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MEETING

of

BIOTECHNOLOGY DEVELOPMENT TASK FORCE

"Regulatory environment affecting the biotechnology industry and the promotion of the industry through the transfer of technology"

LOCATION: Room 319
State House
Trenton, New Jersey

DATE: November 16, 1993
12:00 Noon

MEMBERS OF TASK FORCE PRESENT:

Senator Robert W. Singer, Chairman
Mr. Ira Weisberg
Dr. Abraham Abuchowski
Mr. Joseph S. Roth

ALSO PRESENT:

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Walter C. Kowalski, III
Office of Legislative Services
Aide, Biotechnology Development
Task Force

Hearing Recorded and Transcribed by
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ROBERT W. SINGER
Chairman

New Jersey State Legislature

BIOTECHNOLOGY DEVELOPMENT TASK FORCE
LEGISLATIVE OFFICE BUILDING, CN-068
TRENTON, NJ 08625-0068
(609) 984-0445

TASK FORCE NOTICE

TO: MEMBERS OF THE BIOTECHNOLOGY DEVELOPMENT TASK FORCE

FROM: SENATOR ROBERT W. SINGER, CHAIRMAN

SUBJECT: **TASK FORCE MEETING - November 16, 1993**

The public may address comments and questions to Walter C. Kowalski, III, Task Force Aide, or make bill status and scheduling inquiries to Cynthia D. Petty, secretary, at (609) 984-0445.

The Biotechnology Development Task Force will meet on **Tuesday, November 16, 1993 at 12:00 NOON in Room 319 of the State House, Trenton, New Jersey**, to discuss the regulatory environment affecting the biotechnology industry and to discuss the promotion of the industry through the transfer of technology.

Issued 11/08/93

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SENATOR ROBERT W. SINGER (Chairman): Ladies and gentlemen, we are going to start the meeting, if you will bear with us.

Good afternoon, and welcome to the third meeting of the Biotechnology Development Task Force. Once again, I am delighted with the level of support the Task Force has received. The recognition we have gained is far greater than anything I could have imagined when I first brought up the idea with legislative leadership of creating the Task Force. The level of interest that has been expressed and the qualifications of those persons expressing their interest illustrate just how important this interest is overall to the economic development in our State.

New Jersey would be wise to take advantage of the biotechnology industry and to do what it can to promote its success. Previous witnesses have testified that biotechnology offers the potential to create many jobs at various educational levels. These are the types of jobs that are essential for a vibrant economy.

During previous hearings, the Task Force has heard from numerous individuals who discussed what the State needs to do to promote the growth of this industry. For example, State involvement could come in many forms, such as: providing financial incentives; assisting companies in finding suitable locations; and helping them to obtain all necessary permits.

Biotechnology also requires a strong economic environment to provide for the development of new ideas. The State support of these institutions of higher education is essential. Today, the Task Force will continue to examine the State's role in promoting the biotechnology industry. One area we will be looking at is the State's regulatory environment. New Jersey is often perceived negatively in its ability to attract and keep industry. A major reason for this perception is its sometimes overburdensome regulatory climate, including

excessive permitting requirements at B levels. The biotechnology industry cannot be allowed to be regulated out-of-state.

Before we begin taking testimony from those who have agreed to participate today, would any member of the Task Force like to say anything? Ira, would you like to say anything?

MR. WEISBERG: Not right now. Thank you.

SENATOR SINGER: Abe?

DR. ABUCHOWSKI: No, thank you.

SENATOR SINGER: Okay. Let me just say to everyone here today, I apologize. Unfortunately, Assemblymen Roberts and Impreveduto, who were planning to be here today, were called away at the last moment, and unfortunately, Nick Felice is down at the League of Municipalities. But as the Chairman and the lone Senator, it is my pleasure to be here today, and I really appreciate the time people have taken out of their busy schedules to be here.

I would ask John Martinson to please come up first to testify. Thank you, John, for being here with us today.

J O H N H. M A R T I N S O N: I passed out a package which included the text of my remarks. There are a few tables in it, and a few pamphlets. I am going to address what I am calling, "The Private Equity Crisis," and my recommendation that New Jersey's pension funds and other large investment pools should invest in venture capital and private companies.

I am John Martinson, Managing Partner of the Edison Venture Fund in Lawrenceville. I am also President of the Delaware Valley Venture Group, and a Director of the National Venture Capital Association. Our venture capital firm is named after Thomas Alva Edison, who was America's greatest inventor, and also, probably, New Jersey's most prolific entrepreneur, starting over 35 companies, including General Electric and many utilities. Founded in 1986, the Edison Venture Fund is the most active investor in emerging technology businesses in New

Jersey and in the Mid Atlantic states. Edison has financed over 50 young technology companies, many of which support the biotechnology and pharmaceutical industries. Our investment approach is outlined in the green pamphlet which I left with you. From my fund-raising activities seeking institutional investors for Edison, I have become knowledgeable by necessity about the investment policies of public pension funds.

I want to say right up front that my firm has a vested interest in the topic at hand. Edison is funded in large part by pension funds. If the recommendations contained in my testimony today were to be implemented, then Edison would very likely be one of the firms vying to manage some of this capital.

It is now widely acknowledged that economic and employment growth are driven mostly by expanding private companies. Yet, these promising businesses are frequently unable to raise financing, especially from New Jersey's major investment pools. Their growth is restrained by a critical shortage of equity available to New Jersey's private companies. Less than $75 million annually is invested in New Jersey companies by venture capital firms, and most of this financing comes from outside the State.

I am here today to advocate that the New Jersey Legislature permit the State Investment Council to invest in professionally managed venture capital funds, which in turn invest in private companies. The term "venture capital" connotes high risk and may seem too speculative for pension funds. However, most asset allocation experts recommend that large pension funds include private equity along with bonds, public stocks, and real estate in a diversified portfolio. New Jersey may have the largest pension fund in the United States without a private equity program.

I would next like to address what is happening in nearby states. First, the recommendation for venture capital investment by New Jersey was initiated over 10 years ago by the

Governor's Commission on Science and Technology. In 1985, I began a dialogue with the Director of the Division of Investment and members of the State Investment Council. In 1987 and 1990, Senator DiFrancesco introduced legislation which passed the Senate, but was never considered in the General Assembly.

Meanwhile, New Jersey has been surpassed in this respect by every Northeastern state. All nearby states, including Pennsylvania, New York, Connecticut, Delaware, and Maryland, not only permit, but encourage venture capital investment by their state pension funds. Nationally, about 60 percent of the states, incuding all states larger than New Jersey, enable their state pension funds to invest in private equity. Typically, their private equity allocation ranges from 1 percent to 11 percent of total assets. If you look at the map in my written testimony, New Jersey is the only State without, again, as I said, a private equity emphasis.

These small percentages, however, mean that private equity will not jeopardize the overall assets of the retirement system. However, they represent substantial resources of well over $2 billion in New York and $1 billion in Pennsylvania earmarked for private companies.

A common misconception is that venture capital is primarily funded by wealthy individuals who can afford to lose the money. Nationwide, private and public pension funds now provide nearly half of the capital for our industry. The long-term horizon of pension funds is uniquely compatible with the 10- to 13-year term of venture limited partnerships. Unfortunately, insurance companies are being forced out of venture funding due to certain accounting treatment which requires an immediate write-down of limited partnership interests. Foreign investment has also become unreliable due to so many world trends outside of our control. Nearly 20

percent of venture funding comes from endowments and foundations nationally, but those in New Jersey generally overlook venture capital, mostly due to lack of experience.

I show a table here of the funding sources. Looking at New Jersey, shockingly, private equity is barred or discouraged by nearly every investmnet pool in New Jersey. We are not talking just about the State Pension Fund. We are talking about nearly every insurance fund, mutual fund, and corporate pension fund. The AT&T Retirement System is the only organization in New Jersey that regularly invests in venture capital pools. They consider only large funds located throughout the United States.

As an example of the New Jersey financing environment, let me briefly describe my own firm's -- Edison's -- relevant fund-raising experience. We have raised two partnerships totaling $102 million in 1986 and 1990. About 15 percent of these funds came from New Jersey-based institutions. We are in the final stages of raising an additional $100 million partnership. I now anticipate that less than 4 percent will come from New Jersey-based sources.

Edison, like most venture firms, is highly dependent on public pension funds. For Edison's new fund with a $100 million goal, we have received commitments totaling $50 million from the two state pension funds in Pennsylvania, with an understanding that we will continue to invest about one-third of our capital in New Jersey and one-third in Pennsylvania. We have previously raised capital from nine public and eight corporate pension funds, which I have listed in my written statement, including: Connecticut, Dallas, Illinois, Maryland, Missouri, Montana, Pennsylvania, Rhode Island, and Virginia.

The investment managers of these pension systems believe Edison's strategy to invest in expansion stage, private technology companies in New Jersey and nearby states offers a suitable return potential versus the risk for their pensioners.

Why does the New Jersey Legislature and the State Investment Council think our own private companies are not investment worthy? I am often kidded about the lack of participation by New Jersey institutions. I never share in the amusement, for as I have explained, we have a private equity crisis in New Jersey that is most evident in the biotechnology industry, which is very capital intensive. About half of the $75 million that I said came from venture sources is really earmarked for follow-on financings for existing companies. Only $30 million to $40 million is supporting new companies. In biotechnology that means very few companies can be started each year.

Financing young businesses has never been more challenging. The credit crunch has made borrowing even more improbable for technology companies. The recession and the lack of capital gains tax preference have discouraged private investors. The currently frothy initial public offering market benefits just a handful of New Jersey companies which are in the most popular emerging segments. Biotechnology was very popular in the 1991-'92 period, but unfortunately, now is most disfavored as a public stock during this period of uncertainty over this country's health care direction.

I am personally involved in organizing venture fairs and participating in small business clubs to bring the private, or individual investor together with entrepreneurs running companies with revenues under $5 million that require less than $1 million financing. The South Jersey and North Jersey Venture Fairs showcased 40 young companies to over 100 financing sources, mostly individual investors.

I have also helped to form the New Jersey Private Investors Network. These initiatives are useful in financing early-stage companies. But biotechnology and other capital intensive businesses need sources with much "deeper pockets." Institutional investors are necessary for financing

requirements over $1 million and the much greater amounts required for biotechnology. The benefits of venture capital are highlighted by the brochure I handed out, which was prepared by Coopers & Lybrand. We must support high-potential private companies, the backbone of New Jersey's economic growth.

Most public pension funds set a cap on private equity that ranges from 1 percent to 10 percent of their total assets. Some pension fund managers interpret these caps as a legislative mandate to participate in venture capital, while others seem very eager to establish a substantial private equity program for its own merit. For example, in Pennsylvania, the cap is 5 percent, and in Michigan, the cap is 10 percent. In both Pennsylvania and Michigan, the investment staff selects venture capital partnerships emphasizing those with coverage of their state. They also invest directly in private companies. In Pennsylvania, they consider only later-stage businesses referred by select consultants. In Michigan, they have invested directly in 125 local companies, including some start-ups. Most state pension funds engage a specialized consultant in venture capital to select and monitor independent limited partnerships without undue geographical preference.

I was requested to discuss the performance results of private equity investing by public pension funds. In general, they do not publish their returns for individual categories. Over the long term, venture capital funds have outperformed public stocks and fixed income securities. Although each investment is speculative, blending 10-50 investments in a partnership largely mitigates the overall risk. Many institutional investors expect a 15 percent to 20 percent annual return from private equity. Venture capital partnerships have historically earned from 5 percent to 70 percent annual returns. This very wide variation often depends upon the timing of technology evolution, market dynamics, and

stock market cycles. However, the principal differentiation is the professional manager's skill in selecting and existing investments. The specialized biotechnology funds headquartered in New Jersey rank among the venture industry's best performers.

Most states today are increasing their private equity commitments at a greater rate than their other investment vehicles. The hot new issues market has propelled venture capital to much higher returns in the 1990s, with biotechnology exhibiting considerable gains and considerable volatility. Once again, many consultants are advising that private equity offers an attractive investment potential.

Few funds have actually lost money, but the early results are usually down. Since venture capitalists invest in young private companies, the development process often takes five to ten years for them to mature enough to go public or to be sold. Consequently, the typical venture capital fund has a 10- to 13-year life. This long-term illiquidity can be accommodated by pension funds, but not many other investment classes. Venture capital partnerships and pension funds make good partners.

A few states have focused primarily on local economic development. Some selected inexperienced investment managers and pursued solely the most risky strategy: start-up technology companies. I trust that New Jersey will learn from such misjudgments. I recommend investments in several limited partnerships directed by experienced venture managers. The partnerships should be diversified among investment strategies involving stage of development, industry, location, and size of financing. A private equity program could also include direct investments in estabished businesses with good financial prospects, incuding public biotechnology companies.

In my opinion, the Division of Investment is superbly managed with an excellent track record. Roland Machold, the Director, is among the country's most respected investment

executives, but he operates under restrictive guidelines. Let's modernize the laws and regulations to further broaden the investment opportunities beyond public stocks and bonds. Mr. Machold has previously studied venture capital and is well-prepared to oversee a private equity program with professional managers. Way back in 1984, and then revised in 1988, Mr. Machold prepared draft internal guidelines for venture capital investing. Several experts and I contributed to those balanced guidelines.

After 10 years of discussion, let's finally pass the appropriate legislation. The question is not should New Jersey pension funds invest in private equity, but when and how. I will finish my testimony with several recommendations. I endorse earlier speakers' recommedations that the Division of Investment be allowed to invest in diversified pools of venture capital and later-stage private companies. I recommend that you quickly reintroduce and pass legislation similar to Senator DiFrancesco's 1990 Senate Bill No. 455. However, I believe that State appropriations of general tax collections should not be utilized for equity investment.

I also recommend placing a cap on investing in private equity at 5 percent to 10 percent of total assets A 5 percent allocation to private equity would provide over $2 billion, which could finance hundreds of private companies. However, I don't favor economically targeted investment quotas. New Jersey's venture capital managers just desire the opportunity to compete for an investment allocation based on our strategies and performance. I believe that New Jersey's best private companies and venture capital funds will be selected on their merits. We cannot continue to expect that New Jersey's companies will be primarily financed by venture capital partnerships and pension funds from other states, since their investment strategies may change.

I also recommend that the Legislature, Governor, and State agencies reexamine the investment regulations and guidelines for insurance companies, utilities, banks, mutual funds, corporate pensions, and other long-term capital pools. This is not just an issue with the State Pension Fund. We must erase the outdated stigma that private equity is too complex and risky even for our seasoned money managers.

In conclusion, emerging private companies, as we all know, drive job growth in this economy. New Jersey has more scientists and engineers per capita than any other state. Our State already has many of the country's finest pension fund managers and experienced successful venture capital. Let's update New Jersey's antiquated investment regulations to at least be comparable with other states. I urge the Legislature to unleash our investment managers to finance New Jersey's worthy entrepreneurs who are building leading companies.

I greatly appreciate the opportunity to bring the private equity crisis to your attention. Your staff person, Walter Kowalski, was very professional, courteous, and helpful in my preparation for this testimony.

Thank you.

SENATOR SINGER: One thing I will say, John, is that if we have to give Roland a raise, we will refer him to you.

Are there any questions?

MR. WEISBERG: I have a couple of questions.

SENATOR SINGER: Sure.

MR. WEISBERG: Mr. Martinson, we heard in previous testimony, and from your own experience as well, that venture capital money is often restricted from being used for facility growth, but rather is used for technology development. Other testimony we had in the Task Force indicated a lack of available laboratory space for emerging companies. If the State were to unleash the pension money, could there be

(indiscernible) of not using brick and mortar be diminished?

MR. MARTINSON: In my mind, it is the choice of the investment managers: Is that a suitable investment for a competitive rate of return? In general, venture capitalists do not invest in facilities; we invest in people, R&D, marketing, and those other things. We look for debt sources to finance buildings.

One of the things we bring to the company is the credibility to raise that debt money.

MR. WEISBERG: Also, over the last five years or so, what has the rate of return been in biotechnology development investments?

MR. MARTINSON: The rate of return? It is not a published number, but one way to see it is, the biotechnology funds that are domiciled in the State of New Jersey have raised enormous amounts of additional capital. So obviously they are performing well, if they are able to attract more money. But their results are private.

I am told that they are among the top -- as I stated in my testimony -- performing funds in the country. A number of them have returns greater than 20 percent per year.

This has been an unusual period of time with the number of public offerings and other things, so generally investment managers would say 15 percent to 20 percent would be just fine.

MR. WEISBERG: As you mentioned twice, this has been turned down by the Legislature. Is there any reason why they shouldn't pass it now?

MR. MARTINSON: No. I believe -- and I am obviously biased -- that nearly every consultant who recommends where you allocate money within a pension, includes venture cap or private equity in that allocation. You can see it in every state that surrounds us. They have done that, and so have most

states across the country. We are behind the times in not doing that, and we are ultimately impairing our own businesses.

It is also a symbol to the other investment pools in our State of whether private equity is a suitable investment area. I believe in small percentages or moderation it certainly is, and it offers, historically, among the highest rates of return. The chief negative is that it is illiquid. You can't suddenly decide that you do not like the stock and sell. You are a shareholder for a good time until you can find another private buyer. That is certainly a serious disadvantage.

Pension funds, however, with their large pools and long term, are uniquely qualified to handle that part of the undesirable feature of the long-term illiquidity.

MR. WEISBERG: My last question: In your experience, when a young company, an emerging company, is looking for initial funding and they come to venture capitalists, have you dissuaded some of your clients to go to a state where there is pension money available, as opposed to remaining in New Jersey?

MR. MARTINSON: I am suggesting that pension funding does not directly come into most young start-up companies. It should come through professional managers who do that full-time. I think what happens is, Edison is the only fund in New Jersey which is truly dedicated to investing in this area. Every other fund operates nationally. Pension funds which have started -- which have invested in venture capital have generally supported more their local funds, and that has led to more money being resident.

There is considerably more money available for early-stage companies in Pennsylvania, due to the pension fund investment.

MR. WEISBERG: Has New Jersey lost jobs because of not having this policy -- the opportunity for jobs?

MR. MARTINSON: I am not going to go to that stretch. I think it is coming.

SENATOR SINGER: Ira, I don't think he has the qualifications to tell us that. I think he can tell us about investments; I don't think he can tell us who has lost businesses. I don't think he is making that type of a presentation.

MR. MARTINSON: I would say it is more difficult for a young company to raise money in the State of New Jersey than perhaps other parts of the country. That ultimately has a job impact.

MR. WEISBERG: Thank you.

SENATOR SINGER: Abe?

DR. ABUCHOWSKI: Do you know if the funds that you manage have any investments in biotechnology in this State?

MR. MARTINSON: We support service-related industries, packaging companies, and software companies that have an impact upon the biotech, but we are not a pure investor in biotech. We do not believe we are large enough to do that. I was asked here because we are the pension fund of New Jersey which has attracted the most capital from other public pension funds. We have nine investors who think our strategy to invest in New Jersey is very suitable for them. I think, as I said, I am somewhat embarrassed that we can't attract New Jersey institutions which think New Jersey is a worthwhile place for private equity investing.

SENATOR SINGER: You should know, Ira, that the objectors to the past bills have not been the pension funds themselves. There has been some concern from the banking industry based on the change in regulations that this would require, and some changes they might have to make. So there is more to it than just that, but there has not been an objection from anyone involved with the pension system strongly saying, "We are against what--"

Remember, the bills were permissive, which allowed them to either do it or not do it. They are not mandated to do it.

MR. WEISBERG: Right.

SENATOR SINGER: That gives a lot of flexibility in what to do.

John, I thank you very, very much for taking your time to testify.

MR. MARTINSON: Thank you.

SENATOR SINGER: The next gentleman will be P. Andrew Neighbour, Ph.D., Director, START Technology Partnership, and the Ben Franklin Fund.

P. A N D R E W N E I G H B O U R, Ph.D.: Mr. Chairman, ladies and gentlemen: My name is Andrew Neighbour. I am here in two capacities, really, as Director of the START Technology Partnership, and I am also affiliated with the Ben Franklin Technology Center in Southeastern Pennsylvania. Although my accent may not suggest it, I currently reside in Pennsylvania, but I should also mention that I recently married someone from New Jersey, so this State does have some relevance to me.

What I am going to talk about today-- I am going to give you a brief overview of these two programs in Pennsylvania that are, in part at least, focusing on technology transfer and economic development. (witness will be using slide projector to demonstrate)

The Ben Franklin Technology Center is a state-funded, nonprofit economic development program. I will talk a little about its mission, some of the financing programs it engages in, the services it offers to companies and academic institutions in Pennsylvania, and some information regarding its budget. Then I will focus on the START Technology Partnership, a new academic technology transfer consortium formed a short while ago in our state. Again there I will give you some background on our mission, how we are organized, the

budget allocations, the fund -- that's the program -- the services we offer, and where we have gotten in the past two years.

The Ben Franklin Technology Center Program is an initiative of the Ben Franklin Partnership. It is approximately 10 years old, and was founded as a nonprofit economic development consortium -- or corporation.

The local chapter in Philadelphia -- the Southeastern Pennsylvania Chapter -- administers the Partnership Program for the state. Its fundamental mission is to promote economic competitiveness through innovation and technology. The key element is by forming partnerships between academic institutions and private individuals and companies to stimulate the development of technology and the development of products, jobs, and companies in our region.

Currently, it is actually the largest source of seed capital for technology development in the Philadelphia region. By seed capital here we mean moneys that are made available to developing corporations and companies at that very early stage in their growth, prior generally to any equity investment -- needed funds, moneys for the development of technology from the original concept until the formation and establishment of a freestanding company.

In our region, Ben Franklin claims that it is the leader in technology transfer for universities. That is primarily because of its recent and significant investment in the START Technology Program, which I will talk about in a moment.

The Ben Franklin Technology Center essentially has two components. Much of its budget -- and I will give you the breakdown in a moment -- is appropriated towards the providing of funding, or as grants, if you will, to a variety, and through a variety of programs to private individuals, universities, and companies. The Technology Transfer Fund is a

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Fund that individuals can apply for, primarily in universities, to seed the development of their technology leading to the formation of a company. These funds typically run upwards of $150,000 over a three-year period. They have a strong matching requirement, meaning that for the individual or the group to receive these funds, they must find a company that is willing to match that contribution equally. That company typically is going to have a keen interest in that technology and may ultimately acquire the invention, but more importantly, may become a strategic partner with that new company as it develops from the mother ship, if you will.

Innovation awards, smaller grants, usually $25,000 to $50,000, given to individuals, often private inventors who need those funds to establish the proof of principle of their invention and take it on from the original discovery. They are competitively awarded. There are committees within the Ben Franklin Technology Center that assess the merit of those applications, and funds are awarded to those individuals on that basis.

The program also provides some funds for growing companies. Again, these are grants that can run up to about $150,000. They seed growing companies in our region. Again, we require that in these cases, the company provide something back to the Ben Franklin Partnership in the way of a royalty on their future sales and profits. It is actually this program that has established the Ben Franklin a fairly substantial flow of revenue back into the organization, moneys which are now going to be used to reinvest in the development of technologies.

Two smaller programs have been initiated recently: one to support the development of recycling technology for the environmental area, and the Microloan Program, where the Ben Franklin is administering a grant that it received from the U.S. Small Business Administration of almost $1 million, to

give small funds and loans to women and minorities engaged in the development of start-up companies.

On the services side, which is, again, about 50 percent of Ben Franklin's operating funds, it has initiated a number of programs that offer support and provide services to companies that are being developed in our region. The lead one-- At the top of the list is the Center of Research Excellence Program. In a sense, this is a mix of the two types of areas, because this is a funding program that gives moneys to programs within universities that have defined a particular research competency. Those university groups have, in part, gone out and pulled together a number of larger companies which have agreed to match those contributions and found a research program of excellence. The technologies being developed in that Program will be owned by the companies that have coinvested.

We have established some 13 Centers of Excellence in a broad area of technologies, many of them biotech in the Philadelphia region at most of the leading universities and research centers. These would include such things as: thrombolitic research, environmental remediation, orthopedic devices, a whole variety of areas. Now, in fact, we are beginning to think about, and look for, opportunities where we can fund research into more public health-type issues, outcome research for medical care, and such programs.

That Program receives, as you will see a little bit later, somewhere around three-quarters of a million dollars a year out of the total budget of the Ben Franklin grant.

The START Technology Partnership-- I will talk in details; I will not dwell on it here. The Business Information Center is a major service that the Technology Center provides. This is essentially an electronic library, with trained professionals who provide access to a variety of on-line databases to small companies in our region. Through various

funding programs that have been granted to the Business Information Center, they are able to provide subsidized assistance in searching patent literature, technical literature, business literature to help companies to better do their business.

The Delaware Valley Total Quality Consortium is a new program being administered through the various community colleges in our region. Ben Franklin provides financial support and some specific expertise to help in the running of these programs. Southeastern Pennsylvania is rich in networks of incubators. These are sometimes physical facilities provided to new companies. Many of those incubators are funded by the Ben Franklin Program. The leading one would be the University City Science Center in Central Philadelphia. There is also an incubator network in Paoli, in suburban Philadelphia.

Recently, Ben Franklin has appropriated some funds to providing assistance with small business innovation research grants, the SBIR programs that the Federal government is supporting. The Ben Franklin will help people be competitive for those programs. We provide information, services, and handholding to individuals to help them to apply for such applications.

Then again recently, a new program in the training of minorities and welfare recipients, cofunded by the Ben Franklin Technology Center.

I won't go into detail here, but you can see that the total budget for the Ben Franklin Southeastern Pennsylvania office is around $6 million. The million that is not reflected on the chart is the operating expense for the Partnership. Over $3 million is given through grant programs and funding programs to other initiatives, and about $2 million is spent to fund these internal services.

Let me turn now to START. This is one of the programs that Ben Franklin has been very critical in initiating. Two

years ago, START was founded as a premier consortium for academic technology transfer. By that I would like to emphasize the word "premier," but maybe in a year or two we can claim that. Currently, what I would claim is, we are a consortium. We recognize the need to bring people together with common interests, but more importantly, with a wide and diverse array of expertise. We have put them together in a unit called START, which is there to augment the technology transfer activities of our regional universities and research institutions. Our role is to help by adding value to their inventions; to help those basic inventions to become more commercial in the marketplace; to recognize the ones that are commercial from those which are not; and to help universities make decisions on where to put their development time, effort, and funds.

We obviously want to make money. We are a not-for-profit entity, but our mission is to increase the revenues and financial returns for our sponsors. As you will see in a minute, our sponsors are the universities and a number of other entities that fund the operations of START.

We want to form new companies. We have this strong economic initiative also. We are interested in our models. START is a unique model, and we are interested in seeing that model duplicated elsewhere and providing some demonstration that this approach to tech transfer is effective and provides some real merit.

We look at the consortium, and we can see the variety of the organizations that form START. AT the top there, we have now 11 institutions ranging from Drexel, Hahnemann, Temple, Thomas Jefferson, most of the leading universities and research centers in Philadelphia. Our regional territory, if you will, is southeastern Pennsylvania, throughout the Delaware Valley. I decided the Delaware Valley, which is, in a sense, why I am here talking to you today.

