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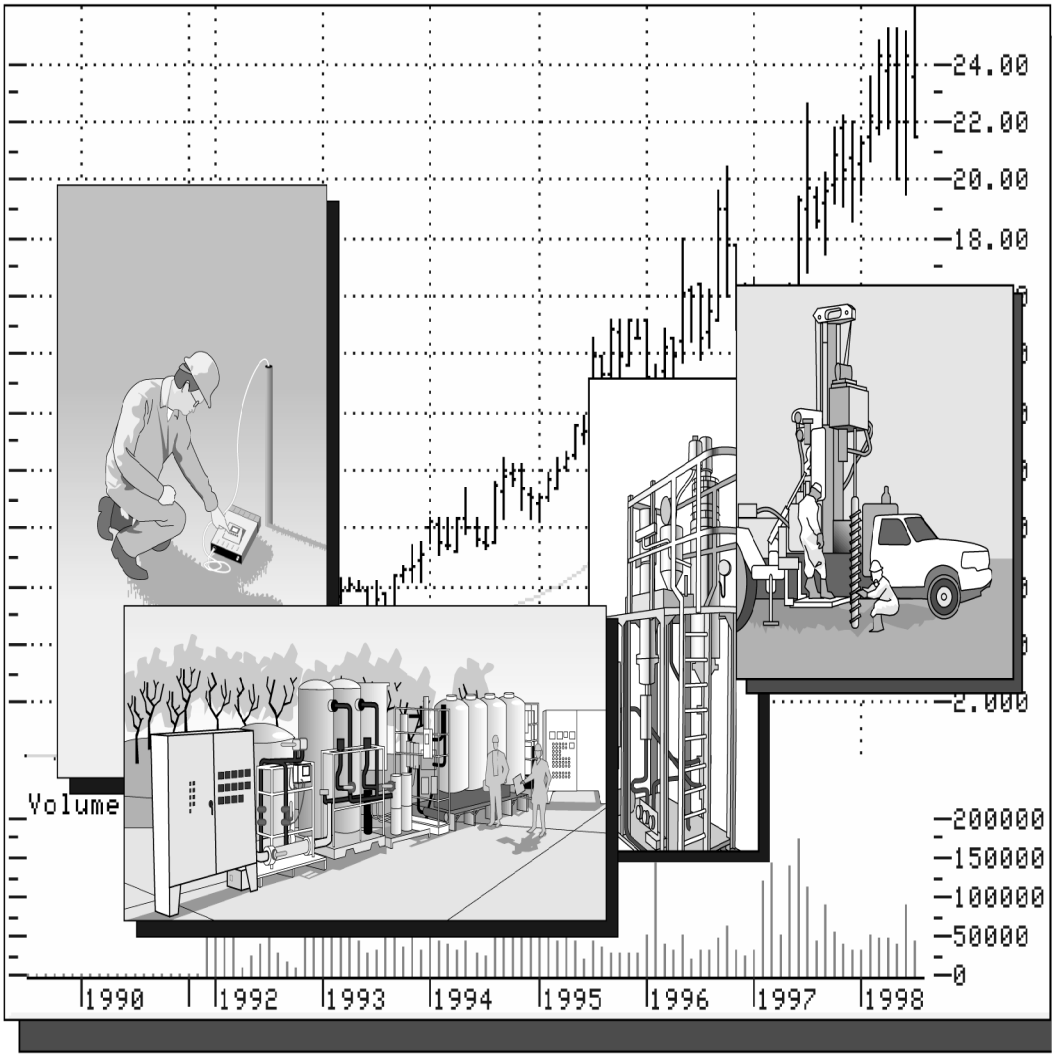
Profile of Innovative Treatment Technology Providers



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FOREWORD

The purpose of this study is to offer detailed information about the market, financial, and stock market performance over time of a sector of the environmental technology market – companies that offer innovative remediation technology approaches. While successful commercialization of technologies is tied to many factors, this report attempts to provide a realistic backdrop and set of expectations for financial performance for new entrants into that market. This multi-year review highlights the importance of building alliances beyond the market niche of remediation to achieve better financial results. In addition, by reviewing both the successful and the less successful approaches that have been taken, the report suggests strategies for achieving successful commercialization.

EXECUTIVE SUMMARY

Developed as alternatives to more conventional technologies, such as incineration and containment, innovative treatment technologies (ITT) have been deployed at hundreds of sites nationwide over the past decade. Such technologies have been used to conduct cleanups ranging from efforts that address leaking underground storage tanks to complex remediation efforts that involve chlorinated compounds and metals and address diverse environmental media, including contaminated soil and groundwater. This study presents an assessment of the characteristics of ITTs and the firms that supply them, the recent financial performance of firms that market ITTs, and investor confidence in such firms (as measured by growth in market value).

The technical profile of ITTs and providers of ITTs presented in this study summarizes technical information about the characteristics of various types of ITTs and trends in the development and marketing of ITTs as a whole. The analyses presented in the profile were conducted using data derived from Versions 1.0 - 6.0 of the U.S. Environmental Protection Agency's (EPA) Vendor Information System for Innovative Treatment Technologies (VISITT) database and pertain to the operations of providers of ITTs from 1992 through 1997.

The analyses presented in the technical profile indicate that:

- The total number of ITTs available in the marketplace increased at an average rate of approximately 19 percent per year from 1992 to 1997. Much of this growth, however, took place during the early years of the VISITT program. The data indicate that while the number of ITTs increased, the rate at which those ITTs are entering the system has decelerated since the release of Version 2.0 of VISITT (1993).

- The total number of full-scale ITTs increased from 61 ITTs in 1992 to 289 in 1997. In 1992, approximately 40 percent of ITTs were full-scale ITTs, while in 1997, approximately 78 percent were full-scale ITTs.

- In 1993, 40 percent of the ITTs for which patents either had been issued or were pending were full-scale ITTs, compared with over 70 percent in 1997. In addition, the number of pilot-scale ITTs for which patents had been issued increased by three percent from 1992 to 1997. The number of bench-scale ITTs for which patents had been issued decreased by 39 percent during that five-year period. The increased numbers of ITTs that were patented or for which patents were pending is a further indication of the increasing maturity and growth in the supply of ITTs.

- The total number of providers of ITTs in VISITT increased at an average rate of approximately 17 percent per year from 1992 to 1997. Much of this growth, however, took place during the early years of the VISITT program. Those data indicate that while

the number of providers of ITTs is still increasing, the rate at which those providers are entering the system has decelerated since the release of Version 2.0 of VISITT.

- The number of providers of ITTs that describe themselves as "small business concerns" increased from 89 providers (or approximately 54 percent of all providers) in 1994 to 128 providers (or approximately 60 percent) in 1997. In addition, the data indicate that the number of ITTs marketed by those "small" providers increased from 131 ITTs (or approximately 47 percent) in 1994 to 208 ITTs (or approximately 56 percent) in 1997. The data appear to contradict suggestions that, due to increased consolidation among environmental remediation firms, the number of small providers of ITTs is decreasing.

For the financial analysis presented in this study, the firms that are involved in marketing ITTs are divided into two groups. The first group, referred to as "the ITT providers," is defined as the 62 firms that were identified as having ITTs listed in Version 6.0 of VISITT and for which enough financial data were available to calculate specific ratio values for more than one year. Because the business operations of many of those providers are not focused primarily on environmental products or services, however, a second group was created. The second group, referred to as "the environmental subgroup" is defined as the 26 of the ITT providers whose operations focus primarily on environmental lines of business and for which enough financial data were available to calculate specific ratio values for every year from 1994 through 1997.

The financial analyses indicate that:

- While many ITTs are being marketed by providers that are strong financial performers, those providers that are strong financial performers tend to be engaged in lines of business that are highly diversified; they do not focus primarily on environmental products or services.

- The ratios show that, as a whole, the ITT providers became more liquid, more solvent, and more profitable from 1994 to 1997.

- The ratios show that, on average, firms in the environmental subgroup were unprofitable throughout the four-year period covered in this study and became less solvent and more leveraged from 1994 to 1997.

- The ratios show that, from 1994 to 1997, firms in the environmental subgroup were consistently less solvent and less profitable, on average, than the ITT providers.

- The ratios show that, while the financial performance of the ITT providers tends to be comparable to or, in certain cases, superior to that of other industry groups, the financial performance of the environmental subgroup tends, in many respects, to be inferior to that of other industry groups.

For the stock performance analysis presented in this study, the firms that are involved in marketing ITTs also are divided into two groups. The first group, referred to as "the ITT providers," is defined as the 19 publicly held firms that were identified as having ITTs listed in Version 6.0 of VISITT and for which market value data were readily available. Again, because the business operations of many of those providers are not primarily focused on environmental products or services, a second group was created. The second group, referred to as "the environmental subgroup," is defined as the 13 ITT providers whose operations focus primarily on environmental lines of business.

The stock performance analyses indicates that:

- While the overall market value of the ITT providers increased from the beginning of 1994 to the end of 1997, the performance of the stocks of those providers that are not "environmental" firms tend to be better, on average, then the performance of the stocks of those providers whose operations focus primarily on environmental lines of business.

- While the market value of the ITT providers increased by approximately 69 percent from the beginning of 1994 to the end of 1997, the market value of the environmental subgroup decreased by approximately 4.4 percent during that same period of time.

- Overall, the poor performance of the stocks of the providers in the environmental subgroup reflects the poor performance of the environmental industry in general.

- Environmental technology stocks experienced a period of relative growth and prosperity from 1990 through the start of 1994, but, in general, suffered a major collapse in April and May of 1994. From a market value perspective, the time period evaluated in this study (1994 through 1997) represents perhaps the worst period of performance in the environmental industry.

- In terms of growth in market value, most of the other industry groups considered in this study significantly outperformed the ITT providers from the beginning of 1994 to the end of 1997. In addition, all of those industry groups outperformed the environmental subgroup during that period of time.

1.0 INTRODUCTION

This study presents the results of an analysis the U.S. Environmental Protection Agency (EPA) conducted to assesses the growth and development of the supply of innovative treatment technologies (ITT) for contaminated soil and groundwater. EPA's Technology Innovation Office (TIO) over the past six years has collected technological and business data from providers of ITTs and entered those data into the Vendor Information System for Innovative Treatment Technologies (VISITT) database.[1] Data from VISITT were analyzed to identify trends in the ITT market. Data obtained from other sources also were used to analyze the financial and stock performance of providers of ITTs. The profile tracks the increases in the numbers of ITTs and providers of ITTs that have occurred over the past several years and documents the financial and stock performance of those providers that have listed ITTs in VISITT.

Section 2.0 of this study presents an analysis of ITTs and providers of ITTs over a six-year period from 1992 through 1997. Section 3.0 presents an analysis of the financial performance of providers of ITTs over the four-year period from 1994 through 1997. Section 4.0 presents an analysis of the performance of the stocks of those providers of ITTs that are publicly traded companies for the period from the beginning of 1994 to the end of 1997. Appendix A presents the approach taken in conducting an analysis of the financial performance of providers of ITTs. Appendix B discusses the limitations of that financial analysis. Appendix C presents the ratio values of each ITT provider for the period from 1994 through 1997. Appendix D presents the ratio values of each firm in the environmental subgroup for the period from 1994 through 1997. Appendix E discusses the limitations of the stock performance analyses presented in this study.

2.0 TECHNICAL PROFILE OF ITTs AND PROVIDERS OF ITTs

This section summarizes technical information about the characteristics of various types of ITTs and trends in the development and marketing of ITTs as a whole. The analyses presented below are based on data derived from the VISITT database and pertain to the operations of providers of ITTs from 1992 through 1997. According to those data, the total number of ITTs listed in VISITT increased at an

[1] VISITT is an electronic database service offered by EPA to promote the use of ITTs that can be used to treat groundwater and soil contaminated with hazardous and petroleum wastes. VISITT provides firms an opportunity to market their capabilities to decision makers that are directly involved in selecting remedial treatment technologies. The database enables federal, state, and private-sector environmental professionals to consider applicable ITTs for use at particular sites. VISITT provides specific information about the availability, performance, and cost associated with the application of those ITTs. VISITT is now part of the EPA Remediation And Characterization Innovative Technologies (EPA REACH IT) online database which can be accessed at *www.epareachit.org*.

average rate of approximately 19 percent per year from 1992 to 1997. In addition, the data indicate that the total number of ITTs in VISITT in each technology category (thermal, physical, chemical, and biological technologies) more than doubled during the six-year period. Although those data could be interpreted to indicate that more ITTs in all treatment types were available in the marketplace in 1997 than in 1992, it also is likely that by 1997, more providers of ITTs had registered their existing ITTs in VISITT than had done so in the early years of the VISITT program.[2]

Because other sources of information about ITTs generally are lacking, the VISITT database served as the primary source of data for this analysis. Although the VISITT database is one of the most comprehensive sources of information about ITTs, neither all providers that are involved in marketing ITTs nor all the ITTs that currently are available in the marketplace necessarily are listed in VISITT. Further, because the business operations of many of the providers of ITTs for which data are available do not focus primarily on environmental lines of business, many of those providers have little in common save the registration of ITTs in VISITT. The lack of other commonalities among those providers and the lack of a standard industry classification (SIC) code for the environmental industry or any of its market sectors complicated the conduct of traditional business analyses. Finally, because the data in VISITT focus exclusively on the characteristics of providers of ITTs rather than on the purchasers, or potential purchasers, of such technologies, those data do not lend themselves to the conduct of a comprehensive market analysis of both the buyers and sellers of ITTs.

2.1 TRENDS AMONG VARIOUS TYPES OF ITTs

An analysis of trends was performed to evaluate changes in the availability and use of ITTs from 1992 through 1997. The data indicate that the rates of growth of low-cost, lower-perceived-risk, and in situ ITT applications from 1992 to 1997 exceeded those of other types of ITTs. During that six-year period, the number of bioremediation and thermal ITTs listed in VISITT increased. The number of chemical and physical ITTs listed in VISITT also both increased during those years, but declined as percentages of the total number of ITTs listed in the database. Despite the decline in the total number of ITTs in the bioremediation category, that category contained 39 percent of the total number of ITTs in VISITT in 1997. In comparison, thermal, physical, and chemical ITTs made up 21 percent, 21 percent, and 19 percent, respectively, of the total number of ITTs in VISITT in 1997. Figure 2-1 illustrates the distribution of ITTs in VISITT by category of technology in 1997.

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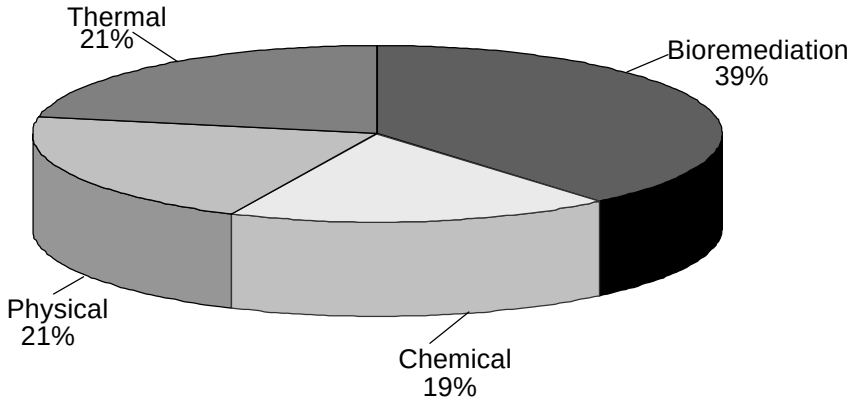
[2] In 1997, the VISITT database contained information about 214 providers of ITTs.

Figure 2-1: Distribution of ITTs in VISITT by Category of Technology in 1997



- This graph is based on 371 ITTs offered by 214 ITT providers.

As Figure 2-2 illustrates, the total number of ITTs in VISITT increased from 154 in 1992 to 371 in 1997. The data indicate that the total number of ITTs available in the marketplace increased at an average rate of approximately 19 percent per year from 1992 to 1997. Much of this growth, however, took place during the early years of the VISITT program. For example, the total number of ITTs in VISITT increased by an even 50 percent from 1992 to 1993. From 1993 to 1994 and from 1994 to 1995, the total number of ITTs in VISITT increased by approximately 20 percent and 17 percent, respectively. From 1995 to 1996 and from 1996 to 1997, however, the total number of ITTs in VISITT increased by approximately 6 percent and 7 percent, respectively. Those data indicate that while the number of ITTs in VISITT is increasing, the rate at which those ITTs are entering the system has decelerated since the release of Version 2.0 of the VISITT database.

Figure 2-2 also illustrates that the number of bioremediation ITTs available in the marketplace increased steadily from 1992 through 1997. That finding correlates to that of a market study[3] that notes that while the environmental remediation market as a whole remained flat, a trend toward the more frequent selection of bioremediation technologies, relative to other technologies, began to grow in 1995. In 1992, 51 bioremediation ITTs were listed in VISITT. By 1997, that number had increased to 144.

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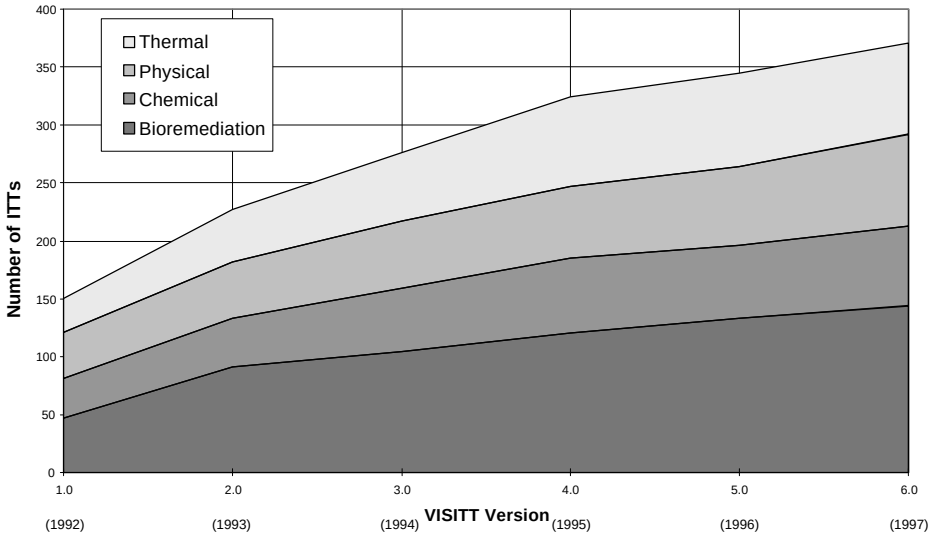
[3] "Remediation Market Stays Flat." 1997. *Environmental Business Journal* Volume X, Number 8. August.

