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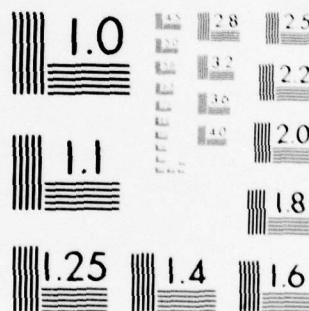
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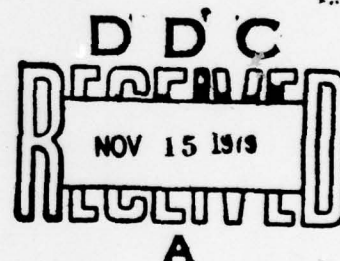


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THESIS

A COST ACCOUNTING STANDARD ON  
CAPACITY-RELATED COSTS: A DESIRABILITY  
AND FEASIBILITY ANALYSIS

by

Harvey L. Kennedy

September 1979

Thesis Advisor:

J. M. Fremgen

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A Cost Accounting Standard on Capacity-Related Costs:  
A Desirability and Feasibility Analysis

by

Harvey L. Kennedy  
Lieutenant Commander, United States Navy  
B.S., University of Texas at El Paso, 1967

Submitted in partial fulfillment of the  
requirements for the degree of

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from the

NAVAL POSTGRADUATE SCHOOL  
September 1979

Author:

*H. Kennedy*

Approved by:

*J. W. Frazier*

Thesis Advisor

*W. J. Frazier*

Second Reader

*C. J. R.*

Chairman, Department of Administrative Sciences

*A. Schrey*

Dean of Information and Policy Sciences

## ABSTRACT

The purpose of this thesis was to examine the subjects of capacity and capacity-related costs from both a theoretical and pragmatic standpoint and to determine the desirability and feasibility of a formal cost accounting standard on capacity-related costs. The writer attempted to simulate, in an individual effort, the staff work of the Cost Accounting Standards Board (CASB) through a literature survey and an analysis of the CASB issues paper on capacity-related costs. The thesis concluded that there were potential benefits to the government if a standard could be developed. However, a standard that could meet the objectives of the Cost Accounting Standards Board did not appear feasible, primarily because of difficulties in the accurate measurement of various capacity levels and because such a standard could lead to unduly complex accounting procedures and excessive administrative costs.

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## I. INTRODUCTION

In November of 1978, the Cost Accounting Standards Board (CASB) solicited responses from the academic community, government agencies, government contractors, and professional organizations in connection with a study relating to the treatment of capacity-related costs for contract costing purposes. The Board's inquiry was in the form of an "issues paper" whereby respondents were given the opportunity to comment on many broad issues in the area of capacity-related costs.

### A. OBJECTIVE

The purpose of this thesis is to examine the subjects of capacity and capacity-related costs from both a theoretical and a pragmatic standpoint to determine the feasibility and desirability of a formal standard on capacity-related costs. In addition to the feasibility/desirability question, specific subsidiary issues of the CASB issues paper will be examined with appropriate conclusions drawn and recommendations stated.

### B. SCOPE AND LIMITATIONS

The scope of the thesis will be limited by the fact that the writer is attempting to simulate, in an individual effort, the staff work of the Cost Accounting Standards Board. The Board, of course, is staffed with experts in the areas of

accounting and government contracting; therefore, any individual attempt to resolve a research question is severely disadvantaged. On the positive side, however, Mr. Paul McClenon, Project Director of the capacity-related costs project for the CASB, was extremely helpful by providing written and verbal information concerning the work of the CASB, in general, and the capacity-related costs project, specifically.

The paper, although not extremely technical in nature, does require a background in or knowledge of accounting in order to be understood properly. Government or contractor experience in contracting matters is helpful, although not completely essential, in understanding the various issues.

### C. METHODOLOGY

The methodology employed in researching the subject is basically the same as that employed by the Cost Accounting Standards Board. A reason for even considering the project was examined. Next, a literature survey was conducted and theoretical concepts extracted when they appeared to be pertinent to the issues. Included in this background material is a chapter on the CASB itself. This section is considered to be essential to the study since it is fundamentally the Board's work that is being emulated. Most importantly, the responses of industry (i.e., government contractors) to the issues paper along with the responses of government agencies and those of professors of accounting

were examined and the data analyzed. At that point, conclusions were reached and recommendations presented.

#### D. IMPORTANCE

Why is the subject of capacity-related costs worthy of consideration for action by the CASB? What condition or perceived inequity exists that warrants the considerable expenditure of time and resources to research the issues? Although not the sole cause, one factor is the current situation in the aircraft industry. This industry, which may be representative of many others essential to the military well-being of the country, contains some disturbing characteristics.

A joint DOD/OMB study report, "U.S. Aircraft Industry: Capacity Analysis and Policy Implications," was released in January of 1977. Jaques Gansler was chairman of the study group. The abstract of the report begins:

This study examined the question of overcapacity in the U. S. aircraft industry. It found there is considerable excess capacity in relation to realistic requirements. The study also indicated such excess capacity is costing the Department of Defense on the order of \$400 million per year [18, abstract].

In business terms, World War II made a market for airplanes on which the aircraft companies grew strong. After the war, the U. S. industry dominated world aircraft sales, commercial and military, for the next generation. Our national legacy from WW II was the industrial base to support the prosperity this country has enjoyed ever since. Government spending and risk tasking nurtured the infancy

of the great post war industries--atomic energy, plastics and synthetics, computers, and jet propulsion, among others. Every American benefitted in one way or another; however, Americans are still paying dearly for this prosperity. We are paying millions of dollars to maintain the unnecessary capacity in the aircraft industry [ 6 ].

Some aircraft companies have moved away from the military market. Several companies have merged (McDonnell and Douglas) and others were absorbed by huge conglomerates (North American by Rockwell, Vought by LTV, Consolidated Vultee by General Dynamics). But there are still twelve major airplane manufacturers and five helicopter companies, all bidding furiously for the available business. The problem is that America has excess aircraft production capacity. Even if two or three companies went out of business, the industry would still have abundant extra capacity for the future. As it is, the aircraft industry is roughly twice as large as it needs to be to produce all the commercial and military planes needed between now and 1990 [ 6 ]. A solution to this problem could be approached by either a reduction of approximately one-half of the aircraft companies or a diminution of the existing capacity of each company. The question, then, is whether a few large companies or many smaller ones would be more efficient.

The Defense Department, as the principal customer, pays for most of the cost of this excess capacity. Conservatively estimated, maintaining this excess eats up

\$300 million to \$500 million a year [18]. This government spending pays for unnecessary employees, for idle factories, and for inflated costs of airplanes and helicopters which are manufactured at inefficiently low production rates.

The expenditure of \$300 million to \$500 million annually of the taxpayer's money for unnecessary productive capacity certainly warrants at least an examination of the issues of capacity-related costs. There may be ample justification for a formal cost accounting standard on this subject.

## II. THE COST ACCOUNTING STANDARDS BOARD

Before determining the propriety of a standard for capacity-related costs, a general understanding of the Cost Accounting Standards Board, the promulgating agency, is appropriate. The historical background, stated objectives, and research techniques of the CASB are an integral part of any discussion concerning proposed cost accounting standards.

### A. HISTORICAL BACKGROUND

The accounting profession, primarily through the American Institute of Certified Public Accountants (AICPA) and under pressure from the Securities and Exchange Commission (SEC) and the Internal Revenue Service (IRS), has been promoting generally accepted accounting principles for many years. Generally accepted accounting principles (GAAP) are concerned primarily with reports of financial condition and the results of a company's operations for a specific period of time. Regulations of the SEC are concerned primarily with reporting to the public the financial condition of corporations, while IRS regulations are intended to implement the tax laws of the federal government. Neither GAAP nor the regulations of the government agencies provides the necessary principles for contract costing purposes.

