PUBLIC HEARING

before

ASSEMBLY HIGHER EDUCATION AND REGULATED PROFESSIONS COMMITTEE

on

ASSEMBLY BILL NO. 1761

(Designated the "Science and Technology Bond Act of 1984"
Provides for a $80,000,000 Bond Issue)

Held:
March 22, 1984
Assembly Chamber
Trenton, New Jersey

MEMBERS OF COMMITTEE PRESENT:

Assemblyman Joseph V. Doria, Jr. (Chairman)
Assemblywoman Mildred Barry Garvin
Assemblyman Joseph L. Bocchini, Jr.
Assemblywoman Marie S. Muhler

ALSO PRESENT:

Kathleen Fazzari, Research Associate
Office of Legislative Services
Aide, Assembly Higher Education and Regulated Professions Committee

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AN ACT authorizing the creation of a debt of the State by issuance of bonds in the sum of $80,000,000.00 for the establishment and construction of a network of Advanced Technology Centers at public and private institutions of higher education; providing for the construction and improvement of technical and engineering facilities at public and private institutions of higher education; setting forth the ways and means to pay the interest ~~and principal of~~ and also to pay and discharge the principal thereof this debt; providing for the refinancing of any or all of these bonds under certain circumstances; providing for the submission of this act to the people at a general election; and making an appropriation therefor.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. This act shall be known and may be cited as the "Science and Technology Bond Act of 1984."

2. The Legislature finds that:

a. New Jersey is already a major center of technological innovation in the United States and has played a crucial role in the success of the nation's economy.

b. New Jersey's share of the nation's high technology employment as well as employment in traditional manufacturing industries has declined over the past decade.

c. The future economic well being of New Jersey requires that increased efforts be made to retain existing industry and attract new high technology industry to the State. It is also imperative that steps be taken to ensure that the State's work force is adequately trained in the new technologies.

d. The State's public and private institutions of higher education shall be strengthened and the potential of these institutions as vehicles for economic development shall be fully realized through the development of high technology.

e. The Governor's Commission on Science and Technology has recommended the creation of a network of Advanced Technology Centers at various public and private institutions of higher education in those technological

fields in which New Jersey has shown exceptional industrial and academic strength. The Governor's Commission on Science and Technology has also recommended that funds be provided for the construction and improvement of technical and engineering facilities at the State's public and private institutions of higher education.

3. As used in this act:

a. "Advanced Technology Centers" means ~~a~~ programs of substantial and concentrated financial support that ~~is~~ are provided to outstanding programs or departments at New Jersey's public and private institutions of higher education to promote their development into national level bases for innovative technology research.

b. "Commission" means the Governor's Commission on Science and Technology or the permanent New Jersey Commission on Science and Technology as enacted into law pursuant to P.L. _____, _____ (C.) (now pending before the Legislature as Assembly Bill No. 1767 of 1984) which was established as the successor to the Governor's Commission on Science and Technology as created by Executive Order No. 12 of 1982.

c. "Construction" means the planning, erecting, purchasing, improving, developing, constructing, reconstructing, extending, rehabilitating, demolishing and equipping of facilities at public and private institutions of higher education.

d. "Public institutions of higher education" means Rutgers, The State University, the State colleges, the New Jersey Institute of Technology, the University of Medicine and Dentistry of New Jersey, the county colleges and any other public university or college now or hereafter established or authorized by law.

e. "Private institutions of higher education" means ~~an~~ independent colleges, universities or institutes incorporated and located in New Jersey, which by virtue of law or character or license, ~~is a~~ are nonprofit educational institutions authorized to grant academic degrees and which provides a level of

education which is equivalent to the education provided by the State's public institutions of higher education as attested by the receipt of and continuation of licensure by the State Board of Higher Education.

f. "Government securities" means any bonds or other obligations which as to principal and interest constitute direct obligations of, or are unconditionally guaranteed by, the United States of America, including obligations of any federal agency to the extent the obligations are unconditionally guaranteed by the United States of America and any certificates or any other evidences of an ownership interest in the obligations of, or unconditionally guaranteed by, the United States of America or in specified portions thereof (which may consist of the principal thereof or the interest thereon).

4. The Commission shall issue and promulgate rules and regulations necessary and appropriate to carry out the provisions of this act as described in subsection a. of section 5 of this act. The Board of Higher Education shall issue and promulgate rules and regulations necessary and appropriate to carry out the provisions of this act as described in subsection b. of section 5 of this act.

5. Bonds of the State of New Jersey in the sum of $80,000,000.00 are authorized for the following purposes:

a. The establishment and construction of a network of Advanced Technology Centers at the State's public and private institutions of higher education which may include but are not limited to centers in Biotechnology, Food Science, Hazardous and Toxic Substance Management, and Ceramics.

b. The construction and improvement of technical and engineering related facilities and equipment at the State's public and private institutions of higher education.

6. These bonds shall be serial bonds, term bonds or a combination thereof and known as "Science and Technology Bonds," and they shall be subject to redemption prior to maturity and shall mature and be paid not later than 35 years from the respective date of their issuance but may be issued in whole or

in part for a shorter term. These bonds may be issued in coupon form, fully registered form, or book-entry form.

These bonds shall be issued from time to time as the issuing officials herein named shall determine.

7. The Governor, State Treasurer and the Comptroller of the Treasury, or any two of these officials, herein referred to as "the issuing officials," are authorized to carry out the provisions of this act relating to the issuance of bonds, and shall determine all matters in connection therewith subject to the provisions of this act. In case any of these issuing officials shall be absent from the State or incapable of acting for any reason, his powers and duties shall be exercised and performed by the person authorized by law to act in his place as a State official.

8. Bonds issued in accordance with the provisions of this act shall be a direct obligation of the State of New Jersey and the faith and credit of the State are pledged for the payment of the interest thereon as it shall become due and for the payment of the principal at maturity. The principal and interest of the bonds shall be exempt from taxation by the State or by any county, municipality or other taxing district of the State.

9. The bonds shall be signed in the name of the State by the Governor or by his facsimile signature, under the Great Seal of the State, (which seal may be by facsimile or by way of any other form of reproduction on the bonds) and attested by manual or facsimile signature of the Secretary of State, or an Assistant Secretary of State, and shall be countersigned by the facsimile signature of the Comptroller of the Treasury and may be authenticated by an authenticating agent or bond registrar, as the issuing officials shall determine. Interest coupons, if any, attached to bonds shall be signed by the facsimile signature of the Comptroller of the Treasury. The bonds may be issued notwithstanding that any of the officials signing them or whose facsimile signatures appear on the bonds or coupons shall cease to hold office at the time of the issue or at the time of the delivery of the bonds to the purchaser.

10. a. The bonds shall recite that they are issued for the purposes set forth in section 5 of this act and that they are issued pursuant to this act and that this act was submitted to the people of the State at the general election held in the month of November, 1984 and that it was approved by a majority of the legally qualified voters of the State voting thereon at the election. This recital shall be conclusive evidence of the authority of the State to issue the bonds and of their validity. Any bonds containing that recital shall in any suit, action or proceeding involving their validity be conclusively deemed to be fully authorized by this act and to have been issued, sold, executed and delivered in conformity herewith and with all other provisions of statutes applicable thereto, and shall be incontestable for any cause.

b. The bonds shall be issued in denominations and in such form or forms, whether coupon, fully registered or book-entry, and with or without provisions for interchangeability thereof, as may be determined by the issuing officials.

11. When the bonds are issued from time to time the bonds of each issue shall constitute a separate series to be designated by the issuing officials. Each series of bonds shall bear the rate or rates of interest as may be determined by the issuing officials, which interest shall be payable semiannually; provided that the first and last interest periods may be longer or shorter, in order that intervening semiannual payments may be at convenient dates.

12. These bonds shall be issued and sold at such price or prices and under the terms, conditions and regulations, as the issuing officials may prescribe, after notice of the sale, published at least once in at least three newspapers published in the State of New Jersey, and at least once in a publication carrying municipal bond notices and devoted primarily to financial news, published in the city of New York or in New Jersey, the first notice to be at least five days prior to the day of bidding. The notice of sale may contain a provision to the effect that any or all bids in pursuance thereof may be rejected. In the event of rejection or of failure to receive any acceptable

bid, the issuing officials, at any time within 60 days from the date of the advertised sale, may sell the bonds at private sale at such price or prices and under the terms and conditions as the issuing officials may prescribe. The issuing officials may sell all or part of the bonds of any series as issued to any State fund or to the federal government or any agency thereof, at private sale, without advertisement.

13. Until permanent bonds can be prepared, the issuing officials may, in their discretion, issue in lieu of the permanent bonds temporary bonds in the form and with the privileges as to registration and exchange for permanent bonds as may be determined by the issuing officials.

14. The proceeds from the sale of the bonds shall be paid to the State Treasurer and be held by him in a separate fund, and be deposited in the depositories as may be selected by him to the credit of the fund, which fund shall be known as the "Science and Technology Fund."

15. a. The moneys in the "Science and Technology Fund" are specifically dedicated and shall be applied to the cost of the purposes set forth in section 5 of this act, and all such moneys are appropriated for those purposes, and no such moneys shall be expended for such purpose (except as otherwise hereinbelow authorized) without the specific appropriation thereof by the Legislature, but bonds may be issued as herein provided notwithstanding that the Legislature shall not have then adopted an act making specific appropriation of any of the monies.

b. At any time prior to the issuance and sale of bonds under this act, the State Treasurer is authorized to transfer from any available money in the treasury of the State to the credit of the "Science and Technology Fund" a sum as he may deem necessary. The sum so transferred shall be returned to the treasury of this State by the treasurer thereof from the proceeds of the sale of the first issue of bonds.

c. Pending their application to the purposes provided in this act, moneys in the "Science and Technology Fund" may be invested and reinvested as

other trust funds in the custody of the State Treasurer in the manner provided by law. Net earnings received from the investment or deposit of that fund shall be paid into the General State Fund.

16. In case any coupon bonds or coupons thereunto appertaining or any registered bond shall become lost, mutilated or destroyed, a new bond or coupon shall be executed and delivered of like tenor, in substitution for the lost, mutilated or destroyed bonds or coupons, upon the owner furnishing to the issuing officials evidence satisfactory to them of the loss, mutilation or destruction, proof of ownership and security and indemnity and reimbursement for expenses as the issuing officials may require.

17. Accrued interest received upon the sale of the bonds shall be applied to the discharge of a like amount of interest upon the bonds when due. Any expense incurred by the issuing officials for advertising, engraving, printing, clerical, authenticating, registering, legal or other services necessary to carry out the duties imposed upon them by the provisions of this act shall be paid from the proceeds of the sale of the bonds, by the State Treasurer upon the warrant of the Comptroller of the Treasury, in the same manner as other obligations of the State are paid.

18. Bonds of each series issued hereunder shall mature, including any sinking fund redemptions, not later than the thirty-fifth year from the date of issue of the series, and in such amounts as shall be determined by the issuing officials. The issuing officials may reserve to the State by appropriate provision in the bonds of any series the power to redeem all or any of the bonds prior to maturity at the price or prices and upon the terms and conditions as may be provided in the bonds.

19. The issuing officials may issue refunding bonds and in an amount not to exceed the amount necessary to effectuate the refinancing of all or any bonds issued pursuant to this act, at any time and from time to time, for the purpose of refinancing any bond or bonds issued pursuant to this act, subject to the following provisions:

(1) Refunding bonds may be issued at such time prior to the maturity or redemption of the bonds to be refinanced thereby as the issuing officials shall determine; and

(2) Each series of refunding bonds may be issued in a sufficient amount to pay or to provide for the payment of the principal of the bonds to be refinanced thereby, together with any redemption premium thereon, any interest accrued or to accrue on such bonds to be refinanced to the date of payment of such outstanding bonds, the expense of issuing such refunding bonds and the expenses, if any, of paying such bonds to be refinanced; and

(3) No refunding bonds shall be issued unless the issuing officials shall first determine that the present value of the aggregate principal of and interest on such refunding bonds is less than the present value of the aggregate principal of and interest on the bonds to be refinanced thereby; provided, for the purposes of this limitation, present value shall be computed using a discount rate equal to the yield of such refunding bonds, and yield shall be computed using an actuarial method based upon a 360-day year with semi-annual compounding and upon the price or prices paid to the State by the initial purchasers of such refunding bonds; and

(4) Any refinancing authorized hereunder may be effected by the sale of the refunding bonds and the application of the proceeds thereof to the immediate payment of the principal of the bonds to be refinanced thereby, together with any redemption premium thereon, any interest accrued or to accrue on such bonds to be refinanced to the date of payment of such bonds, the expenses of issuing the refunding bonds and the expenses, if any, of paying such bonds to be refinanced, or, to the extent not required for such immediate payment, shall be deposited, together with any other moneys legally available therefor, in trust with one or more trustees or escrow agents, which trustees or escrow agents shall be trust companies or national or state banks having powers of a trust company, located either within or without the state, to be applied solely to the payment when due of the principal of, redemption premium,

if any, and interest due and to become due on the bonds to be refinanced on or prior to the redemption date or maturity date thereof, as the case may be. Any such proceeds or moneys so held by such trustees or escrow agents may be invested in government securities (including government securities issued or held in book-entry form on the books of the Department of Treasury of the United States); provided, such government securities shall not be subject to redemption prior to their maturity other than at the option of the holder thereof. Except as provided in the immediately succeeding sentence, neither government securities nor moneys so deposited with such trustees or escrow agents shall be withdrawn or used for any purpose other than, and shall be held in trust for, the payment of the principal of, redemption premium, if any, and interest on the bonds to be refinanced thereby; provided that any cash received from such principal or interest payments on such government securities deposited with such trustees or escrow agents, (A) to the extent such cash will not be required at any time for such purpose shall be paid over to such trustees or escrow agents, and (B) to the extent such cash will be required for such purpose at a later date, shall, to the extent practicable and legally permissible, be reinvested in government securities maturing at times and in amounts sufficient to pay when due the principal of, redemption premium, if any, and interest to become due on the bonds to be refinanced on and prior to such redemption date or maturity date thereof, as the case may be, and interest earned from such reinvestments to the extent not required for the payment of bonds shall be paid over to the State, as received by such trustees or escrow agents. Notwithstanding anything to the contrary contained herein: (a) such trustees or escrow agents shall, if so directed by the issuing officials, apply moneys on deposit with such trustees or escrow agents pursuant to the provisions of this section and redeem or sell government securities so deposited with such trustees or escrow agents and apply the proceeds thereof to (i) the purchase of the bonds which were refinanced by the deposit with such trustees or escrow agents of such moneys and government securities and immediately

thereafter cancel all such bonds so purchased or (ii) the purchase of different government securities; provided, however, that the moneys and government securities on deposit with such trustees or escrow agents after such purchase and cancellation of such outstanding bonds or such purchase of different government securities shall be sufficient to pay when due the principal of, redemption premium, if any, and interest on all other bonds in respect of which such moneys and government securities were deposited with such trustees or escrow agents on or prior to the redemption date or maturity date thereof, as the case may be; and (b) in the event that on any date, as a result of any purchases and cancellations of such bonds or any purchases of different government securities as provided in this sentence, the total amount of moneys and government securities remaining on deposit with such trustees or escrow agents is in excess of the total amount which would have been required to be deposited with such trustees or escrow agents on such date in respect of the remaining bonds for which such deposit was made in order to pay when the principal of, redemption premium, if any, and interest on such remaining bonds, such trustees or escrow agents shall, if so directed by the issuing officials, pay the amount of such excess to the State. Any amounts held by the State Treasurer in a separate fund or funds for the payment of the principal of and interest on bonds to be refinanced, as provided herein, shall, if so directed by the issuing officials, be transferred by the State Treasurer for deposit with one or more trustees or escrow agents as provided herein to be applied to the payment when due of the principal of, redemption premium, if any, and interest to become due on such bonds to be refinanced, as provided in this section, or be applied by the State Treasurer to the payment when due of the principal of and interest on refunding bonds issued hereunder to refinance such bonds. The State Treasurer is authorized to enter into any contract or contracts with one or more trust companies or national or state banks, as provided herein, to act as trustees or escrow agents as provided herein, subject to the approval of the issuing officials.

(5) Notwithstanding the provisions of sections 11 and 17 hereof, any series of refunding bonds issued pursuant to this section 19 shall mature at any time or times not later than 5 years following the latest scheduled final maturity date, determined without regard to any redemptions prior thereto, of any of the bonds to be refunded thereby, and in no event later than 35 years following the date of issuance of such series of refunding bonds, and such refunding bonds may be sold at public or private sale at such prices and under such terms, conditions and regulations as the issuing officials may prescribe. Refunding bonds shall be entitled to all the benefits of this act and subject to all its limitations except as to sale provisions and to the extent herein otherwise expressly provided.

20. Any bond or bonds issued hereunder shall no longer be deemed to be outstanding, shall no longer constitute a direct obligation of the State of New Jersey and the faith and credit of the State shall no longer be pledged to the payment of the principal of and interest on such bonds, and such bonds shall be secured solely by and payable solely from moneys and government securities deposited in trust with one or more trustees or escrow agents, which trustees and escrow agents shall be trust companies or national or state banks having powers of a trust company, located either within or without the state, as provided herein, whenever there shall be deposited in trust with such trustees or escrow agents as provided herein either moneys or government securities (including government securities issued or held in book-entry form on the books of the Department of Treasury of the United States) the principal of and interest on which when due will provide money which, together with the moneys, if any, deposited with such trustees or escrow agents at the same time, shall be sufficient to pay when due the principal of, redemption premium, if any, and interest due and to become due on such bonds on or prior to the redemption date or maturity date thereof, as the case may be; provided, such government securities shall not be subject to redemption prior to their maturity other than at the option of the holder thereof. The State of New Jersey hereby covenants

with the holders of any bonds for which government securities or moneys shall have been deposited in trust with such trustees or escrow agents as provided in the preceding sentence that, except as provided in the immediately succeeding sentence, neither the government securities nor moneys so deposited with such trustees or escrow agents shall be withdrawn or used by the State for any purpose other than, and shall be held in trust for, the payment of the principal of, redemption premium, if any, and interest to become due on such bonds; provided that any cash received from such principal or interest payments on such government securities deposited with such trustees or escrow agents, (a) to the extent such cash will not be required at any time for such purpose, shall be paid over to the State as received by such trustees or escrow agents, free and clear of any trust, lien, pledge or assignment securing such bonds, and (b) to the extent such cash will be required for such purpose at a later date, shall, to the extent practicable and legally permissible, be reinvested in government securities maturing at times and in amounts sufficient to pay when due the principal of, redemption premium, if any, and interest to become due on such bonds on and prior to such redemption date or maturity date thereof, as the case may be, and interest earned from such reinvestments shall be paid over to the State, as received by such trustees or escrow agents, free and clear of any trust, lien or pledge securing such bonds. Notwithstanding anything to the contrary contained herein: (a) such trustees or escrow agents shall, if so directed by the issuing officials, apply moneys on deposit with such trustees or escrow agents pursuant to the provisions of this section and redeem or sell government securities so deposited with such trustees or escrow agents and apply the proceeds thereof to (i) the purchase of the bonds which were refinanced by the deposit with such trustees or escrow agents of such moneys and government securities and immediately thereafter cancel all bonds so purchased, or (ii) the purchase of different government securities; provided, however, that the moneys and government securities on deposit with such trustees or escrow agents after such purchase and cancellation of such bonds or such

purchase of different government securities shall be sufficient to pay when due the principal of, redemption premium, if any, and interest on all other bonds in respect of which such moneys and government securities were deposited with such trustees or escrow agents on or prior to the redemption date or maturity date thereof, as the case may be; and (b) in the event that on any date, as a result of any purchases and cancellations of bonds or any purchases of different government securities as provided in this sentence, the total amount of moneys and government securities remaining on deposit with such trustees or escrow agents is in excess of the total amount which would have been required to be deposited with such trustees or escrow agents on such date in respect of the remaining bonds for which such deposit was made in order to pay when due the principal of, redemption premium, if any, and interest on such remaining bonds, such trustees or escrow agents shall, if so directed by the issuing officials, pay the amount of such excess to the State free and clear of any trust, lien, pledge or assignment securing such refunding bonds.

21. Refunding bonds issued pursuant to section 19 of this act may be consolidated with bonds issued pursuant to section 6 of this act or with bonds issued pursuant to any other act for purposes of sale.

