix A for a description of the sampling protocol). These sample claims were then matched to the PIQs that were submitted.

For the PIQs that matched to a claim in the sample (3,217), all of the attachments and supplemental attachments were sent to the Celotex Asbestos Settlement Trust ("Celotex Trust" – now the Delaware Claims Processing Facility) for data entry. Experienced Celotex Trust claim reviewers entered information in the attachments for each claim (not the PIQ form itself). The information captured in this manner included demographics, medical information, and exposure information. See Appendix B for a description of the data entry system.

3.4 Historical Closed Claim Sample Data

ARPC also chose a sample of Grace historical closed claims. Claimants with settled historical claims were not asked to fill out a PIQ. Rather, ARPC selected a random sample of 2,889 claims from the claims that were closed (settled or dismissed) prior to the bankruptcy and had been served against Grace in 1998 or later (see Appendix A for a description of the sampling protocol). Supporting documentation for these claims was requested from Grace.

This information was also sent to the Celotex Trust for data entry. The Celotex Trust reviewers entered information that was present in the same manner as the attachments to the sample of PIQ claims discussed above.

3.5 Manville Trust Claims Database

Johns-Manville Corporation ("Manville") was the largest domestic producer of asbestos products, one of the first asbestos defendants, one of the first asbestos-related bankruptcy filings (1982), and one of the first trusts established to compensate asbestos claimants (1988). The Manville Trust collects and makes commercially available information pertaining to the approximately 750,000 claimants who have filed claims against the Manville Trust. For some of the Grace claims, certain data are not present in the Grace database, the PIQ/POC database, the PIQ sample database, or the Closed Claim sample database. Where possible, these missing data items were supplemented by matching the Grace claims to the Manville Trust database (Manville Trust data as of September 30, 2006).

3.6 X-ray Review Sample Data

On December 22, 2006, the Bankruptcy Court required all individuals alleging that they had radiographic evidence to support an allegation that they had a cancer caused by exposure to asbestos to produce certified x-rays that support their assertions or certify that the x-rays were destroyed or in the possession of third parties. Two random samples of the certified x-rays that were received were drawn. The first was a sample of 500 x-rays where the x-ray was submitted with an ILO reading. Additional x-rays were sampled irrespective of whether they had submitted an ILO reading. The x-rays in these samples were reviewed by three independent B-readers in a blind study to determine whether or not the x-ray provided evidence of an ILO score of 1/0 or greater as determined by at least two of the three independent B-readers.[1]

3.7 PFT Review Sample Data

A random sample of 150 PIQs alleging a Nonmalignant disease and indicating pulmonary function test ("PFT") results were reviewed to determine whether the pulmonary function tests were conducted in adherence to ATS standards.[2]

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[1] Study conducted by Dr. Daniel Henry. See Dr. Henry's June 11, 2007 report for a more detailed description.

[2] Study conducted by Dr. David Weill. See Dr. Weill's June 11, 2007 report for a more detailed description.

3.8 Combining the Data Sources Into a Single Analysis Database

To create an analysis database, ARPC combined the data from all seven sources. ARPC used an extensive set of data analysis programs to complete the following steps:

1. standardize and remove duplicates from historical Grace CMS database
2. standardize the PIQ and POC data
3. supplement with data supplements and electronic files submitted by claimants
4. remove duplicates from the PIQ and POC data
5. match the PIQ and POC database to the historical Grace CMS data
6. merge data from PIQ and POC database with historical Grace CMS database
7. add additional data from the PIQ attachment sample and Closed Claim sample databases
8. match claims database to Manville Trust database
9. match ILO study claims to analysis database
10. match PFT study claims to analysis database

Appendix C describes this process in more detail.

4.0 Pending Claims Estimation

Grace asked ARPC to assume that only the claimants whose claims met specific criteria will be able to sustain their burden of proof that the claims against Grace are valid and therefore compensable. ARPC was tasked with estimating how many of the historical pending claims met those criteria. After combining all of the data sources described above, ARPC analyzed which historical pending claimants met the assumed criteria of valid claims as described below.

4.1 Criteria

ARPC first had to determine how many of the historical pending claims met the following criteria provided by Grace:

1. A POC filed with the Bankruptcy Court
2. Minimum exposure criteria:
   - Nature of exposure to Grace asbestos containing products must be one of the following types (as described in Part 3 of the PIQ):
     - o a worker who personally mixed Grace asbestos-containing products
     - o a worker who personally installed Grace asbestos-containing products
3. Minimum causation criteria for Lung Cancer claims of:
   - Diagnosis of asbestosis based on the B-Reader report of a reliable B-Reader
   - Reproducible ILO score of 1/0 or greater
4. Minimum medical criteria for Other Cancer claims of:
   - Diagnosis of laryngeal cancer
5. Minimum medical criteria for Nonmalignant claims of:
   - Diagnosis of asbestosis or diffuse pleural thickening based on the B-Reader report of a reliable B-Reader
   - ILO score of 1/0 or greater for asbestosis

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6. Minimum criteria for Severe Asbestosis claims of:
   - Diagnosis of asbestosis based on the B-Reader report of a reliable B-Reader
   - ILO score of 2/1 or greater and
   - PFT results of TLC <65% or (FVC<65% and FEV1FVC ratio >=65%) complying with ATS standards
7. Minimum impairment criteria for Asbestosis claims of:
   - Diagnosis of asbestosis or diffuse pleural thickening based on the B-Reader report of a reliable B-Reader
   - ILO score of 1/0 or greater
   - PFT results of TLC <80% or (FVC<80% and FEV1FVC ratio >=65%) complying with ATS standards

4.2 Determining Which Claims Met the Assumed Criteria

4.2.1 Filing Of A POC - Matching The POC Database To The Historical Grace CMS Data And The POC Database To The PIQ Database

The Bankruptcy Court ordered all claimants with a claim pending at the time of the bankruptcy to file a POC by the Bar Date. ARPC matched the POCs received to the historical Grace CMS database.

ARPC programmatically determined matches between the historical and POC databases. Due to the complexity of the matching process (caused by the use of nonstandard forms, duplicates, sparseness of data, etc.), ARPC created four levels of matches: Definite Matches, Probable Matches, Possible Matches, and No Possible Matches (see Appendix E for more information on the types of matches and the matching process).

As can be seen in the table below, only 84,476 of the 113,648 historical pending claims submitted a POC[3] (63,784 definite matches, 1,431 probable matches and 19,261 possible matches). At least 29,172 (26%) of the 113,648 historical pending claims do not have a POC and another 19,261 historical pending claims may not have a POC because they are only possible matches.

Table 4-1
Number of Historical Pending Claims That Match to POCs

Historical Disposition Type	1) POC Definite Match	2) POC Probable Match	3) POC Possible Match	Total Matches	4) POC No Possible Match	Total Number of Historical Claims
Pending	63,784	1,431	19,261	84,476	29,172	113,648

Table 4-2 categorizes the 84,476 historical claims that filed a POC by disease:

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[3] All analyses of historical claims exclude 5,063 claims with either a diagnosis date or date filed that is post-bankruptcy.

Table 4-2
Number of Historical Pending Claims That Filed a POC by Disease
After Allocation of Unknown Diseases[4]

Pending Claims	Meso- thelioma	Lung Cancer	All Other Cancers	Non-malig- nancies	Total
Have a POC	2,412	5,505	2,106	74,453	84,476

Table 4-3 shows the total number of historical pending claims with both a POC and a PIQ. Only 74,154 of the historical pending claims that matched to a POC also matched to a PIQ (55,075 definite matches, 899 probable matches and 18,180 possible matches). At least 39,494 (35%) of the 113,648 historical pending claims do not have a POC and a PIQ and another 18,180 historical pending claims may not have a POC with a PIQ because they are only possible matches.

Table 4-3
Number of Historical Pending Claims That Match POCs with PIQs

Historical Disposition Type	1) Have a POC Match				4) PIQ No Possible Match	2) No POC Match	Total Number of Historical Pending Claims
	1) PIQ Definite Match	2) PIQ Probable Match	3) PIQ Possible Match	Total Matches			
Pending	55,075	899	18,180	74,154	10,322	29,172	113,648

Table 4-4 categorizes the 74,154 historical pending claims that filed a POC and a PIQ by disease:

Table 4-4
Number of Pending Claims That Filed a POC and a PIQ by Disease
After Allocation of Unknown Diseases

Pending Claims	Meso- thelioma	Lung Cancer	All Other Cancers	Non-malig- nancies	Total
Have a POC and PIQ	2,122	4,893	1,905	65,233	74,154

ARPC's estimates were based on analyses that only excluded pending historical claims for which there was no possible POC match.

4.2.2 Historical Pending Claims That Met the Minimum Exposure Criteria

ARPC was asked to assume that only historical pending claimants whose claims also met the following criteria would be able to sustain their burden of proof that their claims against Grace are valid, and therefore, their claims should be valued as part of the estimation process:

- Claimants must have exposure to a Grace asbestos-containing product as the result of the following "Nature of Exposure"[5]:

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[4] Method for allocation of unknown diseases is described in Appendix F.

o   personally mixing Grace asbestos-containing products

o   personally installing Grace asbestos-containing products

To determine if the claims met the exposure criteria, the PIQ specifically asked each pending claimant to characterize the claimant's "Nature of Exposure" as one of the descriptions shown above or as being in the proximity of Grace products. Only 13% of the claimants who submitted PIQs responded to this question. Based on the Celotex Trust review of a sample of attachments submitted with the PIQs, 71% of the PIQ claims in the sample had information regarding nature of exposure[6].

Using data from the PIQ attachment sample, ARPC calculated the number of historical pending claims that met the assumed criteria of sufficient exposure to Grace asbestos-containing products (and also filed a POC). If claimants did not respond to the "Nature of Exposure" question either on the questionnaire or the attachments to the questionnaire, ARPC had no data to calculate how many, if any, of the claimants who did not respond had claims that met the criteria. ARPC analyzed the PIQ attachment sample in two ways. One method calculates the number of historical pending claims that met the criteria based on the claims that provided data that they met the nature of exposure criteria. The second method calculates the number of historical pending claims that met the assumed criteria and assumes that claimants who did not provide nature of exposure data either on or with the PIQs met the criteria in the same proportion as those who provided the data.

Table 4-5
Number of Historical Pending Claimants That Met the Exposure Criteria
Based on the PIQ Attachment Sample

Pending Claims	Meso-thelioma	Lung Cancer	All Other Cancers	Non-malig-nancies	Total
Based on claims providing exposure data	323	477	368	11,161	12,330
Based on claims providing exposure data and assuming the same proportion for those not providing data	813	848	472	19,261	21,394

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[5] See June 11, 200 report of Elizabeth Anderson: The Scientific Credibility of Personal Injury Claims Related to Alleged Exposure to W. R. Grace Asbestos Containing Products – Supplemental Report.

[6] Due to the varied formats of the exposure records submitted for the PIQ sample claims and because the claimants often did not specifically identify exposure to a Grace asbestos containing product, it was decided to have Celotex Trust reviewers code any type of information concerning the nature of the claimant's asbestos exposure instead of requiring Celotex Trust reviewers to discern whether or not each exposure was linked to a Grace asbestos containing product.

4.2.3 Minimum Causation Criteria for Lung Cancer Claims

The assumed minimum causation criteria for Lung Cancer historical pending claims are based on the following criteria:

1. Diagnosis of asbestosis based on the B-Reader report of a reliable B-Reader
2. Reproducible ILO score of 1/0 or greater

To determine whether the claimants met these assumed criteria, Dr. Daniel Henry developed a claimant x-ray study. The x-ray study performed by Dr. Henry was based on a Court order requiring each claimant alleging asbestos-related Lung Cancer as evidenced by radiographic evidence to submit a certified copy of the x-ray showing such evidence or certify that the x-ray was held by a third party or destroyed. Of the 4,764 Lung Cancer claimants subject to the Court order, 2,421 claimants (51%) neither submitted a certified copy of an x-ray nor certified that the x-ray was held by a third-party or destroyed.

ARPC was asked to make the assumption that absent receipt of certified copies of x-rays such evidence would not be available for the estimation trial. Therefore, ARPC included in its analyses only those claimants that provided certified copies of x-rays.

In addition, the x-ray study found that the requirement of reproducibility (at least two independent doctors reading the x-ray as having an ILO of 1/0 or greater) was met by only a small number of the Lung Cancer claimants in the sample (restricted to claimants with a POC that match to a historical pending claim). Based on the results of this study concerning both noncompliance and reproducibility of an ILO of 1/0 or greater, Table 4-6 provides the number of historical pending Lung Cancer claims that met these criteria:

Table 4-6.
Number of Lung Cancer Claims with A Reproducible ILO of 1/0 or Greater
Based on X-ray Study

Pending Claims	Lung Cancer
Number of pending claims with reproducible ILO of 1/0 or greater	344

Because this sample had no corresponding review of exposure information, ARPC did not examine the combined impact of the causation criteria and the exposure criteria. Absent additional data, ARPC did not know how many, if any, of these claimants met the exposure criteria. Further review of these claims is underway. Pending completion of this review, for the purpose of this estimation, ARPC considered that the Lung Cancer claimants that have a reproducible ILO score also met the exposure criteria. Final numbers will be included after the additional review is completed.