Prior to 1970, the provisions of section XV of the Defense Acquisition Regulations (DAR) provided the only general cost accounting guidance and procedures for defense

contracting. Unfortunately, their effectiveness was impaired because (1) they made frequent references to generally accepted accounting principles and/or regulations of the IRS and (2) they lacked specific criteria for the use of alternative accounting principles and indirect cost allocation models [14]. The lack of uniformity led accounting personnel in the government to conclude that it was costing millions of dollars in time and manpower to unravel the myriad of cost accounting procedures used by the thousands of contractors performing for the government. No uniformity of accounting methods was observed, no consistency existed, and, even for those procedures which were similar, there were decided differences of interpretation for key terms used within the procedures [20].

The Cost Accounting Standards Board (CASB) was created to deal with problems of cost accounting for significant negotiated defense contracts. The CASB was intended to help the federal government and its suppliers of products and services agree on what is meant by "cost". Because prices are often negotiated on the basis of estimated costs, the Congress directed the Board to issue standards covering cost estimates for contract negotiation and for cost ascertainment during and after contract performance for the administration and settlement of contracts [9].

Vice Admiral H. G. Rickover was one of the early leaders of the movement which led to the creation of the CASB. In June 1968, the House of Representatives passed a bill

requiring the General Accounting Office (GAO) to develop uniform cost accounting standards and to recommend them to the Congress for enactment. An amendment to the bill, proposed by Senator William Proxmire of Wisconsin, also an early leader of the uniform cost accounting activity, provided that, instead of establishing standards, the GAO make a study of the feasibility of establishing standards. The compromise proposal was passed into law. The resulting GAO study was significant, and the final report showed the magnitude of the need. A growing proportion of purchases or procurements by the Department of Defense had been contracted for on a negotiated, rather than a formally advertised bid basis. In the last five fiscal years prior to 1969, an average of 86 percent of DOD procurements by contract were obtained through negotiation. Out of an average of approximately \$38 billion per year awarded for military procurements, approximately \$33 billion were committed through negotiated contracts. In fiscal year 1969, 89 percent of military procurement--over \$36 billion--was obtained by contract negotiation. In the same year, government-wide negotiated procurement represented \$46 billion out of a total of \$53 billion, or more than 86 percent [14].

It was pointed out during Congressional debate that uniform cost accounting standards were necessary mainly because of substantially increased costs of procurements and difficulties in contract administration. In a negotiated bid situation, the estimate of the contractor's cost plays

an important role in the establishment of the price. The cost accounting principles followed also have a large impact on the determination of contractor costs. In the absence of "uniform principles," evaluation of contractor practices rests entirely upon procurement officials. Procurement officials were forced to rely upon the concept of "generally accepted accounting principles" as a guide to ascertaining costs. Testimony was offered from professional accountants to the effect that one of the weaknesses of generally accepted accounting principles was that, although the alternatives for treatment of costs in the accounts were well known, the criteria for the use of each alternative had never been established or "generally accepted" [14].

The General Accounting Office report generally concluded that establishing and applying cost accounting standards would not only be feasible but would also achieve a greater degree of "conformity and consistency" in cost accounting than existed at that time. The report further concluded that detailed uniformity of practices was not a feasible objective. One area of major concern was whether the cost of implementing cost accounting standards could be justified by the benefits derived. The Congress decided, however, that a definite need for the standards existed. On August 15, 1970, President Nixon signed Public Law 91-379, an amendment to the defense production act of 1950, which authorized the creation of the Cost Accounting Standards Board [13].

The CASB has five members comprised of the Comptroller General as chairman, one member each from industry and the public sector, and two from the accounting profession, one of which must have a background in small business firm accounting problems. Membership on the Board is a part-time activity; most Board members have other full-time jobs. The Board does have a full-time executive secretary and a professional staff of approximately 25. Over half of the staff are CPA's, some have earned doctorates, and several are attorneys [ 9 ].

#### B. OBJECTIVES OF THE CASB

The primary objective of the CASB is to issue clearly stated Cost Accounting Standards (CAS) which achieve the following goals:

- (1) An increased degree of uniformity in cost accounting practices among government contractors in like circumstances.
- (2) Consistency in cost accounting practices in like circumstances by individual government contractors over periods of time.

In accomplishing this primary objective, the Board takes into account the probable costs of implementation, including inflationary effects, if any, compared to the probable benefits of such standards. A CAS is a statement formally issued by the Board that (1) enunciates a principle or principles to be followed, (2) establishes practices to be applied, and/or (3) specifies criteria to be employed in selecting from alternative principles and practices in estimating,

accumulating, and reporting costs of contracts. A standard may be stated in terms as general or as specific as necessary to accomplish its purpose [15].

### C. RESEARCH TECHNIQUES

The CASB has directed that its activities be conducted openly. Accordingly, the staff had to develop relations with government agencies, the accounting profession, and defense contractors. An important part of the staff activity was the encouragement of the accounting profession to assist the Board. Techniques for cooperative staff work were developed and proved to be quite useful.

A summarization of the process which the CASB has approved for staff development of proposed cost accounting standards is appropriate since the same general methodology will be used here in the consideration of a possible standard on capacity-related costs. The first step is the identification of a problem area. No significant staff effort is devoted to a particular topic unless the board approves that topic for further activity. Once a potential problem area has been identified, the staff engages in extensive research to determine the severity of the problem and to inquire into the likely usefulness of a cost accounting standard. Authoritative literature is examined, and consultation with knowledgeable representatives of contractors, government agencies, and professional associations is conducted. This research provides background on all relevant viewpoints.

Further investigation may vary, depending upon the situation; but every effort to obtain as much outside participation as is practicable is made at every step of the process. The Board has demonstrated a willingness to revise proposed standards in response to outside criticism. Constructive criticisms which offer alternatives to proposed Board actions are welcomed.

The analysis of the problem may help to determine whether there is, in fact, a need for a cost accounting standard and may lead to the development of a number of possible solutions. The most promising potential solutions may be tested in practical situations at contractor locations. Sometimes identified deficiencies can be corrected by modifying existing audit practices or, perhaps, better information can be made available to the contracting parties.

If the staff research, including reactions to a draft standard, shows that a cost accounting standard is appropriate, a specific exposure draft is developed for publication in the Federal Register. This exposure draft begins the official promulgation procedure. One of the strengths of the CASB procedures is that the government position is not rigidly established prior to the proposal being released to the public. The final versions of Board promulgations may contain many changes from the preliminary exposure drafts [9].

#### D. EFFECTIVENESS OF THE CASB

To date, the Cost Accounting Standards Board has promulgated standards dealing with a broad range of topics from consistency in reporting requirements to the allocation of various types of costs to final cost objectives. In addition, there are several proposed standards on indirect costs. Understandably, the Board's work has elicited a variety of reactions, both laudatory and critical.

Criticism of the work of the CASB was levied by the Aerospace Industry Association (AIA) in mid-1977 when it released the results of a survey among its members on the economic impact of cost accounting standards. The survey concluded that the savings forecast from establishment of the CASB have failed to materialize. The study cited new delays and difficulties in contracting and reduced competition for government contracts and subcontracts. The surveys also criticized the CASB for creating considerable contract administration effort without compensating benefits to the government [11].

CASB Chairman, Elmer B. Staats, defended the Board's record by pointing to the effective standards and interpretations issued at that time. Staats said that some critics of the Board, mostly in Congress, have admonished the Board for moving too slowly while others, particularly from industry, have criticized it for moving too quickly [11].

Another critic of the Board, Robert F. Trimble, assistant administrator of the Office of Federal Procurement

Policy, suggested that Congress overreacted when it created the CASB and that it would have been better for the government to

stop at disclosure and consistency requirements and improve its own internal analysis capabilities than to impose the standards we have today on private sector firms that are overregulated [11, p. 32].

Administration of cost accounting standards was cited as a major problem by the well-respected Logistics Management Institute (LMI) in a report of January 1979.

Administration covers the actions contractors must take to comply with standards, rules, and regulations of the CASB as implemented in Defense Acquisition Regulations (DAR) and also the actions DOD Administrative Contracting Officers (ACO's) must take to ensure contractors' compliance with CAS requirements.

