

# **COUNCIL ON GOVERNMENTAL RELATIONS**

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## **INDIRECT COSTS OF RESEARCH AT COLLEGES AND UNIVERSITIES**

### **SOME OBSERVATIONS, QUESTIONS AND ANSWERS**

- o Thoughts on Overhead
  
- o Why do Sponsored Projects Administration Rates Vary
  
- o Cost Impact of Federal Regulations on Research Universities
  
- o Indirect Reimbursement for Research Facilities and Equipment
  - o Incentives to Control Indirect Costs

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## SOME THOUGHTS ABOUT OVERHEAD

### INTRODUCTION

The Office of Management and Budget (OMB) has asked the Council on Governmental Relations (COGR) to answer some questions concerning indirect costs and invited COGR to raise and respond to other questions COGR feels will help OMB understand the issues relating to indirect costs and the impact of changes in indirect cost reimbursement policies on the health of universities. This paper is in response to that invitation. It examines some of the basic difference between the interested parties and the reasons why there is disagreement over indirect cost allocations and wide disparity in indirect cost practices.

The subject is confusing to most and has become a source of great irritation to many. Unfortunately, the decisions made on overhead reimbursement also encompass fundamental policy issues of national significance. Overhead reimbursement is the funding source supporting the basic research infrastructure of the nation. Simple solutions and simple approaches which would "solve the problem" are likely to be dangerous.

Overhead reimbursement is a contentious issue in every setting, be it between subsidiary corporations and headquarters, between the Department of Defense and defense contractors, between individual schools within and the central administration of a university, or between federal negotiators/sponsors and universities/faculty members. Essentially all universities involved in federally sponsored research have, at one time or another, been embroiled in controversy concerning the calculation, allocation, and application of overhead. The sensitivities are felt by faculty, academic administrators, federal administrators and legislators. The reasons, however, are diverse. While some are real, most are perceptual. They stem from:

- the relative dependency of universities on the federal government for research support;
- competition between universities for all types of research funding;
- the degree to which university funds can be reallocated from one activity to another when new sources of support become available;
- organizational and geographical differences;
- the bureaucratic procedures and consequent administrative rules required by the government;
- the inherent flexibility of the A-21 costing principles and the different ways in which they are interpreted and applied by different federal officials;
- the inconsistencies in applying overhead (federal vs. non-federal);

- the inconsistency between federal full costing policies and agency budgets and practice;
- and, perhaps, most important,
- the tendency for academics to be uncomfortable with recovering full cost.

#### UNIVERSITIES' DEPENDENCE ON FEDERAL RESEARCH SUPPORT AND INCENTIVES FOR FULL COST RECOVERY

The history of indirect cost recovery is instructive. In the early years, the growth in research support was such as to make indirect cost recovery of little practical importance. Faculty and universities wanted to do more research. Initial projects were done in existing laboratories by existing personnel. The salaries of some faculty and those of their research assistants could be transferred to federal sponsors. Support of direct costs alone was sufficient to provide universities with a new source of revenue which allowed existing funds to be reallocated. The reallocated money was invested in new and better facilities, additional faculty, additional graduate students, and additional staff. These additional expenses were built into the base of operations. Also, federal funds for new facilities and equipment were widely available. Growth funded by both sources translated quickly into fixed cost commitments. It became clear that support of direct costs alone was not enough to encourage the expansion demanded by the growth in federal research budgets. Indirect cost support was essential to support the expanded base of activity.

When research support was increasing rapidly, universities were not interested in maximizing overhead recovery so each responded in a slightly different fashion. Few sought full cost recovery. Most used the money made available from federal support of existing costs to compete more effectively with each other for more research dollars. They sought to maximize prestige and quality, not overhead recovery. Even in a system with strong incentives to allocate more costs to research, most universities were very reluctant to do so. Faculty attitudes toward overhead were suspicious and negative. The universities originally recognized the risk of growing too rapidly and becoming too dependent on federal research support, but the incentives for expansion often proved too strong to resist.

As long as research support expanded at a faster rate than university expenditures as a whole, sponsored research tended to be a net provider of funds. However, when sponsored research activities have flattened out or declined, the blade has cut in the other direction. Changes in the mix of research support have left some schools and disciplines in difficult positions. Universities which were satisfied with less than full cost recovery have found it essential to increase overhead rates just to maintain the level of revenue to cover what had become fixed costs. Overhead charges have increased rapidly not only because indirect costs, particularly those related to buildings, have increased rapidly but also because many universities have had to move toward full recovery of research costs in response to levelling off or decline in federal support and the severe pressures caused by the inflation of the last decade.

The difference in time perspective is significant in other dimensions as well. Many research costs disappear very slowly. New or newly renovated laboratories represent 20 to 30 year financial obligations which universities must undertake to be competitive. Research funding for particular projects is typically provided on a year to year basis. If research support declines significantly, universities are left holding an expensive bag of fixed costs which cannot be easily shed. They have less volume of research across which to apply overhead costs and they have fewer sources of income to cover long term commitments.