22. To provide funds to meet the interest and principal payment requirements for the bonds issued under this act and outstanding, there is hereby appropriated in the order following:

a. Revenue derived from the collection of taxes as provided by the "Sales and Use Tax Act" (P.L. 1966, c. 30; C. 54:32B-1 et seq.) as amended and supplemented, or so much thereof as may be required; and

b. If in any year or at any time funds, as hereinabove appropriated, necessary to meet interest and principal payments upon outstanding bonds issued under this act, be insufficient or not available then and in that case there shall be assessed, levied and collected annually in each of the municipalities of the counties of this State a tax on real and personal property upon which municipal taxes are or shall be assessed, levied and collected,

sufficient to meet the interest on all outstanding bonds issued hereunder and on the bonds as it is proposed to issue under this act in the calendar year in which such tax is to be raised and for the payment of bonds falling due in the year following the year for which the tax is levied. The tax thus imposed shall be assessed, levied and collected in the same manner and at the same time as other taxes upon real and personal property are assessed, levied and collected. The governing body of each municipality shall cause to be paid to the county treasurer of the county in which such municipality is located, on or before December 15 in each year, the amount of tax herein directed to be assessed and levied, and the county treasurer shall pay the amount of said tax to the State Treasurer on or before December 20 in each year.

If on or before December 31 in any year the issuing officials shall determine that there are moneys in the General State Fund beyond the needs of the State, sufficient to meet the principal of bonds falling due and all interest payable in the ensuing calendar year, then and in the event the issuing officials shall by resolution so find and shall file the same in the office of the State Treasurer, whereupon the State Treasurer shall transfer the moneys to a separate fund to be designated by him, and shall pay the principal and interest out of that fund as the same shall become due and payable, and the other sources of payment of the principal and interest provided for in this section shall not then be available, and the receipts for the year from the tax specified in subsection a. of this section shall thereon be considered and treated as part of the General State Fund, available for general purposes.

23. Should the State Treasurer, by December 31 of any year, deem it necessary, because of insufficiency of funds to be collected from the sources of revenues as hereinabove provided, to meet the interest and principal payments for the year after the ensuing year, then the treasurer shall certify to the Comptroller of the Treasury the amount necessary to be raised by taxation for those purposes, the same to be assessed, levied and collected for and in the ensuing calendar year. In this case the Comptroller of the Treasury shall,

on or before March 1 following, calculate the amount in dollars to be assessed, levied and collected as herein set forth in each county. Such calculation shall be based upon the corrected assessed valuation of each county for the year preceding the year in which such tax is to be assessed, but such tax shall be assessed, levied and collected upon the assessed valuation of the year in which the tax is assessed and levied. The Comptroller of the Treasury shall certify the amount to the county board of taxation and the county treasurer of each county. The county board of taxation shall include the proper amount in the current tax levy of the several taxing districts of the county in proportion to the ratables as ascertained for the current year.

24. For the purpose of complying with the provisions of the State Constitution this act shall, at the general election to be held in the month of November, 1984 be submitted to the people. In order to inform the people of the contents of this act it shall be the duty of the Secretary of State, after this section shall take effect and at least 15 days prior to the election, to cause this act to be published in at least 10 newspapers published in the State and to notify the clerk of each county of this State of the passage of this act, and the clerks respectively, in accordance with the instructions of the Secretary of State, shall cause to be printed on each of the said ballots, the following:

If you approve the act entitled below, make a cross (X), plus (+), or check ( ) mark in the square opposite the word "Yes."

If you disapprove the act entitled below, make a cross (X), plus (+), or check ( ) mark in the square opposite the word "No."

If voting machines are used, a vote of "Yes" or "No" shall be equivalent to such markings respectively.

	Yes.	SCIENCE AND TECHNOLOGY BOND ISSUE Should the "Science and Technology Bond Act of 1984" which authorizes the State to issue bonds in the amount of $80,000,000.00 for the purpose of establishment of a network of Advanced Technology Centers at the State's public and private institutions of higher education and for the construction and improvement of technical and engineering related facilities and equipment at these institutions, and in a principal amount sufficient to refinance all or any such bonds if the same will result in a present value savings, providing the ways and means to pay that interest of such debt and also to pay and discharge the principal thereof, be approved? INTERPRETATIVE STATEMENT Approval of this act would authorize the sale of $80,000,000.00 in bonds to be used for the establishment and construction of a network of Advanced Technology Centers at the State's public and private institutions of higher education and for construction and improvement of technical and engineering related facilities and equipment at these institutions and bonds in a sufficient amount to refinance all or any such bonds if the same will result in a present value savings.
	No.	

The fact and date of the approval or passage of this act, as the case may be, may be inserted in the appropriate place after the title in said ballot. No other requirements of law of any kind or character as to notice or procedure except as herein provided need be adhered to.

The votes so cast for and against the approval of this act, by ballot or voting machine, shall be counted and the result thereof returned by the election officer, and a canvass of the election had in the same manner as is provided for by law in the case of the election of a Governor, and the approval or disapproval of this act so determined shall be declared in the same manner as the result of an election for a Governor, and if there shall be a majority of all the votes cast for and against it at the election in favor of the approval of this act, then all the provisions of this act not made effective theretofore shall take effect forthwith.

25. There is hereby appropriated the sum of $5,000.00 to the Department of State for expenses in connection with the publication of notice pursuant to this section.

26. The Commission shall submit to the State Treasurer a plan for the expenditure of funds from the Science and Technology Fund for the upcoming fiscal year. This plan shall include the following information: a performance evaluation of the expenditures made from the fund to date; a description of programs planned during the upcoming fiscal year; a copy of the regulations in force governing the operation of programs that are financed, in part or in whole by funds from the Science and Technology Fund; and an estimate of expenditures for the upcoming fiscal year.

27. Immediately following the submission to the Legislature at the Governor's Annual Budget Message the Commission shall submit to the General Assembly Agriculture and Environment Committee, the Senate Energy and Environment Committee, or their successors, and the Subcommittee on Transfers of the Joint Appropriations Committee, a copy of the plan called for under section 26 of this act, together with such changes therein as may have been required by the Governor's budget message.

28. No less than 30 days prior to the Commission entering into any contract, lease, obligation, or agreement to effectuate the purposes of this act the Commission shall report to and consult with the Subcommittee on Transfers of the Joint Appropriations Committee.

29. This section and sections 25 and 26 of this act shall take effect immediately and the remainder of the act shall take effect as and when provided in section 24.

STATEMENT

This bill would authorize a referendum to approve an $80,000,000.00 Science Education and Technology Bond Issue to be used for the establishment and construction of a network of Advanced Technology Centers at public and private institutions of higher education and for the construction and improvement of technical and engineering facilities at public and private institutions of higher education. The Governor's Commission on Science and Technology has

strongly recommended that the major capital improvements outlines in its report be funded through this Bond Issue.

ASSEMBLYMAN JOSEPH V. DORIA, JR. (Chairman): At this point, I want to call to order the public hearing we are holding on the bond issue, Bill No. 1761. The other bill, A-628, the bond issue I introduced last year, is not being discussed today. Bill No. 1761 is the bond issue we are working on now. It is important that we work on this quickly. We have to hold a public hearing, under the law. It has to pass both houses, and it has to be signed by the Governor so it can get on the ballot for next November.

Obviously, we need some time to educate the public on the needs of this area. I just want to begin by saying -- and then we will have Kathy read the statement -- that this bond issue is related to higher education. It is not primarily a higher education bond issue. I still think when we present this to the public at large, we will call it a job and technology bond issue, in order to make them aware of the fact that this will help to create jobs in New Jersey. This will be done through the development of high technology programs in our institutions of higher education.

I think this is something that should be emphasized: That this is to benefit all of the citizens of the State of New Jersey through the attraction of high technology firms to the State, all of which would then produce jobs, help to improve the economy, and provide the citizens with a means of sustenance. So, this is a beginning.

I think we will now have Kathy read the Committee statement, and then we would like to hear your comments on the bond issue, Chancellor.

MS. FAZZARI: Assembly Bill 1761, the Science and Technology Bond Act of 1984, authorizes the sale of $80 million in bonds, the proceeds of which are to be used for the establishment and construction of a network of Advanced Technology Centers at the State's public and private institutions of higher education, including centers in biotechnology, food science, hazardous and toxic substances management, and ceramics. It is also for the construction and improvement of technical and engineering facilities at the State's public and private colleges and universities.

Under the Bill's provisions, the Governor's Commission on Science and Technology, or its recommended successor, the New Jersey Commission on Science and Technology, is to adopt rules and regulations regarding the establishment of a network of Advanced Technology Centers.

The State Board of Higher Education, however, is to adopt the regulations concerning the construction or improvement of technical and engineering-related facilities at the State's colleges and universities.

The recommendation for the bond issue was made by the Governor's Commission on Science and Technology in its December, 1983, Report.

ASSEMBLYMAN DORIA: Let me just add that the bill you have before you is the bill that was put together by the Science and Technology Commission, together with the Governor's Council's office. There are some changes that are going to have to be made -- technical changes and other changes, obviously, as we go along, depending upon need.

Let me begin by saying that I have already received comments from the south Jersey representatives in the Legislature, especially those from the Camden area, who feel there is not enough in here for the southern part of New Jersey; thus, they feel that something should be added. I would have to say that obviously we have to look into this and see what can be done, because it is obvious that we need the votes of the people in South Jersey as well as we need the votes of the people in North Jersey.

Let me also begin by saying that we will try to stay, as much as possible, with the draft. The amendments to the bill will only be those amendments that are necessary to make it a more viable piece of legislation, and that will encourage it to bring in the votes that are necessary for passage -- and that is a very practical problem.

With that, Chancellor, we would now like to have your comments.

DR. T. EDWARD HOLLANDER: Thank you very much. I just saw a Senator from South Jersey enter the Chamber. (laughter)

Let me start by expressing my personal thanks, not only to you, Joe, as a member of the Commission, but also to the other three legislators who were also members of the Commission, and who contributed so significantly to the work of the Commission.

ASSEMBLYMAN DORIA: Could you speak into the microphone, please? I don't want any compliments to be missed. (laughter)

DR. HOLLANDER: To repeat for the record, I started by expressing my thanks to Joe Doria, and not only to him but to the other three members of the Legislature who were part of the Commission, and who attended all of the meetings, helping to shape the Commission's report.

I also owe you another vote of thanks, and that is for deferring your own bill -- which I know you were deeply committed to, and one which you worked very hard on, and argued for, at the Commission meetings -- to the bill which is before you now as the Commission's recommendation. So, there is unity and support from all the members of the Commission -- Republicans and Democrats -- for a program which is desperately needed in this State. It is recognized by all, on both sides of the aisle, that this is desperately needed.

I am very excited about the Commission report, not only because it gives a new direction to the State of New Jersey -- and it does do that in a very significant and meaningful way -- but because the Commission, in its deliberations, recognized the competence of our colleges and universities, and their potential for being nationally ranked in research. They also recognized the important contribution the other colleges and universities in the State can make through the instruction of the technologies. It is a vote of recognition given to the value of our system of higher education, and for that I am personally and deeply indebted.

I think this bond issue promises significant strides in economic development for the people of this State, and I think it has to be sold to the people of this State in terms of jobs, jobs, jobs, because it does mean jobs, jobs, jobs.

We are in an important transition period in our economy. We will always have blue-collar jobs, and they will always be important.

But, the new and emerging jobs in our society will tend to be in what we call "high technology" or "emergent technology." New Jersey has always been a high technology State. We have been losing our share in recent years, and it is important that we not only maintain our share, but that we enhance our share.

So, you have before you a proposal for an $80 million bond issue. It is no secret that roughly $23 million of that is being earmarked to strengthen instructional programs at all of our colleges and universities in high technology, and most of those moneys, or all of those moneys, will be used to construct facilities and to provide initial equipment to the facilities for teaching highly-technical subjects in our two-year and four-year colleges.

In my judgment, that is as important as the $57 million, supplemented by $20 million from Rutgers and UMDNJ, which will be used to fund the High Technology Centers. These will be centers for major research, and will bring together faculty from other institutions in our State, faculty that is competent in the area of applied research, as well as theoretical research that is industrially oriented, and research that will establish cooperation between business, industry, and higher education.

I appreciate your early consideration of the bill. We have a selling job to do to the public. Our colleges and universities all support the bond issue, and we will work hard, along with the Governor and the members of the Legislature, to persuade the public to vote yea for this item on the ballot.

Ed Cohen, and others, are here to speak in more detail about the specifics of the bond issue. So, I will end with this brief introductory comment, and thank you again for your support.

ASSEMBLYMAN DORIA: Thank you very much, Chancellor. I want to thank you for your kind comments and your support. I think this bond issue is very important. I think there has to be a bipartisan effort on this. It is something that both parties have seen a need for, and it is something that the Governor's office has seen a need for.

We have the Science and Technology Commission's recommendations. I think the general recommendations, when you conside that the business community and the research community in New Jersey were directly involved with these recommendations, are very good. Obviously, there is now a need for some refinement, and that is about all that is needed at this point.

I think it is good to emphasize that, in addition to this $80 million, there will be $20 million coming from the Bond Authority of Rutgers University and UMDNJ which will provide additional funds to develop these High Technology Centers. I think a lot of people have to realize we are talking about an initiative that is going to amount to over $100 million when we are finished -- and it may be significantly more as the years go on, when you look at the yearly expenditures in the area of high technology.

So, I just want to thank you, and I would like to open this up to any questions the Committee members may have on the specifics of the bill. They may also wish to ask the Chancellor questions on this as we go along.

Assemblywoman Muhler.

ASSEMBLYWOMAN MUHLER: This is a follow-up on a question I asked at the last meeting before the Capital Budget Commission, and that dealt with the price of the square footage. I am sure someone else will follow up on that.

DR. HOLLANDER: Could you hold that question for Ed Cohen?

ASSEMBLYWOMAN MUHLER: All right.

DR. HOLLANDER: He is more capable of answering that than I am.

ASSEMBLYMAN DORIA: Are there any other questions? (no response)

Okay. Chancellor, we would like to thank you again.

DR. HOLLANDER: I made him blush. (laughter)

ASSEMBLYMAN DORIA: I want to thank you again for coming here this morning. I apologize for being late, as I said earlier. Unfortunately, I had another commitment. I want to thank you for giving an excellent presentation on all of the issues, the initiatives

in the various programs that you presented, the budget, and the bond issue. Thank you very much.

DR. HOLLANDER: Thank you. I hope you will excuse me now, I have a meeting in Piscataway.

ASSEMBLYMAN DORIA: No problem. Thank you very much. I want to thank the Vice Chancellor for being here also.

I would like to ask everyone to speak louder so that all those present can hear your testimony. We have copies of the bond issue up front here if you do not have a copy, and we also have a list of the speakers if you would like one. We will try to follow the list as closely as we can. However, some individuals may have to leave early, and we may not be able to follow the list exactly as we have it here.

The next witness to testify before this Committee is Dr. Edward Cohen. Dr. Cohen is the Executive Director of the Governor's Commission on Science and Technology.

DR. EDWARD COHEN: Thank you very much Chairman Doria, and members of the Committee. Good morning. As has been said, my name is Ed Cohen. I appear before you today as Executive Director of the Governor's Commission on Science and Technology.

Since Ted Hollander is also my boss in my capacity as Assistant Chancellor, I have to immediately acknowledge that his is a very hard act to follow, and I am going to stick to my prepared remarks. I will be happy to answer your questions, and also to provide copies of my full testimony to the Committee, since I won't read all of it.

I trust you have all had an opportunity to read the Commission's Report, especially its recommendations on capital improvements. We do believe that these recommendations will help to launch one of the most important initiatives in New Jersey's recent history, and certainly one of the most important ones for higher education, economic development, and job creation within the last 15 years.

I do want to emphasize that last point, with respect to economic development and job creation, by bringing to your attention,

at the end of my testimony, that the Commission is submitting a proposed amendment to the legislative statement, which we feel is fine as far as it goes, but it makes insufficient reference to the purpose of this bond act and its assistance to these proposed centers, in terms of economic development and job creation. We trust that you will concur that this clarification is very much in keeping with the spirit of both the Commission's work and the bond act.

But, specifically, I am here to testify in favor of, and in support of, the Science and Technology General Obligation Bond Bill, which Assemblyman Doria has introduced. This, of course, is fully in accord with the recommendations of the Governor's Commission, of which Assemblyman Doria was a member.

The main thrust of the $80 million capital improvement will occur in four advanced technology fields: biotechnology, hazardous waste management, industrial ceramics, and food technology.

These will take the form of new and renovated laboratories, research space, and processing centers. In most cases, they will include highly technical and sometimes expensive "clean rooms" where the environmental and working conditions must be perfectly maintained, and where safety factors can be given proper attention. In all cases, moreover, these facilities will conform to Federal and State safety standards.

Biotechnology clearly involves the greatest concentration of resources, and we believe the greatest potential for payback to New Jersey.

The $40 million capital budget proposed for this Center would come from $20 million in general obligation bonds and $20 million in the revenue bonds that Assemblyman Doria referred to earlier, which would be guaranteed by both Rutgers and the UMDNJ, under their separate statutory authorities for this purpose.

The Advanced Technology Center in Biotechnology would be jointly governed by Rutgers and UMDNJ, and located, as a matter of fact, on their adjoining campuses in Piscataway. The projected cost of this core center is $24 million out of that $40 million.

Portions of the Waksman Institute of Rutgers University and the Middlesex General University Hospital affiliate of the Rutgers Medical School of the UMDNJ will be integrated into this Center, and capital improvement totaling $9 million is recommended for that purpose.

Likewise, the Science and Technology Commission has recommended, and the Presidents of both Rutgers and UMDNJ also have called for, a contribution of $5 million to the capital facilities in molecular biology, proposed for construction at Princeton. You are probably aware that this amount would represent only a small proportion of the $46 million investment that Princeton is making in molecular biology, but it would signify a genuine endorsement by New Jersey of the new spirit of cooperation in this field among Rutgers, UMDNJ, and Princeton, and it will help to draw the three institutions closer together for combined research. Developing a world-class center in biotechnology in New Jersey, with all its component parts, requires serious attention to the advantages of this three-way relationship, and the intention of the Commission is to pursue this matter in every way possible.

With respect to hazardous and toxic substance management, the proposed Cooperative Research Center will begin its activities this July 1. This seems assured in light of the extraordinarily successful outcome of the recent National Science Foundation Industry Planning Conference that was held recently. From eight to 20 industrial members are anticipated in this Center, with each paying $30 thousand annually. Industrial membership will, in turn, be matched by a Federal "seed" grant from the National Science Foundation.

The research and the public policy programs of the Center, which will emphasize, by the way, such areas as incineration, biological and chemical treatment, and physical treatment, will be assets to both New Jersey and the nation. They will bring university-level research to bear on such problems as toxic waste clean-up, as well as appling these findings to such economic growth areas as resource recovery. In other words, it is our expectation that not only will this Center provide a stimulus to New Jersey's effort and

need to address its own toxic waste problems, but the solutions found to these problems will spin off into industry and create jobs that will not only address New Jersey's problems, but will also be saleable technologies for the rest of the nation and the world.

The Center itself needs a core facility, both to meet this potential and to draw together the five graduate institutions of higher education, led by the New Jersey Institute of Technology, that form the research consortium to do the job. The Commission has recommended that $7 million of the bond issue be assigned to this facility, with new construction to occur in Newark, on the campus of NJIT.

The third field is industrial ceramics. The Center for Ceramics Research at Rutgers, performing lead-edge research in one of the so-called new materials of the future, is fast approaching world-class stature. The Center expects to increase its industrial membership to 25 companies and its annual affiliates fee to $40 thousand, all of which translate into an industrially-sponsored research program of $1 million a year.

The recommendations of the Commission are designed to ensure that this Center attains -- truly attains -- world-class standing and generates benefits of primary importance to New Jersey. The latter will occur through further enhancement of the Ceramics Research Center's research program, emphasizing technology transfers to New Jersey's small and medium-sized industrial ceramics companies, and through the provision of a core facility for the Center on the Busch Campus of Rutgers. Currently, the Center operates from borrowed and outgrown space at the Engineering School. The Commission has recommended $9 million for this core facility.

The fourth field, food technology, encompasses the study of chemical, biological, and engineering aspects of food and food processing, packaging, and storing. The food industry is an important part of New Jersey's economic base; food processing, as a matter of fact, represents annual shipments of over $6 billion today in New Jersey. At the same time, the State has experienced a loss of employment in the overall food industry through the relocation of production centers.