The LMI findings indicated that the major problem in the administration of CAS's is the difficulty many ACO's experience in executing CAS requirements. Most prevalent difficulties include determining the adequacy of compliance with present and proposed cost accounting practices, the impact of changes on costs, and the significance and materiality of reported noncompliance. As a group, ACO's are inadequately prepared to make the required decisions and rely instead on the advice of DCAA auditors. The average ACO lacks the formal accounting education needed to understand the cost accounting theory and practice

embodied in the standards and has not received adequate training and guidance [19].

### III. CAPACITY-RELATED COSTS

One of the major problems in dealing with the subject of capacity and capacity-related costs is the absence of specific definitions and clearly understood concepts. A review of the current literature, however, reveals certain recurring and accepted concepts, the most pertinent of which will be examined. The discussion here will include two alternatives for the disposition of idle capacity costs. In addition, basic to an understanding of capacity-related costs is a review of the much discussed, although never resolved, controversy over variable (direct) versus absorption costing. Specific attention will be given to William J. Vatter's research report of 1969, which was prepared specifically for use in the GAO's feasibility study for adopting uniform cost accounting standards [14, p. 481-558]. Finally, the only existing rules concerning capacity-related costs, which are contained in Section XV of the Defense Acquisition Regulations, will be summarized.

#### A. TERMINOLOGY

Capacity. No simple practical definition for capacity exists. Capacity constitutes that fixed amount of plant and machinery and of personnel to which management has committed itself and with which it expects to do business [10, p. 539]. In addition to the physical aspects of capacity,

It is not merely a matter of plant size. Capacity may be expanded by construction of new plant facilities or by purchase of new equipment... Capacity may also be expanded in the short run by working additional shifts, by working overtime and on weekends, and by contracting with other companies to produce some of the necessary output... Thus capacity is established by managerial decisions as well as by physical plant limitations. However, it is defined, capacity places an upper limit on output [3, p. 173].

Capacity, therefore, contains two separate concepts: (1) the physical and human elements that constitute capacity and (2) its function as an upper limit or constraint on output.

Volume. Volume denotes business activity of some kind and is generally expressed in units of production [3].

Volume is the variable factor in business or production.

It is related to capacity in that volume or activity represents the level of utilization of existing capacity.

The distinction between capacity and volume is important because the literature revealed that a co-mingling of concepts was present during definitions of the various levels of capacity. These certain levels of capacity include the following:

Theoretical Capacity. Theoretical capacity is the maximum output of which facilities and personnel are physically capable under ideal operating conditions with no interruptions [10].

Practical Capacity. Practical capacity represents the maximum level of output that could be achieved by facilities and personnel with allowances made for unavoidable interruptions such as time lost for repairs and maintenance,

inefficiencies, set-up failures, delays in deliveries of raw materials and labor shortages and absences. These allowances reduce theoretical capacity to the practical capacity level. The reduction typically ranges from 15 percent to 25 percent resulting in a practical capacity level of 75 to 85 percent of theoretical capacity [10].

The source for the above described levels of capacity, Matz and Usry, along with several other authors also define terms such as "expected actual capacity" and "normal capacity." These terms only serve to complicate a discussion of capacity-related costs because what they really represent are volume concepts. They deal with planned levels of production or production averaged over several business cycles to eliminate peaks and valleys. Normal volume is an extremely important concept to cost accounting since that is the level at which overhead rates will be computed. The use of the computed rate will cause all overhead to be absorbed, provided normal volume and estimated expenses prevail during the period. "Expected actual volume" is a common alternative to "normal volume" for computing overhead rates.

Idle Capacity versus Excess Capacity. Idle capacity results from the temporary idleness of production facilities due to a slow-down or shut-down in production caused by a temporary lack of orders. Idle facilities are restored to use as soon as the need or demand arises. Expenses associated with idle capacity are part of the product cost.

Excess capacity, on the other hand, results from greater productive capacity than the company can reasonably expect to use. Expenses arising from excess capacity should be excluded from the factory overhead rate and from the product cost [10]. The cause and the duration of the idleness are the characteristics that distinguish idle from excess capacity. Idle capacity is caused by external happenings and should last for only a short period of time. Excess capacity connotes an indefinite or long term duration; it could also be the result of some deliberate internal management action such as the acquisition of plant and equipment for long-range expansion. The use of the term "idle facilities" in conjunction with the definition of idle capacity is unfortunate because, as discussed later in this chapter, "idle facilities" will take on a specific meaning of its own when used in Defense Acquisition Regulations (DAR). It will then be equated with excess capacity.

#### Variable Costs.

Variable costs are those costs which vary in total in direct proportion to changes in volume. Successive increases of volume result in parallel and proportionate increases in variable costs. Similarly, decreases in volume produce proportionate cost decreases [3, p. 22].

Fixed Costs. "Fixed costs remain constant in total regardless of changes in volume. They are unaffected by volume changes" [3, p. 23].

Absorption Costing. A type of cost accounting practice that assigns direct materials and direct labor

costs and a share of both fixed and variable factory overhead costs to units of production is referred to as absorption costing. This practice is also known as "full" or conventional costing.

Variable (or Direct) Costing. A cost accounting practice which charges units of production with only those costs that vary directly with volume is variable costing. Costs such as depreciation, insurance, and taxes that are a function of time are excluded from the cost of the product [10].

Full Costing. The determination of full cost, as the term is used for government contracting purposes, appears to have evolved from the usual product cost determination. After direct material, direct labor and production overhead costs have been allocated to the product or other "final cost objectives" in the usual fashion within the broad framework of generally accepted accounting principles, an additional cost allocation is performed to allocate all relevant period costs to these same cost objectives. Thus, all allowable costs incurred by the business entity are allocated through the cost accounting system. The allocation base used to allocate those period costs, frequently referred to as "general and administrative costs," tends to be some broad base such as the total of production costs [1].

#### B. AN ALTERNATE BASE FOR ALLOCATING CAPACITY COSTS

An important feature of the allocation process described under full costing is that it ignores the distinction between fixed and variable costs. Consequently, any change in the

volume of production can dramatically affect unit costs.

If output drops, fixed costs have to be spread over a smaller volume and unit costs will increase, possibly by a substantial amount. While this situation applies to any cost system that allocates fixed costs to products, the impact of such an allocation process is felt more acutely under the full cost concept. Even if a breakdown between fixed and variable costs is recognized but the fixed costs are nevertheless traced to the product as part of the full cost and therefore part of the price to the government, the problem of allocating fixed costs to products remains. Product costs and prices may be affected to a substantial degree by changes in volume [1].

There is an alternative to allocation under the full cost concept that is available under certain conditions. This alternative is based on the notion that a business entity's fixed costs represent capacity costs. The traditional method of full costing ensures that capacity costs are allocated to final cost objectives, generally on some basis related to actual production. However, the rationale behind the selection of such an allocation base can be challenged. Capacity, it may be argued, is created in anticipation of a certain volume of production; and, therefore, it may be appropriate to allocate capacity costs on the basis of expected or anticipated utilization rather than on the basis of actual production volume. There is an important qualification to the application of this

principle however; capacity can be allocated on this basis only if the potential customers can be clearly identified and some type of long term relationship can be established. Once this qualifying requirement is satisfied, it seems quite feasible to allocate the fixed capacity costs on the basis of anticipated volume and to use conventional cost accounting principles to allocate the remaining variable costs [1].

The principle of separate allocation of capacity costs on the basis of expected capacity utilization could be applied where a more or less permanent relationship is established between the buyer and the seller. For example, in certain areas of defense procurement a significant number of major defense contractors have established what appear to be long-term relationships with various procurement agencies. However, a basically radical experiment of this nature may be difficult to implement in the essentially conservative accounting environment that appears to prevail in the government contract costing area [1].