Figure 2-2: Trends of Growth of ITTs in VISITT by Category of Technology



The total number of thermal ITTs in VISITT, including those ITTs that involve the use of low-temperature mobile units, increased from 29 ITTs in 1992 to 79 in 1997. The total number of chemical ITTs in VISITT, such as solvent extraction, increased from 34 ITTs in 1992 to 69 in 1997. Finally, the total number of physical ITTs, such as soil washing, increased from 40 ITTs in 1992 to 79 in 1997. The findings set forth above track closely with the conclusions of other studies of the environmental industry that indicate the more frequent use of in situ, low-cost, and low-risk technologies for remediation.

Indicating to some extent the increased number of ITTs in the marketplace, the total number of full-scale ITTs in VISITT increased from 61 ITTs in 1992 to 289 in 1997. In 1992, approximately 40 percent of ITTs in VISITT were full-scale ITTs, while in 1997, approximately 78 percent were full-scale ITTs. During that six-year period, however, the total number of pilot-scale ITTs in VISITT increased only slightly, from 60 ITTs in 1992 to 62 ITTs in 1997. In 1992, approximately 39 percent of ITTs in VISITT were pilot-scale ITTs, while, in 1997, approximately 17 percent were pilot-scale ITTs. Finally, the total number of bench-scale ITTs in VISITT decreased, from 33 ITTs in 1992 to 20 in 1997. In 1992, approximately 21 percent of ITTs in VISITT were bench-scale ITTs, while, in 1997, only about 5 percent were bench-scale ITTs.

Overall, the data indicate that more ITTs may be available in the marketplace today than in 1992. Most of the ITTs added to VISITT since 1992 entered the system as full-scale applications. However, the data also may indicate that ITT providers are experiencing increased success in developing full-scale ITTs from bench- or pilot-scale efforts. The decrease in the number of bench-scale ITTs in VISITT also appears to indicate that a number of ITTs that entered the system in the early stages of development have now matured. Figure 2-3 illustrates the distribution of ITTs in VISITT by scale in 1992 and 1997.

Figure 2-3: Comparative Distribution of ITTs in VISITT by Scale of Development in 1992 and 1997

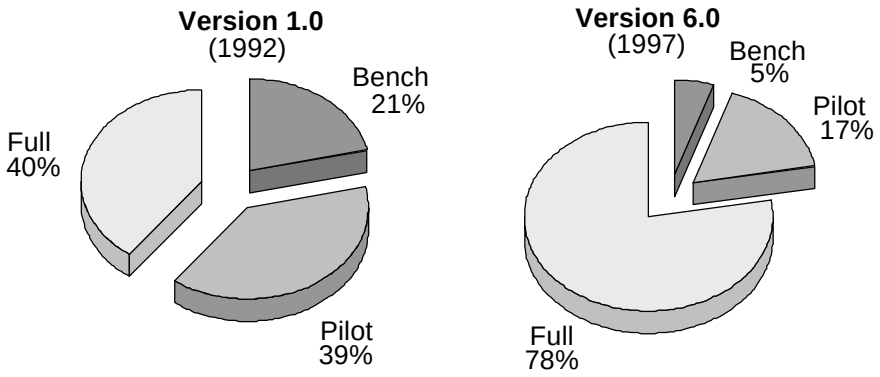


Table 2-1 presents the percentages of the total number of ITTs in both Versions 2.0 and 6.0 of VISITT that could be used to treat various groups of contaminants.[4] The data show that, for the most part, the percentages of ITTs used to treat various groups of contaminants rose modestly between 1993 and 1997, and that the number of ITTs that could be used to treat more than one group of contaminants increased during that period of time.

[4] Because the data in Version 1.0 of VISITT did not distinguish between in situ and ex situ media or types of media actually treated, as distinct from those potentially treated, those data were unsuitable for this analysis. Therefore, for this analysis, the data in VISITT Version 6.0 are compared with the data in Version 2.0 of VISITT. Percentages, rather than the total number of ITTs, are used to normalize the data between the two versions of VISITT.

TABLE 2-1

PERCENTAGES OF ITTs IN VISITT USED TO TREAT VARIOUS TYPES OF CONTAMINANTS

Contaminant Group	VISITT Version 2.0 (1993) (%)	VISITT Version 6.0 (1997) (%)
HVOCs/NHVOCs	58	66
HSVOCs/NHSVOCs	56	59
VOCs/SVOCs	65	70
PAH	45	40
Heavy Metals	19	19
PCBs	16	18
Explosives	6	13
Radioactive contaminants	6	9

Specifically, the percentage of ITTs used to treat halogenated volatile organic compounds (HVOC) and nonhalogenated volatile organic compounds (NHVOC) increased from 58 percent of all ITTs in VISITT in 1993 to 66 percent in 1997. In addition, the percentage of ITTs used to treat explosives increased from 6 percent of all ITTs in 1993 to 13 percent in 1997. To lesser degrees, the percentages of ITTs used to treat volatile organic compounds (VOC) and semivolatile organic compounds (SVOC), halogenated semivolatile organic compounds (HSVOC) and nonhalogenated semivolatile organic compounds (NHSVOC), polychlorinated byphenyls (PCB), and radioactive contaminants also increased. Further, the fact that 70 percent and 66 percent of ITTs listed in Version 6.0 of VISITT can be used to treat VOCs and HVOCs, respectively, indicates that providers of ITTs may be focusing on marketing ITTs that are used to treat those specific groups of contaminants.

Table 2-2 presents the percentages of the total number of ITTs in both Versions 2.0 and 6.0 of VISITT that are used to treat various types of environmental media. The data show that the percentages of ITTs that are in situ ITTs increased overall from 1993 to 1997, while the percentages of ITTs that are ex situ ITTs decreased during that period of time. In addition to suggesting an increased focus on in situ ITTs, the data indicate that, over the five-year period, providers of ITTs also placed increased some emphasis on ITTs used to treat solid and off-gas wastes. The data also suggest that the number of ITTs that could be used to treat more than one type of environmental media increased between 1993 and 1997.

TABLE 2-2

PERCENTAGES OF ITTs IN VISITT USED TO TREAT VARIOUS TYPES OF ENVIRONMENTAL MEDIA

Media Treated	VISITT Version 2.0 (1993) (%)	VISITT Version 6.0 (1997) (%)
Soil (in situ)	20	34
Soil (ex situ)	51	47
Sludge	33	31
Solid	14	19
Sediment (in situ)	10	16
Sediment (ex situ)	23	22
Groundwater (in situ)	12	27
Off-gas	4	5

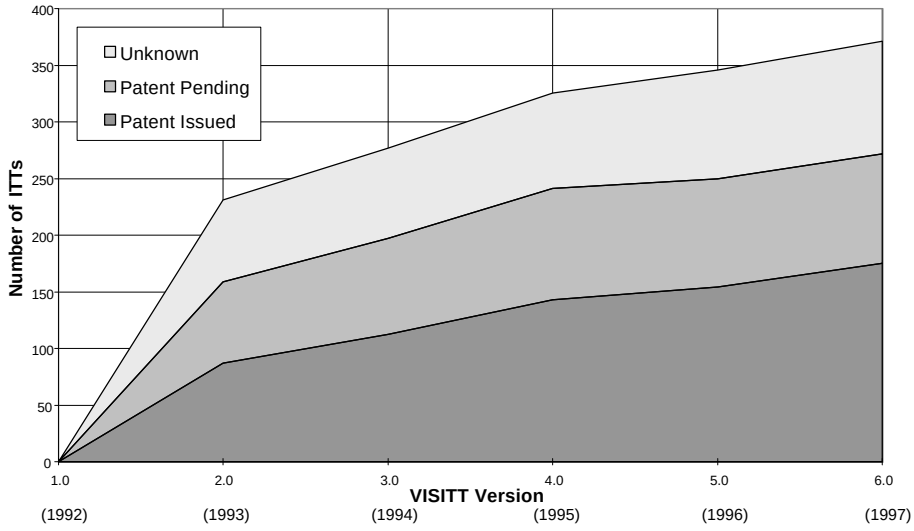
Specifically, the data indicate that the percentages of all ITTs that are in situ ITTs and are used to treat soil, groundwater, and sediment increased from 20 percent, 12 percent, and 10 percent, respectively, of all ITTs in VISITT in 1993 to 34 percent, 27 percent, and 16 percent in 1997. The data also indicate that the percentages of ITTs used to treat solid and off-gas wastes increased from 14 percent and 4 percent, respectively, of all ITTs in VISITT in 1993 to 19 percent and 5 percent in 1997. On the other hand, the data indicate that the percentages of all ITTs in VISITT that are ex situ ITTs and are used to treat soil and sediment decreased from 51 percent and 23 percent, respectively, of all ITTs in 1993 to 47 percent and 22 percent in 1997.

The data in VISITT indicate that the number of ITTs in VISITT that were patented increased from 87 in 1993 to 175 in 1997, an increase of approximately 101 percent.[5] In addition, the data show that the number of providers that had ITTs for which patents either had been issued or were pending increased by approximately 71 percent, from 159 in 1993 to 272 in 1997. The percentage of the total number of ITTs in VISITT for which patents had been issued increased from 38 percent in 1993 to 47 percent in 1997. Further, the percentage of the total number of ITTs in VISITT for which patents were pending decreased from 31 percent to 26 percent during that five-year period. Finally, the percentage of the total number of

[5] Information about the patent status of ITTs was not requested in 1992 for inclusion in Version 1.0 of VISITT.

ITTs in VISITT for which patent status was not specified decreased from 31 percent to 27 percent from 1993 to 1997. Figure 2-4 illustrates trends in the patent status of ITTs in VISITT from 1992 to 1997.

Figure 2-4: Growth Trend of Patent Status of ITTs in VISITT 1992 through 1997



In 1993, 40 percent of the ITTs for which patents either had been issued or were pending were full-scale ITTs, compared with over 70 percent in 1997. In addition, the number of pilot-scale ITTs for which patents had been issued increased by three percent from 1992 to 1997. The number of bench-scale ITTs for which patents had been issued decreased by 39 percent during that five-year period.

Data derived from VISITT for 1997 show a strong trend toward the patenting of ITTs at all scales of development. In 1997, 13 bench-scale, 21 pilot-scale, and 125 full-scale ITTs were patented. Patented ITTs accounted for 175 (or 47 percent) of the 371 ITTs listed in VISITT in 1997. Also in 1997, patents were pending for 97 ITTs. When those ITTs are taken into account, the data show that a total of 272 (or 73 percent) of the 371 ITTs listed in VISITT in 1997 were patented or patents were pending for them. The increased numbers of ITTs that were patented or for which patents were pending is a further indication of the increasing maturity and growth in the supply of ITTs. Further, the process of obtaining a patent is a long and costly one. The fact that so many providers of ITTs are choosing to undertake that process also may be interpreted as a sign of optimism about the future use of ITTs.

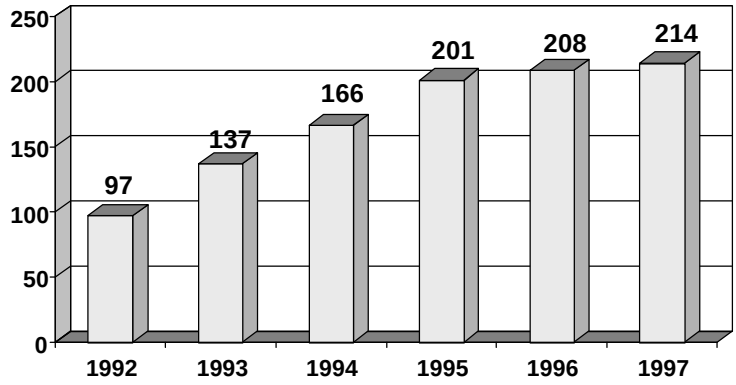
Data from VISITT indicate that, from 1992 to 1997, more patents were issued for bioremediation ITTs than for any other type of ITT. In 1997, more bioremediation ITTs were listed in VISITT than any other type of ITT. In 1997, 23 percent of the ITTs in VISITT for which patents had been issued were bioremediation technologies. A significant number of patents also were issued for thermal ITTs, such as thermal desorption and thermally enhanced recovery (in situ), and for chemical ITTs, such as oxidation and reduction techniques. From 1992 to 1997, however, the fewest new patents were issued for physical ITTs, such as pneumatic fracturing and soil washing. The data may indicate a decreased emphasis on the patenting of those types of ITTs during the five-year period or may indicate that, because those ITTs are more mature than they were in earlier years, they are no longer in need of (or eligible for) patent protection.

2.2 TRENDS AMONG PROVIDERS OF ITTs

The total number of providers of ITTs in VISITT increased at an average rate of approximately 17 percent per year from 1992 to 1997. Much of this growth, however, took place during the early years of the VISITT program. For example, the total number of providers of ITTs in VISITT increased by approximately 41 percent from 1992 to 1993. During 1993 to 1994 and 1994 to 1995, the total number of providers increased by approximately 21 percent while, from 1995 to 1996 and from 1996 to 1997, the total number increased by only 3 percent. Those data indicate that while the number of providers of ITTs in VISITT is still increasing, the rate at which those providers are entering the system has decelerated since the release of Version 2.0 of the VISITT database. Figure 2-5 illustrates the growth in the number of providers of ITTs in VISITT from 1992 through 1997.

Overall, the system grew from a total of 97 providers of ITTs in 1992 to 214 in 1997, an increase of approximately 121 percent. Although a relatively small number of providers withdrew their ITTs from VISITT each year, the number of providers added to the system each year was more than sufficient to compensate for those that were lost. The net increase in the number of providers of ITTs in VISITT, combined with the net increase in the total number of ITTs listed in VISITT, suggests that interest by firms in marketing ITTs may have increased over the six-year period.

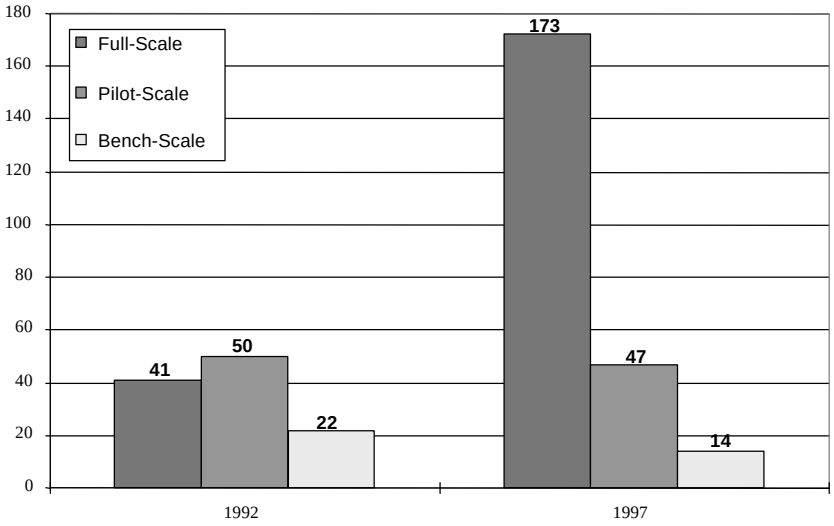
Figure 2-5: Total Number of Providers of ITTs in VISITT 1992 through 1997



Overall, the total number of providers in VISITT increased from 208 in 1996 to 214 in 1997. However, from 1996 to 1997, 49 providers withdrew their ITTs from VISITT for various reasons. The reasons those providers cited for withdrawing their ITTs from VISITT were: (1) insufficient interest in the ITT in the market place or the provider went out of business (36 providers, or 73 percent of those providers that withdrew their ITTs); (2) the providers never developed an ITT (9 providers, or 18 percent); and (3) there was a shift in market demand toward containment technologies (4 providers, or 9 percent).

The number of providers offering full-scale ITTs increased from 41 providers (or approximately 42 percent of all providers in VISITT) in 1992 to 173 providers (or approximately 81 percent of all providers in VISITT) in 1997. The number of providers in VISITT offering pilot-scale ITTs decreased from 50 providers (or approximately 52 percent of all providers in VISITT) in 1992 to 47 providers (or approximately 22 percent of all providers in VISITT) in 1997. Finally, the number of providers in VISITT offering bench-scale ITTs decreased from 22 providers (or approximately 23 percent of all providers in VISITT) in 1992 to 14 providers (or approximately 7 percent of all providers in VISITT) in 1997. Figure 2-6 illustrates the number of providers of ITTs in VISITT by scale of development of ITTs in 1992 and 1997.

Figure 2-6: Number of Providers of ITTs by Scale of Development of ITTs in 1992 and 1997



Data derived from VISITT indicate that the number of providers of ITTs that describe themselves as "small business concerns"[6] increased from 89 providers (or approximately 54 percent of all providers in VISITT) in 1994 to 128 providers (or approximately 60 percent of all providers in VISITT) in 1997.[7] In addition, the data show that the number of ITTs marketed by those "small" providers increased from 131 ITTs (or approximately 47 percent of all ITTs in VISITT) in 1994 to 208 ITTs (or approximately 56 percent of all ITTs in VISITT) in 1997. The data appear to contradict suggestions that, due to increased consolidation among environmental remediation firms, the number of small providers of ITTs is decreasing. Rather, the data show that the number of small providers of ITTs and the number of ITTs that are offered by those providers, both increased from 1994 to 1997. Figure 2-7 illustrates the numbers and percentages of providers of ITTs in VISITT that were small business concerns in 1994 and 1997. Figure 2-8 illustrates the numbers and percentages of ITTs in VISITT that were provided by small business concerns in 1994 and 1997.