Those institutional sponsors, which currently all come from Greater Philadelphia, provide us with money. They provide an annual fee to join START of $10,000 each. But more importantly, they are the source of technology. We have also managed to convince seven leading venture funds to join. Again, they provide funds; again, $10,000 a year. But most importantly, they provide their expertise in new company formation, in recognizing technologies that are commercial, and hopefully are a captured source of future investment if any of our technologies are strong enough to stand the test of new company formation.

We have a small cadre of corporate sponsors and commercial entities that offer services in return for sponsorship. We have eight legal firms from Philadelphia which provide discounted services in general legal and intellectual property.

Now, we have two fundamental organizing sponsors who provide most of our operating moneys. One is the Ben Franklin Technology Center that I have told you a little about. The other is the British Technology Group. BTGUSA, which is the American affiliate of British Technology Group worldwide, was established about three years ago in Philadelphia. BTG, its parent company, has 40 years experience in commercializing technology from universities and government labs. By becoming a partner of START, it essentially makes that experience and expertise, as well as its broad contacts in the industry, available to our consortium. So they bring us the organization. Organizing sponsors provide us with our operating moneys, but most importantly, people who we use on a regular and daily basis to help us to get our work done.

START's objective is to take the technologies from the sponsors and bring them out into the marketplace through licensing or through forming start-up companies.

If we look at our budget today, we can see that the largest percentage of it so far has come from the Commonwealth of Pennsylvania through the Ben Franklin Technology Center. We receive about one-sixth of our funds from the institutions, and a little bit more than that from the British Technology Group, the venture funds, and other revenue sources. But the critical number there is that in the two years of operations -- but we are now in our third funding year -- we have successfully raised from these consortium members a little more than $2 million, which has been invested in this program.

Now, together with the budget resources comes the expertise I have mentioned already briefly. But Ben Franklin's experience in forming companies, the Business Information Center, and access to some of these additional financing programs give us a lot of leverage in helping universities in our area. The British Technology Group brings its licensing professionals. If I do not understand a technology, I go next door and bang on the door to someone with 20 years experience in the electronics industry and ask him what he thinks. I apply that knowledge to START's decision making. It is a very valuable expertise.

More importantly, however, BTG owns 8000 patents worldwide, and has currently 700 active licenses worldwide. That means they know 700 companies very, very well. We can go to them and use that network when we have technologies that we want to take out and license. The British Technology Group is extremely cooperative in helping us do that. The key in technology transfer is knowing who to market your technology to, and who is the champion in that company to interact with. The venture funds, as I mentioned, bring a more subtle, but nonetheless significant expertise to START's operation.

Our fundamental daily activity is assessing technology. We undertake significant assessment, patentability, business potential, competitive activity, and

market analysis on the disclosures that are coming out of our universities. Those assessments are returned to the universities. We do this on a "no obligation" basis. The universities decide what technologies we look at. We assess them. We tell them which ones we do not think are commercial, and we tell them which ones we think are commercial. The ones we like, the ones we think we can get into the marketplace, they are under no obligation to give us. But obviously, we offer services in such a way that we try to make them believe they are going to get added value by working with us, so we seek to take ownership of those programs from the universities and take them forward into the marketplace.

We will apply funds. It is not atypical for me to give $25,000 to a project at a university in order to help to nurture it a little bit, to make it more attractive to a potential company for license. I have a limited amount of that money in my own budget that I can do that with, but then beyond that I can go out to Ben Franklin and raise more money, or go to British Technology, or the venture funds, and help seed these embryonic inventions to a point to make them either very good candidates for a company's formation, or much more attractive in the marketplace to a new pharmaceutical company or to an electronics company.

Obviously, we are very heavily involved in the management of the intellectual property, and once we have acquired an invention from a university we have to go out and market it, negotiate, set up the deal, and so on. Those are the very active things that START does.

Now, who gets what out of this? I said we were not-for-profit, so I can say that START gets nothing from it, which is true. We recover some of our costs, but the net royalties or equity that is developed as a result of a commercialization is passed through START back to our investors and to the technology source. A standard formula is that the

university will get 50 percent of everything we recover, BTG -- British Technology Group -- gets half of the other half -- namely 25 percent -- and the other royalty will go into a shared pool which is used to repay, then, Franklin's contribution over time with some return on that contribution. Then, anything over that is divided amongst all the institutional sponsors.

What that means in plain terms is that Drexel will ultimately get some return from a Jefferson invention, and vice versa. That is a very clever, if you will, system in our consortium which helps to tie the universities together and helps vest them in the success of the entire program.

Status: Very quickly, as I said, we are two years old. We have reviewed 120 technologies in the first two years. We are now at the beginning of year three, and the numbers haven't jumped much yet in year three. Of all those 120 programs -- or projects -- we now own six of them. Those are six inventions that we are taking out into the marketplace to commercialize. We are actually negotiating nine or so other ones, trying to get the universities to give us the right to go forward and commercialize them.

We have turned down an awful lot of technology. What is very key in this tech transfer business is that there are a lot of things that you can patent, but there are very few things the market wants. It is helping the university make that decision so that they are not needlessly investing money in protecting useless assets. They are able to recognize from their portfolio of inventions those that the market is craving, and then also helping them to understand what needs to be done to realize that return.

So 10 percent of 120 inventions is actually a very high percentage by my reckoning, but we are developing a growing portfolio and we expect to see some royalties coming in from those fairly soon.

I thought I would just very briefly give you a sense of the distribution of technologies we see. Because we service 12 institutions that cover the entire range of technologies, we obviously see everything. We do not turn anything away. We do not specialize in any one area. That is because we have the BTG resources behind us. One day we will have a microwave technology coming in; the next day a new piece of construction tie material. I cannot be expected to be an expert in all of that, so I utilize those resources.

My background is biotechnology. We have a very high emphasis in Pennsylvania -- or in Southeastern Philadelphia -- on the biotech/biomedical area and, in fact, of the 120 inventions, about 80 percent have biomedical application. Strict biotechnology, depending on how you define it, is obviously smaller than that, but we have a great wealth of capability in that area, and most of START's in-house capability is focused around biotech.

In terms of our portfolio, we own six projects now: three biotech programs -- a growth factor, an antisense reagent with a potential pharmaceutical application, and an enzyme used in clinical chemistry. But we also have physical sciences, some microwave technology, and some computer software. We are hoping to bring on board soon a gene promoter and some magnetic resonant spectroscopy technologies from two of our other institutions. It is a wide variety. The portfolio is growing. These are now owned by START. We own the patents and we are absolutely responsible for their commercialization.

I guess I won't bore you with that one, but I will be more than willing to answer any specific questions you may have.

SENATOR SINGER: Andrew, one question I have is: The seed money to the Ben Franklin Fund-- Where did that come from? Was it a bond issue from the State? Was it a line item in the State budget?

DR. NEIGHBOUR: It is a line item.

SENATOR SINGER: How much is the line item each year?

DR. NEIGHBOUR: The Southeastern Pennsylvania Chapter receives about $6 million.

SENATOR SINGER: So every year you get $6 million to replenish the Fund. Was there additional start-up money besides the $6 million, or just the $6 million the first year and each year--

DR. NEIGHBOUR: Well, the budget has changed dramatically over the years. The last two or three years it has been around $5 million, $6 million, $7 million.

SENATOR SINGER: Okay. Who administers how the Fund -- the decision-making factor of the Fund? Is there a Board?

DR. NEIGHBOUR: There are numerous committees that have been formed as an investment: an Advisory Committee, a Technical Review Committee, an Investment Committee. These are manned by volunteers in the region who are drawn from the venture community, the small company start-up community, the academic community, people with specific expertise in the area of that committee's responsibilities.

SENATOR SINGER: Is there a city board that Pennsylvania has established to oversee the Fund?

DR. NEIGHBOUR: Oh, there is a state Board that oversees Ben Franklin -- the Ben Franklin Partnership Fund--

SENATOR SINGER: Okay.

DR. NEIGHBOUR: --which is much larger than $6 million, because that serves four regional chapters.

SENATOR SINGER: How large is that entire Fund, approximately?

DR. NEIGHBOUR: That is somewhere around $22 million.

SENATOR SINGER: And that again is so that each segment gets their allotment each year of the state budget?

DR. NEIGHBOUR: Yes, absolutely.

Now, in addition, as I mentioned, each chapter is now beginning to generate some moneys, and they are being allowed to retain those funds and reinvest them in technology in the area, rather than--

SENATOR SINGER: So in essence, you might have $8 million next year?

DR. NEIGHBOUR: Yes, absolutely.

SENATOR SINGER: Does anyone else have a question?

DR. ABUCHOWSKI: Yes. Some of this may have been presented, but there is a lot of information to absorb it all. Do the universities-- Are they required now to go through this Fund--

DR. NEIGHBOUR: Not at all.

DR. ABUCHOWSKI: --or do they still have the opportunity to go out separately?

DR. NEIGHBOUR: There are no exclusives. They can choose what technology they let us see; they can choose whether or not they give it to us; and they can certainly choose to do it themselves or go out and work with other entities. We are not exclusive in any way. They, of course, have given us $10,000, which is a sizable portion of their budgets, for tech transfer. Oftentimes, that is going to mean that they are going to want to use us exclusively. But for $10,000 they get more in return than they could buy internally with that money, so they are very happy to just channel things to us and keep us working for them.

DR. ABUCHOWSKI: So the benefit to the university is, rather than having an in-house group that tries to create incubator facilities--

DR. NEIGHBOUR: Right.

DR. ABUCHOWSKI: --or to promote the business aspects, they will go to you who will act as the intermediary--

DR. NEIGHBOUR: Correct.

DR. ABUCHOWSKI: --with the business side--

DR. NEIGHBOUR: Correct.

DR. ABUCHOWSKI: --and evaluate everything for them, providing that the business has a start-up--

DR. NEIGHBOUR: That's right.

DR. ABUCHOWSKI: --providing administrative services.

DR. NEIGHBOUR: Yes.

DR. ABUCHOWSKI: Then if the project comes to fruition, then the money that comes in is split--

DR. NEIGHBOUR: Right.

DR. ABUCHOWSKI: --and anyone who takes part in the pool gets a share from it--

DR. NEIGHBOUR: Correct.

DR. ABUCHOWSKI: --regardless of whether they develop it.

DR. NEIGHBOUR: Correct.

DR. ABUCHOWSKI: I see.

DR. NEIGHBOUR: We also take the risk from them, because the moment we take the project on, all costs become ours. We only recover those costs if we are successful. They are recovered from royalties. So if the project isn't commercial and we have made a wrong choice, we lose the money, the university doesn't. So it is very much in their interest to pass the technology on, particularly the riskier ones. The big blockbusters they are probably going to want to do themselves, and they may well choose to do that.

But for 90 percent of the commercial things, they will see that there are many ways in which we can help them to do it.

SENATOR SINGER: Are there any other questions? (no response)

Doctor, thank you very much for your presentation. It was a very nice presentation. We appreciate it.

DR. NEIGHBOUR: Thank you.

SENATOR SINGER: Next will be Mr. John Hume, Director of Planning and Analysis of Enzon, Inc.

J O H N E. H U M E: Thank you, Bob. I would like to give you thanks also for the fine New Jersey weather you have arranged for today, and for kindly agreeing to share it with our neighboring states as well.

In front of you, you have a report from Enzon dated November 16, 1993. I will be going through this report.

I am John Hume, Director of Planning and Analysis of Enzon, Inc. I am responsible for strategic planning and budget analysis. At the October 8, 1993 meeting of this Task Force, you heard a presentation by Edward Ehrenberg, Executive Vice President, Business Operations and Acting Chief Financial Officer of Enzon. I report to Ed in his capacity as Acting Chief Financial Officer.

In Ed's presentation, he provided a comprehensive plan to encourage the establishment and growth of the biotechnology industry in New Jersey. Highlighted were the characteristics of the industry, including the lengthy timetable for new drug development, examples of the financial inducements other states are offering to companies such as Enzon, and a listing of nine recommendations for making New Jersey competitive. One recommendation proposed the modification of State laws and regulations to allow the State of New Jersey to invest its pension funds in biotechnology companies. For today's Task Force meeting, we have been asked to elaborate on the merits of this recommendation.

In my presentation, I will provide an overview of the growing importance of biotechnology as an investment alternative, give examples of how other states are investing in biotechnology, and make specific recommendations for amending State laws and regulating policies.

I would like to make a few comments about our methodology. We selected states based on their known interest in biotechnology and geographic proximity to New Jersey. The data on individual states is obtained from documents which

institutional investors, including some state pension funds, are required to report to the U.S. Securities and Exchange Commission. These documents are called 13F Filings. Such data is provided through Vickers, an on-line computerized database service. Because of technical reporting requirements, not every state pension fund must report its portfolio. To supplement our information for those states not covered by Vickers, we conducted a telephone survey to obtain qualitative input. While our findings are not complete, they do provide important insights into the present status of state pension funds investment in biotechnology.

I will proceed by giving you a summary of our findings. First, our summary shows that for the industry overview, biotechnology stocks have outperformed the stock market during the past five years. This, I think, will answer one of the earlier questions. Biotechnology stocks have grown to represent 0.6 percent of the total stock market capitalization. It has become a sizable industry.

We will also show that other states are investing in biotechnology, and have made significant investments through their state pension funds in biotechnology companies. Their biotechnology investments are spread among a number of biotechnology companies. We call this the "Basket Approach."

States have estabished venture capital funds for start-up companies as well. That was covered in a previous presentation. Also, we found that states make investments in support of their economic development goals.

Then we will cover what keeps New Jersey from investing in biotechnology. We found that legal and regulatory policies exclude consideration of all but five biotechnology companies, and that none of New Jersey biotechnology companies meet the State's requirements.

What can New Jersey do? We provide recommendations to support the New Jersey biotechnology industry.

Our first graph shows that biotechnology stocks have outperformed the stock market during the past five years. On the left-hand scale you see the relative performance index with 1988 as the starting year with an index of 100. Biotechnology stocks have grown through 1993 year-to-date to an index of about 300. Standard & Poor's 500 at the same time has grown to an index of only about 163.

This shows (using next graph) the growing importance of biotechnology in outperforming the stock market in general, and particularly it highlights the importance of also investing in biotechnology for the long term. You can see a sharp peak in 1991 when the biotechnology market peaked. Since then there have been some declines down to the current level.

This tripling of the biotechnology stocks has resulted in biotechnology stocks reaching -- or representing 0.6 percent of the total stock market capitalization. This number was derived as of September 30, 1993, and we show the biotechnology -- the 50 largest biotechnology companies that are publicly traded have a current market value of about $30 billion. The combined value of all the stock markets is about $5.3 trillion, thus deriving the biotechnology share of the stock market at 0.6 percent. It is interesting: Twenty years ago, the biotechnology industry was just a fledgling, and this number would have been about zero.

States have made significant investments in biotechnology. On our next graph we show the size of investment by various state pension funds.

In the back of your report, there is a legend that shows the state pension funds that match up with the states identified on our graph. You can see that the Wisconsin Investment Board has the largest investment in biotechnology at over $300 million. The State of California is next at $76 million, followed by New York at $60 million. There is a trail off in size to Ohio, Colorado, and Michigan. We attempted to

find data on other states closer to New Jersey, but much of this data was missing from the-- Because of the technical requirements, it was not submitted to the U.S. Securities and Exchange Commission.

When looking at the significant investments states have made in biotechnology on a relative scale, the next chart shows the percent of state pension fund portfolios that are held in biotechnology. Again, Wisconsin leads, with over 2.3 percent of its investment in biotechnology. We show California and Colorado next at 0.4 percent and 0.2 percent. This compares with the Market Capitalization Line for Biotechnology of 0.6 percent, which we derived from its market capitalization.

When looking at the number of companies that the state pension funds have invested in biotechnology, we find that California is the most diversified, with 61 companies -- 61 biotechnology companies in its portfolio. Wisconsin is next with 31, followed by New York and Michigan, with 14 and 13, respectively. This broad inclusion of companies is what we call the "Basket Approach" to investing in biotechnology. On the far extreme, we see the State of Ohio, which has one company invested. Because of the volatility of biotechnology stocks, we suggest that this broad basket approach be adopted.

We have also looked at which states have established venture capital funds for start-up companies. On April 9 of this year, California announced the allotment of $75 million for the creation of a Venture Capital Fund to invest its start-up companies. The State's biotechnology, electronics, and other high-tech firms are primary candidates. Further, Rhode Island and Massachusetts have created Venture Capital Funds for start-up companies, including biotechnology. These are funded out of state pension funds.

We also found that states make investments in support of economic development goals. The California State Teachers' Retirement System has set a goal of investing 75 percent of its

Venture Capital Fund in companies doing business in California. Also, one 1989-1990 survey of state public pension funds reports that of 42 responding funds, 25, or 60 percent, made investments to promote socioeconomic goals, including in-state economic development.

What keeps New Jersey from investing in biotechnology companies? New Jersey has legal and regulatory policies which exclude consideration of all but five biotechnology companies. Present State law requires that the prudent person is only evaluated on their individual stock performance, not the overall performance of the entire or whole portfolio. This is in pension fund management jargon, but basically the end result is that it encourages consideration of only low-risk, low-return investments. Also, there are no New Jersey investments in venture capital, as far as we know.

Regulatory policies to implement the law follow the approved list approach. Companies are selected for inclusion in the State pension fund by using the following guidelines: The minimum market capitalization must be $200 million. They must have probable income, solid business management, and control a sizable market share within their segment of the business. Only 600 companies have been selected to meet these guidelines.

More importantly, none of the New Jersey biotechnology companies meet these guidelines. Profitability and/or market capitalization criteria prevent investment in every New Jersey biotechnology company. The lengthy timetable for new product development delays the realization of profitability of these companies.

What are our recommendations to support the New Jersey biotechnology industry? We propose that the State amend its regulatory policies -- "the Approved List" -- to allow investment in biotechnology companies by lowering minimum market capitalization from $200 million to $100 million, and

including companies with profitability expected within five years. Also, New Jersey should eliminate the market share requirement.

Our second recommendation is to spread biotechnology investments among a number of companies by following the Basket Approach and measure performance accordingly, adopting the Whole Portfolio Approach.

Third, New Jersey should target pension fund holdings in biotechnology stocks at 0.6 percent. As we have seen, Wisconsin already exceeds this target.

Fourth, New Jersey should make investments in biotechnology companies that are consistent with the State's economic development goals.

Fifth, New Jersey should establish a Venture Capital Fund to invest in a diversified pool of start-up companies with market capitalizations less than $100 million. This would pick up the large number of New Jersey biotechnology companies which do not meet the approved list criteria which we are proposing.

Last, the Task Force should review Senate Bill No. 455, introduced by Senator DiFrancesco, in light of the above recommendations.

SENATOR SINGER: John, that was some presentation. Thank you.

Are there any questions?

MR. WEISBERG: Why $100 million as a trigger for the amount to invest?

MR. HUME: Well, we think with the $200 million market capitalization, it eliminates a lot of companies that are in the late stages of development, such as Enzon. The $100 million would provide access to -- capital access to companies when they need it in trying to reach the late stages to become profitable. That would give the State an opportunity to make -- would give the State potential for the kinds of returns we showed for biotechnology companies.

MR. WEISBERG: How many later-stage companies are there with a market capital of $100 million?

MR. HUME: In New Jersey, we think there are five companies: Liposone Company, Inc., Alteon, Enzon, Cytogen Corp., and Immunomedics. They would all benefit from this.

MR. WEISBERG: And those that are below the $100 million--

MR. HUME: Those below $100 million would be included in the venture capital pool.

SENATOR SINGER: Yes?

MR. ROTH: How large an initial venture capital fund would you like to see created?

MR. HUME: I guess you have heard some other testimony on that. I think the size of investment that companies need is pretty large. If you look-- It would be on the order, probably, of several hundred million dollars. That would be made available over a period of several years.

SENATOR SINGER: Thank you.

We are now going to switch gears a little bit and go away from the finance into the regulatory. Based on time restraints, I am going to ask that Mr. Richard Greenberg, from Environmental Waste Management Associates, come forward. I know he has another engagement he has to go to.

R I C H A R D S. G R E E N B E R G, Ph.D.: I can start before they put the slide equipment up, I guess. That's fine.

My name is Richard Greenberg. I am President of Environmental Waste Management Associates. We are an environmental consulting firm in Wayne, New Jersey. I also have a couple other offices in New Jersey and an environmental laboratory. We employ about 100 people altogether, so we are reasonably sized in the State. About 95 percent of our work is within New Jersey.

I guess I learned a lot today about raising capital. I went through that myself in a different industry. What I

would like to talk to you about today -- as soon as we can get this slide equipment set up -- is that there is a little bit of a comparison. You know, we have heard a lot of things in the press about DEPE and how it hampers New Jersey business. I have a couple of suggestions which I think directly bear on the biotech industry and on getting New Jersey back to work again and, in particular, on bringing in new industry and allowing new and exciting businesses like biotech companies be able to use our educated pool of talent in this State.

Basically, the idea is, how can we work with DEPE, maybe a little bit restructured, and get some positive results, and get some help, instead of a lot of, let's say, horror stories? I have quite a few to tell, but only a few minutes to speak, so I would like to concentrate on my slides here. Well, anyway, you have copies of the survey. I think they were handed to you.

The important thing to look at here-- What we did -- based on our knowledge of some other states and on some telephone polls we conducted -- was take a look at some selected laws and selected regulations that exist in the states. What you can see on the survey are a lot of dark spots by New Jersey and California. Some of the dark spots are good, but most of the dark spots are generally negatives when it comes to business and industry.

In particular, the one that I would like to focus on today, because I think it is probably the most relevant, is the unified permitting concept that was recently adopted in California.

We have very complex environmental regulations in this State. Many clients that we represent end up finding out that they are subject to a regulation only after they receive a huge fine. It would be really nice if we could put DEPE together to perhaps have an ombudsman, or call it a "facilitator," someone who would know your industry and would be able to tell you, if

you wanted to locate here, or if you wanted to expand your business, or even if you wanted to check on the effects of new laws on your business, what laws you are subject to, what permits you are required to have, and perhaps more importantly in today's fee-driven society with DEPE, how much they cost.

Many companies which we look at sites in New Jersey for that are from out-of-state are astounded by the costs of environmental compliance. That's not ECRA or ISRA and the cost of cleanup. That is simply the cost in manpower and dollars of filling out a lot of forms and then paying fees for the right to do business here. I think, you know, unlike most of the talks I give and the work we do, that is probably the most relevant portion where a Task Force like this can be of help; in pushing for some sort of facilitator or ombudsman to help out. You know, if there were one person you could call -- call it one-stop shopping -- where you could say, "This is the type of industry, and this is the type of plant we have set up," they could tell you, "Well, here are the permits, and here are the costs based on your volumes."

I have worked with many plant engineers in different industries, including biotech companies, in both this State and in other states and, you know, it is a whole different world. Engineers give you how many volumes -- or how many cubic yards they are going to produce; how many volumes of liquid they are going to discharge. In New Jersey, the first question is: "Well, if it is going to go to the sewer authority, they won't take it," or, "They are going to charge you 'X' amount of dollars per gallon." If you want to get a NJPDES permit to discharge to groundwater or a surface water permit, that is based on a complicated set of calculations. If you ever saw the formula, you would probably die. It is about a page and a half long. Last year, one of the hidden taxes in our industry-- They essentially tripled the fees.

These are the types of things that I am really here to address.

If you take a look at the survey, you will notice that many states do not have, you know, an ECRA- or ISRA-type law. In fact, on the list, only New Jersey and Massachusetts do. The Massachusetts law actually kicks in at different thresholds, and is not as onerous. But those are downsteam. In other words, you have been operating for awhile. Perhaps you want to expand. Those things really do not come into play. What is important to look at is the climate that we produce to the outside world and to other people who might want to move into our market.

You know, I do work all over the country, and I represent a couple of national clients. It is amazing. As soon as you mention New Jersey, it is like the last place people want to consider. It is perhaps the biggest negative to our public relations. I would really like to see that change. Perhaps one way of using the facilitator would be to get that message across. The only states we have dealt with where we have actually been able to call up a single person-- We were looking at working, I guess, with a malt factory that tried to open up in Montana. They essentially gave me one person to deal with. The dollar value of the permits that were necessary was a couple of thousand dollars. The same company operating in New Jersey would be subject to a couple of hundred thousand dollars worth of permits and discharge fees.

So, you know, that really piqued my interest in having one person to deal with. As a consultant, I can't be an expert in everything; nobody really can. But if you have a person working for each group, that is really going to make a difference.

The other thing that perhaps we can look at within the DEPE itself is the problem you have in getting anything done because you have different competing groups, different

fiefdoms, each looking to keep their people and hang onto their territories. One of the things we see historically-- There are actually multimillion dollar remedial systems sitting in this State waiting to be turned on for lack of a permit. To give you a simple example that you can relate to, a simple gas station stripping system requires four separate permits. So you can get your treatment works permit, and it takes as long as two to three years afterward to get an air permit. It may take one to two years to get a groundwater discharge permit. Meanwhile, a client has paid for a system that sits there and rusts.

But more importantly for the State, nothing is getting cleaned up during that period of time. The idea of a facilitator, one person, one application package to handle all your permits, an educated person to ask the right questions -- volume, flow, type of business -- and everything could be set up up front. That is really the basic message I wanted to talk about today: the fact that there is a good way, and a simple, cost-effective way that does not necessarily involve what we would all like to do, which is perhaps to take DEPE and start it all over -- you know, start with a new building and new personnel.

The personnel who work there are actually pretty good in many cases. What happens is, again, with the entrenched bureaucrats -- and I am on the phone with DEPE probably five times a day-- If you look at the generation out of our office, we deal with literally hundreds of people. I am at least happy to tell you that many of the people are good. What they need, perhaps, is a little bit of direction and a little bit of remembering that without the jobs, and without industry here, they would not have a job either. I mean, it is absolutely amazing to me how things get lost in the permitting process. I have pulled my hair out over air permits for clients. They come back to me and say, "Gee, Rich, how come you couldn't do

it for me?" I say, "Well, you know, I got this one, and that one -- the treatment works, the groundwater." Air permitting is probably the worst. They are out in left field -- absolutely.

Going back, you know, to somebody to help with: What does a permit cost? What permits do I need? How can I make the system work for me?-- In some ways, we have some good rules here. We finally codified the cleanup levels. That, for a company doing business or wanting to know what the downside is, or a site assessment if you are looking at a new facility-- What is my liability? What number do I have to achieve? Those are good moves that have recently been made.

There is a new fund for cleanup that we have applied to for a number of clients. Perhaps on a general, mundane variety, the lack of a tank fund in this State isn't really a good idea, considering 43 states have them. There are a lot of things you can address within the environment, but I think for this Task Force, and from what I have been hearing about raising capital and trying to attract competitive ventures -- which is why I presented a new table, you know -- having someone to step forward to tell new ventures, or expanding ventures, or people who want to come in here and do biotechnical manufacturing, "This is what you are subject to and this is the way it is"-- It is not going to change overnight.

We are further ahead than most of the states. I mean, I will tell you that other states we work in, particularly Illinois right now, their cleanup levels are essentially background detection limits. To get away from that, you have to do a formal risk assessment. If you know the lingo I'm talking in, that means a lot of dollars just to get to the numbers that we already have.