#### C. IDLE CAPACITY COSTS: TWO ALTERNATIVES

When a decision is made to incur costs of land, building, equipment and other physical attributes of capacity, that decision is made with a capacity goal in mind. The capacity goal is simply an expectation of production. In this context, some goals are reached and some are approached or exceeded; but they all imply an expected standard of output. At the beginning of production, such a standard may be used

to determine idle capacity, that portion of capacity not contributing to output. This will be an unreliable measure initially because what is expected of a facility is not necessarily what the facility is capable of producing. After some time and experience and through a continuing and dynamic process, a standard or normal output can be established. A deviation from this on the low side is one measure of idle capacity [2].

1. The Argument for Charging Idle Capacity Costs to Products

The net income of an enterprise over its lifetime is equal to total revenues less total expenditures. When resources are expended, they are categorized as expenses, assets, or losses. Expenses are incurred when money is spent for legitimate business purposes but nothing of measurable value is left behind that was not there before. Assets, on the other hand, involve the same kind of expenditure of resources; but they result in additions to business wealth in the form of inventories, facilities, or other items of value. Losses are expenditures of funds which result in no benefit, either in services or assets. If the long-range view of a business enterprise (the "going concern" concept) is accepted and an accounting view of business success (maximizing owners' equity) is also maintained, then the measure of success does not depend on any categorization of expenditures but only on the amount by which revenues exceed expenditures during the existence of the enterprise.

If the concept of matching revenues and expenditures is also accepted and because products of the firm are the only source of revenues, then all expenditures during the life of a firm (whether categorized temporarily as expenses, assets, or losses) are actually product costs. In the long term, all costs must be shared by all products; but, in the short term, the question arises as to which costs belong to which products. For example, if a plant manufactures certain products this year and anticipates manufacturing more next year, what would be a fair way to allocate the firm's advertising expenses to products? Certainly both this year's and next year's outputs derive benefit from the advertising. What is needed is a system whereby this year's production could be assigned a proper share of the cost as the products were completed. The remaining costs could reside in an asset account and be amortized to transfer such costs to future products [2].

Capacity costs are customarily distributed to products on the basis of some logical method of allocation. However, a problem of idle capacity arises when a facility or machine is idle some portion of the time. It still incurs costs at a constant rate (based on time), regardless of its lack of output. Whatever products are produced will yield the only revenues against which all the fixed costs must be matched. All of the costs of all the capacity can be absorbed only by all of the products which those costs produced, regardless of the number of products that come off the production line.

The establishment of capacity in any form is a long range decision. There must be enough capacity to take advantage of surges in demand and to accommodate a firm's expected growth pattern. Some idle capacity, therefore, has to be accepted. Everyone in business recognizes seasonal fluctuations, business cycles and rapid changes in demand. Fluctuations in capacity use do occur, and the costs are ultimately a part of aggregate product costs. In the short run, a firm must recover all variable costs through sale of its products; any excess will contribute to the absorption of fixed costs and to profit. But, in the long run, all costs, including those generated by idle capacity, must be recovered or the firm will cease to exist [2].

## 2. The Argument for Charging Idle Capacity Costs to Current Expense

Eric Kohler defines idle capacity as

unused productive potential: said of a machine, operation or plant not in use or only partially in use; it may be variously measured, as in tons of possible additional output, or in hours available for use [3, p. 223].

Idle capacity is that capacity which is not used productively at a specific time. The costs of the existence and maintenance of that unused capacity are the costs of idle capacity. If specific points in time are expanded into a period of time, the idle capacity costs are averaged because at every point in time there will likely be a different amount of idle capacity. The idle capacity costs are then period costs [2].

The cost of a product is dependent on the materials, labor, use of equipment and floor space necessary for production. If some other part of a plant were idle, there seems to be little logic in assigning any of the costs of that portion of the plant to products manufactured in the active part of the plant. Costs of idle capacity are normally higher at a time when products are difficult to sell, and prices may be lower. Since inventory cannot have a value greater than selling price, it may be impossible to assign idle capacity costs to products. The proper distribution of these excess production costs is to profit and loss. The argument here is that, while other costs are considered controllable, idle capacity costs are not controllable at the manufacturing plant level. Idle capacity costs are generally the responsibility of some part of the organization other than production. It may be sales, marketing or top management; but such costs are almost never the fault of the producing part of the company. These costs are not product oriented and should not be accounted for as product costs [2].

#### D. VARIABLE (DIRECT) VERSUS ABSORPTION COSTING TECHNIQUES

The question of whether fixed costs of production should be product costs or charged as an expense of the period in which incurred has been a controversial issue in recent years. Several agencies of the federal government with authority in accounting matters have taken action which lends considerable support to the "full absorption" method of

accounting for costs [12]. Full absorption costing is the practice of fully charging cost objectives with a proportionate share of all costs. Technically, the full absorption model describes the practice of allocating all costs of production to inventories; however, the phrase is broadening to include the allocation of all costs of all functions, including general and administrative, to cost objectives as well.

Variable (direct) costing, on the other hand, embodies the theory that fixed costs of production are costs of the period in which incurred and, as such, should be recognized as expenses during the current period. Since no direct casual or beneficial relationship can be identified between fixed costs of a period and specific cost objectives of that period, fixed costs are viewed as costs of the period in which incurred.

To date, the strongest support for the full absorption method of accounting has come from the Cost Accounting Standards Board. The CASB rationale, in short, states that the full absorption method results in the proper measure of cost for pricing purposes under cost reimbursement or cost-based contracts. The seller attempts to recover a proportionate share of all his costs, and the buyer seeks to satisfy himself that he is paying no more than an equitable portion of costs allocable to his work [12].

In the controversy between variable (direct) and full costing, the most fundamental point is the question of

whether fixed manufacturing costs are costs of the product produced or whether they are costs of the period in which they were incurred. Traditionally, accounting reports have treated them as product costs. Variable (direct) costing would treat them wholly as period costs [4].

The concept of a period cost was well explained by Charles T. Horngren and George H. Sorter:

Proponents of variable costing maintain that fixed factory overhead provides capacity to produce. Whether that capacity is used to the fullest extent or not used at all is usually irrelevant insofar as the expiration of fixed costs is concerned... As the clock ticks, fixed costs expire, to be replenished by new bundles of fixed costs that will enable production to continue in succeeding periods [7, p. 88].

The period cost concept, in essence, states that there are certain costs which, by their nature, expire with the passage of time, regardless of production activity. They are incurred for the benefit of operations during a given period of time. The benefit is unchanged by activity levels during the period and, in any event, it expires at the end of the period [4]. The period cost concept clearly conflicts with the traditional accounting view that costs attach to production and that time periods are established arbitrarily as a convenience in matching costs with revenues.

Proponents of the product cost concept argue that all manufacturing costs are costs of the product and there is no such thing as a manufacturing cost of the period. Logically, all so-called fixed production costs should be

amortized by a unit-of-output method, which would attach costs to the units those costs were intended to produce, rather than by a method based on time, which is an arbitrary measure of production. Time period amortization is acceptable only as a practical convenience, the need for which derives from uncertainty as to future operations. James M. Fremgen, in supporting the product cost concept, contended that

... in theory there is no such thing as a true period cost. All costs incurred by a firm, including non-manufacturing costs, are costs of the product. For the product of a firm is not merely a physical commodity from a production line; it is a bundle of economic utilities which include time and place as well as form. Thus, in theory, distribution and administrative costs are just as much costs of the product as are factory costs. The product is not complete until it is in a form and place at a time desired by the customer; and this product completion involves distribution just as essentially as it does manufacturing [5, p. 78].

An enterprise is not interested in capacity, as such, but in production and the consequent revenue. Capacity is merely a means to production and should be regarded as part of the cost thereof in the same way as materials and labor. According to the product cost approach, fixed costs are assigned to the product rather than the period because the product generates the revenue. The time period is purely incidental to the operations of the firm [4].