The proposed Center for Food Technology -- or, better stated, for advanced technology -- with a capital requirement of $6 million, will strengthen New Jersey's research and economic base in this industry by providing new food products and developing more efficient and economical food processing and related techniques. The nucleus of this Center will be formed around the Food Science Department at Cook College of Rutgers. The core facility, however, located on the Cook Campus, will draw together the strengths of nearly a dozen academic departments, including biochemistry, chemistry, nutrition, plant physiology, mechanical engineering, chemical engineering, and materials science. In addition to strengthening joint research and development programs, this facility will include a pilot plant designed to bridge the technical gap between laboratory research and commercialization. Given the cross-disciplinary commercial orientation of the Center, we anticipate that it will help to spin off new businesses in such areas as ingredient supplies, chemical and packaging supplies, processing, sensory equipment and instrumentation, transportation, warehousing, and waste disposal.

The four centers I mentioned are included in the so-called "first-stage" priority need, identified by the Commission. The stage two needs are also provided for, to some extent, in the bond issue. Although the Commission was not able to ascertain certain additional needs with the same finality as those identified for stage one, its Report emphasizes that there will be other capital requirements over the next several years. We already have mentioned the optical fiber material area as a possible "second wing" of the Center for Ceramics Research. Another academic area where we anticipate requirements for capital improvements is the field we have dubbed "telematics," representing the growing confluence of computer technologies and telecommunications.

A third possible area under the general heading of "material science" is surface modification technology. But, we do believe there will be other needs, and the Chancellor alluded to some of them.

For this reason, the Science and Technology Commission strongly urged that sufficient funding -- $15 million -- be available

to permit timely forward movement in these areas as soon as their importance is confirmed and their requirements more precisely identified. These determinations will be the responsibility of the successor agency to the Commission, as proposed in the bond bill.

With respect to community colleges, public four-year colleges, and independent institutions, to ensure that the instructional improvements that are needed for a technology-trained work force in New Jersey -- that aspect of a science and technology-based development that Assemblywoman Muhler alluded to -- the Commission recommended that substantial capital funds -- $23 million -- be provided to maintain high-quality science and technology education at the public four-year and community colleges, as well as at the many independent institutions of higher education in the State. These funds will be applied to the construction and improvement of instructional laboratories, computer and educational facilities, and building space for technical equipment installations.

Projects to be funded from this portion of the bond issue will be major capital expenditures valued at more than $250 thousand, and with an extended-use life expectancy. These expenditures will differentiate themselves by dollar size and nature from current technology initiative grant programs to higher education institutions, and especially from Chapter 12 projects that fund the county colleges. a competitive grant process, within each sector, will be used. All projects drawn from this $23 million fund will be the responsibility of the Chancellor and the Board of Higher Education, as to their adaptation.

Let me conclude with just a few words about the fiscal implications of this major new initiative. A major test of this program will be its ability to create more employment and new jobs. Although it is impossible at this stage to assign a precise number of new jobs to be created, there are several factors to indicate that the science and technology program will meet this test extremely well. First of all, the standard rule of thumb indicates that approximately 50 percent of all capital projects represent labor costs. From the priority fields alone that were identified, this translates into $30 million for new construction jobs in New Jersey.

Secondly, the Commission has recommended investments in those technologies, such as advanced ceramics and biotechnology, where New Jersey already has demonstrated strengths. The Report does not call upon the State to pursue fields like microchip production, where New Jersey would experience a competitive disadvantage, nor does it recommend academic-industrial collaborations whose outcomes emphasize job displacement through a heavy reliance on automated production routines.

To be sure, there will be employment adjustments, but this is a situation which New Jersey faces in common with the rest of the nation and, indeed, much of the world. Our response, principally in the form of new technology education and training, must be tailored to meet our industrial and service-sector needs.

Let me also add that the bond issue addresses that aspect of the Commission's recommendations which call for major capital investments. It does not, obviously, address that portion of the Commission's recommendations that the Chancellor referred to, the $8.1 million represented in the Governor's recommendation for operating funds. Some of those funds will indeed be used for the operation, in part, of the centers. Other funds would be used to incur, stimulate, and support other activities which would address other kinds of fields, and involve other institutions in other parts of the State, as well as those that are indicated in terms of the location of these particular advanced technology centers.

I thank you. I appreciate the opportunity to speak before you today. If there are any questions that I can answer, including the one that was posed before, I would be happy to answer them.

ASSEMBLYMAN DORIA: Marie the question she wanted to ask, and then Assemblywoman Garvin has a question.

DR. COHEN: Yes.

ASSEMBLYWOMAN MUHLER: In reviewing this, I asked a question last week about the $200 per square foot for the construction of this kind of building. I have had staff do some follow-up work on the cost of building and the cost of construction. I would assume that the food center you talked about would be somewhat similar to a corporate laboratory, would it not?

DR. COHEN: Yes, and no. The work that the Center will be doing--

ASSEMBLYWOMAN MUHLER: I don't mean the work. I mean the construction of the facility -- the building itself.

DR. COHEN: It is similar.

ASSEMBLYWOMAN MUHLER: Well, the cost of that kind of a building is anywhere from $83 to $100 per square foot. Our college laboratories presently being constructed are $43 to $61 per square foot. I know we are talking about much more complex buildings than that.

The Forrestal Center cost $85 a square foot to build, which is a rather impressive building. The highest cost per square foot of any kind of construction, for the most technical kind of building I could find, involved a very, very expensive medical center lab, and that was $178 per square foot.

Looking at this whole picture, I am kind of concerned about the per square-foot cost of the buildings. When you get right down to it, most of the bond issue is for this capital construction, and I would like some back-up information verifying those kinds of figures, because, I am having a little difficulty dealing with them.

DR. COHEN: We are obviously going to have to do that because the figures you are reading from are apparently disconcerting. I would have to ask, if I could speak with your staff, where those figures came from.

Let me indicate where some of our figures came from.

ASSEMBLYWOMAN MUHLER: Well, I would rather dispute your facts and figures than question mine.

DR. COHEN: Let me give you -- because they sound very low -- an indication of where some of our figures came from. Take the biotechnology area, in which a good deal of work has been done. The Commission itself, in attempting to verify the need for this group, took a special step in this instance and appointed-- In fact, the Governor brought together a special committee to specifically address this area, even after the regular process had identified biotechnology as one of the important areas. That group included some of the

following individuals: Howard Johnson -- Dr. Johnson is a former Chairman of the Board of MIT, and the Executive Vice President of Squibb, who, by the way, as a former Chief Operating Officer of Massachusetts General Hospital, was involved in the $70 million Hecht Corporation investment to establish a center there. It also included a Corporate Vice President for Research at Johnson and Johnson; the President of Hoffman LaRoche; and, the President of Merck Research Corporation.

ASSEMBLYWOMAN MUHLER: That's pretty nice, but those Presidents didn't come up with those figures.

DR. COHEN: No, those figures were discussed by them, and the following evidence was attested to by them: That $200 per square foot in this area, for these kinds of facilities, would be the minimum.

Two reference points were made. Johnson and Johnson has recently completed laboratories of this nature, and Dr. Ronald Brenna indicated that $200, in his view, was the minimum amount needed.

In addition, the Princeton Molecular Biology facility is being constructed; it is under construction now, as a matter of fact. If I can recall the figures correctly, since I was not prepared to quote them precisely, they are something in the magnitude of $275 per square foot.

The Chairman of the Task Force, a member of the Commission, under which all of this work was done -- it is what we called our "Academic, Industrial Innovation Center Task Force, headed by Dr. Edward David, the President of Exxon Research and Engineering Corporation -- thought that $200 per square foot was a minimum, precisely because he has just completed the erection of new facilities for his organization, to facilitate their move from Floral Park to Clinton. He felt that $200 a square foot was, again, a minimum.

ASSEMBLYMAN DORIA: Could I interrupt you for one minute? I think Assemblyman Bocchini has a question that will help to clarify this.

ASSEMBLYMAN BOCCHINI: Ed, there is a large disparity between what Marie is saying and what you are saying. Do the figures you are relating to include the related equipment that is necessary? And, Marie, do your figures include related equipment?

ASSEMBLYWOMAN MUHLER: No. They are based on the information I was given last week, which I probably should have clarified before. They are strictly for the cost of the building, no equipment at all. That is not part of it at all.

ASSEMBLYMAN BOCCHINI: I would like to inject one thing here, in order to satisfy Marie, and maybe all of us. The $200 per square foot may very well be -- and it sounds, from what you are saying and from the sources you are citing, like they are legitimate estimates -- a breakdown of the actual cost to build the building, and then the related equipment that goes into the building is inserted. If we look at the figures in that way, maybe we would see what the breakdown is, and we would match the $85 cost. We could then accompany it with another $115 worth of allied equipment that needs to be put in place in order to make it that type of a biotech building.

DR. COHEN: Assemblyman, thank you very much for your point, but I would be less than honest if I tried to pretend that the disparity would be covered by that -- and a few other factors, by the way. Not only are fixed and some degree of moveable equipment included in those figures, but so too are fees and land costs, where they would be involved. But, that would not cover the full disparity.

However, let me make another point--

ASSEMBLYMAN DORIA: Let me just clarify that, and then you can go on to the next point. I would like to clarify this, because I think everybody is concerned with this question of $200 per square foot.

What you are saying is equipment is included in the cost?

DR. COHEN: No.

ASSEMBLYMAN DORIA: You are saying that no equipment, equipment is included, or some equipment is included?

DR. COHEN: Fixed equipment is included.

ASSEMBLYMAN DORIA: By fixed equipment, you mean things that are stable and are major pieces of equipment?

DR. COHEN: You would not normally finance moveable equipment.

ASSEMBLYMAN DORIA: Let's just say a cyclotron would be included, if we were dealing in that area.

DR. COHEN: Probably.

ASSEMBLYMAN DORIA: All right. So, we are talking about major equipment; we are not talking about minor equipment.

ASSEMBLYWOMAN MUHLER: I was told there was no equipment in that figure last week.

ASSEMBLYMAN DORIA: By whom?

ASSEMBLYWOMAN MUHLER: By the people who were there with the Chancellor.

ASSEMBLYMAN DORIA: No moveable equipment.

ASSEMBLYWOMAN MUHLER: No equipment. The figure was strictly for the building.

ASSEMBLYMAN DORIA: What do you see as the difference between moveable and non-moveable equipment? I am trying to get a clear definition.

DR. COHEN: As Assemblywoman Garvin knows, a Cancer Research Facility was added to the facilities of the New Jersey Medical School in Newark. What was included in the construction price there, that constitute fixed equipment, would be the lead-lined room and the kinds of things that must be put into place when you build the building.

ASSEMBLYMAN DORIA: So, if you are trying to build a germ-free environment, then the entire isolation process that might be necessary for that area would be part of the construction cost. However, you are not talking about test tubes, or that type of equipment?

DR. COHEN: No. Nor even something of a larger magnitude.

ASSEMBLYMAN DORIA: Even something that is larger in size. We are just talking about something that has to be built into the building. Okay?

Are you talking about land acquisition?

DR. COHEN: Where that would be necessary.

ASSEMBLYMAN DORIA: And fees?

DR. COHEN: Oh, yes. Construction fees, and so forth.

ASSEMBLYMAN DORIA: Okay, architectural fees and all. Now, what you are saying is, even with those you do not see that the discrepancy is too great at this point to make a determination that is

based only on those differences. So, at this point, one of the things I think we are going to have to clarify before the Committee meets to improve the bill and make amendments, is that question. I would appreciate it if you would get together with Assemblywoman Muhler and the rest of the Committee members to discuss exactly why there is that difference. Okay?

DR. COHEN: Yes, I will.

Let me make another point, and that of course -- as you all know -- is that the actual allocation of these funds, either by the Commission's successor, or by the Legislature, will only occur after there is a presentation of full architectural plans and all the justifications that go into that. Moneys under the bond issue don't just flow automatically. One must then go through an actual verification process in each of those instances.

ASSEMBLYMAN DORIA: That would have to be appropriated by the Legislature?

DR. COHEN: It would have to be appropriated by the Legislature. I would also like to say at this stage that I would not be candid if I did not indicate that all we have right now are very preliminary estimates on the part of the institutions, and they cannot get down to a level of detail with higher architects, which can only occur once authorization occurs, and get such estimates as yet.

ASSEMBLYMAN DORIA: We know that those estimates are usually all inflated, so we don't have to worry about that. (laughter) I mean if you don't inflate them, you have problems.

ASSEMBLYWOMAN MUHLER: Right. I fully support the concept of what you are trying to accomplish. That is not my concern.

DR. COHEN: As you all know, I wear another hat, and I have been involved with the most expensive higher education construction in the State, namely UMDNJ's construction, and I was taken back by those figures initially. It was an educational process for me to realize that times have changed since we completed that construction -- there has been inflation -- and we are talking about something different as well.

ASSEMBLYMAN DORIA: Okay, thank you very much. Are there any questions from the other Committee members?

ASSEMBLYWOMAN GARVIN: Yes, but they are not related to what we were just discussing.

ASSEMBLYMAN DORIA: Well, if you would like to ask questions of Dr. Cohen, there will be no problem with that.

ASSEMBLYWOMAN GARVIN: Okay. I am concerned with this bond issue, although I totally support the concept. My concern has to do with something in your presentation to us. When you mentioned Rutgers, you did not identify the Newark campus, nor the Camden campus. Now, we went through this before with the bond issue that did not pass, because there were legislators who were concerned about those two campuses as a part of Rutgers.

In going over your presentation, on page two, the last paragraph -- if you want to refer to it -- you referred to the Advanced Technology Center governed by Rutgers and UMDNJ, and located on their adjoining campuses in Piscataway. I am asking for clarification of that because with this dollar amount, I would hope an allocation to Rutgers would include a sub-allocation to both Newark and Camden. So, would you clarify that for me? I really want to support this bond issue, but I have problems because Rutgers does have two other campuses, and many times we put most of our money -- and I hope my colleagues excuse me for saying this -- into what we call the "Grey House" -- that is New Brunswick.

The other campuses, which happen to be urban campuses, many times do not get their fair share, and I, for one, am concerned about that omission. I am not asking about NJIT, which is in here for $7 million. But, I am concerned with Rutgers, which you talk about in your presentation. There is no specific identification of any activity taking place on the Camden or the Newark campuses.

DR. COHEN: I would be very happy to answer that. It is a very legitimate question. First of all, this is a bond issue in support of the construction of facilities, and it is felt that the best location of the core facility, with respect to molecular biotechnology, was there, because this is where the greatest strengths are found at the present time. It does not say that there would not be activities in biotechnology supported elsewhere, in terms of operations.

I am not at liberty to indicate, for instance, that very shortly we will have current fiscal year '84 moneys. Awards will be made with respect to biotechnology equipment purchases, in the general thrust of the Commission. What I cannot say is where they are going. But, I can assure that when they are announced, it will be seen that these competitive grants -- there was a request for a proposal distributed, and responses were received from all over the state -- and some of the awards are indeed going into other parts of the State.

The activities at the Center, however, must have what is called in the field "power." If we are to function as a magnet in order to attract individuals to such a Center, the "super stars" if you will -- let's take biotechnology, which is the example you cited -- we must ensure that these are very high quality facilities, staffed by very high quality people in very close proximity to one another in order to provide that interaction, or they will not come.

In turn, unless industry is convinced that they can bring a problem to that center and find solutions to some of the questions they are seeking the answer to, they will continue to go to some of the other powerful centers in other parts of the United States, or the world.

In addition, the benefits from this are not confined. If economic development really does occur as a consequence of the generation of these technological spinoffs that undergird the thinking of the Commission in this regard -- if this occurs -- the taxes that these companies pay will go to the State coffers. The persons who will be employed, will be employed all over the State. Biotechnology, as you know, is powerful from the south to the north. We fully anticipate that the activities of this Center will, indeed, interact with institutions of higher education throughout the State, and with companies throughout the State. Indeed, as I said, grant awards, which will be announced shortly, will indicate that the process has already begun.

ASSEMBLYWOMAN GARVIN: You made a couple of statements that I really have a problem with. One has to do with where the people are and where the strengths already exist. I have no quarrel with the core

facility, if you will. What I would like to ask you, since we will be dealing with amendments -- so that the whole concept of what this is about is not that loaded -- could we say, when we talk about Rutgers -- period -- that we are also including some kind of fallout, if you will, to both the Newark Campus and the Camden Campus?

I would rather not accept the fact that it will happen. I would rather perhaps propose an amendment, so that it will be in place, and then those of us from these areas can begin to support this bond issue because we will then have something that will impact on our constituency. We can then get this bond issue passed.

When I think about the last one, the public does not understand things that we are discussing here this morning, and we have to get the public to vote on bond issues. What I am saying is, would there be any problem with this kind of an amendment that has to be worked out in some way?

DR. COHEN: If the amendment were to say that it is the sense of the Legislature that every consideration must be given to this, I am sure the Commission would not only welcome that, but would have no problem whatsoever with actually carrying it out.

It is already there. Certainly, it is there in the $23 million portion of the bill. Ted acknowledged, when Walter Rand came in, that the south is indeed represented. I am already aware that Walter is concerned about this. It is not for me to say where I think the decisions ought to be made, although I do play a role in that process as a member of the staff. On the other hand, with regard to the $23 million, there is no question in my mind, but the process that the Department of Higher Education will conduct for the allocation of those funds cannot, in my knowledge of the situation, result in anything but some of those funds going north, south, east, and west.

There is no question, for instance -- and I have talked to Senator Foran -- that there is an extraordinary development occurring in that tier north of Camden. There is no question that biotechnology and North Jersey, while not exclusively synonymous -- because it does go on also in the central part of the State as well as the south -- are synonymous. There is a great deal happening there, and it will

continue to happen. I cannot but imagine that the Commission will support them, each of them, in their appropriate levels.

ASSEMBLYWOMAN GARVIN: Thank you.

ASSEMBLYMAN DORIA: Assemblyman Bocchini?

ASSEMBLYMAN BOCCHINI: Ed, in view of the fact that you mentioned the $23 million that you referred to on page nine of your statement, it is indicated that these funds will be applied to the construction and improvement of instructional laboratories, computer and educational facilities, and building space for technical equipment installations. I can't help but reflect back on the county colleges again, and their statement. Keep in mind what they say in relation to the proposed 1985 budget. They indicate: "There is an additional irony involved in the high technology issue and the role of county colleges. The fiscal 1985 budget recommends $1.7 million in high technology initiatives for our sector. If each college received an equal share of this money, it would only total about $90 thousand each.

"Even more to the point, what good will new computers and high-tech hardware do us if operational budgets are so starved that we are hard-pressed to provide the normal administrative, instructional, and physical plant support services needed to utilize new equipment?"

Now, I understand this is not your problem.

DR. COHEN: It is my problem too. I was the first Director of Community Colleges in this State.

ASSEMBLYMAN BOCCHINI: Okay. Well, fine, you can then empathize with me, hopefully.

I am just wondering, Joe -- and I know you are going to address this, hopefully, with some amendments -- are we going to keep in mind the shortfall we have when the community colleges implement potential programs, and then will not be able to come across with the money?

ASSEMBLYMAN DORIA: Well, obviously, the bond issue could not deal with current expense matters.

ASSEMBLYMAN BOCCHINI: I understand that. But, if we build the building and put the facility there, then all of a sudden the presidents of the community colleges are going to say, "Well, we can't staff this."

ASSEMBLYMAN DORIA: I think what we have to do here is, we have to spend a lot of time encouraging the Joint Appropriations Committee to better fund the formula for the community colleges. I think this is the responsibility of all the members of the Committee to do that. So, what I think we have to say is, "Yes, we have to try and go out there and get more money."

What is here is important for the community colleges, the State colleges, and the private colleges. Obviously, the community colleges will need operating funds, and that will have to come out of current expenses.

We are also contemplating putting in, and we are going to put in -- we have put in -- Chapter 12 funding for an additional $80 million for community colleges, which will provide additional funds to them. So, I think we are moving in that direction at the present time.

At this point, I want to thank Dr. Cohen for his comments. We have a number of people here who wish to speak. I see Commissioner Putnam here. I know Senator Rand wants to speak, and he has to leave soon. We have a number of other individuals also who wish to speak. We have Dr. Edelman, from UMDNJ, here also. We will hopefully hear from each of these people.