4.2.4 Minimum Medical Criteria for the Other Cancer Claims

The assumed minimum medical criterion for Other Cancer claims is a diagnosis of Laryngeal Cancer[7]. Using data from the PIQ attachment sample, ARPC calculated the number of historical pending Other Cancer claims that met the assumed medical criteria (and also filed a POC and met the minimum exposure criteria described in Section 4.2.2). If claimants did not specify the type of Other Cancer alleged in either the questionnaire or the attachments to the questionnaire, ARPC had no data to calculate how many, if any, of the claimants who did not respond had claims that met the criteria. ARPC analyzed the PIQ attachment sample in two ways. One method calculates the number of historical pending Other Cancer claims that met the medical criteria based on the claims that provided the required information and filed a POC. The second method calculates the number of historical pending Other Cancer claims that met the criteria based on claims providing the required data and assuming that claimants who did not provide the required data met the criteria in the same proportion as those who did provide the data.

Table 4-7 provides the number of historical pending Other Cancer claimants that met both the medical and exposure criteria based on the PIQ attachment sample (and filed a POC).

Table 4-7
Number of Historical Pending Other Cancer Claimants That Met the Medical and Exposure Criteria and Filed a POC
Based on the PIQ Attachment Sample

Pending Claims	Other Cancer
Based on claims providing medical and exposure data	42
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	63

4.2.5 Minimum Medical Criteria for the Nonmalignant Claims

The assumed minimum medical criteria for Nonmalignant claims are based on the following criteria:

1. Diagnosis of asbestosis or diffuse pleural thickening based on a B-reader report of a reliable B-reader
2. ILO score of 1/0 or greater for asbestosis

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[7] See June 11, 2007 report of Dr. David Weill.

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For purposes of calculating which claims met the criteria of a reliable B-reader, ARPC was asked to assume that a group of B-Readers do not satisfy the evidentiary standard of reliability[8], and a claimant alleging a Nonmalignant disease using only one of these B-Readers had not met the burden of proof that the claim is valid.[9]

To determine if the claims met the reliable doctor criteria and other medical criteria, the PIQ specifically asked each pending claimant to answer medical questions. Many of the claimants did not fill out the information on the questionnaire but stated "See attached" or "Objection". The Celotex Trust reviewed a sample of attachments to capture additional medical data attached to the PIQ.

Using data from the PIQ attachment sample, ARPC calculated the number of historical pending Nonmalignant claims that met the assumed medical criteria (and also filed a POC and met the minimum exposure criteria described in Section 4.2.2). If claimants did not specify an ILO score and the name of a B-reader, ARPC had no data to calculate how many, if any, of the claimants who did not respond had claims that met the criteria. ARPC analyzed the PIQ attachment sample in two ways. One method calculates the number of historical Nonmalignant claims that met the medical criteria based on the claims that provided the required information. The second method calculated the number of historical pending Nonmalignant claims that met the criteria based on claims providing the required data and assuming that claimants who did not provide the required data met the criteria in the same proportion as those who did provide the data.

Table 4-8
Number of Historical Pending Nonmalignant Claimants That Met the Medical and Exposure Criteria and Filed a POC
Based on the PIQ Attachment Sample

Pending Claims	Nonmalignants
Based on claims providing medical and exposure data	4,379
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	8,292

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[8] These doctors are discussed in the June 11, 2007 report of Dr. Haber: Diagnostic Practices in a Litigation Context: Screening Companies and the Doctors They Employed.

[9] See Appendix G for a list of the non-qualified doctors. Some claimants provided information from multiple B-readers. In these instances, a single B-reader, and the reading, was selected. If a B-reader who is not in Appendix G made a reading that qualified a claimant as having asbestosis or diffuse pleural thickening by the assumed criteria, then that B-reader was selected for purposes of analysis for that claimant. If more than one reader for a given claimant was not in Appendix G, then the B-reader with the most severe reading was selected for purposes of analysis.

*4.2.6   Allocation of Nonmalignant Claims Among Severe Asbestosis, Asbestosis,
          and Unimpaired Asbestosis Claims*

In addition, ARPC was asked to categorize Nonmalignant claims into three categories based on
assumed medical criteria: Severe Asbestosis, Asbestosis, and Unimpaired Asbestosis. The
assumed criteria are:

> Severe Asbestosis:
> - Diagnosis of asbestosis based on the B-Reader report of a reliable B-
>   Reader
> - ILO score of 2/1 or greater and
> - TLC <65% or (FVC<65% and FEV1FVC ratio >=65%) complying with
>   ATS standards
>
> Asbestosis:
> - Diagnosis of asbestosis or diffuse pleural thickening based on the B-
>   Reader report of a reliable B-Reader
> - ILO score of 1/0 for asbestosis
> - TLC <80% or (FVC<80% and FEV1FVC ratio >=65%) complying with
>   ATS standards
>
> Unimpaired Asbestosis:
> - Diagnosis of asbestosis or diffuse pleural thickening based on the B-
>   Reader report of a reliable B-Reader
> - ILO score of 1/0 or greater for asbestosis

To examine the issue of PFTs complying with ATS standards for the purpose of identifying
claimants that met the criteria of Severe Asbestosis and Asbestosis, Dr. David Weill conducted a
study that consisted of a random sample of 150 Nonmalignant claims that alleged PFT evidence
of impairment on their PIQs.   Doctors reviewed the PFT test results based on ATS criteria.[10]
The conclusion of the sample analysis was that none of the 150 PIQs sampled complied with all
of the ATS standards. Further review of noncompliance with ATS standards is underway to
determine its impact on ARPC's estimation analyses.

Pending completion of the further review, if even non-ATS compliant PFT results are used to
determine the number of Nonmalignant pending claims that met the evidentiary criteria, the
following table shows the number of Nonmalignant claims that met the assumed medical and
exposure criteria by type of nonmalignancy using the PIQ attachment sample. If claimants did
not specify an ILO score, the name of a B-reader, and the necessary PFT results, ARPC had no
data to calculate how many, if any, of the claimants who did not respond had claims that met the
criteria. ARPC analyzed the PIQ attachment sample in two ways: (1) based on claims providing
medical data and (2) based on claims providing data and assuming the same proportion for those
not providing data.

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[10] Based on 1994 Spirometry Standards, the ATS ERS-2005 Lung Volume Standards, and the
ATS 1995 DLCO Standards.

Table 4-9
Breakout of Nonmalignant Categories Based on the PIQ Attachment Sample

Pending Claims	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis
Based on claims providing medical and exposure data	70	1,782	2,527
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	132	3,375	4,786

Final numbers will be included after the completion of the additional review of noncompliance with ATS standards.

4.3 The Number of Pending Claims That Met the Assumed Criteria

Table 4-10 and Table 4-11 below show the number of historical pending claims by disease that ARPC estimated met the assumed criteria using the two methods described earlier in this section and summarizes the results in Section 4.2.

Table 4-10
Summary of Estimated Pending Claims That Met the Criteria
Based on Claims Providing Data

Pending Claims	Meso-thelioma	Lung Cancer	All Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
1) Had a POC	2,412	5,505	2,106		74,453		84,476
2) Met Exposure Criteria and #1	323	477	368		11,161		12,330
3) Met Causation Criteria and #1		344					
4) Met Medical Criteria and #2			42		4,379		
5) Nonmalignancy Allocation of #4				70	1,782	2,527	
Overall	323	344	42	70	1,782	2,527	5,088

Table 4-11
Summary of Estimated Pending Claims That Met the Criteria
Based on Claims Providing Data and Assuming the Same Proportion for Claims Not Providing Data

Pending Claims	Meso-thelioma	Lung Cancer	All Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
1) Had a POC	2,412	5,505	2,106		74,453		84,476
2) Met Exposure Criteria and #1	813	848	472		19,261		21,394
3) Met Causation Criteria and #1		344					
4) Met Medical Criteria and #2			63		8,292		
5) Nonmalignancy Allocation of #4				132	3,375	4,786	
Overall	813	344	63	132	3,375	4,786	9,512

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4.4 Computation of Average Settlement Amounts

ARPC calculated settlement averages to value the pending claims.

4.4.1 Value of Mesothelioma and Lung Cancer Claims

To value the estimated pending malignancy claims, ARPC analyzed Grace's historical settlement data.

Because ARPC estimated pending claims that met the assumed evidentiary criteria, ARPC examined the settled Mesothelioma and Lung Cancer claims in the Closed Claim sample that met the criteria (of the ones that provided the necessary information). ARPC applied an average inflation value of 2.5% per year to bring all settlement averages to 2001 dollars. The range from April 1999 to April 2001 was selected as being most recent and therefore most reflective of future events, without overweighting any single time period. Table 4-12 illustrates the results of this exercise:

Table 4-12.
Settlement Averages for Claims in the Closed Claim Sample That Met the Criteria
Claims Closed From April 1999 to April 2001

	Mesothelioma	Lung Cancer
Settled claims in sample that met criteria	$135,860	$34,673

4.4.2 Value of Other Cancer and Nonmalignant Claims

Because there were insufficient Other Cancer closed claims and because Grace historically did not differentiate between different levels of Asbestosis in the historical database, ARPC calculated the average settlement values for Other Cancer, Severe Asbestosis, Asbestosis, and Unimpaired Asbestosis claims as a ratio to Lung Cancer based on the average ratios of values found in four recent asbestos trusts (Armstrong, Babcock & Wilcox, USG, and Pittsburgh Corning) and the average Lung Cancer value for claims that met the criteria in the Closed Claim sample as shown in Table 4-12.

Table 4-13 provides the results of this calculation:

Table 4-13
Estimated Settlement Averages for Other Cancer and Nonmalignant Claims

Alleged Disease	Other Cancer	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis
Average ratio to Lung Cancer settlement value based on current trusts	51.7%	100.0%	23.8%	10.1%
Estimated settlement value based on Lung Cancer value for April 1999-April 2001	$17,926	$34,673	$8,252	$3,502

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4.4.3 Values Used to Value Pending Claims

Table 4-14 provides the values used by ARPC to value pending claims:

Table 4-14
Values Used to Value Pending Claims

	Meso-thelioma	Lung Cancer	All Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis
Value	$135,860	$34,673	$17,926	$34,673	$8,252	$3,502

4.5 Estimated Indemnity of Historical Pending Claims

The following table presents estimates of the value of the pending claims using the estimated claim values described above:

Table 4-15
Estimated Value of Pending Claims That Met the Evidentiary Criteria (millions)

Pending Claims	Meso-thelioma	Lung Cancer	Other Cancer	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Based on claims providing medical and exposure data	$43.9	$11.9	$0.8	$2.4	$14.7	$8.9	$82.5
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	$110.5	$11.9	$1.1	$4.6	$27.8	$16.8	$172.7
Overall Median	$77.2	$11.9	$0.9	$3.5	$21.3	$12.8	$127.6

The estimated value of the pending claims that met the evidentiary criteria ranges from $83 million to $173 million with a median value of $128 million.

5.0 Future Claims Estimation

5.1 Historical Pending and Closed Claims That Met the Criteria

ARPC was also tasked with forecasting the number of future claims. Grace asked ARPC to assume that only the claimants whose claims met specific criteria will be able to sustain their burden of proof that the claims against Grace are valid and therefore compensable. Since a forecast of future claims that will meet the evidentiary criteria is based on both historical pending and closed claims that met the criteria, ARPC calculated the number of historical closed claims that met the assumed criteria, in addition to the number of historical pending claims that met the assumed criteria.

Table 5-1 and Table 5-2 show the estimated number of historical pending and closed claims that met the assumed criteria by disease and year served/filed assuming that the historical closed

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claims would meet the criteria in the same proportion as the historical pending claims. Table 5-1 is based on claims providing exposure and medical data and Table 5-2 is based on claims providing exposure and medical data and assuming the same proportions for those not providing data. These numbers of claims were used as the foundation for the estimation of future asbestos claims against Grace that are assumed will be able to meet the evidentiary criteria.