So in some ways there is good news. But I think we would all really like to see, not so much a loosening of

environmental regulation, where people can go out and dump -- I don't think anyone is for that -- but a loosening of something I saw with one client, a $750,000 fine for spilled milk. I can't talk about the client in particular, but suffice it to say it is a dairy that had some problems. Milk got in the storm system and they ended up with a $750,000 fine from multiple agencies. That was settled, so I guess we did something, from our point of view.

Just the idea that they can put the manpower and that type of number on what seems like a trivial fine, is where we are headed in the wrong direction. Where we need to be headed is toward assisting businesses in complying with the regulations, and making sure that we do not fine people because an obscure law passes that nobody has ever heard about.

Thank you.

SENATOR SINGER: Rich, just a few things. First of all, let me just briefly mention to you that there has been a lot of discussion in the Legislature that DEPE will change from a fee-based type of budget to a standard budgetary part of the budgetary process. That will mean that they will have a set budget, and the fees they collect will come into the General Fund, as opposed to the fees they collect now, which go toward the operation of their own agency.

The incentive to fine, and the incentive to overpermit is not going to be there, because that money would not come directly to them. That has not happened yet. That would have to come via the Governor. But that is certainly something that will be discussed in this coming budgetary cycle. I know the Governor-elect has been looking at that particular issue.

In the survey you showed us, of course, what stands out, I think, most is that the largest biotech state, which is California, if I am correct, is more regulated than New Jersey.

DR. GREENBERG: Yes.

SENATOR SINGER: So I guess overregulation does not have to be actually a counterpart to biotechnology. But let me say one thing to you: In my studies of the environmental aspects of things, I have found many states, such as North Carolina, which pharmaceutical companies and some other things tend to like-- A lot of these types of states do not have anywhere near the regulations, because they don't want to know what's happening.

I give you a very, very basic example: We never hear about pollution of the waters of some of the states' oceanfronts, because they never test them. So they can't tell you there is a problem with their waters, because they don't want to know it. Whereas in New Jersey, in our particular county, which has more beaches than anywhere else, we test daily, so we can tell you if there is a problem.

So many of these states hide things and, very honestly, you're right, attract businesses to their states, not really caring what they are discharging, how they are discharging, or what's happening. They will worry about it later. That is not the case in New Jersey. Yes, I agree with you, one-stop shopping should come about. We have talked to the Department of Commerce about that, talked very strongly about that, and they have assured us that they are developing that. I agree on that, you should know up front. There is a certain amount of overfeeing, overpermitting, overregulation in some areas of it.

I think the realization is that we, unfortunately, have had the bitter pill of pollution in this State, and the Superfund sites and other things like that have made us very wary of it. I think one of the attractions of the biotechnology industry has always been that it is a nonpolluting industry. That is certainly a positive aspect. We just want to make sure that they can come to that one-stop

permitting. That was told to us by a new company that moved in. What was the name of the company, Abe, on that?

DR. ABUCHOWSKI: Inclone. (phonetic spelling)

SENATOR SINGER: They told us the problems they had. You're right. There should be one place you can call and get all the information up front. I think that is something that is coming.

I just want you to really know that although I understand that aspect of it, the regulation we have in this State -- and I know that the air quality permit is a very difficult one; you talked about it -- has been forced on us because of problems we are facing with the bad actors and things like that, that happen in the State.

DR. GREENBERG: I think it is a combination of the growth of the DEPE and the environmental business. I mean, my own company has grown in response to the change in regulations. I started in 1986, and today I have 100 people. Maybe that is good for the environmental business, but, you know, we represent clients by trying to basically negotiate and fight with the DEPE. That is what I do for a living. I am not very well liked this way.

From the standpoint of what you brought out, yes, California is heavily regulated. They brought about the concept of the unified permitting that is listed on my survey. That is the one positive black spot on the little table. The difference in New Jersey is, you can't get an answer, even from a consultant, and guys who work for me who are hygienists.

SENATOR SINGER: You're 100 percent correct. I have called many times for constituents trying to get answers out of DEPE because they couldn't get them. It is amazing. Sometimes I call, and all of a sudden the permit is issued, not because I asked them to do it, but I inquired about it, and all of a sudden they looked at it. Or the stated answer is, "I have 45

days to look at it, and this is only day two. I will look at it on the 44th day." That is certainly a concern we all have.

One last comment, though, on that. Senator Smith has a bill, which hopefully may pass in lame duck, that is going to talk about if companies are fined for a violation, and it was an unintentional violation and they correct that within a short period of time, the fine will be negated. I don't know that that is the real mission of the State; that is, to attack people who do things accidentally -- which happens -- with venom, and whether they correct it or not they are going to pay that $750,000, or the $650,000.

So something is being done on that. By the way, that bill is being proposed by DEPE, based on the way they fund themselves. I think that funding will stop. It will stop being funded based on their penalties and permits; they will have a regular budgetary line like everybody else; and a lot of that incentive will be taken out of their sails.

DR. GREENBERG: Taking that bill just one step further, one of the things-- I don't know if it is in consideration, because I am not familiar with the actual bill, but what we managed to do in the case of many fines-- When you have a fine that has been levied and there is a corrective action that is, let's say, expensive, such as pollution treatment and that type of thing, what we have been able to do is negotiate prior to the fine when the majority of the fine is upgrading the environmental facilities at the site.

I think that is another good practice, because the mission should not be to collect fines. It should be to help clean up the environment.

Thank you.

SENATOR SINGER: Thank you. Thank you for coming.

Next will be Mr. Karl B. Kelly, Director of Project Development, Fluor Daniel.

K A R L B. K E L L Y: Thank you.

Let me just take a minute to introduce myself and explain why I am here today. I am Karl Kelly. I am Project Director and Director of Project Development for Fluor Daniel, our Biotech Pharmaceutical Division. We are a company of about 22,000 people currently, with some 52 domestic and international offices. I work specifically for the biotech pharmaceutical group. Our role is really to work with companies across the United States in developing new products on an engineering and construction basis.

Now, I emphasize our role in product relationships, because what we have found is that if we assist these companies in moving their products from the bench top into manufacturing, that is where they reach profitability. That is the goal we are all looking at.

The overhead I have selected is one that really relates to biotechnology company development. What I would like to do is relate this to really what the incentives and needs are during the different growth phases of the companies. If you will look across the top of it in years, you realize that development of a company is a long-term venture. What I encourage is that as you look at a venture of this term, the program needs continued support to be productive.

In the early years, as the concept is being developed, most often in a university environment -- not always, but sometimes in a university environment -- the concept then is supported by venture capital. Sometimes some states support, and the university relationships are very important.

A couple of major trends that we see that are important in looking at incentives and State support:

We believe it is a partnership. As we look across from California to Colorado and the East Coast, we see that the most successful programs are backed by a partnership of not only the emerging biotech companies, but also the existing pharmaceutical companies. One of the reasons we located our

office in Marlton, New Jersey was because of the proximity to the existing pharmaceutical businesses here. We think that for a lot of reasons this region has tremendous potential, so we invite your continued involvement in the support of the development of these companies.

As we look across the schedule from year one through year three, if we look at the facility needs, those are the areas that we are most familiar with, and that I would like to speak to first.

In the early years, it is often the least lab space in the administration. Now, we've found that different states have addressed this problem in different ways; one being that they develop an incubator concept. The other is that they support companies in the development of labs themselves.

It is my opinion that the most successful method is one that encourages the companies to develop the space themselves. What we found is the first thing after a generic laboratory incubator concept is developed and put in the marketplace, is that a company comes in and we are asked to retrofit it. There are generally additional costs associated with that. By the time they really enter some type of preclinical phase in a biopharmaceutical, they have some very special "as needs." So the first thing we do is to add additional cost to it, because we have retrofitted what was designed as a generic facility to meet everybody's needs. We are seeing the science grow at a tremendous rate, with very rapid changes in equipment and needs.

Then the other thing is, their needs change pretty quickly. They start first in a laboratory and bench environment, and then move quickly to a pilot scale where they have to produce clinical materials.

So the first phase of this development in there-- We think that actually helping the science progress is extremely important, and the real estate, although it is an important

factor, is not the primary factor. We concentrate on helping companies get product into market. So we find that in the early days when the science exists, they need other skills. Those skills are often regulatory skills. There are different types of scale-up and development finance. Those are often professional skills support.

As we look across some of the different states that have programs today, specialized biotech programs, we see a couple of different approaches to the development. One of the best examples, I think, today is perhaps the North Carolina Biotech Association, one we have worked with, as well as programs across the U.S. What they have done is center a group of professionals together in an association which is a quasi public/private entity that receives about $67 million annually to fund their program.

Now, that particular organization supports the development of the companies early on. That is a key role, we think, in incentive, and a role that can be played by a state in a program, very complimentary to the economic development agencies that currently exist in all major states.

I want to take just a minute here to paint a picture of what is happening nationally in the recruitment of biotechnology. Historically, we saw that the companies came from universities. Once they were located in one particular area, they were generally there because of the cost of their capital investment. It is so expensive in terms of-- In our group it is commonly called the "worship of stainless steel," because of the value of investment in both pilot plants and in laboratory facilities.

So once major investments were made, because of the limited number of people resources and capital resources, they did not move frequently. The message is, when you design your incentive program, help the companies early and you will retain them in the area where they first locate.

We think, though, as we look into the next five to seven years, that there is an emerging trend; that we will see biotech companies today look to other areas for the manufacturing facilities. The manufacturing facilities, as we look down the list, at best in year seven, are $20 million to $40 million for the bulk manufacturing facilities. That is where most of the jobs in the manufacturing are created, as well as the related support services.

One of the interesting things when you look at a biopharmaceutical manufacturing facility-- You will find that the level of service support is generally much higher than you will find in other traditional industries. That is because of the intense technical and instrumentation in equipment requirements, as well as the FDA G&P requirements that are placed on the manufacturing facilities.

So to get down to the jobs there, we think the environment will become more and more competitive throughout the State. As I travel and work with companies across the U.S., we see now that many states have existing biotech programs with incentive packages in place. Some are formalized; some are informal. We have worked with companies through site location assistance in evaluating some of these different packages. What we found was that virtually every state in the U.S. is now going through a trend of reevaluating what they are offering in incentives. We think the next five to seven years will hold a very competitive environment for companies.

So no longer will we be in a situation where if the company originates and the technology is in that state that they will necessarily stay there. They may, but there are going to be new challenges. For example, Georgia -- in the southeast -- Alabama, and North Carolina are all developing very aggressive programs and are recruiting actively in the northeast to entice the first manufacturing plants into their

states. We worked recently with California, and saw them revisit their entire biotech program because of -- almost an unheaval by the companies within the state that are going through questions on permit, access of water, state support, and taxation. So there is going to be, we think, a trend of competition over the next five to seven years. We encourage you to get involved.

SENATOR SINGER: It is my understanding that you do not recommend manufacturing to your clients in New Jersey. Is that true?

MR. KELLY: That is not true at all. In fact, my role in there is not in our market development approaches. We do not take any position on location -- specific location -- to a company. Rather, we often work with them and facilitate the people within the company to do that.

No. In fact, we made a decision to put our office in Marlton, New Jersey, and looked at states throughout the region. So we personally made our decision based on that. We have approximately 400 engineers in our Marlton office.

When we look at the area and the region, our biotechnology and pharmaceutical skills are based in Greenville, South Carolina and in Marlton, New Jersey. That is the heart of our professional folks.

If I could move to one particular overhead on incentives-- This really captures a lot of the incentives that we see across the U.S. and puts them into one overhead. They are divided into requirements and options.

The requirements: I think it is going to become important that states develop business development support, whether it is done through their economic development entities or whether it is done through a specialized biotech program. I believe the biotech companies have some very specialized needs. Some of those are mentioned in the options. For example, during the growth of the company, it is as important

to establish strategic research alliances with other pharmaceutical companies, as well as venture capital relationships early on. I have seen programs where they have brought professionals in, in a State agency to assist in establishing those relationships.

A second one of State seed capital sources: Now, there are a lot of different formats for those, but seed capital, to me, is really designed to help the emerging company in their first financing round, or their early years, before they get to a point where they have a marketable product. It really helps them to take good science and illustrate that they have a market there and can attract other capital.

For example, I have seen programs where on an intermittent basis companies will provide support -- or request support from a seed capital source, and it may range up to $250,000. They are generally $200,000 to $250,000 maximum seed loans in their early years. After they develop and have proven their product, some states have taken the position that it is in the best interest to seek private sourcing after that. It is my opinion that in some instances there have been some difficulties, but generally good science will find money. The right of their development may be tempered a little bit, and the market conditions, but generally it will.

I think the third point that has been mentioned -- and today I heard it mentioned a couple of times, and also in past sessions -- is that the venture capital relationships are extremely important. We believe that building that track record and continuing to work with it will bring more money into the State.

Now, there is a relationship between State seed capital sources and venture capital. We have seen often that once a State seed capital fund will endorse a particular technology or company, that the venture capitalists are more willing to participate.

The last requirement is university research and facility support. We think the partnership will include not only the emerging biotech companies, but the State and the existing pharmaceutical companies. But a strong player has to be the universities in the system. Their research and the facility support really is a pretty intricate program that allows and encourages for new technology to be transferred out of the universities. Then there is a vehicle and a mechanism for State development support, followed by State seed capital and venture capital relationships.

Now, the options in the incentives: Facilitating and joint ventures with major pharmaceuticals. That often can be done under the business development support guidelines.

Strategic research alliances: We are finding that more and more younger companies are looking at establishing relationships with universities and with major pharmaceutical companies in particular strategic areas, and they share both proceeds and research, and jointly develop those products. In a young company, that can be a very important source of cash and development for them.

Fermentation capacity: Right now, there are a lot of people who are looking at the current problem with the lack of contract fermentation capacity in the U.S. What is happening is that-- We estimate that there are some 500 to 600 new compounds that are headed to the FDA. Now, if that occurs as we project, there currently is, and will continue to be a shortage in pilot plants that are suitable on a GMP basis to produce adequate clinical materials. What we are seeing are some states and independent companies that are currently evaluating entering a contract research and clinical manufacturing role to support some of that market need.

Clinical fill and finish support -- that is just the fill and finish of the clinical drugs: In some states where there may be a pharmaceutical school located, there are

programs to support clinical fill and finish, and they develop relationships with many of the emerging companies.

The last one is project finance assistance, one of the things that we constantly see as a real problem in financing the first pilot plan. There is a real gap there. That gap exists because the company, at that point in development, often is not profitable. We think there can be, carefully evaluated and of limited use, a role for project finance assistance in bricks and mortar. The problem is really created by the lack of interest of the venture capitalists in participating in financing equipment and buildings.

What we are seeing is that the traditional commercial sources are not viable, because the companies, at this point in time, are not profitable. They traditionally look at ability to repay. Their sources of funding are generally from venture capital or from an early IPO at this point in time.

I guess in closing a couple of the comments in looking at the benefits there-- In biotechnology with a significant capital investment the benefits to the State and to the community are often in property taxes, but also in the creation of the jobs and the quality of the jobs you are creating. The retention of the research in the State, I think, is extremely important. One area of benefit that I would not neglect would be the amount of service sector jobs that are created through support and development of the program. One of the things that we have seen in several states is that a continued, well-designed program can actually be a financial benefit. For example, again, the North Carolina program-- I saw statistics where they have created 32 companies. They have attracted $160 million in investment capital over the last six years to support the development of those companies.

If you look at the tax proceeds that accrue from that, with the potential of the new product sales that these

companies will generate, it will far outweigh the investment of the state.

Thank you.

SENATOR SINGER: Any questions? (no response)

Just one question: Do any states that you are involved with have a filling plant?

MR. KELLY: I'm sorry?

SENATOR SINGER: Do any states that you have been involved with have a filling plant?

MR. KELLY: Have a filling plant? No, we have not-- Part of it is because the volume of new drugs that are now entering clinical trials has really overcome some of the capacity of the traditional sources for filling finish.

SENATOR SINGER: Thank you very, very much.

Our last speaker will be Jim Finne, Director of Engineering, Interferon Sciences. Jim?

J A M E S F I N N E: Thank you. You will have to excuse my remarks. They are somewhat unstructured, but have a different perspective on how a small company like Interferon Sciences ends up diluting a lot of our major efforts by having to comply with many of the DEPE regulations that to us almost appear excessive. I think the one-stop shopping concept could certainly be of great benefit to a small company.

We have very limited resources, very few people. Our goal is to get a product on the market to make a return on somebody's investment. It is the State Pension Fund's investment that we will make a return on.

I have a number of horror stories. They are all small; they are all trivial, but when you take them in their sum they make a difference to a small company like ours. Anything the State can do to facilitate streamlining the regulations so they do not become a burden, but become meaningful--

One regulation which we followed from day one of the regulation was the regulation of medical waste. As a company we purchase a large quantity of blood, which makes us a Category 5 generator of medical waste. To conform with the regulation-- We were in conformance when the regulation came down. Our costs to actually implement were minimal. We spend, like, $3000 a year to get rid of the waste, but the DEPE-- We spent $3500 for the fee -- our annual registration fee. It is more than it costs us to handle our four tons of waste. What are we getting for that $3500? They review our annual report, and then they determine that we owe them another $3500 on top of that. Now we have $7000 worth of fees for a $3000 service for us to have the waste taken away.

It is the ludicrousness of some of these regulations that gives DEPE a very bad rap in this State. Although the speaker two speakers ago pointed out that he deals with some very competent people there -- very competent -- as a sum total you are dealing with an inmovable force. We live -- ours is a small company -- in constant fear that one spill, or doing one thing wrong, will bring down the wrath of the agency and a huge fine. We all live regulatory bound -- cradle to grave -- with our hazardous chemicals. We have all gotten used to this and it is easy to implement.

In marches the DEPE inspector. We are handling waste fine. There are no environmental problems, but by the time he gets finished with his inspection of 10 or 15 administrative violations, you are staring at a potential fine of tens of thousands of dollars. The fines might not end up being implemented if you can comply, but it dilutes our efforts as a company. It takes away from what we are trying to do, which is bring a product to market.

So anything that can be done-- I wish I had the magic solutions to curb what are perceived as the excesses of the DEPE. One little -- I want to call it, maybe, another one of

my horror stories-- Another regulation that came down on us a few years ago was the Community Right-to-Know, a simple regulation. I don't think anyone has any philosophical differences with the regulation, but by the time it was implemented through the DEPE some of it became laughable about what you have to report as an employer to DEPE that you have in your workplace. I filled out, like, seven pages of a report of things from -- that are in the trunk of our car, which we have to report to the Community Right-to-Know.

Does the community really care that we use compressed air? Does the community really care that we have tobacco, cigarette lighters, and all the other things we have to report in zero quantity? If you have 10,000 pounds of a really bad -- or 9900 pounds of a really bad-acting chemical, you don't have to tell the community. But if it is on the other DOT lists, you have to tell them every little thing. These are the little things that become kind of laughable in terms of trying to comply.

My entire point is, it dilutes our effort, which is ultimately to be a major employer, a major manufacturer, and to bring an economic benefit to the State.

SENATOR SINGER: Jim, you could do me a favor, if you would. Can you just possibly send me a letter outlining the situation you have with your permitting fees based on the amount of disposal? You're saying that your permitting fees are $7000 -- or $3500, yet your disposal fees are only $3000. I would just like to have that, if I can -- or $3500 to $3000 -- because I would like to ask DEPE that question -- if you wouldn't mind.

MR. FINNE: Actually, that particular data is on the annual report of every generator. How much do you spend for disposal fees? They do not say, "How much do you spend on permit fees?" but they do say, "How much do you spend on disposal fees?" You can get that data for every--

SENATOR SINGER: Yes, but there has to be some simulation at DEPE as to how much -- what your disposal is as compared to what your permitting fee is. It is bothersome that they are telling you that your permit fee is greater than your disposal fee. I mean, that is just ludicrous. Maybe they are going to have to redo how they permit people based on quantities. In other words, I realize that, unfortunately, they take a broad-stroke approach to how they determine the permits. Based on your Level 5, that is what the permitting fee is. But in no way is that supposed to mean, in my mind, that if you only have $3000 worth of disposal, that the permitting fee should be greater than the disposal cost. There is something wrong with that philosophy, if that is a philosophy.

I would like to have it documented, so that when I ask the question-- The first thing they will say is, "Well, where did that happen?" They will say, "Well, we will have to research." I don't want them to research for too long. I want to be able to say, "Well, explain to me why this is happening."

Okay? If you don't mind. I know a lot of times businesses do not like to do that, because they feel they will become a target. I can only assure you that I would do anything in my power to see that that never happens. But I think we have to get to the root of some of these problems with DEPE. With a new Commissioner coming in, I am sure these are the kinds of things I would like to have the administration look at to see if we can correct them. There is no question about it. As a businessperson, that has to be upsetting, and certainly in dollars and cents a waste of money when your permits are greater than your disposal fees. Normally, it is 10 times greater in disposal fees than in permit fees.

MR. FINNE: Maybe we just fall into some unique little niche. The permitting fees took two classifications. One was as a generator, but the other was as an intermediate handler,

which if you read the preamble to the regulation, we were not supposed to be. But DEPE said, "Oh, no, because of the way the 'i' is dotted in paragraph whatever--

SENATOR SINGER: I would appreciate it.

MR. FINNE: --we classify you that way."

SENATOR SINGER: Does anyone have any questions?

MR. WEISBERG: Jim, maybe you could just discuss for a second or two some of the paperwork problems also, the duplication of paperwork issues that come up?

MR. FINNE: Well, just in many of the reports that have to be filed -- and I think there is a whole list of them -- from the Community Right-to-Know, reports to the Department of Community Affairs for hazardous chemicals stored on site, the toxic emissions inventory that has to be filed annually, certainly the chemical waste-- Much of the data that gets reported to DEPE is reported several times in several different formats. I guess in my mind--

SENATOR SINGER: Is that the case all over? In other words--

MR. FINNE: I have to believe it is.

SENATOR SINGER: Well, again, if you can give me some examples of that, we will take a look at it. If it is the case all over, you're right. If it may be the case in your particular company, but it may not be the case in Abe's company-- But we can look at that and ask them to cross-reference that.

As I said, with the administration change, with the new Commissioner coming in, hopefully there is going to be an entire new conceptual look at what DEPE's role is.

MR. FINNE: It has to be conceptual.

SENATOR SINGER: Absolutely. Thank you very much.

MR. FINNE: Thank you.

SENATOR SINGER: Is there anyone I missed? Roland, did you want to say something? (addressed to Roland Machold in

audience; response indiscernible) Does anyone have any questions of Roland? (no response)

Roland, can you just briefly, if you don't mind, because you are probably the only one who knows-- What was the main objection to why the DiFrancesco bill did not go forward?

R O L A N D M. M A C H O L D: The bill, to my recollection, passed the Senate and went through commission twice -- went through the Committee twice. On one occasion, there was a Senator-- Excuse me, my memory isn't all that good. All things questioned venture capital as being too risky. That was-- I don't believe he is in the Senate now. At any rate, the bill passed over his objections, four to one. So there was that objection.

The other objection came -- as far as I know, and I can't speak for other agencies in the State -- from the Bankers Association. The "prudent man bill" does relate to the banks as well, and they raised some technical objections, which I put in a copy of a memorandum to you. I tried to talk to them, because I thought there was some common ground, but I think what really concerned them was that if you rewrote the prudent man law it would just open up the door to lots of litigation. So they were really just not happy about changing the law at all, simply because of the prospect for sort of a new level of litigation, without the--

SENATOR SINGER: The fact that things are antiquated doesn't make a difference.

MR. MACHOLD: I don't want to say that.

SENATOR SINGER: I said that. It's okay.

DR. ABUCHOWSKI: So there was no philosophical difference from the bankers in terms of using venture capital, or busting venture capital. There seemed to be more of a--

MR. MACHOLD: They did not oppose the whole plan principle, which was probably the primary objective. The other thing that was being dropped out was, there was a specific

mention in the State's prudent man law about income and the preservation of capital. Immediately a great many, particularly biotech companies, have no income -- net income. They have been losing money, and may have a deteriorating capital position, so they would, just on the face of it, perhaps not qualify.

Those were the two primary things. The third thing was the business of unregistered trusts. It says in the prudent man law that registered trusts are permitted. The AG has opined that that would mean that unregistered trusts are not permitted. Those were the three things.

We drafted the law. We didn't draft it, but the Commission on Science and Technology did, and then we had some legal help from Washington on it, with the idea of conforming it to ERISA, which is the state-of-the-art prudency law across the country which does provide for the whole plan. It does not have a specific reference to the income -- preservation of capital, and has a terrific body of legislative and legal history in the courts. That was the idea of updating the prudent man law.

SENATOR SINGER: Thank you.

MR. MACHOLD: The only thing I could add is, we do not have a hard and fast guideline about 200 million. We just don't tend to go below that, because it is very hard for us to acquire enough stock in the market to do it, and we do not have the analytical support to carry it forward.

SENATOR SINGER: Well, thank you. Thank you for your help.

MR. MACHOLD: Oh, and the returns for the other neighboring funds have been about 5 percent and 6 percent a year for the last five years. I called Pennsylvania and New York yesterday.

DR. ABUCHOWSKI: In the venture capital funds?

MR. MACHOLD: Venture capital, yes.

DR. ABUCHOWSKI: So there is a summary war and lower risk?

MR. MACHOLD: Well, it is higher risk. It is lower returns. Our returns have been about -- almost 13 percent for the last five years.

MR. WEISBERG: Isn't that about half of your normal return?

MR. MACHOLD: Excuse me?

MR. WEISBERG: Isn't that half?

MR. MACHOLD: Well, I think it is very hard. I don't want to take the venture capital industry to task on that, because it is very hard to tell you what the returns are. They have to report using whatever methodologies they use. But I think John Martinson pointed out that it takes 10 or 12 years to know exactly what your returns are over that period of time.

DR. ABUCHOWSKI: What is harmony with the national dollar-- (indiscernible; Doctor speaking off mike)

MR. MACHOLD: Excuse me?

DR. ABUCHOWSKI: What is harmony. In other words--

MR. MACHOLD: Well, it's both.

DR. ABUCHOWSKI: --an achievement that would return both?

MR. MACHOLD: Yes, it is both time and dollar related. The returns have been very low for all venture capital since about 1983, simply because enormous amounts of money went in at about that point, and they were just, really, chasing too few good ideas. That is coming back now.

DR. ABUCHOWSKI: It hasn't averaged out yet.

MR. MACHOLD: Excuse me?

DR. ABUCHOWSKI: It just hasn't averaged out yet.

MR. MACHOLD: Well, it is a cyclical business, and a lot depends on tax laws. The tax laws were changed in 1977 and strongly favored it because of capital gains treatment. Then

that was reversed in 1986, and that was a strong disincentive. So you have national trends here that have very powerful effects.

One of the biggest effects right now is the Clinton administration's plan on health care, because their whole idea is to cap the cost of expensive medicines. And that has hurt. Every biotech stock virtually, with a few exceptions, is down 20 percent to 30 percent this year. Every drug company stock.

SENATOR SINGER: Roland, thank you.

I want to thank all of you for coming.

J A M E S S C H R O E D E R: I have a question.

SENATOR SINGER: I don't know if I want to answer his question. Yes, Jim?