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6 For purposes of reporting under VISITT, providers of ITTs are referred to the definition of "small business concern" provided under Parts 19 through 26 of the Federal Acquisition Regulations.

7 VISITT Versions 1.0 and 2.0 do not contain data regarding the designation of providers of ITTs as small business concerns. Therefore, this analysis compares the data in Versions 3.0 and 6.0 of VISITT.

Figure 2-7: Small Business Concerns in VISITT in 1994 and 1997

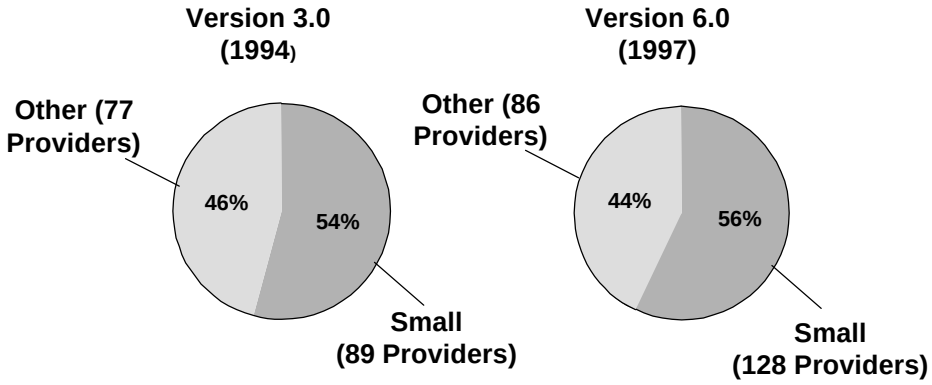
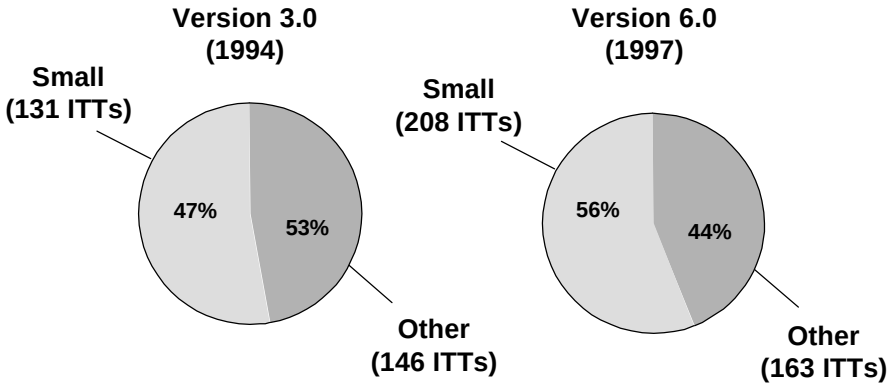


Figure 2-8: ITTs in VISITT Provided by Small Business Concerns in 1994 and 1997



3.0 PROFILE OF FINANCIAL PERFORMANCE OF ITT PROVIDERS

Four types of ratio analyses were conducted to measure the financial performance of providers of ITTs in terms of solvency, profitability, leverage, and liquidity. Analyses of providers' financial statements fill two primary functions: 1) to measure the past and present financial performance of those providers and 2) to provide a framework for predicting their future financial performance. For each type of analysis, the financial performance of providers of ITTs in VISITT was compared with that of a subset of providers whose operations focus primarily on environmental products or services and with that of 10 industry groups that have attributes similar to those of providers of ITTs. Appendix A of this study presents the approach taken in conducting an analysis of the financial performance of providers of ITTs. Appendix B of this study discusses the limitations of that financial analysis.

For this study, providers of ITTs are divided into two groups. The first group, referred to as "the ITT providers," comprises the 62 providers that were identified as having ITTs listed in Version 6.0 of VISITT and for which enough financial data were available to calculate specific ratio values for more than one year. See Appendix A for a discussion of the limitations of financial data. Appendix C of this study presents a list of the ITT providers and their associated ratio values for 1994 through 1997. Because many providers of ITTs are not primarily in the environmental business, another group was created. That group, referred to as "the environmental subgroup," comprises the 26 providers that have ITTs listed in VISITT, whose operations focus primarily on environmental lines of business, and for which complete financial data were available to calculate specific ratio values for every year from 1994 through 1997. Appendix D of this study presents a list of the providers in the environmental subgroup and their associated ratio values for 1994 through 1997.

Because complete financial data for many providers of ITTs were not available for every year from 1994 through 1997, and because the quality of the data that were available for each provider varied from one year to the next, the total number of providers for which data were available to calculate each ratio value fluctuated over the four-year period. Further, because the operations of many of the providers for which data were available were not focused primarily on environmental lines of business, many providers had little in common, save for the listing of their ITTs in Version 6.0 of VISITT.

To strengthen the analysis from a statistical perspective, those providers for which only enough financial data were available to calculate one value for each specific type of ratio for one year were excluded from the analysis. In addition, the environmental subgroup was established to strengthen the analysis by

gathering together those providers that had similar business operations and for which trends could be measured through the use of consistent sample groups for each specific type of ratio throughout the four-year period.

The financial conditions of both the ITT providers and the environmental subgroup were compared with those of 10 industry groups:

1. Commercial Physical and Biological Research (SIC code 8731)
2. Computer Integrated Systems Design (SIC code 7373)
3. Testing Laboratories (SIC code 8734)
4. Radio and Television Broadcasting and Communications Equipment (SIC code 3663)
5. Electronic Components and Accessories (SIC code 3671)[8]
6. Electromedical and Electrotherapeutic Apparatus (SIC code 3845)
7. Laboratory Analytical Instruments (SIC code 3826)
8. Refuse Systems (SIC code 4953)
9. Engineering Services (SIC 8711)
10. Petroleum Refining (SIC 2911)

Industry groups 1 through 6 were selected for comparison with providers of ITTs because they are:

1) Made up of companies in "emerging" industries
2) Relatively "young" industry groups (15 to 20 years old)
3) Not dominated by a few firms
4) Dependent on development of innovative technologies and products

Industry groups 7, 8, and 9 were selected because many "environmental" firms fall in those groups. Group 10 was selected because firms in that group are major users of environmental technologies and services and because those firms tend to invest large amounts of capital in research and development of new technologies.

Solvency ratios, such as Altman's Z-score, can be used to determine the likelihood that firms in an industry group will experience financial distress that could result in bankruptcy. The Z-score is a formula that measures factors to predict financial distress. Profitability ratios, such as the return on assets (ROA) ratio (defined as net income after tax divided by total assets), indicate the overall ability of firms in an industry group to realize profit from their operations. Leverage ratios, such as the debt to assets ratio (DAR) (defined as total liabilities divided by total assets) can provide information about the overall extent of debt in the capital structures of firms in an industry group and on the overall ability of

[8] Because of the manner in which financial data for this industry group are presented in Robert Morris Associates' Annual Statement Studies, this group also includes firms in SIC codes 3672 and 3674 through 3679.

those firms to incur new debt obligations safely. Liquidity ratios, such as the current ratio (CR) (defined as current assets divided by current liabilities), can be used to measure the overall ability of firms in an industry group to meet short-term expenses and other financial obligations in a timely manner.
The analyses presented in this study indicate that, on average, the financial performance of the ITT providers is stable and improving. The analyses also indicate, however, that there is a marked difference between the financial performance of the ITT providers and that of the environmental subgroup.

In many respects, the ratio values for the ITT providers demonstrate improvement in financial performance from 1994 to 1997. The ratios show that the ITT providers became more liquid, more solvent, and more profitable, on average, during that four-year period. Although the analysis shows that, as a whole, the ITT providers operated at a loss in 1994, that group demonstrated significant improvement in profitability in the next three years. The analyses also indicate that the ITT providers are, on average, highly solvent and are not likely in the near future to experience levels of financial distress that could result in bankruptcy. Although the ability of the ITT providers to realize sufficient amounts of profit from their operations while simultaneously servicing large amounts of debt remains a concern, those providers appear to have more than sufficient resources to meet their current obligations and continue operations, at least in the short term. If current trends persist, the overall financial performance of the ITT providers may continue to improve.

The analyses also show, however, that, while the financial performance of the ITT providers improved from 1994 to 1997, the performance of those providers in the environmental subgroup generally remained the same or worsened from 1994 to 1997. The analyses indicate that those providers that are involved in marketing ITTs but that are not "environmental" firms tend to be better financial performers than those providers in the environmental subgroup. Much of the financial success of the ITT providers appears, therefore, to be attributable to the strong financial performance of those providers of ITTs that are not environmental firms.

While many ITTs are being marketed by providers that are strong financial performers, those providers tend to be engaged in lines of business that are highly diversified and that do not focus primarily on providing environmental products or services. The ratios show that providers in the environmental subgroup were largely unprofitable and became less solvent and more highly leveraged, on average, during the four-year period. The analyses indicate that the providers in the environmental subgroup were adequately solvent and were not likely in the near future to experience levels of financial distress that could result in bankruptcy. However, the analyses also indicate, that, from 1994 to 1997, providers in the

environmental subgroup were consistently less solvent and less profitable than the ITT providers as a whole.

The financial performances of both the ITT providers and the environmental subgroup were compared with those of the 10 industry groups identified above. The ratios indicate that the financial performance of the ITT providers tends to be comparable to or, in certain cases, superior to that of the industry groups selected for comparison. However, the ratios also indicate that the financial performance of the environmental subgroup tends, in many respects, to be inferior to that of most of the industry groups selected for comparison.

Sections 3.1 through 3.4 of this study present an analysis of the financial performance of the ITT providers and the environmental subgroup and of the 10 industry groups selected for comparison. Each of the ratios identified above was used in performing the analysis.

3.1 ANALYSIS OF SOLVENCY

Although solvency ratios are used most frequently to evaluate the financial performance of individual firms, such ratios also may be used to measure the overall ability of a group of firms to remain in business without substantial infusions of new equity, major liquidations of existing assets, or other significant changes in operations or corporate behavior. Solvency ratios evaluate the overall ability of firms to cover financing charges and debt exposures and can be used to determine the likelihood that those firms might experience a level of financial distress that could result in bankruptcy. When firms are not able to generate sufficient cash over the long term to satisfy current obligations, such as debts to suppliers or employees or current maturities of long-term debt, the operations of those firms are jeopardized. One indicator of solvency is the Z-score.

The Z-score, which was developed more than 30 years ago, provides a time-tested model for analyzing firms and determining the degree of financial duress under which they may be operating. On the basis of extensive testing and use, the Z-score is considered accurate for forecasting the financial failure of an individual firm for a period of as many as two years from the date of the financial data on which the Z-score is based.

The Z-score is a composite of five ratios used in evaluating financial performance. Within the composite, coefficients are used to weight each of the ratios to account for the relative significance of that ratio in

determining the likelihood of bankruptcy. The coefficients are fixed and are based on the continued use of the model over a period of approximately 30 years. The five ratios used in the Z-score are: (1) working capital to total assets, (2) retained earnings to total assets, (3) earnings before interest and taxes to total assets, (4) net worth[9] to total liabilities, and (5) sales to total assets. Figure 3-1 presents the equation used to calculate the Z-score.

FIGURE 3-1

EQUATION FOR ALTMAN'S Z-SCORE

$$\text{Z-score} = 0.717\left(\frac{\text{Working Capital}}{\text{Total Assets}}\right) + 0.847\left(\frac{\text{Retained Earnings}}{\text{Total Assets}}\right) + 3.107\left(\frac{\text{Earning Before Interest and Taxes}}{\text{Total Assets}}\right) + 0.420\left(\frac{\text{Net Worth}}{\text{Total Liabilities}}\right) + 0.998\left(\frac{\text{Sales}}{\text{Total Assets}}\right)$$

Data on net worth were available for a number of providers of ITTs that are privately held. However, data for retained earnings for those providers typically were not available from Dun and Bradstreet Information Services (D&B). To calculate the Z-score for those providers of ITTs that are privately held, financial data were obtained from Moody's Financial Information Service (FIS)[10] for those providers that are publicly held firms and used to determine the average percentage of the net worth of those firms that consisted of retained earnings for each year. It was determined that, in 1994, 1995, 1996, and 1997, those percentages were 73.4 percent, 64.4 percent, 69.7 percent, and 70.0 percent, respectively. Those percentages were applied to values of net worth for each provider that is privately held to derive estimated values of retained earnings for that provider.

Although data on net worth were available for each of the 10 industry groups selected for comparison, data on retained earnings were not provided by Robert Morris Associates, Inc. (RMA) in its Annual Statement Studies for those industry groups. To calculate Z-scores for those industry groups, financial data were obtained from Moody's FIS for publicly held companies that had SIC codes that matched those

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[9] Net worth also is known as stockholders' equity.

[10] Moody's FIS is located on the Internet at *http://fisonline.moodys.com.*

of the industry groups selected for comparison. The data were used to determine the average percentages of net worth that consisted of retained earnings for each year for each industry group. Table 3-1 presents those percentages. To derive estimated values of retained earnings for each industry group, the percentages listed were applied to the values of average net worth for each industry group for each year.

TABLE 3-1

AVERAGE PERCENTAGES OF NET WORTH THAT CONSIST OF RETAINED EARNINGS

Industry Group	SIC Code	Average Percentage of Net Worth That Consists of Retained Earnings (%)			
		1994	1995	1996	1997
Commercial Physical and Biological Research Industry	8731	-43.9	-38.6	-42.8	-48.9
Computer Integrated Systems Design Industry	7373	-32.6	-17.6	-13.5	-7.0
Testing Laboratories Industry	8734	-35.1	-26.2	-27.6	-36.6
Broadcasting and Communications Equipment Industry	3663	17.6	18.2	17.8	13.7
Electronic Components and Accessories Industry	3671	59.0	58.9	59.1	57.3
Electromedical and Electrotherapeutic Apparatus Industry	3845	33.3	30.3	25.9	16.9
Laboratory Analytical Instruments Industry	3826	56.0	57.7	56.7	46.8
Refuse Systems Industry	4953	68.3	66.4	55.8	32.5
Engineering Services Industry	8711	47.6	54.2	57.0	53.5
Petroleum Refining Industry	2911	87.5	86.5	85.9	85.8

In general, if the average Z-score of a group of firms is lower than 1.23, firms in that group would be considered likely to experience financial distress that could result in bankruptcy. An average Z-score higher than 2.90 indicates that a group of firms is healthy and that those firms are relatively strong financial performers. An average Z-score between 1.23 and 2.90 indicates that a group of firms is in a

"gray area." While firms in that group would not be likely to go bankrupt in the near future, they also would not be considered among the strongest of financial performers.[11]

Table 3-2 presents the average Z-scores of the ITT providers and the environmental subgroup for 1994 through 1997, compared with the average Z-scores of the 10 industry groups selected for comparison. From 1994 through 1996, the average Z-scores of the ITT providers indicated that those providers were stable and would not be likely to experience bankruptcy in the near future. In 1997, however, the average Z-score of the ITT providers indicated that those providers were, on average, strong financial performers and would be highly unlikely to go bankrupt in the near future. Overall, the data indicate that the position of solvency of the ITT providers improved significantly during the four-year period, with the average Z-score for those providers increasing from 2.11 in 1994 to 3.12 in 1997.

From 1994 through 1997, the average Z-scores of the environmental subgroup also indicated the providers in that subgroup were stable, on average, and would not be likely to experience bankruptcy in the near future. However, the average Z-scores of the environmental subgroup were significantly lower than those of the ITT providers throughout the four-year period. Further, the data indicate that the average position of solvency of the providers in the environmental subgroup declined overall during the four-year period.

In 1994, the average Z-score values of the ITT providers were superior to those of firms in SIC codes 8731, 8734, and 4953, respectively. In 1995, the average Z-score values of the ITT providers were superior to those of firms in SIC codes 8731, 8734, 3845, and 4953, respectively. In 1996, the relative solvency position of the ITT providers improved significantly, with only the average Z-scores of those firms in SIC codes 3671, 8711, and 2911 remaining higher than that of the ITT providers during that year. By 1997, the solvency position of the ITT providers had improved even more. However, the average Z-scores of those firms in SIC codes 3663, 8711, and 2911 were superior to that of the ITT providers during that year. From 1994 through 1997, the average Z-score values of the environmental subgroup were consistently lower than those of each of the industry groups selected for comparison, indicating a relatively inferior position of solvency throughout the four-year period.

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[11] For this analysis, a Z-score was used to evaluate the position of solvency of groups of firms rather than individual firms. Because the coefficients used in the Z-score were derived from data on individual firms, rather than aggregated data of groups of firms, it can be argued that the design of the Z-score lends itself best to the evaluation of the financial performance of individual firms rather than groups of firms. While the use of Z-score to evaluate the position of solvency of a group of firms is somewhat unconventional, it is believed that an analysis of industry data performed through the use of the Z-score offers insight into the overall solvency of a group of firms. Because financial data useful for comparison with the ITT providers and the environmental subgroup were available only on the industry level, the adaptation of the Z-score and its associated thresholds is merited.