Table 5-1
Number of Estimated Pending and Closed Claims That Met the Criteria
Based on Claims Providing Data

Year Served	Meso-thelioma	Lung Cancer	All Other Cancers	Nonmalig-nancies	Total
1996	85	108	8	1,644	1,845
1997	77	87	7	1,259	1,429
1998	79	77	8	1,383	1,546
1999	89	91	9	1,391	1,580
2000	150	122	13	2,089	2,373
2001	44	52	5	671	772
Total	523	537	49	8,436	9,545

Table 5-2
Number of Estimated Pending and Closed Claims That Met the Criteria
Based on Claims Providing Data and Assuming the Same Proportion for Claims Not Providing Data

Year Served	Meso-thelioma	Lung Cancer	All Other Cancers	Nonmalig-nancies	Total
1996	213	108	12	3,113	3,446
1997	193	87	10	2,383	2,673
1998	198	77	12	2,619	2,906
1999	224	91	13	2,635	2,964
2000	376	122	19	3,955	4,472
2001	112	52	7	1,270	1,441
Total	1,317	537	73	15,975	17,902

To implement the forecast methods described in the next section of this report, ARPC analyzed the filing trends by year of diagnosis. Appendix H describes the imputation of missing diagnosis years and the adjustments for claims diagnosed after the filing year.

5.2 Forecast of Incidence of Mesothelioma and Lung Cancer

Two different methods were used to estimate the number of future claims that will be able to meet the assumed evidentiary criteria against Grace for Mesothelioma and Lung Cancer—one based upon the work of Nicholson, Perkel, and Selikoff (1982) and the other based upon the work of Peto, Henderson, and Pike (1981). These methods are described in Appendix I.

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5.3 Methods for Estimating Other Cancer and Nonmalignant Claims

Two general methods were used to estimate Other Cancer and Nonmalignant claims. One method used the lung cancer claims as an "index series" to determine the ratio of the number of Other Cancer and Nonmalignant claims in the forecast database to the total number of Lung Cancer claims in the forecast database. The other method used regression models to estimate the natural logarithm of the annual filing rate for the valid Other Cancer and Nonmalignant claims as a linear function of the natural logarithm of the annual filing rate for valid Lung Cancer claims.

5.4 Estimation of The Number of Future Claims

The table in this section represents the median forecast of future claims. The median forecast is based on 32 individual forecasts—the product of two methods for calculating the number of claimants that would be able to meet the evidentiary criteria, two alternative mesothelioma and lung cancer forecast methods (Nicholson and Peto), four calibration periods (1996-2000, 1997-2000, 1998-2000 and 1999-2000), and two methods for estimating the other cancers and nonmalignancies (ratio and regression). The calibration period refers to the historical period of time that is used as the basis for the forecast. A calibration period is selected to be that historical period that is expected to be most reflective of future events. The range of calibration periods: 1996-2000, 1997-2000, 1998-2000, and 1999-2000, was selected so as to include sufficient years such that the influence of any single anomalous year would be mitigated. These calibration periods were also selected as being current with the last full year of data prior to the bankruptcy.

The median of the forecasts of the number of future claims based on claims providing data, based on claims providing data and assuming the same proportion for claims not providing data, and the median of all these forecasts are presented in the Table 5-3.

Table 5-3
Estimated Number of Future Claims That Will Be Able to Meet the Evidentiary Criteria

Median	Meso-thelioma	Lung Cancer	All Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Based on claims providing medical and exposure data	2,381	2,271	234	583	14,920	21,158	41,546
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	6,153	2,269	340	1,074	27,500	38,997	76,332
Median of all 32 scenarios	3,716	2,270	277	778	19,926	28,257	55,225

5.5 Present Value of Indemnity for Estimated Future Claims

5.5.1 Nominal Estimated Indemnity

The following table presents the nominal value of the median future claim estimates using the estimated claim values described in Section 4.4. A 2.5% annual inflation rate was applied to

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settlement values through 2007 and then a 1.0% inflation rate was used to reflect a 2.5% annual inflation rate reduced by an average 1.5% claim deflation rate representing the effects on claim values of an aging population and a primarily static period of exposure.

Table 5-4
Estimated Nominal Value of Future Claims That Would Meet the Evidentiary Criteria
(millions)

Median	Meso-thelioma	Lung Cancer	All Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Based on claims providing medical and exposure data	$397	$97	$5	$25	$151	$91	$766
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	$1,028	$97	$8	$46	$278	$167	$1,623
Median of all 32 scenarios	$617	$97	$6	$33	$201	$121	$1,076

5.5.2 Present Value of Estimated Indemnity

Similarly, the following table presents the net present value of the median future claims estimates using the estimated claim values described in Section 4.4. The discount rate used was 5.63%, based on the average of three different methods for the calculation of the discount rate as described in Appendix K.

Table 5-5
Estimated Present Value of Future Claims That Would Meet the Evidentiary Criteria
(2001 dollars - millions)

Median	Meso-thelioma	Lung Cancer	All Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Based on claims providing medical and exposure data	$213	$52	$3	$13	$81	$49	$411
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	$549	$51	$4	$25	$151	$91	$870
Median of all 32 scenarios	$337	$52	$3	$18	$109	$66	$585

The 32 estimates of future claims range in net present value from $317 million to $1,147 million.

Appendix J shows the total number of claims, the nominal value and the net present value of the median of all 32 forecasts by year and by disease.

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6.0 Total Number and Value of Pending and Future Claims

Table 6-1 provides the total number of pending and future claims that met or will be able to meet the evidentiary criteria:

Table 6-1
Estimated Number of Pending and Future Claims That Met or Will Be Able to Meet the Evidentiary Criteria

Median	Meso-thelioma	Lung Cancer	All Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Based on claims providing medical and exposure data	2,704	2,615	276	652	16,703	23,686	46,634
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	6,966	2,613	403	1,206	30,874	43,782	85,844
Median of all 32 scenarios	4,284	2,614	330	879	22,505	31,914	62,525

Table 6-2 provides the estimated nominal value of pending and future claims that met or will be able to meet the evidentiary criteria:

Table 6-2
Estimated Nominal Value of Pending and Future Claims That Met or Will Be Able to Meet the Evidentiary Criteria (millions)

Median	Meso-thelioma	Lung Cancer	All Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Based on claims providing medical and exposure data	$441	$109	$6	$27	$166	$100	$849
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	$1,139	$109	$9	$50	$306	$184	$1,796
Median of all 32 scenarios	$694	$109	$7	$37	$223	$134	$1,203

Table 6-3 provides the estimated net present value of pending and future claims that met or will be able to meet the evidentiary criteria:

Table 6-3
Estimated Present Value of Pending and Future Claims That Met or Will Be Able to Meet the Evidentiary Criteria (millions)

Median	Meso-thelioma	Lung Cancer	All Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Based on claims providing medical and exposure data	$257	$63	$3	$16	$96	$58	$493
Based on claims providing medical and exposure data and assuming same proportion for those not providing data	$659	$63	$5	$29	$179	$107	$1,043
Median of all 32 scenarios	$414	$63	$4	$21	$131	$79	$712

7.0 Conclusion

ARPC was asked to estimate the Grace number and value of pending and future asbestos personal injury claims under the assumption that only claimants whose claims met the required criteria will be able to sustain their burden of proof that their claims against Grace are valid, and therefore, their claims should be valued as part of the estimation process.

ARPC estimated 32 forecasts based on various combinations of assumptions concerning which historical claims met the imposed criteria. As of April 2001, ARPC estimated the net present value of pending and future claims using a discount rate of 5.63%, an inflation rate of 2.5%, and a claim value deflation rate of 1.5% (reflecting lower claim valuations due to the aging of the claimant population) to be within a range from $385 million to $1,314 million through 2049. The median of this range is $712 million.

8.0 Disclosures and Signature

In reaching the opinions and conclusions set forth in this report I have considered the items of data identified in this report, the reports, articles and documents identified in this report, the claims databases referenced in this report, the documents listed in Exhibit 1, and my knowledge of asbestos claim forecasting.

My qualifications to perform the analyses described in this report and provide expert testimony are set forth in Exhibit 2 to this document. Any publications I have authored and my testimony during the past four years are also set forth in Exhibit 2.

My compensation for services rendered in this matter is reflected in invoices submitted in the bankruptcy case. At present my hourly rate is $560.

I reserve the right to modify this report as new information becomes available between now and the time of trial.

B. Thomas Florence
President
ARPC

Appendix A: Protocol for the PIQ Attachment and Closed Claim Samples

After analyzing the Grace historical CMS database, ARPC drew two random samples based on the following population of claims:

1. claims that were pending at the time of the bankruptcy and
2. closed claims that were served/filed between 1998 and 2001.

For the population of historical pending claims, the purpose of the sample was to review the information provided by the claimant in attachments to the PIQ. ARPC drew a random sample of claims by disease and year served (claims served in 1996 or earlier were treated as one stratum). ARPC sampled the following number of claims:

65 claims for Mesothelioma per year
90 claims for Lung Cancer per year
20 claims for Other Cancer per year
300 claims for Asbestosis per year
100 claims for Pleural Disease per year
300 claims for Unknown disease

for a total of 5,250 claims.

For the population of historical closed claims, the purpose of the sample was to compare the characteristics of the sample of closed claims with the pending claims that responded to the Grace questionnaire. ARPC sampled claims served in the last 3+ years of Grace's filing history. For this sample of claims, ARPC randomly sampled 100 claims for each disease and year served (or all of the claims if there were fewer than 100) except for Asbestosis where 200 claims were sampled for each year served for a total of 2,889 claims.

Appendix B: Data Entry of PIQ Attachment Sample and Closed Claim Sample

The Grace Data Collection system was created to facilitate the collection of data for analysis and verification from remote entities. The process divided the attachments to the Personal Information Questionnaires (PIQs) and Closed Claims documents (CC's) into three parts: Medical Information, Legal Information, and Other Information. The Grace system was set up to accept and maintain the information from these three sources independently while linking them based upon an internal id for analysis and verification.

The Grace system was designed as a web based application encrypted with a 128 bit SSL certificate to ensure the security of the data. It was accessible via the internet to facilitate the remote entry of data while maintaining the central database locally.

Grace contracted with the Celotex Asbestos Settlement Trust to enter the data from the PIQ sample attachments and the closed claim sample documents. The use of the Celotex Trust ensured that the data was entered by claims reviewers already experienced in the coding of asbestos claims, including the medical and legal documents. Celotex Trust personnel were instructed to enter the data that they found in the documents; they were instructed not to make any determinations about the data.

Upon receipt, the documents were divided into three categories: Medical, Legal, and Other. Each type of document had one or more dedicated reviewers. The reviewers were provided with data entry protocols, and an ARPC staff member was always available to answer questions regarding the entry of the data. A protocol was also developed to perform intermittent quality checks on the data during the data entry process.

Appendix C: Database Steps

The following describes the list of steps ARPC took in developing the analysis database.

1. Standardize and Remove Duplicates From the Historical Grace CMS Database

The historical Grace CMS database that ARPC received was current as of June 14, 2002. ARPC limited the analyses to only plaintiff and co-plaintiff type cases (excluding consortium and third-party cases) and removed approximately 3,000 duplicates. ARPC did not remove duplicates based on name matches alone.

This process was an iterative process such that if there was a definite match to a PIQ or POC in a later step (described below) that provided more identifying information about the CMS claim (such as social security number), ARPC then went back and repeated the duplicate removal processes based on this updated information. Nearly another 1,000 duplicates were removed based on updated information from PIQs and POCs that matched to the Grace CMS claims.

2. Standardize the PIQ/POC Data

ARPC's analysis of the PIQ and POC databases began with standardization of the claimant names and standardization of the law firm and physician names. Dates of exposure to asbestos containing products (both Grace and Non-Grace) were also extracted from text fields and standardized into year formats.

3. Supplement With Data supplements and Electronic Files Submitted by Claimants

The Rust PIQ/POC database identified supplemental data in two form types:

> SDA – Supplemental Data and Attachment
> GAR – Supplemental data supplied for multiple claimants in an Excel spreadsheet

This information was linked to the original PIQ submission and then used to update any data fields from the original submission that were missing or differed from the supplemental data.

The Rust PIQ/POC database also identified those claimants who requested that their claims be withdrawn. The Court was also notified by one law firm that all of their claimants were withdrawing their claims.

4. Remove Duplicates from PIQ and POC Databases

To remove duplicates from the PIQ and POC databases, ARPC identified claims that matched on the following criteria:

- Historical claims database ID plus first three letters of Claimant Last Name

- Full Social Security Number match
- Last four digits of Social Security Number, Full Claimant Name, Date of Birth
- Last four digits of Social Security Number, Full Claimant Name, Law Firm Name
- Full Claimant Name, Date of Birth, Law Firm Name
- First four letters of Claimant's Last Name, First three letters of Claimant's First Name, Last four digits of Social Security Number, and Date of Birth
- First two letters of Claimant's Last Name, full Claimant First Name, Last four digits of Social Security Number, and Date of Birth
- Claimant's Last Name, First Initial of Claimant's First Name, Last four digits of Social Security Number, and Date of Birth.

Because of the limited information captured in the POC database, duplicates were identified by:

- Last four digits of Social Security Number, Claimant Last Name, Claimant First Name and
- Last four digits of Social Security Number, Law Firm Name, First four letters of Claimant's Last Name, and First three letters of Claimant's First Name.

These methods identified 9,256 duplicates in the PIQ database and 7,063 duplicates in the POC database.