MR. SCHROEDER: Very briefly, I am Jim Schroeder, from the New Jersey Education Association. I am not an expert in this in any way, shape, or form. I just want to say that we do have some concerns about the lower return we see in some of the public investments in venture capital funds. You know, we certainly don't want to see higher risk of pension moneys for a lower return. That is a concern.

We also have a concern that as you get into this arena and you start targeting for geographic reasons, for example, to help and assist New Jersey firms, there again the pension moneys are there. It is something we take very, very seriously. We are very concerned about the return on that investment.

However laudable the objective may be, we have historically been very concerned about targeted investment. We are very satisfied that Ronald Machold does an outstanding job. We do not want to see any entity interfering with his independent ability to invest those funds in a safe manner that will provide maximum return on investment.

That is where we are coming from. I just wanted to make that point at this time.

SENATOR SINGER: Jim, I would have thought nothing less if you didn't make that point.

MR. SCHROEDER: Okay.

SENATOR SINGER: But I would say one thing to you just for the record: I don't think Roland-- I am not speaking for Roland -- has a tremendous objection-- Remember, we are not mandating. The bill will be permissive and allow him to go into that aspect. I think when I look around and see that states like Wisconsin, for example, own 7 percent or 8 percent of your company--

DR. ABUCHOWSKI: Nine percent.

SENATOR SINGER: --nine percent of their company, and that neighboring states have done investments in the industry, there is a certain amount of factor that plays into it where investment relates back to healthier industries and healthier jobs.

We are certainly not even thinking, nor would we even talk about thinking of jeopardizing anything to do with our pensions. I asked Roland if that was allowed, to make that investment, would that jeopardize anything, and he said, "Absolutely not." We are not talking about that kind of amount of moneys. We certainly would not do that. But I think that not being able to do it has hampered us in some cases in helping some New Jersey companies, and helping to attract some companies to come in.

In this particular industry -- and I know you have missed some of the hearings -- when a biotech company wants to get started, the first state they go to is Wisconsin, not New Jersey. You know, we have to be a player in this. Certainly the fact that neighboring states are doing it-- They are doing it for a reason. I think we have to look at that.

But you're right. Do it with all prudent care and make sure, certainly, that our pensions -- because we are all part of that -- are well protected.

New Jersey State Library

MR. SCHROEDER: Okay, thank you.

SENATOR SINGER: Seeing no one else, I thank you. We will be scheduling a final wrap-up meeting.

Oh, by the way, just for the record, I have written a letter to the Senate President and the Assembly Speaker to ask that the Task Force be allowed to continue for an additional six months. I have done so because though our legislation -- and we are going to come up with some conceptual ideas to the legislation -- may not be able to get through lame duck, I felt the Task Force would be the best vehicle to do that. It would be a Joint Task Force from the Senate and the Assembly, since I cannot Chair an Assembly Task Force anymore. So we're talking about that, and I have had some initial talks with staff. We should be coming to a conclusion on that within the next several weeks.

They will be asking again of the members on the legislative side who wants to continue. I believe the makeup will be three Assemblypeople and three Senators. Several Senators-- Senator Ewing has let it be known that he is interested in being involved in it. I know Assemblyman Impreveduto said that he wanted to continue. I think Assemblyman Roberts has also. So we will be getting back with that.

This will remain a Task Force until the end of the year, but we are asking for a continuation of an additional six months.

Thank you.

(MEETING CONCLUDED)

APPENDIX

TESTIMONY PRESENTED TO THE
NEW JERSEY LEGISLATURE
BIOTECHNOLOGY DEVELOPMENT TASK FORCE

by John H. Martinson
Managing Partner
Edison Venture Fund
Lawrenceville, New Jersey

November 16, 1993
Trenton, New Jersey

The Private Equity Crisis: New Jersey's Pension Fund and Other Large Investment Pools Should Invest in Venture Capital

Introduction

I am John Martinson, Managing Partner of the Edison Venture Fund from Lawrenceville, NJ. I am also President of the Delaware Valley Venture Group and a director of the National Venture Capital Association. Our venture capital firm is named after Thomas Alva Edison who was the world's greatest inventor and New Jersey's most prolific entrepreneur, starting over 35 companies including General Electric and many utilities. Founded in 1986, the Edison Venture Fund is the most active investor in emerging technology businesses in New Jersey and the Midatlantic region. Edison has financed over 50 young technology businesses, some of which support the biotechnology and pharmaceutical industries. Our investment approach is described in the attached pamphlet. From my fund raising activities seeking institutional investors for Edison, I have become knowledgeable by necessity about the investment policies of public pension funds.

I want to say right up front that my firm has a vested interest in the topic at hand. Edison is funded in large part by pension funds. If the recommendations contained in my testimony

today were to be implemented, then Edison would very likely be one of the firms vying to manage some of this capital.

It is now widely acknowledged that economic and employment growth are driven mostly by expanding private companies. Yet, these promising businesses are frequently unable to raise financing especially from New Jersey's major investment pools. Their growth is restrained by a critical shortage of equity available to New Jersey's private companies. Less than $75 million annually is invested in New Jersey companies by venture capital firms, and most of this financing comes from outside the state.

I am here today to advocate that the New Jersey Legislature permit the State Investment Council to invest in professionally managed venture capital funds which in turn invest in private companies. The term "venture capital" connotes high risk and may seem too speculative for pension funds. However, most asset allocation experts recommend that large pension funds include private equity along with bonds, public stocks, real estate, etc. in a diversified portfolio. (Sometimes, private equity is known as alternative assets with venture capital as a subset for early stage technology investing.) New Jersey may have the largest pension fund in the United States without a private equity program.

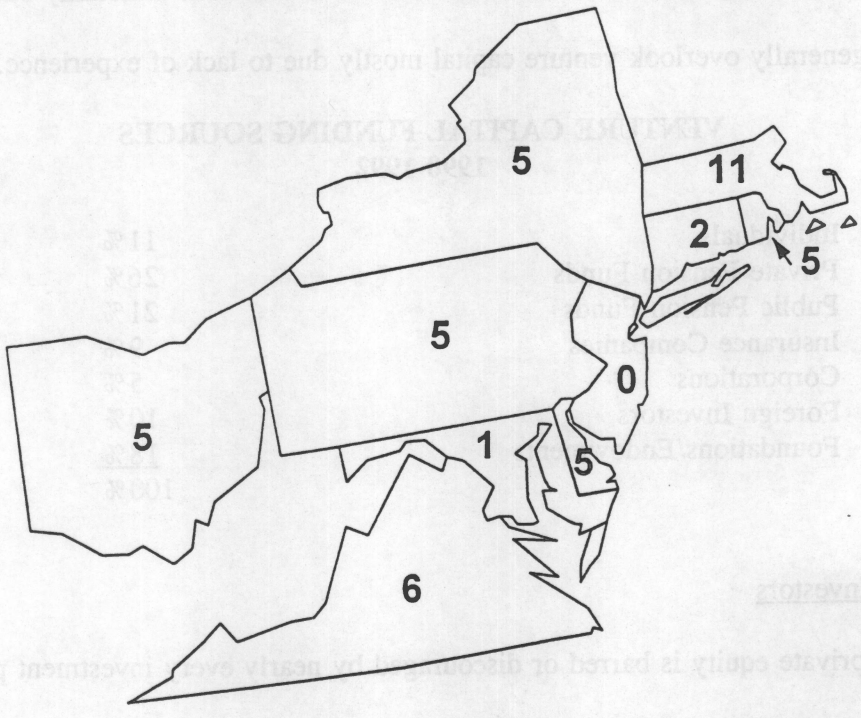
Public Pension Investing in Nearby States

The recommendation for venture capital investment by New Jersey was initiated over ten years ago by the Governor's Commission on Science and Technology. In 1985, I began a dialogue with the Director of the Division of Investment and members of the State

Investment Council. In 1987 and 1990, Senator DiFrancesco introduced legislation which passed the Senate but was never considered in the General Assembly.

Meanwhile, New Jersey has been surpassed in this respect by every Northeastern state. All nearby states including Pennsylvania, New York, Connecticut, Delaware and Maryland, not only permit but encourage venture capital investment by their state pension funds. Nationally, about 60% of the states (including all states larger than New Jersey) enable their state pension funds to invest in private equity. Typically, their private equity allocation ranges from 1 to 11% of total assets. See the map below of the nearby Northeastern states:

Private Equity Allocation Percentage of Total Assets for Public Pension Funds



These small percentage allocations to private equity will not jeopardize the overall assets of the retirement systems. However, they represent substantial resources of well over $2 billion in New York and $1 billion in Pennsylvania earmarked for private companies.

A common misconception is that venture capital is primarily funded by wealthy individuals who can afford to lose the money. Nationwide, private and public pension funds provide nearly half of the capital for our industry. The long term horizon of pension funds is uniquely compatible with the 10-13 year term of venture limited partnerships. Unfortunately, insurance companies are being forced out of venture funding due to certain accounting treatment which requires an immediate writedown of limited partnership interests. Foreign investment has also been unreliable due to so many world trends outside our control. Nearly 20% of venture funding comes from endowments and foundations nationally but those in New Jersey generally overlook venture capital mostly due to lack of experience.

VENTURE CAPITAL FUNDING SOURCES
1990-1992

Individuals	11%
Private Pension Funds	26%
Public Pension Funds	21%
Insurance Companies	9%
Corporations	5%
Foreign Investors	10%
Foundations/Endowments	18%
	100%

New Jersey Investors

Shockingly, private equity is barred or discouraged by nearly every investment pool based in New Jersey. The AT&T Retirement System is the only organization in New Jersey that

regularly invests in venture capital pools. They consider only large funds located throughout the U.S.

As an example of the New Jersey financing environment, let me briefly describe Edison's relevant fund raising experience. We have raised two partnerships totalling $102 million in 1986 and 1990. About 15% of the funds came from New Jersey based institutions. We are in the final stages of raising an additional $100 million partnership. I now anticipate that less than 4% will come from New Jersey based sources.

Edison, like most venture funds, is highly dependent on public pension funds. For Edison's new fund with a $100 million goal, we have received commitments totalling $50 million from the two state pension funds in Pennsylvania with an understanding that we will continue to invest about one third of our capital in New Jersey and one third in Pennsylvania. We have previously raised capital from nine public and eight corporate pension funds:

EDISON'S LIMITED PARTNERS

Public Pensions	Corporate Pensions
Connecticut	Ameritech
Dallas	Baxter
Illinois	Bell Atlantic
Maryland	DuPont
Missouri	General Motors
Montana	GTE
Pennsylvania	Southwestern Bell
Rhode Island	YMCA
Virginia	

The investment managers (and their advisors) of these pension systems believe Edison's strategy to invest in expansion stage, private technology companies in New Jersey and nearby

states offers a suitable return potential versus risk for their pensioners.

Financing of New Jersey Private Companies

Why does the New Jersey Legislature and the State Investment Council think our own private companies are not investment worthy? I am often "kidded" about this lack of participation by New Jersey institutions. I never share in the amusement. For as I have explained, we have a private equity crisis in New Jersey that is most evident in the biotechnology industry which is very capital intensive. About half of the $75 million in annual venture investments in New Jersey represents follow-on financings. Only $30-40 million is supporting new companies. In biotechnology that means only a few companies can be started each year.

Financing young technology businesses has never been more challenging. The credit crunch has made borrowing even more improbable especially for technology companies. The recession and the lack of capital gains tax preference have discouraged private investors. The currently frothy initial public offering market benefits just a handful of New Jersey companies which are in the popular emerging segments. Biotechnology was very popular in 1991-92 and most disfavored by the public investor during the past year of uncertainty over this country's health care direction.

I am personally involved in organizing venture fairs and participating in small business clubs to bring private investors together with entrepreneurs running companies with under $5 million revenues that require less than $1 million financing. The South Jersey and North Jersey Venture Fairs showcase 40 young companies to over 100 financing sources, mostly

individual investors. I also helped to form the New Jersey Private Investors Network. These initiatives are useful in financing early stage companies. But biotechnology and other capital intensive businesses need sources with "deeper pockets". Institutional investors are necessary for financing requirements over $1 million and the much greater amounts required for biotechnology. The benefits of venture capital are highlighted by the enclosed Coopers & Lybrand booklet. We must support high potential, private companies, the backbone of New Jersey's economic growth.

Venture Capital Return Performance

Most public pension funds set a cap on private equity that ranges from 1% to 10% of their total assets. Some pension fund managers interpret these caps as a legislative mandate to participate in venture capital while others seem very eager to establish substantial private equity programs. For example, in Pennsylvania the cap is 5%, and in Michigan the cap is 10%. In both Pennsylvania and Michigan, the investment staff selects venture capital partnerships emphasizing those with coverage of their state. They also invest directly in private companies. In Pennsylvania, they consider only later stage businesses referred by select consultants. In Michigan, they have invested directly in 125 local companies including some start-ups. Most state pension funds engage a specialized consultant in venture capital to select and monitor independent limited partnerships without undue geographical preference.

I was requested to discuss the performance results of private equity investing by public pension funds. In general, they do not publish their returns for individual categories. Over

the long term, venture capital funds have outperformed public stocks and fixed income securities. Although each investment is speculative, blending 10-50 investments in a partnership largely mitigates the risk. Many institutional investors expect a 15-20% annual return from private equity. Venture capital partnerships have historically earned from 5 to 70% annual returns. This wide variation often depends upon timing of technology evolution, market dynamics and stock market cycles. However, the principal differentiation is the professional manager's skill in selecting and exiting investments. The specialized biotechnology funds headquartered in New Jersey rank among the venture industry's best performers.

Most states are increasing their private equity commitments at a greater rate than their other investment vehicles. The hot new issues market has propelled venture capital to much higher returns in the 1990s with biotechnology exhibiting considerable gains and volatility. Once again, many consultants are advising that private equity offers an attractive investment potential.

Few funds have actually lost money but the early results are usually down. Since venture capitalists invest in young private companies, the development process often takes 5-10 years for them to mature enough to go public or be sold. Consequently, the typical venture capital fund has a 10-13 year life. This long term illiquidity can be accommodated by pension funds but not many other investment classes. Venture capital partnerships and pension funds make good partners!

A few states have focused primarily on local economic development. Some selected inexperienced investment managers and pursued solely the most risky strategy: start-up technology companies. I trust that New Jersey will learn from such misjudgments. I recommend investment in several limited partnerships directed by experienced venture managers. The partnerships should be diversified among investment strategies involving stage of development, industry, location and size of financing. A private equity program could also include direct investments in established businesses with good financial prospects including public biotechnology companies.

In my opinion, the Division of Investment is superbly managed with an excellent track record. Roland Machold, the Director, is among the country's most respected investment executives, but he operates under restrictive guidelines. Let's modernize the laws and regulations to further broaden the investment opportunities beyond just public stocks and bonds. Mr. Machold has previously studied venture capital and is well prepared to oversee a private equity program with professional managers. In 1984 and then revised in 1988, Mr. Machold prepared draft internal guidelines for venture capital investing. Several experts and I contributed to those balanced guidelines.

Recommendations

After ten years of discussion, let's finally pass the appropriate legislation. The question is not should New Jersey pension funds invest in private equity but when and how. I will finish my testimony with several recommendations. I endorse earlier speakers' recommendation that the Division of Investment be allowed to invest in diversified pools of

venture capital and later stage private companies. I recommend that you quickly reintroduce and pass legislation similar to Senator DiFrancesco's 1990 Bill No. 455. However, I believe that state appropriations of general tax collections should not be utilized for equity investment.

I also recommend placing a cap on investing in private equity at 5-10% of total assets. A 5% allocation to private equity would provide over $2 billion which could finance hundreds of private companies. However, I don't favor economically targeted investment quotas. New Jersey's venture capital managers just desire the opportunity to compete for an investment allocation based on our strategies and performance. I believe that New Jersey's best private companies and venture capital funds will be selected on their own merits. We can't continue to expect that New Jersey's companies will be primarily financed by venture capital partnerships and pension funds from other states since their investment strategies may change.

I also recommend that the Legislature, Governor and State agencies reexamine the investment regulations and guidelines for insurance companies, utilities, banks, mutual funds, corporate pensions and other long term capital pools. We must erase the outdated stigma that private equity is too complex and risky even for our seasoned money managers.

In conclusion, emerging private companies, as we all know, drive job growth in this economy. New Jersey has more scientists and engineers per capita than other states. Our state already has many of the country's finest pension fund managers and experienced

successful venture capitalists. Let's update New Jersey's antiquated investment regulations to at least the level of comparable states. I urge the Legislature to unleash our investment managers to finance New Jersey's worthy entrepreneurs who are building leading companies!

I greatly appreciated the opportunity to bring the private equity crisis to your attention. Your staff person, Walter Kowalski, was very professional, courteous and helpful in my preparation for this testimony.

John H. Martinson
Managing Partner
Edison Venture Fund
997 Lenox Drive, #3
Lawrenceville, NJ 08648
Phone 609/896-1900
Fax 609/896-0066

taskforc.sph

Coopers
&Lybrand

Third Annual Economic Impact of Venture Capital Study

by Coopers & Lybrand and Venture Economics



Solutions
for Business[sm]

Conducted For:
National Venture Capital Association

12X

ABOUT THE SURVEY

Coopers & Lybrand and Venture Economics conduct this annual survey for the National Venture Capital Association to analyze the impact venture-backed companies have on our economy. This is the third year of our study. We sent the survey to 1,500 young, venture-backed companies. Consistent with previous years, 246 (16 percent) usable responses were returned. A number of this year's respondents were new to our study. Thus, over the past three years, a total of 428 companies have responded to the survey. Unless otherwise stated, survey conclusions are based upon the information reported by the 246 current respondents providing data for the period 1985 - 1991.

The National Venture Capital Association

The NVCA is an association of over 200 professional venture capital organizations with over $20 billion of capital under management. Venture capital firms organized the association in 1973 to foster a broader understanding of the importance of venture capital to the vitality of the U.S. economy.

The NVCA also represents over 4,000 emerging growth companies through the American Entrepreneurs for Economic Growth. The AEEG is the largest entrepreneurial network, representing over 350,000 jobs in the United States.

Coopers & Lybrand

Coopers & Lybrand is one of the world's leading public accounting and management consulting firms with offices in major cities around the world. Coopers & Lybrand's High Tech and Venture Capital Groups include over 1000 accounting, auditing, tax and consulting professionals providing value-added services to emerging and mature technology companies.

Venture Economics

Venture Economics is recognized internationally as the authoritative source of information on venture capital and related investment activity. The company provides a complete family of information and advisory services and publications to venture capitalists, corporations, and government organizations fostering business development activities.

For details on the survey contact:

National Venture Capital Association ***703/351-5269***

Coopers & Lybrand ***617/574-5292***

Venture Economics ***201/622-4500***

EXECUTIVE SUMMARY

Professional venture capital aggressively stimulates the economy of the United States.

- Through the long-term investment of venture capital funds, young companies secure the equity needed to generate a stream of economic benefits.
- Job creation is often dramatic at these young companies. The 428 venture-backed companies in our database efficiently created a net 92,500 highly skilled U.S. jobs between 1985 and 1991. During just the past five years and through the recent recession, the survey companies posted a significant 18 percent job growth per year. Yet, during this same time period, the Fortune 500 companies cut jobs at a rate of 2 percent each year.
- The United States' technological future realizes a tremendous benefit from the almost $3 billion the 428 survey companies invested in research and product development (R&D) from 1985 to 1991. As a percentage of shareholders' equity, current survey participants invest more than twice as much in R&D as Fortune 500 companies.
- Even though many of these young companies are not yet profitable, as a group they paid just over $1 billion in federal and state taxes in 1985 - 1991. As high-growth businesses, their contribution to the nation's tax coffers will grow rapidly.
- Through the investment of professional venture capital as their most important equity source, these young survey companies quickly benefit the U.S. economy and show meaningful promise for continued gains. In the first five years of their existence, the ventures produced jobs at a compounded average of 48 percent each year. Assets grew 42 percent a year. Investment in plant, property and capital equipment rose an average 64 percent each year. Commitment to R&D expanded an average of 50 percent annually. Tax payments swelled 79 percent per year. Export sales multiplied 206 percent compounded annually.
- Venture-backed companies experience exceptional sales growth rates, an average 35 percent in constant dollars each year, giving much needed support to the U.S. GDP. This helps our country maintain its international competitive advantage.

Entrepreneurs increasingly depend upon venture capital as their main source of equity to fund and nourish high-growth businesses.

- The surveyed venture-backed companies expended 50 percent of their hard-won equity to finance their assets. Fortune 500 companies, with their greater access to other financing options, needed to spend only 31 percent of their equity on assets.
- The start-up ventures in our survey that were founded between 1986 - 1991 required an average equity investment of $14.6 million to build their companies. This is a 108 percent increase from the equity requirements for ventures founded between 1981 - 1985. Professional venture capitalists supply the majority, 56 percent, of the equity needed by these high-growth companies.

What is Professional Venture Capital?

The National Venture Capital Association (NVCA) defines "professional venture capital" as capital provided by firms of full-time professionals who invest alongside management in young, rapidly growing or rapidly changing companies that have the potential to develop into significant competitors in regional, national and global markets.

The most visible venture capital money comes from professionally managed venture capital firms. Generally these are private partnerships or closely held corporations funded by an informal network of investors that include: pension funds, insurance companies, endowment funds, foundations, bank holding companies and their affiliates, corporations, wealthy individuals, foreign investors and the venture capitalists themselves.

Venture capitalists generally are characterized by the following common features:

- They finance new and rapidly growing companies;
- They develop an innovative business idea — often high technology-based — for a product or service;
- They add value to the company by active participation;
- They take higher risks with expectation of higher rewards;
- They have a long-term orientation; and
- They purchase equity securities.

Professional venture capitalists assist young companies by carefully screening both the technical and business merits of proposals and by investing risk capital — usually with no cash repayment schedule. They work actively with the management of their portfolio companies, contributing the experience they and their firms have developed helping other companies with similar growth challenges.

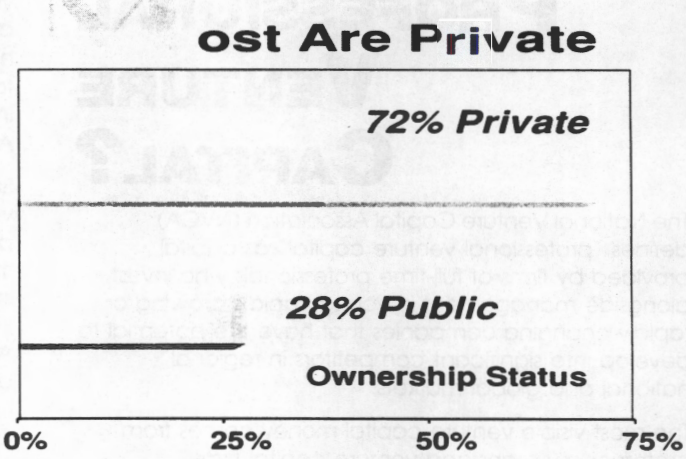
The risks and returns of venture investing are stabilized by including investments in several young companies in a single venture capital fund and by co-investing in those companies with other professional venture firms. That stability and the returns achieved by professional venture firms have attracted funds from institutions and foreign investors, thereby significantly increasing the flow of capital into young American companies.

Since World War II the professional venture capital industry in this country has played an indispensable role in nurturing the growth of America's high technology industries. Companies like Digital Equipment Corporation, Data General, Apple, Compaq and Sun Microsystems are famous examples in the computer industry. Both Intel in the late 60s and Cypress in the early 80s were venture-funded start-ups in the semiconductor industry, along with Microsoft and Lotus in software. Professional venture capital has made it possible to create entirely new industries in this country through the success of companies like biotechnology pioneer, Genentech, and Federal Express. ■

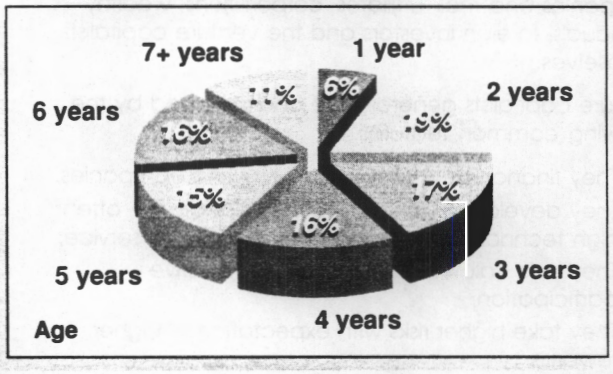
15X

PARTICIPANT PROFILE

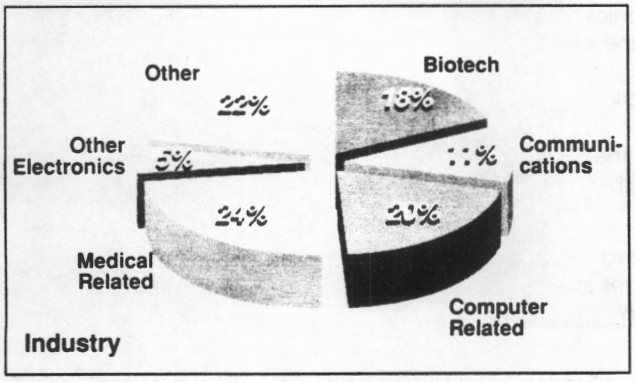
Seventy-two percent of this year's respondents are privately held companies. Because the data provided by these private ventures is typically not publicly available, this study provides a rare sketch of the impact young, venture-backed companies have on our economy. The average public company in the survey made initial public offering five years from their founding date.



The survey targets young participants. It is during the start-up years that venture capital plays a vital role in the nourishing of a successful company. This year's respondents average 4.3 years in business.



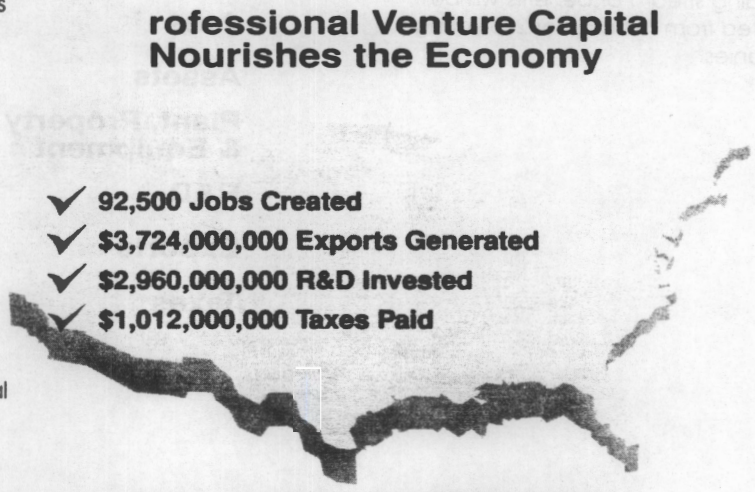
Venture capitalists tend to invest in the engine driving U.S. economic growth — technology. Over 75 percent of our survey respondents are technology related. According to the *1992 U.S. Industrial Outlook*, technology related industries are expected to grow rapidly through 1992, an average 6.4 percent. This is two and a half times more than the output for the manufacturing sector as a whole. The "Other" piece of the pie in the chart includes venture-backed companies in the consumer-related and service industries.