### THE BUREAUCRACY

Within the universities there are serious and bitter disputes as well. Faculty members' view of overhead range from confusion over its complexities to resentment of both the bureaucracy which must be maintained to process and monitor grants and contracts and the procedures, committee work, and time consumed by the growing number of regulation and accounting requirements. Not only do these rules and regulations result in costs that their research must bear but they also require a commitment of time and energy--time and energy that otherwise could be spent on research.

### THE FLEXIBILITY OF A-21

Overhead rates are negotiated between universities and the federal government based on the costing principles set forth in the Office of Management and Budget (OMB) Circular A-21. The principles accommodate significant flexibility in accounting and cost allocation procedures but clearly state that universities should be allowed to collect a large fraction of the full cost of research rather than just marginal cost. As a result, overhead calculations typically include a share of fixed costs, e.g., the salaries of presidents and deans and the costs of operating libraries and of faculty time taken by committee work, just as the overhead of for-profit businesses includes a share of corporate headquarter costs. Beyond the standard recoveries, A-21 is capable of adapting to the differing organizational structures of universities. As a result, direct charges in one university might be indirect charges in another. Both the numerator and denominator of the fraction which determines the overhead rate are uniquely determined for each university. The flexibility is essential to accommodate the wide variety of management structures and the resulting accounting practices supporting these structures, but the resulting rate variances only fuel the confusion.

### INCONSISTENCIES AND INEQUITIES

Government policies are inconsistent. Although universities are allowed by OMB to recover most indirect costs, they are often required by law and agency practice to share the cost of research. Additionally, in their need for all types of research funding, universities are sometimes inclined to accept non-federal funding without full recovery for indirect costs. In some instances, too, universities charge industrial sponsors more than the approved federal overhead rate because the rate negotiated with the federal government does not cover full cost. The inconsistency with which overhead is applied results in sensitivities and tension. Faculty are quite

sensitive to the possibility that some are treated differently because of their source of funding or their bargaining power with deans or administrators.

In addition, faculty who do not use laboratories feel disadvantaged by overhead allocations. Scientists who work in energy intensive, space intensive, and equipment intensive fields have the same overhead rate applied to their grants as those who use little more than pencil and paper. Laboratory renovations and operations and new laboratory facilities have added costs which have pushed up overhead rates significantly in recent years. Researchers who do not utilize these laboratories know that the overhead on their work is subsidizing the work of those who have the best space and the best equipment.

This issue is compounded by the way in which different institutions allocate the overhead funds once received. One might think that overhead funds which are funds that reimburse costs would be allocated directly to pay those costs. Universities are unable to be as precise on matching particular sources of overhead costs to overhead revenue as one might expect. For example, overhead received for the depreciation of a laboratory may be spent for any purpose. The laboratory may have been funded partially or entirely by a gift. Depreciation recovery comes back to the university over 20 or 30 years and the funds are not segregated and separately invested. Come time to replace the laboratory, everyone may wish that the depreciation had been saved and invested, but few universities can afford to put aside such funds. Typically, they have been spent in the quest for better faculty and more research.

The same issue drives rates down in many public universities. Funds for overhead reimbursement in some states must be turned over to the general revenue coffers of the state and are unavailable for university purposes. Not surprisingly, the overhead rates negotiated by such universities are significantly lower than those for universities that recoup the overhead for their own purposes. No retention of overhead recovery equates with no incentive to achieve full cost recovery.

Added to this, federal agencies are sometimes as variable as the universities in their position on overhead reimbursement. Although OMB has clearly stated that full cost reimbursement is the goal of federal policy, some agencies continue to take the position that the federal government should negotiate the best possible price in order to maximize direct support of research. Principal investigators and the institutions are badgered to forgive overhead or to accept a lower rate than the negotiated rate in order to get the grant. Principal investigators, some deans, and indeed some institutions are willing to price their services at marginal cost to obtain certain grants or certain kinds of high priority research. The perception by faculty that overhead rates directly affect their chances of receiving support adds enormously to institutional strains.

The debate with federal agencies is complicated by these factors. Sponsoring agency personnel and faculty both want to minimize overhead. Every dollar of overhead avoided by the sponsor means another dollar of research is possible in the short term. Both sponsors and faculty want to maximize the amount of direct support available. Some tend to be judgmental

of those who insist that full cost is fully allocated costs. However, their perceptions stem from their sense of the centrality of their own research to the mission of the university and to the needs of society. Passion for research invariably translates into passionate distaste for bureaucracy and overhead.

A further complication arises because of the difference between overhead rates and overhead recovery. Rates have risen much faster than actual recovery because higher rates have led to more concessions by universities--more cost sharing and more waving of rates.

#### THE ACADEMIC CULTURE

The University environment is different from the business environment. Many academics feel that fully allocated overhead is excessive. After all, the argument goes, the university would have to have a president and deans even if there were no federally sponsored research. Faculty often view many important support items as institutional responsibilities and object strongly to the reduction in funds available for direct support of research caused by the university's insistence that research sponsors pay full allocated costs. This pressure has hindered university ability to recover full costs.

#### CONCLUSION

More than money is at stake in the debate about overhead. The fundamental issue of national research policy is easily obscured by technical accounting issues. Cost savings can only occur if costs are cut. Overhead reimbursement reductions without overhead cost reductions would reduce the national capacity for research and discourage university investment in vitally important facilities.