I want to thank you for your comments and for your time, Dr. Cohen.

DR. COHEN: Thank you, Mr. Chairman.

ASSEMBLYMAN DORIA: I just want to mention also that we are going to include in the record two sets of comments, one by Assemblyman Edward Gill, who is a member of the Commission on Science and Technology. He could not be here today, but he made some short comments, which he asked me to include in the record. I will give that to the stenographers.

In addition, Senator Lesniak gave me some comments concerning biomolecular research. His feeling is that this is an area where there is a need for some additions to the bond issue. To me, this may be an area where we can get the southern part of New Jersey -- Camden -- involved in some type of a program. We will talk with Senator Rand about that as we go along.

So, we would like to enter these two things into the record, and I will just pass them over to the stenographers.

At this time I would like to call Commissioner Borden Putnam, of the Department of Commerce and Economic Development. Dr. Putnam is Cochairman of the Governor's Commission on Science and Technology. Thank you, Commissioner, for stopping by. We appreciate your comments on the bond issue.

COMMISSIONER BORDEN R. PUTNAM: Thank you, Mr. Chairman, and members of the Committee. Good afternoon. I appreciate this chance to offer just a brief statement in further support of the project you are considering.

You have heard a lot about the intricacies of the issue, and most recently of some of the physical facilities. I think it might be useful to you if I took a step back and talked, just for a second or two, about "why high-tech"? Why are we talking about the bond issue, or any part of this big project in the first place?

I would think the place to start would be to remind you of some of the very basic trends that are going on in the economy in the State of New Jersey, and of the mission of our Department. In reverse order, our Department's mission is stated in some very flowery language in our statute, but it boils down to a very simple statement, a one-word statement, namely jobs. Everything we do over there, all day, everyday, is devoted to maintaining jobs in the State, attracting new jobs to the State, and encouraging companies to expand and create more jobs in the process.

In the course of doing that, we are conversant with the trends that are taking place in the State economy, as measured in terms of jobs. I won't belabor this, because I think you are as familiar with the numbers as I am. But, I would like to say quickly that over the last 10 or 15 years, perhaps longer, the State has lost a serious number of manufacturing jobs. And, for a State which originally and traditionally has been a very heavy manufacturing State -- manufacturing has been very important in its economony and a very diversified part of its economy -- this has had a profound effect. Over the last 10 years, we have lost about 15 percent of the

manufacturing jobs that existed at the beginning of the decade. And, that 15 percent probably boils down to over $2 billion worth of revenue that is not circulating in the State as a result of losing those jobs.

I take some of the point away from that statement by offering you a very optimistic and very cheerful note, and that is that the number of manufacturing jobs reached an all-time low, so far, in June of 1983. There has been a steady downward trend, and that bottomed out in June of '83. In the five or six months since then, for which we have numbers, it has gone up. It hasn't gone up a lot, but it has bottomed out, and it is climbing every month. I find this is a very encouraging thing, indeed.

Offsetting that serious loss in manufacturing jobs -- much more than offsetting it -- there has been a big pickup in service jobs, and you have heard a lot about this development happening nationwide; they are not just in New Jersey by a long shot. The numbers are impressive. For the 100,000 or so manufacturing jobs we lost in the 10 year period, we gained 400,000 service jobs. So, for every one manufacturing job that we unfortunately lost, we have gained about four in the service part of the economy.

This is all well and good, but our mission, again, is to do what we can to find and encourage new jobs, and this leads us then to study what the economy is, and what parts of it might be particularly susceptible to concentrated attention. And, one of our major conclusions is that the high-tech area, generally, is a prime target. This is no great surprise. That is not a very profound finding. We could have come to that conclusion, I guess, without reference to the books of statistics, simply by noting what other states are doing. And, as you well know -- as do I -- all states are very heavily engaged in promoting high-tech these days. This has been going on for several years now. Some states have been extremely successful at it.

Well, there are some good reasons for that, and there are some good reasons for our wanting to push ahead with this project you are hearing about today in order to further the optimistic trend we see there. For one thing, high-tech as a class -- and I include computers, molecular biology, medicine, and all kinds of high-tech activities in

that -- is by far the fastest-growing part of not only the State's economy but also the national economy.

In the case of New Jersey -- and again, measured in terms of jobs, which is always my yardstick -- the rate of growth of high-tech companies in the State is about three times that of the rest of the economy, which is a very big difference indeed. So, if you are looking for new opportunities and new places where you might help to create jobs, certainly a growth rate -- and a very fast growth rate like that -- is one that captures one's attention.

The second thing is, the State is already very heavily into high-tech industries. It would perhaps not be so fruitful to concentrate on some brand new industry in its very early stage, where we have no particular posture or position at this time. But, here is an industry that is already important in the State. Something like 250,000 people in the State work in high-tech companies, which amounts to something near 10 percent of our total population. About one in ten are already at work in high-tech operations.

For another thing, about 20 percent or 25 percent of the jobs in high-tech companies are manufacturing jobs. So, whatever we can do to promote those kinds of activities in the State will also come to deal with the major problem that we see in the manufacturing area.

The third thing, which brings our attention to high-tech as a prime opportunity, is the fact that we seem to have in the State the things that high-tech companies look to, find attractive, and find facilitating to their own growth. The most important of all of these is our network of educational facilities in this State. We have a lot of educational facilities. We have some very high-quality educational facilities. And, all of this is in a State that is not very large. It is not as though they are scattered all over the place. There is definitely an intellectual community of educational institutions in this State, which is one of the first things that people in the high-tech companies look to when they consider where to locate.

So, for those three basic reasons, stated very quickly the fact that these are high-growth industries makes this is a very exciting, timely thing to get into at this point in time. The fact

that we are already in high-tech, and have been for many, many years, and we are one of leading states in high-tech already -- we rank number five in terms of our employment in high-tech -- and also the fact that we have a lot of things that companies in the high-tech area like, is what makes this, to us, a very unusual opportunity for the State to create and sustain new jobs.

The project you are immediately talking about, the bond issue, what it will do, and what it means, is a key part of this. You don't get something for nothing, obviously, and it requires, in our judgment, the kinds of facilities and the kinds of commitments you are talking about here today, if we are going to capitalize on what we believe to be an unusual opportunity for the State.

I think I will stop at that point and try to answer any questions you may have.

ASSEMBLYMAN DORIA: Thank you, Commissioner Putnam. I think you have highlighted the importance of the bond issue, and the creation of jobs which will strengthen the economy of New Jersey. I think that is important because when we go to the public we have to make them realize that this is the base on which we can build and develop our economy much further. So, I want to thank you for your presentation, and also for your work on the Commission.

Would the Committee members like to ask any questions of Commissioner Putnam? (no questions)

Thank you very much, Commissioner.

COMMISSIONER PUTNAM: Thank you very much, Assemblyman.

ASSEMBLYMAN DORIA: At this point, I would like to call Senator Walter Rand and ask him to make a few comments.

SENATOR WALTER RAND: Mr. Chairman, members of the Committee, good afternoon. I would like to state for the record that I am happy to appear before my colleagues on such an important matter. I would also like to clear the air, Assemblyman Doria. I am not here to scuttle an $80 million bond issue. I have never operated in a negative fashion, and I have been on this Committee in the past, as Assemblywoman Garvin will tell you. I am here to make comments in a positive way, and also to rationalize with this Committee about some of my concerns.

I must admit to you that I just got a copy of the bill. I just got it about one-half hour ago. It looks as though it is some 18 or 20 pages long, and I just looked it over quickly. So, I am not familiar with every detail and nuance of the bill.

I know that I like to read over a bill of this magnitude some six or eight times, but I think I have a general feeling as to what is going on insofar as the financing picture is concerned.

I would merely like to say that if the State is committed to the substantial sum of $80 million to encourage science and technology in New Jersey, then there must be a coherent and cohesive program in place to direct the funds, so that optimum benefits are obtained. And, more importantly, there has to be a clear accountability with respect to the expenditure of the funds and the implementation of the policies that were recommended by the Commission.

Why do I say that to you? It is very simple. It is a very easy thing to -- and it is getting easier, I must admit that -- get a referendum passed. But, the obligation of financing and paying the debts, whether they be general obligation bonds, revenue bonds, pay-as-you-go, deficits, or minus areas is the responsibility of this Legislature and subsequent legislatures. That responsibility falls upon your shoulders, and I don't think you should surrender that in any way.

I didn't hear what was said very well when I was sitting back there, but I was quick to hear the comments of both Assemblywoman Muhler and you, Mr. Chairman, when you spoke of your concerns about the capital and how much it will cost. With reference to your concern about the cost, I would say to you that the enabling legislation which will go into effect after this referendum is passed, is probably more significant and more important than the $80 million we ask for today.

I am sure that there are very few people here today to testify who are not in favor of the $80 million referendum. But, the implementation of that $80 million is another story, left for another day.

I just thought I would like to zero in on that, and voice my concerns. I have a 47-page bond issue on transportation that I am

working on, and I can assure you that I will voice the same concerns on that as I have voiced on this. Being a member of this Legislature, and being very proud of that fact, I will not surrender any right of the Legislature to have accountability, to find out where the money is going, what it is going for, what purpose it being used for, and every other nuance regarding capital expenditure.

ASSEMBLYMAN DORIA: Thank you very much, Senator. I would have to agree wholeheartedly with your comments. There is no question about the fact that we as legislators have the responsibility to make sure that the money that is appropriated through a bond issue is spent in a proper manner.

Obviously, you are correct. The enabling legislation that follows this referendum is much more important. We will all be working together with our colleagues in the Senate and the Assembly to guarantee that whatever is spent is spent properly, and will effectively bring about the goals we have tried to set through this bond issue.

So, obviously, we appreciate your comments. They are well taken. I think we all have general concerns. We are aware that your interests are the same as the interests of your constituents and the State of New Jersey, and, as such, we have to work together to try and provide the best possible program for all the citizens of the State.

SENATOR RAND: Mr. Chairman, I have no concern over the members of this Committee doing the right thing.

ASSEMBLYWOMAN GARVIN: I like that.

SENATOR RAND: I would like to zero in on just one other subject which you addressed in your opening remarks, Mr. Chairman.

ASSEMBLYMAN DORIA: Right, because I consider it to be a serious issue.

SENATOR RAND: Thank you. And, Assemblywoman Garvin, I thank you for your remarks. With respect to the establishment of science and technology-oriented facilities, the keystone of the Commission's proposal seems to be the establishment of Advanced Technology Centers.

Very honestly, this is spelled out in the Governor's State of the State Address. If I may quote from that address: "In the budget I

will present to you later this month, I will ask you to provide funding both from the State budget and through the adoption of the Higher Education Technology Bond Issue for the establishment of four Centers for Advanced Technology -- a Center in Biotechnology on the ajoining campus of Rutgers University and the University of Medicine and Dentistry in Piscataway; a Center in Hazardous and Toxic Substance Management in Newark, through a consortium of institutions led by the New Jersey Institute of Technology, including Steven's Institute of Technology, the University of Medicine and Dentistry, and Rutgers University; a multi-disciplinary Center in Material Sciences and Ceramics at Rutgers University; and a multi-disciplinary Center in Food Technology at Cook College, Rutgers University.

"The creation of these four centers will not only thrust New Jersey into a national leadership role in each of these research areas, it will serve as a key stimulus for the creation of jobs in areas of emerging growth."

I want to you to know, Mr. Chairman and members of this Committee, that I detract nothing from those statements. I would agree with every comment about every one of those facilities of higher education. But, there seems to be an omission: Part of the State, was, inadvertently I suppose, omitted. So, I would say that the proposal lacks flexibility. While the four areas selected may be worthy candidates in 1984, there may be very different needs in 20 years, and what we have done is to effectively cut off one part of the State.

I was very happy to hear my good friend, Dr. Cohen, who spoke about $23 million being left in reserve for east, west, north, and south, for grants -- or what have you. I must be very honest with you, that does not satisfy us, Mr. Chairman, and members of this Committee.

I have some written material with me that I would like to distribute to the members of the Committee. I didn't come here today all of a sudden. This has been on my mind for some two months, and I have worked on this material during that time. (whereupon Senator Rand distributes written material to the Committee)

My concerns are great, but I must admit to you that between the Joint Appropriations Committee and my own Committee, plus some of the obligations I had, this precluded me from immediately writing to the Governor. But, on March 7, I did write to the Governor, voicing my concerns. And, they were based on three fundamental issues. I won't bother reading this, because it is right in front of you. But, needless to say, I asked the Governor to support advanced technology in the southern area of the State.

I pointed out my reason for this in attachment one. But, I also point out to you three other fundamental reasons. We have an area -- and I would like you to read the letter from RCA -- that probably has the greatest amount of engineers in the communication and data field in the entire State, and maybe -- and I say maybe because I can't be sure -- in the entire country. RCA has, today, approximately 2,900 engineers, and they intend to double that force in the next five years and add an additional 3,000. That information comes directly from that company. They are engaged in some of the most sophisticated and highly-technical communications and defense programs that this country has ever undertaken.

We have an institute, which is known as the Institute of Medical Research, and I zero in on that because they are probably one of the world's outstanding research centers in the field of cancer research. They deal in the area of microbiology, molecular biology, chemistry, environmental carcinogens, aging, and the field of genetics. I don't have to tell you -- and I just handed you this -- that their field of accomplishment has received world recognition.

I asked the RCA people why the corridor from Philadelphia down, and up as far as Hightstown, is so important, and they said to me that on any given evening 30 percent of their highly-technical personnel are involved in research, reading the latest technical data available to them in the libraries stretching from Drexel University to the University of Pennsylvania, to Rutgers, Camden, to Camden Community College, and down to Glassboro. Therein is a field by itself that we can draw on, and we can at least tell you that we have an area that is worthwhile exploring.

There is a third field, and that is in Pomona, where the FAA has a technical aviation center which is one of the outstanding technical aviation centers in the eastern part of the country.

What I am trying to say, Mr. Chairman, is I don't think anybody should spell out to the Legislature where these centers should be. You have been in the Assembly for quite a while, and certainly Assemblywoman Garvin and Assemblyman Bocchini have also been in the Assembly for quite a while. What we have done in the past, and what is becoming more and more prominent is, we line-item things because the Legislature is zealous of its prerogative to see where that money is going.

Now, I don't suggest that you line-item everything or every project, but I think it becomes incumbent on us, so that geographically, politically, and morally, none of the great parts of this State are neglected.

So, I would say that I think the Commission on Technology has certainly recommended many, many good things, and the recommendations they made are good. But, they should not be held up as sacrosanct, nor as the only knowledgeable group. I would suggest to you one more thing: maybe you ought to make this a proposal for $100 million, rather than $80 million. Therein, you can address the needs of South Jersey without interfering with, or without eroding the possibility of having the four Centers in the north. And, I don't like to use the word "north" in the geographical sense, but I use it. Maybe that would suffice, because if you are going to bear the responsibility of pushing this bond issue, you are going to bear the responsibility of paying for it.

There is in your hands, Mr. Chairman, and ladies and gentlemen of this Committee, the responsibility to fund; and, the responsibility to fund is the responsibility to pay. If you are willing to pay $80 million, maybe in your deliberations -- and this may be the answer that we seek -- the answer is to raise that bond issue to $100 million and put the placing of those Centers -- plus all the other responsibilities and accountability factors -- in your hands.

I certainly thank you very much for hearing me out. If it is a fact that I am over-zealous when it comes to the south, you bet your sweet life I am.

ASSEMBLYWOMAN GARVIN: I wonder why?

SENATOR RAND: I make no bones about that.

ASSEMBLYMAN DORIA: Thank you very much, Senator Rand. I think your recommendations have a lot of merit to them, and I think the Committee will review them seriously. I think your suggestion concerning the contribution made by the IMR Center, and its background in biomolecular science, ties into some of the recommendations that Senator Lesniak made in the area of biomolecular science. Possibly, we can join together in that area and come up with some type of a center that would be of value to South Jersey, while at the same time performing important and valuable research in this State.

So, these are things we can look at. We will be happy to get your input on this, and we will be calling on you again.

SENATOR RAND: Mr. Doria, I thank you for your comments. I know you have reassured me about this issue previous to this meeting. So, I thank you again, and I thank the members of this Committee.

ASSEMBLYMAN DORIA: Thank you, Senator.

At this point, I would like to call Dr. Norman H. Edelman, Assistant Dean of Research, and Professor of Medicine and Physiology at UMDNJ, Rutgers Medical School.

DR. NORMAN H. EDELMAN: Thank you very much. I will try and be brief. I am here representing the University of Medicine and Dentistry of New Jersey. The major interest of this University in the legislation before you relates to the Biotechnology Center, which is proposed for the Piscataway Campus of the University, and Rutgers University.

I would like to spend just a few minutes telling you why we feel this is an important endeavor. First, I would like to mention what I think biotechnology -- or new biology -- which is really a bigger and broader term, is all about. It is really analogous to what has happened in the physical sciences in the last two generations.

In the last two generations most of our technology has been in the physical sciences, and the results have been extraordinary. We have gone to the moon. We have developed computers which have entirely modified the way we live.

We believe, and I think most people in science now believe, that in the next generation or two, the major advances in science and technology will be in biology. And, the scope of what we will do is truly extraordinary. We will, undoubtedly, understand and cure many diseases which we consider incurable. We will probably generate enormously plentiful and inexpensive new sources of food, and we may even learn how to teach bacteria to turn garbage into gasoline. These are all projects that are being worked on, and there are many more that we haven't even thought of.

The only issue is, how long will it take to get these things done, and, more important to this proceeding, where it will get done?

The second point I would like to make is that biotechnology -- or the new biology -- is a large endeavor. It can no longer be done in small laboratories scattered around the country, or scattered around the world. If we are to find the gene that causes and therefore cures cancer, the gene that allows us to grow wheat and corn more cheaply, we will need molecular-geneticists, molecular-biologists, and immunologists -- all working together in the same facility, using expensive equipment that is hard to maintain.

The basic concept is critical mass. This can't be done in a first-rate way on a small scale. We believe that what we are requesting for the Center for Biotechnology is an absolute minimum. And, I urge you strongly in your deliberations, because I know it will come up, not to dilute that effort. Do not think that a world-class Center for Biotechnology can be done for less than the $40 million we have proposed.

My third point is that biotechnology is highly competitive. Almost every week, I hear about a university that is developing a biotechnology thrust. The last one was Columbia University, and I think the amount of money they suggested they needed was $200 million. That is for a single university.

Almost every month, another state is announcing a thrust in technology and biotechnology. It is clear that we are in an intense competition with other universities and other states. It is also clear to us that those states and universities that do not choose to compete will simply have to give up the field.

So, I urge you, in your deliberations, not to vacillate. I think the time to do this is now. I believe biotechnology will be good for business. I won't bother you with the defense of that, because you have just heard Commissioner Putnam defend it. Specifically, the kind of Center we envision will be good for small business. It will provide the resources, both intellectual and technological, to back up the small-venture, capital-type industry that develops around technological endeavors. The examples of those, as you know, are Silicon Valley and Route 128 in Boston.

The fifth point is a somewhat more subtle point, and perhaps I shouldn't even raise it. A recent survey I read -- it just came across my desk this morning -- about high technology industry that had chosen to relocate, asked these people what factors they considered when they relocated. They were the usual ones. There was transportation, and the availability of trained personnel; but, one which was a little unusual was the image of the area they relocated to. High-technologic people, scientists, academicians, industry-based people care about the image of where they relocate. I suggest to you that it is important that by this endeavor we make a statement to the academic and business community that this State is willing to support, and willing to invest in, excellence in technology in general, and in biotechnology in particular. Thank you.

ASSEMBLYMAN DORIA: Thank you. Are there any questions or comments from the Committee?

ASSEMBLYWOMAN GARVIN: Yes.

ASSEMBLYMAN DORIA: Assemblywoman Garvin.

ASSEMBLYWOMAN GARVIN: I have two comments. The first one has to do with why we are specifying the Piscataway Campus and not dealing with UMDNJ in Newark. Could you respond to that?

DR. EDELMAN: Yes. And, I thank you for asking the question. We believe -- as I hope I pointed out -- that in order to do this right, to bring in the highly-visible, highly-successful scientists, to put in the various different kinds of science that work together to make a successful endeavor in biotechnology, we need a center of critical mass, and that is the core facility we are proposing. We believe we can only propose one of those, and we believe the one we are proposing is the smallest we can possibly do and do well.