TABLE 3-2

AVERAGE Z-SCORE VALUES - ITT PROVIDERS, ENVIRONMENTAL SUBGROUP, AND SELECTED INDUSTRY GROUPS
1994 - 1997

Groups of Firms	SIC Code	Average Z-Score Values			
		1994	1995	1996	1997
ITT Providers[12]	None	2.11	2.27	2.50	3.12
Environmental Subgroup[13]	None	1.60	1.63	1.60	1.32
Commercial Physical and Biological Research Industry	8731	1.75	1.87	2.11	2.02
Computer Integrated Systems Design Industry	7373	2.44	2.44	2.50	2.55
Testing Laboratories Industry	8734	2.01	2.01	2.00	2.00
Broadcasting and Communications Equipment Industry	3663	2.41	2.50	2.49	3.83
Electronic Components and Accessories Industry	3671	2.61	2.67	2.65	2.67
Electro Medical and Electrotherapeutic Apparatus Industry	3845	2.23	2.12	1.89	1.77
Laboratory Analytical Instruments Industry	3826	2.77	2.31	2.30	2.28
Refuse Systems Industry	4953	1.69	1.96	1.72	1.75
Engineering Services	8711	3.23	3.46	3.98	3.62
Petroleum Refining Industry	2911	3.99	3.19	3.83	3.81

[12] Data for 24 of the 62 ITT providers were available to calculate the Z-score for the ITT providers group for 1994, data for 29 providers were available to calculate the Z-score for the ITT providers group for 1995, data for 37 providers were available to calculate the Z-score for the ITT providers group for 1996, and data for 40 providers were available to calculate the Z-score for the ITT providers group for 1997. Appendix C of this study presents the Z-scores of each of the ITT providers for 1994 through 1997.

[13] Data for 14 providers were available to calculate Z-scores for the environmental subgroup for 1994 through 1997. Appendix D of this study presents the Z-scores of each provider in the environmental subgroup for 1994 through 1997.

3.2 ANALYSIS OF PROFITABILITY

Profitability ratios reflect the performance of a group of firms, as measured by the average returns on resources realized by those firms in conducting business operations. One accepted measure of profitability is the ROA ratio. The ROA ratio is defined as net income[14] divided by total assets. The ROA ratio measures the productivity or efficiency of firms' use of assets to derive profit. Depending on economic conditions, ROA ratio values of less than 0.06 generally are considered a sign of insufficient long-term profitability.[15]

Data on profit before tax were available for each of the 10 industry groups selected for comparison. However, the RMA Annual Statement Studies did not provide data on net income after tax for those industry groups. To derive estimated values for net income after tax and calculate ROA ratio values for those industry groups, a marginal corporate tax rate of 34 percent[16] was applied to the values of profit before tax for each industry group for each year. The values of profit before tax minus 34 percent of those values were used as the estimated values of net income after tax for each industry group for each year.

Table 3-3 presents the average ROA ratio values of the ITT providers and the environmental subgroup for 1994 through 1997, compared with average ROA ratio values of the 10 industry groups selected for comparison. The average ROA ratio value of the ITT providers was negative in 1994, indicating that those providers were not profitable, on average, during that year. The ROA ratio values of the ITT providers for 1995, 1996, and 1997 were positive, however, indicating that those providers did realize profits, on average, during those years. Each of the average ROA ratio values for the ITT providers for 1994 through 1996 was lower than the generally accepted ratio threshold value of 0.06, indicating that the profitability of those providers may have been substandard, on average, during those years. In 1997, however, the average ROA ratio value for the ITT providers was equal to the threshold value, indicating that those providers may have been adequately profitable, on average, during that year. Overall, the profitability of the ITT providers improved significantly during the four-year period, with the average ROA ratio value of those providers increasing from -0.02 in 1994 to 0.06 in 1997.

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[14] Net income also is known as "profit after tax."

[15] Beaver, W.H. 1966. "Financial Ratios as Predictors of Failure: Emperical Research in Accounting: Selected Studies." *Supplement to Journal of Accounting Research.* Pages 77-111.

[16] Brealey, R.A. and S.C. Myers. 1991. *Principles of Corporate Finance, Fourth Edition.* McGraw-Hill, Inc. New York. Page 422.

TABLE 3-3

AVERAGE ROA RATIO VALUES - ITT PROVIDERS, ENVIRONMENTAL SUBGROUP, AND SELECTED INDUSTRY GROUPS
1994 - 1997

Industry Group	SIC Code	Average ROA Ratio Values			
		1994	1995	1996	1997
ITT Providers[17]	None	-0.02	0.01	0.03	0.06
Environmental Subgroup[18]	None	-0.03	-0.01	-0.01	-0.02
Commercial Physical and Biological Research Industry	8731	0.03	0.04	0.05	0.06
Computer Integrated Systems Design Industry	7373	0.06	0.06	0.05	0.05
Testing Laboratories Industry	8734	0.06	0.07	0.06	0.05
Broadcasting and Communications Equipment Industry	3663	0.06	0.06	0.07	0.05
Electronic Components and Accessories Industry	3671	0.06	0.07	0.07	0.06
Electro Medical and Electrotherapeutic Apparatus Industry	3845	0.03	0.05	0.04	0.01
Laboratory Analytical Instruments Industry	3826	0.06	0.05	0.06	0.04
Refuse Systems Industry	4953	0.05	0.06	0.07	0.05
Engineering Services Industry	8711	0.07	0.07	0.07	0.07
Petroleum Refining Industry	2911	0.06	0.05	0.03	0.06

From 1994 through 1997, the average ROA ratio values of the environmental subgroup were consistently negative, indicating that providers in that subgroup were not profitable, on average, during those years. The average ROA ratio values of the environmental subgroup also were consistently lower than those of

[17] Data for 38 of the 62 ITT providers were available to calculate the ROA ratio for the ITT providers group for 1994, data for 43 providers were available to calculate the ROA ratio for the ITT providers group for 1995, data for 43 providers were available to calculate the ROA ratio for the ITT providers group for 1996, and data for 42 providers were available to calculate the ROA ratio for the ITT financial providers group for 1997. Appendix C of this study presents the ROA ratio values of each ITT provider for 1994 through 1997.

[18] Data for 22 ITT providers were available to calculate ROA ratio values for the environmental subgroup for 1994 through 1997. Appendix D of this study presents the ROA ratio values of each provider in the environmental subgroup for 1994 through 1997.

the ITT providers from 1994 through 1997, indicating that providers in the ITT financial environmental subgroup were less profitable, on average, than the ITT providers during that four-year period.

From 1994 through 1996, the average ROA ratio values of the ITT providers were lower than or equal to those of each of the 10 industry groups selected for comparison. In 1997, however, the average ROA ratio value of the ITT providers was equal to or higher than the average ROA ratio values of firms in SIC codes 8731, 7373, 8734, 3663, 3671, 3845, 3826, and 4953. Overall, the trend indicates that the profitability of the ITT providers may have improved during the four-year period, relative to that of the 10 industry groups selected for comparison. From 1994 through 1997, the average ROA ratio values of the environmental subgroup were consistently negative and lower than the average ROA ratio values of each of the industry groups selected for comparison. The ratios indicate that the ITT providers in the environmental subgroup were consistently less profitable, on average, than firms in each of the 10 industry groups selected for comparison.

3.3 ANALYSIS OF LEVERAGE

Leverage ratios provide information about the extent of debt in the capital structures of groups of firms. A high degree of indebtedness indicates a high probability of credit risk and default, as well as substantial costs to service debt (for example, fees and payments of principal and interest required by creditors). Chronically high leverage may result in solvency problems because firms may not be able to repay borrowed funds over the long term. A standard indicator of the leverage position of firms is the DAR.

The DAR is defined as total liabilities divided by total assets. The DAR is one measure of the extent of debt present in the capital structures of firms and indicates whether those firms can incur new debt obligations safely. Generally, a DAR higher than 0.65 indicates that groups of firms may be overly leveraged and unable to assume new debt safely. From a solvency perspective, a DAR higher than 0.65 also may indicate that firms may not be able to meet existing debt obligations.[19] A DAR value of 1.0 or higher indicates that groups of firms have, on average, zero or negative equity, because the combined liabilities of such firms equal or exceed their combined assets.

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[19] Beaver, W.H. 1968. "Alternative Accounting Measures as Predictors of Failure." *Accounting Review.* Pages 113-122.

It is difficult to establish any direct link between DAR values and confidence on the part of the lender community in any particular firm or group of firms because the processes by which financial institutions determine whether to lend funds include analyses of many factors. On the one hand, a high DAR value might be interpreted as a sign of high confidence on the part of the lender community because firms cannot become highly leveraged unless lenders are willing to issue them loans. On the other hand, the financial community might interpret high DAR values as indicators that such firms are less likely to be able to assume new debt obligations safely. Under such circumstances, firms may be perceived as higher risks for loans, lender confidence may decrease, and the standards adopted to underwrite new debt for such firms will tend to tighten. Even firms that are marginal financial performers may be able to secure loans at high rates of interest or by posting excessive collateral. High positions of leverage therefore do not necessarily indicate increased lender confidence. Confidence on the part of lenders tends to be communicated most clearly by the underwriting standards adopted by the lender community in issuing loans, rather than by decisions about whether to lend funds at all.

Table 3-4 presents the DAR values of the ITT providers and the environmental subgroup for 1994 through 1997, compared with average DAR values of the 10 industry groups selected for comparison. In 1995, the DAR value of the ITT providers was higher than the generally accepted ratio threshold value of 0.65. That circumstance indicates that the ITT providers may have been highly leveraged, on average, during that year. In 1994, 1996, and 1997, however, the DAR values of the ITT providers were lower than the generally accepted ratio threshold of 0.65, indicating that the ITT providers were not overly leveraged, on average during those years. The ratios indicate that the position of leverage of the ITT providers did not change, overall, during the four-year period, with the average DAR values of those providers 0.63 in both 1994 and 1997.

In 1994 and 1995, the average DAR values of the environmental subgroup were lower than the generally accepted ratio threshold value of 0.65. That circumstance indicates that those providers were not overly leveraged, on average, during those years. In 1996, the average DAR value of the environmental subgroup was equal to the threshold value of 0.65, indicating that those providers were fully leveraged, on average, during that year. In 1997, the DAR value of the environmental subgroup was higher than the threshold value, indicating that those providers may have been overly leveraged, on average, during that year.

TABLE 3-4

AVERAGE DAR VALUES - ITT PROVIDERS, ENVIRONMENTAL SUBGROUP, AND SELECTED INDUSTRY GROUPS
1994 - 1997

Industry Group	SIC Code	Average DAR Values			
		1994	1995	1996	1997
ITT Providers[20]	None	0.63	0.67	0.61	0.63
Environmental Subgroup[21]	None	0.59	0.64	0.65	0.73
Commercial Physical and Biological Research Industry	8731	0.54	0.57	0.54	0.51
Computer Integrated Systems Design Industry	7373	0.62	0.65	0.62	0.63
Testing Laboratories Industry	8734	0.54	0.58	0.62	0.62
Broadcasting and Communications Equipment Industry	3663	0.50	0.51	0.47	0.46
Electronic Components and Accessories Industry	3671	0.53	0.56	0.58	0.58
Electro Medical and Electrotherapeutic Apparatus Industry	3845	0.42	0.48	0.60	0.56
Laboratory Analytical Instruments Industry	3826	0.38	0.55	0.58	0.51
Refuse Systems Industry	4953	0.65	0.65	0.63	0.68
Engineering Services Industry	8711	0.60	0.60	0.60	0.60
Petroleum Refining Industry	2911	0.61	0.65	0.63	0.60

In 1994 and 1995, the DAR values of the environmental subgroup were lower than those of the ITT providers, indicating that the ITT providers were more highly leveraged than the environmental subgroup during those years. In 1996 and 1997, however, the DAR values of the environmental subgroup were

[20] Data for 47 of the 62 ITT providers were available to calculate the DAR for the ITT providers group for 1994, data for 54 providers were available to calculate the DAR for the ITT providers group for 1995, data for 52 providers were available to calculate the DAR for the ITT providers group for 1996, and data for 52 providers were available to calculate the DAR for the ITT providers group for 1997. Appendix C of this study presents the DAR values of each ITT provider for 1994 through 1997.

[21] Data for 27 ITT providers were available to calculate DAR values for the environmental subgroup for 1994 through 1997. Appendix D of this study presents the DAR values of each ITT provider in the environmental subgroup for 1994 through 1997.

higher than those of the ITT providers, indicating that the ITT providers were less highly leveraged than the environmental subgroup during those years. In addition, the ratios indicate that the environmental subgroup became increasingly leveraged during the four-year period, with the average DAR values of that subgroup increasing from 0.59 in 1994 to 0.73 in 1997.

In 1994, only the average DAR value of those firms in SIC code 4953 was higher than that of the ITT providers. The ratios indicate that, in 1994, the ITT providers were more highly leveraged than all but one of the industry groups selected for comparison. In 1995, the average DAR value of the ITT providers was higher than that of each of the 10 industry groups selected for comparison. The ratios indicate that, in 1995, the ITT providers were more highly leveraged than all but one of the industry groups selected for comparison. In 1996, however, the average DAR values of those firms in SIC codes 7373, 8734, 4953, and 2911 were higher than the DAR value of the ITT providers. Further, in 1997, the average DAR values of those firms in SIC codes 7373 and 4953 were equal to or higher than the average DAR value of the ITT providers. The ratios indicate that the position of leverage of the ITT providers improved during the four-year period, but only in relation to the positions of leverage of certain other industry groups.

In 1994, the DAR value of the environmental subgroup was higher than the average DAR values of those firms in SIC codes 8731, 8734, 3663, 3671, 3845, and 3826, indicating that the environmental subgroup was more highly leveraged than those industry groups during that year. In 1995, the DAR value of the environmental subgroup was higher than the average DAR values of those firms in SIC codes 8731, 8734, 3663, 3671, 3845, 3826, and 8711, indicating that the environmental subgroup was more highly leveraged than those industry groups during that year. In 1996 and 1997, the DAR values of the environmental subgroup were higher than those of each of the 10 industry groups selected for comparison. Those values indicate that, during those years, the environmental subgroup was more highly leveraged than each of the industry groups selected for comparison. Overall, the ratios indicate that the environmental subgroup became more highly leveraged during the four-year period, with the DAR value for that subgroup increasing from 0.59 in 1994 to 0.73 in 1997.

3.4 ANALYSIS OF LIQUIDITY

Liquidity ratios measure the ability of groups of firms to meet short-term liabilities, using current assets such as cash. Groups of firms that demonstrate poor overall liquidity may include firms that have difficulty meeting short-term liabilities, such as payroll, cost of supplies, and current maturities of long-term debt. A representative indicator of the average liquidity of groups of firms is the CR.

The CR is defined as current assets divided by current liabilities. The CR measures assets that are available to pay expected short-term liabilities.[22] In general, a CR value that is higher than 3.0 indicates that groups of firms have on hand more than adequate current assets, on average, to meet short-term financial requirements. A CR value in the range of 2.0 to 3.0 usually indicates that sufficient resources are available to meet expected short-term liabilities. A CR value of less than 2.0 may signify potential liquidity problems.[23]

Table 3-5 presents the CR values of the ITT providers and the environmental subgroup for 1994 through 1997, compared with CR values for the 10 industry groups selected for comparison. From 1994 through 1997, the CR values of both the ITT providers and the environmental subgroup consistently were higher than the generally accepted ratio threshold value of 2.0, indicating a strong position of liquidity for those groups throughout the four-year period. The CR values indicate that, on average, from 1994 through 1997, both the ITT providers and the environmental subgroup had sufficient cash on hand to meet short-term financial requirements.

From 1994 through 1996, the CR values of the environmental subgroup were lower than those of the ITT providers, indicating that the ITT providers were more liquid, on average, than the environmental subgroup, during those years. In 1997, however, the CR value of the environmental subgroup was higher than that of the ITT providers, indicating that the ITT providers were less liquid, on average, than the environmental subgroup, during that year. The data indicate that both the ITT providers and the environmental subgroup became increasingly liquid during the four-year period, with the CR value of the ITT providers increasing from 2.3 in 1994 to 2.6 in 1997 and that of the environmental subgroup from 2.1 to 3.0.

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[22] For this analysis, short-term liabilities are those liabilities that must be met within a period of one year or less.

[23] Beaver, W.H. 1966. "Financial Ratios as Predictors of Failure; Empirical Research in Accounting: Selected Studies." *Supplement to Journal of Accounting Research.* Pages 77-111.

TABLE 3-5

AVERAGE CR VALUES - ITT PROVIDERS, ENVIRONMENTAL SUBGROUP, AND SELECTED INDUSTRY GROUPS
1994 - 1997

Industry Group	SIC Code	Average CR Values			
		1994	1995	1996	1997
ITT Providers[24]	None	2.3	2.6	2.4	2.6
Environmental Subgroup[25]	None	2.1	2.5	2.3	3.0
Commercial Physical and Biological Research Industry	8731	1.7	1.6	1.6	1.7
Computer Integrated Systems Design Industry	7373	1.5	1.4	1.5	1.5
Testing Laboratories Industry	8734	1.7	1.5	1.4	1.4
Broadcasting and Communications Equipment Industry	3663	1.9	2.0	2.2	2.2
Electronic Components and Accessories Industry	3671	1.8	1.7	1.7	1.7
Electro Medical and Electrotherapeutic Apparatus Industry	3845	2.3	2.0	1.7	2.0
Laboratory Analytical Instruments Industry	3826	2.6	1.8	1.7	2.0
Refuse Systems Industry	4953	1.1	1.0	1.1	1.0
Engineering Services	8711	1.6	1.6	1.5	1.5
Petroleum Refining Industry	2911	1.2	1.2	1.3	1.3

In 1994, the average CR values of firms in SIC codes 3845 and 3826 were equal to or higher than those of both the ITT providers and the environmental subgroup, indicating that those firms were more liquid, on average, than both the ITT providers and the environmental subgroup during that year. From 1995

[24] Data for 47 of the 62 ITT providers were available to calculate the CR value for the ITT providers group for 1994, data for 54 providers were available to calculate the CR value for the ITT providers group for 1995, data for 52 providers were available to calculate the CR value for the ITT providers group for 1996, and data for 52 providers were available to calculate the CR value for the ITT providers group for 1997. Appendix C of this study presents the CR values of each ITT provider for 1994 through 1997.