#### E. AN EXAMINATION OF WILLIAM J. VATTER'S RESEARCH REPORT

In August of 1969, William J. Vatter of the University of California (Berkeley) prepared a research report for the Comptroller General of the United States, entitled Standards

for Cost Analysis, in which he tried to establish a basis for uniformity in the basic standards for cost determination. Vatter's report was included as an appendix to the Comptroller General's feasibility study which ultimately led to the creation of the CASB.

Vatter maintained that fixed costs should not be mixed in with other kinds of costs when making cost assignments. Fixed costs should remain unassigned to any cost objectives unless it is a direct cost assignable to a single cost objective. He reasoned that this position was a logical consequence of the fact that fixed costs are typically irrelevant to short run decisions; relevant costs are those which will be affected by the decision. In all situations that do not require change in available capacity, fixed costs are unchanged by the situation and are thus irrelevant [14].

There is an increasing acceptance of the procedures whereby fixed costs are not allocated to product output and inventories. This "direct costing" approach is philosophically opposed to the conventional notion of full absorption costing, in which all costs, including fixed costs, are traced to final cost objectives. Direct costing, according to Vatter, would best be described as "variable" costing because the variable costs will include elements that are not conventionally considered to be direct costs, such as fringe labor costs, overtime premiums, power, and supplies. Variable costing treats all variable costs as assignable to cost objectives but regards fixed costs as outlays or amortizations

related to providing the capacity to produce for a time period. Capacity costs or period costs, as they are often referred to by advocates of "direct" costing, are left unassigned to products on the premise that capacity costs cannot be saved by any ordinarily feasible decision or adjustment. The only situation in which allocated fixed costs are relevant to managerial action is one in which legal or contractual obligations require such allocations as part of negotiated arrangements [14].

Even though the fixed costs of providing capacity are not relevant to managerial decisions, the facilities provided are available for any use they may serve. Any amount that may be gained from using them in a particular way is an opportunity cost of using them in some other way. If a machine can produce a contribution margin of five dollars for each hour of use on one product, it would not be advantageous to shift to another product unless a net contribution of at least five dollars for each hour can be attained. This, of course, depends upon the amount of total business that is available. When a plant is operating at less than full potential, any business that will bring in any more than the amount of variable cost incurred should be accepted. Management will seek the most advantageous sales up to its comfortable capacity level.

During contract negotiation, management will have in mind the alternative uses of the facilities to be used for that contract. Thus, any negotiated price will be at least

enough to cover the opportunity cost of the facilities to be used. This opportunity cost may be as much as the highest alternative net contribution margin per unit of capacity with the plant operating at "comfortable" (practical) capacity [14].

If fixed costs are allocated to cost objectives, they must not be mixed with other kinds of costs; they must be identified with homogeneous cost pools; and the allocations must be based on practical (normal) capacity. This would, by necessity, be less than maximum capacity to allow for down time, for maintenance and repairs, and for a small cushion for random fluctuations and emergencies.

The cost of providing capacity which is not used--because there is no desirable employment for it--is a cost of not producing. It should not be charged against any other activities or products. Separating the costs of unused facilities from the costs that may be assigned to cost objectives presents a difficult problem--that of defining capacity. What amount of facilities or services represents normal use? Equipment may be used in overtime periods if necessary; it may be put on a two or three shift basis and used seven days a week if a need exists. This will probably result in an increase in the fixed costs over that of a normal one-shift range, but it will also tend to spread or dilute those fixed costs which do not increase when the range of activity is broadened, such as the obsolescence element of depreciation. The combination of effects is merely an extension of the basic problem of keeping variable and

and fixed costs separate. If fixed costs must be allocated, they should never exceed the opportunity cost at practical (normal) capacity [14].

Vatter attacked the "fair and equitable" assignment of fixed costs to cost objectives, which many consider to be essential, as a mixing of issues. Cost measurement must be based upon objective evidence, logically and consistently analyzed and interpreted. No cost assignment should be made without a valid (statistically verifiable) justification. Fairness and equity are conditions that arise from negotiation, from ethical and motivational considerations. The purpose of cost measurement is to supplement personal judgments by measuring and determining the financial effects of activities. Rather than to cloud the measurement and logic of cost assignments with equitable considerations, Vatter contended that it is better to leave some cost items unassigned and subject to negotiation, if they cannot be assigned with statistical confidence. There is certainly no justification for sweeping any costs under a rug of capricious assignment merely because they should be assigned fairly. Negotiation should take over when measurement is impossible [14].

#### F. DEFENSE ACQUISITION REGULATIONS--SECTION XV: CONTRACT COST PRINCIPLES AND PROCEDURES

The Defense Acquisition Regulations (DAR) are issued by the Assistant Secretary of Defense (Installations and Logistics) on a continuing basis. Section XV of the DAR

contains general cost principles and procedures for the pricing of contracts whenever cost analysis is performed, for contract modifications, and for the determination, negotiation, or allowance of costs, when such action is required by a contract clause. Principles and procedures pertaining to capacity are quoted below. These definitions and concepts are necessary because of their importance to the discussion of the CASB issues paper in Chapter IV and the desirability analysis in Chapter V.

#### Composition of Total Cost.

The total cost of a contract is the sum of the allowable direct and indirect costs allocable to the contract, incurred or to be incurred less any allocable credits. In ascertaining what constitutes cost, any generally accepted method of determining or estimating costs that is equitable under the circumstances may be used, including the use of standard costs properly adjusted for applicable variances [16, p. 15:7].

#### Reasonable Cost.

A cost is reasonable if, in its nature or amount, it does not exceed that which would be incurred by an ordinarily prudent person in the conduct of competitive business [16, p. 15:7].

#### Direct Costs.

A direct cost is any cost which can be identified specifically with a particular final cost objective. No final cost objective shall have allocated to it as a direct cost, any cost, if other costs incurred for the same purpose, in like circumstances, have been included in any indirect cost pool to be allocated to that or any other final cost objectives [16, p. 15:9].

#### Indirect Costs.

An indirect cost is one which, because of its incurrence for common or joint objectives, is not readily subject to treatment as a direct cost... After direct costs have been determined and charged directly to the contract or other work as appropriate, indirect costs are

those remaining to be allocated to the several cost objectives [16, p. 15:9].

#### Facilities.

Facilities means plant or any portion thereof (inclusive of land integral to the operation); equipment individually or collectively; or any other tangible capital asset, wherever located, and whether owned or leased by the contractor [16, p. 15:25].

Idle Facilities. "Idle facilities means completely unused facilities that are excess to the contractor's current needs." [16, p. 15:25]

#### Idle Capacity.<sup>1</sup>

Idle capacity means the unused capacity of partially used facilities. It is the difference between that which a facility could achieve under 100 percent operating time on a one-shift basis less operating interruptions resulting from time lost for repairs, setups; unsatisfactory materials, and other normal delays, and the extent to which the facility was actually used to meet demands during the accounting period [16, p. 15:25].

#### Costs of Idle Facilities or Idle Capacity.

Costs of idle facilities or idle capacity are costs such as maintenance, repair, housing, rent, and other related costs, e.g., property taxes, insurance and depreciation.

The Costs of idle facilities are unallowable except to the extent that (1) they are necessary to meet fluctuations in workload; or (2) although not necessary to meet fluctuations in workload, they were necessary when acquired and are now idle because of changes in program requirements, contractor efforts to produce more economically, reorganization, termination, or other causes which could not have been reasonable foreseen [16, p. 15:25].

The costs of idle capacity are normal costs of doing business and are a factor in the normal fluctuations of usage or overhead rates from period to period. Such costs are allowable, provided the capacity is reasonably

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<sup>1</sup>DAR's definition of "idle capacity" is the same as that previously developed; however, the previously discussed "excess capacity" equates to DAR's "idle facilities."

anticipated to be necessary or was originally reasonable and is not subject to reduction or elimination by subletting, renting, or sale, in accordance with sound business, economics, or security practices. Widespread idle capacity throughout an entire plant or among a group of assets having substantially the same function may be idle facilities [16, p. 15:25].