5. Match the PIQ and POC Databases to the Historical Grace CMS Data and the POC Database to the PIQ Database

The PIQ and POC databases were matched to the historical Grace CMS data and to each other based on stepwise processes as described in Appendix E.

6. Merge Data from PIQ and POC Databases with Historical Grace CMS Database

Data from the PIQ and POC databases were merged with the historical Grace CMS database for the claims defined as "Definite" and "Probable" matches to a pre-petition pending claim, and the PIQ/POC data if present were allowed to override any pre-existing historical information. For example, if the alleged disease in the historical database for a pre-petition pending claim was unknown and the alleged disease from the matching PIQ was known, then the PIQ alleged disease would override the historical alleged disease for that claim (as long as the diagnosis date in the PIQ data was not post-bankruptcy). Similar supplementation was done for date of birth, date of death, diagnosis date, exposure information, etc. If the pertinent information was missing in the PIQ/POC database but present in the historical claim database, then the historical data were retained for analysis purposes.

7. Add Additional Data from the PIQ Sample and Closed Claim Sample Databases

Similar to the supplementation of the historical data with the PIQ/POC data, the data collected in the PIQ and Closed claim samples were also used to supplement data in the combined historical/PIQ/POC analysis database.

8. Match Claims Database to Manville Trust Database to Supplement Any Remaining Missing Data Required for the Forecast

After the data from the historical, PIQ, POC, PIQ attachment sample, and Closed claim sample databases had been combined, missing data for the analysis variables were supplemented based on the match to the Manville Trust database.

9. Match X-ray Study Claimants to Analysis Database

ARPC matched the x-ray study claimants to the analysis database and flagged all claims that were not in compliance with the Court's order.

10. Match PFT Study Claimants to Analysis Database

ARPC matched the PFT study claimants to the analysis database and flagged all claims that had pulmonary function tests that did not comply with ATS standards.

Appendix D: Design and Weighting of the PIQ Attachment Sample

Many law firms and claimants wrote "See attached" on their questionnaires and included copies of documents related to exposure, medical and demographic issues in what they returned. The coding of this information for subsequent data entry required staff with expert knowledge and considerable time. Because sufficient resources were not available to deal with the volume of attachments returned with the "See attached" questionnaires, a random sample of all the PIQs that were originally distributed was selected. Any attachments returned with the sampled PIQs or subsequent supplement information submitted were then reviewed and coded by experienced Celotex Trust (now the Delaware Claims Processing Facility) claim reviewers.

The following table shows the number of PIQs distributed by year served and augmented alleged disease (i.e., the "historic" disease—the disease in the W.R. Grace CMS database if a known disease, otherwise the disease in the Manville Trust database if a match could be made). Also shown is the per-year (counting "To 1996" as a year) and total size of the PIQ Attachment Sample.

Table D-1
Number of PIQs Distributed by Year Served and Augmented Alleged Disease (Historic Disease) and the per-Year and Total Size of the PIQ Attachment Sample

Year Served	Alleged Disease in W.R. Grace CMS Database Augmented by Manville If Unknown							Total
	Meso-thelioma	Lung Cancer	All Other Cancers	Unspecified Cancer (Excluded)	Asbes-tosis	Pleural Injury	Asbestos-Related and Unknown	
To 1996	351	601	142	27	6,239	1,731	17,233	26,324
1997	73	120	27	0	790	503	4,020	5,533
1998	80	160	36	2	1,881	377	8,211	10,747
1999	131	248	46	5	2,001	595	5,588	8,614
2000	306	404	93	3	7,645	1,250	13,604	23,305
2001	106	151	37	3	3,911	303	5,442	9,953
Total	1,047	1,684	381	40	22,467	4,759	54,098	84,476
Sample Size								
per Year	65	90	20	0	300	100	300	875
Total	390	540	120	0	1,800	600	1,800	5,250
Total Sample Size as a Percent of Total Filings								
	37.2%	32.1%	31.5%		8.0%	12.6%	3.3%	6.2%

The sample design is a stratified random sample with a disproportionate allocation of the sample to the strata. The term "disproportionate allocation" is used because the fraction of the population appearing in the sample varies from stratum to stratum. For example, overall nearly 37% of the PIQs corresponding to claims alleging mesothelioma appear in the sample compared to 8% of the PIQs corresponding to claims alleging asbestosis.

Because the probability of drawing a sample of a given size from any stratum is known, the design used here is a valid probability sample. The method by which the population distribution of year and disease are represented in computations of descriptive statistics based on the disproportionate allocation of the sample data is through the use of weights. The weights reflect both the number of PIQs in the strata both in the sample and in the population from which it was selected.

In the present case, weights were developed that reflect the population distribution of the final disease as ascertained by the PIQ. The following table shows the distribution of final disease for the total population of pending claims (restricted to pending claims that filed a POC and were not filed or diagnosed post-bankruptcy) and for the sample.

Table D-2
Distribution of Final Disease in the Population and in the PIQ Attachment Sample

| Statistic | Data | Final PIQ Disease | | | | | Total |
		Meso-thelioma	Lung Cancer	Other Cancer	Total Asbestosis	Unknown Disease	
Counts	Sample	1,961	4,338	1,618	57,101	19,418	84,436
	Population	297	484	133	2,572	385	3,871
Percent of Total	Sample	2.3%	5.1%	1.9%	67.6%	23.0%	100%
	Population	7.7%	12.5%	3.4%	66.4%	9.9%	100%

The weights to be applied to the sample were the product of three factors. One factor corresponds to the Historic Disease and will vary by disease. The second corresponds to the Year Served and varied by year. And the third corresponds to the Final Disease (historic disease augmented with the PIQ information). A given sample datum (Y) can be indexed by four subscripts—three of them corresponding to Historic Disease, Year Served (stratification characteristics), and Final Disease (post-stratification), and a fourth subscript representing the sample datum within the combination of the first three. Symbolically this is Y_{hsfk}, where h represents the historic disease, s the year served, f the final disease, and k, the subscript identifying a point within the combination of the first three. In the sample, there are n_{hsf} items with Historic Disease h, Year Served s, and Final Disease f. In the population, there are N_{hsf} items with Historic Disease h, Year Served s, and Final Disease f.

The weight W_{hsf} is the product of three factors A_h, B_s, and C_f. The purpose of the weights, and therefore the factors comprising them, is to cause the weighted marginal totals of the sample to equal the marginal totals of the population. The marginal totals of the population appear in the two tables presented above. The Historic Disease marginal totals are shown in the Total line of Table D-1. (The 40 unspecified cancers were excluded from the population.) The Year Served marginal totals appear in the last (Total) column after subtracting the unspecified cancers. And the Final Disease marginal totals are in the first numeric column of Table D-2.

Some more notation is required. The population marginal totals for Historic Disease can be symbolized as $N_{h\bullet\bullet} = \sum_{s=1}^{S} \sum_{f=1}^{F} N_{hsf}$; the dot ($\bullet$) represents summation over the appropriate subscript.

The marginal totals for the other two margins are similar: $N_{\bullet s\bullet} = \sum_{h=1}^{H} \sum_{f=1}^{F} N_{hsf}$ and

$N_{\bullet\bullet f} = \sum_{h=1}^{H} \sum_{s=1}^{S} N_{hsf}$. The weighted sample marginal totals were computed as $M_{h\bullet\bullet} = \sum_{s=1}^{S} \sum_{f=1}^{F} W_{hsf} n_{hsf}$

and similarly for $M_{\bullet s\bullet}$ and $M_{\bullet\bullet f}$. The intent of the weights (or, equivalently, weight factors) was to cause $M_{h\bullet\bullet} = N_{h\bullet\bullet}$, $M_{\bullet s\bullet} = N_{\bullet s\bullet}$, and $M_{\bullet\bullet f} = N_{\bullet\bullet f}$ simultaneously.

The following table shows the weight factors for the three controlled characteristics. Because these weights combine multiplicatively, multiplying one set of factors by a constant can be countered by multiplying one of the two other sets by the reciprocal of the constant. Each of the sets of factors was adjusted to have an average value of 1; the single multiplicative adjustment factor needed to rescale the product of the weight factors to its original value also appears in the table.

Table D-3
Values of the Historic Disease, Year Served, and Final Disease Sample Weight Factors

Historic Disease					
Meso-thelioma	Lung Cancer	All Other Cancers	Asbes-tosis	Pleural Injury	Related or Unknown
0.377	0.303	0.277	1.193	0.670	3.180
Year Served					
To 1996	1997	1998	1999	2000	2001
2.016	0.371	0.632	0.543	1.677	0.761
Final Disease					
Meso-thelioma	Lung Cancer	Other Cancers	Total As-bestosis	Unknown Disease	
0.755	1.004	1.070	1.088	1.083	
Final Scale Factor	13.485				

Appendix E: Matching Algorithms

PIQs and POCs were originally mailed with the claimant's name and attorney information and a barcode on the cover page placed by BMC which provided a link back to a specific claim in the historical database. However, at least 50% of the POCs that were submitted were not on the original form, so the intrinsic link to the historical database was not available. ARPC programmatically determined possible matches between the historical and POC databases. Due to the complexity of the matching process (caused by the use of nonstandard forms, duplicates, sparseness of data, etc.), ARPC created four levels of matches based on the following definitions:

- **Definite Matches** – these are matches based primarily on names and social security numbers and the barcode placed on the PIQ/POC by BMC at the time of mailing that contained a mailing ID that could be linked to the historical database.

- **Probable Matches** – these are matches that are somewhat less definitive than the definite matches but have a probability of being accurate matches.

- **Possible Matches** – these are matches that have been generated by a computer algorithm that assesses the difference in each POC/PIQ name and each historical claimant name and assigns a score to each possible match. ARPC reviewed these matches ranked by their score and determined a threshold that delineates possible matches from incorrect matches. These matches also allow one-to-many matches – e.g., if there are seven John Smith's in the historical claims database and one John Smith in the POC database, we would allow the one John Smith POC to be a "Possible Match" to all seven John Smith's in the historical database.

- **No Possible Matches** – these are claims where the computer algorithm did not find a match (out of the entire database) that was over the pre-determined threshold criteria for a possible match.

Historical to PIQ – POC Matching

Names were standardized by removing suffixes, punctuation and extraneous text (for example, "(DEC)"). Full name was considered to be Last, First Middle.

For the POC database, matches by name were allowed between Historical full name in the Grace CMS database and either of Injured Party Name or the Creditor Name on the POC.

The matches were:

1. **PartyID** Historical claims were matched to PIQ/POC on PartyId to ClaimId, subject to the requirement that the first three letters of the first name, the first three letters of the last

name, and the last four digits of the social security number ("SSN4") (if it existed) all had to match as well.

2. **Full Name and SSN4** Matching was done on exact full name and SSN4
3. **Full Name and Law Firm** Exact match on full name and standardized law firm name
4. **Full Name and SSN4** Matching was done on exact full name and SSN4, using SSN4 information from the previous matches
5. **Unique Full Name** Exact match on full name, where each full name appeared in each database exactly once
6. **PIQ/POC Matching** If a POC or PIQ matched to a historical claim, and that POC or PIQ had a corresponding PIQ or POC, then that record was matched as well
7. **Last Name, First 3 of First Name, SSN4, Law Firm** Exact match on last name, first three letters of the first name, SSN4, and standardized law firm name.
8. **Last Name, First Name, SSN4** Exact match on last name, first name, and SSN4
9. **Last Name, First 3 of First Name, SSN4** Exact match on last name, first three letters of the first name, and ssn4.
10. **First 4 of Last Name, First Name, SSN4** Exact match on first four letters of the last name, first name, and SSN4.
11. **Name Code** Exact unique match on name code constructed based on first three letters of the last name plus next five consonants, plus first two letters of the first name, plus next two consonants.
12. **Last Name, First 3 of First Name, Law Firm** Exact match on last name, first three letters of the first name, and standardized law firm name.
13. **Distance-Based for Possible Matches** A distance measure was computed between the historical name and the PIQ and POC claimant names using SAS PROC COMPGED, and the nearest match was retained. If the distance between a historical claim and POC or PIQ was beneath the threshold, it was considered a possible match.

POCs identified as having "No Possible Match" to a historical Grace claim, based on name, were further investigated manually to identify matches based on abbreviated names ("Bob" vs. "Robert", "Tony" vs. "Anthony", etc.) and other nonsystematic criteria.

PIQ to POC Matching

Names were standardized by removing suffixes, punctuation, and extraneous text (for example, "(DEC)") was removed. Full name was considered to be Last, First Middle.

Matches by name were allowed between Claimant Name on the PIQ and either of Injured Name or Creditor Name on the POC.