[25] Data for 27 ITT providers were available to calculate CR values of the environmental subgroup for 1994 through 1997. Appendix D of this study presents the DAR values of each ITT provider in the environmental subgroup for 1994 through 1997.

through 1997, however, the CR values of both the ITT providers and the environmental subgroup were consistently higher than the average CR values of each of the 10 industry groups selected for comparison. Overall, the ratios indicate that the ITT providers and the environmental subgroup were more liquid during the four-year period than each of the 10 industry groups selected for comparison.

3.5 SUMMARY OF FINANCIAL PERFORMANCE ANALYSES

In summary, the above analyses indicate that:

- While the financial performance of the ITT providers improved from 1994 through 1997, the financial performance of the environmental subgroup generally remained the same or worsened during that period of time.
- Much of the financial success of the ITT providers appears to be attributable to the strong performance of those providers that are not environmental firms.
- While many ITTs are being marketed by providers that are strong financial performers, those providers tend to be engaged in lines of business that are highly diversified; they do not focus primarily on providing environmental products or services.
- While the financial performance of the ITT providers tends to be comparable to or, in certain cases, superior to that of selected industry groups, the financial performance of the environmental subgroup tends to be inferior to that of most of the industry groups selected for comparison.

4.0 PROFILE OF STOCK PERFORMANCE OF ITT PROVIDERS

In deciding whether or not to invest in the stocks of particular companies, investors rely heavily on analysis of ratios and other measures of financial performance. In making such decisions, investors collectively and continuously redefine the market values of each firm for which stock is publicly traded. For this study, "market value" is defined as the number of shares of stock of a firm that are outstanding, multiplied by the price per share of that stock. From year to year, the market value of a firm fluctuates according to the price of its stock. Market value reflects the collective opinion of investors about the value of a firm and indicates its total worth. Issuances and splits of stocks usually do not affect the actual market values of firms in any significant way. For example, if a stock is split on a two-for-one basis, the price of each share of stock drops to 50 percent of its price before the split. However, because the number of shares of stock that are outstanding doubles, the market value of the firm issuing those shares does not change.

For this study, analyses of market values were conducted for all the providers of ITTs in VISITT that are publicly traded firms and for which data on market value were readily available. Such data were obtained for a total of 19 publicly held providers that had ITTs listed in Version 6.0 of VISITT. For the market value analyses presented in this study, those 19 firms are referred to collectively as "the ITT providers." Because the business operations of many ITT providers are not focused primarily on environmental products or services, a second group was created. The second group, referred to as "the environmental subgroup" is defined as the 13 publicly traded firms in VISITT whose operations focus primarily on environmental lines of business and for which data on market value were readily available. The 19 ITT providers analyzed are listed below. The 13 firms in the environmental subgroup are identified by asterisks.

1. ATC Group Services, Inc.*
2. Aqua Alliance Corporation*
3. Baker Hughes, Inc.
4. Cadmus Communications Corporation
5. Dames & Moore Group*
6. Dow Chemical Company
7. Envirogen, Inc.*
8. Ionics, Inc.*
9. Morrison Knudsen Corporation*
10. Monsanto Company
11. OHM Corporation*
12. Quality Systems, Inc.
13. Roy F. Weston, Inc.*
14. Sevenson Environmental Services, Inc.*
15. Texaco, Inc.
16. The IT Group, Inc.*
17. Thermo Tech Technologies, Inc.*
18. Waste Management, Inc.*
19. Waste Technology Corporation*

The performances of both the ITT providers and the environmental subgroup, in terms of market value, were compared with those of eight stock price indices covering specific industries that S&P generates, as follows:

1. Biotechnology
2. Services (Computer Systems)
3. Communication Equipment
4. Electronics (Instrumentation)
5. Health Care (Medical Products and Supplies)
6. Waste Management
7. Engineering and Construction
8. Petroleum Refining

In addition, the performances of both the ITT providers and the environmental subgroup, in terms of market value, were compared with those of 12 segments of the environmental industry identified by the *Environmental Business Journal* (EBJ), as follows:

1. Solid Waste
2. Water Treatment
3. Instrument Manufacturing
4. Water Utilities
5. Remediation
6. Waste Management Equipment
7. Process/Prevention Equipment
8. Resource Recovery
9. Environmental Energy
10. Air Pollution Control
11. Consulting and Engineering
12. Hazardous Waste

The analysis indicates that the market value of the ITT providers increased by approximately 69 percent from the beginning of 1994 to the end of 1997. The analysis also indicates, however, that: 1) the increase was primarily the result of the increase in the market value of only a handful of very large firms and 2) the performance of the ITT providers paled in comparison with that of the S&P 500 Index, which increased by approximately 108 percent during that period of time. The analysis indicates that, in terms of growth in market value, there is a marked difference between the performance of the ITT providers and that of the environmental subgroup. The analysis shows that, in contrast to the overall increase in market value of the ITT providers, and the more than doubling of the S&P 500 Index, the collective market value of the environmental subgroup decreased by approximately 4.4 percent from the beginning of 1994 to the end of 1997.

The analysis indicates that the performance of the stocks of those providers that are not "environmental" firms tends to be better, on average, than the performance of the stocks of those providers whose operations focus primarily on environmental lines of business. The analysis also indicates that there is a strong correlation between the poor financial performance of the environmental subgroup and the negative performance of that subgroup in terms of change in market value. Overall, the performance of the stocks of the environmental subgroup reflects the poor performance of the environmental industry from 1994 through 1997.

The analysis indicates that, in terms of growth in market value, most of the S&P indices selected for comparison significantly outperformed the ITT providers. However, the analysis also shows that the ITT

providers outperformed the waste management, engineering and construction, and petroleum refining industries from the beginning of 1994 to the end of 1997. In contrast, the analysis indicates that, in terms of growth in market value, each of the industry groups selected for comparison outperformed the environmental subgroup.

The data indicate that, in terms of growth in market value, the ITT providers outperformed the combined growth of the 12 segments identified by EBJ. In addition, the analysis indicates that, in terms of growth in market value, the ITT providers outperformed 8 of the 12 individual segments. The instrument manufacturing, water utilities, remediation, and process/prevention equipment segments outperformed the ITT providers. In contrast, the data indicate that, in terms of growth in market value, most of the 12 segments outperformed the environmental subgroup.

Sections 4.1 and 4.2 of this study present analyses of the market values of the ITT providers and the environmental subgroup, respectively. Section 4.3 presents a comparison of trends for the ITT providers and the environmental subgroup in terms of growth in market value and financial performance. Section 4.4 presents a comparison of the performances of the ITT providers and the environmental subgroup in terms of growth in market value with that of stock price indices that cover specific industries. Finally, Section 4.5 presents a comparison of the performances of the ITT providers and the environmental subgroup in terms of growth in market value with that of various segments of the environmental industry.

4.1 MARKET VALUE OF THE ITT PROVIDERS

Table 4-1 presents the market values, and the annual and net percentage changes in market values, of the ITT providers for each year from the beginning of 1994 through the end of 1997. The providers are listed in order of net change in market value from 1993 through 1997. For comparison of performance, Table 4-1 also presents the annual percentage changes in the market values of the ITT providers and the firms included in the S&P 500 Index from 1994 through 1997. The data indicate that the market value of the ITT providers increased by approximately $40,667 million (or 69 percent) from $59,097 million at the beginning of 1994 to $99,764 million at the end of 1997. Despite that seemingly large increase, however, the data also show that, in terms of growth in market value, the performance of the ITT providers from the beginning of 1994 through the end of 1997 paled in comparison to that of the S&P 500 Index, which increased by approximately 108 percent during that period of time.

TABLE 4-1

MARKET VALUE OF THE ITT PROVIDERS, 1994 - 1997

Company/Index	January 1, 1994 ($)[26]	1994 (year-end)		1995 (year-end)		1996 (year-end)		1997 (year-end)		Net Change 1994-1997 ($)[26]	Percent Change 1994 - 1997
		($)[26]	(%)	($)[26]	(%)	($)[26]	(%)	($)[26]	(%)		
Monsanto	8,707	8,197	-5.9	14,120	72.3	22,860	61.9	24,905	8.9	16,198	186.0
Texaco	16,770	15,536	-7.4	20,733	33.5	25,950	25.2	29,756	14.7	12,986	77.4
Dow Chemical	15,557	18,635	19.8	18,390	-1.3	19,044	3.6	23,015	20.9	7,458	47.9
Baker Hughes	2,808	2,573	8.4	3,442	33.8	4,987	44.9	7,386	48.1	4,578	163.0
Ionics	344	437	27.0	611	39.8	759	24.2	657	-13.4	313	91.0
Cadmus	85	94	10.6	203	116.0	122	39.9	160	31.1	75	88.2
ATC Group	23	53	130.4	88	66.0	100	13.6	93	7.0	70	304.3
OHM Corp.	173	133	23.1	196	47.4	226	15.3	209	-7.5	35	20.2
Quality Systems	12	15	25.0	133	786.7	43	-67.7	43	0.0	32	266.7
Thermo Tech	10	13	30.0	28	115.4	17	39.3	34	100.0	24	240.0
Envirogen	21	10	-52.4	19	90.0	43	126.3	35	18.6	14	66.7
Waste Technology	3	3	0.0	7	133.3	4	-42.9	3	-25.0	-1	-33.3
Roy F. Weston	59	42	-28.9	38	-9.5	26	-31.6	31	19.2	-28	-47.5
IT Group	126	111	-11.9	99	-10.8	77	-22.2	73	-5.2	-53	-42.1
Sevenson	92	106	15.2	110	3.8	115	4.5	32	-72.2	-60	-65.2
Dames & Moore	400	328	-18.0	275	-16.2	319	16.0	239	-25.1	-161	-40.2
Waste Management	12,746	12,641	-0.8	14,475	14.5	15,766	8.9	12,513	-20.6	-233	-1.8
Morrison Knudsen	790	421	-46.7	148	-64.8	483	226.4	529	9.5	-261	-33.0
Aqua Alliance	372	191	-48.7	196	2.6	200	2.0	52	-74.0	-320	-86.0
ITT Providers	**59,097**	**59,539**	**0.7**	**73,311**	**23.1**	**91,141**	**24.3**	**99,764**	**9.5**	**40,667**	**68.8**
S&P 500 Index	**466**	**459**	**-1.5**	**616**	**34.2**	**741**	**20.3**	**970**	**30.9**	**504**	**108.2**

[26] Market value amounts are expressed in millions.

While the total market value of the ITT providers increased from the beginning of 1994 to the end of 1997, further analyses of the data indicate that the increase was primarily the result of the increase in market value of only a handful of very large providers. As Table 4-1 shows, the largest ITT providers, in terms of market value, are Baker Hughes, Dow Chemical, Monsanto, Texaco, and Waste Management. In 1997, the combined market value of those providers was approximately $97,575 million, representing 97.8 percent of the total market value of the ITT providers as a whole. Table 4-2 compares the data on market value for the ITT providers with the data for only the five providers identified above, and for the ITT providers without those five providers. For reference and comparison, Table 4-2 also presents the annual percentage changes in the S&P 500 Index from 1994 through 1997.

The data indicate that, from the beginning of 1994 to the end of 1997, the combined market value of the five largest ITT providers increased by $40,987 million, or 72.4 percent, and accounted for almost all of the growth in market value of the ITT providers during that period of time. The data also indicate that the combined market value of the remaining 15 ITT providers actually declined by $320 million, or 12.7 percent, from 1994 through 1997, again a period during which the S&P 500 Index more than doubled.

4.2 MARKET VALUE OF THE ENVIRONMENTAL SUBGROUP

Table 4-3 presents the market values, and the annual and net and percentage changes in market values, of the environmental subgroup from the beginning of 1994 through the end of 1997. The providers in the subgroup are listed in order of net change in market value from the beginning of 1994 to the end of 1997. For comparison of performance, Table 4-3 also presents the annual percentage changes in the market values of the ITT providers and the S&P 500 Index from 1994 through 1997. Because Waste Management, Inc. is such a large provider, data on its market value overwhelm those of the remaining providers in the environmental subgroup. For that reason, the performance of the environmental subgroup is measured both with and without data on Waste Management.

The data indicate that, in contrast to the overall growth in market value of the ITT providers and the more than doubling of the S&P 500 Index, the market value of the environmental subgroup decreased by approximately $660 million (or 4.4 percent) from $15,159 million at the beginning of 1994 to $14,499 million at the end of 1997. When the market value data on Waste Management are removed from the analysis, the performance of the environmental subgroup appears worse still, with the market value of the subgroup decreasing by 17.7 percent, overall, from $2,413 million at the start of 1994 to approximately $1,986 million at the end of 1997. In total, the data appear to indicate that there is a strong correlation between the poor financial performance of the environmental subgroup, as discussed in Section 3.0 of this study, and the negative performance of the providers

TABLE 4-2

MARKET VALUES OF THE ITT PROVIDERS BOTH WITH AND WITHOUT THE LARGEST PROVIDERS
1994 - 1997

Group of Firms	January 1, 1994 ($)[27]	1994 (year end)		1995 (year end)		1996 (year end)		1997 (year end)		Net Change 1994-1997 ($)[27]	Percent Change 1994 - 1997
		($)[27]	(%)	($)[27]	(%)	($)[27]	(%)	($)[27]	(%)		
ITT Providers	59,097	59,539	7.0	73,311	23.1	91,141	24.3	99,764	9.5	40,667	68.8
Five Largest ITT Providers	56,588	57,582	1.8	71,160	23.6	88,607	24.5	97,575	10.1	40,987	72.4
ITT Providers Without the Five Largest Providers	2,509	1,957	-22.0	2,151	9.9	2,534	17.8	2,189	-13.6	-320	-12.7
S&P 500 Index	466	459	-1.5	616	34.2	741	20.3	970	30.9	504	108.2

[27] Market value amounts are expressed in millions.

TABLE 4-3

MARKET VALUE OF THE ENVIRONMENTAL SUBGROUP, 1994 - 1997

Company/Index	January 1, 1994 ($)[28]	1994 (year end)		1995 (year end)		1996 (year end)		1997 (year end)		Net Change 1994-1997 ($)[28]	Percent Change 1994 - 1997
		($)[28]	(%)	($)[28]	(%)	($)[28]	(%)	($)[28]	(%)		
Ionics	344	437	27.0	611	39.8	759	24.2	657	-13.4	313	91.0
ATC Group	23	53	130.4	88	66.0	100	13.6	93	7.0	70	304.3
OHM Corp.	173	133	23.1	196	47.4	226	15.3	209	-7.5	35	20.2
Thermo Tech Technologies	10	13	30.0	28	115.4	17	39.3	34	100.0	24	240.0
Envirogen	21	10	-52.4	19	90.0	43	126.3	35	18.6	14	66.7
Waste Technology	3	3	0.0	7	133.3	4	-42.9	3	-25.0	-1	-33.3
Roy F. Weston	59	42	-28.9	38	-9.5	26	-31.6	31	19.2	-28	-47.5
IT Group	126	111	-11.9	99	-10.8	77	-22.2	73	-5.2	-53	-42.1
Sevenson	92	106	15.2	110	3.8	115	4.5	32	-72.2	-60	-65.2
Dames & Moore	400	328	-18.0	275	-16.2	319	16.0	239	-25.1	-161	-40.2
Waste Management	12,746	12,641	-0.8	14,475	14.5	15,766	8.9	12,513	-20.6	-233	-1.8
Morrison Knudsen	790	421	-46.7	148	-64.8	483	226.4	529	9.5	-261	-33.0
Aqua Alliance	372	191	-48.7	196	2.6	200	2.0	52	-74.0	-320	-86.0
Environmental Subgroup	**15,159**	**14,490**	**-4.4**	**16,290**	**12.4**	**18,134**	**11.3**	**14,499**	**-20.0**	**-660**	**-4.0**
Environmental Subgroup (without Waste Management)	**2,413**	**1,849**	**-23.4**	**1,815**	**-1.8**	**2,368**	**30.5**	**1,986**	**-16.1**	**-427**	**-17.7**
ITT Providers	**59,097**	**59,539**	**0.7**	**73,311**	**23.1**	**91,141**	**24.3**	**99,764**	**9.5**	**40,667**	**68.8**
S&P 500 Index	**466**	**459**	**-1.5**	**616**	**34.2**	**741**	**20.3**	**970**	**30.9**	**504**	**108.2**

[28] Market value amounts are expressed in millions.

in that subgroup in terms of market value. In addition, the data indicate that the performance of the stocks of those providers that are not "environmental" firms tends to be better, on average, than the performance of those providers whose operations focus primarily on environmental lines of business.

The poor performance of the environmental subgroup reflects the overall poor performance of firms in the environmental industry as a whole (see Section 4.1). From the perspective of market value, the period of time evaluated in the study (the beginning of 1994 to the end of 1997) was perhaps the period of worst performance ever by the environmental industry. Even during that period of generally poor performance, however, certain providers of ITTs demonstrated growth, both in financial performance and in market value. Despite the overall poor performance of the environmental industry, therefore, the presence of such providers demonstrates that, from the perspective of market value, there were some significant success stories among providers of ITTs during that four-year period.

4.3 COMPARISON OF TRENDS IN MARKET VALUE AND FINANCIAL PERFORMANCE

Absent other factors of market psychology, financial performance is the key element that investors typically evaluate to determine the market values of firms. If trends in financial performance do not correspond to trends in changes in market value, the behavior of the market may indicate that, in the minds of investors, criteria other than the financial performance of the firms involved may have supplanted financial performance as the basis for determining market value. Recently, for example, because of investors' expectations of future earnings, the market values of some Internet-based firms have risen significantly despite the fact that several of those firms have yet to demonstrate a profit.