#### IV. PRESENTATION OF RESPONSES TO THE CASB ISSUES PAPER

##### A. CASB ISSUES PAPER ON CAPACITY-RELATED COSTS

Appendix A contains the actual text of the CASB issues paper on capacity-related costs. The paper requests responses to seven different broad issues and provides respondents with the opportunity to bring up other points that should be considered by the study. The paper does not request a response as to the respondents' opinions of whether or not there is a legitimate requirements for a CAS in this area; however, that is the first issue addressed in a majority of the responses. Accordingly, that issue will be analyzed first, followed by the eight issues listed in the paper. Each major issue, including its subsidiary questions, is presented as a separate section of this chapter.

Perhaps the most important aspect of the staff research for a proposed CAS, as described in Chapter II, is the examination of all relevant viewpoints on the issue. In keeping with that procedure, the responses to the issues paper will be analyzed. Forty-three usable responses were received by the CASB--five from the academic community, five from different accounting associations, ten from various government agencies, and twenty-three from contractors in a variety of industries. All are in the form of letters to the CASB and will be identified occasionally by name; more often, however, identification will be by

the previously mentioned groupings. Often a particularly well-worded or pertinent response will be used to represent a consensus of opinion or a dissenting opinion on some issue.

Several issues elicited numerous and lengthy responses, while others received little attention. The analysis of the responses must, by necessity, be somewhat subjective because the data are of a type not subject to statistical analysis. An attempt was made to allow equal weight to each of the responses; however, this was not possible in all cases. Some of the responses did not address the issues specifically and others addressed some points but excluded others from consideration. Those respondents who addressed all of the primary and subsidiary issues, in effect, caused their opinions to be weighted more than those not offering complete responses. There seemed to be a positive correlation between the extensiveness of the response and the degree to which the respondent was involved in negotiated government contracts, although the correlation certainly could not be quantified.

B. IS THERE A LEGITIMATE REQUIREMENT FOR A COST ACCOUNTING STANDARD ON CAPACITY-RELATED COSTS?

Although not a specific issue to be addressed, many respondents made their attitudes toward the need for a CAS in the area of capacity-related costs quite clear by their prefatory or introductory remarks. Others simply offered advice or words of warning.

Dr. Robert Anthony of Harvard University suggested that the sole problem for the study was to distinguish between idle capacity costs that are properly charged to a contract and those that are not. He does not believe that a distinction between "committed costs" and "managed costs," between fixed and variable costs, or between direct and indirect costs is relevant to the problem. The Committee on Cost Accounting Standards of the American Accounting Association feared that significant measurement difficulties might occur in attempting to develop a rule based on the concept of capacity. The measurement question arose in a majority of the responses as one particular problem area. The Association of Government Accountants emphatically expressed the desire that "whatever criteria are developed concerning these (capacity) costs must make perfectly clear the firmly established applicability of full absorption costing."

The Council of Defense and Space Industry Associations (CODSIA) expressed apprehension that a standard on capacity-related costs would generate much greater administrative costs for both the government and the contractor and would foster many disputes concerning the determination of capacity for each contractor facility. A serious concern was also expressed over the nation's industrial base being capable of major production increases should the country's welfare require them. The CASB was asked not to encourage a reduction of present and possible future capacity through

a cost accounting standard, while other agencies of the government are properly planning for the use of such capacity.

Of the ten responses received from governmental agencies, three indicated a favorable attitude toward developing the standard, two were definitely opposed, and the remaining five indicated ambivalence. The two respondents in opposition were the Department of Defense (DOD) and the Defense Contract Audit Agency (DCAA). DOD indicated that it would be a serious mistake to prescribe standards relating to capacity-related costs which would require companies to change existing practices that were originally designed to meet their individual needs. In addition, DOD indicated no awareness of any significant problems relating to capacity-related costs of DOD contractors; therefore, issuance of standards in this area would be counterproductive, resulting in the incurrence of additional administrative expense and quite likely generating problems and disputes where none currently exist. DCAA was concerned with the ultimate scope and the cost/benefit aspects of the contemplated standard. Since capacity-related costs would seem to require a cost accounting system that incorporates the features of a flexible budget, at least a partial abandonment of the full absorption approach to contract costing would be necessary. Another likely requirement would be an additional type of CAS contract price adjustment based on changes in the contractor's use of capacity.

Responses containing a favorable attitude were received from the Interstate Commerce Commission and the National Science Foundation, both of which believed that it was both desirable and feasible to refine or further develop definitions for procurement and accounting concepts involving the measurement of capacity and utilization rates. Also, the Renegotiation Board believed that the resolution of the capacity-related costs issues would be beneficial to everyone concerned.

Of the 23 responses received from contractors, 22 indicated clear and emphatic opposition to the development of a standard on accounting for capacity-related costs. Although numerous reasons were cited for this opposition, several key points were of a recurring nature and are significant enough to warrant listing as a consensus opinion:

(1) The lack of objective criteria to be used for defining capacity and capacity-related costs prevent the possibility that a standard could be written which would have applicability to the wide spectrum of defense contractors.

(2) A standard to cover the topic of capacity-related costs is unnecessary. Defense Acquisition Regulations (DAR), Section 15-205.12, provide adequate workable definitions to cover varying situations.

(3) The accounting for capacity-related costs is a management concept, not a cost accounting concept, and,

by its nature, is not compatible with the full absorption concept required of government contractors.

(4) The most prevalent objection encountered was that a standard in this area would cause the accounting procedures to become unduly complex and would result in administrative costs far in excess of any benefits. In fact, most contractors failed to see any benefit to either the government or themselves.

Several responses, most notably those from major aircraft manufacturing companies, were so adamant in their opposition that the responses may be classified as hostile. One major aircraft company opined:

The prospects of a cost accounting standard which necessitates regular and recurring accounting and pricing for a separate category of costs identified as capacity-related costs has the attributes of an exercise in futility.

The inherent problems.....make it quite obvious that this research project of the CASB is destined to fall well beyond the point of diminishing return on any rational cost/benefit scale.

Any election to continue to pursue this highly theoretical concept for potential practical application in government contracting has to be classified as a pure luxury expenditure of taxpayer monies by the Board... Can we next expect to separately classify and account for day and night cost, for normal and abnormal costs, for fixed, semi-fixed, semi-variable and variable costs? All would be conceivably possible, but who really wants or needs such costly subtlety in classifications of cost for government contracting.

The same firm estimated that the costs incurred by the several segments contributing to the response to the issues paper clearly exceeded \$5,000. These remarks were selected for presentation not as representative of the entire group of responses, but as the extreme in critical content.

The single favorable response from a contractor indicated that the development and issuance of guidelines regarding the nature and behavior of capacity-related costs may prove useful to both contracting officers and contractors in consistently and fairly evaluating and resolving reimbursement issues.

#### C. WHAT IS THE CONCEPTUAL NATURE OF CAPACITY?

Does the concept of capacity apply only to manufacturing facilities? Under what circumstances does it apply to a research laboratory? To a warehouse? To service industries?

Does the concept of physical capacity of a facility differ from the concept of productive capacity of humans? If so, how? (Appendix A)

A wide range of definitions was provided by the respondents on the issue of the conceptual nature of capacity. Dominating the spectrum of ideas were two basic concepts? (1) capacity as a collection of plant, equipment and personnel and (2) capacity as an upper limit or constraint on production. In most responses capacity was believed to be measured in terms of output; however, in some cases, capacity measurement in terms of input or size was considered acceptable. Many attempts to define various levels of capacity were made. Included were definitions for theoretical, maximum, normal, probable, anticipated, expected, and actual attained capacity. Although many of the terms are different, the concepts are remarkably similar. At the risk of oversimplifying, there are really only two different levels of capacity with differing workable definitions:

(1) Maximum (or theoretical) capacity is the absolute greatest amount of output that can be achieved with a fixed amount of resources (i.e., plant, equipment, personnel, materials) being utilized at optimum efficiency. According to the responses, there is a slight variation, in concept only, as to how down-time for repairs and maintenance should be considered. Some respondents included an allowance for essential maintenance while others did not. The difference is probably immaterial since both concepts represent a theoretical level of output, one that could possibly be achieved but not over an economically meaningful period.