The matches were:

1. **RustID** PIQs were matched to POCs on RustID
2. **Name and SSN4** Matching was done on exact full name and SSN4
3. **Name within 2, SSN4** Full name within two characters (using SAS procedure PROC COMPLEV) and exact match on SSN4

4. **Name within 4, SSN4** Full name within four characters (using SAS procedure PROC COMPLEV) and exact match on SSN4
5. **Name, SSN4 within 1** Exact match on full name and SSN4 within one character (using SAS procedure PROC COMPLEV)
6. **Name and Law Firm** Exact match on full name and standardized law firm name
7. **Unique Name** Exact match on full name, where each full name appeared in each database exactly once
8. **Last Name, Law Firm, DOD** Exact match on last name, standardized law firm name, and date of death
9. **First 4 of Last Name, Law Firm, DOD** Exact match on first four letters of last name, standardized law firm name, and date of death
10. **Last Name, Law Firm, DOD within 1 month** Exact match on last name, standardized law firm name, and the absolute value of the difference between the dates of death was less than or equal to 31 days
11. **Last Name, Law Firm, Year of Death** Exact match on last name, standardized law firm name, and year of death
12. **Last Name, DOD** Exact match on last name, and year of death
13. **Related Claimant Name, Related Claimant SSN4** Exact match on Related Claimant Name to Injured or Creditor, Related Claimant SSN4 to SSN4
14. **Related Claimant Name, Claimant SSN4** Exact match on Related Claimant Name to Injured or Creditor, Claimant SSN4 to SSN4
15. **Related Claimant Name, Law Firm** Exact match on Related Claimant Name to Injured or Creditor, Standardized Law Firm
16. **Distance-Based for Possible Matches** A distance measure was computed between the PIQ and POC claimants using SAS procedure PROC COMPGED, and the nearest match was retained. If the distance between a POC and a PIQ was beneath the threshold, it was considered a possible match.

Appendix F: Allocation of Unknown Diseases

After combining all of the data sources as described in Appendix C, the disease for some claims remained unspecified. In the Grace CMS database, there were three types of unspecified diseases:

> Unspecified Cancer
> Asbestos-Related Disease
> Unknown

The estimation of indemnity associated with pending and future asbestos claims is influenced by the disease alleged by the claims. Therefore, if the disease of a claimant was not specified in any of the databases combined to develop the analysis database, then a disease must be imputed for that claim.

To impute the unspecified diseases, ARPC compared all of the claims with non-specific diseases in the Grace CMS data with the disease alleged in the PIQ forms (including PIQ attachment sample).

Table F-1
Comparison of Non-Specific Historical Disease and PIQ Disease

PIQ Alleged Disease	Unspecified Cancer		Asbestos-Related and Unknown	
	Count	Percent	Count	Percent
Mesothelioma	12	1.6%	1,104	2.3%
Lung Cancer	47	6.4%	2,870	6.0%
Other Cancer	343	46.4%	1,172	2.4%
Nonmalignant*	338	45.7%	42,999	89.3%
Total	740	100%	48,145	100%

*Includes Severe Asbestosis, Asbestosis, and Other Asbestos-Related Disease

These percentages were then used to allocate the claims with non-specific diseases in the analysis database to specific disease categories.

Appendix G: List of Questionable B-Readers

The following is a list of twenty-four doctors discussed by Dr. Haber in his report,[11] and ARPC was asked to assume that these B-Readers do not satisfy the evidentiary standard of reliability, and a claimant alleging a Nonmalignant disease using only one of these B-Readers had not met the burden of proof that the claim is valid.

Robert Altmeyer	Richard B. Levine
James Ballard	Barry Levy
Jeffrey Bass	Phillip Lucas
Leo Castiglioni	George Martindale
Kevin Cooper	Robert Mezey
Todd Coulter	Larry Mitchell
Dominic Gaziano	Greg Nayden
Andrew Harron	Walter Allen Oaks
Ray Harron	Alvin Schonfeld
Glynn Hilbun	Jay Segarra
James Krainson	Paul Venizelos
Richard Kuebler	Robert von McGee

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[11] Haber MD FCCP, Steven E., "Diagnostic Practices in a Litigation Context: Screening Companies and the Doctors They Employed". June 11, 2007.

Appendix H: Claims by Diagnosis Year

To implement the forecast methods described in Appendix I, ARPC analyzed the filing trends by year of diagnosis. Table H-1 below shows the historical pending and closed claims that meet or would be able to meet the evidentiary criteria organized by actual or imputed year of diagnosis. Year of diagnosis was missing for approximately 18% of these historical claims. ARPC imputed diagnosis years by applying a lag matrix developed through the examination of claims with known diagnosis years. The lag matrix specified the percentage of claims that are filed in the same year as they are diagnosed, within 1 year of diagnosis, within 2 years, etc. for each injury. These percentages were then applied to the filing years of claims to impute missing diagnosis years.

Table H-1
Number of Estimated Pending and Closed Claims That Met the Criteria
Based on Claims Providing Data
(excludes claims served in 2001)

Year Diagnsosed	Meso-thelioma	Lung Cancer	All Other Cancers	Nonmalig-nancies	Total
Through 1980	6	10	2	14	32
1981	2	4	1	9	16
1982	4	6	1	21	32
1983	6	10	1	38	55
1984	10	14	1	61	87
1985	17	23	2	131	174
1986	24	34	3	248	309
1987	31	37	3	345	416
1988	35	45	4	390	474
1989	39	58	4	417	519
1990	55	69	6	645	775
1991	65	88	8	896	1,056
1992	72	91	8	917	1,087
1993	73	98	8	1,016	1,195
1994	83	118	10	1,842	2,053
1995	85	115	9	2,011	2,220
1996	84	94	7	1,601	1,786
1997	81	77	7	1,050	1,215
1998	78	83	9	1,107	1,277
1999	85	66	7	1,434	1,592
2000	64	46	6	1,267	1,383
Total	**999**	**1,187**	**106**	**15,459**	**17,752**

Table H-2
Number of Estimated Pending and Closed Claims That Met the Criteria
Based on Claims Providing Data and Assuming the Same Proportion for Claims Not
Providing Data
(excludes claims served in 2001)

Year Diagnsosed	Meso-thelioma	Lung Cancer	All Other Cancers	Nonmalig-nancies	Total
Through 1980	14	10	3	26	53
1981	6	4	1	17	28
1982	9	6	1	40	56
1983	15	10	1	71	98
1984	26	14	2	116	157
1985	44	23	3	248	318
1986	62	34	5	468	569
1987	75	37	5	655	772
1988	90	45	6	738	879
1989	98	58	7	792	954
1990	139	69	9	1,220	1,437
1991	161	88	12	1,697	1,958
1992	181	91	12	1,737	2,020
1993	185	98	12	1,924	2,219
1994	208	118	15	3,487	3,829
1995	214	115	14	3,810	4,152
1996	210	94	11	3,032	3,347
1997	205	78	10	1,987	2,280
1998	196	83	13	2,097	2,388
1999	215	66	10	2,716	3,007
2000	161	46	9	2,399	2,615
Total	2,514	1,187	160	29,276	33,137

Table H-1 and Table H-2, however, do not capture the claims that were diagnosed as of 2000 but had not yet been filed. This is because diagnosis can precede filing by up to six or more years, depending upon the injury. Claims with a diagnosis year of 1999, for example, will file claims in 1999, 2000, 2001, 2002, etc. Therefore, since ARPC had information on claims filed through April of 2001, there were claims that were diagnosed on or before 2001 that had not filed a claim as of 2001. ARPC addressed this issue using two methods. One method used the historical distribution of the time from diagnosis to the year received, to estimate adjustments to the numbers of recent diagnoses for claims yet to be received in subsequent years. These adjusted number of Mesothelioma and Lung Cancer diagnoses were used to calibrate the forecast model

suggested by Julian Peto (discussed in Appendix I).

ARPC also used another method for adjusting the number of recent diagnoses based on applying an average time from diagnosis to filing adjustment to the Mesothelioma (1 year average lag) and Lung Cancer (2 year average lag) allegations by year served. This method was used to calibrate the Nicholson model (discussed in Appendix I).

Appendix I: Forecast Methods

1. The Nicholson/KPMG Method

Dr. Nicholson and his co-authors prepared a study for the U.S. Department of Labor in June, 1982, entitled "Disability Compensation for Asbestos-Associated Disease in the United States." The article published in the American Journal of Industrial Medicine was taken from this larger study. The purpose of this multi-disciplinary study was to provide an estimate of the total number of future cancer deaths that could be ascribed to exposure to asbestos.

In 1991, Dr. Thomas Vasquez (with the KPMG Peat Marwick Policy Economics Group), in cooperation with Dr. Nicholson, revised and refined the model for use in the National Gypsum bankruptcy proceedings. The revisions and refinements were intended to better match National Cancer Institute (NCI) based projections of the total U.S. mesothelioma incidence and NCI estimates of the age distribution of the mesothelioma victims. The revisions to the original Nicholson model are described in a KPMG Policy Economics Group report.

The Nicholson/KPMG method is based on historical employment information. The method identifies major industry and occupation groups having occupational exposure to asbestos between 1940 and 1980 and enumerates the number exposed in each group.

Each industry group then had a risk associated with it, based on OSHA dose-response models. The asbestos exposure risk assessment models of OSHA (of the Department of Labor) were first described in October 1983. OSHA's dose-response calculations were based on the evaluation of 11 epidemiological studies of actual worker populations exposed to asbestos in different industries. These studies involved some 53,000 workers. This research formed the basis for the construction of the mesothelioma and lung cancer dose-response models that link asbestos exposure conditions to likelihood of death from mesothelioma and lung cancer. The OSHA models were subject to peer review among government agencies and academics before and after publication in 1983. During the three-year period prior to final publication of these models, no peer reviewer challenged the mathematical equations devised by OSHA in its models to predict risk of lung cancer and mesothelioma from asbestos exposure. The consensus was that the data behind their assumptions were correct and that the models were appropriate and acceptable means of risk assessment. The dose-response models presented in the 1986 report have never been revised and have been adopted by several other regulatory and scientific bodies for use in risk assessments.

The Nicholson/KPMG method estimates the total number of mesothelioma and lung cancer claims for each of the industry/occupation groups and sums the separate industry estimates. Originally, this method employed 11 categories, but the more refined version used here is based on 13 industry/occupation categories. The numbers, ages, and conditions of asbestos exposure are determined from aggregate historical data on national employment for each of the thirteen industries shown in Table I-1.

Table I-1 Nicholson Industries

Traditional Nicholson Industry/Occupation Categories	KPMG Refinement to Categories
Insulator (An Occupation)	Insulator
	WWII Insulator
Primary Asbestos (Mining and milling)	Primary Asbestos
Secondary Asbestos (Asbestos-products manufacturing)	Secondary Asbestos
Railroad (Mainly steam locomotive repair)	Railroad
Utilities	Utilities
Chemical	Chemical
Marine	Marine
Construction	Construction
Automobile (Mainly brake repair and installation)	Automobile
Shipyard	Shipyard
	WWII Shipyard
Stationary Engineers (An Occupation)	Stationary Engineers

The purpose of distinguishing claims by industry is to reflect differences in asbestos exposure conditions between industries. A secondary role is to reflect differences in the time dynamics between industries (number of entrants, their ages, and their exposure durations).

The output of the Nicholson/KPMG forecasting method includes the number of mesothelioma deaths (by industry and year of occurrence), the number of total lung cancer deaths (by industry and year), the number of deaths due to other causes (by industry and year), and the average age (by cause of death, industry, and year). Because the method is based on data spanning most industries related to production and primary use of asbestos, the forecasts are of mesotheliomas and lung cancers arising from workers exposed to asbestos in the work place, not just workers exposed to Grace asbestos products.

The mesothelioma estimates based on this method lie between the National Cancer Institute SEER program projection of historical mesothelioma deaths for males and the SEER total projection of historical mesothelioma deaths (males + females) with the peak incidence rate in 1995. Since the full Nicholson/KPMG projection focuses on all workers exposed to asbestos, it must be adjusted to fit the claims filed against Grace. The adjustment is done industry group-by-industry group. First, the 13 industries are assigned to an industry group (Early, Middle, or Late) on the basis of their peak incidence year for mesothelioma:

I. Early (primary and secondary asbestos, WWII insulator, railroad, shipyard, and WWII shipyard),

II. Late (auto maintenance and construction), and

III. Middle (all other industries).

The non-Nicholson industries of manufacturing, metals, rubber, and other are assigned to an industry group (II - Middle) on the basis of the average year of first exposure (as a surrogate for peak incidence year).

For a given industry group and disease (mesothelioma or lung cancer), a ratio is computed over the range of calibration years (1996 through 2000). The numerator represents the estimated number of claims filed against Grace that either meet or are assumed to be able to meet the evidentiary criteria and is the number of these claims by disease in the industry group in question summed over recent year range ("calibration period"). The denominator is the sum over the years in the calibration period of the Nicholson/KPMG national estimate of claims for the same disease and industry group. This ratio is then applied to the Nicholson based estimate for the same disease and industry group year-by-year from 2001 to 2049 to yield the estimates of future mesothelioma and lung cancer claims for Grace. The total estimate for mesothelioma and lung cancer claims is obtained by summing the estimates of the three industry groups.