16X

FUNDS INJECTED INTO OUR ECONOMY BY PROFESSIONAL VENTURE CAPITALISTS STIMULATE GROWTH IN MANY AREAS

We tracked down the companies who had responded in previous years but didn't supply 1991 data. Ninety-three percent continue to grow. To calculate the impact the entire database of 428 companies has had on our economy, we extrapolated the 1991 data for these still existing companies.



JOBS:

The equity supplied by professional venture capitalists kindles job growth. By 1991, the 428 young enterprises in the total survey database created over 92,500 new jobs in the United States or an average of 216 jobs per company.

EXPORTS:

Newly-founded, venture-backed companies also generate significant export sales, helping to reduce our trade deficit. The term "international start-up" is often used to describe today's new companies that are instantaneously competitive in the global markets. Survey companies recorded $3.7 billion from sales abroad during 1985-1991.

R&D:

The R&D commitment of these technology-oriented survey companies does much to expand America's technical prowess. From 1985-1991, participating companies invested almost $3 billion to create and improve their products, often spawning new technologies and even industries in their wake.

TAXES:

The lag time between developing the technology and manufacturing the product can be years. Yet these 428 young companies paid corporate taxes of over $1 billion in the period studied. As these high-growth companies mature, they will supply the economy with rapidly rising tax contributions.

19X

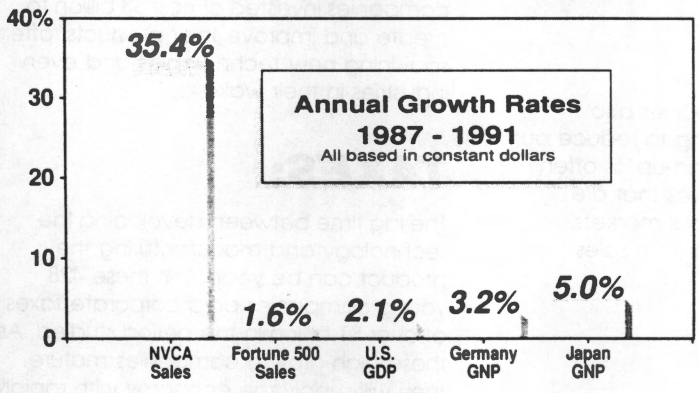
These venture-backed companies hit the ground running, quickly benefiting the U.S. economy. Their compound average growth rates, shown for just their first five years of life, illustrate the importance of young growing companies to our country's future. Acknowledging the small initial base from which these averages are calculated, it is still clear that with continued risk equity backing, an expanding stream of benefits will be harvested from this crop of 246 young companies.

enture Capital Sows Seeds for Accelerated Growth

THE FIRST FIVE YEARS GROWTH RATES

Jobs	***48%***
Assets	***42%***
Plant, Property & Equipment	***64%***
R&D	***50%***
Exports	***206%***
Taxes	***79%***

enture-Backed Companies Boost U.S. Competitiveness



Source: International Financial Statistics

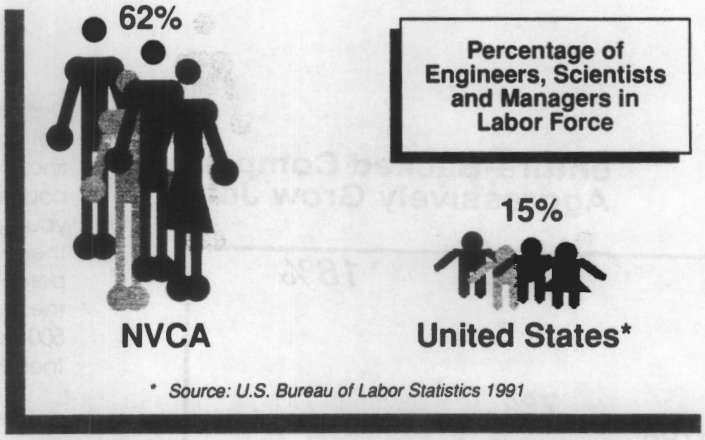
Venture-backed companies strengthen U.S. international competitiveness. Over the past five years, survey companies' compounded average sales growth, 35.4 percent based in constant dollars, dwarfed the Gross National and Domestic Product increases in Japan, Germany, and the U.S. During the same time period, the surveyed companies' revenue growth rate, again based in constant dollars, also eclipsed the revenue growth rate of the Fortune 500.

IBX

YOUNG VENTURE-BACKED COMPANIES ARE MAJOR ENGINES OF JOB CREATION

Many of today's leading economists argue that America's economic leadership in the 21st century will be based on the solid foundation of a technically skilled work force. Young, venture-backed companies generate the type of skilled jobs that will keep the U.S. dominant. The percentage of highly skilled positions for scientists, engineers and managers created by our survey companies is over four times greater than the percentage of skilled jobs created in the economy as a whole. As these survey companies expand operations, the percentage of production and other positions should also increase.

enture - Backed Companies Create A Greater Percentage of Skilled Jobs

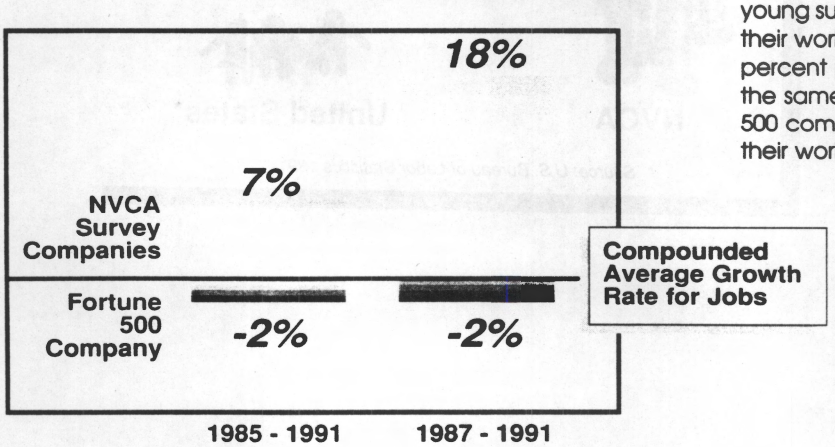


Not only do these young companies create a larger proportion of highly skilled jobs, they do so more cost-efficiently. Given the high price of equity, these growing companies use 12 percent less equity to create a job than Fortune 500 companies. Additionally, understanding that bioscience companies are highly equity intensive, we compared the efficiency of job creation in the 203 non-bioscience survey companies against the Fortune 500 companies. The non-bioscience companies needed only $44,500 to create a job, almost 20 percent less than Fortune 500 companies.

enture-Backed Companies Create Jobs More Efficiently Than Fortune 500 Companies



enture-Backed Companies Aggressively Grow Jobs



Despite the increased difficulty of obtaining investment equity to finance job growth during the country's recent recession, our young survey companies increased their work force an average of 7 percent per year since 1985. During the same time, 1985-1991, Fortune 500 companies cut 2 percent of their work force per year. Looking at just the past five years, venture-backed companies rallied an impressive 18 percent job growth per year, compared to the persistent 2 percent job loss at Fortune 500 companies from 1987-1991.

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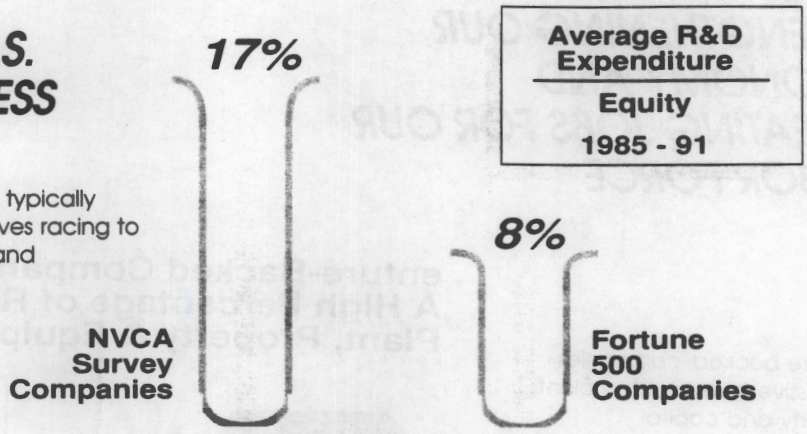
VENTURE-BACKED COMPANIES QUICKLY CREATE NEW TECHNOLOGIES AND PRODUCTS, ENHANCING U.S. COMPETITIVENESS

Venture-backed companies typically spend the first years of their lives racing to produce new technologies and products that strengthen America's competitive edge. Without access to debt financing, these growing companies often depend on the equity invested by venture capitalists to fuel their R&D engines. The 246 companies in our current survey invested over twice as much of their equity in R&D as Fortune 500 companies. The 428 companies in our entire database poured almost $3 billion into R&D efforts that will enhance the United States' competitive position in world markets for years to come.

nvestment Equity Fuels the R&D Engine

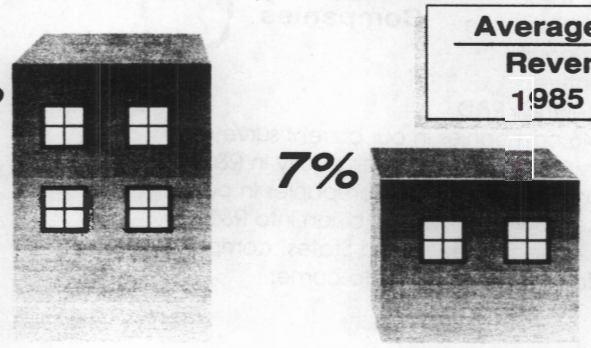


.21%

VENTURE-BACKED COMPANIES SPEND A GREATER PERCENTAGE ON LONG-TERM CAPITAL INVESTMENTS, STRENGTHENING OUR ECONOMY AND CREATING JOBS FOR OUR LABOR FORCE

enture-Backed Companies Invest A High Percentage of Revenues in Plant, Property & Equipment

Venture-backed companies' aggressive investment in plant, property and capital equipment (P.P.E.) fortifies our economic recovery and creates much needed jobs for our country's labor force. From 1985 - 1991, survey companies spent 11 percent of their revenue on long-term capital investment. At the same time, Fortune 500 companies spent only 7 percent of their revenue investing for the future.

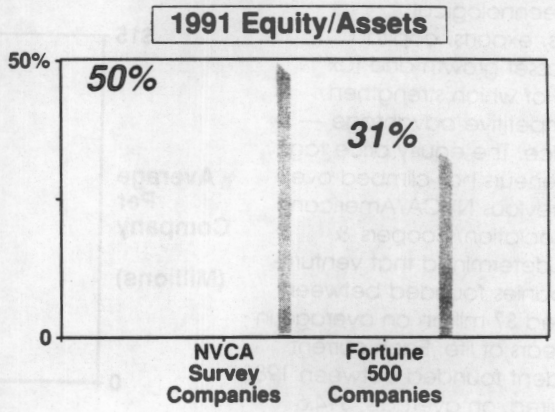


22.X

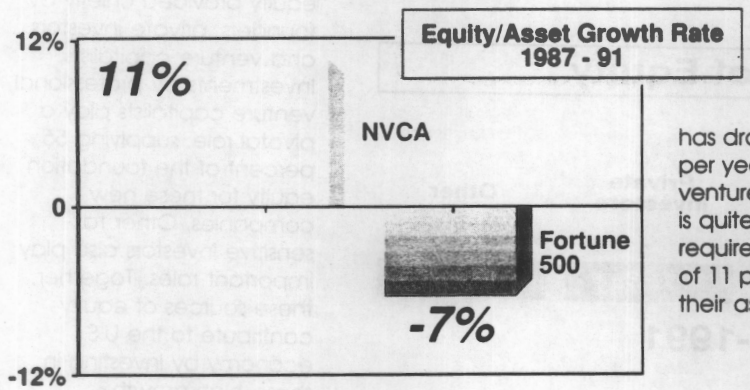
CRITICAL ASSETS ARE FINANCED THROUGH HARD-WON EQUITY

Young companies are investment equity intensive, having little access to the financing options available to larger companies. As a result, venture-backed companies must allocate a significant portion of their equity base to support their assets. In 1991, 50 percent of the equity raised by the surveyed companies was used to support assets. By contrast, Fortune 500 companies needed only 31 percent of their equity base to finance assets.

urvey Companies Largely Finance Assets Through Investment Equity



enture-Backed Companies Go To the Equity Well More Often To Support Asset Growth



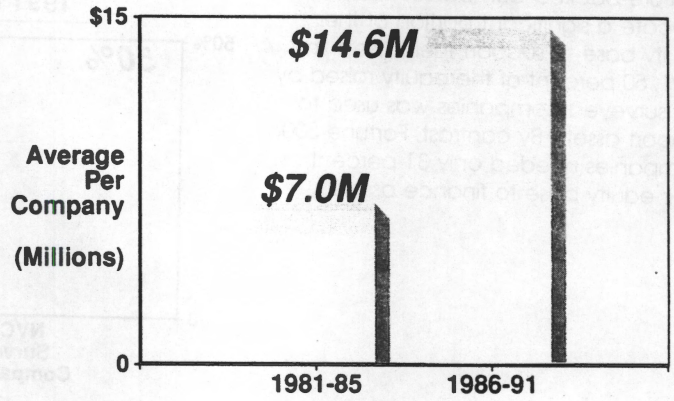
These Fortune 500 companies require less and less equity to finance the same level of assets. Since 1987, their need has dropped an average of 7 percent per year. For the equity-hungry venture-backed companies, the story is quite different. Their equity requirements have grown an average of 11 percent each year to support their assets.

23X

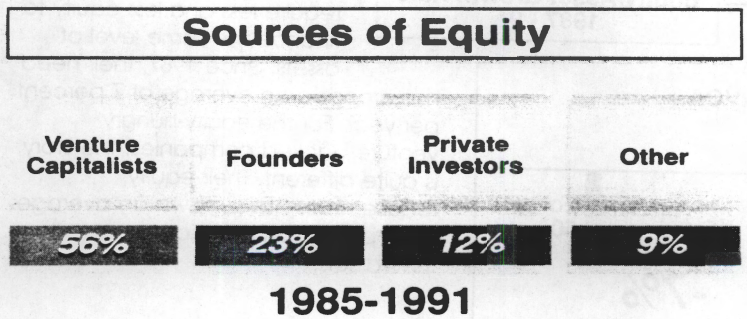
THE POSITIVE ECONOMIC IMPACT OF VENTURE-BACKED COMPANIES REQUIRES AN INCREASING INJECTION OF INVESTMENT EQUITY

Creating an on-going benefits stream of job creation, technological advancements, exports, capital expenditures, asset growth and tax revenues — all of which strengthen America's competitive advantage — comes at a price. The equity price tag facing entrepreneurs has climbed over the years. A previous NVCA/American Electronics Association/Coopers & Lybrand study determined that venture-backed companies founded between 1981 -1985 raised $7 million on average in their first few years of life. Each current survey respondent founded between 1986 and 1991 required, on average, $14.6 million over these initial years. This is an increase of 108 percent.

nitial Funding Required by Survey Participants Grows



hese Companies Depend on Investment Equity



These entrepreneurial companies have few avenues to turn for the equity investment they need to grow and prosper. They are dependent on the investment equity provided chiefly by founders, private investors and venture capitalists. Investments by professional venture capitalists play a pivotal role, supplying 56 percent of the foundation equity for these new companies. Other tax-sensitive investors also play important roles. Together, these sources of equity contribute to the U.S. economy by investing in these high-growth companies.

24X

The Coopers & Lybrand Commitment

To provide the ***quality*** *of service expected by our clients; to develop individual* ***initiative*** *and help our people fulfill their potential; and to foster a sense of* ***teamwork*** *—among our people and with our communities.*

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25X



TECHNOLOGY CENTER
OF SOUTHEASTERN PENNSYLVANIA

1983-1993
TEN YEAR ANNIVERSARY REPORT

26X

"... the function of entrepreneurs is to reform or revolutionize the pattern of production by exploiting an invention, or more generally, an untried technological possibility for producing a new way, by opening up a new source of supply of materials or a new outlet for products..."

Joseph A. Schumpeter,
Capitalism, Socialism and Democracy, c. 1942

TEN YEARS INVESTING IN THE FUTURE:
THE BEN FRANKLIN TECHNOLOGY CENTER OF SOUTHEASTERN PENNSYLVANIA

Entrepreneurs are the key to economic growth, and during the past ten years, the Ben Franklin Technology Center has supported the entrepreneurial community in Southeastern Pennsylvania.



Max Kraus
Chairman of the
Board of Directors

During its first decade, the Technology Center developed regional networks of small business incubators, export services, and total quality management training. Through its university-based Centers of Research Excellence, the Center provided access to world-class university faculty and facilities. Scores of companies benefited from its Innovation Award Program, which provides funding for prototype development.

The Technology Center is now the largest source of formal seed-capital for technology development in the region. Two-thirds of the 25 leading growth oriented companies identified in *Business Philadelphia* (March 1993) received seed-stage funding from the Center. Scores of Ben Franklin funded companies have received millions of dollars of investment capital from private individuals, venture capital funds and initial public offerings.

As it enters its second decade of service, the Technology Center is developing specialized, consortial programs that provide unique resources to the entrepreneurial community:

- Its START Technology Partnership provides a "window" on the region's entire range of university technologies that have commercial potential;
- Its Business Information Center provides instant access to on-line electronic databases with timely technology, market, industry and competitive information;
- Its Enterprise Growth Fund provides start-up capital to women and minority entrepreneurs; and,
- Its Defense Conversion Initiative provides support to defense dependent companies and dislocated defense workers.

We are proud of the accomplishments in our first decade. This 10th Anniversary Report highlights five of the hundreds of successful entrepreneurs who have participated in the programs of the Ben Franklin Technology Center. We also salute the dedicated volunteers and staff who turned the Ben Franklin Partnership program concept into a reality.

REINVENTING GOVERNMENT:
THE BEN FRANKLIN PARTNERSHIP AS A MODEL FOR ENTREPRENEURIAL GOVERNMENT



Phillip A. Singerman, Ph.D.
President and
Chief Executive Officer

In 1993, the Ben Franklin Partnership's Technology Center program celebrates its 10th Anniversary. During that decade, the program has received generous levels of financial support from the Commonwealth's General Assembly and Administration - over one-quarter of a billion dollars.

This commitment of "patient capital" by the State's elected officials has made Pennsylvania internationally known for innovation and technology. In a survey of employment growth regions, *Business Week* (October 19, 1992) praised the significant role the State governments have played in supporting new job creation through technology and innovation, and recognized Pennsylvania's Ben Franklin Partnership as the "granddaddy" of State development programs.

David Osborne, the co-author of the widely cited *Reinventing Government*, (1992) described the Ben Franklin Partnership in *Laboratories of Democracy* (1988) as "arguably the best state economic development program in the country."

"It is comprehensive; it is decentralized; it catalyzes significant private investment in important activities; and it has mobilized major local players in new ways. It is also focused on important targets: the commercialization of research, the transfer of technology from academia to industry, the birth of new firms, and the integration of advanced technology into mature industries."

The results of the program are compelling. Through 1991, the Partnership's four regional Technology Centers created and retained over 24,000 jobs, started and expanded 1,800 new companies, commercialized 540 products and processes, and leveraged over $750 million in non-State funds.

In 1993 the United States is facing many of the same economic problems and policy choices faced by Pennsylvania in 1983. Pennsylvania's successful transformation from a "rustbelt" state - dominated by large manufacturers - to a diversified economy populated by small, high-tech enterprises, provides a model for the development of an effective and entrepreneurial national economic development policy.

29X

Four structural elements are critical to the success of the Partnership's Technology Center program.

Decentralized decision-making

Recognizing that Pennsylvania's economy is diverse, the program is managed by four regional "advanced technology centers," which invest State funds in carefully chosen projects for technology and innovation, selected in accordance with locally developed "strategic investment plans."

Performance driven funding

The four Technology Centers are carefully, systematically and regularly evaluated by the State's Ben Franklin Partnership Fund Board on their success in mobilizing private sector resources, encouraging industrial participation, achieving technical milestones and producing measurable economic outcomes.

Independent non-profit management

A special purpose, mission-driven, non-profit organization was created to achieve the economic development goals of the State. To ensure accountability to community goals, the Technology Centers are overseen by independent Boards of Directors, comprised of private sector executives, university administrators and economic development officials.

Application and deployment of technology

Technological innovation is a means, not an end. The Technology Centers have focused on the application and deployment of advanced technology, to both new and existing companies, to improve productivity and competitiveness. Under this approach, the Centers follow the "quiet path to technological preeminence" (R. Reich, *Scientific American*, October 1989), intended to "transform discoveries quickly into high quality products and into processes for designing and manufacturing . . . such products."

30X

George Jenkins
Managing Partner
APA/Fostin Pennsylvania Venture Capital Fund

The Technology Center is absolutely critical at the moment. Start-up capital is scarce. But Ben Franklin can provide that vital $50,000 to $150,000 injection to get new businesses to a point where a venture fund manager can afford, as a fiduciary, to go the next step.

The Technology Center's $6 million in funding to 13 Centers of Research Excellence has attracted over $52 million in matching dollars as well as an additional $15 million in follow-on Federal dollars.

Established Ben Franklin Technology Center as stand alone, non-profit corporation with a private sector Board of Directors to better serve as a bridge between private, university, community and public sectors.

By 1993, the Technology Center has made seed capital investments of over $8 million to over 130 companies. This investment has been matched with $28 million in additional capital from mainly private sources and created more than 850 jobs.

Since 1984, $1.5 million has been invested in ten small business incubators.

Began providing Innovation Awards of $25,000 to entrepreneurs for product development and prototypes.

Funded first consortial Center for Research Excellence, the Center of Excellence for Biomedical Imaging, with Drexel and Thomas Jefferson Universities. (See story page 17.)

Established program to provide seed stage funding for start-up companies. First project with Immunicon, Inc., a spin-out from Thomas Jefferson University.

Funded first small business incubator, RDC, Inc., in Upland, Delaware County.

University City Science Center designated as Ben Franklin Partnership Advanced Technology Center. The Commonwealth awards a $250,000 planning grant.

Joe Serritella, Esq.
Head of the Intellectual Property Practice Group
Pepper, Hamilton & Scheetz

Ben Franklin delivers its State-funded economic development program in a sensitive way. The staff is high quality. They are dedicated people with experience in either high-tech or seed-capital businesses. And, they really give the kind of hands-on advice that helps entrepreneurs.

1983 **1984** **1986** **1988** **1989**

31X

Received $937,500 "Microloan" award from the U.S. Small Business Administration for women, minority and low-income entrepreneurs.

Received three year, $600,000 National Institute for Standards and Technology grant to provide customized on-line database searches to small and mid-sized companies in association with Pennsylvania's Small Business Development Centers.

Founded Business Information Center to provide small companies with access to on-line business information. (See story page 14.)

Howard Ross
Partner in Charge
Emerging Business Practice
Arthur Andersen & Co.

The Technology Center helped create a lot of visibility for entrepreneurism among professional services in the Philadelphia area. And for every additional accountant, lawyer, banker, insurance or advertising person who devotes some time to working with small companies, the better it is for the Region.

Charles Hadley
General Partner
Hillman Medical Ventures

It's smart money. Between the Technology Center's staff and their advisory boards, they're a pretty capable group in evaluating new opportunities. The fact that Ben Franklin chooses to invest in a particular company is validation in terms of that company's technology.

Denise L. Devine
President
Devine Foods

The Technology Center has been a wonderful support mechanism. A start-up is a mental roller coaster. One day you're elated. The next day it's like, "Oh, my god, what am I doing?"

Being in that community put me in touch with other entrepreneurs. It helps to know that there are other people who are just as committed as you are and are making big sacrifices just the same. It helps to know that maybe you're not alone.

1990 **1991** **1992** **1993**

32X

BIOSYN, INC.



93X



Anne Marie Corner,
President and
Chief Executive Officer

Anne-Marie Corner and her partner, Daniel Malamud, had an idea about a technology with the potential to kill HIV. They started Biosyn with a $2,000 loan to rent an office, buy a used computer and keep going until the company could get more money.

The first money Anne-Marie got as President of Biosyn was a Ben Franklin Innovation Award for $25,000. This money enabled her to open up an office in the University City Science Center's small business incubator and enabled the company to leverage other capital investments.

The psychological boost of getting that first check and running over and putting it in the bank was unbelievable.

That was just the biggest kick. Here was somebody who looked at our idea, looked at our concept, and said, "Yes, we believe in this, and we're willing to put our money down because we believe in it."

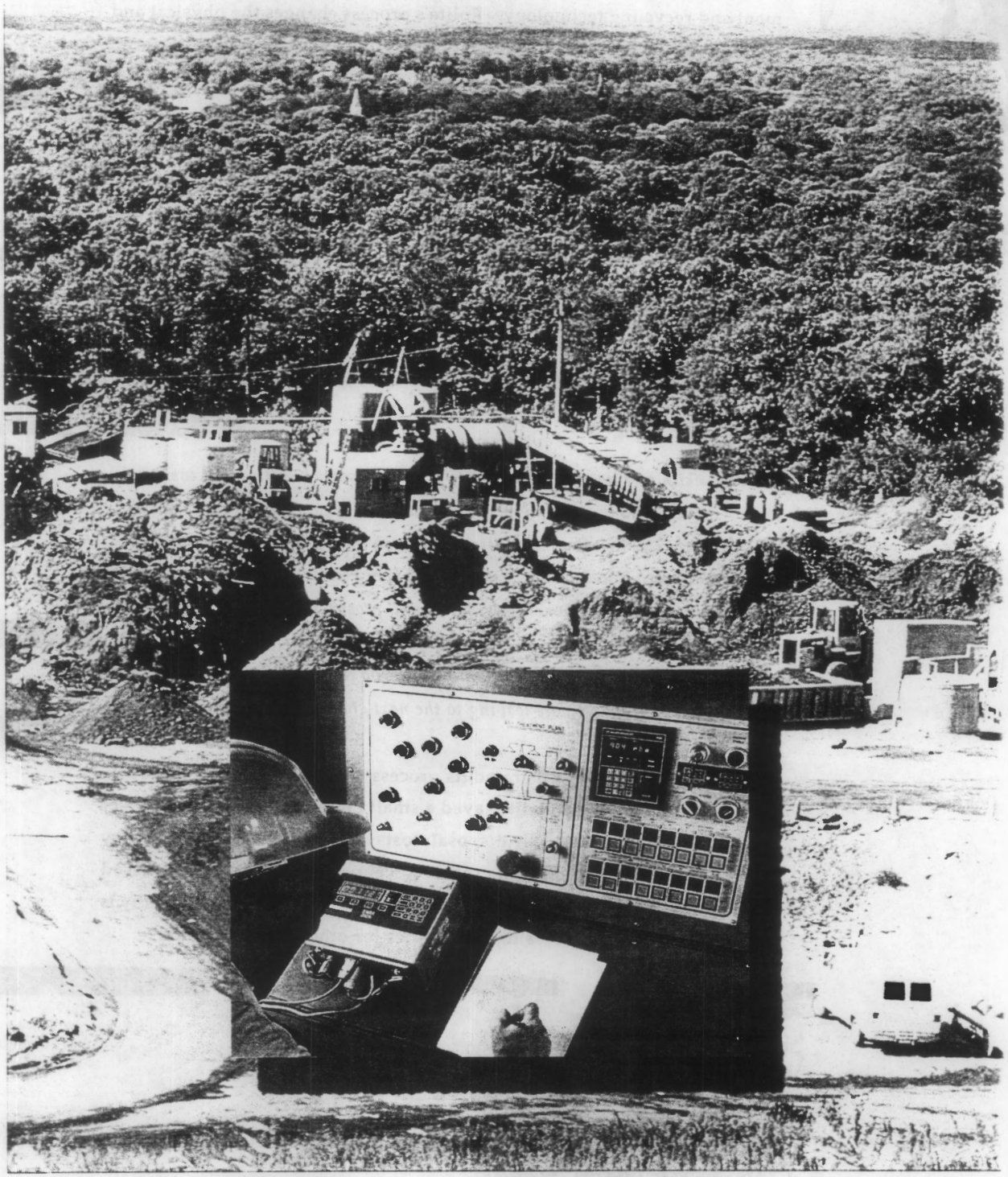
The fact that we leveraged Technology Center money to get other people to come in was almost equally as important. Investors see the Technology Center as someone external who has looked at your science and your business plan and said, "The technology is sound. The people can get it to market. The markets are good. And, it's worth investing in." That gives investors a large measure of confidence in your company.