The reason the Piscataway Campus was chosen is that when you put together the faculty of UMDNJ, Piscataway, and Rutgers University, there is a large group of people who are already doing excellent work in biotechnology and new biology. So, the base is there to a much greater extent than the base in Newark or Camden.

Now, our proposal, which we presented a while back, also invokes a network concept -- that is, in addition to the physical center, there will be collaborating laboratories that are supported by the center, and these will be laboratories throughout the State.

ASSEMBLYWOMAN GARVIN: Doctor, I think I have read about the network, and I couldn't put together which component was involved. No one has talked about it this morning. I think we will have to consider the use of that point. I don't know who talked about it. I know it wasn't the Governor, because my next question was, I don't want to tamper with the core, as I have said before. But, I also don't want to leave the fine institutions in Newark out of this new high-tech process. I would want them included in some way. I will leave it up to the experts. I am not saying I am against the core. But, I guess I am against anything that would isolate us.

Whoever did that survey that included the image of the area where they locate -- I really would take them on for that. I would want a network where the Newark component of UMDNJ has some involvement. If that is so, I accept your answer. If that is not so, I would deal with it in the amendment process.

DR. EDELMAN: Well, to answer your question, and perhaps expand on it, the network concept implies collaboration and support of

laboratories throughout the State. As we wrote the proposal, we did not identify specific areas of the State, but clearly it is in there because we recognized the need to include people, other than in Central New Jersey. So, I think the answer is, yes, we mean to include Newark.

Let me say again, with all due respect, $80 million is not a lot of money. This is a bare-bones proposal to get this thing going. The University of Medicine and Dentistry of New Jersey has, as you know, a major commitment to Newark, which includes high technology. And, in fact, our first major thrust in high technology -- the cancer center -- is there. So, this university is certainly not going to be neglected with regard to high technology or anything else.

ASSEMBLYWOMAN GARVIN: I think I would support my colleague, Senator Rand, in that I don't want to take anything away from this. I mean, I really support it. But, if it is necessary to add to the dollar amount so that we can do justice to other parts of the State, that again will be something the Committee will have to discuss at its work session.

Thank you, Doctor.

ASSEMBLYMAN DORIA: Are there any other questions?

Okay. Thank you very much, Dr. Edelman.

I just want to point out again that obviously the thrust here is that all these programs will hopefully create jobs.

We are now going to have a representative from the independent colleges and the community colleges. People will be trained in these colleges to work in the high-tech area, with technicians and professionals, and we will begin to see the development of jobs for people who need gainful employment.

At this point, I would like to call former Assemblyman Robert Janiszewski, who represents the Association of Independent Colleges and Universities. I just want to take this opportunity to thank Bob for coming, to congratulate him on his new position, and to say we are very happy that the first formal presentation he is making in his new position is before our Committee. So, we just want to voice our appreciation and let you know how we feel, Bob.

ROBERT C. JANISZEWSKI: Mr. Chairman, thank you very much. I appreciate that. I think it is pretty obvious that I feel very comfortable in these chambers. Perhaps I would be a little bit more comfortable on that side of the table. (laughter) It is my first experience on this side of the table, but the position I now occupy as Vice President of the Association of Independent Colleges and Universities in New Jersey is one which presents a challenge to me, and one that fits my background very well. It is one that I am very excited about. This is my first opportunity to appear before a legislative body on behalf of the Association to give testimony on an issue which, of course, is of great importance, not only to the independent colleges but to the entire higher education community as well.

Perhaps I might start by saying that each of you has a statement, and I will speak in close conjunction with that statement. It represents the position the Association of Independent Colleges has taken.

But, let me -- just by way of introduction -- say that I am not here to simply say "me too" on behalf of the independent colleges. I am not here to attempt, in any way, shape, or form, to artificially inflate a bond issue. I recognize, having been a member of this body, that in the final analysis, even if I were to succeed in doing that subsequent appropriations of dollars would need to be spent in a finely-tuned manner -- not only at this point, but at subsequent points.

I am also not here to submit a "wish list," but rather to represent a concern. We support the bond issue, but there are some concerns that the independent sector has expressed, and I want to thank the Chairman and the Committee for the opportunity to voice them here today.

If we go back to the basic premise of the Governor's Commission on Science and Technology, I think we will find what we are all here trying to accomplish today, and that is -- and I quote the Commission's Report: "To devise a long-range plan of technological development strategy that builds on New Jersey's industrial and

academic strengths." And, isn't that exactly what the Chancellor spoke to, in terms of the academic strengths and opportunities that exist in the State of New Jersey?

Commissioner Putnam spoke to the jobs aspect as well, and its connection with the industrial sector of our economy. But, we in the independent sector of higher education believe that our colleges and universities represent one of our State's major academic strengths, and that this strength must be utilized fully if the goals of the Commission's Report, as ambitious as they are, are to be realized and accomplished.

I would like to cite, by way of example, two independent institutions that will participate directly in the set-aside for science and technological centers: Stevens Institute of Technology and Princeton University. Both will be participants under that recommendation, and they will share in, to some degree, the $57 million set-aside in the bond issue for Science and Technological Centers. However, both Stevens, Princeton, and the other 14 independent colleges and universities in New Jersey actually need more and, in our view of course, deserve more.

The independent colleges, both individually and as a sector, have a long record of achievement in the fields of science, technology, and engineering. Two examples are cited in here to support that, and I won't repeat them.

But, to point something out, not so much for the Committee but for the record and for others present in the room -- and for those who will be reading our record as well -- during the last academic year, the 16 independent institutions of higher education in New Jersey enrolled a total of 60,000, plus, students, most of whom, of course, are residents of our State. Of all the baccalaureate degrees awarded in 1982 in New Jersey, over 30 percent were awarded by the independent sector. We granted 44 percent of all masters degrees, and 34 percent of doctoral and first professional degrees.

Most relevant to this particular piece of legislation and to the area of science and technology are the contributions which the independent sector has already given to the areas of science and

technology. At the undergraduate level, 30 percent of the B.A. degrees in New Jersey in engineering, mathematics, and physical science were awarded by our schools. And, at the graduate level, the numbers are even more impressive. Fully 80 percent of computer science degrees, 49 percent of all engineering degrees, and two-thirds of the degrees in the physical sciences were granted by the independent colleges and universities of the State of New Jersey. We have truly been on the cutting edge of science and technology in this State.

To follow up on Commissioner Putnam's statement, as a sector the independent colleges are the tenth largest employer of individuals in the State of New Jersey, and we wear that badge rather proudly. We have helped to build that foundation of science and technology, and we hope to play an integral part in the future of technological development in New Jersey.

I would like to drop to the bottom of the page just to amplify a bit on the last paragraph which appears there. It says that the independent sector alone could easily exceed $20 million in expenditure for the purposes of science and technology. How does that compare with what is presently contained within the bill on which this hearing is being held?

If you subtract the $57 million set aside from the $80 million, that leaves a balance of $23 million -- not for the independent colleges, of course, but to be split, in a fashion, between the independent colleges, the community colleges, and the State colleges. We think that number is altogether too small for the independent colleges, for the county colleges -- who you will hear from -- and, in all likelihood for the State colleges as well. We think this bond issue represents an opportunity -- which is a very rare one for the State of New Jersey -- to take a quantum leap forward to maintain our cutting edge. But, in order to do that, in our opinion, we have to be courageous; we ought not to be shortsighted; and, we ought to be fully committed. And, that may take some commitment on behalf of this Committee; commitment on behalf of the Joint Appropriations Committee, and your counterpart in the Senate as well.

By carefully judging all of the testimony you have received, and that which you will still receive as the process winds its way through the Legislature, and with an eye not toward "How can we shave it down?" or, "How can we reallocate?" but, rather, "How can we do the job that is necessary and how much money will that take?" -- as opposed to, "How much money might we be able to convince the public to adopt?" -- perhaps within that parameter, we can shape a future for the State of New Jersey.

I would rather see this Committee, on behalf of the sector I represent, judge the larger picture, and then, when finally concluding what is necessary to do, determine the cost in that fashion, and have the courage -- along with the help of many of us in the higher education field -- to convince the public of the rightness of our decisions, and the impact it will have on their future.

As a consequence, we would like to request that the Committee raise the amount of funds going to the county colleges, the State colleges, and the independent colleges by at least $10 million, to a total of $33 million.

Secondly, we respectfully request that our share of that increased amount be approximately $14 million, as is indicated in my written statement.

We believe that this amount of State support, coupled with the matching funds, as required, will provide a meaningful foundation for the future development of science and technology within the State of New Jersey, in partnership with all sectors, including the independent colleges of this State.

Mr. Chairman, thank you very much for your welcome, and your patience. I appreciate the opportunity to speak before you today.

ASSEMBLYMAN DORIA: Thank you very much for your comments. Are there any questions or comments from the Committee members?

ASSEMBLYWOMAN GARVIN: No, but I would just like to publicly say, "Good luck to you." If you do as well on that side of the table as you did on this side of the table, then the independent colleges will be lucky.

MR. JANISZEWSKI: Mildred, thank you very much. I appreciate your support and your advice. Best wishes to you and the Committee, as well.

ASSEMBLYMAN DORIA: I would just like to say that we will definitely take your testimony into consideration. I think the idea of raising the amount that would be allocated to the three institutions -- county colleges, State colleges, and independent colleges -- deserves a great deal of consideration. The Committee will take that into consideration when we consider amendments to the bill, so I want to thank you.

MR. JANISZEWSKI: Mr. Chairman, if I might ask a question, the Committee, as I understand it, is holding the public hearing today, but no action will be taken formally on the bill. I assume the sectors will be notified, as well as the Department, when the Committee meeting comes about and when action will be taken. As Chairman, do you have any idea when that will occur?

ASSEMBLYMAN DORIA: I am going to poll the members of the Committee to determine what day will be good, but we hope to have a meeting before we come back into session, which will be April 30. We will come up with a date sometime in April which will be mutually acceptable to the members of the Committee. We will obviously notify all interested parties. The bulk of that meeting will be spent in amending this bill and taking into consideration any further comments or questions. Basicially, we will be amending the bill, but we will definitely contact you before April 30.

MR. JANISZEWSKI: Thank you very much.

ASSEMBLYMAN DORIA: You're welcome. The next witness is Dr. Robert Barringer, President of Brookdale Community College.

DR. ROBERT BARRINGER: Mr. Chairman and members of the Committee, it is always a pleasure to address this Committee. I had the pleasure of addressing you last year, and it is always nice to be with you.

I don't speak just as President of Brookdale Community College; I also speak on behalf of the Council of County Colleges, which as you know, consists of 19 colleges. In this case, there is no jurisdictional problem because we're spread throughout the State, and we represent all sectors of the great State of New Jersey.

We certainly are pleased to support and applaud the Commission's recommendation with regard to the bond issue. We obviously would support Mr. Janiszewski's recommendation with regard to increasing the $23 million.

This Committee is extremely familiar with the issues involved here, and I'm certainly not going to sit and read this paper to you.

ASSEMBLYMAN DORIA: We will include it in the record, in addition to your comments.

DR. BARRINGER: I don't think it is necessary for me to repeat all of this, because we've said a number of these things before. As I said, last year we supported your bond issue, and we're here again in support of this particular bond issue.

I would just like to reiterate a couple of things. What we're trying to do, as the community college sector, is to give this State a balance. The success in the development of high technology and industrial development in other states -- and I have the experience in those states, particularly the Sunbelt states -- has been that they have developed a balanced program of effort. The community colleges have been a major part of that effort, because we know that most of the employees are not going to be engineers, as important as that is, and as important as advanced research is. Most of the people who are employed in high technology or in industrial development in this State will not be graduate or professional engineers. They will be technicians, and that is what we are talking about here. We're talking about technicians -- the entry-level and mid-level technicians. We don't import them; we don't bring them from Cal-Tech; we don't bring them from Stanford; and we don't bring them from M.I.T. Our technicians are right here, and the responsibility for that rests heavily on the shoulders of the community colleges. We want this Committee to know that we are already in the business, as I think you know, and that we are very committed.

We now have 240 programs collectively, which are spread throughout engineering, computer science, business, allied health, and natural sciences. Last year we graduated over 6,000 people with Associate in Applied Science degrees. That is a technology degree. Many of those people are in a high-technology area.

We have programs that you are familiar with in Data Processing, Computer Programming, Instrumentation, Computer Repair, Computer Aided Drafting and Design, Robotics, Fiber Optics, Telecommunications, Micrographics, and Word Processing. These programs are spread throughout our colleges around the State. We, as well, try to support some of the other technologies in the other fields of health, business, and medical occupations.

We don't feel this State can meet the challenge which is before you -- this Legislature in this State -- unless community colleges are a part of that. We're telling you that we want to be a part of that. What we need are the resources to do it. We certainly have the will and the inclination to do it. There are many examples which I could give you. There are some from my institution simply because I happen to be familiar with them.

An example from Camden County College is the CAD-CAM system. There has been a sizeable commitment made by all of our colleges -- Mercer, Essex, Brookdale, and Camden -- across the State. There have been sizeable commitments already made in this area, and what we lack now is the ability to expand, because the demand is there.

Last week a representative came down from General Motors and told us and our automotive technician group that unless we made some dramatic changes, we would be out of business -- that the car is no longer a mechanical device; it is an electronic device. We've got to make that adjustment or get out of the business of training automotive technicians. That is just one example, and all of this is cited in my paper.

We do, again, support the Governor's Commission in terms of the research centers. We also want to remind this group that we don't live by research alone. Our ability to carry out the implications of that research is our business. Our business is to develop and train an educated citizenry which can take these jobs and move with them.

In closing, we would like to support that, and we would like to raise several questions for this Committee to consider.

First of all, we don't understand why Sections 4 and 5 of the legislation divide the administrative functions of this Act between the

Commission of Science and Technology and the Board of Higher Education. There is that division, and we just raise that question. The Commission is given the authority under this bill to establish and construct a network of advanced technology centers, whereas the Board of Higher Education is given the authority to supervise the construction and improvement of technical and engineering-related facilities and equipment at the State's public and private institutions. We just wonder why that separation of functions is necessary.

In addition, although we understand the intent of the language was to be placed on the ballot, it is not at all clear that $23 million of the $80 million, as provided in the Commission's report, is to be used for construction and improvement of the technical and engineering-related facilities and equipment at the State's public and private institutions. We would like more specificity with regard to that particular amount, or an increased amount, as Mr. Janiszewski has suggested.

Finally, I want to reiterate again our support of the $80 million bond issue. We think it is imperative that the legislation pass and the bond issue pass. We pledge our support, if it gets through the Legislature, by working in our own community to try to get its support. We feel it will make a gigantic step in bringing this State in line with regard to a wise investment which will have an immediate payoff for the future of the State.

Thank you, sir.

ASSEMBLYMAN DORIA: Thank you very much, Dr. Barringer. I want to thank you for your recommendation, which we will obviously take into consideration -- that the amount of the three other sectors be increased.

I think your concern about the way the question is worded on the ballot is a good one. It is realistic in the sense that people will know the money will be going not only to technology centers, but to the other institutions, whether they be community colleges, State colleges, or independent colleges. We will have to try to work up something which will do that, while at the same time, not losing the

flavor and being too long-winded so that people lose themselves in the verbiage. We'll work on that.

Regarding the questions of the differentiation, the dichotomy between sensors being under the jurisdiction of the Science and Technology Commission, and the remaining programs being under the jurisdiction of the Board of Higher Education, the recommendations of the Governor's Commission is that they will basically be a successor group to the Governor's Commission. The Governor and the Commissioner felt this would be necessary to maintain some independence which would allow for greater flexibility and the achievement of financial goals for the future. I think that is to attract more money from foundations and other organizations in the development process. I don't know if it is totally necessary, but it is a recommendation which was made by the Commission, and I think we have to take it seriously. That, as I see it, is one of the reasons for the dichotomy.

Are there any other questions or comments from any of the Committee members? (no response) Okay, thank you very much. Next we have Arlene Gilbert representing the New Jersey Institute of Technology.

ASSEMBLYMAN BOCCHINI: Joe, I can't stay any longer. I've got a partner in trial, so I've got to leave.

ASSEMBLYMAN DORIA: We would like to thank Assemblyman Bocchini for his time. We appreciate his being here. We'll let you know about the date in April.

ASSEMBLYMAN BOCCHINI: I'd like to point out that I'm going to be away from April 13 through Good Friday.

ASSEMBLYMAN DORIA: April 13, if I remember correctly, is the week before Good Friday. Passover is also during that week, so I don't think we would have any meetings during that week.

Okay, next is Ms. Gilbert, who is Vice President of Development at N.J.I.T. Is this your statement?

ARLENE M. GILBERT: Yes, that statement is written testimony which was prepared by Dr. Fenster.

ASSEMBLYMAN DORIA: We'll include it in the record.

MS. GILBERT: I would like you to include it in the record. Unfortunately, Dr. Fenster could not be here today.

ASSEMBLYMAN DORIA: Okay, we'll include the testimony from Dr. Fenster in the record. Do you want to make some comments?

MS. GILBERT: Yes, I just want to highlight some of the testimony, and of course, I'm here to answer some questions for the Institute.

The Report of the Governor's Commission on Science and Technology and the bond authorization bill in support of the Commission's recommendations really represent a watershed for New Jersey. I think it allows us to hold our heads up among the leading states in the nation educationally, just as we do technologically. It hasn't been mentioned here today, and perhaps it was mentioned at the Commission hearings, but New Jersey represents 10% of all the R&D dollars spent in the United States by industry. I'm very pleased to see that the State itself is beginning to spend that kind of money also in support of this.

The proposed program I will speak about is the Advanced Technology Center in Hazardous and Toxic Waste Management. One of the things it will do is, it will foster important academic/industrial cooperation. It will present a message to the nation and the world that New Jersey has set upon a bold course of economic development.

We at NJIT are especially pleased to have been designated as the leader of this research and public policy consortium. The building that we have been talking about is located on the NJIT campus in very close proximity to UMDNJ on our southern border. The consortium includes Stevens Institute of Technology, the University of Medicine and Dentistry, Rutgers, Princeton, and of course, NJIT.

The project is timely. According to the results of a recent Star-Ledger/Eagleton poll, New Jersey's citizens are "more concerned about the threat of toxic wastes in their environment than they are about the bread-and-butter issues such as unemployment and inflation."

What we are proposing is not a hazardous and toxic waste disposal plant. Rather, the proposed center will conduct research both to determine how to clean up existing toxic waste sites and to identify and manage future hazardous substance problems.

NJIT's work in this area is predicated upon three initiatives:

1. The Institute for Hazardous and Toxic Waste Management was established officially by the Board of Trustees of NJIT on September 11, 1981. It was formed to bring the Environmental Engineering graduate programs and the research activities of the Environmental Instrumentation and Systems Laboratory, the Air Monitoring Laboratory, the Water Monitoring Laboratory, and the Center for Environmental Law and Technology under one executive director.

These direct the academic activities of the graduate Environmental Engineering programs. They coordinate the research activities to address problems related to hazardous and toxic waste, and they establish an information and public service center to disseminate to the public and private sectors the results of this activity.

2. The National Science Foundation has sponsored a Cooperative Research Center, which was begun by a planning grant in 1983. It was designed to foster long-term academic/industrial cooperation with companies ranging up to 30, which provide financial support for industrially relevant research.

Other NSF centers are located at such major universities as MIT, Rensellaer Polytechnic Institute, and Georgia Institute of Technology. New Jersey is, in fact, the only State with two such centers, the other one being Rutgers University's Ceramics Research Center.

3. An Advanced Technology Center in Toxic and Hazardous Substance Management has been proposed by the Governor's Commission on Science and Technology. We see the confluence of three centers and an extensive amount of research at five universities, converging and supported by a rather modest allocation for a building in the City of Newark.

Out of these three separate, but complementary initiatives, has come a research center, which is unique in that it represents the combined efforts of the Federal government, the State government, private industry, and the universities. A description of the organization and management structure of the center, examples of possible research projects, and a prospectus on the proposed funding are included in the testimony distributed to the Committee.

I am going to stop at this point. You have most of the material before you, so I would like to ask if there are any questions.

ASSEMBLYMAN DORIA: Are there any questions from the Committee members? Assemblywoman Garvin?

ASSEMBLYWOMAN GARVIN: No.