The solvency positions of firms are of particular interest to investors because, regardless of the potential future performance of a firm, investors may be reluctant to invest in it if it is financially unstable or likely to experience bankruptcy. The analysis described below was performed to determine whether the performance of the ITT providers in terms of growth in market value corresponds to the solvency positions of those providers or whether factors other than solvency might have been at work in establishing their market values. As discussed in Section 3.0 of this study, the Z-score is a measure commonly used to assess the solvency positions of firms. The analysis therefore attempts to compare the trends for the Z-scores of the ITT providers with those for their market values from the beginning of 1994 to the end of 1997.

Table 4-4 presents the Z-scores and market values for the ITT providers and the environmental subgroup from 1994 through 1997 and identifies the trends for each of those indicators over that four-year period. It is important to note, however, that because Table 4-4 presents Z-scores only for those providers for which market value could be derived, the average Z-scores of the ITT providers and the environmental subgroup presented in Table 4-4 do not correspond with those presented in Table 3-2 of this study.

Overall, the data indicate a significant correlation between the solvency positions of individual providers of ITTs and their growth in terms of market value. The correlation that exists for most providers between their Z-scores and their market values provides evidence of the importance of the financial performance of providers and in this case, the performance of providers in terms of solvency position, in increasing market value.

The data indicate that, while the market value of the ITT providers increased from the beginning of 1994 to the end of 1997, the solvency position of the ITT providers also improved. In addition, while the environmental subgroup, as a whole, decreased in market value, the solvency position of that subgroup also worsened from 1994 through 1997. For most providers, the correlation between growth in market value and improvement in solvency position is exact. However, the market values of several providers, namely ATC Group, Baker Hughes, Cadmus, Monsanto, Thermo Tech, and Quality Systems, actually increased from the beginning of 1994 to the end of 1997 despite corresponding decreases in solvency position. That circumstance suggests that investors may have weighed other factors more heavily than financial performance and, in particular, solvency, in determining the market values of those providers.

4.4 COMPARISON OF THE PERFORMANCES OF THE ITT PROVIDERS AND THE ENVIRONMENTAL SUBGROUP WITH THOSE OF FIRMS INCLUDED IN INDICES THAT COVER SPECIFIC INDUSTRIES

To parallel the financial analyses presented in Section 3.0 of this study, the performances of both the ITT providers and the environmental subgroup, in terms of market value, were compared with those of selected industry groups. Seven indices of stock prices generated by S&P were selected for comparison with the ITT stock performance group and the ITT stock performance environmental subgroup. The indices pool the results of the performances of the stocks of firms that S&P believes to be representative of their respective industries. Analysts often use such indices to compare the respective performances of various industry sectors.

TABLE 4-4

COMPARISON OF TRENDS IN Z-SCORES AND MARKET VALUES, 1994 - 1997

Company/Industry Group	January 1, 1994 ($)[29]	1994 (year-end)		1995 (year-end)		1996 (year-end)		1997 (year-end)		Trend in Market Value 1994-1997	Trend in Z-Score 1994 - 1997
		($)[29]	Z-Score	($)[29]	Z-Score	($)[29]	Z-Score	($)[29]	Z-Score		
Monsanto	8,707	8,197	2.02	14,120	1.87	22,860	1.62	24,905	1.54	Up	Down
Texaco	16,770	15,536	1.99	20,733	2.13	25,950	2.59	29,756	2.54	Up	Up
Dow Chemical	15,557	18,635	1.37	18,390	2.07	19,044	1.90	23,015	1.85	Up	Up
Baker Hughes	2,808	2,573	1.77	3,442	1.73	4,987	1.95	7,386	1.70	Up	Down
Ionics	344	437	3.10	611	3.12	759	3.11	657	3.31	Up	Up
Cadmus	85	94	2.33	203	2.56	122	1.93	160	1.98	Up	Down
ATC Group	23	53	3.11	88	4.11	100	2.60	93	0.21	Up	Down
OHM Corp.	173	133	1.64	196	1.98	226	2.58	209	2.14	Up	Up
Quality Systems	12	15	2.97	133	4.44	43	2.74	43	1.14	Up	Down
Thermo Tech	10	13	-0.07	28	-0.15	17	-0.28	34	-0.53	Up	Down
Envirogen	21	10	-1.12	19	-0.83	43	0.85	35	1.65	Up	Up
Waste Technology	3	3	2.68	7	2.03	4	1.89	3	1.73	Unchanged	Down
Roy F. Weston	59	42	2.21	38	2.20	26	1.49	31	1.42	Down	Down
IT Group	126	111	1.61	99	1.82	77	1.46	73	0.71	Down	Down
Sevenson	92	106	3.52	110	4.35	115	4.08	32	4.30	Up	Up
Dames & Moore	400	328	3.19	275	2.62	319	2.27	239	2.33	Down	Down
Waste Management	12,746	12,641	1.16	14,475	1.08	15,766	1.03	12,513	0.48	Down	Down
Morrison Knudsen	790	421	2.79	148	2.84	483	1.11	529	2.92	Down	Down
Aqua Alliance	372	191	-0.57	196	0.7	200	0.87	52	-0.41	Down	Down
ITT Providers	**59,097**	**59,539**	**2.11**	**73,311**	**2.11**	**91,141**	**2.68**	**99,764**	**3.14**	**Up**	**Up**
Environmental Subgroup	**15,159**	**14,490**	**1.60**	**16,290**	**1.63**	**18,134**	**1.60**	**14,499**	**1.32**	**Down**	**Down**

[29] Market value amounts are expressed in millions.

The seven S&P indices selected for this comparative analysis of market value correspond roughly to 8 of the 10 industry groups selected for comparison in Section 3.0 of this study. Because S&P does not provide stock price indices that correspond well to SIC codes 8731 (Commercial Physical and Biological Research Industry) and 8734 (Testing Laboratories Industry), those industry groups are not included in the analysis. In addition, because S&P does not provide indices of stock prices that correspond to each SIC code, certain indices were selected to represent more than one SIC code. The S&P indices selected for the analysis, along with their corresponding SIC codes, are:

1. Computers (Software and Services) (SIC code 7373)
2. Communication Equipment (SIC code 3663)
3. Electronics (Instrumentation) (SIC codes 3671 and 3826)
4. Health Care (Medical Products and Supplies) (SIC codes 3845)
5. Waste Management (SIC code 4953)
6. Engineering and Construction (SIC code 8711)
7. Oil (Domestic Integrated) (SIC code 2911)

Table 4-5 presents the annual and net percentage changes in market value of both the ITT providers and the environmental subgroup from 1994 through 1997 and the annual and net percentage changes in index values of each of the seven S&P indices identified above. The data indicate that, in terms of growth in market value, the computer (software and services), communications equipment, electronics (instrumentation), and health care (medical products and supplies) industries significantly outperformed the ITT providers. While the indices of each of those industries increased by more than 150 percent from the beginning of 1994 to the end of 1997, the market value of the ITT providers increased by only 68.8 percent during that period of time. The data also indicate, however, that, in terms of growth in market value, the ITT providers did outperform the oil (domestic integrated), waste management, and engineering and construction industries from the beginning of 1994 to the end of 1997.

In contrast, the data indicate that, in terms of growth in market value, each of the industries selected for comparison outperformed the environmental subgroup. Even the engineering and construction industry, which lost market value overall from the beginning of 1994 to the end of 1997, did not decrease in value to the same degree as the environmental subgroup. Further, when the market value data on Waste Management are removed from the analysis, the relative performance of the environmental subgroup worsens.

TABLE 4-5

COMPARISON OF THE CHANGE IN MARKET VALUES OF THE ITT PROVIDERS, THE ENVIRONMENTAL SUBGROUP, AND SELECTED SEGMENTS OF THE ENVIRONMENTAL INDUSTRY, 1994-1997

S&P Indices and Corresponding SIC Codes	January 1, 1994 Index/ Market Value[30]	1994 (year-end)		1995 (year-end)		1996 (year-end)		1997 (year-end)		Net Change 1994-1997[30]	Percent Change 1994 - 1997
		Index/ Market Value[30]	(%)	Index/ Market Value[30]	(%)	Index/ Market Value[30]	(%)	Index/ Market Value[30]	(%)		
Computers (Software and Services) (7373)	137.15	161.72	17.9	226.90	40.3	352.45	55.3	490.83	39.3	353.68	257.9
Communication Equipment (3663)	73.85	84.29	14.1	125.77	49.2	146.72	16.7	190.12	29.6	116.27	157.4
Electronics (Instrumentation) (3671 and 3826)	128.54	159.77	24.3	244.64	53.1	301.94	23.4	350.17	16.0	221.63	172.4
Health Care (Medical Products and Supplies) (3845)	177.97	206.59	16.1	344.72	66.9	391.29	13.5	483.52	23.6	305.55	171.7
Waste Management (4953)	246.16	247.62	0.6	276.81	11.8	289.05	4.4	292.12	1.1	45.96	18.7
Engineering and Construction (8711)	178.44	169.03	-5.3	236.90	40.2	216.61	-8.6	176.29	-18.6	-2.15	-1.2
Oil (Domestic Integrated) (2911)	582.80	586.76	0.7	642.63	9.5	785.94	22.3	907.66	15.5	324.86	55.7
ITT Providers	**$59,097**	**$59,539**	**0.7**	**$73,311**	**23.1**	**$91,141**	**24.3**	**$99,764**	**9.5**	**$40,667**	**68.8**
Environmental Subgroup	**$15,159**	**$14,490**	**-4.4**	**$16,290**	**12.4**	**$18,134**	**11.3**	**$14,499**	**-20.0**	**-$660**	**-4.4**
Environmental Subgroup (without Waste Management)	**$2,413**	**$1,849**	**-23.4**	**$1,815**	**-1.8**	**$2,368**	**30.5**	**$1,986**	**-16.1**	**-$427**	**-17.7**

[30] Market value amounts are expressed in millions.

4.5 COMPARISON OF THE PERFORMANCES OF THE ITT PROVIDERS AND THE ENVIRONMENTAL SUBGROUP WITH THOSE OF SEGMENTS OF THE ENVIRONMENTAL INDUSTRY

In addition to the preceding analysis, the performances of both the ITT providers and the environmental subgroup, in terms of market value, were compared with those of the various segments of the environmental industry. For the analysis, the respective performances of the ITT providers and the environmental subgroup were compared with those of the 12 segments of the environmental industry identified by EBJ. Each of those segments pools the results of the performance of the stocks of a number of firms that EBJ believes are representative of that segment of the environmental industry.

The 12 segments of the environmental industry identified by EBJ and used for this analysis are:

1. Solid Waste
2. Water Treatment
3. Instrument Manufacturing
4. Water Utilities
5. Remediation 6. Waste Management Equipment
7. Process/Prevention Equipment
8. Resource Recovery
9. Environmental Energy
10. Air Pollution Control
11. Consulting and Engineering
12. Hazardous Waste

Table 4-6 presents the annual and net percentage changes in market value of the ITT providers, the environmental subgroup, and each of the 12 segments, from the beginning of 1994 to the end of 1997. For comparison of performance, Table 4-6 also presents the annual and net percentage changes of the S&P 500 Index from the beginning of 1994 to the end of 1997.

The data indicate that, in terms of growth in market value, the ITT providers outperformed all the segments identified by EBJ, measured as combined growth in market value. The data show that the market value of the ITT providers grew by 68.8 percent from the beginning of 1994 to the end of 1997, while, as a whole, the combined market value of the 12 segments grew by only 32.2 percent during that period of time. The data indicate that, in terms of growth in market value, the ITT providers outperformed the following eight segments of the environmental industry from the beginning of 1994 to the end of 1997: 1) solid waste, 2) water treatment, 3) waste management equipment, 4) resource recovery, 5) environmental energy, 6) air pollution control, 7) consulting and engineering, and

TABLE 4-6

COMPARISON OF THE CHANGE IN MARKET VALUES OF THE ITT PROVIDERS, THE ENVIRONMENTAL SUBGROUP, AND EBJ SEGMENTS, 1994-1997

EBJ Segment	January 1, 1994 ($)[31]	1994 (year-end)		1995 (year-end)		1996 (year-end)		1997 (year-end)		Net Change 1994-1997 ($)[31]	Percent Change 1994 - 1997
		($)[31]	(%)	($)[31]	(%)	($)[31]	(%)	($)[31]	(%)		
Solid Waste	23,502	23,534	0.1	29,120	28.8	35,231	21.0	30,606	-13.1	7,104	30.2
Water Treatment	8,019	7,790	-2.9	7,960	2.2	11,494	44.4	12,918	12.4	4,900	61.1
Instrument Manufacturing	3,185	3,825	20.1	5,812	51.9	6,485	11.6	6,982	7.7	3,797	119.3
Water Utilities	2,751	2,477	-10.0	3,058	23.5	3,695	20.8	4,991	35.1	2,239	81.4
Remediation	1,434	1,510	5.3	1,585	5.0	1,856	17.1	2,738	47.5	1,304	90.9
Waste Management Equipment	3,000	3,012	0.4	4,074	35.3	4,001	-1.8	3,659	-8.5	659	22.0
Process/Prevention Equipment	998	835	-16.3	1,417	69.7	1,287	-9.2	1,479	14.9	481	48.2
Resource Recovery	6,943	6,428	-7.4	6,678	3.9	6,091	-8.8	7,047	15.7	104	1.5
Environmental Energy	2,555	2,145	-16.0	1,286	-40.0	1,953	51.9	2,621	34.2	66	2.6
Air Pollution Control	1,705	1,350	-20.8	1,428	5.8	1,703	19.3	1,489	-12.6	-216	-12.7
Consulting and Engineering	2,607	2,377	-8.8	2,896	-12.3	2,438	-15.8	3,016	23.7	409	15.7
Hazardous Waste	3,826	3,447	-9.9	1,309	-62.0	1,300	-0.7	2,493	91.8	-1,333	-34.8
All EBJ Segments	**60,525**	**58,730**	**-3.0**	**66,623**	**13.4**	**77,534**	**16.4**	**80,040**	**3.2**	**19,514**	**32.2**
ITT Providers	**59,097**	**59,539**	**0.7**	**73,311**	**23.1**	**91,141**	**24.3**	**99,764**	**9.5**	**40,667**	**68.8**
Environmental Subgroup	**15,159**	**14,490**	**-4.4**	**16,290**	**12.4**	**18,134**	**11.3**	**14,499**	**-20.0**	**-660**	**-4.4**
Environmental Subgroup (without Waste Management)	**2,413**	**1,849**	**-23.4**	**1,815**	**-1.8**	**2,368**	**30.5**	**1,986**	**-17.7**	**-427**	**-17.7**

[31] Market value amounts are expressed in millions.

8) hazardous waste. However, the data also show that, in terms of growth in market value, four segments, instrument manufacturing, water utilities, remediation, and process/prevention equipment, outperformed the ITT providers from the beginning of 1994 to the end of 1997.

In contrast, the data indicate that, in terms of growth in market value, the combined market values of the 12 segments as well as those of most of the segments selected for comparison significantly outperformed the environmental subgroup. The environmental subgroup lost approximately 4.4 percent of its market value, overall, between the beginning of 1994 and the end of 1997. However, the environmental subgroup still outperformed the engineering and consulting and the hazardous waste segments, which lost 9 percent and 28 percent of their market values, respectively, during that period of time. When the market value data on Waste Management are removed from the analysis, the performance of the environmental subgroup worsens. With Waste Management removed from the analysis, only one segment of the environmental industry, hazardous waste, demonstrated worse performance than the environmental subgroup in terms of growth of market value during the period of time in question.

4.6 SUMMARY OF ANALYSES OF STOCK PERFORMANCE

In summary, the above analyses indicate that:

- While the market value of the ITT providers increased from the beginning of 1994 to the end of 1997, the increase can be attributed primarily to the growth in market value of only four large providers.
- Much of the growth in market value of the ITT providers appears to be attributable to the strong performance of those providers of ITTs that are not environmental firms.
- The performance of the stocks of those providers of ITTs that are not environmental firms tends to be better, on average, than the performance of the stocks of those providers that focus their operations primarily on environmental lines of business.
- In terms of growth in market value, most of the selected industry groups outperformed the ITT providers, while all those groups outperformed the environmental subgroup.
- There is a significant correlation between the solvency positions of providers of ITTs and their growth in terms of market value.
- While the ITT providers outperformed all the segments of the environmental industry identified by EBJ in terms of combined growth in market value, those segments significantly outperformed the environmental subgroup, again in terms of combined growth in market value.

APPENDIX A

PROJECT APPROACH FOR FINANCIAL ANALYSIS

APPENDIX A

PROJECT APPROACH FOR FINANCIAL ANALYSIS

The financial analysis presented in the study was conducted in two distinct phases over a period of approximately two years. Phase one of the analysis used financial data for the years 1994 through 1996. For phase one of the analysis, financial data were collected for those providers that had innovative treatment technologies (ITT) listed in Version 5.0 of the Vendor Information System for Innovative Treatment Technologies (VISITT) database or in previous versions of that database. To gather the data, a comprehensive list of providers was developed and the providers then were separated into two categories: those that are publicly held and those that are privately held.

For the publicly held providers, financial data for the years 1994 through 1996 were obtained from Moody's Financial Information System (FIS)[1] and the U.S. Securities and Exchange Commission's (SEC) EDGAR database.[2] In cases in which a provider's financial data were consolidated completely into that of its parent company, only financial data for the parent company were collected. Financial data for 25 publicly held providers were collected. Of those providers, 20 were determined to have had ITTs listed in Version 5.0 of VISITT, and five were determined to have withdrawn their ITTs from VISITT before the release of Version 5.0.

In addition, financial data for 1994 through 1996 were collected from Dun and Bradstreet Information Services (D&B) for a number of privately held providers that had ITTs listed in Version 5.0 of VISITT. Although it was determined that D&B maintained active files for many of the privately held providers identified for the study, relatively few of those files contained significant amounts of financial data. Therefore, although reports were obtained from D&B for a large number of providers that had ITTs listed in Version 5.0 of VISITT, only those reports that contained enough financial data to calculate at least one ratio value for at least one year were retained for the analysis. Financial data for 50 privately held providers were collected. Of those providers, 46 were determined to have had ITTs listed in Version 5.0 of VISITT, and four were determined to have withdrawn their ITTs from VISITT before the release of Version 5.0. In total, in conducting phase one of the study, financial data were collected for 66 providers that had ITTs listed in Version 5.0 of VISITT.