2. The Peto/ARPC Model

The Peto/ARPC approach can be characterized as an "inverse" method. Beginning with the same OSHA dose-response models as used by the Nicholson/KPMG method and the number of valid claims filed against Grace within the calibration range, the model operates by answering the question: "Given that we know the probability of death due to mesothelioma and asbestos-related lung cancer, how many asbestos workers exposed to Grace asbestos products were required at the start of the calibration period to yield the average number of diagnoses seen during the calibration period?" Given an estimate of this number, the OSHA dose-response models and mortality rates for lung cancer and all other causes then can be used to "age" the population estimate of exposed workers to yield the future claim estimates of valid mesothelioma and lung cancer claims against Grace.

As discussed earlier, OSHA published two models in 1986 linking asbestos exposure conditions to the incidence (number of deaths per unit of time) of mesothelioma and of lung cancer. According to these models, the death rates for mesothelioma and lung cancer for persons exposed to asbestos depend upon the following four factors:

1. intensity of asbestos exposure (fiber concentration),
2. duration of asbestos exposure,
3. date of initial exposure (elapsed time since first exposure to onset of the disease), and
4. date of birth (age).

These two OSHA "dose-response" models take these factors as their inputs and yield as their output estimates of the absolute risk of death due to mesothelioma and the relative risk of death due to lung cancer.

The rates for all other causes of death that would reduce the exposed population depend most strongly upon age. This death rate is estimated using data from the U.S. National Center for Health Statistics (NCHS). If the size of the exposed population could be estimated when coupled with information about how the four key factors listed above apply to this population, then the number of deaths per year for mesothelioma, lung cancer, and all other causes can be estimated.

When the population of Grace historical claims is partitioned according to the four factors into homogeneous groups that have similar values for each factor (e.g., fiber concentration = 2.5, 5-9 years of exposure, 25-29 years since first exposure, and 50-54 years of age), the disease-specific death rates can then be determined for any given group to yield an estimate of the number of persons in the group that were exposed and living at a specific point in time. Totaling across all such groups provides an estimate of the exposed population alive at a certain point in time.

Given this calculation of the exposed population, it is then possible, using the same disease-specific death rates, to estimate the number of asbestos-related mesothelioma and lung cancer deaths over time. For example, assume that at the start of the process 10,000 persons out of the entire exposed population fall into the same group on the basis of their similarity with respect to the key factors. That is, the persons in the group have the same age, fiber concentration, time since first exposure, and exposure duration. Also, suppose that the death rate for persons with these characteristics is computed to be 0.1% for mesothelioma (by OSHA mesothelioma model), 1.9% for lung cancer (OSHA lung cancer model), and 3.0% for all other causes (NCHS death rate tables). That is, 0.1% + 1.9% + 3.0% = 5% of the 10,000 can be expected to die over a one-year span, and the remaining 95% will survive. This means that 9,500 of the original 10,000 will be alive one year later, about 10 persons will die of mesothelioma, 190 of lung cancer, and 300 will die of other causes.

This process may then be repeated to determine the number of the 9,500 persons still living that can be expected to be alive at the end of the second year. The 9,500 persons are still similar to one another with respect to the four key exposure characteristics, but are now all a year older with a time since first exposure one year greater and will therefore have a slightly higher death rate. The process is repeated again and again, year-by-year, until none of the original 10,000 persons is still alive. At each step of the process, the number still living is reduced by applying death rates. Furthermore, the process is applied in parallel to all of the groups with similar exposure conditions into which the original population was partitioned.

The annual number of deaths due to mesothelioma for the population is obtained by adding up the number of mesothelioma deaths over all of the similar exposure groups. The number of annual deaths attributable to lung cancer is computed the same way.

In summary, this method is dependent upon an estimate of the population of persons with sufficient exposure to the asbestos in Grace products. Using the OSHA dose response models described earlier, the population of persons with sufficient exposure to Grace products is estimated from the claims filed against Grace.

Appendix J: Median Forecast by Year and Disease
Table J-1 ARPC Median Forecast

Year Served	Meso-thelioma	Lung Cancer	Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Pending	568	344	52	101	2,578	3,656	7,300
4/01-12/01	111	57	7	23	600	851	1,649
2002	188	108	13	39	1,001	1,420	2,769
2003	187	108	12	38	984	1,396	2,726
2004	185	107	12	38	966	1,370	2,678
2005	183	106	12	37	954	1,352	2,644
2006	180	105	12	37	939	1,331	2,603
2007	176	102	12	36	922	1,307	2,554
2008	172	100	12	35	902	1,280	2,501
2009	167	99	11	34	882	1,251	2,444
2010	162	96	11	33	853	1,210	2,365
2011	156	93	11	32	823	1,167	2,282
2012	150	91	11	31	798	1,132	2,213
2013	144	87	10	30	767	1,087	2,124
2014	136	84	10	29	734	1,041	2,034
2015	130	80	10	27	701	994	1,943
2016	123	77	9	26	655	929	1,818
2017	116	73	9	24	622	883	1,727
2018	108	69	8	23	586	831	1,624
2019	101	65	8	21	550	780	1,524
2020	94	61	8	20	514	729	1,425
2021	86	56	7	18	472	670	1,309
2022	77	52	7	17	446	633	1,233
2023	70	48	6	16	411	583	1,134
2024	63	44	6	15	374	530	1,031
2025	59	40	5	13	334	473	923
2026	53	36	5	12	302	428	836
2027	49	33	5	10	266	377	739
2028	44	29	4	10	244	346	677
2029	40	26	4	8	217	307	602
2030	35	23	3	7	183	259	509
2031	30	20	3	6	162	230	450
2032	26	18	3	5	138	196	385
2033	23	16	2	5	118	167	330
2034	19	14	2	4	101	143	283
2035	17	11	2	3	85	120	237
2036	14	9	1	3	69	97	192
2037	11	8	1	2	54	76	152
2038	10	6	1	2	47	67	132
2039	8	5	1	1	34	48	97
2040	7	4	1	1	33	47	92
2041	5	3	0	1	21	29	59
2042	4	2	0	1	18	26	51
2043	3	2	0	1	15	21	42
2044	2	2	0	1	13	19	37
2045	2	1	0	0	7	9	19
2046	1	1	0	0	5	7	14
2047	1	0	0	0	3	5	9
2048	1	0	0	0	1	2	4
2049	1	0	0	0	1	2	4
Total	4,284	2,614	330	879	22,505	31,914	62,525

Table J-2 Estimated Nominal Indemnity for ARPC Median Forecast

Year Served	Meso-thelioma	Lung Cancer	Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Pending	$77	$12	$1	$3	$21	$13	$128
4/01-12/01	$15	$2	$0	$1	$5	$3	$26
2002	$26	$4	$0	$1	$8	$5	$45
2003	$27	$4	$0	$1	$9	$5	$46
2004	$27	$4	$0	$1	$9	$5	$46
2005	$27	$4	$0	$1	$9	$5	$47
2006	$28	$4	$0	$1	$9	$5	$47
2007	$28	$4	$0	$1	$9	$5	$48
2008	$27	$4	$0	$1	$9	$5	$47
2009	$27	$4	$0	$1	$9	$5	$46
2010	$26	$4	$0	$1	$8	$5	$45
2011	$26	$4	$0	$1	$8	$5	$44
2012	$25	$4	$0	$1	$8	$5	$43
2013	$24	$4	$0	$1	$8	$5	$42
2014	$23	$4	$0	$1	$8	$5	$40
2015	$22	$3	$0	$1	$7	$4	$39
2016	$21	$3	$0	$1	$7	$4	$37
2017	$20	$3	$0	$1	$7	$4	$35
2018	$19	$3	$0	$1	$6	$4	$33
2019	$18	$3	$0	$1	$6	$4	$31
2020	$17	$3	$0	$1	$6	$3	$30
2021	$15	$3	$0	$1	$5	$3	$27
2022	$14	$2	$0	$1	$5	$3	$25
2023	$13	$2	$0	$1	$5	$3	$23
2024	$12	$2	$0	$1	$4	$3	$21
2025	$11	$2	$0	$1	$4	$2	$20
2026	$10	$2	$0	$1	$3	$2	$18
2027	$9	$2	$0	$1	$3	$2	$17
2028	$9	$1	$0	$0	$3	$2	$15
2029	$8	$1	$0	$0	$3	$2	$14
2030	$7	$1	$0	$0	$2	$1	$12
2031	$6	$1	$0	$0	$2	$1	$10
2032	$5	$1	$0	$0	$2	$1	$9
2033	$5	$1	$0	$0	$1	$1	$8
2034	$4	$1	$0	$0	$1	$1	$7
2035	$3	$1	$0	$0	$1	$1	$6
2036	$3	$0	$0	$0	$1	$1	$5
2037	$2	$0	$0	$0	$1	$0	$4
2038	$2	$0	$0	$0	$1	$0	$3
2039	$2	$0	$0	$0	$0	$0	$3
2040	$1	$0	$0	$0	$0	$0	$2
2041	$1	$0	$0	$0	$0	$0	$2
2042	$1	$0	$0	$0	$0	$0	$1
2043	$1	$0	$0	$0	$0	$0	$1
2044	$0	$0	$0	$0	$0	$0	$1
2045	$0	$0	$0	$0	$0	$0	$1
2046	$0	$0	$0	$0	$0	$0	$0
2047	$0	$0	$0	$0	$0	$0	$0
2048	$0	$0	$0	$0	$0	$0	$0
2049	$0	$0	$0	$0	$0	$0	$0
Total	$694	$109	$7	$37	$223	$134	$1,203

Table J-3 Estimated Net Present Value for ARPC Median Forecast

Year Served	Meso-thelioma	Lung Cancer	Other Cancers	Severe Asbestosis	Asbestosis	Unimpaired Asbestosis	Total
Pending	$77	$12	$1	$3	$21	$13	$128
4/01-12/01	$15	$2	$0	$1	$5	$3	$26
2002	$25	$4	$0	$1	$8	$5	$43
2003	$24	$4	$0	$1	$8	$5	$41
2004	$23	$3	$0	$1	$7	$4	$39
2005	$22	$3	$0	$1	$7	$4	$38
2006	$21	$3	$0	$1	$7	$4	$36
2007	$20	$3	$0	$1	$6	$4	$34
2008	$19	$3	$0	$1	$6	$4	$32
2009	$17	$3	$0	$1	$6	$3	$30
2010	$16	$2	$0	$1	$5	$3	$28
2011	$15	$2	$0	$1	$5	$3	$26
2012	$14	$2	$0	$1	$4	$3	$24
2013	$12	$2	$0	$1	$4	$2	$22
2014	$11	$2	$0	$1	$4	$2	$20
2015	$10	$2	$0	$1	$3	$2	$18
2016	$9	$1	$0	$0	$3	$2	$16
2017	$8	$1	$0	$0	$3	$2	$15
2018	$7	$1	$0	$0	$2	$1	$13
2019	$7	$1	$0	$0	$2	$1	$12
2020	$6	$1	$0	$0	$2	$1	$10
2021	$5	$1	$0	$0	$2	$1	$9
2022	$4	$1	$0	$0	$2	$1	$8
2023	$4	$1	$0	$0	$1	$1	$7
2024	$3	$1	$0	$0	$1	$1	$6
2025	$3	$1	$0	$0	$1	$1	$5
2026	$3	$0	$0	$0	$1	$1	$5
2027	$2	$0	$0	$0	$1	$0	$4
2028	$2	$0	$0	$0	$1	$0	$3
2029	$2	$0	$0	$0	$1	$0	$3
2030	$1	$0	$0	$0	$0	$0	$2
2031	$1	$0	$0	$0	$0	$0	$2
2032	$1	$0	$0	$0	$0	$0	$2
2033	$1	$0	$0	$0	$0	$0	$1
2034	$1	$0	$0	$0	$0	$0	$1
2035	$1	$0	$0	$0	$0	$0	$1
2036	$0	$0	$0	$0	$0	$0	$1
2037	$0	$0	$0	$0	$0	$0	$1
2038	$0	$0	$0	$0	$0	$0	$0
2039	$0	$0	$0	$0	$0	$0	$0
2040	$0	$0	$0	$0	$0	$0	$0
2041	$0	$0	$0	$0	$0	$0	$0
2042	$0	$0	$0	$0	$0	$0	$0
2043	$0	$0	$0	$0	$0	$0	$0
2044	$0	$0	$0	$0	$0	$0	$0
2045	$0	$0	$0	$0	$0	$0	$0
2046	$0	$0	$0	$0	$0	$0	$0
2047	$0	$0	$0	$0	$0	$0	$0
2048	$0	$0	$0	$0	$0	$0	$0
2049	$0	$0	$0	$0	$0	$0	$0
Total	$414	$63	$4	$21	$131	$79	$712

Appendix K: Calculation of the Discount Rate

The projection of future asbestos-related claim payments ("Future Asbestos Liability") is a long-term liability stream beginning in 2001 and ending in 2049. To convert the aggregate cost of these future liabilities to present value terms at the time of bankruptcy, the nominal values over time must be discounted to represent 2001 dollars. The main component of this calculation is the Discount Rate, which effectively reduces all future cash flows to account for expected inflation and risk.