The debate is conducted typically in a highly charged atmosphere by experts with entrenched positions in front of busy people who want the problem solved. Budget pressure, inconsistent and incomplete data, and negative faculty attitudes toward overhead have conspired to produce an atmosphere which makes reasoned deliberation quite difficult. The debate seldom recognizes the research role of universities and the fabric supporting this research which has been woven since WWII. The nation's brightest minds have chosen to work for salaries significantly below those available in the market, after years of training at sub-market wages in university laboratories. The system has received support from these faculty and students, from donors, from student tuitions, and from state government appropriations. University overhead rates are far less than industrial rates more because university research is supported by all revenue sources than because industrial rates include a margin for profit. The simple fact is that no university receives "full cost" reimbursement from federal sponsors. Unless those involved in trying to cut budgets recognize this fundamental fact, grave damage to the nation's research effort could result.

OMB's current review is to be applauded. There is far more at stake than most of those arguing for arbitrary cuts have been willing to recognize.

## WHY DO SPONSORED PROJECTS ADMINISTRATION RATES VARY? ARE THE COSTS CONTROLLED?

In order to understand why the Sponsored Projects Administration (SPA) component of the indirect cost rate varies from one university to another, COGR reviewed the FY1986 indirect cost rates broken down by component for 44 universities. Some universities spend more on administrative services than others, thereby affecting the level of the SPA component within the indirect cost rate. In addition to the level of expenditure, the other major factor affecting the level of SPA is the extent to which SPA administrative functions are performed in central administration offices rather than within schools, departments and other organizational units throughout the university. Some achieve this administration in a very decentralized structure with most services (and thus costs) within school, department, center and institute units. Others rely on a highly centralized structure in which nearly all administrative systems serving sponsored projects (development, accounting, purchasing, project administration, reprographics, security, etc.) are concentrated in a central administration office.

For purposes of this paper, the definition of SPA is as presented in OMB Circular A-21. An excerpt including that definition is attached as Appendix A. The 1982 version is used for consistency with the data.

Consistent with the A-21 definition, Sponsored Projects Administration includes proposal review and submission, grant and contract award negotiations, post award administration and assuring compliance with applicable federal, state and local laws, agency regulations and university policies. It also includes administrative services related to financing, cost sharing, purchasing, accounting, personnel and other administrative functions to the extent that they benefit sponsored research.

Among the 44 universities whose indirect cost rates were reviewed, the SPA component varies from a low of 0.43 to a high of 17.90 points with a notable clustering in the 2 to 4 points range. Several universities were selected for in-depth analysis including some in the 2 to 4 cluster and some both below that cluster and above it. The findings provide a basis for explaining why the SPA component of the rate varies from one university to another.

### TYPICAL SPA RATES

The universities analyzed having an SPA component in the "typical" range of 2 to 4 points all administer their sponsored projects through a somewhat decentralized structure with the administrative services shared among central administration, schools and departments. None of them operated through a research foundation.

Further, all of them had roughly the same elements and levels of service within the central administration offices. Typically, these included the following:

1) Sponsored Research Administration

Responsible for final institutional review and sign-off on proposals, negotiation and acceptance of contracts and grants, interpretation of sponsor and university policies applicable to sponsored research, identification of funding sources, administration of agency rules.

2) Sponsored Research Accounting

Responsible for setting up project accounts, budget monitoring, internal/external fiscal reporting, administration of letters of credit, billing and collection on cost reimbursable agreements, etc.

3) Vice President/Provost for Research

Official within the President's office ultimately responsible for formulating and administering research policies.

4) Technology Transfer

Responsible for patenting and licensing of inventions/technologies resulting from the university's research projects.

5) Government Fiscal Relations

Responsible for conducting special cost studies, preparation of the indirect cost study and negotiation of rates.

6) Federal Property Management

Responsible for maintaining institutional inventories of equipment acquired under sponsored projects and for the screening under federal/university policies preparatory to acquiring new equipment for sponsored projects.

7) Sponsored Projects Administration Effort of Faculty

Participation in faculty committees relating to research and coordination of budgets, staff and facilities among multiple sponsored projects.

Not only was there considerable similarity in this "typical" group in the administrative elements cited above but there was also substantial similarity in the scope and level of services provided by those individual and collective elements. They have only modest (if any) program development services, relying heavily on schools and departments to support their faculty in that function. Further, they do not routinely provide typing, graphic, illustration or reproduction services related to sponsored project proposals. Those too are met largely within school and departments or through service centers on a direct charge basis.



### LOWER SPA RATES

Those universities with lower SPA rates of less than 2 points within the total indirect cost rate are generally quite decentralized. They have a modest central sponsored research administration office for final sign-off on proposals and nominal involvement in negotiation of awards and coordination of research policies.

Thus, the majority of research related administrative services are performed at the school/department level and the costs are allocated largely to the departmental administration pool. Indeed, it is common for universities in the sample with lower than "typical" SPA rates to have relatively high (16 to 21 points not uncommon) departmental administration rates.

Further, the universities with lower SPA rates seem to offer little in the way of program development and appear to have few research centers or institutes administered by a central office rather than a single school, college or department.