Today, Biosyn's product development strategy focuses on: a barrier cream for use under latex gloves, expected to be on the market within two years; a treatment for oral candidiasis in AIDS patients; and, a viricidal spermicide. This technology was partially developed at the University of Pennsylvania and subsequently licensed from the inventor's small company to Biosyn.

Anne-Marie Corner has been recognized by local and national organizations in her role as an entrepreneur. To date, Biosyn has raised $1 million and gained the attention of the National Institutes of Health and the World Health Organization for these socially useful products.



ROLITE, INC.



Rolite processing facility at Blydenburgh Landfill, Islip, NY

35X



illiam A. Roberts,
esident

When Rolite first contacted the Ben Franklin Technology Center, it was a newly formed company with little more than an experienced management team and a good idea.

The company wanted to commercialize a municipal incinerator ash treatment and recycling technology. Rolite's process changes the physical and chemical characteristics of ash to inhibit leaching and generate a uniform, marketable aggregate.

Bench scale tests yielded positive results, convincing Bill Roberts, Rolite's president, that Rolite could offer an environmentally sound and competitive waste management strategy. However, gearing up from 50 pound batches to 30 tons per hour offered many challenges.

Ben Franklin didn't let us rest on past success. They made us focus on our weaknesses. That can be a little discouraging, but if you focus on obstacles - in marketing, operations, technology and so on - you have a better chance of overcoming them.

Ben Franklin worked with us to identify and overcome hurdles. For instance, to do business in any state, we need cooperation from multiple state agencies. In Pennsylvania, Ben Franklin introduced us to the right people so we didn't waste time getting to decision-makers. And being funded by the Center gave us credibility with government regulators and prospects.

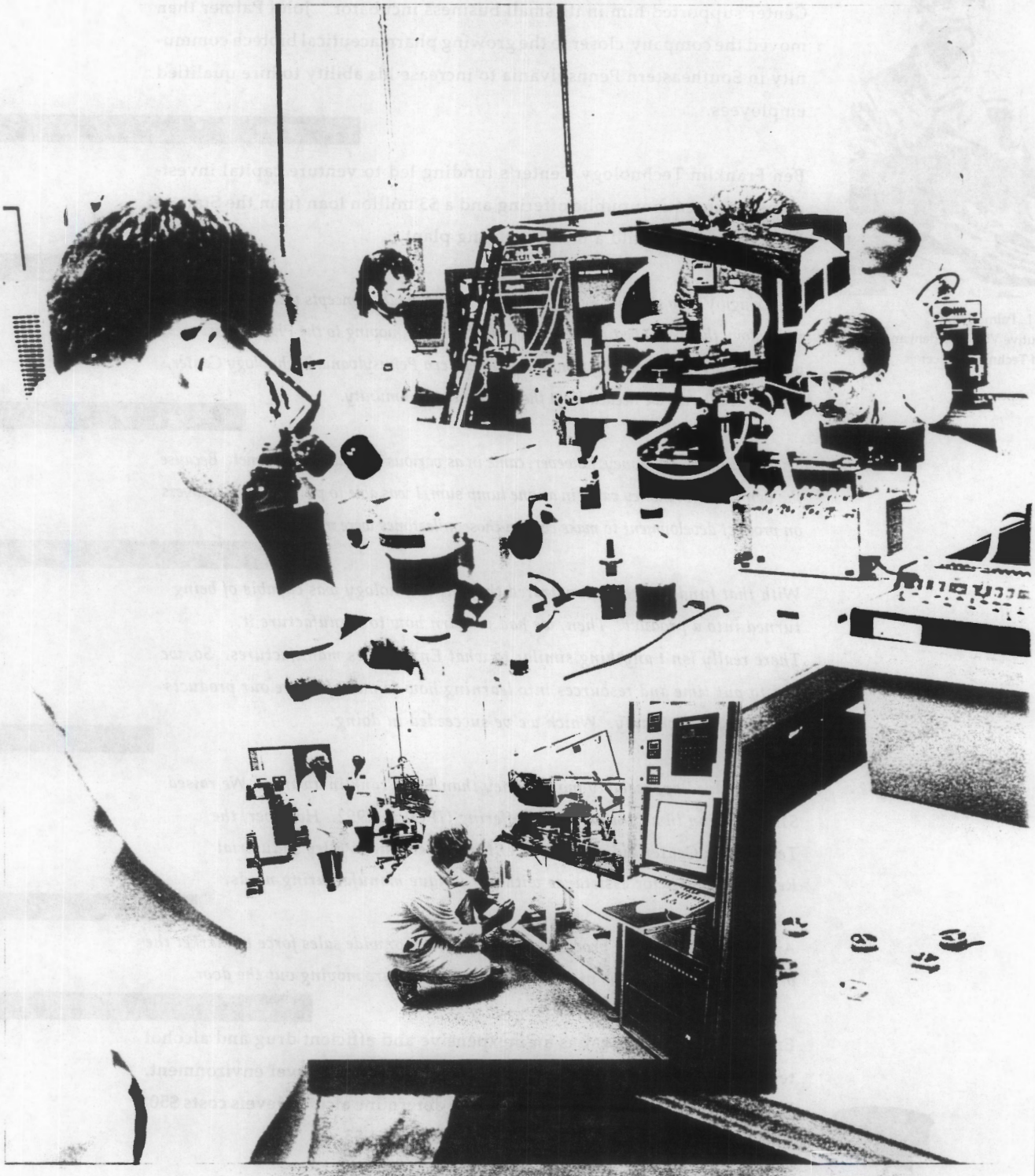
I call that moral support - they didn't do our job for us but they made sure we thought it all through before leaping to the next stage of development.

Rolite successfully demonstrated its process in Florida, then in New York. In two and a half years, Rolite saved a small Long Island community over $15,000,000 in reduced ash disposal costs and aggregate purchases by recycling its ash into sand and gravel. Revenues from this project enabled Rolite to repay the Technology Center's investment. Now the company is looking to develop processing capabilities for other waste streams.



Rolite Aggregate®
Recycled incinerator ash

ENZYMATICS, INC.





n L. Palmer, Ph.D.,
ecutive Vice President and
ief Technical Officer

Enzymatics is an eight year old medical diagnostic testing company founded by an inventor, John Palmer. The Lehigh Valley's Ben Franklin Technology Center supported him in its small business incubator. John Palmer then moved the company closer to the growing pharmaceutical biotech community in Southeastern Pennsylvania to increase his ability to hire qualified employees.

Ben Franklin Technology Center's funding led to venture capital investment, a subsequent public offering and a $3 million loan from the State of Pennsylvania to build a manufacturing plant .

The Lehigh Valley start-up money enabled us to define the concepts we had and get to a technology that could be turned into a product. After moving to the Philadelphia area, our technology, and funding from the Southeastern Pennsylvania Technology Center, got us the interest we needed from the investment community.

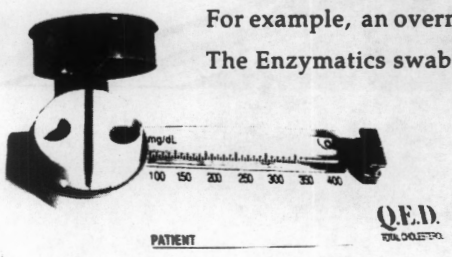
The venture capital money, however, came in as various milestones were met. Because the Ben Franklin money came in as one lump sum, I was able to put additional players on product development to make certain those milestones were met.

With that funding we demonstrated that the technology was capable of being turned into a product. Then, we had to learn how to manufacture it. There really isn't anything similar to what Enzymatics manufactures. So, we had to put time and resources into learning how to manufacture our products efficiently and cheaply. Which we've succeeded in doing.

This involved appreciably more money than Ben Franklin awards. We raised $11.9 million in an initial public offering (IPO) in 1992. However, the Technology Center did connect us with the Delaware Valley Industrial Resource Center for assistance with our unique manufacturing needs.

And now we are in the process of building a nationwide sales force to market the products. That effort is picking up and products are moving out the door.

Enzymatics' saliva swab is an inexpensive and efficient drug and alcohol test designed to create a healthy and safe work and travel environment. For example, an overnight blood test to determine alcohol levels costs $50. The Enzymatics swab takes 3 minutes and costs $3.



38X

National Safety Clean, Inc.



National Safety Clean Partners: Thomas A Quinn, James M. Baker, Frank P. LeMaster, Mark R. Taylor, Jeff Boles

39x



Frank P. LeMaster,
Chief Executive Officer

National Safety Clean's founders were volunteer firemen who had expertise in cleaning woven fibers. They knew certain contaminants can cause firemen's clothing to burst into flames in high temperatures. Others, such as carcinogens and bloodbourne pathogens, can move from the garment through the fire fighters' open pores as they fight fires. The proprietary cleaning process they invented removes the toxic and flammable chemicals that build up in protective clothing without destroying fire protection ability or voiding manufacturer warranties. This process substantially reduces the cost of maintaining fire fighting gear.

Ben Franklin Technology Center funding and an introduction to Dr. Elihu Grossmann of Drexel University's Department of Chemical Engineering, were the proof and support they needed to interest private investors. Those investors recommended the hiring of Frank LeMaster, former all-pro middle linebacker for the Philadelphia Eagles, as CEO and helped move company headquarters from a garage to an upgraded new facility.

Although they now dominate the industry, CEO Frank LeMaster wants National Safety Clean to stay on the leading edge.

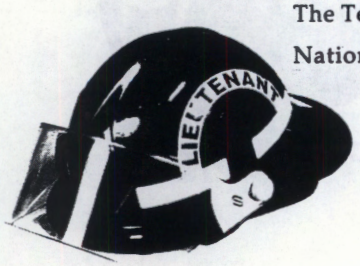
Our State Representative, Joe Pitts, thought the Technology Center could help. So, we called and they came out and met with us.

That meeting was pretty exciting. They analyzed what we were doing and, right then, suggested that we call Drexel University. They put us in touch with Dr. Grossman to see if there would be an opportunity for research and development.

At this point, we can analyze contaminants in the gear. But if we had better, quicker and more efficient ways to test for contaminants, our customers could make better decisions on when to get cleaning. Right now it's a common sense call, depending on what types of fires they've fought, and how many. With better tests, fire companies could just send a removable patch from the gear and we could tell them the contaminant buildup.

This joint venture is giving us the ability to stay on the leading edge and to take it even further - to make us grow faster.

The Technology Center provides funding for Drexel to do the research and National Safety Clean matches with funds and in-kind contributions.



40X

The Business Information Center

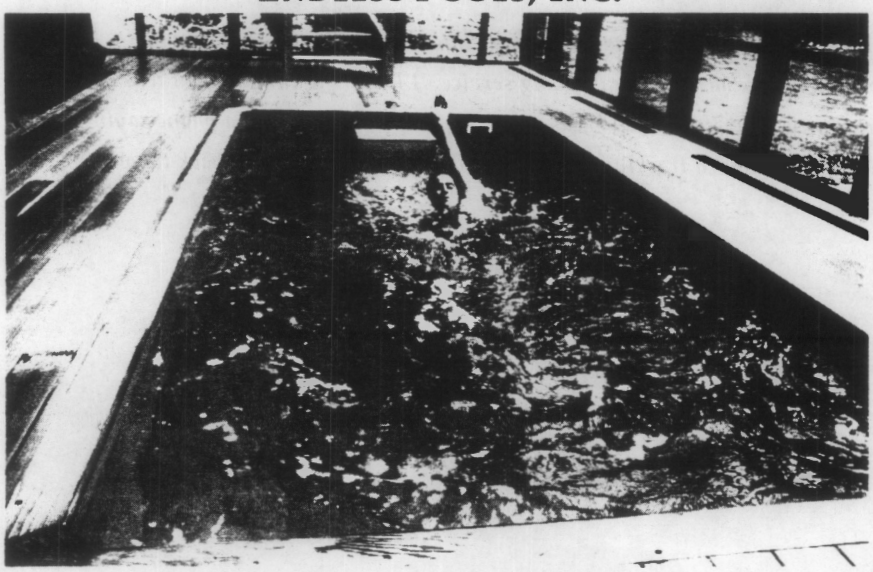
During the last ten years large companies learned to increase their knowledge-at-hand by tapping public databases and information services with their computers. Small companies haven't had the resources to do this effectively.

In 1990, the Technology Center of Southeastern Pennsylvania created the Ben Franklin Business Information Center to provide entrepreneurs with customized computer-based information searches to find market, technical, competitor, business and economic information. For example, DUN's Market Identifiers database presents over fifty important facts for more than 7.6 million U.S. business establishments. PTS Promt contains articles from over 1,000 business publications world-wide.

In 1992, the Business Information Center began offering these services to businesses other than technology companies. Through grants from Bell of Pennsylvania - matched by the Technology Center - and in collaboration with Portfolio Associates, Inc., the Business Information Center provided these "information services" to over 65 minority enterprises. Through a 3-year pilot program funded by the U.S. Small Business Administration and the National Institute for Standards and Technology, and in collaboration with Pennsylvania's Small Business Development Centers, the Business Information Center has served over 300 small businesses scattered throughout rural and urban communities in the State of Pennsylvania.

The Business Information Center is staffed with four professional librarians with a combined total of over 55 years of on-line database search experience.

Endless Pools, Inc.



41X

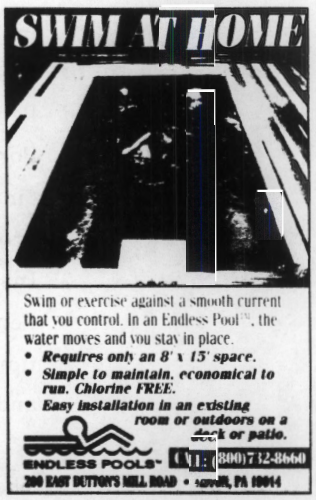


James Murdock,
President

Endless Pools manufactures and sells a compact, personal pool where the water moves and the swimmer stays in place. The company sells these swimming exercise machines in the United States and abroad, relying heavily on national advertising. James Murdock, president of Endless Pools, used the Business Information Center to optimize their advertising expenditures.

Our biggest concern, then as now, is the competitive threat. So I asked the Business Information Center for information on our largest competitor. Since their search of recent publications found articles I already knew about, I asked another question - Where else does our competitor advertise? The Information Center research librarian found the name of a service that tracks advertising. It turns out our competitor advertises in publications I had never heard of.

Now, for $500 a year, we find where they advertise. Then we place our ads where they do. Actually, we only go into publications where they've repeated. Our competitor advertised in 20 publications the first year but repeated in only five of them the second year. One can make a pretty good assumption that those five were better than the other fifteen. We know our competitor spends four times as much as we do on advertising. With this information we are able, if not to match them, to come pretty close by not making the mistakes that they've made.



Many small companies figure they can't do that if they're small. They will assume, "Well, that's what big companies do. That's what Nabisco does to keep track of where General Mills advertises." But it turns out there are many bits of information out there in the market that are accessible - if you only knew how to get to them.

I'll soon forget that it was the Business Information Center that put me in touch with the advertising tracking service. I'll start to think that it was my ingenuity. But it wasn't, it was somebody on the other end of a phone saying, "Well you know, a tracking service probably exists. Let me get back to you."

42.X

The START Technology Partnership

Over the past ten years Southeastern Pennsylvania's universities and research institutions gained national prominence as sources of new technology. However, the results of that work were not being commercialized at the same rate as the institutions in Boston and Silicon Valley. The Technology Center saw that, although the region had a large technology base, it was dispersed among many institutions. In response, the Technology Center co-sponsored the START Technology Partnership with the British Technology Group-USA, and developed a consortium of institutions, venture capital funds and economic development organizations. START evaluates and commercializes new technologies and licenses them to large corporations or helps to create new companies to market new products. By taking advantage of university innovations, START helps create jobs in Southeastern Pennsylvania.

Institutional Sponsors

Albert Einstein Healthcare Foundation
Children's Hospital of Philadelphia
Drexel University
Fox Chase Cancer Center
Graduate Health Systems
Hahnemann University
Medical College of Pennsylvania
Temple University
Thomas Jefferson University
University City Science Center
Villanova University

Venture Capital Sponsors

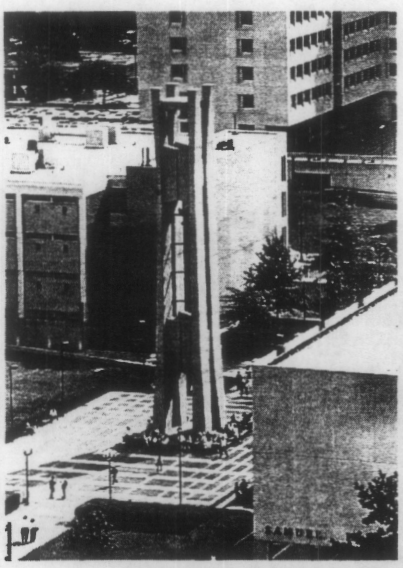
Grotech Capital Group
Hillman Medical Ventures
NEPA Venture Fund
Penn Venture Fund
Philadelphia Ventures
S.R. One, Ltd.

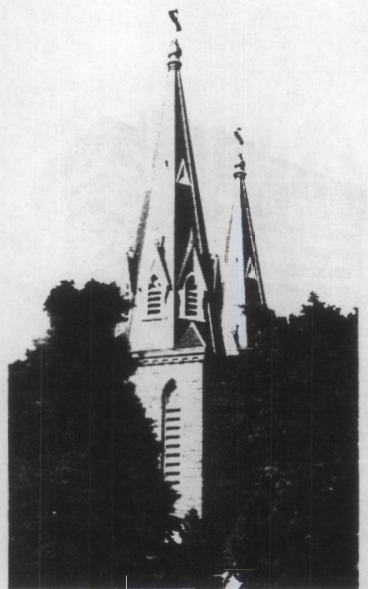
Business Sponsors

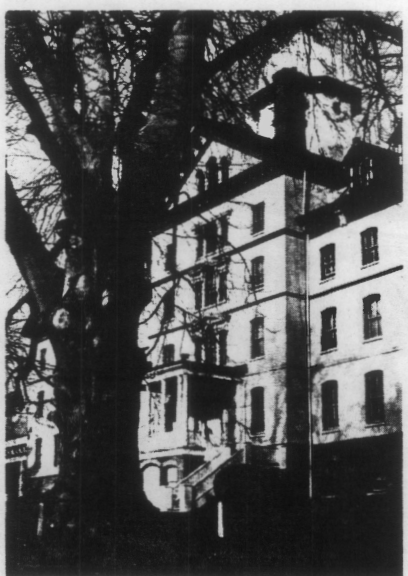
CITECH
Greater Philadelphia Economic Development Coalition
MLR Biomedical Publishing

Organizing Sponsors

Ben Franklin Technology Center
British Technology Group-USA







4-3X

CENTERS OF RESEARCH EXCELLENCE

Since 1987 the Technology Center has sponsored 13 Centers of Research Excellence to link local universities with companies from around the country to promote generic research in a single field or technology, such as superconductivity, information systems engineering, biomedical imaging and solid waste systems.

In addition to the support they provide to entrepreneurs and established companies, the Centers of Research Excellence have had significant success in attracting Federal dollars to the region. These Technology Center funds typically attract eight times their value in Federal dollars. These substantial amounts of outside funding provide new jobs in Southeastern Pennsylvania's existing companies and institutions, and create new industries for the 21st century.

Large, well established companies pay membership fees to participate in many of these Centers. In return they expand their research capabilities and enhance product development efforts by collaborating with leading researchers in Southeastern Pennsylvania universities and research facilities.

Small companies also can access that knowledge through the Centers of Research Excellence "Service to Companies" program. The Centers provide short-term consulting and use of equipment and analyzing facilities for rapid problem solving. For example, this access might result in a moderate redesign or a quick analysis of a part that fails under stress.

Outside funds attracted by the Centers of Research Excellence

Center for Advanced Communications
Villanova University: $10 million from the Department of Defense

Center for Research in Cognitive Science
University of Pennsylvania: $12 million over ten years from the National Science Foundation

Center of Excellence for Biomedical Imaging
Drexel University and Thomas Jefferson University: $1.5 million from the National Institutes of Health

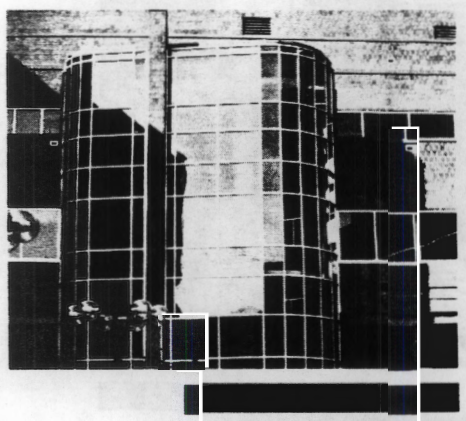
Center for the Study of Connectivity and Databases
West Chester University: $2 million equipment donation from Digital Equipment Corporation

Center of Excellence for Cardiovascular Studies
The Graduate Hospital: $1.2 million from the National Institutes of Health

Center for Multidisciplinary Information Systems Engineering
Drexel University: $750,000 from the U.S. Air Force







Success In The Future
A Conversation with Several Members of the Board of Directors

TELECOMMUNICATION INFRASTRUCTURE



Julie Dobson, President and CEO
Bell Atlantic Business Systems International

The Philadelphia region is a leading edge community in the deployment of telecommunication technology with numerous fiber optic rings around the region. However, having it in place doesn't mean it's being utilized. Most businesses, particularly the low-end user, are still not using telecommunications for data. The successful entrepreneur of the 90s needs to know that the future is going to be electronic communication between customers and suppliers, partners, everybody.

Bell Atlantic Business Systems is the world's leading provider of independent computer support services including comprehensive data center and distributed systems services for both business customers and OEMs.

LICENSING



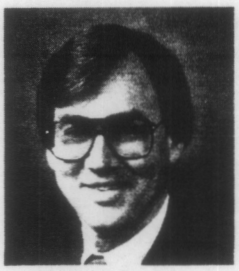
Derek Schafer, Ph.D., President and CEO
British Technology Group-USA, Inc

Technology should be used effectively and efficiently in product development. But that technology can also be licensed in areas beyond a small company's core strategic strengths. Through effective technology transfer the entrepreneur can find added value without having to raise unrealistic amounts of resources. At the same time, entrepreneurs should be looking for complimentary technologies from other sources.

And finally, small companies often haven't got the resources or the time to really come to grips with protecting their technology. It's imperative to get a good technology well protected first - then build on it and get good value out of it.

BTG-USA is the North American affiliate of British Technology Group, the world's leader in technology transfer with many years' experience in the identification and commercialization of novel technology and inventions.

IT - INFORMATION TECHNOLOGY



James Coane, President and CEO
Telebase Systems, Inc.

New business owners must really know their markets and competition all the time in order to bring to market something that is needed, at either a higher quality or lower price than competitors.

The only way to be able to effectively monitor the marketplace is through

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excellent information management systems. The IT (information technology tool) is going to be as critical to the entrepreneur as the salesperson, chief financial officer and manufacturing process. The entrepreneur's reach in the 90s has to be much broader and much deeper and the tool to achieve that is efficient utilization of information technology.

Telebase Systems is the leading provider of on-line business and general reference information services through a uniform gateway. Via the gateway, Telebase users are able to access nearly a thousand diverse on-line databases.

COMMUNITY IMPACT



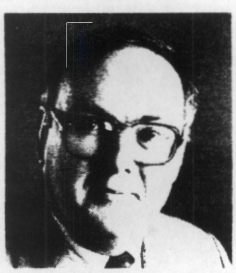
Ernest E. Jones, Esq., Executive Director
Greater Philadelphia Urban Affairs Coalition

Entrepreneurship plays a key role in community development and not enough focus has been placed on connecting the two. We'll go into a community and put a lot of money into buildings and maybe some social programs, but all of that will go for naught unless, at the same time, we develop the economic wherewithal to sustain it.

Most of the people in these communities today, if they are employed at all, are employed by small businesses and entrepreneurs. If minority enterprises are nurtured, they'll hire local people, which will help insure the stability of neighborhoods.

The Greater Philadelphia Urban Affairs Coalition is a major catalyst for positive action throughout the region. Currently there are 39 programs, reaching across the city and the suburbs, designed to weave together, strengthen and repair the social and economic fabric of the region.

VENTURE CAPITAL



Peter A. Sears, President
S.R. One, Limited

Venture capital is a much more competitive environment for entrepreneurs in the 90s. There was a boom in the late 70s and early 80s, but today, the people that fund the venture capitalists are less abundant and less generous.

In addition, the quality of entrepreneurship has improved locally. More people have "caught on" to how it's done. So we're getting more and better people coming with business start-up proposals.

The Technology Center will be a huge advantage to an entrepreneur because it's become a focus point for capital formation behind technology

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transfer and the development of early stage science. Through the way its managed, there always seems to be Ben Franklin money accompanied by other monies, either now or in the future. They are agents for leverage.

S.R. One, Limited is a $100 million venture capital fund investing in early stage companies conducting research in the life sciences which lead to products in the health field.

WORLD CLASS WORKFORCE



Richard D. DeCosmo, Ed.D., President
Delaware County Community College

Today, companies compete in the global marketplace. Success requires a world class workforce. For this reason, workforce training and retraining is the watchword of the 90s. Many colleges and universities can help train current employees. Most area community colleges provide training in management, marketing, quality (TQM), productivity, ISO 9000 and forming a company culture and business practices. Many have trainers to develop customized programs.

Delaware County Community College is an accredited two-year college offering associate degree, career and occupational programs in more than sixty areas and providing training for business, education and government.

REGIONAL PARTNERING RESOURCES



John Claypool, Executive Director
Greater Philadelphia First Corporation

This Region has a large and diversified economy which provides entrepreneurs with the opportunity to integrate their product ideas into a world of rich market information. For example, SEI and Shared Medical Systems, which were both started by entrepreneurs in this region 15 - 20 years ago, took advantage of Philadelphia's large financial and hospital industries.