ARPC developed three methods for determining an appropriate discount rate, the average of which is 5.63%.

Method 1: U.S. Government Risk Free Rate.

A weighted average Duration of 12.5 years was calculated based on the size and timing of expected cash outflows representing the Future Asbestos Liability. By convention, each cash flow was assumed to take place mid-year, thus using a mid-year weighting approach.

The yield curve for U.S. treasuries ("Yield Curve") as of April 2, 2001 ("Petition Date") was used to identify a risk-adverse Growth Rate for an investment with a duration of 12.5 years (see Table K-1).

The result was a Growth Rate of 5.15%.

Method 2. An allocation combining both U.S. treasuries and high-grade corporate bonds.

- 75.0% in U.S. treasuries,
- 25.0% in AAA rated corporate bonds

The process for projecting the yield on AAA rated corporate bonds was a three-step process.

1. A comparison of monthly historical yield data for AAA rated corporate bonds and the 1-year U.S. treasury for the ten years prior to bankruptcy showed an average yield spread of 235 basis points from the 1-year U.S. treasury up to the AAA rate corporate bonds (see Table K-2).
2. The Yield Curve as of the Petition Date was used to forecast the yield on 1-year U.S. treasuries as issued for each year of future payment obligations (see Table K-3).
3. A future forecast of AAA rated corporate bond yields was produced by adding 235 basis points to each annual yield in the 1-year U.S. treasury forecast. When weighted against the Future Asbestos Liability the overall yield for the AAA rated corporate bonds is 7.69%

The 5.15% Duration adjusted yield on the U.S. treasuries calculated in Method 1 was then combined with the 7.69% estimated for the AAA rated corporate bonds using the above allocation. The result was a Growth Rate of 5.78%.

Method 3: An allocation combining both U.S. Treasury and equity investments.

- 85.0% in U.S. treasuries,
- 15.0% in equity investments

For the equity investments the average annual gain on the S&P 500 during the 25 years prior to the Petition Date was calculated at 10.56%.

The 5.15% Duration adjusted yield on the U.S. treasuries calculated in Method 1 was then combined with the 10.56% average annual gain on the S&P 500 using the above allocation. The result was a Growth Rate of 5.96%.

Table K-1
Yield Curve for U.S. Treasuries as of April 2, 2001

Maturity	Interpolated Yield Curve
1	4.10%
2	4.22%
3	4.37%
4	4.52%
5	4.66%
6	4.79%
7	4.92%
8	4.94%
9	4.96%
10	4.98%
11	5.05%
12	5.11%
13	5.18%
14	5.24%
15	5.31%
16	5.38%
17	5.44%
18	5.51%
19	5.57%
20	5.64%
21	5.63%
22	5.61%
23	5.60%
24	5.58%
25	5.57%
26	5.55%
27	5.54%
28	5.52%
29	5.51%
30	5.49%
31	5.49%
32	5.49%
33	5.49%
34	5.49%
35	5.49%
36	5.49%
37	5.49%
38	5.49%
39	5.49%
40	5.49%
41	5.49%
42	5.49%
43	5.49%
44	5.49%
45	5.49%
46	5.49%
47	5.49%
48	5.49%
49	5.49%

Note: Values in red text are actual yields from the April 2, 2001 Yield Curve.

Table K-2
Comparison of Monthly Historical Yield Data for AAA Rated Corporate Bonds and The 1-year U.S. Treasury

Date	1-Year Treasury Yield	AAA Corp Bonds	Date	1-Year Treasury Yield	AAA Corp Bonds	Date	1-Year Treasury Yield	AAA Corp Bonds
4/2/01	4.10%	7.20%	11/3/97	5.44%	6.87%	6/1/94	5.36%	7.97%
3/1/01	4.45%	6.98%	10/1/97	5.44%	7.00%	5/2/94	5.12%	7.99%
2/1/01	4.56%	7.10%	9/2/97	5.57%	7.15%	4/4/94	4.83%	7.88%
1/2/01	5.11%	7.15%	8/1/97	5.52%	7.22%	3/1/94	4.16%	7.48%
12/1/00	5.93%	7.21%	7/1/97	5.64%	7.14%	2/1/94	3.60%	7.08%
11/1/00	6.10%	7.45%	6/2/97	5.78%	7.41%	1/3/94	3.67%	6.92%
10/2/00	6.06%	7.55%	5/1/97	5.89%	7.58%	12/1/93	3.62%	6.93%
9/1/00	6.18%	7.62%	4/1/97	6.00%	7.73%	11/1/93	3.53%	6.93%
8/1/00	6.09%	7.55%	3/3/97	5.68%	7.55%	10/1/93	3.35%	6.67%
7/3/00	6.07%	7.65%	2/3/97	5.54%	7.31%	9/1/93	3.36%	6.66%
6/1/00	6.32%	7.67%	1/2/97	5.63%	7.42%	8/2/93	3.58%	6.85%
5/1/00	6.24%	7.99%	12/2/96	5.40%	7.20%	7/1/93	3.41%	7.17%
4/3/00	6.23%	7.64%	11/1/96	5.46%	7.10%	6/1/93	3.55%	7.33%
3/1/00	6.17%	7.68%	10/1/96	5.65%	7.39%	5/3/93	3.22%	7.43%
2/1/00	6.30%	7.68%	9/3/96	5.94%	7.66%	4/1/93	3.32%	7.46%
1/3/00	6.09%	7.78%	8/1/96	5.74%	7.46%	3/1/93	3.30%	7.58%
12/1/99	5.73%	7.55%	7/1/96	5.74%	7.65%	2/1/93	3.40%	7.71%
11/1/99	5.47%	7.36%	6/3/96	5.78%	7.71%	1/4/93	3.56%	7.91%
10/1/99	5.30%	7.55%	5/1/96	5.60%	7.62%	12/1/92	3.86%	7.98%
9/1/99	5.30%	7.39%	4/1/96	5.41%	7.50%	11/2/92	3.62%	8.10%
8/2/99	5.15%	7.40%	3/1/96	5.07%	7.35%	10/1/92	2.96%	7.99%
7/1/99	5.09%	7.19%	2/1/96	4.88%	6.99%	9/1/92	3.45%	7.92%
6/1/99	5.09%	7.23%	1/2/96	5.17%	6.81%	8/3/92	3.61%	7.95%
5/3/99	4.79%	6.93%	12/1/95	5.33%	6.82%	7/1/92	4.04%	8.07%
4/1/99	4.73%	6.64%	11/1/95	5.46%	7.02%	6/1/92	4.32%	8.22%
3/1/99	4.91%	6.62%	10/2/95	5.65%	7.12%	5/1/92	4.28%	8.28%
2/1/99	4.58%	6.40%	9/1/95	5.60%	7.32%	4/1/92	4.48%	8.33%
1/4/99	4.58%	6.24%	8/1/95	5.71%	7.57%	3/2/92	4.50%	8.35%
12/1/98	4.46%	6.22%	7/3/95	5.63%	7.41%	2/3/92	4.23%	8.29%
11/2/98	4.33%	6.41%	6/1/95	5.68%	7.30%	1/2/92	4.13%	8.20%
10/1/98	4.28%	6.37%	5/1/95	6.32%	7.65%	12/2/91	4.68%	8.31%
9/1/98	4.87%	6.40%	4/3/95	6.45%	8.03%	11/1/91	5.03%	8.48%
8/3/98	5.37%	6.52%	3/1/95	6.44%	8.12%	10/1/91	5.42%	8.55%
7/1/98	5.37%	6.55%	2/1/95	6.97%	8.26%	9/3/91	5.72%	8.61%
6/1/98	5.40%	6.53%	1/3/95	7.23%	8.46%	8/1/91	6.23%	8.75%
5/1/98	5.41%	6.69%	12/1/94	6.94%	8.46%	7/1/91	6.38%	9.00%
4/1/98	5.37%	6.69%	11/1/94	6.25%	8.68%	6/3/91	6.27%	9.01%
3/2/98	5.43%	6.72%	10/3/94	6.06%	8.57%	5/1/91	6.09%	8.86%
2/2/98	5.26%	6.67%	9/1/94	5.56%	8.34%	4/1/91	6.27%	8.86%
1/2/98	5.46%	6.61%	8/1/94	5.40%	8.07%	**Average**	**5.15%**	**7.50%**
12/1/97	5.56%	6.76%	7/1/94	5.50%	8.11%			

Table K-3
Forecasted Yield on 1-year U.S. Treasuries as Issued for Each Year

Maturity	Interpolated Yield Curve	Forecasted 1-Yr T-Bill
1	4.10%	4.10%
2	4.22%	4.34%
3	4.37%	4.67%
4	4.52%	4.95%
5	4.66%	5.24%
6	4.79%	5.44%
7	4.92%	5.70%
8	4.94%	5.08%
9	4.96%	5.12%
10	4.98%	5.16%
11	5.05%	5.71%
12	5.11%	5.84%
13	5.18%	5.97%
14	5.24%	6.10%
15	5.31%	6.23%
16	5.38%	6.37%
17	5.44%	6.50%
18	5.51%	6.63%
19	5.57%	6.76%
20	5.64%	6.89%
21	5.63%	5.33%
22	5.61%	5.30%
23	5.60%	5.27%
24	5.58%	5.24%
25	5.57%	5.21%
26	5.55%	5.18%
27	5.54%	5.15%
28	5.52%	5.12%
29	5.51%	5.09%
30	5.49%	5.05%
31	5.49%	5.05%
32	5.49%	5.05%
33	5.49%	5.05%
34	5.49%	5.05%
35	5.49%	5.05%
36	5.49%	5.05%
37	5.49%	5.05%
38	5.49%	5.05%
39	5.49%	5.05%
40	5.49%	5.05%
41	5.49%	5.05%
42	5.49%	5.05%
43	5.49%	5.05%
44	5.49%	5.05%
45	5.49%	5.05%
46	5.49%	5.05%
47	5.49%	5.05%
48	5.49%	5.05%
49	5.49%	5.05%

* Note: Values in red text are actual yields from the April 2, 2001 Yield Curve.

Exhibit 1: Documents Relied Upon

1. Grace historical CMS database as of June 14, 2002.

2. Rust Consulting database of all PIQ, POC, and supplemental data and images as of April 30, 2007.

3. PIQ Attachment and Closed Claim sample database entered by Celotex Trust reviewers.

4. Peto, J., Henderson, B.E., & Pike, M.C. *Trends in mesothelioma incidence in the United States and the forecast epidemic due to asbestos exposure during World War II.* In Peto, R. & Schneiderman, M. (Eds.) **Quantification of Occupational Cancer**, Banbury Report 9, Cold Spring Harbor Laboratory, 1981, 51–69.

5. Nicholson, W.J., Perkel, G., & Selikoff, I.J. *Occupational exposure to asbestos: Population at risk and projected mortality—1980–2030.* **American Journal of Industrial Medicine**, 1982, 3, 259–311.

6. Data compiled by the National Cancer Institute as part of their Surveillance, Epidemiology, and End Results (SEER) program (http://seer.cancer.gov).

7. KPMG Peat Marwick Policy Economics Group. *Estimation of Company Liability, Volume I: Personal Injury,* 1992.

8. Occupational Safety and Health Administration, Department of Labor, U.S. Government. *Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules.* **Federal Register**, 29 CFR Parts 1910 and 1926, June 20, 1986.

9. National Center for Health Statistics (NCHS) in **Vital Statistics of the United States** and the NCHS web site; the URL is http://www.cdc.gov/nchswww/datawh/statab/unpubd/mortabs/gmwk292a.htm.

10. Testimony of Robert Beber on February 21, 2007 in W.R. Grace & Co., et al., Debtors. United States Bankruptcy Court for the District of Delaware Case No. 01-1139 (JFK).

11. Testimony of Jay Hughes on February 22, 2007 in W.R. Grace & Co., et al., Debtors. United States Bankruptcy Court for the District of Delaware Case No. 01-1139 (JFK).

12. Testimony of Frederick H. Zaremby on April 25, 2007 in W.R. Grace & Co., et al., Debtors. United States Bankruptcy Court for the District of Delaware Case No. 01-1139 (JFK).

13. Testimony of David B. Siegel on May 23, 2007 in W.R. Grace & Co., et al., Debtors. United States Bankruptcy Court for the District of Delaware Case No. 01-1139 (JFK).

14. Testimony of John Vernon Port on July 18, 2002 in W.R. Grace & Co., et al., Debtors. United States District Court for the District of Delaware Case Nos. 01-1139 through 01-1200.