### HIGHER SPA RATES

Several factors characterize most universities whose SPA component is significantly higher than the "typical" value. The magnitude of the increment generally relates to which and how many of these factors is present. As already noted above, universities with higher SPA components frequently provide a wider range of centralized services. One example of an added increment of service is a more extensive capability (typing, graphics, illustrations, copies, etc.) for assisting investigators in preparing proposals. Other examples include some of a series of subsystems (accounting, purchasing, payroll, security, information services, etc.) dedicated to sponsored projects administration. These additional services are provided centrally through one or a combination of the "typical" offices described above. Sponsored projects administration often approaches its most centralized form at universities using university-affiliated research foundations or similar organizations through which nearly every administrative service benefiting sponsored projects is available to investigators. This model generally produces a higher than "typical" SPA rate.

Beyond these expanded centralized services just mentioned, administrative costs for research institutes or centers are frequently found as an element of SPA among universities with higher SPA rates. Administrative costs for these separately budgeted units comprise half or more of the total SPA costs at some universities that include them in the SPA pool.

Other elements of administration that appear consistently in the SPA pool of institutions that have higher SPA rates are program development services and those related to preparing bids or proposals for potential sponsored projects.

### INCENTIVES TO CONTROL SPA POOL

1. Due to the myriad limitations only about two-thirds of full SPA cost is recovered leaving about one-third chargeable to college/university funds. The Government requires that universities include cost sharing in their research base and this has a two-pronged adverse impact on the university's recovery. Firstly, inclusion of cost sharing in the research base drives the indirect cost rate down. Secondly, that already diminished rate cannot be applied to the university's cost sharing expenditure so that is no indirect cost recovery on the cost sharing. Further, the Government limits indirect cost recovery on training grants to 8% TDC, allows only 10% TDC on Presidential Young Investigator Awards, allows no indirect costs on Biomedical Sciences Support Grants nor Career Development Awards, etc.
2. Federal auditors and negotiators vigorously limit cost allocations to the SPA pool because of the relatively high recovery of that pool compared to most of the other pools. Given this attitude approach, university expenses allocated to the SPA pool are more at risk of being deleted or reduced.
3. Management oversight exercised by federal and state governments and internal/external audit functions collectively weave a fabric that effectively identifies and discourages waste and inefficiency.
4. The administrative service units included in the SPA pool must compete directly with other college/university needs in the budget process so do not receive a disproportionate share of scarce resources.
5. Units represented within the SPA pool must be staffed and funded in reasonable symmetry with other units within the college/university. It is simply not tolerable in the institutional setting that such units be funded appreciably better than other units whose costs are not recovered to similar extent from sponsors.
6. At virtually all colleges/universities, the faculty actively participate in the resource allocation process and typically restrain allocations to administrative units rather than to faculty salaries and other elements of their academic programs.
7. Managers of all units including those within the SPA pool have a professional motivation to operate their units efficiently and at minimum cost. Their success in doing so enters into their performance evaluation and thus their receipt of promotions, salary increases and other forms of professional recognition.

It is clear that these several incentives are working effectively. The 44 university table in Appendix B shows that during the period 1982-1986 the mean SPA component value increased by just 3.6% while the mean total indirect cost rate increased by 10%.

➤ **5. Sponsored projects administration.**

a. The expenses under this heading are those that have been incurred by a separate organization(s) established primarily to administer sponsored projects, including such functions as grant and contract administration (Federal and Non-Federal), special security, purchasing, personnel administration, and editing and publishing of research and other reports. They include the salaries and expenses of the head of such organization, his assistants, and their immediate staff, together with the salaries and expenses of personnel engaged in supporting activities maintained by the organization, such as stock rooms, stenographic pools, and the like. The salaries of professorial and professional staff whose responsibilities to the institution require administrative work that benefits sponsored projects may also be included to the extent that the portion charged to sponsored agreements administration is determined in accordance with Section J.6. This category should also include the fringe benefit costs applicable to the salaries and wages included therein, an appropriate share of general administration and general expenses, the operation and maintenance expenses, and depreciation and use allowance. Appropriate adjustments should be made for services provided to other functions or organizations.

b. In the absence of the alternatives provided for in Section E2d, the expenses included in this category shall be allocated to the major functions of the institution under which the sponsored projects are conducted on the basis of the modified total cost of sponsored projects.

c. An appropriate adjustment shall be made to eliminate any duplicate charges to sponsored agreements when this category includes similar or identical activities as those included in the general administration and general expense category or other indirect cost items, such as accounting, procurement, or personnel administration.

APPENDIX B

UNIVERSITY

University of Alabama  
University of Arizona  
University of Arkansas  
California Institute of Technology  
University of California at San Francisco  
Case Western Reserve University  
University of Chicago  
University of Cincinnati  
Colorado State University  
Cornell University  
University of Dayton  
University of Denver  
University of Florida  
Harvard University  
University of Houston  
Indiana University  
Johns Hopkins University  
University of Kentucky  
Massachusetts Institute of Technology  
Michigan State University  
University of Michigan  
University of Minnesota  
University of Nebraska  
New York University  
University of North Carolina  
Northwestern University  
Ohio State University  
Pennsylvania State University  
University of Pennsylvania  
University of Pittsburgh  
Princeton University  
Purdue University  
University of Rochester  
University of Southern California  
Stanford University  
Syracuse University  
Texas A&M University  
University of Texas  
University of Virginia  
Washington University  
University of Washington  
West Virginia University  
University of Wisconsin  
Yale University

## **COST IMPACT OF FEDERAL REGULATIONS ON RESEARCH UNIVERSITIES**

### INTRODUCTION

The purpose of this paper is to explain and document how certain federal regulations impact the operations of research universities and subsequently increase indirect costs. These regulations are for the most part well intended and result in safer and better operations, but they do have the effect of increasing operating costs.