SEI is a software company that supports investment programs at banks. And, Shared Medical provides software support for hospitals. Their products are a synergy of technology and marketplace knowledge in local industries. That by-play is one of the continuing opportunities for a big, diverse Region like ours

Greater Philadelphia First Corporation is a private association of business chief executives working to advance the economic development and quality of life in Greater Philadelphia..

This Anniversary Report was written, designed & produced by Portfolio Associates, Inc.

Photography by Raymond W. Holman, Jr. and Kristin & Matt: top of p.7
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Ben Franklin Technology Center

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Entrepreneurial Services

Jerry Smith, Ed.M.
Director,
Training and Information Systems

Carol A. Williams
Director,
Enterprise Growth Fund

Horace Smith
Director of Finance

CONTACT US AT:

The Ben Franklin Technology Center of Southeastern Pennsylvania
University City Science Center
3624 Market Street
Philadelphia, PA 19104-2615

TEL: 215-382-0380
FAX: 215-387-6050

Sponsored by Pennsylvania's Ben Franklin Partnership to promote economic competitiveness through technology and innovation

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BusinessWeek
OCTOBER 19, 1992 A McGRAW-HILL PUBLICATION $2.75

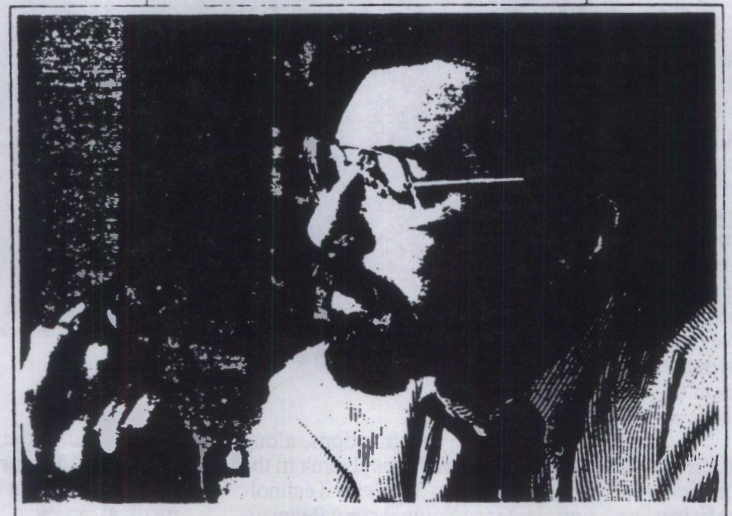
HOT SPOTS

AMERICA'S NEW GROWTH REGIONS ARE BLOSSOMING DESPITE THE SLUMP

THE BIOTECH BOOMLET A FEW MILES FROM PHILLY

Nobody planned Medical Mile, a stretch of U. S. Route 202 west of Philadelphia that's home to 30 biotech and medical startups. But all the ingredients were there. Take a major concentration of big drug companies looking for fresh ideas. Add a couple of universities and research institutions. Offer a high quality of life. Make startup capital available. And presto!—you attract the best and brightest.

The result is companies such as Magainin Pharmaceuticals Inc. in Plymouth Meeting, which is working on a new generation of anti-infection drugs to succeed antibiotics. A dozen miles away, a former Du Pont Co. researcher has set up a company called Cephalon in West Chester to work on new drugs for neurodegenerative disorders such as Lou Gehrig's disease. Some startups, such as Centocor Inc. run into trouble, but new faces keep emerging.



MAGAININ FOUNDER ZASLOFF: FINDING NEW CURES IN FROGS AND SHARKS

DRUG LORDS. These newcomers have opted against costlier biotech havens on the West Coast to be near the drug industry's biggest players. Major labs of Merck, Rhône-Poulenc Rorer, SmithKline Beecham, the Wyeth-Ayerst Laboratories unit of American Home Products, and Johnson & Johnson's McNeil Pharmaceutical subsidiary all dot the suburban Philly area.

The symbiosis between big and small is crucial. The upstarts want to be close to the giants that may someday market their products or become joint-venture partners. Already, scientists at several biggies are experimenting with Magainin's promising drug compounds synthesized from the immune-system substances of frogs and sharks.

The majors, of course, are fertile sources of talent. Zynaxis, whose novel molecules may help make drugs more effective against cancer, was founded by a group of senior SmithKline scientists and is run by a veteran of American Home. And top business and scientific staffers from SmithKline and Rhône-Poulenc have gambled on taking jobs with Magainin, partly because they didn't have to move. "That's very important for a very established guy," says Magainin founder Dr. Michael A. Zasloff. "Should he not like the startup, he can find his way back to a big company."

Equally important is closeness to top-flight medical institutions. Philly boasts five medical schools that are handy for clinical testing of drugs and as fertile sources of skilled workers. Zasloff, for instance, left a genetics post with the National Institutes of Health, two hours to the south in Maryland, to take jobs as a professor at the University of Pennsylvania's medical school and as chief of genetics at the Penn-affiliated Children's Hospital of Philadelphia. This year, he quit Children's to work full-time as a Magainin executive vice-president.

Like most hot spots, Medical Mile depends on more than just the private sector. Startups benefit mightily from Pennsylvania's Ben Franklin Partnerships, which funnel seed grants and equity investments into new outfits. The state helps, too, in education and training, going so far as to open a satellite campus of Pennsylvania State University just off Route 202. And now a 400-company booster group, the Technology Council of Greater Philadelphia, makes sure entrepreneurs meet their elected officials regularly. Without all these players, Route 202 would be just another bucolic drive.

By Joseph Weber in Plymouth Meeting, Pa.

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Reprint from

GENETIC ENGINEERING GEN NEWS

March 1, 1993

Greater Philadelphia Region Works to Lure Biotechnology Companies

By Myrna E. Watanabe, Ph.D.

The Greater Philadelphia region, home to some of the country's largest pharmaceutical firms, is actively courting biotechnology companies—with much success. The City of Philadelphia, the four suburban counties (Delaware, Chester, Montgomery and Bucks), and the nearby counties in New Jersey (Burlington, Camden and Gloucester) all comprise the Greater Philadelphia region, which now has more than 80 resident biotechnology companies.

The Philadelphia area is a fertile ground for biotech company growth because the seeds, in the form of the major pharmaceutical houses and their concomitant pool of qualified employees, are well-established. The pharmaceutical firms themselves support this growth through cooperation with the economic development initiatives and direct venture capital investment in the new companies.

For example, the board of directors of the Greater Philadelphia Economic Development Coalition (GPEDC, Philadelphia), a privately-funded regional economic development initiative, includes Sterling Drug (Great Valley), Rohm and Haas (Bristol) and Rhone-Poulenc Rorer (Collegeville). The GPEDC's parent organization, Greater Philadelphia First (Philadelphia), is composed of some of the largest corporations in the region, including those on the board of GPEDC and others, such as ARCO Chemical Co. (Newtown Square), Betz Laboratories (Trevose), Coopers & Lybrand (Philadelphia), Philadelphia Electric (Philadelphia) and SmithKline Beecham (Philadelphia).



Malvern, PA-based Tektagen, a quality control testing laboratory, was initially funded by the Ben Franklin Partnership. The state-supported program loaned Tektagen money so they could add technical personnel and fund their research and development activities.

All of these organizations, along with the State of Pennsylvania in the form of the Ben Franklin Technology Center of Southeastern Pennsylvania (Philadelphia), and the not-for-profit High Technology Council of Greater Philadelphia (Wayne), have made an investment in the development of the region.

What Makes the Area Attractive?

Aside from the presence of the pharmaceutical firms, what makes the area attractive to biotech companies?

Philip Schein, M.D., chairman and CEO of U.S. Bioscience (West Conshohocken), emphasizes the great concentration of medical resources in Philadelphia proper: its five medical colleges plus research centers such as the Fox Chase Cancer Center and Wistar Institute. "This is a community that is very rich in biomedical science," Dr. Schein says. "There's the opportunity to collaborate directly with medical and basic scientists."

Jack Lief, vice president of Cephalon, Inc. (West Chester, PA), points out several other advantages: there is "access to both technology as well as corporate partners;" it is located "in the corridor between New York and Washington. In communications, it's not hard to overemphasize the value of that." Furthermore, "another thing that a small growing company needs is low cost. To be able to start small and just grow and grow and grow and grow, you need space," Lief continues. At a rental fee of $6/

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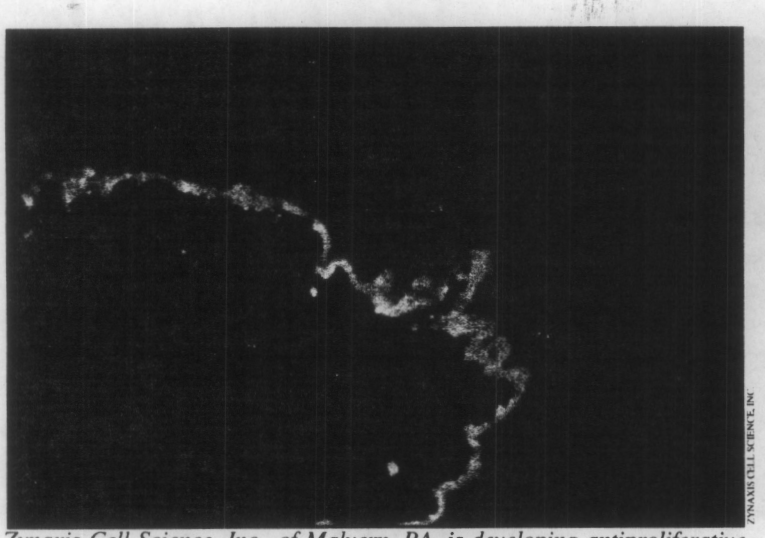

Zynaxis Cell Science, Inc., of Malvern, PA, is developing antiproliferative Zyn-Linker Conjugates that may be delivered directly to the damaged arterial wall via catheter during angioplasty. A Zyn-Linker (bright yellow) was injected into this artery and it attached uniformly to the endothelium, illustrating how a Zyn-Linker Conjugate can be delivered to, and retained at, a disease site.

sq.ft., with ample space for growth—the company leases 44,000-sq.ft. now and expects to lease a total of 55,000-sq.ft. by the middle of this year—space is very affordable.

Most of Cephalon's employees have been recruited locally and, according to Peter A. Sears, president of S.R. One, Ltd. (Radnor), SmithKline Beecham's venture capital group, the executives of the small biotech companies originally come from the nearby large chemical and pharmaceutical houses such as Rhone-Poulenc Rorer, DuPont (Wilmington, DE), and Merck (West Point and Blue Bell, PA; and Whitehouse Station, NJ), among others. Eleven scientists from SmithKline formed Zynaxis, Inc. (Malvern), U. S. Bioscience's Dr. Schein is out of the former SmithKline French, and Cephalon's founders are from DuPont. The region, however, is attractive to prospective personnel and some employees, such as Cephalon's Lief, have been lured from the West Coast.

Desirable Lifestyle

One usually doesn't equate a populous, northeastern, urban location with a desirable lifestyle, but the GPEDC has amassed impressive statistics to prove that the Philadelphia region is eminently livable.

GPEDC points out that housing costs are affordable. In 1991, the average selling price for a house in the region was $118,890, compared to $142,000 for Boston, $173,000 for San Diego, $190,000 for Washington, D.C., and $300,000 for White Plains, NY.

Many of the public schools in the region are excellent, with the bulk of the students going on to college. Plus there are 110 private schools and the second largest parochial school system in the U.S.

Higher education is well-represented. There are more than 80 colleges and universities, ranging from 14 community colleges to the prestigious University of Pennsylvania in Philadelphia, Swarthmore College (Swarthmore, PA) and New Jersey's Princeton University.

The presence of six medical schools, plus a veterinary school and several medical-profession related schools, assures an active intellectual climate for biomedical personnel and ample corporate opportunities for interactions.

Added to these amenities are Philadelphia's cultural institutions and events, professional sports teams, and proximity to New York's and Washington's cultural institutions.

The GPEDC also points out that "of the 82 metropolitan areas with populations of 500,000 or more, Greater Philadelphia has the 11th lowest crime rate."

How To Plug Into the System

In some regions of the U.S., a biotech company that is trying to locate rental space or a building for purchase, is pretty much on its own, relying on real estate agents or some assistance from a company already in the area, but in Philadelphia, a complex network of assistance is available and may be entered from any portal.

A company that approaches the GPEDC will find itself enveloped in a mass of information and assistance. Their Biotech Business Attraction Team is geared to provide the company with introductions to other biotech companies, real estate agents familiar with the industry and its needs, and sources of local economic support.

A company also may make its initial approach to the area through the local utility company, the Philadelphia Electric Company. Donna Phillips, regional director for Philadelphia Electric, explains, "I'm finding people coming to me at the very, very earliest thought process of looking for an area." The utility company may then introduce the biotech company to GPEDC. But both organizations work hand-in-hand.

"Our objective is to see the deal happen," says Phillips.

Another organization that gets involved in selling the region is the Technology Council of Greater Philadelphia. "We certainly encourage companies to locate here," says Jennifer Massey, the Technology Council's director of health care groups.

For all its support to companies wishing to move into the region, the organizations involved in economic development are relatively low key. According to Lynn Martin Haskin, Ph.D., the GPEDC's executive director, the organization neither advertises nor publicizes itself. This is in contrast to some states which are so aggressive in recruiting companies that the governor may become involved at the earliest stages of negotiations. One state took a New York-based CEO to a building that had his company's name emblazoned on it. None of this will happen in the Greater Philadelphia region. But the onslaught of data to the company that is considering a move may be relentless. GPEDC has prepared briefing reports on all phases of life in the region including a comprehensive report on higher education, an index to databases on the region, an assessment of regional technologies, and a briefing book on the pharmaceutical industry.

Continuing Support

Once a company has located in the Greater Philadelphia region, it can receive both financial and business support. The Ben Franklin Partnership, a state-funded organization with four centers located around the state, provides investment dollars from a $3 million/year fund for technology projects and startup companies. A number of local firms have benefitted from Ben Franklin funding during their early growth stages, including Centocor (Malvern), the local biotech giant; Cephalon; Enzymatics, Inc. (Horsham); Tektagen, Inc. (Malvern) and Affinity Biotech (Boothwyn). Ben Franklin Partnership funding is often the first capital a new company receives.

Symphony Pharmaceuticals of Philadelphia, a firm focusing on the central nervous system, was formed in early 1992 and received Ben Franklin funds for its first six months of operation. The partnership also supports a high technology incubator at Philadelphia's University City

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Science Center, which provided Symphony's first home.

The Ben Franklin Partnership also assists with entrepreneurial services for small businesses. And Ben Franklin will aid in technology transfer through the Start Technology Partnership (Gulph Mills), a consortium of universities and medical schools, venture capital groups, economic development organizations and the British Technology Group U.S.A., which provides support and office space.

Other sources of funding include the Technology Council of Greater Philadelphia which can aid a company that needs access to venture capital. The council itself, which has 400 member companies, has a $60 million venture fund, and also represents the Pennsylvania Private Investors Group.

Local pressure from economic development initiatives, universities and pharmaceutical companies led to the development of local venture capital firms. These include SmithKline's S.R. One, Philadelphia Ventures (Philadelphia) and the Pennsylvania Merchant Group Ltd. (Radnor), among others.

Although the venture capital firms do not restrict their investments to local enterprises—S.R. One, for example, has invested in Cambridge Biotech (Worcester, MA), Cruachem (Sterling, VA), Gliatech (Cleveland, OH), Oncogene Science (Uniondale, NY), Sepracor (Marlborough, MA), Synaptic (Paramus, NJ) and others—local firms are heavily represented in their portfolios. S.R. One made investments in at least six local biotech firms including ActiMed Laboratories (Burlington, NJ), Affinity Biotech, DNX (Princeton, NJ), International Canine Genetics (Malvern), Symphony Pharmaceuticals and Zynaxis.



West Chester, PA-based Cephalon, Inc., has remained in the Greater Philadelphia region due to low rental costs, lower costs of living, the region's central location in the Washington-New York corridor, and the company's ability to recruit qualified personnel locally. Here, Randy Bradway, associate director of drug development, loads samples into an HPLC for analysis.

The Technology Council offers business services for members including executive mentoring and breakfast meetings. It also runs courses at local major medical schools.

Synergy Works

Dan Kelly, Rhone-Poulenc Rorer's spokesman, uses the word "synergy" to describe what the companies in the region wish to achieve. A quick perusal of the joint agreements between regional companies shows that this, indeed, is what happens. Affinity Biotech has agreements with Smithkline Beecham, Zynaxis licensed its Zyn-Linker technology from SmithKline, Cephalon has a research collaboration with Schering-Plough (Madison, NJ) and the medical schools, such as Thomas Jefferson University (Philadelphia), are actively submitting their technologies to Start for evaluation and transfer.

Rhone-Poulenc Rorer's president, Randy H. Thurman, is one of the Greater Philadelphia region's boosters. "It provides all of the resources necessary in terms of human resources, infrastructure and higher education to really build your company in the long-term," says Thurman. "When you combine that with the high level of support and cooperation received from county and local governments, you just end up with an ideal situation." The biotech firms seem to agree. ■

Greater Philadelphia has numerous universities, medical schools, and teaching hospitals with 50,000 annual graduates. More than 180 biotech firms and major pharmaceutical companies have already located in the region to benefit from the 40 preeminent research centers, more than $1.7 billion in venture capital under local management, a highly skilled workforce, and a strategic location between Washington and New York.

The Greater Philadelphia Economic Development Coalition, privately funded by the region's 30 largest companies, provides access to corporate executives, scientists and political leaders through its Biomedical/Pharmaceutical Business Attraction Team.

For more information, call the Coalition at (215) 575-2230 or write: Lynn Martin Haskin,Ph.D.,Executive Director, Greater PhiladelphiaEconomic Development Coalition, 1818 Market Street, Suite 3510, Philadelphia, PA 19103

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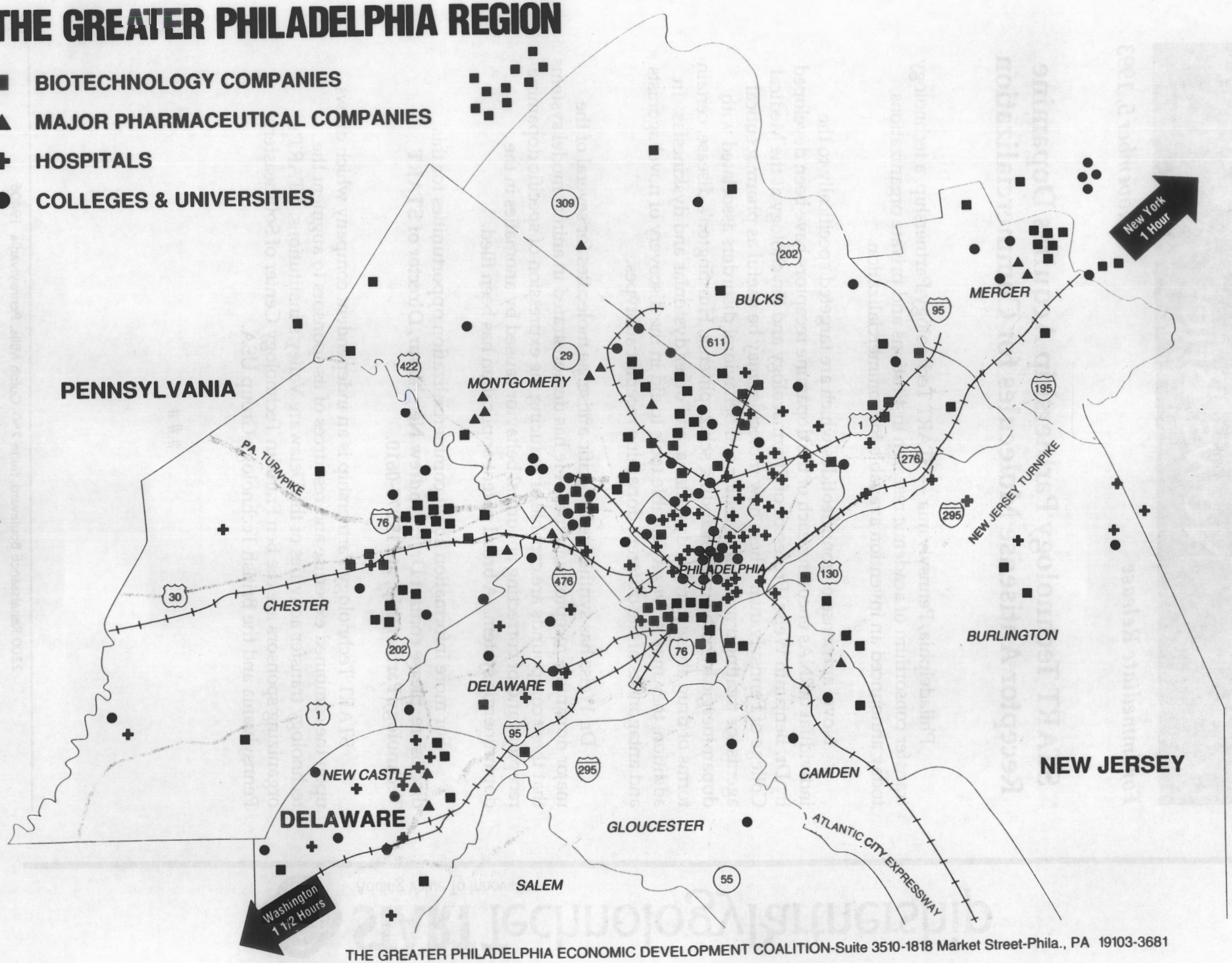
THE GREATER PHILADELPHIA REGION

- ■ BIOTECHNOLOGY COMPANIES
- ▲ MAJOR PHARMACEUTICAL COMPANIES
- ✚ HOSPITALS
- ● COLLEGES & UNIVERSITIES



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START Technology Partnership
Adding Value To Innovation

News Brief

For Immediate Release *November 5, 1993*

START Technology Partnership Acquires Dopamine Receptor Antisense Molecules for Commercialization

Philadelphia, Pennsylvania — START Technology Partnership, a technology transfer consortium of academic research institutions and private organizations, today announced an invention available for commercialization.

Novel antisense oligonucleotides which are targeted specifically to the individual mRNAs encoding each of the dopamine receptors have been developed by Dr. Benjamin Weiss, Professor of Pharmacology and Psychology at the Medical College of Pennsylvania. These new molecules may be useful as pharmaceutical agents for treating a number of motor and behavioral disorders associated with dopaminergic hyperactivity including schizophrenia, Huntington's disease, certain forms of drug abuse, tardive dyskinesia, and other dystonias and dyskinesias. In addition, they may serve as valuable tools to aid in the discovery of novel agonists and antagonists of the different dopamine receptor subtypes.

Dr. Weiss has synthesized specific antisense molecules for several of the major dopamine receptor subtypes. He has demonstrated in animal model systems that these compounds are capable of reducing the expression of specific dopamine receptors and of correcting abnormal behavior caused by anomalies in the dopaminergic system. A broad patent application has been filed.

For more information about commercialization opportunities for this disclosure, please contact **Dr. P. Andrew Neighbour, Director of START Technology Partnership, at 215 275-0610.**

START Technology Partnership is an independent company which draws upon the combined expertise and resources of its sponsors to augment the technology transfer activities of the Delaware Valley's institutions. START's organizing sponsors are the Ben Franklin Technology Center of Southeastern Pennsylvania and the British Technology Group USA.

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2200 Renaissance Boulevard, Suite 250 Gulph Mills, Pennsylvania 19406

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TESTIMONY PRESENTED TO THE **NEW JERSEY LEGISLATURE BIOTECHNOLOGY DEVELOPMENT TASK FORCE**

By John E. Hume
Director of Planning and Analysis
Enzon, Inc.

November 16, 1993
Trenton, New Jersey

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ENZON, Inc.
Adding time to life®

I am John Hume, Director of Planning and Analysis of Enzon, Inc. I am responsible for strategic planning and budget analysis. At the October 8, 1993 meeting of this Task Force, you heard a presentation by Edward Ehrenberg, Executive Vice President, Business Operations and acting Chief Financial Officer of Enzon. I report to Ed in his capacity as Acting Chief Financial Officer.

In Ed's presentation, he provided a comprehensive plan to encourage the establishment and growth of the biotechnology industry in New Jersey. Highlighted were the characteristics of the industry including the lengthy timetable for new drug development, examples of the financial inducements other states are offering to companies such as Enzon, and a listing of nine recommendations for making New Jersey competitive. One recommendation proposed the modification of state laws and regulations to allow the State of New Jersey to invest its pension funds in biotechnology companies. For today's Task Force meeting, we have been asked to elaborate on the merits of this recommendation.

In my presentation, I will provide an overview of the growing importance of biotechnology as an investment alternative, give examples of how other states are investing in biotechnology, and make specific recommendations for amending state laws and regulating policies.

40 Kingsbridge Road Piscataway, NJ 08854-3998 (908) 980-4500 FAX: (908) 980-5911

I would like to make a few comments about our methodology. We selected states based on their known interest in biotechnology and geographic proximity to New Jersey. The data on individual states is obtained from documents (13F Filings) which institutional investors including some state pension funds are required to report to the U.S. Securities and Exchange Commission. Such data is provided through Vickers, an on-line computerized database service. Because of technical reporting requirements, not every state pension fund must report its portfolio. While our findings are not complete, they do provide important insights into the present status of state pension funds investment in biotechnology.

I will proceed by giving you a summary of our findings.