ASSEMBLYMAN DORIA: Assemblywoman Muhler?

ASSEMBLYWOMAN MUHLER: No.

ASSEMBLYMAN DORIA: I want to thank you. We consider it important that the Center is going to be working with hazardous waste. Hazardous waste is a problem in northern New Jersey, especially around Newark, the Essex/Hudson County area. It is one that we are concerned with. I think NJIT working with Stevens, UMDNJ, and Rutgers can do a very good job. We thank you.

At this time, I would like to call Donald Edwards, Vice President of Rutgers University.

DONALD B. EDWARDS: Mr. Chairman and members of the Committee, thank you. I'll be submitting a written statement next week. What I thought I would do in view of the hour--

ASSEMBLYMAN DORIA: (interrupting) Okay, make sure you get it to Kathy, because these minutes are going to be transcribed immediately. They have to be ready by April 30.

MR. EDWARDS: Fine. In view of the hour, what I thought I would do is simply to comment on two issues that have been raised here. There is very little I can do to add to the general arguments for the bond issue that you have heard at length already.

First, with regard to the questions raised about Newark and Camden, I want to assure Assemblywoman Garvin and Senator Rand that we're very conscious of the need to include those campuses in our work. Before the Governor's Commission was established, President Bloustein appointed a Rutger's Faculty Committee on Relations with Business and High Technology, and that Committee included faculty both from Newark and Camden. As Dr. Edelman suggested, the networking concept in biotechnology is one that will be used wherever it is

appropriate in all the activities we undertake. We have a large, talented, and diversed faculty on all three campuses, and wherever there are people who can take good advantage of the opportunities to use the research facilities -- wherever those are located -- we will certainly involve them in that. In fact, that is already taking place in a number of areas.

With regard to the question of the size of the bond issue, and in answer to the question of, "Are there areas that have been overlooked or areas which could be developed but are not included?" -- obviously the answer to that is "yes." The Commission had to make some very difficult choices about priorities, and they had to make some very difficult decisions about which areas to tackle first. There are many areas which have yet to be explored, and indeed, the bond issue recommendation from the Commission sets aside a specific amount of money for what they call "future fields," in recognition of the fact that there are other areas which we are still defining, exploring and studying -- areas which the State needs to be ready to move into.

One of the areas that we are concerned about is the application of biomolecular research to agriculture in the environment, an area where the Commission did not feel it was prepared to address.

Of course, there are other areas, and indeed, there is no question in our minds that the other sectors of the higher education community could make good use of additional funds. The role of the county colleges, the independent institutions, and the State colleges is a significant one in all of this process, and it is one that President Bloustein, along with Assemblyman Doria, championed within the Commission. So, we fully recognize that.

The question of how large the bond issue ought to be is a question that obviously the Legislature and the Governor will have to answer. There may be other ways to finance some of the additional needs beyond a bond issue that we could explore and address within the next several months. Certainly, those are areas which we are symphathetic to.

I would only say that we should all remember the principles the Commission was operating under and the reason they are important. As someone else mentioned, there are many other states involved in this same effort. At our last count, there were 37 State Commissions on High Technology of one sort or another, and we are in national competition. There is no point in spending money in any area where we cannot compete nationally. It is important that we subject everything we do to the same kind of searching judgment that the Commission used in its peer-review process. We could waste money if we don't spend it very wisely in areas where New Jersey can be a national leader.

I think the recommendations of the Commission clearly identify areas where we can achieve national leadership. I also believe there are many other areas, as well.

The only comment I would make about the text of the bill itself is to urge you to look at the ballot language, particularly with reference to economic development. Certainly the Commission's report and its findings, which are cited in the bill, make clear that economic development is the objective of this bill. But, as you well know, despite the best efforts we all make to educate the citizens about the purpose of the bond issue between now and November, many voters will not know anything about this bond issue until they walk into the polling place, pull the curtain, and read what is on the ballot. So, I think it is terribly important that the ballot language -- and I know the necessity to keep it very brief -- explain that economic development and job production is the objective of this expenditure.

ASSEMBLYMAN DORIA: I think one of the things we will do is to add the words "Job Science and Technology Bond Issue." That is the way the bond issue was originally-- The other bond issue I had was "Jobs and Technology Bond Issue." We'll leave the "Science" there, but we'll add the "Jobs," because it is meant to produce jobs. That is the purpose, so we will definitely put that in the title of the bond issue. Also, we will definitely look at the statement, because I agree with you, as reported out before, it leaves a lot to be desired in that it does not really get across the intentions of the bond issue.

MR. EDWARDS: That is all I want to say, Mr. Chairman. I would be happy to answer any questions.

ASSEMBLYMAN DORIA: Are there any questions from the Committee members?

ASSEMBLYWOMAN GARVIN: No, but thank you for your reassurance.

ASSEMBLYWOMAN MUHLER: If you don't mind, I have one question slightly off the subject, but dealing with the budget. Rutgers wasn't there when the Chancellor presented it. Ever since I've been in the Legislature, it seems that every budget comes out without the agricultural extension services part of the funding. I understand it is the same way this year. Can you tell me why, and if you want it funded?

MR. EDWARDS: It is listed in the budget, right after the appropriation for the General University Appropriation for Rutgers. It has been underfunded consistently in recent years, and we face that problem both in the General University Budget and in the experiment station in this current one. Since you asked the question, I wanted to second the comments that were made earlier about the relationship of this bond issue to the operating budgets of the institutions.

Not all the costs of these important new initiatives are covered in the specific budgets which relate to them. There are operating and maintenance costs which are going to come along with it, and while we applaud the initiatives, we are also facing a budget for the coming year, which is at best a steady State budget. It is a level budget in the case of Rutgers, and we are reallocating. We have been reallocating in anticipation of these new initiatives for some time, but it will be very difficult for us to support these new initiatives without some resources, as well, in the operating budget.

ASSEMBLYMAN DORIA: Thank you very much, Don. We have one last speaker. He is Dr. George Pruitt, President of Edison State College. Dr. Pruitt is also representing the State Council of State Colleges.

DR. GEORGE PRUITT: Thank you.

ASSEMBLYMAN DORIA: Thank you for coming today.

DR. PRUITT: Mr. Chairman and members of the Committee, the day is long, and I will be brief. That is one advantage of being last.

I would like to tell you a story that I believe to be true. Even if it isn't, there is a message in it. A very important, powerful, high-tech company in the Northeast went to a very famous and powerful high-powered research university in the Northeast, and said, "We can't find enough trained software engineers and technicians for our company. Would you develop such a program?" The university responded, "We are interested in producing researchers, not practitioners."

COMMITTEE: (laughter)

DR. PRUITT: That company then became, to my knowlege, the first corporation to offer a fully accredited academic master's degree in software engineering. I know that part is true. I don't know how it got there, but that is the story I heard.

The point of that is to reemphasize the statements which Dr. Barringer made. High-tech is a very nebulous area, and there is a tarrying of responsibilities in the initiatives that are being proposed. Certainly, the cutting-edge research is a powerful and important part of it, and it needs to take place, but there needs to be practitioners as well as researchers. There needs to be technicians as well as scholars in the area.

The bond issue anticipates that, and it calls for a tarrying of support in the proposed funding. If the initiative is to succeed, that tarrying will have to be maintained and strengthened, for no other reason than the fact that it can't succeed unless that is done.

Having said that, however, I would like to add one caution. For this particular project, higher education is a tool of the project, and not the object of the project. Therefore, the allocation of resources within the various sectors, it seems to me, has been and will logically flow from how we contribute to the enterprise. There is another arena and another forum to argue some of the other questions.

All of us -- the community colleges, the State colleges, the private colleges, the research universities, the public universities, and the Institute of Technology -- need additional support. There is

no question about that. While this State has much to brag about, its support for higher education is not one of them. That is a separate question which is addressed in this bond issue.

I am confident that the tarrying which is called for will be maintained. My caution is, I suggest you be very careful in using the allocation of resources among the sectors, which is contained in this initiative to address some other problems which we have in the sectors in terms of our basic overall support for higher education.

ASSEMBLYMAN DORIA: That point is well taken. Obviously, the primary purpose is the creation of jobs and high-tech industry in the State. This does not solve some of the colleges' unique problems which they may have in the area of ongoing current expenses, as well as capital expenditures. We're aware of that. I think that should be addressed at another time, and I think that should be something we should all deal with very seriously.

Obviously, your point about the training is important. One of the things I don't think this bill directly does is to address the question of the training -- that the money which goes to the other segments outside of the centers -- the $23 million, or whatever figure we develop-- I get the impression that you also support an increase in that figure. It would be to provide training, as well as the hardware, so that the training programs which use the hardware are basically where we are. I think that has to be emphasized -- to train the technicians and the professionals who are necessary, not the research scientists. The centers will do that. We're talking now about the technicians and the professionals who will have to deal with the research scientists.

Are there any other questions or comments from the Committee? (no response)

MR. EDWARDS: It must be enormously gratifying for a Committee to hear testimony where everyone is in agreement.

ASSEMBLYMAN DORIA: It is always nice.

COMMITTEE: (laughter)

ASSEMBLYMAN DORIA: Assemblywoman Garvin would like to make a comment.

ASSEMBLYWOMAN GARVIN: I want the record to show that I'm requesting we add a section in our Committee work sessions dealing with women and minorities -- an affirmative action.

ASSEMBLYMAN DORIA: I agree that is lacking here, and we should do that. That is one of the technical amendments which will be included. It definitely will be included.

As I said at the beginning, there are a number of technical amendments. The bill has technical questions. One of the changes that has to be made in the bill is the inclusion of the independent sector. We have specific wording which was developed by Legislative Services -- our Director, Albert Porroni -- that has to be included in here, so we have no questions as to how the money can be allocated to the independent sector. There are a number of other very technical items that have to be included. Unfortunately, the bill has some problems with the technical areas. We will deal with those, as well.

Kathy will contact the members of the Committee to come up with a date. I suspect that date will be sometime during the week of April 23 and April 30. Marie, will that--

ASSEMBLYWOMAN MUHLER: I'll be gone then.

ASSEMBLYMAN DORIA: You'll be away during that week?

ASSEMBLYWOMAN MUHLER: Yes.

ASSEMBLYMAN DORIA: Okay, but you'll be back on April 30?

ASSEMBLYWOMAN MUHLER: I'm leaving on April 27.

ASSEMBLYMAN DORIA: Okay, but if we had a meeting before April 27, you would be able to attend. So, if we had a meeting on April 24--

ASSEMBLYWOMAN MUHLER: I could do that.

ASSEMBLYMAN DORIA: Mildred?

ASSEMBLYWOMAN GARVIN: I guess I'm the only one not taking a vacation.

ASSEMBLYMAN DORIA: I'm not either. I'll be available all the time too. Neither one of us is going anywhere. We'll both be available.

SUSAN SHAW: Senator Lesniak asked me to make a statement for him. Will I be able to do so?

ASSEMBLYMAN DORIA: Oh, yes, definitely. Will you please come forward? I wasn't aware that you wanted to speak. Will you give your name? We have already included some of the information that Senator Lesniak gave us on the biomolecular center, but I would be very happy to hear your comments.

MS. SHAW: I'm Susan Shaw. Senator Lesniak asked me to--

ASSEMBLYMAN DORIA: (interrupting) And, you represent the Senator? Are you an aide to the Senator?

MS. SHAW: Yes.

ASSEMBLYMAN DORIA: Okay.

MS. SHAW: Senator Lesniak asked me to make a statement for him because he could not be here today. He would like the Committee to know that he finds the proposal to establish an Institute for Biomolecular Research in the Agricultural and Environmental Science Departments at Rutgers both interesting and exciting.

The proposal could have dramatic effects on toxic waste cleanup and pesticide control -- problems that are of tremendous interest to people in our State. Unfortunatey, the institute should be located in New Brunswick; however, the institute will be developing technology to solve many problems that affect southern New Jersey, such as toxic waste, as well as helping to lessen our reliance on chemical pesticides, while increasing the production of crops.

Senator Lesniak has not had sufficient time to thoroughly evaluate the proposal, but he will be submitting detailed comments to the Committee shortly.

May I just make a quick statement from our organization, which is the New Jersey Coalition for Alternatives to Pesticides?

ASSEMBLYMAN DORIA: Certainly.

MS. SHAW: We are interested in your bill as it relates to public health and the environment. We will not be benefitting, monetarily speaking, from it, but we will be benefitting in many valuable ways from it.

We're concerned that the bill does not include our study of non-chemical methods of controlling insect problems and weed problems. Non-chemical methods have been effective and safer than chemical

pesticides, and this area of research is not really very well funded on the national level. Rutgers has had its funding for this program cut -- I think they have no funding -- and, right now, there is a biological laboratory operated by the Department of Agriculture in our State, which estimates that they can save millions of dollars for farmers if they use these non-chemical means of control -- money which would have been spent on chemical pesticides.

I would hope that this could be looked into -- funding a biological laboratory, which would be run by the Department of Agriculture. Perhaps the non-chemical methods of control--

ASSEMBLYMAN DORIA: (interrupting) As an example, we're talking about the recent problem with the EDB -- the replacement of a type of chemical such as EDB, with a non-toxic type of pesticide. I think the Committee will definitely look into the feasibility of that. We'll talk to the representatives from the institutions, but I definitely think that is something worthwhile to discuss.

MS. SHAW: Fine, thank you very much.

ASSEMBLYMAN DORIA: Assemblywoman Muhler?

ASSEMBLYWOMAN MUHLER: As a point of clarification, were these views representative of Senator Lesniak, or are they just your comments?

MS. SHAW: No, I just made a statement from the Coalition. The first part was Senator Lesniaks's statement. He is going to be researching the proposal.

ASSEMBLYWOMAN MUHLER: And, the others do not represent him?

MS. SHAW: It must, because he has a 17-page pesticide bill, and what I just said--

ASSEMBLYMAN DORIA: (interrupting) I can clarify that. I spoke to Senator Lesniak. Senator Lesniak explained to me that he is very interested in the concept of the proposal. He has not had time to totally review it to determine the viability as it might relate to this bond proposal, but he told me that he definitely wanted us to consider it. He will send more information to us.

ASSEMBLYWOMAN MUHLER: I just wanted to be careful of what we had on the record.

ASSEMBLYMAN DORIA: Okay, I was aware of that. At this point the Committee will adjourn. Are there any further comments from the Committee before we adjourn? (no response)

I would like to thank the Committee members for their patience. We went straight through without lunch. I want to thank our aide, Kathy, for her job in putting this together. I would also like to thank the aides from the Democratic side, and Fred from the negative side--

COMMITTEE AND AUDIENCE: (laughter)

ASSEMBLYMAN DORIA: (continuing) the Republican side.

COMMITTEE AND AUDIENCE: (laughter)

ASSEMBLYMAN DORIA: Okay, thank you very much.

(HEARING CONCLUDED)

INSTITUTE FOR BIOMOLECULAR RESEARCH IN THE AGRICULTURAL AND ENVIRONMENTAL SCIENCES

Biomolecular Research Serving Agriculture and The Environment

The great advances in the biological sciences of the past three decades, especially those in molecular genetics, have placed within our reach most of the essential tools for solving the major mysteries of living organisms. We now understand the basic processes involved in information transfer within and between cells; and, more importantly, we are learning how to modify these processes for useful purposes. The utilization of knowledge from this science promises enormous dividends for the fields of agriculture and the environment. With this knowledge and its applications, we can significantly increase crop productivity; manipulate genes affecting developmental regulation; improve the efficiency of animal production, as well as the quality of animal products for human consumption; and improve human nutrition. It can now also be expected that genetic modification of microorganisms and cells will permit us to convert cellulosic materials to alcohols; improve nitrogen fixation in plants; destroy toxic/hazardous wastes; synthesize organic substances of industrial and agricultural importance; produce products for the food industry; and develop monoclonal antibodies to detect bacterial toxins, drug and pesticide residues, and pathogens for plants and animals. Indeed, these accomplishments are well within our reach.

New Jersey's Critical Needs and Unique Position

New Jersey is in a unique and advantageous position to develop and operate an institute for biomolecular research in the agricultural and environmental sciences. As a highly urbanized and industrialized state, the pressures on agricultural and environmental resources are the greatest in the nation. Therefore, needs for practical solutions to complex biological problems of both agriculture and the environment are most pressing. There is a tremendous diversity in New Jersey's agricultural economy and in the scope of environmental problems faced.

Many of the major high technology industries serving agriculture are headquartered in New Jersey or have substantial research and development operations in the state.

New Jersey is a natural geographic focus for both basic and applied research, training and continuing education in biomolecular research for agricultural and environmental problems.

Establishing An Institute for Biomolecular Research at The New Jersey Agricultural Experiment Station

Application of new research technologies will require the efforts of scientists trained in microbiology, physiology and biochemistry who understand gene structure, function, regulation and transfer. This will require collaboration with plant pathologists, entomologists, agronomists, foresters, breeders, environmental scientists and others in the identification of agriculturally and environmentally important genes and in developing an understanding of the function and expression of such genes. It is obvious that the application of these discoveries will require an integration of the basic sciences with the disciplines of traditional agricultural and environmental science and an effective extension service delivery system.

The New Jersey Agricultural Experiment Station at Rutgers University is organized to conduct both basic and applied research and to carry new discoveries through all steps, from development to practical application utilizing the Cooperative Extension Service. There is a long tradition of formal and informal cooperation between research and extension faculty, industry, and farmers.

However, the complexity of research in modern biology, requires large groups of investigators from various disciplines in a single place. In consideration of traditional and present strengths of the New Jersey Agricultural Experiment Station, it is proposed that the State establish there an Institute for Biomolecular Research in the Agricultural and Environmental Sciences as part of Rutgers, The State University of New Jersey.

Resource Requirements

The investment that the State would have to make to provide the physical requirements of the Institute, while substantial, is nevertheless relatively modest compared with the potential benefits to be derived and with the investment in the agricultural and environmental sciences already made at the Experiment Station and the Cook-Douglass campus.

The proposed Institute will require an additional facility to house the director, laboratory space for at least 20 senior investigators, their scientific staffs and support personnel. The estimated project cost for constructing this facility of 35,000 net square feet is $15 million. The cost of equipping the Institute is estimated at $6 million. Support for ongoing operating expenses of the Institute is anticipated, and significant interest has been expressed by potential industrial sponsors.

TESTIMONY ON A 6761
by Assemblyman Edward Gill

Today the magnitude and speed of technological change are affecting our lives more than ever before. The availability of new products and processes which result from technological innovation and the uses to which we put these products and processes can improve the quality of our lives, expand economic development and provide employment for America and the State of New Jersey. N.J. could very well be called the research and development state - or better yet, the high-tech state. We are recognized as a talent pool for industry with more than 100,000 engineers and scientists - the highest per capita in the nation. With an estimated 700 R+D laboratories, N.J. accounts for 25% of all privately sponsored R+D in the United States. Today, N.J. is at the very cutting edge of the newest technologies.

The proposal to authorize a referendum seeking approval of $80,000,000 Science and Technology Bond Issue, represents the capital requirements of the program set forth by the Governors Commission on the Science and Technology. It will be used for the establishment and construction of 3x network of Advanced

(2)

Technology Centers at public and private institutions of higher education. The funding provided in the bonding act will enable the construction and operation for centers in Biotechnology, Food Science, Hazardous and Toxic Substance Management and Ceramics

The program presented after long study by the Governor's Commission of Science and Technology is essential to the future economic life of New Jersey. I urge support of the bill.

NEW JERSEY SENATE

WALTER RAND
SENATOR, 5TH DISTRICT
(PARTS OF CAMDEN AND GLOUCESTER COUNTIES)
514 COOPER STREET
CAMDEN, NEW JERSEY 08102
(609) 541-1251

March 7, 1984

The Honorable Thomas H. Kean
State House
Trenton, New Jersey 08625

Dear Governor:

In your annual message to the State Legislature you included many encouraging references. One such reference was to the establishment of several academic/industrial centers for advanced technology. These centers, according to your message, would be located at institutions of higher education. The four specific locations mentioned were Piscataway, Newark, Rutgers and Cook. No reference to Rutgers-Camden being included. Without the inclusion of such a center in the Camden area I would find it impossible to support the others.

One corporation in the Camden/South Jersey area currently employs no less than 2,885 engineers. With their expansion plans they anticipate more than doubling that number with another 3,000 engineers being added in the next five years.