Generally, the regulations we are discussing involve such things as safety, care of animals, proper handling of hazardous wastes -- all of which require increased staff to carry out, increased supplies and expense for recordkeeping, monitoring, testing and disposal, and the renovation of facilities to meet new standards. Almost all costs fall into the indirect category because they cannot be directly attributed to a particular project or activity that occurs within the university. Primarily they are support activities within the university's organizational structure.

Those federal regulations may be the result of specific federal statutes or they may be administratively generated based on broad statutory powers. In either event, although subject to interpretation and implementation by each university, they must be satisfied.

### ALLOCATION OF THE COSTS OF FEDERAL REGULATIONS

As already pointed out, the impact of most relevant federal regulations is to increase indirect costs. These increased costs in turn must be allocated among the three primary functions of instruction, research and public service. However, because of the nature of many of the regulations, they tend to impact the operating costs related to the research function more than those of instruction and public service. For example, regulations on hazardous chemicals affect the costs of research activities the most because hazardous chemicals are used in more volume in research than in instructional or public service activities. Likewise, regulations impacting the use of animals results in increased costs for research more than the other functions. EEOC regulations tend to impact the costs of all functions in direct relation to the number of staff assigned to the primary functions. It should be noted that universities recover only a portion of those regulation-driven costs that are related to research. The remainder must be borne by the universities.

Regulatory costs are of two types; (1) initial or start-up, and (2) ongoing. Furthermore, they can affect current operating costs or they can result in capitalized plant costs for renovation.

Start-up costs include the staff time and the materials required to develop and implement new procedures to comply with new regulations. For regulations such as the Hazard Communication, the start-up costs can be substantial and spread over several years.

Ongoing costs involve staff time and materials to maintain operations to comply with regulations on a continuing basis. The salaries of OSHA

inspection staff, the purchase of individually fitted respirators for maintenance workers, the costs of annual physicals for maintenance workers, and the fees paid to vendors to dispose of hazardous chemicals are representative examples of such ongoing costs.

The costs cited above represent current operating costs. On the other hand, the renovation of a laboratory to install new hoods or other fixed equipment is treated as a capital cost and is converted to a facilities use or depreciation charge.

#### SELECTED CASE STUDIES

In order to document a few of the regulatory costs, actual case studies are presented from Purdue University and the University of Houston with some additional cost data from the University of Iowa. These case studies show the actual annual ongoing costs being incurred. These costs then would be spread to the three primary functions following the guidelines prescribed by OMB Circular A-21. They might be described as the "direct costs" of the regulations in that only those costs directly attributed to the regulations are identified. In all cases, the costs have been carefully identified, conservatively estimated and well documented.

#### FEDERAL REGULATIONS GOVERNING THE CARE AND USE OF ANIMALS

The number of regulations concerning laboratory animals has been increasing rapidly in the last few years with concurrent increases in operating costs. A recent cost study indicates that Purdue University is spending approximately \$355,000 for 1986-87 to meet regulatory requirements in this area. These costs include such things as the salaries of a full-time veterinarian and secretary, and those partial salaries of faculty who serve on the Animal Care Committee. They also include the staff costs of proposal monitoring, protocol preparation and facilities oversight.

Currently, Purdue does not meet all of the requirements for AAALAC certification. If AAALAC certification is required for 1987-88, the projected additional operating costs will be about \$247,000. Assuming a five percent inflationary increase in base costs, this will mean that for 1987-88, Purdue's projected operating costs to meet federal animal regulations will be about \$620,000.

Furthermore, recent changes in the Animal Welfare Act requiring protocol review, training of animal users, and improved housing are estimated by the University of Houston to increase operating costs by about \$48,000 per year and may require up to \$230,000 for new cages and other renovations. The University of Iowa studies discovered that their operating costs due to federal regulations relating to animal care are running about \$151,000 per year.

#### FEDERAL REGULATIONS ON HANDLING OF ASBESTOS AND PCB'S (OSHA)

In the past several years, federal regulations concerning the handling of asbestos have become complex, voluminous and costly. While prior to 1982, no separate cost figures were maintained at Purdue, in 1982-83 the

cost was \$19,912. In 1985-86, these costs had increased to \$754,698. Anticipated costs for 1986-87 are about \$650,000.

The University of Houston estimates costs then between \$35 and \$75 per square foot to remove asbestos containing materials or to encapsulate them.

Although less expensive, the costs history for federal regulations for the management of the PCB problem is similar to that of asbestos. For the five years prior to 1985, Purdue spent between \$3,700 and \$13,700. In 1986-87, the expected expenditure is \$98,900, and this doubles for 1987-88 at \$208,500.