State Pension Funds Investing in Biotechnology Companies

Summary

- <u>Industry Overview:</u>
  - Biotechnology stocks have out-performed the stock market during the past five years
  - Biotechnology stocks have grown to represent 0.6% of the total stock market capitalization
- <u>Other States are Investing in Biotechnology:</u>
  - States have made significant investments in biotechnology
  - Their biotechnology investments are spread among a number of companies (The Basket Approach)
  - States have established venture capital funds for start-up companies
  - States make investments in support of economic development goals

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State Pension Funds Investing in Biotechnology Companies

Summary (continued)

- <u>What Keeps New Jersey from Investing in Biotechnology?</u>
  - Legal and regulatory policies exclude consideration of all but five biotechnology companies
  - None of the New Jersey biotechnology companies meet the requirements
- <u>What Can New Jersey Do?</u>
  - Recommendations to support the New Jersey biotechnology industry

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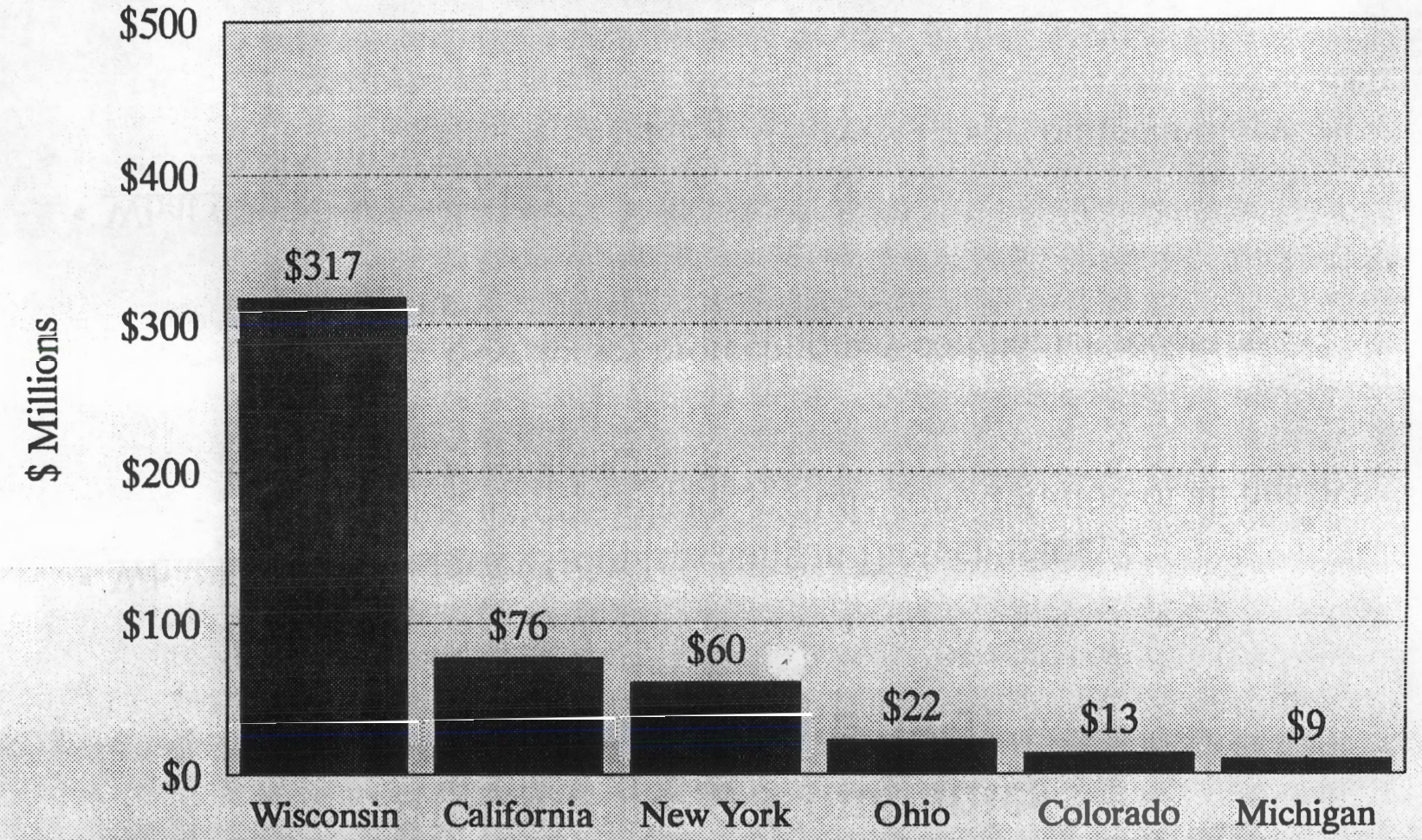
States Have Made Significant Investments in Biotechnology



Source: Vickers /13F (6/30/93)
Note: See Legend

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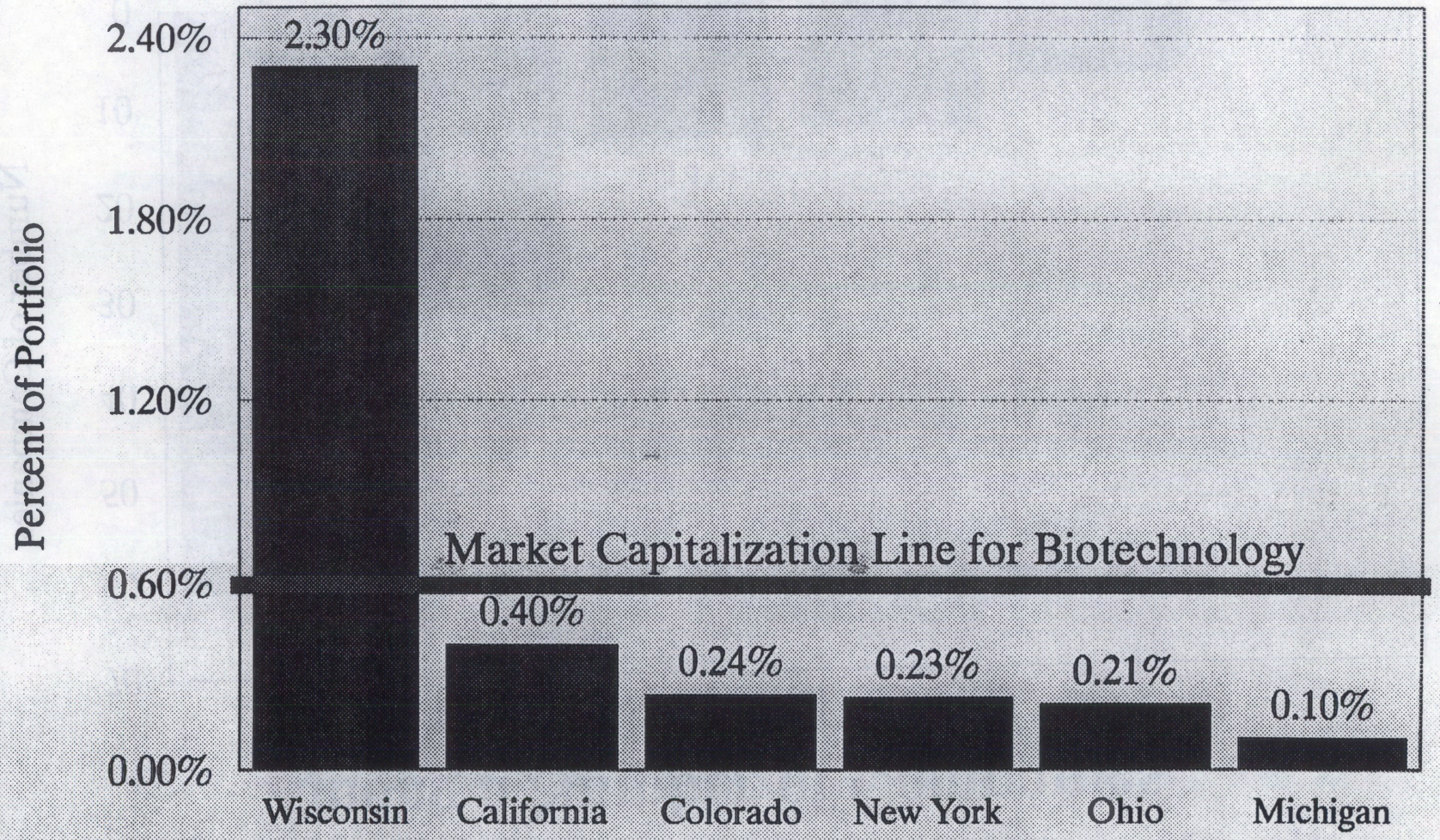
States Have Made Significant Investments in Biotechnology



Source: Vickers /13F (6/30/93)
Note: See Legend

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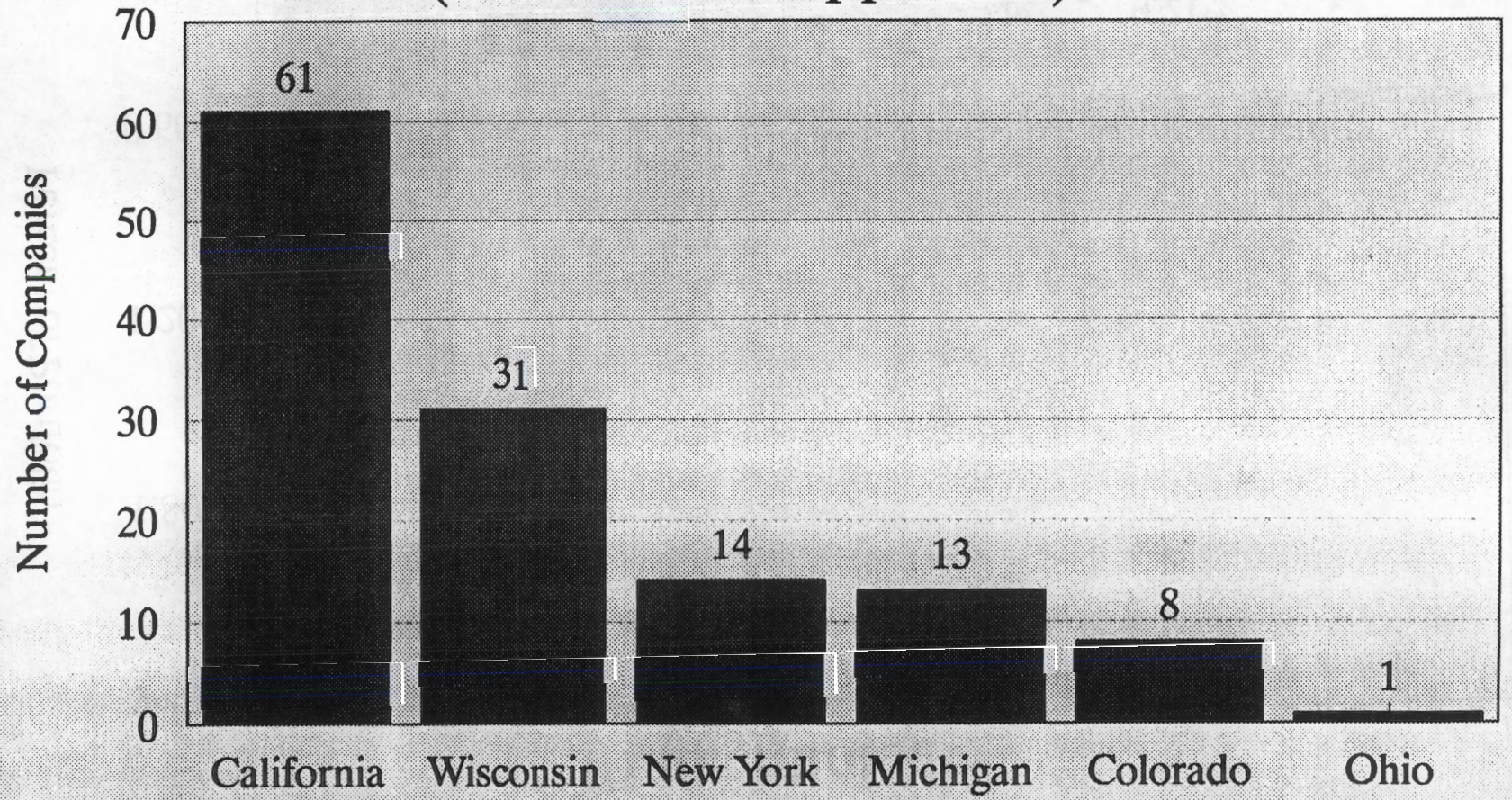
Their Biotechnology Investments are Spread Among a Number of Companies

(The Basket Approach)



Source: Vickers /13F (6/30/93)

Note: See Legend

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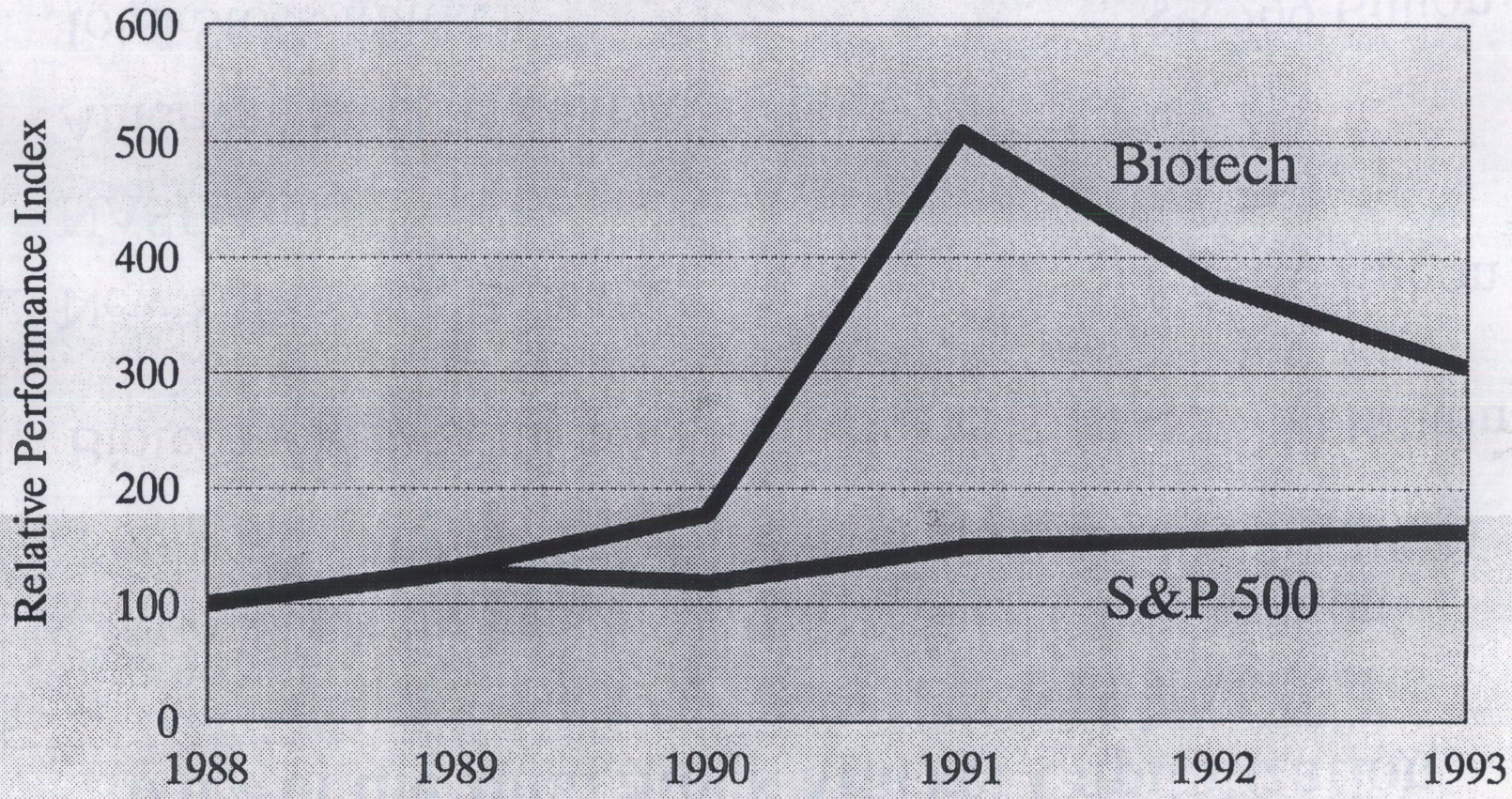
Biotechnology Stocks Have Out-Performed the Stock Market During the Past Five Years

Five Year Gain is Double the S&P 500



Source: Shearson Lehman Biofinancials, Third and Fourth Editions.

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Biotechnology Stocks Have Grown to Represent 0.6% of the Total Stock Market Capitalization

Stock Exchange	Total Market Capitalization (September 30, 1993)
Biotechnology Companies	$ 30 Billion
New York Stock Exchange	$ 4,410 Billion
NASDAQ	$ 763
American Stock Exchange	$ 127
Total Stock Market	$ 5,299 Billion
Biotechnology Share of the Stock Market	0.6%

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States Have Established Venture Capital Funds for Start-Up Companies

- On April 9, 1993 California State announced the allotment of $75 million for the creation of a venture capital fund to invest in start-up companies. The State's biotechnology, electronics, and other high technology firms are primary candidates.

- Rhode Island and Massachusetts have created venture capital funds for start-up companies including biotechnology.

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States Make Investments in Support of Economic Development Goals

- The California State Teachers' Retirement System has set a goal of investing 75% of its venture capital fund in companies doing business in California

- One 1989-1990 survey of State Public Pension Funds reports that of 42 responding funds, 25 (or 60%) made investments to promote socioeconomic investment goals including in-state economic development

Source: "Socioeconomic Investment Practices of State Pension Funds: The Results of a National Survey" by James Leigland, Public Budgeting & Finance, vol. 12, issue 2, Summer 1992, pp. 48-58.

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What Keeps New Jersey From Investing in Biotechnology Companies?

- <u>Legal and Regulatory Policies Exclude Consideration of All But Five Biotechnology Companies:</u>
  - Present state laws require that:
    - ▸ The prudent person is only evaluated on individual stock performance, not the overall performance of the entire (whole) portfolio. (This encourages consideration of only low risk, low return investments.)
    - ▸ There are no investments in venture capital.
  - Regulatory policies follow the "Approved List" approach
    - ▸ Companies are selected using the following guidelines:
      - Minimum Market Capitalization of $200 million
      - Probable income
      - Solid business management
      - Control a sizable market share within their segment of the business
    - ▸ Only 600 companies have been selected

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What Keeps New Jersey From Investing in Biotechnology Companies?

(continued)

- <u>None of the New Jersey Biotechnology Companies Meet the Requirments:</u>
  - Profitability and/or market capitalization criteria prevent investment in every New Jersey biotechnology company
  - The lengthy timetable for new product development delays realization of profitability

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Recommendations to Support the New Jersey Biotechnolgy Industry

- Amend state regulatory policies (the "Approved List") to allow investment in biotechnology companies by:
  - Lowering minimum market capitalization from $200 million to $100 million
  - Including companies with profitability expected within five years
  - Eliminating the market share requirement

- Spread biotechnology investments among a number of companies (The Basket Approach) and measure performance accordingly (The Whole Portfolio Approach)

- Target holdings in biotechnology stocks at 0.6%

- Make investments in New Jersey biotechnology companies consistent with the State's economic development goals

- Establish a venture capital fund to invest in a diversified pool of start-up companies with market capitalizations less than $100 million

- Review Senate Bill #455 introduced by Senator DiFrancesco in light of the above recommendations

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Legend for State Pension Funds

- Wisconsin (State of) Investment Board
- California State Teachers' Retirement System
- New York State Common Retirement Fund
- Ohio State Teachers Retirement System
- Colorado Public Employees Retirement Association
- Michigan (State of) State Treasurer

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ENVIRONMENTAL WASTE
MANAGEMENT ASSOCIATES

Corporate Resume

CORPORATE HEADQUARTERS:
1235A Route 23 South
P.O. Box 648
Wayne, New Jersey 07474
Phone: 201/633-7900
Fax: 201/633-7482

Environmental Waste Management Associates, Inc. (EWMA) is an organization of environmental professionals dedicated to providing environmental services that satisfy the needs of its clients. We emphasize practical approaches and solutions which keep down costs and minimize liability. We constantly monitor the ever-changing environmental laws, regulations, and policies which enables us to provide the most timely guidance available. We provide a broad range of environmental consulting and contracting services to meet the needs of our clients.

Our **real estate services** include:
- Phase I and Phase II Environmental Audits
- ECRA Applications
- Sampling Plans
- Cleanup Plans
- Contract and Lease Clauses
- Asbestos Surveys

Our **underground tank services** include:
- Tank Field Design
- Installation
- Removal
- Registrations
- Closure Plans
- Site Assessments
- Discharge Investigation and Corrective Action Reports ("DICARs")

Our **groundwater services** include:
- Monitoring Well Design and Installation
- Sampling and Cleanup
- Sensitive Receptor Surveys
- Groundwater Mapping

Our **waste management services** include:
- Waste Audits
- Waste Minimization
- Recycling Programs
- Employee Education Programs
- Waste Brokering and Disposal Services

MIDATLANTIC REGION:
Skillman, NJ
Phone: 609/683-7600
Fax: 609/683-1556

WESTERN REGION:
Englewood, CO
Phone: 303/843-9700
Fax: 303/843-9094

RECYCLED

Our industrial hygiene services include:

- Asbestos Surveys
- Asbestos Management
- Health and Safety Audits
- Indoor Air Quality
- Sick Building Syndrome
- OSHA Compliance
- SARA Title III
- Right to Know Surveys

EWMA's senior associates are frequently called upon to critique the work of other consultants and to provide expert witness services. The following biographical information summarizes the background and achievements of some of our senior staff:

Richard S. Greenberg, Ph.D., the founder and President of EWMA, has over ten years of experience in the environmental and chemical industries. Prior to founding EWMA, Dr. Greenberg was a research chemist with E.I. DuPont DeNemours and Company, specializing in environmental and pharmaceutical chemistry, a chemistry instructor at the University of California, and the property manager for over five million square feet of industrial real estate. Dr. Greenberg holds multiple patents and has numerous technical publications to his credit.

Dr. Greenberg lectures internationally on current environmental issues, and was a conferee to the first environmental conference on the Unification of Germany and the Eastern Block of Nations, as well as a member of the delegation selected by the World Bank to prepare an environmental impact study on the nation of Brazil. Dr. Greenberg is frequently called upon as an expert witness for environmental litigation, serves on government/business advisory committees which help shape environmental policy making, and has successfully led EWMA toward national recognition.

Tracy Straka, C.E.A., the Vice President of EWMA, is in charge of corporate operations. Ms. Straka has been with EWMA since its inception, and has acquired a broad range of administrative and technical experience through her previous employment with Hoffmann-La Roche, The George Washington University Medical School and the National Society of Professional Engineers. She also has experience in the management and sale of environmentally distressed real estate.

Ms. Straka, a certified environmental auditor, acts as an environmental advisor to local business groups, investment and financial organizations, realtors, attorneys and property owners. She is certified by the NJDEPE to install, close and test underground storage tank systems and to perform subsurface investigations, and has supervised over one thousand projects during her tenure with EWMA. Ms. Straka is a frequent contributor to many publications and participates in many organizations with interests in environmental issues.

David Zervas, Associate and manager of **EWMA's** Mid-Atlantic Regional office, has ten years previous employment experience with the NJDEPE. Mr Zervas was involved in various enforcement programs within the NJDEPE, including ECRA, RCRA, DOD and Superfund. Mr. Zervas is **EWMA's** primary liaison with the NJDEPE and the firm's foremost authority on CERCLA (Superfund) matters.

Larry Leftin, Associate and manager of **EWMA's** Western regional office, has eight years experience in environmental health and toxicology. Mr Leftin is **EWMA's** wellness consultant specializing in environmental toxicology, occupational health and risk assessment. Prior to his employment with **EWMA,** Mr. Leftin maintained a private wellness clinic. Mr. Leftin also has experience in the industrial/commercial real estate field

Thomas Andrews, P.E., a Project Manager with **EWMA,** holds Professional Engineer licenses in New Jersey and New York. Mr. Andrews is a certified corrosion engineer, a licensed wastewater treatment operator and a licensed realtor. Mr. Andrews has extensive experience in the areas of civil, environmental and municipal engineering with emphasis on wastewater and water supply systems, subsurface soil investigations and computer modelling.

Kevin Orabone, a Senior Project Manager with **EWMA** is responsible for supervising groundwater and geotechnical investigations and remediation projects. Mr. Orabone has completed advanced training in groundwater modelling and hydrogeology, and is an active member of the National Groundwater Association and the New Jersey Geologic Society. Mr. Orabone is certified by NJDEPE to perform UST Closure and Subsurface Evaluation investigations.

John Szalkowski, A.S.T., a Senior Environmental Scientist with **EWMA,** is responsible for Phase I and II audits, asbestos surveys, health and safety audits, industrial hygiene, OSHA compliance, air monitoring, air permitting and stack testing. Mr. Szalkowski has over seventeen years of experience in the environmental industry, and is certified as an EPA asbestos inspector, handler and supervisor. Mr. Szalkowski is a member of the National Asbestos Council, the American Society of Heating, Refrigeration and Air Conditioning Engineers, and The White Lung Association of New Jersey.

John Brennan, a Senior Project Manager with EWMA is responsible for supervising multimedia cleanups. Mr. Brennan was previously employed with the NJDEPE and has over 3 years experience with NJDEPE enforcement programs including NJPDES, BUST, Stream Encroachment and PRP Investigations. Mr. Brennan is an active member of the National Groundwater Association and the New Jersey Geologic Society. He is NJDEPE certified for UST Closure and Subsurface Evaluations. Mr. Brennan lectures locally on current environmental issues and trends.

Anne Lazo, a Waste Management Consultant with **EWMA,** co-manages **EWMA's** recycling division. Prior to her employment with **EWMA,** Ms. Lazo spent five years as the Somerset County Recycling Coordinator. As Recycling Coordinator, Ms. Lazo was responsible for overseeing the County's curbside recycling program which serves a population of 250,000. In addition, she designed and implemented the County's Household Hazardous Waste Collection Program, Medical Waste Disposal Program, and Underground Storage Tank Management Program.

QUALIFICATIONS

Dr. Greenberg, EWMA's Founder and President, is a Ph.D. chemist with ten years of experience in the environmental and chemical industries. Dr. Greenberg is a recognized industry expert, holds multiple patents, is frequently published, and serves on numerous government/business advisory committees which help shape environmental policy. Dr. Greenberg advises attorneys, investment and financial organizations, municipalities, real estate owners and industrial clients, both nationally and abroad and is often called upon as an expert witness during environmental litigation.

EDUCATION

Doctorate of Philosophy in Chemistry, University of California, San Diego
Master of Business Administration Program, University of Delaware
Graduate Student, Chemistry, Rice University, Houston, Texas
Bachelor of Science Degree, Chemistry, Duke University, Durham, NC

CAREER POSITIONS

* Environmental Waste Management Associates, Inc., Founder and President
* Integrated Analytical Laboratories, Inc., Founder and President
* E.I. DuPont De Nemours and Company, Research Chemist
* University of California, San Diego, Chemistry Instructor
* Property Manager for over 2,000,000 square feet of real estate for an investment group

RELATED QUALIFICATIONS AND SPECIAL ACHIEVEMENTS

* Conferee to the first environmental conference on the Unification of Germany and the Eastern Block Nations.

* Independent consultant to the Brazilian Hazardous Waste and Pollution Control projects sponsored by the World Bank.

* Chairman, Commerce and Industry Association of New Jersey Subcommittee for Promulgation of NJDEPE cleanup standards.

* Member, NJDEPE ECRA Regulatory Advisory Subcommittee.

* Multiple patents, publications and speaking engagements.

PROFESSIONAL AFFILIATIONS

Member, New York Academy of Sciences
Member, American Chemical Society, Environmental Division
Member, American Chemical Society, Organic Division
Member, Commerce and Industry Association of New Jersey
Member, National Water Pollution Control Association
New Jersey Real Estate License

State By State Survey

	CA	NJ	RI	NC	MA	PA	NY
Tank Fund							
Real Estate/Property Transfer Act							
Pollution Prevention Act							
County Environmental Health Act							
Deed Notices							
Unified Permitting							
Zero Discharge/Spill Act Threshold							
Treble/Punative Damages							
Oil as "Hazardous Waste"							
NJDEPE Direct Billing							
Codified Cleanup Levels							

Based on recent phone conversations with each of the above state's Regulaory Agencies

	CA	NJ	RI	NC	MA	PA	NY
Bank Fund							
Model State Property Transfer Act							
Pollution Prevention Act							
Country Environmental Health Act							
Speed Violations							
Subsidized Permitting							
Zero Discharge Shellfish Act Threshold							
Coastal Construction Setback							