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[1] Moody's FIS is located on the Internet at *http://fisonline.moodys.com*.

[2] SEC's EDGAR database is located on the Internet at *http://www.sec.gov*.

In conducting phase two of the analysis, attempts were made to collect financial data for 1997 for each of the 75 providers identified in phase one. Once again, financial data for the publicly held providers were obtained from Moody's FIS and SEC's EDGAR database, while financial data for the privately held providers were collected from D&B. When obtained, the financial data for 1997 were added to the data for 1994 through 1996 to support a more current analysis of financial performance and to allow an analysis of trends over a four-year period.

In addition, for phase two of the analysis, a list was generated of providers that had added ITTs to VISITT since Version 5.0 of the database was released. Those providers that had added ITTs to VISITT were separated into two categories: those that are publicly held and those that are privately held. Attempts were made to collect financial data for 1994 through 1997 for each of the providers on the list. Once again, financial data for the publicly held providers were obtained from Moody's FIS and SEC's EDGAR database, while financial data for a number of the privately held providers were collected from D&B.

In total, for phase two of the study, financial data were collected for 72 providers that had ITTs listed in Version 6.0 of VISITT. However, to strengthen the analysis from a statistical perspective, those providers for which only enough financial data were available to calculate one value for each specific type of ratio for one year were excluded from the analysis. Therefore, financial data for 62 providers that had ITTs listed in Version 6.0 of VISITT and for which enough financial data were available to calculate at least one specific ratio value for more than one year were used in conducting phase two of the study.

In addition, for phase two of the study, the ITT providers for which financial data were available were divided into two groups. The first group was defined as the 62 providers that had ITTs listed in Version 6.0 of VISITT and for which enough financial data were available to calculate at least one specific ratio value for more than one year. For the financial analysis, that group is referred to collectively as "the ITT providers." The second group includes only those ITT providers whose operations focus primarily on environmental lines of business and for which sufficient financial data were available to calculate at least one specific ratio value for every year from 1994 through 1997. For the financial analysis, that group is referred to collectively as "the environmental subgroup."

Because sufficient financial data for many providers were not available for every year from 1994 through 1997, and because the quality of the data that were available for each provider varied from one year to the next, the total number of providers for which data were available fluctuated over the four-year period. Further, because the operations of many of the providers for which data were available were not focused

primarily on environmental lines of business, many of those providers had little in common, save for the listing of ITTs in Version 6.0 of VISITT. To that end, the environmental subgroup was established to strengthen the analysis by gathering together those providers that had similar business operations and for which trends could be measured on the basis of consistent sample groups for each specific type of ratio throughout the four-year period.

The methodology used in conducting both phases 1 and 2 of the analysis involved calculation of four standard financial ratios and use of those ratios to evaluate the financial performances of the ITT providers and the environmental subgroup. Business analysts frequently use such ratios to measure the financial condition of various types of firms. The financial data collected for the study were used to assess the financial performance of the ITT providers and of the environmental subgroup for 1994, 1995, 1996, and 1997 and to facilitate an analysis of trends.[3] The ratios were used to measure the financial performance of the ITT providers and the environmental subgroup in terms of liquidity, leverage, solvency, and profitability during that four-year period. Financial data for each of 10 industry groups selected for comparison under the study were obtained for fiscal years 1994, 1995, 1996, and 1997 from Robert Morris Associates' (RMA) Annual Statement Studies, 1998-1999 edition. Ratios calculated from those data were used to establish the level of financial performance of the ITT providers and the environmental subgroup in relation to those of the 10 industry groups selected for comparison.

[3] At the time this report was prepared, 1997 was the most recent year for which financial data were available for most providers that had ITTs listed in Version 6.0 of VISITT.

APPENDIX B

LIMITATIONS OF THE FINANCIAL ANALYSIS

APPENDIX B

LIMITATIONS OF THE FINANCIAL ANALYSES

The financial analysis presented in the study is subject to the following limitations:

1) To conduct the financial analysis presented in the study, financial data were collected only for those providers that had innovative treatment technologies (ITT) in Version 6.0 of the Vendor Information System for Innovative Treatment Technologies (VISITT) database. However, not all providers of ITTs necessarily are listed in VISITT. Therefore, data gathered only for those providers listed in VISITT may not be representative of all providers of ITTs.

2) Significant amounts of financial data were obtained for only 62 of the 214 providers that had ITTs listed in Version 6.0 of VISITT. Because financial data could not be obtained for all the providers in VISITT, measures of the financial performance of those providers for which data were available may or may not be indicative of the financial performance of ITT providers as a whole.

3) Many of the 62 providers for which significant amounts of financial data were available conduct operations that do not focus exclusively, or even primarily, on the marketing of ITTs. Because the operations of many providers are highly diverse, and because, in many cases, the interests of those providers in ITTs do not represent a material portion of their overall business activities, the financial performance of those providers may not necessarily reflect or be representative of the degree of success they have encountered in their efforts to market ITTs.

4) Financial data for 10 industry groups were gathered from Robert Morris Associates' (RMA) Annual Statement Studies, 1998-1999 Edition and used in this analysis. The financial statements used to compile industry-specific data for presentation in RMA's Annual Statement Studies were not selected by any random or statistically reliable method. The data were obtained from RMA's member banks, which each year voluntarily submit to RMA the financial data on specific companies that they have available.

5) A review of literature in financial analysis indicates that there are four key limitations to the use of financial ratios to evaluate the financial condition of groups of firms. First, no single financial ratio or indicator is a perfect test of financial condition. However, a set of ratios that measure liquidity, leverage, solvency, and profitability is generally informative and may be useful in identifying financial trends. Second, minimum, or threshold, levels of financial ratios reflect only values that the financial community considers "red lights" that signal possible financial distress. Further, because such generally accepted thresholds are intended to provide benchmarks for financial performance for a broad range of businesses, because the levels of financial performance that are deemed acceptable may vary significantly from one group of firms to the next, and because such thresholds do not take into account levels of financial performance that might be associated with certain phases of the business development process, the thresholds may not apply directly or exclusively to the performance of specific groups of firms. Third, industry average ratio values, while indicative of the performance of a group of firms, do not necessarily represent the financial performance of any individual firm in that group. Finally, historical ratios over the past three to five years always should be checked to identify trends and to adjust for extraordinary events or market conditions.

6) To derive average ratio values for the ITT providers and the environmental subgroup, ratio values were calculated for each provider for which data were available, and a mean was derived from those values. Company-specific financial data were not, however, available for individual firms in each of the 10 industry groups selected for comparison in this analysis. Rather, aggregated data for those industry groups were obtained from RMA's Annual Statement Studies, 1998-1999 Edition and used instead to derive industry average ratio values for those groups.

APPENDIX C

RATIO VALUES OF THE ITT PROVIDERS

SIC Code	Vendor	1994	1995	1996	1997
	Current Ratio	**2.27**	**2.59**	**2.35**	**2.64**
2879	Agsco Inc.	1.37	1.30		1.28
8711	Aqua Alliance Corp.	0.79	0.94	1.04	0.70
8734	ATC Group Services, Inc.	2.32	4.94	2.56	1.85
3533	Baker Hughes, Inc.	2.57	2.70	2.70	2.37
8731	Battelle Memorial Institute, Inc.	1.28	1.39	1.48	1.44
2741	Beckenhorst Press, Inc.	4.79			5.84
5169	Bio GT Inc.	1.19	2.25		1.09
2759	Cadmus Communications Corp.	1.61	1.74	2.19	1.70
711	Carlo Environmental Technologies, Inc.	1.24	1.17		
8748	Clayton Services, Inc.		1.59	1.57	1.31
6519	Commodore Environmental Services, Inc	0.98	0.73	1.94	2.58
8711	Dames & Moore, Group	2.63	3.07	2.24	2.31
8731	Delphi Research, Inc.	1.11		1.13	
5531	Discount Tire Co., Inc.	19.28	23.34	13.86	
2821	Dow Chemical Co.	1.31	1.88	1.64	1.18
8711	Earthfax Engineering, Inc.	1.80	5.03	4.11	22.01
8748	EET, Inc.		0.57	3.12	1.29
5999	EFX Systems, Inc.		3.16	4.60	2.41
8748	Ensr Corporation		1.41		1.66
4959	Environgen, Inc.	4.22	3.53	3.70	1.93
8711	Environmental Fuel Systems, Inc.			1.92	1.37
8748	First Environment, Inc.	1.96	1.97	2.04	1.73
3569	Frantz, SG Co., Inc.	2.30	5.30	4.85	3.41
1541	GEM, Inc.			2.06	14.57
1799	Geo-Con, Inc.			1.28	1.28
1781	Gregg Drilling and Testing, Inc.		2.33	1.28	1.07
1799	Hayward Baker, Inc.		1.39	1.48	1.52
8731	Hazen Research, Inc.	1.69	1.71	1.90	2.00
4953	Horsehead Resource Development Co., I	2.33	3.48		
8733	IIT Research Institute, Inc.	1.61	1.75	1.79	2.18
8711	Integrated Environmental Solutions, Inc.	1.25	1.77	2.07	
4959	The IT Group, Inc.	1.81	2.13	2.21	1.38
3559	Ionics, Inc.	0.79	0.94	1.04	0.70
8731	Lynntech, Inc.		1.16	1.07	1.06
4959	Maxymillian Technologies Inc.	1.50	1.34	1.31	1.46
8731	Membrane Technology & Research, Inc.	1.14		1.77	1.37
2824	Monsanto Co.	1.59	1.53	1.28	1.21
1611	Morrison Knudsen Corp	2.45	2.22	1.15	1.35
8731	MSE Technology Applications, Inc.		2.86	1.19	
5199	Nucon International, Inc.		1.16		3.62
3822	OHM Corporation	2.8	2.16	1.91	1.71
8711	Parsons Engineering Science, Inc.	4.14	4.76	3.17	11.23
7373	Quality Systems, Inc.	3.40	7.73	5.75	2.15
8734	Recra Environmental Inc.	4.20	5.59	4.85	1.93
711	Recyling Sciences International, Inc.	0.24	0.10	0.60	0.43
8748	REP Environmental Processes, Inc.	1.36	1.93	2.35	3.13
4959	Roy F. Weston, Inc.	2.83	2.32	2.11	1.91
8748	S.s. Papadopulos & Associates, Inc.	3.04	3.86	3.91	3.23
8731	SC & A, Inc.			2.25	2.57
4953	Sevenson Environmental Services, Inc.	4.25	5.54	6.06	6.68
2037	Simplot, JR Company, Inc.	1.84	2.00	1.65	
8711	Smith Technology Corp.	1.20	1.35		
4959	Soil Solutions, Inc.	0.52	1.22	0.38	
4953	Solitech ATP Systems, Inc.	0.07	0.10		
2911	Texaco, Inc.	1.20	1.24	1.24	1.07
2899	Texarome, Inc.		1.08		1.16
N/A	Thermo Tech Technologies, Inc.	0.37	0.63	0.77	0.38
8731	University of Wyoming Research Corporporation			0.93	1.24
4731	UPS Yamato Partnership USA	1.10	0.89	0.91	1.13
4953	Waste Management, Inc.	0.97	0.88	1.02	0.51
3569	Waste Technology Corp.	2.91	1.53	1.39	1.34
8744	Whitney American Corporation	1.29	1.23	1.33	1.12

	Debt-to-Assets Ratio	**0.63**	**0.67**	**0.61**	**0.63**
2879	Agsco Inc.	0.64	0.73		0.75
8711	Aqua Alliance, Inc.	0.88	0.88	0.90	1.29
8734	ATC Group Services, Inc.	0.45	0.16	0.47	0.86
3533	Baker Hughes, Inc.	0.45	0.52	0.49	0.45
8731	Battelle Memorial Institute Inc.	0.29	0.28	0.27	0.27
2741	Beckenhorst Press, Inc.	0.15			0.47
5169	Bio GT Inc.	0.45	0.29		0.73
2759	Cadmus Communications Corp.	0.66	0.64	0.62	0.62
711	Carlo Environmental Technologies, Inc.	0.68	0.72		
8748	Clayton Group Services, Inc.		0.61	0.64	0.68
6519	Commodore Environmental Services, Inc	0.69	0.90	0.69	0.90
8711	Dames & Moore Group	0.28	0.47	0.63	0.61
8731	Delphi Research, Inc.	0.56		0.69	
5531	Discount Tire Co., Inc..	0.77	0.79	0.72	
2821	Dow Chemical Co.	0.69	0.69	0.68	0.68
8711	Earthfax Engineering, Inc.	0.57	0.32	0.20	0.04
8748	EET, Inc.		0.86	0.17	0.17
5999	EFX Systems, Inc.		0.28	0.21	0.20
8748	Ensr Corporation		0.53		0.42
4959	Environgen	0.19	0.43	0.21	0.20
8711	Environmental Fuel Systems, Inc.			0.63	0.83
8748	First Environment, Inc.	0.60	0.58	0.44	0.61
3569	Frantz, SG Co., Inc.	0.35	0.34	0.34	0.40
1541	GEM, Inc.			0.33	0.07
1799	Geo-Con, Inc.			0.94	0.75
1781	Gregg Drilling and Testing, Inc.		0.34	0.36	0.46
1799	Hayward Baker, Inc.		0.75	0.64	0.64
8731	Hazen Research, Inc.	0.52	0.46	0.41	0.37
4953	Horsehead Resource Development Co., I	0.44	0.39		
8733	IIT Research Institute, Inc.	0.44	0.41	0.41	0.30
8711	Integrated Environmental Solutions, Inc.	0.51	0.49	0.46	
4959	The IT Group, Inc.	0.60	0.55	0.51	0.79
3559	Ionics, Inc.	0.21	0.21	0.23	0.21
8731	Lynntech, Inc.		0.68	0.52	0.64
4959	Maxymillian Technologies Inc.	0.66	0.72	0.69	0.58
8731	Membrane Technology & Research, Inc.	0.55		0.34	0.60
2824	Monsanto Co.	0.67	0.65	0.67	0.62
1611	Morrison Knudsen Corp.	0.34	0.30	0.63	0.55
8731	MSE Technology Applications, Inc.		0.29	0.72	
5199	Nucon International, Inc.		0.52		0.25
3822	OHM Corporation	0.72	0.57	0.48	0.51
8711	Parsons Engineering Science, Inc.	0.23	0.19	0.30	0.08
7373	Quality Systems, Inc.	0.27	0.12	0.15	0.33
8734	Recra Environmental Inc.	0.15	0.49	0.66	0.75
711	Recyling Sciences International, Inc.	3.62	4.72	4.84	6.35
8748	REP Environmental Processes Inc.	0.66	0.64	0.48	0.36
4959	Roy F. Weston, Inc.	0.48	0.49	0.53	0.56
8748	S.s. Papadopulos & Associates, Inc.	0.28	0.22	0.23	0.27
8731	SC & A, Inc.			0.41	0.48
4953	Sevenson Environmental Services, Inc.	0.24	0.19	0.17	0.15
2037	Simplot, JR Company, Inc.	0.60	0.51	0.60	
8711	Smith Techology Corp.	0.80	0.82		
4959	Soil Solutions, Inc.	2.07	2.39	1.28	
4953	Solitech ATP Systems, Inc.	1.55	2.18		
2911	Texaco, Inc.	0.62	0.62	0.62	0.57
2899	Texarome, Inc.		0.73		0.57
N/A	Thermo Tech Technologies, Inc.	0.27	0.18	0.18	0.33
8731	University of Wyoming Research Corporation			0.67	0.54
4731	UPS Yamato Partnership USA	0.87	1.10	1.06	0.86
4953	Waste Management, Inc.	0.74	0.74	0.73	0.90
3569	Waste Technology Corp.	0.54	0.57	0.70	0.65
8744	Whitney American Corporation	0.74	0.73	0.72	0.72
	Return on Assets Ratio	**-0.02**	**0.01**	**0.03**	**0.06**
2879	Agsco Inc.	0.05	0.02		0.03
8711	Aqua Alliance, Inc.	-0.43	-0.01	-0.01	-0.42
8734	ATC Group Services, Inc.	0.13	0.08	0.07	-0.01
3533	Baker Hughes, Inc.	0.01	0.03	0.05	0.02
8731	Battelle Memorial Institute, Inc.	0.04	0.04	0.05	0.04
2741	Beckenhorst Press, Inc.	0.42			0.05