#### FEDERAL REGULATIONS GOVERNING THE DISPOSAL OF HAZARDOUS CHEMICALS

Recent Federal regulations governing the disposal of hazardous chemicals are requiring large expenditures for storage and handling facilities. Also, start-up activities to develop recordkeeping systems, educational materials and programs add to ongoing operating costs. Purdue just occupied a new hazardous chemical storage and handling building that cost \$770,000 to construct. In addition, the operating costs are running about \$130,000. Projections indicate that by 1990, these costs will be in excess of \$250,000 per year.

The University of Houston estimates their annual costs to be about \$160,000 with costs running \$25 per gallon or \$60 per pound for hazardous waste. They have found that the cost of disposal exceeds the original cost of purchase in most cases.

#### FEDERAL REGULATIONS CONCERNING EQUAL EMPLOYMENT OPPORTUNITY AND AFFIRMATIVE ACTION

Federal regulations concerning Equal Employment and Affirmative Action have been in place for some time now. A current cost study shows that for 1986-87, Purdue will spend about \$735,200. These costs are mostly for staff time and data processing. In addition, at an earlier date, substantial sums were spent to develop computer programs to be able to provide the required data and analyses. Of course, these systems must be maintained on an ongoing basis.

#### FEDERAL REGULATIONS CONCERNING AUDITS

With the adoption of OMB Circular A-110, there was an immediate increase in operating costs to perform systems audits. In addition, there are the increased audit costs relating to OMB Circular A-88. The University of Houston estimates that these additional audit requirements relating to research activities have increased the costs of their audits by about \$135,000 per year. Purdue University estimates its additional audit costs to run about \$31,200 per year. Their costs tend to be lower than usual because the auditing is performed by the State Board of Accounts of Indiana.

#### FUTURE FEDERAL REGULATIONS GOVERNING TRAVEL ON GRANTS AND CONTRACTS

OMB has indicated their intent to issue regulations very soon requiring all travel charged to federal grants and contracts to follow federal travel

regulations. Purdue staff have begun studying how to implement these anticipated new regulations. Preliminary estimates are that the increased ongoing operating costs will be approximately \$240,000 per year. In addition, there will be substantial start-up costs to develop computer programs, travel information booklets, etc. These start-up costs are estimated to be \$109,000 at the University of Houston with ongoing increases in operating expenses of about \$49,600.

The University of Iowa estimates that their operating costs will increase about \$160,000 when these federal regulations go into effect.

### CONCLUSIONS

The case studies done for this paper at Purdue University and the University of Houston demonstrate that certain federal regulations have caused increased operating costs of a material nature. These costs are a significant part of every university's indirect cost structure and, therefore, as they increase, it causes upward pressure on the university's indirect cost rate. Through the indirect cost rate mechanism, a portion of these increased costs gets charged to sponsored research budgets. But only part is funded from research. The balance is charged against instruction and funded by a combination of student fees, state appropriations, and/or endowment income.



## A CASE FOR INCREASED INDIRECT COST REIMBURSEMENTS FOR THE USE OF RESEARCH FACILITIES AND EQUIPMENT

### RECOMMENDATIONS

1. Buildings should be amortized over a 20-year life (versus the present 50-year life)
2. Equipment should be amortized over 5 to 10 years depending on the class of equipment (versus the present 15-year life)
3. Reimbursements for the use of facilities and equipment should be a separate component of the indirect cost rate so as to be clearly differentiated from regular operating costs. (There is no such present requirement.)

### GROWING NEEDS FOR RESEARCH FACILITIES AND EQUIPMENT

More and more fields of science have become "big science." To conduct research and training in these fields requires tremendous capital investments in facilities and equipment. Computers, spectrometers, lasers, and electron microscopes are just a few examples of scientific equipment. Facilities must be renovated or constructed to meet stringent environmental standards as well as rigorous standards for health and safety and handling and disposal of radioactive wastes to give just a few examples. In nearly every field of science, further progress requires increasingly sophisticated facilities and equipment as scientists probe deeper into nature's processes. It is widely acknowledged that there has been great synergism as a result of the marriage of leading-edge science with the most advanced facilities and equipment. Indeed, up-to-date facilities and equipment are important determinants of what research can be done and how productive the research efforts will be.

### PRESENT CONDITION OF RESEARCH FACILITIES AND EQUIPMENT

Aging facilities and obsolete equipment are one of the major obstacles faced by research universities in fulfilling the expectations for continued progress and new discoveries which are so important to the national interest. In a recent survey of departmental chairpersons, nearly half believed their departments had inadequate research instrumentation and only 16% of research equipment was regarded as "state-of-the-art." The stock of academic research equipment is about twice as old as equipment in comparable industrial laboratories. There is wide agreement that rebuilding the research support infrastructure at research universities is an urgent national problem.

### RESTORING AND SUPPORTING INFRASTRUCTURE

The trends toward "big science" require a realignment of the proportion of research funding used for staff salaries versus facilities and equipment. An increasingly larger investment per scientist must be made in facilities and equipment. Yet, at the same time, federal support of new facilities has largely ended and equipment funding is far short of what is required and the

federal share of total equipment funding has actually declined in recent years. Universities have responded to short falls in total funding by reducing spending on infrastructure in order to retain staff members. As a result of years of neglect, it is now necessary to make a huge investment in restoring and maintaining the research infrastructure.