15. W.R. Grace & Co.-Conn.'s Response to Plaintiffs' Revised Second Set of Requests for Admissions on September 13, 2002 in W.R. Grace & Co., et al., Debtors. United States District Court District of Delaware Case Nos. 01-1139 through 01-1200.

16. W.R. Grace & Co.-Conn.'s Response to Plaintiffs' First Set of Requests for Admissions and plaintiffs' Second Set of Interrogatories on August 28, 2002 in W.R. Grace & Co., et al., Debtors. United States District Court District of Delaware Case Nos. 01-1139 through 01-1200.

17. Testimony of Jay W. Hughes, Jr., Esq. on August 21, 2002 in W.R. Grace & Co., et al., Debtors. United States District Court for the District of Delaware Case No. 01-1139 (JFK).

18. Testimony of Jay W. Hughes, Jr., Esq. on July 19, 2002 in W.R. Grace & Co., et al., Debtors. United States District Court for the District of Delaware Case Nos. 01-1139 through 01-1200.

19. Testimony of Robert A. Beber on August 30, 2002 in W.R. Grace & Co., et al., Debtors. United States District Court for the District of Delaware Case Nos. 01-1139 through 01-1200.

20. Testimony of Robert Beber on July 30, 2002 in W.R. Grace & Co., et al., Debtors. United States District Court for the District of Delaware Case Nos. 01-1139 through 01-1200.

21. Testimony of David Siegel on September 19, 2002 in W.R. Grace & Co., et al., Debtors. United States District Court for the District of Delaware.

22. Testimony of Robert Beber on July 31, 2002 in W.R. Grace & Co. et al., Debtors. United States District Court for the District of Delaware Case Nos. 01-1139 through 01-1200.

23. Weill, M.D., David. June 11, 2007 Expert Report.

24. PFT study results database as described in Dr. Weill expert report.

25. "Supplemental Report on Asbestos and Disease Causation" by Suresh Moolgavkar, M.D., Ph.D., June 11, 2007 – W.R. Grace & Co. Bankruptcy.

26. "The Role and Process of Exposure Assessment Regarding Asbestos-Related Personal Injury Liability: Supplemental Report" by Peter S.J. Lees, Ph.D., CIH, June 11, 2007 –. W.R. Grace & Co.

27. Hutchins, M.D., Grover M. Report (Letter) June 7, 2007.

28. Report on Development of Claimant X-ray Study, Daniel Henry, M.D. June 11, 2007.

29. X-ray study master list of claimants and results for sample of x-rays that were reviewed by three independent B-readers as described in the Dr. Henry expert report.

30. "Analysis of Libby Claimant Medical Records and Dr. Whitehouse's Expert Report dated September 25, 2006" by Steven E. Haber, M.D., F.C.C.P. of Texas Occupational Medicine Institute. June 11, 2007

31. "Diagnostic Practices in a Litigation Context: Screening Companies and the Doctors They Employed" " by Steven E. Haber, M.D., F.C.C.P. of Texas Occupational Medicine Institute. June 11, 2007

32. Supplemental Report "The Scientic Credibility of Personal Injury Claims Related to Alleged Exposure to W.R. Grace Asbestos-Containing Products" by Elizabeth L. Anderson, Ph.D., A.T.S. Fellow. June 11, 2007

Exhibit 2: Curriculum Vita of B. Thomas Florence, Ph.D.

KEY QUALIFICATIONS:

B. Thomas Florence is the President of *Analysis.Research.Planning Corporation* (ARPC) in Washington, D.C. Dr. Florence has over 30 years of experience in management consulting and research. He has significant experience in environmental risk assessment, forecasting, large-scale statistical modeling, litigation consulting, class action and mass tort case management, toxic tort evaluation, and work flow design and computerization.

Dr. Florence has participated in the start-up and on-going operations of entities established to resolve personal injury claims. He has assisted in the formulation of policies and the structure of operations, including designing and implementing work flow procedures and methods for processing claims, from the receipt of the claim form to the payment of the claim.

Dr. Florence was retained by eight of the asbestos-related personal injury trusts to consult in the area of claims management, and in several instances to perform assessments of the liabilities facing these trusts. He has designed and implemented fully-integrated computerized management systems for processing more than 1,500,000 claims and billions of dollars in payments, and has provided claims valuation and liability assessment in numerous cases involving personal injury and property damage claims stemming from product and premise liability.

Dr. Florence has assisted in the development of reorganization plans of companies facing bankruptcy, and has been retained as an expert witness for the quantification of liability before the Bankruptcy Court.

Dr. Florence has taught courses and given lectures in the areas of research design, psychometrics, multi-variate statistical analysis, systems theory, and communication analysis, and has published in the areas of environmental auditing and environmental risk analysis.

Dr. Florence's consulting experience includes the following representative assignments.

- Estimation of claim values and management methods for the Breast Implant Claims Office.
- Development of claim payment and evaluation methods for class action settlement involving Albuterol.
- National surveys and analyses of credit and financing practices in automotive sales, jewelry, consumer credit, residential mortgage, home furnishings, and home improvements industries.
- Financial analysis and budgeting of governmental fee revenues.
- Financial analysis of alternative organization structures for government agency.
- Estimation of current and future asbestos-related health claims filed against the A-Best Products Asbestos Settlement Trust, Amatex Asbestos Trust, DII Asbestos Trust, Keene Creditor Trust, JT Thorpe Successor Trust, Manville Personal Injury Settlement Trust, Pacor Trust, Fuller-Austin Asbestos Trust, UNR Asbestos Disease Claims Trust, National Gypsum

Settlement Trust, Celotex Asbestos Settlement Trust, Eagle-Picher Personal Injury Settlement Trust, A-Best Products, Babcock & Wilcox, 48-Insulations, Eagle-Picher Industries, A.P. Green, Armstrong World Industries, Federal Mogul, Flintkote Company, Halliburton, Kaiser, NARCO, Plibrico Company, Pittsburgh Corning, US Gypsum, US Mineral, W.R. Grace, Union Carbide, and Fuller-Austin Co.

- Estimation of liabilities, claim values and claims processing methods for a bankruptcy case involving TCE contamination.
- Audit of claim processing procedures for the Settlement Facility – Dow Corning Trust, Celotex Trust, DII Asbestos Trust and the Fuller-Austin Trust.
- Estimation of the value and timing of personal injury claims resulting from the use of the Dalkon Shield IUD.
- Design and implementation of claim processing policies, procedures and systems for the Diet Drug Settlement Trust (Fen Phen).
- Estimation of the value of personal injury claims related to alleged exposure to toxic materials at the Love Canal; Times Beach, Missouri; and Three Mile Island.
- Development of a monetary allocation method for distributing settlement funds to over 10,000 DDT exposed claimants.
- Development and implementation of a system for processing 1,000,000 personal injury claims.
- Design and development of computer tracking and accounting systems for large-scale claims handling.
- Development of an expert system for valuing personal injury claims.
- Estimation of the financial impact on the electric utilities industry of proposed federal ban on polychlorinated biphenyls in electric equipment nationwide.
- Analysis of the incidence and prevalence of PCB equipment in the electric utility industry.
- Time series analysis of toxicological research findings for a hazardous waste site.
- Development of strategic marketing plans for the telecommunications industry.
- Development of a model for assessing the effectiveness of hazardous waste cleanup activities.
- Design and analysis of the long-term behavior of hazardous waste spills in the environment.
- Design of environmental audit procedures for private industry.
- Design and implementation of a computerized system for administering and analyzing the effects of hazardous waste sites.
- Design and management of a toxicological review of hazardous industrial wastes.
- Design and implementation of an exhaust emissions test program.
- Analysis of maintenance and use patterns of automobile owners.
- Design and implementation of statewide management information system for state government.
- Design of minicomputer-based management information system for appellate courts.
- Construction of mathematical model to predict manpower needs for state agency.
- Design of 2,500 and 1,500 employee personnel classification and compensation systems.
- Design of a structural reorganization plan for a state judicial system.
- Design of Affirmative Action Plan for state government.
- Analysis of discriminatory minority employment practices (private industry).
- Design of five-year system development plan for computer information system.

- Design of procedures for state Workmen's Compensation Appeals.
- Workload and procedural analysis of 2,500 employee government agency.
- Design of a national multimedia-training program for governmental planners.
- Management evaluation and audit of large metropolitan data processing department.
- Design of national training conference for governmental planners.
- Analysis of computerized and microfilm information retrieval systems.
- Analysis of technical goods and services in the optical industry.
- Consumer survey and analysis of marketing practices and policies in the vocational schools industry.
- Analysis of national marketing and pricing policies in the accounting industry.
- Analysis of psychological effects of broadcast media on information processing and decision making.

EDUCATION:

Ph.D., Michigan State University
MA, Michigan State University
B.B.A., University of Kentucky

AWARDS AND HONORS:

Summa Cum Laude, University of Kentucky
Beta Gamma Sigma Honor Society
Phi Kappa Phi Honor Society

PUBLICATIONS:

- "Mass Tort Claim Processing Facilities: Keys to Success," *Loyola of Los Angeles Law Review*, Volume 31, Number 2 (January 1998)
- "How Children Spend Their Time: A Sample Survey for Use in Exposure and Risk Assessment," with A. Silvers, D. Rourke and R. Lorimor. *Risk Assessment*, Volume 14, Number 6 (December 1994).
- "The Computerization of Mass Tort Settlement Facilities," with J. Gurney. *Law and Contemporary Problems*, Autumn 1991.
- The Environmental Audit Handbook. With T. Truitt, D. Berz, D. Weinberg, J. Molloy, G. Price, and L. Truitt, New York: Executive Enterprises Publications, Inc. Second Edition, 1983.
- Report of the Study of PCBs in Equipment Owned by the Electric Utility Industry. Published by the Edison Electric Institute, February 1982.
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- Judicial Staffing. Report published by the Wisconsin Supreme Court, 1980.

- Wisconsin Case Processing. Report published by the Wisconsin Judicial Planning Committee, Summer 1978.
- Maryland Court Personnel: District Court Staffing. Report published by the Administrative Office of the Maryland Courts, Summer 1987.
- Profile of the Tennessee Courts. Report published by the Tennessee Supreme Court, Fall 1977.
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- "An Empirical Test of the Relationship of Evidence to Belief Systems and Attitude Change." Human Communication Research, Winter 1975.
- "An Assessment of Videotape in Criminal Courts," with E. Short and M. Marsh. Brigham Young University Law Review, Volume 1975, No. 2.
- A Two-Way Interactive Video/Audio Arraignment System for Suffolk County, New York: Implementation Issues and Costs. Report prepared for the American University, November 1975.
- "The Effects of Videotape Testimony in Jury Trials: Studies on Juror Decision Making, Information Retention, and Emotional Arousal," with G. Miller, D. Bender, F. Boster, N. Fontes, J. Hocking, and H. Nicholson. Brigham Young University Law Review, Volume 1975, No. 2.
- An Evaluation of the District of Columbia Model Court. Report prepared for the National Clearinghouse of Criminal Justice Planning and Architecture, January 1976.
- Videotape Recording in the California Criminal Justice System. Report published by the California Office of Criminal Justice Planning, March 1975.
- "The Development of Interpersonal Communication Theory," with D. Cushman. Today's Speech, Winter 1974.
- "Real vs. Reel: What's the Verdict?" with G. Miller, D. Bender, and H. Nicholson. Journal of Communication, Summer 1974.
- "The Application of Cybernetics to Human Communication Theory." Meeting of International Communication Association, 1972.
- "Effects of Videotaped Testimony on Information Processing and Decision-Making in Jury Trials," with G. Miller, F. Siebert, D. Bender, and H Nicholson. Legal Communication Workshop, 1974.
- "Videotape Recording in the California Criminal Justice System: Impacts and Cost," with E. Short and M. Marsh. California Public Defenders Association, 1975.

TESTIMONY (past four years):

- Superior Court of the State of California, County of Los Angeles
In Re: **Fuller-Austin** Insulation Company v. Fireman's Fund Insurance Company, et al.
(Case No. BC 116835)
Trial: March, 2003
(Also provided deposition testimony)
- United States Bankruptcy Court, Eastern District of Louisiana
In Re: **Babcock & Wilcox Company**, et al.
Confirmation Hearing: September, 2003
(Also provided deposition testimony)
- United States District Court, Eastern District of Pennsylvania
In Re: **Sheila Brown et al. v. American Home Products Corporation** (Civil Action No. 99-20593)
Trial: April, 2004
- United States Bankruptcy Court, Northern District of Illinois, Eastern Division
In Re: **Plibrico Company, et al.** (Case No. 02 B 09952)
Deposition: November, 2005
- United States District Court, Eastern District of Pennsylvania
In Re: Armstrong World Industries, Debtors (Civil Action No. 00-CV-4471)
Trial: May 2006
- United States Bankruptcy Court for the District of Delaware
In Re: Federal Mogul Global, Inc. (Case No. 01-10578)
Confirmation Hearing June 2007