(2) Practical (or normal) capacity is the level of output that can be maintained over a long period of time, taking into consideration such factors as occasional breakdown, malfunction, repair time, and preventive maintenance. In the case of sequential manufacturing processes, practical capacity also takes into account any bottlenecks.

The general opinion of the respondents is that maximum or theoretical capacity has little relevance to cost accounting. Practical or normal capacity is the level from which excess capacity and idle capacity may be determined. Capacity was not considered to be a static or fixed level, since changes in capacity could be effected in a very short time simply through management action and the number of interacting variables comprising output capability.

The subsidiary issues offered little controversy. Almost all respondents concurred that the concept of

capacity applied equally to manufacturing facilities, research laboratories, warehouses, service industries and all areas of activity. Most agreed that the concept of physical capacity of a facility did not differ from the productive capacity of humans. The only significant difference was one of measurement. Humans are subject to motivation, emotions, stresses, peer pressure, and labor union agreements so that, in many circumstances, the measurement of human output (or capacity) may be so imprecise as to be meaningless.

One noticeable problem encountered in analyzing the responses to this issue, particularly those from the academic community, was the inclusion of "volume" concepts as capacity concepts. For example, expected capacity was defined as the expected output for the forthcoming accounting period. Actually attained capacity was defined as that output produced during the previous year. Both of these are definitions of volume and not capacity. A similar confusion was observed in the terminology section of Chapter III, therefore, this response was not unexpected.

#### D. HOW SHOULD CAPACITY BE MEASURED?

With respect to physical facilities, what is the appropriate level for identification of capacity? Under what circumstances should it be the business unit? Cost center? Assembly line? Is the capacity of each physical resource relevant or should capacity only be measured for groups of resources?

What business practices need to be specified (or assumed) in defining capacity? (5-day week? multi-shift? preventive maintenance policy? prevalence of overtime?)

What circumstances determine the appropriate unit of measure? (e.g. machine hours, units of output?) How about unit of measure for capacity of human resources? (Appendix A)

As with all issues dealing with measurement, there were few responses in agreement on any particular point. In answering what is the appropriate level for identification of capacity, the responses ranged from "the smallest integral unit capable of producing an end product or service" to "the integrated corporate level". For those respondents utilizing the terminology of the issues paper, approximately equal numbers indicated a preference for the "business unit" and the "cost center" as the appropriate level of identification. The most often mentioned idea was that it was dependent solely on the individual circumstances. Each industry or even each company within an industry is unique and requires specific sets of criteria in order to measure capacity accurately.

A similar situation existed concerning what business practices needed to be assumed in defining capacity. The typical response was that a five-day week, single-shift operation with a standard maintenance schedule and some predetermined allowance for non-productive time was the appropriate base. However, most responses also included a provision that an alternate base be used for those industries or companies that utilize significantly different practices such as a blast furnace operation or an oil refinery which operates on seven-day weeks and 24-hour days. One obvious area of confusion appeared throughout

the discussions on capacity measurement: the use of the term "generally accepted business practices." This is exactly the type of terminology that needs to be avoided because it is so imprecise. One response which offered perhaps a better description, although the actual determination problem would be just as great, was "business practices that result in optimum lowest cost [per] unit of production." The most practical suggestion was offered by DCAA--a contractor's disclosure statement could be used to describe the conditions assumed for levels of capacity. The disclosure statement is required of major contractors and requires a description of the cost accounting procedures used by the company.

The appropriate unit of measure for capacity was generally agreed to be the unit of output for a particular process or firm; however, it was recognized that such a measure only applies when the output is homogeneous (i.e. tons of steel, barrels of oil). In the case of a multi-product firm, some other common denominator must be obtained. Direct labor hours, machine hours, or total dollar value of production are potential capacity measures, depending entirely on the individual operation considered. The unit selected must be the one that is most representative of productive operations.

The measurement of capacity of human resources was not considered by most respondents to be a meaningful concept. The notion of man-hours or direct labor hours

was considered to be a useful measure of human production but only when applied to repetitive, routine functions, such as assembly line work. Man-hours or labor hours were not a significant measure for management functions, research efforts, and other similar processes involving more complex applications of human effort.

E. HOW ARE COSTS (DIRECT AND INDIRECT) LINKED TO CAPACITY?

Over what time span should capacity be considered to be fixed?

How do you determine which specific costs are linked to capacity?

What happens if utilization differs from that which was expected?

How can capacity-related costs be treated under a full absorption concept? Under what circumstances should idle plant costs be distributed to production? What are the alternatives? (Appendix A)

The meaning of this particular issue was not interpreted in the same way by a majority of the respondents. Most failed to offer any general comments and answered only the subsidiary issues. Those who did respond to the general issue indicated that costs were linked to capacity but that a distinction between direct and indirect costs was not relevant to the determination of capacity costs. The relevant distinction was between fixed and variable costs, although few contractors chose to use those terms. Instead, most defined capacity costs as those encountered in providing and maintaining the physical facilities and providing whatever additional resources (equipment, manpower, materials) were necessary to operate a business entity. A significant

number of contractors indicated that capacity costs were those that did not vary with changes in production or activity. This coincides precisely with the definition of fixed costs previously discussed in Chapter III. There is no implication that fixed costs and capacity costs are identical but rather that capacity costs are sub-set or sub-category of fixed costs. Certainly a firm may incur costs of the fixed variety which are in no way related to capacity. Very few contractors offered a listing of specific costs which comprise capacity costs, but those who did included only basic items such as depreciation of plant and equipment, rent, insurance, and taxes. In analyzing the responses to this issue, there is an inference that "capacity costs" was not a normal category in the respondents' cost accounting systems. Many indicated that such a categorization of costs had little if any significance.

The time span over which capacity should be considered fixed was judged to be any period in which resources and business practices remain relatively unchanged. Of those respondents offering a specific answer, one year or one complete cost accounting period was considered appropriate.

The determination of which specific costs are linked to capacity was most popularly accomplished by examining the behavior of the costs involved. Those that do not vary with less than major changes in production are capacity costs. A slight variation of the same concept was that costs which require a time lag for adjustment in the level

of expenditure after a substantial volume change are related to capacity. The basic message is the same one mentioned earlier: Capacity costs are fixed costs.

Few respondents viewed a difference in utilization from that which was expected as a problem. Variable costs will automatically adjust to a level determined by the actual utilization. Fixed costs will presumably remain at budgeted levels and the variances generated by the over or under application of fixed overhead costs must be equitably allocated to appropriate cost objectives. Other CAS's prescribe the procedures for accomplishing the disposition of variances.

Since a majority of contractors did not identify capacity-related costs as a separate category and did not desire to do so, capacity-related costs can be allocated to final cost objectives either directly or indirectly through the use of cost pools in the same way as any other fixed cost. The allocation must be made on some appropriate measure of activity. Again, adequate regulations exist to prescribe the accomplishment of the allocation under the full absorption concept.

The questions of if and how idle plant costs should be distributed to production become complicated by the absence of specific definitions. Those costs associated with idle capacity, earlier defined as facilities temporarily idle because of a lack of orders and later determined by DAR to be allowable as a charge to government contracts, are a

normal cost of business and should be charged to production. There were no dissenting opinions on this particular issue. Most respondents agreed that the costs of excess capacity, or what DAR designated as idle facilities (greater productive capacity than the company could reasonably expect to use), should be charged to production as a normal cost or allocated to special overhead pools for ultimate allocation to all final cost objectives. Most contractors agreed that DAR, Section 15-205.12, provided adequate regulations for the handling of the two types of idle plant costs.

The only additional point of significance raised with respect to this issue was that of standby capacity. It was suggested that standby capacity, which is actually excess capacity maintained for the convenience of the government in the event of national emergency, be treated as idle capacity. One respondent suggested that Congress should subsidize, through appropriations, standby capacity in critical industries. Another suggested that standby capacity costs be deferred to future production. Regardless of the particular point of view, most respondents saw the critical issue as one of allowability of these costs and not allocability. As such, it was a subject for negotiation with procurement officials and not for a CAS.