Two independent assessments of the amount needed arrived at a figure of approximately \$10 billion to be expended over the next ten years with roughly 50% coming from federal sources. This amount of funding cannot be obtained by a realignment within existing funding - there must be an incremental increase.

The recommendation in this paper will not provide the necessary funds to restore the infrastructure. Extraordinarily efforts will be required from governmental and nongovernmental sponsors as well as colleges and universities to provide the necessary funds. But the proposed changes in indirect cost reimbursements will recognize reality with respect to the lives of building systems and equipment used for research and will help in preventing further deterioration of facilities.

#### CONCLUSION

The costs of facilities and equipment and other instrumentation used in research are a necessary part of the total cost. Productive research is increasingly dependent upon more and more sophisticated and expensive infrastructure support. The recommendations in this paper will enable colleges and universities to increase their investment in facilities and equipment.

Colleges and universities are the principal source of the advancement of science and technology in this nation. The federal investment in these institutions has paid tremendous dividends. Providing funds for improving research facilities and equipment will add greatly to research productivity and even greater national dividends.

## INCENTIVES TO CONTROL INDIRECT COSTS AT RESEARCH UNIVERSITIES

### INTRODUCTION

This paper will describe indirect costs as one element of a complex financial matrix in which all elements are under continuous scrutiny to insure cost control. Research universities have three primary missions: 1) instruction, 2) research, and 3) public service. These missions are carried out by a single faculty and staff, supported by a unified infrastructure, of facilities, equipment, and support services. While the revenue streams supporting each of these missions are generally discrete, the expenses associated with each of them are frequently commingled. The fact that these missions are so closely intertwined is at once the key to the strength of the research university and the source of confusion regarding the appropriate allocation of costs to each mission. However, a careful examination of how colleges and universities allocate and manage their resources, coupled with a review of current and future pressures on those resources, will reveal the absolute necessity of controlling total operating costs, indirect as well as direct.

### UNIVERSITY COSTS, DIRECT AND INDIRECT

Before discussing incentives to control costs it will be useful to understand the nature of the costs involved as well as the methods for their determination and distribution. It is also important to appreciate the management and political environment in which resource allocation decisions are made. The costs of a university are often categorized by the functions cited above, instruction, research, and service. Another way to look at costs is the ease with which they can be identified with a particular function or purpose. Costs that can be readily related such as the salary of an individual teaching a specific course, or the cost of supplies used for a particular research project are defined as direct costs while costs not easily attributable to a specific function such as utilities, building maintenance or administration are classified as indirect costs. Both direct and indirect costs are real and necessary for the proper functioning of the institution, however, the methods of how to appropriately assign these costs to the benefiting function in an equitable fashion differ and are the cause of continuing disagreement. As long as a college or university continues to carry out its mission, it incurs costs for supporting its operations which must ultimately be paid by the institution, whether from its own or external funds. Failure to manage these costs efficiently effects all programs of the institution and may cause its ultimate demise.

It is also important to recognize that as multiple-objective organizations, colleges and universities have multiple sources of revenue. Unlike single-objective institutions, such as hospitals, colleges and universities are unable to automatically pass through their total operating costs to third parties. The resulting budgetary pressures provide significant incentive to minimize indirect costs.

Universities are by nature collegial organizations in which management and decision making are shared between trustees, administrators, faculty, alumni and even students. While the degree of such sharing may vary, the concept is universal. Thus, resource allocation and financial management

decisions while primarily the responsibility of trustees and administrators, are subject to significant review and comment from faculty, through committees as well as individuals. As the primary generators and users of federal research funds, the faculty serve as important critics of institutional behavior in cost allocation. Their continuing oversight of resource allocation priorities and programmatic decision making is a significant factor in controlling costs.

#### UNIVERSITY REVENUES

An analysis of the sources of revenue for colleges and universities indicates that all are projected to grow more slowly in coming years and that some are in jeopardy. In addition, universities are facing an increase in the cost of capital, as well as diminishing of the sources of supply. The Tax Reform Act limited the access of private universities to the tax exempt market to \$150 million and increased the costs of borrowing in both the taxable and tax-exempt markets. There is concomitantly an increasing reluctance of foundations and donors to give "bricks and mortar" dollars, and the Federal government has failed to make a commitment to fund facilities. The research mission of a university is capital intensive and now only a small portion of the capital required for research facilities and equipment is provided by Federal grants and contracts. The General Accounting Office \* reports the following for a sample of 28 research universities, drawn from the 100 universities that receive the most federal research funds in fiscal year 1983:

- Between 1980 and 1984, the annual university investment for construction in science and engineering was 9 to 12 times higher than the annual federal indirect cost reimbursement for building depreciation.
- Annual university expenditures for research equipment from non-federal sources was about twice as much as the annual federal reimbursement for equipment depreciation.
- Experts on university finances, whom we interviewed, expressed some concern that universities may be increasing their physical plant debt due, in part, to borrowing for research facilities.

Operating funds for major research universities are principally derived from six sources: 1) tuition and fees, 2) government grants and contracts, 3) gifts, 4) investment income, 5) appropriations, 6) service income - usually health services income.