Most evenings the libraries of the universities and schools in the Camden area are utilized by an ever increasing number of these trained personnel absorbing all the information that is available.

This area is rapidly becoming a magnet, attracting outstanding engineers in the communications, computer, and systems design fields. We must provide the resources needed to continue to draw these hi-tech individuals and corporations.

I believe that this area should share in the establishment of these academic/industrial centers. If we are going to support advanced technology then look South Governor - look South.

Sincerely,

WALTER RAND
Senator, 5th District

WR/jh

5x

Attachment #1

IMR'S CONTRIBUTIONS TO ADVANCEMENT OF MEDICAL SCIENCE

In addition to their contributions to the control of polio and other childhood diseases, IMR research teams have made many more significant contributions. A partial list follows:

1952 - Successfully prevented polio with gamma globulin, accelerating development of the Salk vaccine

1952 - Established safe dosage levels of antibiotics for infants

1952 - Developed tissue culture techniques that are used by researchers throughout the world

1953 - Pioneered techniques for antibiotic management of infectious diseases

1954 - Conducted laboratory evaluation of the first field trials of Salk vaccine to determine the safety and effectiveness

1956 - Confirmed that a virus can cause breast tumors in mice

1960 - Developed techniques to make chromosome preparations from blood of various laboratory animals

1962 - Discovered that many common virus infections damage human and animal chromosomes

1963 - Demonstrated chromosome breakage by chemicals that inhibit DNA synthesis

1964 - Developed methods for freezing and storing human skin for grafting

1965 - Demonstrated a rare cytogenetic effect of cell fusion caused by measles virus

1967 - Pioneered techniques for preserving purity of cell cultures used in biomedical research

1967 - Demonstrated genetic effects of contamination of cell cultures with mycoplasma

1968 - Developed and tested filtered laminar air flow systems for control of airborne infections--these systems are now used in operating rooms and laboratories throughout the world

1968 - Developed a successful test to predict the occurrence of breast cancer tumors in mice

1971 - Established characterization of the chromosomes of insect cells in culture

1971 - Discovered that different cell types respond differently to virus induced chromosome breakage

1972 - Discovered viral components in humans related to the mouse breast cancer virus

1972 - Developed short term mutation testing to predict cancer risk for environmental chemicals

1973 - Demonstrated that interferon can prevent chromosome damage that can be induced by viruses

1974 - Pioneered studies of chromosomes on individuals using marijuana

1975 - Developed procedures for the detection and prevention of Mycoplasma infection of food crops, insects and humans

1975 - Established a genetic cell bank resource for studies on aging

1976 - Developed studies of a specific chromosome change causing retinoblastoma, a tumor usually occurring on the retina of children

1977 - Established and characterized a new human diploid cell strain in large quantity as a standard for aging research

1977 - Established chromosome characterization of a cellular model for aging research

1978 - Developed a prenatal test to detect hypophosphatasia, a genetic disease that halts bone development and kills affected babies shortly after birth

1979 - Discovered long term chromosome effects of cancer chemotherapy

1981 - Developed a test to identify carriers of hypophosphatasia

1981 - Developed improved chromosome banding procedures

1982 - Developed monoclonal antibodies for detection and identification of cell culture contaminents

1982 - Described potential mutagenic contamination during analysis of liquid environmental samples

1983 - Described detection of air borne particles in rural and urban sites in New Jersey

1983 - Described the deletion of a collagen gene in perinatal Osteogenisis Imperfecta

Cherry Hill, NJ 08358 | Telephone (609) 338-3000

RCA

Ms. Pat Jones
Legislative Aide
Office of State
Senator Walter Rand
514 Cooper Street
Camden, NJ 08102

Dear Pat,

February 16, 1984

With respect to Senator Rand's efforts to see that some portion of the monies derived from the Governor's proposed $80 million higher education and technology bond issue is applied to South Jersey, I have assembled, per his request, some data that I hope will help support his case.

There are at present approximately 2,885 engineers working at seven different RCA facilities in South Jersey. Projections of growth within RCA in South Jersey over the next five years indicate that this figure is likely to double, with an estimated 3,000 engineers to be added to RCA operations within that time frame.

RCA endorses wholeheartedly Senator Rand's efforts to ensure that these funds are distributed equitably throughout New Jersey. If I can be of any further assistance in this regard, please don't hesitate to get in touch with me.

Best regards,

James G. Tierney

TESTIMONY

ASSEMBLY HIGHER EDUCATION AND REGULATED PROFESSIONS COMMITTEE

March 21, 1984

Saul K. Fenster

New Jersey Institute of Technology

Reported by:

Arlene M. Gilbert
Vice President for Development

Testimony

The Report of the Governor's Commission on Science and Technology and the bond authorization bill in support of the Commission's recommendations represent a watershed for New Jersey. The proposed program will provide much-needed support for education, research and development in high technology fields. It will foster important academic/industrial cooperation. And it will present a message to the nation and the world that New Jersey has set upon a bold course of economic development.

We at NJIT are especially pleased to have been designated as the leader of a research and public policy consortium in the critical area of toxic and hazardous substance management. The consortium members are: Stevens Institute of Technology, the University of Medicine and Dentistry of New Jersey, Rutgers University, Princeton University, and NJIT. It is anticipated that, with a portion of the monies from the proposed bond, a facility will be constructed on the NJIT campus.

The project could not be more timely. According to the results of a recent Star-Ledger/Eagleton poll, New Jersey's citizens are "more concerned about the threat of toxic wastes in their environment than they are about such bread-and-butter issues as unemployment and inflation."

The past fifteen years, in fact, have brought growing national concern about the state of the environment, how it has been abused, how it can be protected, and how current environmental problems can be dealt with safely and economically. In response,

the federal government has sought to set standards and to achieve them through stringent requirements for the control and disposal of solid, liquid and gaseous hazardous and toxic substances. Hazardous industrial wastes, as defined by the Resource Conservation and Recovery Act (RCRA) of 1976 (Public Law 94-580), consist of ignitable, corrosive, reactive or toxic materials. These hazardous wastes account for 10 to 15 percent of all industrial wastes, or about 150 million metric tons per year. It is recognized, therefore, that better and more environmentally sound treatment and disposal options must be available for these hazardous industrial wastes.

What we are proposing to build is <u>not</u> a hazardous and toxic waste disposal plant. Rather, the proposed center will conduct research both to determine how to clean up existing toxic waste sites and to identify and manage future hazardous substance problems. The facility will be of no greater threat to the environment than is a normal university laboratory system. What is more, standards designed to minimize environmental dangers will be among the criteria used to select research projects for the center.

NJIT's work in this area is predicated upon three separate initiatives:

1. The Institute for Hazardous and Toxic Waste Management (IHTWM) was established officially by the Board of Trustees of New Jersey Institute of Technology on September 11, 1981. It was formed to bring under one executive director the Environmental Engineering graduate programs

and the research activities of the Environmental Instrumentation and Systems Laboratory, the Air Monitoring Laboratory, the Water Monitoring Laboratory and the Center for Environmental Law and Technology, in order to:

a) Direct the academic activities of the graduate Environmental Engineering programs.

b) Coordinate the research activities to address problems related to hazardous and toxic waste.

c) Establish an information and public service center to disseminate to the public and private sectors the results of the academic and research activity of the IHTWM.

The most recent result of this effort in the academic area has been the establishment of a cooperative academic program between New Jersey Institute of Technology and the University of Medicine and Dentistry of New Jersey that offers a toxicology option to the engineers and scientists enrolled in the graduate Environmental Engineering program.

2. The National Science Foundation - sponsored Cooperative Research Center was begun under a

planning grant in 1983. It is one of 12 such centers nationwide, funded by NSF to bring academic and industrial professionals together to work in a university setting on scientific issues of pressing national concern. The centers are designed to foster long-term academic/industrial cooperation with multi-company financial support for industrially relevant research. Other centers are located at such major universities as MIT, Rensellaer Polytechnic Institute, and Georgia Institute of Technology. New Jersey is, in fact, the only state with two such centers, the other one being Rutgers University's Ceramics Research Center. Moreover, the center at NJIT is one of only two in the nation working in the area of toxic and hazardous substance management.

3. An Advanced Technology Center in Toxic and Hazardous Substance Management has been proposed by the Governor's Commission on Science and Technology. It is conceived as a nationally regarded base for innovative technology research. In recognition of the importance of this work, Governor Kean has already announced a grant of $558,000 to acquire research equipment for several proposed projects.

Out of these three separate but complementary initiatives has come a research center, which is unique in that it represents the combined efforts of the federal government, the state government, private industry, and five major universities. A description of the organization and management structure of the center, examples of possible research projects, and a prospectus on the proposed new facility are provided as follows. Every effort has been made to ensure that the center will respond to industry's needs and operate efficiently within the framework of the cooperating universities.

The budget for the Cooperative Center is anticipated to come, in part, from annual industrial membership fees. Industrial members will be asked to make a three year commitment to membership in the Center. The Center may, in fact, be viewed as an economical extension of their own in-house research. Industrial members will be kept informed of the progress of the research through their industry monitors, quarterly reports and semiannual presentations. They also will have pre-publication access through their informal interaction with the faculty members and graduate students to research results for developing processes and techniques. New ideas for their own in-house research also may be stimulated through these informal discussions. In addition, the center will help members keep abreast of major trends in research which would not be easily available otherwise.

An industrial advisory board will advise the center on matters of operations, policy, and research. Industrial monitors representing each of the participating companies will provide the most frequent interaction with the universities. They will monitor the research progress of specific projects within the Center and communicate the results to their companies.

The center director will be the chief administrator of the facility. In addition, there will be division directors, each responsible for a major area of research. These individuals will generally be faculty or senior research personnel from the participating academic institutions. Their areas of expertise will correspond broadly to anticipated major research interests of the center, including, but not necessarily limited to, incineration, biological and chemical treatment, physical treatment, and health effects assessment. Finally, every project conducted within each division will have a manager drawn from the faculty or senior research staff of the cooperating universities. Each project will also involve additional institutional personnel, including faculty and graduate students with appropriate expertise and/or interests.

The center will also have an academic advisory board comprised of the chief academic officer of each member institution, or his designee. The primary responsibilities of this body will be to review all selected research projects to insure that they are in accord with the policies of the participating academic institutions; review operating and research budgets to insure that they represent fair and appropriate allocation of institutional resources; and review center policies to insure consistency with university policy.

Ideas for research projects may come from anyone associated with the center. In fact, a number of research proposals were presented to industry at a recent NSF-sponsored conference,

and a determination regarding their implementation will be made in the near future. Examples of possible study topics include air pollution control using molten salt scrubbers, effects of heavy metal - organic complexes on anaerobic digestion, absorption and in situ fixation of hazardous water, and development of medical protocol to evaluate toxic exposures.

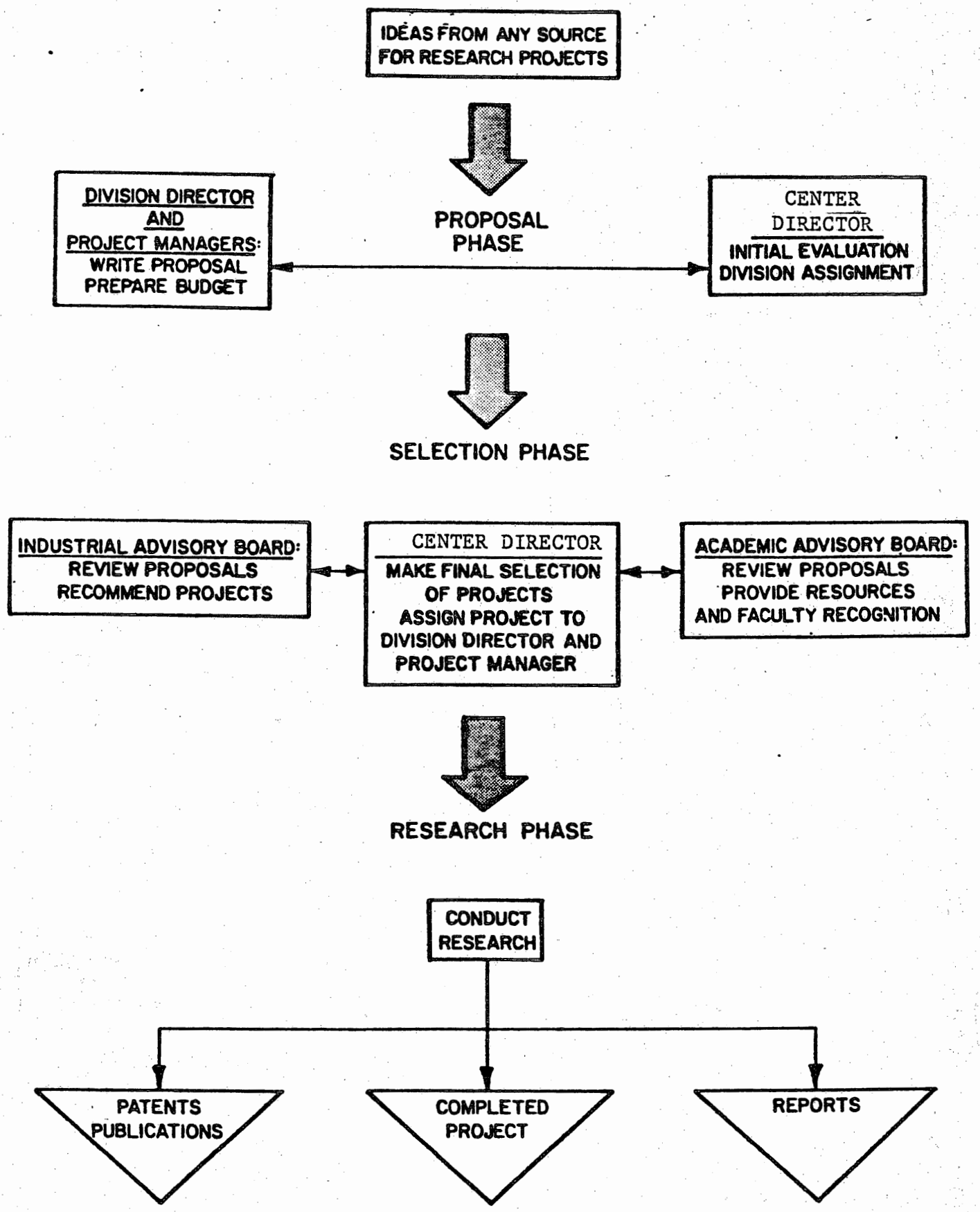
The project flow chart on the following page depicts the procedure for fulfilling the research responsibilities of the center. In addition, the center will have a strong public policy and information component.

The physical plant which will serve as the focal point for these important activities has been conceived with the many functions of the center in mind. The configuration under preliminary consideration is a six story structure. As the schematic layout (Attachment A) indicates, the first floor would include the Information Center, conference rooms, and offices for the executive and project directors. Certain service facilities, including a central equipment area and a receiving and storage area, would also be included on the first floor.

The upper floors would contain eighteen research areas, which would include laboratories, offices for researchers and research faculty, graduate student facilities, and rooms for movable equipment and technical support personnel.

The general configuration for a research area would include a laboratory of 1,000 sq. ft., a graduate student facility of 450 sq. ft., and researcher and faculty offices of 240 sq. ft.

PROJECT FLOW CHART



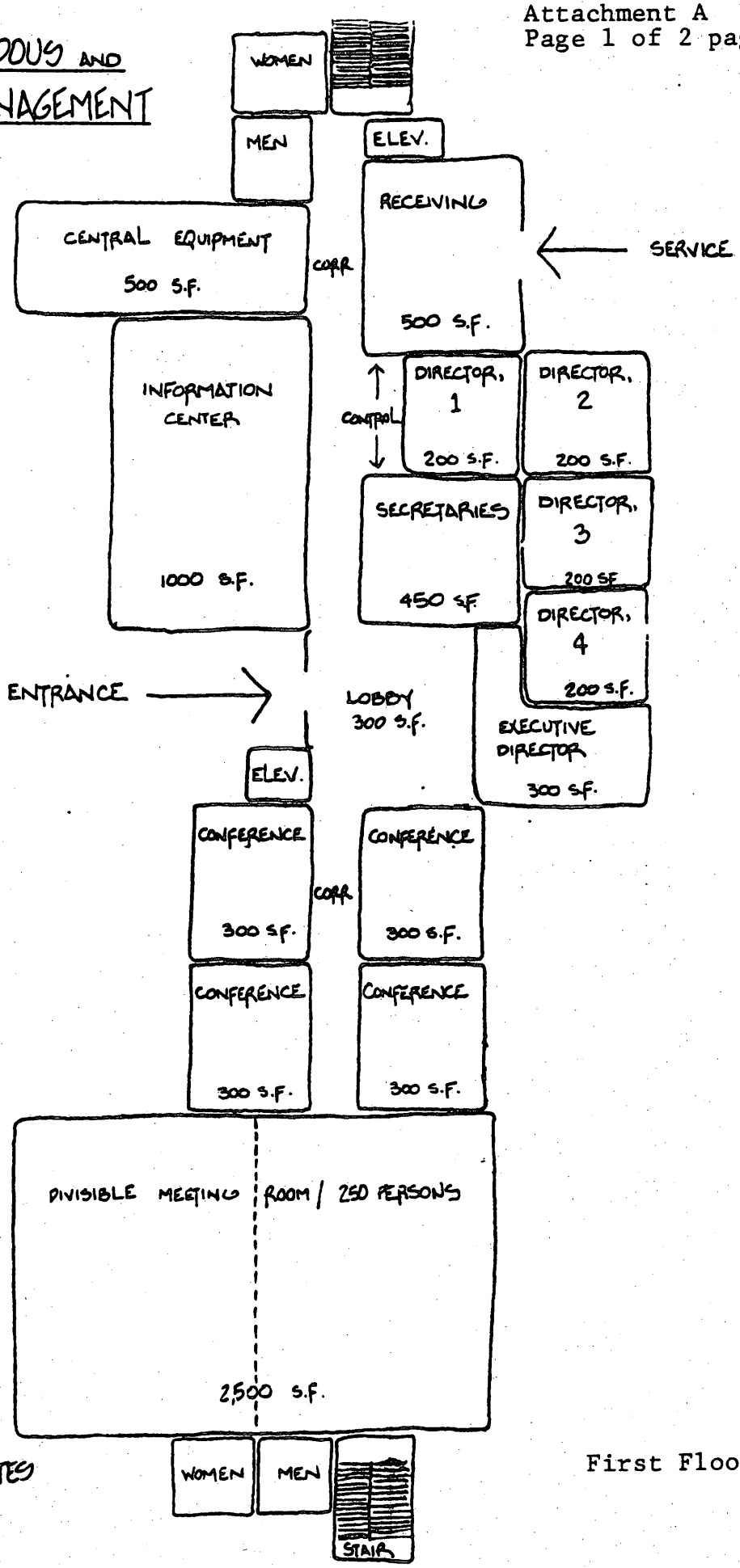
Additionally, each floor of research areas would include 240 sq. ft. for a technical support personnel and equipment area. This would complement the central services provided on the first floor. Attachment B is a preliminary space allocation plan. A Proposed Budget is shown on Attachment C.

After a careful and detailed analysis of the NJIT campus and adjacent land, two potential sites have been identified. One of these is on the southern boundary of the campus in closest proximity to the University of Medicine and Dentistry of New Jersey; the second is on the north campus. Consideration has been given to the adjacent land and building uses, relationships to existing laboratories and services, and the total area required. Owing in part to the public service and public information components of the project, special consideration will be given to the provision of meeting and parking facilities. Development of either site would make a significant contribution to the urban renewal of Newark's Central Ward.

To the extent possible, NJIT will contribute such land as it presently owns to develop the selected site. It is our understanding that monies from the proposed bond will cover remaining site acquisition and construction costs for this very important New Jersey-based project.