5169	Bio GT Inc.	-0.01	-0.05		0.23
2759	Cadmus Communicatations Corp.	0.03	0.04	0.02	-0.02
8748	Clayton Group Services, Inc.		0.01	-0.05	-0.05
6519	Commodore Environmental Services, Inc	-0.11	-0.42	-0.20	-0.39
8711	Dames & Moore, Group	0.08	0.07	0.05	0.05
2821	Dow Chemical Co.	0.04	0.09	0.08	0.07
8711	Earthfax Engineering, Inc.	-0.07	0.14	0.44	0.40
8748	EET, Inc.		-0.93	-0.42	-0.64
5999	EFX Systems, Inc.		0.37	0.28	1.4
4959	Environgen, Inc.	-0.64	-0.25	-0.21	-0.07
8711	Environmental Fuel Systems, Inc.			0.11	0.05
3569	Frantz, SG Co., Inc.	-0.18	0.04	-0.03	0.08
1541	GEM, Inc.			1.09	1.32
1781	Gregg Drilling and Testing, Inc.			0.04	0.02
8731	Hazen Research, Inc.	0.16	0.08	0.15	0.19
4953	Horsehead Resource Development Co., I	0.06	0.08		
8733	IIT Research Institute, Inc.	0.05	0.03	0.00	0.02
8711	Integrated Environmental Solutions, Inc.	0.14		0.02	
4959	The IT Group, Inc.	-0.04	0.00	-0.03	-0.02
3559	Ionics, Inc.	0.06	0.06	0.07	0.07
8731	Lynntech, Inc.		0.06	0.28	0.04
4959	Maxymillian Technologies Inc.	0.09	0.04	0.03	0.03
8731	Membrane Technology & Research, Inc.	-0.06		0.10	0.04
2824	Monsanto Co.	0.07	0.07	0.03	0.04
1611	Morrison Knudsen Corp.	0.00	0.04	-0.01	0.04
8731	MSE Technology Applications, Inc.		0.20	0.09	
5199	Nucon International, Inc.		0.02		0.14
3822	OHM Corporation	-0.03	0.02	0.03	-0.07
7373	Quality Systems, Inc.	0.08	0.06	-0.20	-0.11
8734	Recra Environmental Inc.	0.06	-0.05	-0.19	-0.06
4959	Roy F. Weston, Inc.	-0.01	0.01	-0.12	-0.09
8748	S.s. Papadopulos & Assoiates, Inc.	0.15	0.13	-0.01	0.06
8731	SC & A Inc.			0.03	0.07
4953	Sevenson Environmental Services, Inc.	0.10	0.11	0.06	0.05
8711	Smith Technology Corp.	-0.30	0.00		
4959	Soil Solutions, Inc.	-0.79	0.76	0.19	
4953	Solitech ATP Systems, Inc.	0.11	-0.24		
2911	Texaco, Inc.	0.04	0.02	0.07	0.09
2899	Texarome, Inc.		0.12		0.16
N/A	Thermo Tech Technologies, Inc.	-0.25	-0.46	-0.39	-0.30
4731	UPS Yamato Partnership USA	-0.07	-0.02	0.03	0.17
4953	Waste Management, Inc.	0.04	0.03	0.01	-0.09
3569	Waste Technology Corp.	0.15	0.11	-0.08	-0.04
8744	Whitney American Corporation	0.05	0.03	-0.06	
	Altman's Z-Score	**2.11**	**2.27**	**2.50**	**3.12**
2879	Agsco Inc.		2.36		2.37
8711	Aqua Alliance, Inc.	-0.57	0.7	0.87	-0.41
8734	ATC Group Services, Inc.	3.11	4.11	2.60	0.21
3533	Baker Hughes, Inc.	1.77	1.73	1.95	1.70
8731	Battelle Memorial Institute, Inc.			3.70	3.43
2741	Beckenhorst Press, Inc.	9.06			3.47
5169	Bio GT Inc.		16.21		12.29
2759	Cadmus Communications Corp.	2.33	2.56	1.93	1.98
8748	Clayton Group Services, Inc.			0.93	2.06
6519	Commodore Environmental Services, Inc	-0.88	-3.12	-0.72	-1.79
8711	Dames & Moore, Group	3.19	2.62	2.27	2.33
5531	Discount Tire Co., Inc.	3.42	3.83	2.54	
2821	Dow Chemical Co.	1.37	2.07	1.90	1.85
8711	Earthfax Engineering, Inc.			7.52	17.45
8748	EET, Inc.		-3.52	-0.7	-3.51
5999	EFX Systems, Inc.		0.40	0.26	10.22
4959	Environgen, Inc.	-1.12	-0.83	0.85	1.65
8711	Environmental Fuel Systems, Inc.			3.39	1.56
8748	First Environment, Inc.			3.83	3.48
1541	GEM, Inc.			9.46	14.36
1799	Geo-Con, Inc.			2.23	1.97
8731	Hazen Research, Inc.		3.66	4.03	4.05
4953	Horsehead Resource Development Co., I	1.91	2.12		
8733	IIT Research Institute, Inc.			3.52	4.34
4959	The IT Group, Inc.	1.61	1.82	1.46	0.71

3559	Ionics, Inc.	3.10	3.12	3.11	3.31
8731	Membrane Technology & Research, Inc.			4.52	3.38
2824	Monsanto Co.	2.02	1.87	1.62	1.54
1611	Morrison Knudsen Corp.	2.79	2.84	1.11	2.92
3822	OHM Corporation	1.64	1.98	2.58	2.14
7373	Quality Systems, Inc.	2.97	4.44	2.74	1.14
8734	Recra Environmental Inc.			1.38	1.42
4959	Roy F. Weston, Inc.	2.21	2.20	1.49	1.42
8731	SC & A, Inc.			3.28	3.23
4953	Sevenson Environmental Services, Inc.	3.52	4.35	4.08	4.30
8711	Smith Technology Corp.	1.37	1.21		
4959	Soil Solutions, Inc.			4.09	4.17
2911	Texaco, Inc.	1.99	2.13	2.59	2.54
2899	Texarome, Inc.		2.03		2.54
N/A	Thermo Tech Technologies, Inc.	-0.07	-0.15	-0.28	-0.53
4731	UPS Yamato Partnership USA			3.57	3.18
4953	Waste Management, Inc.	1.16	1.08	1.03	0.48
3569	Waste Technology Corp.	2.68	2.03	1.89	1.73

APPENDIX D

RATIO VALUES OF THE ENVIRONMENTAL SUBGROUP

SIC Code	Vendor	Sample Size	1994	1995	1996	1997
	Current Ratio	**27**	**2.09**	**2.50**	**2.33**	**2.99**
8711	Aqua Alliance Corp.		0.79	0.94	1.04	0.70
8734	ATC Group Services, Inc.		2.32	4.94	2.56	1.85
8731	Battelle Memorial Institute, Inc.		1.28	1.39	1.48	1.44
6519	Commodore Environmental Services, Inc.		0.98	0.73	1.94	2.58
8711	Dames & Moore, Group		2.63	3.07	2.24	2.31
8711	Earthfax Engineering, Inc.		1.80	5.03	4.11	22.01
4959	Environgen, Inc.		4.22	3.53	3.70	1.93
8748	First Environment, Inc.		1.96	1.97	2.04	1.73
3569	Frantz, SG Co., Inc.		2.30	5.30	4.85	3.41
8731	Hazen Research, Inc.		1.69	1.71	1.90	2.00
8733	IIT Research Institute, Inc.		1.61	1.75	1.79	2.18
4959	The IT Group, Inc.		1.81	2.13	2.21	1.38
3559	Ionics, Inc.		0.79	0.94	1.04	0.70
4959	Maxymillian Technologies, Inc.		1.50	1.34	1.31	1.46
1611	Morrison Knudsen Corp.		2.45	2.22	1.15	1.35
3822	OHM Corporation		2.8	2.16	1.91	1.71
8711	Parsons Engineering Science, Inc.		4.14	4.76	3.17	11.23
8734	Recra Environmental Inc.		4.20	5.59	4.85	1.93
711	Recyling Sciences International, Inc.		0.24	0.10	0.60	0.43
8748	REP Environmental Processes, Inc.		1.36	1.93	2.35	3.13
4959	Roy F. Weston, Inc.		2.83	2.32	2.11	1.91
8748	S.s. Papadopulos & Associates, Inc.		3.04	3.86	3.91	3.23
4953	Sevenson Environmental Services, Inc.		4.25	5.54	6.06	6.68
N/A	Thermo Tech Technologies, Inc.		0.37	0.63	0.77	0.38
3569	Waste Technology Corp.		2.91	1.53	1.39	1.34
8744	Whitney American Corporation		1.29	1.23	1.33	1.12
4953	Waste Management, Inc.		0.97	0.88	1.02	0.51
	Debt-to-Assets Ratio	**27**	**0.59**	**0.64**	**0.65**	**0.73**
8711	Aqua Alliance, Inc.		0.88	0.88	0.90	1.29
8734	ATC Group Services, Inc.		0.45	0.16	0.47	0.86
8731	Battelle Memorial Institute, Inc.		0.29	0.28	0.27	0.27
6519	Commodore Environmental Services, Inc.		0.69	0.90	0.69	0.90
8711	Dames & Moore, Group		0.28	0.47	0.63	0.61
8711	Earthfax Engineering, Inc.		0.57	0.32	0.20	0.04
4959	Environgen, Inc.		0.19	0.43	0.21	0.20
8748	First Environment, Inc.		0.60	0.58	0.44	0.61
3569	Frantz, SG Co., Inc.		0.35	0.34	0.34	0.40
8731	Hazen Research, Inc.		0.52	0.46	0.41	0.37
8733	IIT Research Institute, Inc.		0.44	0.41	0.41	0.30
4959	The IT Group, Inc.		0.60	0.55	0.51	0.79
3559	Ionics, Inc.		0.21	0.21	0.23	0.21
4959	Maxymillian Technologies, Inc.		0.66	0.72	0.69	0.58
1611	Morrison Knudsen Corp.		0.34	0.30	0.63	0.55
3822	OHM Corporation		0.72	0.57	0.48	0.51
8711	Parsons Engineering Science, Inc.		0.23	0.19	0.30	0.08
8734	Recra Environmental Inc.		0.15	0.49	0.66	0.75
711	Recyling Sciences International, Inc.		3.62	4.72	4.84	6.35
8748	REP Environmental Process, Inc.		0.66	0.64	0.48	0.36
4959	Roy F. Weston, Inc.		0.48	0.49	0.53	0.56
8748	S.s. Papadopulos & Associates, Inc.		0.28	0.22	0.23	0.27
4953	Sevenson Environmental Services, Inc.		0.24	0.19	0.17	0.15
N/A	Thermo Tech Technologies, Inc.		0.37	0.63	0.77	0.38
3569	Waste Technology Corp.		0.54	0.57	0.70	0.65
8744	Whitney American Corporation		0.74	0.73	0.72	0.72
4953	Waste Management, Inc.		0.74	0.74	0.73	0.90
	Return on Assets Ratio	**22**	**-0.03**	**-0.01**	**-0.01**	**-0.02**
8711	Aqua Alliance, Inc.		-0.43	-0.01	-0.01	-0.42
8734	ATC Group Services, Inc.		0.13	0.08	0.07	-0.01
8731	Battelle Memorial Institute, Inc.		0.04	0.04	0.05	0.04
6519	Commodore Environmental Services, Inc.		-0.11	-0.42	-0.20	-0.39
8711	Dames & Moore, Group		0.08	0.07	0.05	0.05
8711	Earthfax Engineering, Inc.		-0.07	0.14	0.44	0.40
4959	Environgen, Inc.		-0.64	-0.25	-0.21	-0.07
3569	Frantz, SG Co., Inc.		-0.18	0.04	-0.03	0.08
8731	Hazen Research, Inc.		0.16	0.08	0.15	0.19

8733	IIT Research Institute, Inc.		0.05	0.03	0.00	0.02
4959	The IT Group, Inc.		-0.04	0.00	-0.03	-0.02
3559	Ionics, Inc.		0.06	0.06	0.07	0.07
4959	Maxymillian Technologies, Inc.		0.09	0.04	0.03	0.03
1611	Morrison Knudsen Corp.		0.00	0.04	-0.01	0.04
3822	OHM Corporation		-0.03	0.02	0.03	-0.07
8734	Recra Environmental Inc.		0.06	-0.05	-0.19	-0.06
4959	Roy F. Weston, Inc.		-0.01	0.01	-0.12	-0.09
8748	S.s. Papadopulos & Associates, Inc.		0.15	0.13	-0.01	0.06
4953	Sevenson Environmental Services, Inc.		0.10	0.11	0.06	0.05
N/A	Thermo Tech Technologies, Inc.		-0.25	-0.46	-0.39	-0.30
3569	Waste Technology Corp.		0.15	0.11	-0.08	-0.04
4953	Waste Management, Inc.		0.04	0.03	0.01	-0.09
	Altman's Z-score	**14**	**1.60**	**1.63**	**1.60**	**1.32**
8711	Aqua Alliance, Inc.		-0.57	0.7	0.87	-0.41
8734	ATC Group Services, Inc.		3.11	4.11	2.60	0.21
6519	Commodore Environmental Services, Inc.		-0.88	-3.12	-0.72	-1.79
8711	Dames & Moore, Group		3.19	2.62	2.27	2.33
4959	Environgen, Inc.		-1.12	-0.83	0.85	1.65
4959	The IT Group, Inc.		1.61	1.82	1.46	0.71
3559	Ionics, Inc.		3.10	3.12	3.11	3.31
1611	Morrison Knudsen Corp.		2.79	2.84	1.11	2.92
3822	OHM Corporation		1.64	1.98	2.58	2.14
4959	Roy F. Weston, Inc.		2.21	2.20	1.49	1.42
4953	Sevenson Environmental Services, Inc.		3.52	4.35	4.08	4.30
N/A	Thermo Tech Technologies, Inc.		-0.07	-0.15	-0.28	-0.53
3569	Waste Technology Corp.		2.68	2.03	1.89	1.73
4953	Waste Management, Inc.		1.16	1.08	1.03	0.48

APPENDIX E

LIMITATIONS OF THE ANALYSIS OF STOCK PERFORMANCE

APPENDIX E

LIMITATIONS OF THE ANALYSIS OF STOCK PERFORMANCE

The analysis of stock performance presented in this study is subject to the following limitations:

1) To conduct the analysis of stock performance presented in this study, data on market value were collected only for those providers that had innovative treatment technologies (ITT) in Version 6.0 of the Vendor Information System for Innovative Treatment Technologies (VISITT) database. However, not all providers of ITTs are necessarily listed in VISITT. Therefore, data gathered for only those providers in VISITT may not be representative of all providers of ITTs.

2) Data on market value are available only for those providers whose stock is publicly traded. Consequently, of the 214 providers that had ITTs listed in Version 6.0 of VISITT, such data could be obtained for only 19 providers. The performance of the stocks of publicly traded firms in an industry sector often is used by investors as a benchmark for evaluating the potential performances of those privately held firms that also conduct operations in that sector. However, because data on market value could be obtained for only a small number of providers, measures of the performance of those providers in terms of changes in market value may or may not be indicative of the change in value of all providers of ITTs.

3) Of the 19 providers of ITTs for which data on market value were available, six were found to conduct operations that do not focus exclusively, or even primarily, on providing environmental goods or services. Because the interests of those six providers in ITTs do not represent a material portion of their overall business activities, the performance of those providers in terms of growth in market value may not necessarily reflect or be representative of the degree of success they have encountered in their efforts to market ITTs.

4) Compilations of market value data, including the data used for this analysis, are inevitably affected when firms in a particular segment or industry group are acquired by other firms. Such acquisitions often affect the continuity of sets of market value data because they frequently bolster the value of the acquired firm's stock and expand the number of shareholders that have an interest in that firm. The precise effects of acquisitions on the price of stocks can be determined only over time and depend, to a great extent, on the subsequent financial performance of the acquired firm. Nevertheless, to the degree to which acquisitions increase market share and enhance operating efficiencies and profits, growth in market value that results from acquisitions ultimately does reflect increased value for shareholders.

5) For the study, the performances of both the ITT providers and the environmental subgroup, in terms of market value, were compared with those of other selected industry groups. Seven indices of stock prices generated by Standard and Poor's (S&P) were selected for comparison with the ITT providers and the environmental subgroup. The indices pool the results of the performance of the stocks of firms believed by S&P to be representative of their respective industry groups. Analysts often use such indices to compare the respective performances of various industry sectors. Because S&P derives certain of its indices from data for a limited number of firms, the performance reflected by those indices, in terms of growth in market value, may not be indicative of the performance of the industries that they were created to represent. Table E-1 presents the names of the companies that were represented between 1994 and 1997 in each of the seven S&P indices selected for comparison for this study and the corresponding SIC codes for each of those indices.

TABLE E-1

NAMES OF COMPANIES REPRESENTED IN EACH S&P INDEX

S&P Index	Corresponding SIC Codes	Names of Companies Represented
Computers (Software and Services)	7373	Adobe Systems; Autodesk, Inc.; Computer Associates International; Computer Sciences; HBO & Company; Microsoft Corporation; Novell, Inc.; Oracle Systems; Parametric Technology; Unisys Corporation; Automatic Data Processing, Inc. (transferred to a new index on 6/28/96); Ceridian Corporation (transferred to a new index on 6/28/96); First Data (transferred to a new index on 6/28/96); Lotus Development (transferred to a new index on 7/3/95); Shared Medical Systems (transferred to a new index on 6/28/96)
Communications Equipment	3663	Andrew Corporation; DSC Communications; Harris Corporation; Lucent Technologies; Motorola, Inc.; NextLevel Systems; Northern Telecom; Scientific-Atlanta; Tellabs, Inc.; Cabletron Systems (transferred to new index on 6/28/96); Cisco Systems (transferred to new index on 6/28/96); M/A-Com, Inc. (transferred to new index on 6/30/95)
Electronics (Instrumentation)	3671 and 3826	EG&G, Inc.; Perkin-Elmer; Tektronix; Hewlett-Packard (transferred to new index on 6/14/95)
Health Care (Medical Products and Supplies)	3845	Bard; Bausch & Lomb; Baxter International, Inc.; Becton, Dickenson; Biomet, Inc.; Boston Scientific; Guidant Corp; Medtronic, Inc.; St. Jude Medical; U.S. Surgical; Allergan, Inc. (transferred to new index on 4/6/94)
Waste Management	4953	Browning-Ferris Industries; Waste Management, Inc.; Laidlaw, Inc. (transferred to new index on 5/13/97); Rollins Environmental (transferred to new index on 3/31/95); Zurn Industries (transferred to new index on 6/8/94)
Engineering and Construction	8711	Fluor Corporation; Foster Wheeler; McDermott International; Morrison-Knudsen (transferred to new index on 12/19/95); Zurn Industries (transferred to new index on 12/19/95)
Oil (Domestic Integrated)	2911	Amereda Hess; Atlantic Richfield Company; Occidental Petroleum; Pennzoil Corporation; Phillips Petroleum; Unocal Corporation; USX-Marathon Group; Kerr-McGee (transferred to new index on 6/28/96); Louisiana Land and Exploration (transferred to new index on 6/28/96)