Each of these sources of operating support is currently under varying degrees of pressure. Research universities have become increasingly dependent on tuition and fees as a source of revenue to support the institution. The GAO report cited previously noted:

- The fastest growing source of universities education and general revenues was tuition and fees. Revenues from tuition and fees were 48% greater in 1984 than in 1975 for the overall sample.

- In 1975, tuition and fees were 21% of the educational and general revenues and in 1985, they accounted for 25% of educational and general revenues.

The rapid escalation of relative tuition contribution to revenues, together with the absolute cost of tuition and fees, the decrease in availability of financial aid and the low Consumer Price Index (C.P.I.) make it unrealistic to expect that universities will be able to continue with what has become the historic trend in tuition increases.

Government research support has also experienced a healthy annual growth rate over the previous decade. However, the Federal budget deficit pressures, efforts to modify college and university cost principles, and recent attempts by N.I.H. to defer spending all lead the prudent University financial officer to conservatively estimate future revenue from federal research funds.

Though the stock market has performed well over the last several years, recent studies indicate that the nominal value of spending from the average endowment has increased by about 90% since 1970, while the inflation adjusted value has declined by 34%. During the same period, overall university expenditures increased faster than the rate of inflation.

The GAO study indicated that State Appropriations provided 35% of the Educational and General Revenues for its sample in 1975 and 34% in 1984.

The recent changes in service income for major research universities with medical centers will be one of the most difficult areas of change to forecast. Medical services have traditionally been paid for on a cost reimbursement basis. Thus any additional costs associated with teaching hospitals and their associated research missions have been passed on to third party payers. With the advent of prospective payment systems, diagnostic related groups, managed care, limitation on capital pass through, etc., the University Medical Center has been transformed from a creator of resources, for investment in the academic and research enterprises, to a potential consumer of resources.

#### INCENTIVES TO CONTROL COSTS

Strong incentives exist to manage universities as efficiently as possible. The following discussion of incentives to control costs is based on the earlier assertion that universities are obliged to constantly scrutinize all elements of cost whether direct or indirect and to strive to keep them at a minimum.

As nonprofit organizations operating in a highly competitive market faced with extreme pressure on all sources of income, universities have been frugal. They are acutely aware that unnecessary indirect costs are every bit as wasteful as unnecessary direct costs and that such waste affects their ability to fulfill their mission. An example of institutional efforts to minimize costs is the Cost Reduction Incentive Awards program sponsored by the National Association of College and University Business Officers and the United States Steel Foundation, Inc.

Indirect costs are distributed to instructional programs and service activities in the same manner as to research and for most colleges and universities the former functions receive a greater share than the latter. Unlike some single-objective organizations such as hospitals, colleges and universities cannot automatically pass through their operating costs to third parties. Economies in indirect costs will, therefore, provide greater benefit to the instruction and service functions where the incentives for savings are the greatest since the bulk of the revenue for them comes from University funds or sources, e.g., tuition subject to highly competitive market pressures.

Universities are subject to external oversight by a variety of organizations such as independent public accounting firms, state auditors, federal auditors, peer review groups and accreditation agencies. Each of these groups to some extent is concerned with the overall efficiency of the institution establishing continuing pressure to control costs. Of particular note with respect to indirect costs is the role of federal agencies and their thoroughness in the review and negotiation of indirect cost rates.

Not only are there myriad external reviews of university activities, but internal pressures to avoid waste and increase efficiency are also in effect. These exist in the resource allocation or budgeting process where administrative and other support activities must compete with instruction, research and service programs for limited resources. Institutional oversight groups such as faculty budget committees often have significant impact on budgetary decisions. The faculty, who actually acquire the research funds from which indirect cost recovery is obtained, are the severest critics of high indirect cost rates. It is a common belief among investigators that research proposals which include a high indirect cost rate are at a competitive disadvantage. Investigators continually jawbone to assure that unnecessary supporting activities are not added to "their indirect cost tax."

Recent years have seen ever increasing pressures to reduce costs and increase revenues. The executive agencies as well as Congress have pressed colleges and universities to control indirect costs in spite of arguments that such costs are largely beyond the control of the institutions. Many public institutions have experienced significant reductions in state aid as a result of economic difficulties. Increased regulation of activities by federal, state and local governments have forced universities to spend significant sums to comply with the law of the land. Changes in the methodology of reimbursing health care costs have had major impacts on the service function.

In summary, indirect costs are one element of a complex financial matrix in which all elements are under continuous scrutiny. Unnecessary indirect costs are as wasteful as are unnecessary direct costs. Essentially, incentives and controlling costs are synonymous. The following points can be made about incentives and cost control: (1) Economies in indirect costs benefit both instructional programs and research; (2) oversight by both federal and state examiners act to control costs; (3) the tenacity with which indirect cost officials negotiate rates controls reimbursement; (4) administrative needs compete with other university

needs in the budget process; (5) research investigators usually participate in constructing university budgets and exert substantial influence to keep indirect costs to a minimum; (6) the Congress, agencies and OMB all have joined in recent years to limit indirect cost reimbursement. This high level pressure has a substantial impact on rates.

\*United States General Accounting Office Publication No. GAO/RCED-86-162BR, July 1986, entitled "University Finances, Research Revenues and Expenditures"