CENTER FOR HAZARDOUS AND TOXIC WASTE MANAGEMENT

NEWARK, NJ

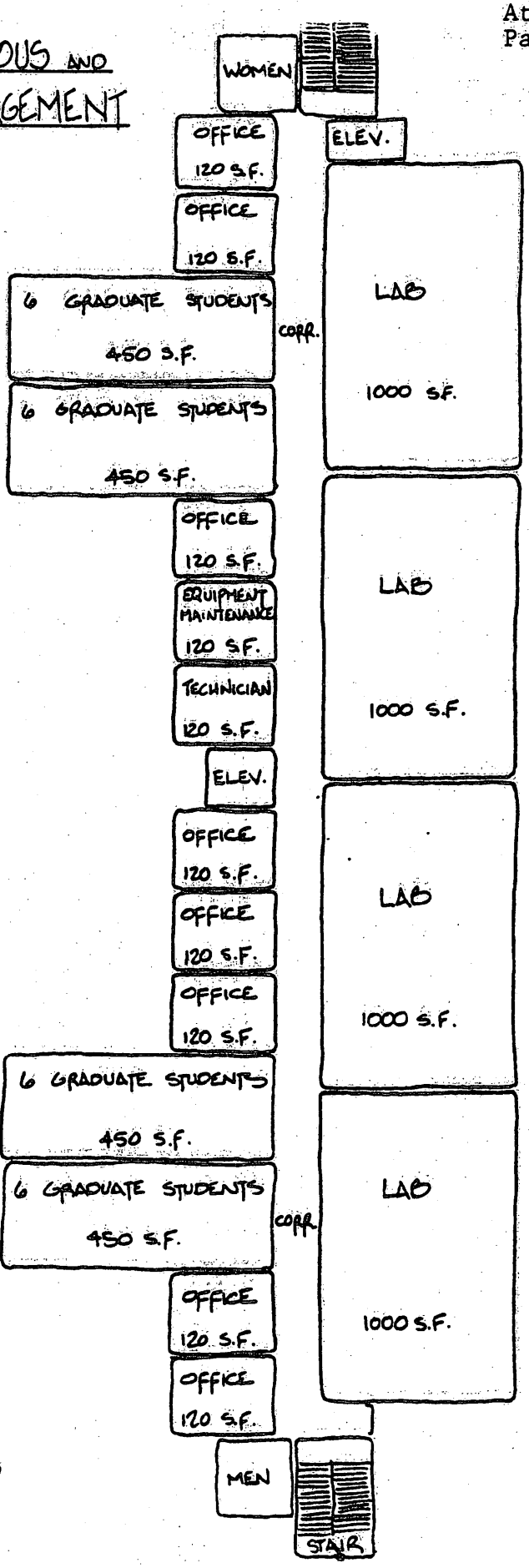


DAVID GIBSON & ASSOCIATES
914 RICHMOND TERRACE
STATEN ISLAND, NY 10301

First Floor

CENTER FOR HAZARDOUS AND TOXIC WASTE MANAGEMENT

NEWARK, NJ



DAVID GIBSON & ASSOCIATES
914 RICHMOND TERRACE
STATEN ISLAND, NY 10301

Typical Floors 2-5
(6th Floor is half this)

Attachment B

ADVANCED TECHNOLOGY CENTER IN TOXIC AND HAZARDOUS SUBSTANCE MANAGEMENT

Proposed Space Allocation

First Floor

Room Purpose	Area Sq. Ft.	
Lobby	300	
Secretaries	450	
Receiving	500	
Director 4 @ 200 sq. ft.	800	
Executive Director	300	
Information Center	1,000	
Conference Rooms (Small) 4 @ 300 sq. ft.	1,200	
Divisible Meeting Room	2,500	
Mens & Womens Rooms	400	
Circulation	2,050	
Central Equipment	500	
Total		10,000

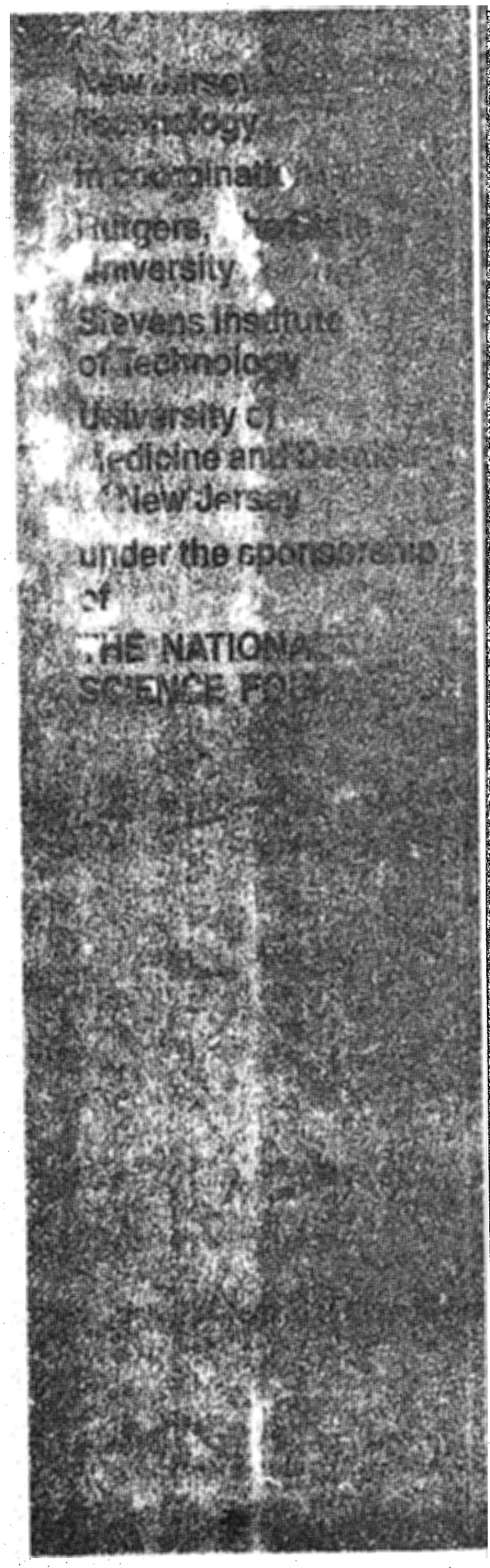
Typical Upper Floor

Room Purpose	Area Sq. Ft.	
Equipment Maintenance	120	
Technician	120	
Offices 8 @ 120 sq. ft.	960	
Graduate Students 4 @ 450 sq. ft.	1,800	
Laboratories 4 @ 1000 sq. ft.	4,000	
Mens & Womens Rooms	200	
Circulation	1,800	
Total Typical Floor	9,000 x	
	4.5 Floors =	40,500
Building Total		50,500

ADVANCED TECHNOLOGY CENTER IN TOXIC AND HAZARDOUS SUBSTANCE MANAGEMENT

Proposed Budget

I.	**Land, Parking, and Site Work**		
	Land for Center "footprint" and peripherals - 30,000 sq. ft. Acquisition Cost: $9/sq. ft.		$ 270,000
	Parking Area		
	240 cars x 425 sq. ft. = 102,000 sq.ft. Acquisition Cost: $9/sq. ft.		918,000
	Site Work		
	Total area - 132,000 sq. ft. Site Work Cost: $3/sq. ft.		396,000
	Total Land, Parking and Site Work		$1,584,000
II.	**Construction**		
	Laboratory Areas 18,000 sq.ft. x $150/sq.ft.	$2,700,000	
	Other Areas 32,500 sq.ft. x 100 sq.ft.	3,250,000	
	Total		$5,950,000
	Design Contingency (10%)		595,000
	Fees - Architectural, Engineering and Other Consultants (15%)		982,000
	Total Construction		$7,527,000
	Total Project		$9,111,000
	Less NJIT Land Contribution		-270,000
	Net Budget		$8,841,000



invites you to attend

PLANNING CONFERENCE II

for the establishment of

THE UNIVERSITY/INDUSTRY COOPERATIVE RESEARCH CENTER FOR HAZARDOUS AND TOXIC WASTE

February 7, 1984

Aspen Conference Center
Parsippany, New Jersey

CONFERENCE II

Agenda

February 7, 1984

8:00 a.m. - 9:00 a.m.
Registration

9:00 a.m. - 9:30 a.m.

INTRODUCTIONS

Arlene M. Gilbert
Vice President for Development
New Jersey Institute of Technology

WELCOMING REMARKS

Dr. Saul K. Fenster, President
New Jersey Institute of Technology

Richard E. Lyon, Jr., Vice President - Exxon Engineering, Exxon Research and Engineering Company

9:30 a.m. - 10:15 a.m.
MORNING SESSION I

Moderator: Robert J. Hilliard
Director of Development
New Jersey Institute of Technology

OUTLINE OF CONFERENCE ACTIVITIES

Dr. John W. Liskowitz, Executive Director
Institute for Hazardous and Toxic Waste Management, New Jersey Institute of Technology

ESTABLISHMENT OF THE NSF UNIVERSITY/INDUSTRY COOPERATIVE RESEARCH CENTER FOR HAZARDOUS AND TOXIC WASTE

Alex Schwarzkopf, Program Manager
Industrial Science and Technological Innovation, National Science Foundation

EVALUATING THE CENTER

Dr. S. George Walters, Director
Interfunctional Management Program
Rutgers University

RESEARCH CENTER ORGANIZATION AND OPERATION: STRUCTURE, POLICIES, PARTICIPATION

Dr. Arnold Allentuch, Associate Vice President, Research and Graduate Studies, New Jersey Institute of Technology

10:15 a.m. - 10:30 a.m.
Coffee Break

10:30 a.m. - noon
MORNING SESSION II:
PRESENTATION OF INITIAL RESEARCH PROJECTS AND DISCUSSION

1. INCINERATION
2. BIOLOGICAL AND CHEMICAL TREATMENT
3. PHYSICAL TREATMENT

Noon - 1:15 p.m.
LUNCHEON

SPEAKER
Edward E. Barr
President and Chief Executive Officer
Courtaulds U.S. Developments, Inc.
Chairman, Governor's Commission on Science and Technology

1:15 p.m. - 2:45 p.m.
AFTERNOON SESSION I:
PRESENTATION OF INITIAL RESEARCH PROJECTS AND DISCUSSION (CONTINUED)

4. ON-SITE ASSESSMENT AND REMEDIAL ACTION
5. HEALTH EFFECTS ASSESSMENT
6. PUBLIC POLICY AND EDUCATION

2:45 p.m. - 3:00 p.m.
Coffee Break

3:00 p.m. - 5:15 p.m.
AFTERNOON SESSION II:
INDUSTRY-ONLY WORKSHOP

Co-Chairmen: Alex Schwarzkopf and Dr. S. George Walters

DISCUSSION OF POTENTIAL RESEARCH CENTER

LETTERS OF INTENT

5:15 p.m. - 5:30 p.m.
FUTURE DIRECTIONS

Dr. Arnold Allentuch

FOLLOW-UP PROCEDURES

SCHEDULED MEETING OF INDUSTRIAL ADVISORY BOARD: TIME AND PLACE

6:00 p.m. - 8:00 p.m.
COCKTAIL RECEPTION AND DINNER

STATE OF NEW JERSEY
COUNCIL OF COUNTY COLLEGES
900 BERGEN AVENUE, JERSEY CITY, NEW JERSEY 07306

DR. NINO F. FALCONE
Chairman of the Council of County Colleges
(201) 656-2020, Ext. 103

ATLANTIC COMMUNITY COLLEGE
Mays Landing, N.J. 08330
BERGEN COMMUNITY COLLEGE
Paramus, N.J. 07652
BROOKDALE COMMUNITY COLLEGE
Lincroft, N.J. 07738
BURLINGTON COUNTY COLLEGE
Pemberton, N.J. 08088
CAMDEN COUNTY COLLEGE
Blackwood, N.J. 08012
CUMBERLAND COUNTY COLLEGE
Vineland, N.J. 08360
ESSEX COUNTY COLLEGE
Newark, N.J. 07102
GLOUCESTER COUNTY COLLEGE
Sewell, N.J. 08080
HUDSON COUNTY COMMUNITY COLLEGE
Jersey City, N.J. 07306
MERCER COUNTY COLLEGE
Trenton, N.J. 08690
MIDDLESEX COUNTY COLLEGE
Edison, N.J. 08817
COUNTY COLLEGE OF MORRIS
Dover, N.J. 07801
OCEAN COUNTY COLLEGE
Toms River, N.J. 08753
PASSAIC COUNTY COMMUNITY COLLEGE
Paterson, N.J. 07509
SALEM COMMUNITY COLLEGE
Penns Grove, N.J. 08069
SOMERSET COUNTY COLLEGE
Somerville, N.J. 08876
SUSSEX COUNTY COMMUNITY COLLEGE COMMISSION
Sparta, N.J. 07871
UNION COLLEGE
Cranford, N.J. 07016
WARREN COUNTY COMMUNITY COLLEGE COMMISSION
Belvidere, N.J. 07823

TESTIMONY BEFORE THE ASSEMBLY HIGHER EDUCATION AND REGULATED PROFESSIONS COMMITTEE

MARCH 22, 1984

My name is Bob Barringer. I am President of Brookdale Community College in Monmouth County. I appear today on behalf of the Council of County Colleges representing the 19 two year public colleges and commissions in New Jersey. The Council applauds the recommendations contained in the recent report of the Governor's Commission on Science and Technology, and supports the proposed 80 million dollar bond issue. We are pleased that the Commission has recognized the need for capital funds at the state and community colleges as well as many independent institutions and has specifically recommended that 23 million dollars be allocated for that purpose.

Although much of the emphasis of the Report with regard to the development of human resources is upon training in engineering, research and advanced technology, the Report clearly acknowledges that the availability of skilled technical workers is limited and that this limitation is a deterrent to industrial development. It has been documented in other states that the availability of technology trained workers is a major factor in deciding the location of technology based firms.

The majority of the technicians and skilled workers needed are for entry-level and mid-level jobs. In fact, the majority of new jobs required in the future will be for support personnel who actually build what the engineer designs. A far greater number of people will need to be trained in the technical support areas than at the professional level.

A report for the New Jersey Department of Labor issued in 1981, entitled "Occupational Outlook for New Jersey 1979-1985," pointed out that the rate of growth for the technician would be faster than for any other category of workers.

In the Commission's Report, community colleges have been singled out and cited as a primary deliverer of technical training in New Jersey.

As the largest sector in higher education in the state, community colleges have over 240 degree programs in areas of engineering, computer science, business, allied health, and the natural sciences. The fact is that the community colleges are already deeply involved in technical training, much of it in the high technologies. For example, in 1983, out of a total of nearly 9,000 graduates, 6,350 students completed the Associate in Applied Science Degree, a degree designed to lead directly to work as a technician.

The programs currently being offered, or are in various stages of planning or development, include the following technologies:

Data Processing	Instrumentation
Computer Programmer	Computer Repair
Mechanical Engineering	Fluid Power
Aeronautical & Aviation	Computer Aided Drafting

Engineering Graphics	Computer Aided Manufacturing
Chemical	Robotics
Automotives	Fiber Optics
Diesel	Telecommunications
Welding	Automated Management Information
Civil	Micrographics
Electronics	Word Processing

In addition to these technologies, there are health, business and medical occupations demanding well trained technicians who are being graduated from the community colleges by the thousands. Many of these fields now employ high technology in delivering their services. Also, it is interesting to note that the number of graduates do not reflect the additional thousands of students who are enrolled in technical programs and successfully complete the training, but choose not to pursue the Associate Degree.

New Jersey cannot meet the challenges as outlined in the Commission's Report without the full cooperation of the community college sector, and the colleges are more than willing to be a major part of any solution to the task of technical training. We can assist in developing a work force whose skills will match the requirements of technology. We already have the mechanism for delivering technical training. We have the will and the inclination to do so. What we don't have are the necessary resources. We need an investment of 15-18 million dollars to enhance our capability to do that which we are already committed to do by virtue of our mission.

The CAD-CAM program at Camden County College employs equipment with a value of over $600,000.00. The college was only able to begin this program through the cooperation and involvement with local industry which eagerly seeks the graduates of the program.

Brookdale is planning a high technology facility to meet the changing needs of Monmouth County.

A facility of approximately 89,000 sq. feet will be needed to accommodate new and existing computer related technology programs.

Expansion in Data Processing, Electronics, Computer Assisted Design and Word Processing is outpacing our capacity to house and equip that demand. This expansion plus new technology programs currently under development will require even more resources than the college has already invested.

We are forming a coalition of business and industry, County and hopefully State government and the college in developing this facility.

The emphasis of the Governor's Commission is on the development of Research Centers, and this may not be inappropriate, but I must remind this Commission that a state's industrial institutions do not live and prosper by research alone but also by the ability to carry out the implications of that research in the marketplace with trained and educated people, and that is what we do in the community colleges.

In closing however, we would like to ask several questions with regard to the specific language in A-1761.

We do not understand why Sections 4 and 5 of the legislation divides the administrative functions of this act between the Commission on Science and Technology and the Board of Higher Education?

The Commission is given the authority to establish and construct a network of Advanced Technology Centers whereas the Board is given the authority to supervise the construction and improvement of technical

and engineering related facilities and equipment at the state's public and private institutions. Why is this separation of functions necessary?

In addition, although we fully understand the intent of the language which is to be placed on the ballot, it is not at all clear that 23 million dollars of the 80 million dollars as provided for in the Commission's Report is to be used for the construction and improvement of technical and related facilities and equipment at the state's public and private institutions of higher education. Thus, we would suggest that the reference language be made more specific.

Finally, I want to reiterate our support for the 80 million dollar bond issue. We believe it is imperative that the bond legislation specify the manner in which the 23 million dollars not earmarked for allocation to the construction of advanced technology research centers will be distributed. Designation of a substantial portion of the 23 million dollars to county colleges is a wise investment which would result in an immediate pay off for the state as it moves toward a high technology economy.

ASSOCIATION OF INDEPENDENT COLLEGES AND UNIVERSITIES IN NEW JERSEY

BOX 206 • SUMMIT, NEW JERSEY 07901 • (201) 277-3738

ASSEMBLY 1761 - SCIENCE AND TECHNOLOGY BOND ACT

TESTIMONY

Good afternoon Chairman Doria and members of the Committee.

Thank you for the opportunity to speak today on Assembly Bill 1761.

The purpose of the Governor's Commission on Science and Technology was to devise a long range plan "of technology development strategy that builds on New Jersey's industrial and academic strengths." (p.i) We in the independent sector of higher education firmly believe that our colleges and universities represent one of our state's major academic strengths, and that this strength must be utilized fully if the ambitious goals of the Governor's Commission are to be accomplished.

Two independent institutions, Stevens Institue of Technology and Princeton University, will be participants in the Commission's recommendations to some extent through the $57 million in the bond issue reserved for the four main science/technology centers. However, they and the other 14 independent colleges and universities need and deserve more.

The independent colleges, individually and as a sector, have established a strong record of achievement in the areas of science, technology and engineering. From Princeton's plasma physics laboratory to Westminster Choir College's utilization of computers in their music curricula, the independent sector has been in the forefront of the practical applications of modern technology. And we want to do more.

During the last academic year our member institutions enrolled a total of 60,086 students. Of all baccalaureate degrees awarded in 1982 in New Jersey, 31% were conferred by independent institutions. We also granted 44% of the masters degrees and 34% of the doctoral and first professional degrees. Most relevant to this piece of legislation, the contribution of the independent sector to education in science and technology should be acknowledged and rewarded. At the undergraduate level over 30% of the baccalaureate degrees granted in New Jersey last year in engineering, mathematics, and physical science were awarded by our schools. At the graduate level 80% of the computer science degrees, 49% of engineering degrees, and 66% of the degrees in physical science were granted by independent colleges and universities.

The independent colleges and universities have helped to build the foundation for New Jersey's present excellence and national leadership in science and technology. We hope to play an integral part in the future technological development of our state.

To quote the Commission report (p.i) "The strategy requires that we make investments in ideas, enterprise, and people." The bond issue is a major component of that investment and we in the independent sector believe that $23 million is not sufficient for the combined needs of our sector plus the county and state colleges.

In fact, the needs of the independent sector alone could easily exceed $20 million. This estimate, based on data submitted by our members, is probably conservative. For example, one school reported that their list of needs was limited by the "exclusion of items which are so expensive that

they might be considered luxiuries by some, e.g. the not unreasonable request of the Biology Department for a Scanning Electron Microscope which together with related hardware would cost upward of $80,000."

Therefore, we would like to request that the committee raise the amount of funds going to the county colleges, state colleges and independent colleges by at least $10 million to a total of $33 million. Secondly, we respectfully request that our share of this increased amount be approximately $14 million.

We believe this amount of State support; coupled with the matching funds, will provide a meaningful foundation for the future development of science and technology capabilities at the independent colleges and universities.

Thank you.

Assembly Higher Education Committee

Robert C. Janiszewski

March 22, 1984