F. WHAT ARE THE ADVANTAGES AND DISADVANTAGES OF INTRODUCING THE CONCEPT OF FIXED COSTS TO CONTRACT COSTING?

Are they the same as capacity-related costs? What types of cost could be considered "fixed" for contract costing? Are all direct costs variable?

Under what circumstances could the parties agree on a "fixed" portion of each significant indirect cost pool?

Does an activity which is carried on at a fixed level without regard to changes in production levels (possible example: research laboratory) represent a fixed cost? (Appendix A)

Few respondents, particularly the contractor's group, could cite any advantages to introducing the concept of fixed costs to contract costing. Most contractors believed that it would only result in increased administrative expense and create more disputes during contract negotiations. Many believed it to be impractical because of the lack of a clear distinction between fixed and variable costs. Costs are generally neither fixed nor variable, even within fairly narrow ranges of volume. Many companies cited the fact that, in the long run, all costs were variable. DCAA believed that introducing this concept would add confusion to a fairly stable area of understanding and would be an act of replacing the present full absorption costing approach. Several contractors also felt that such action would be an abrogation of the full costing concept to which the CASB is committed.

The few advantages listed were that the action could facilitate negotiations of overhead rates because the effect of volume on costs would be clearly indicated and that the identification of idle capacity costs would be possible and, thus, would permit a periodic review of the need for various sources of capacity.

The responses indicated that capacity costs are a sub-set of fixed costs, as was previously discussed. There was divided opinion on whether all direct costs are variable. Some said they were but a majority believed that the two terms were different types of classifications of costs. "Variable" denotes cost behavior with respect to changes in volume or activity. "Direct" denotes a cost that is applicable to a single cost objective rather than

multiple cost objectives. Most respondents concurred that contracting parties could agree on a fixed portion of each significant indirect cost pool if the agreement was mandatory for the contracting process. Most believed that agreement would be difficult to reach and would complicate the negotiation process.

The overall response to this issue of introducing the concept of fixed costs to contract costing was negative, indicating a belief that the costs of implementation would far exceed any benefits realized.

G. WHAT IMPACT ON CONTRACT PRICING TECHNIQUES COULD BE EXPECTED IF CAPACITY-RELATED COSTS WERE WELL IDENTIFIED?

If a specific level of capacity utilization could be forecast, would it be feasible (desirable?) for the parties to agree on a predetermined share (or amount) of capacity-related costs for the contract, without regard to actual capacity performance?

If the contract's portion of fixed cost were thus predetermined, what would be the implications as to entrepreneurial risk-taking and therefore as to weighted guidelines for profit objectives? (Appendix A)

The impact on contract pricing techniques as a result of identifying capacity-related costs was judged by the respondents to be minimal or adverse. As might be expected, the adverse responses were primarily from the contractor's group. The general opinion of the group was that it was feasible but not desirable for the contracting parties to agree to a predetermined share of capacity-related costs for the contract. Common reasons cited were that (1) difficulties would appear in properly identifying which specific costs were capacity-related (fixed),

(2) the forecast of capacity utilization would be difficult to make with accuracy, (3) this type of treatment would make negotiated contracts the same as firm, fixed-price contracts, and (4) current contract pricing techniques are adequate and no new CAS is needed. The governmental agencies' and accounting associations' responses were less negative in tone but generally reflected the opinion that the impact on pricing technique would be minimal. The major reason cited was that procurement and audit activities should already be aware of the difference in capacity (fixed) costs and variable costs. A major problem area cited was the added administrative burden and expense to all contracting parties as a result of the identification and forecasting process. Several respondents questioned the propriety of the CASB delving into pricing matters, apparently thinking that it was a procurement policy, not an accounting, issue.

The subsidiary issue of the implications as to entrepreneurial risk-taking and weighted guidelines for profit objectives revealed a surprising dichotomy of opinion. The respondents generally supported the contention that weighted guidelines for profit objectives would require adjustment, but opinion was divided on whether contractor risk would be increased or decreased. Most non-contractor responses supported the notion of decreased risk to the contractor. Respondents did not elaborate on their reasoning in arriving at a particular opinion.

The problems cited by contractors concerning difficulties in identifying capacity-related costs and forecasting capacity utilization were contradicted somewhat by a small minority of contractor respondents who indicated that: (1) fixed amounts and ceilings are concepts already in use for other types of contracts and (2) the use of predetermined levels of capacity was a concept already in use by many firms in the development of standard costs. The minority opinion appeared to suggest that the concept of fixed cost identification is really not as foreign as many contractors indicated in their responses.

H. HOW SHOULD PRESENT DEFINITIONS AND POLICIES BE CLARIFIED OR IMPROVED?

What are the practical techniques appropriate to identify the point at which idle capacity becomes so widespread as to warrant identification as idle facilities?

What is the concept of "standby" capacity or facilities? How is this best distinguished from idle capacity and idle facilities?

What suggestions do you have with regard to definitions?

What changes should be made in costing concepts with respect to capacity-related costs? (Appendix A)

The issue of how present definitions and policies should be clarified or improved is so broad that one might expect a wide variety of responses. Surprisingly, with the exception of definitional variations, the responses were much in agreement. To the central issue, the responses, particularly from the contractors' group, indicated satisfaction with the definitions contained in DAR, Section 15-205.12 and Section 15-205.42. They saw no need to alter or add to the definitions and concepts presently in

use. Only when addressing the subsidiary issues did the respondents provide new or additional definitions for capacity costs.

To the subsidiary issue of when does idle capacity become so widespread as to warrant identification as idle facilities the responses overwhelmingly indicated that it was strictly a matter of judgement and that it must be determined by the contracting parties involved for each individual case. There are no universally applicable techniques which are appropriate under all circumstances. A few specific answers were provided, such as the one from DOD, which specified that any of the following conditions should exist in order for idle capacity to be designated as idle facilities: (1) a facility is completely unused, (2) no current need for a particular facility can be demonstrated, (3) a facility has been sub-let, rented, or abandoned, or (4) a facility has been excluded from a regular maintenance schedule. One contractor offered a time for consideration by stating that unused facilities in excess of a contractor's needs for a period of one year should be designated as idle facilities. It was apparent that the respondents recognized and utilized the term idle facilities as defined in DAR, Section 15-205.12, which is the same as excess capacity discussed in Chapter III.

The concept of "standby" capacity or facilities was the sub-issue that offered the greatest diversity in responses. The concept seemed to be understood almost unanimously but

was defined or expressed with slight variations. The basic concept was that standby capacity or facilities were represented by assets either withdrawn or withheld from regular usage and retained for use as replacements or additions during breakdowns, emergencies, or other unusual circumstances. For some, the term standby connoted probable or anticipated future use; for others, it suggested a back-up or ready replacement status. Some respondents considered standby capacity to be idle capacity that had been designated by management to be available for use on short notice. Whatever particular variation of the concept was used, standby capacity costs were considered to be costs of production and proper charges to contracts. Standby capacity was generally considered to be a part of idle capacity, although it was maintained intentionally rather than through unplanned circumstances.

A large majority of respondents suggested that the DAR definitions of idle capacity and idle facilities were adequate and that no changes were necessary. Most saw no need to introduce the concept of standby capacity or facilities. The same large majority of respondents saw no reason to change the costing concepts with respect to capacity-related costs. One worthwhile suggestion was offered by DCAA--to provide illustrations for determining what is idle capacity and what are idle facilities.

I. HOW SHOULD CAPACITY-RELATED COSTS BE CONSIDERED WHEN IDLENESS IS OCCASIONED BY EXTERNAL HAPPENINGS SUCH AS CONTRACT CANCELLATIONS OR DELAYS CAUSED BY A CUSTOMER, STRIKES AND NATURAL DISASTERS?

Should capacity-related costs be defined to include only the costs directly related to physical elements of capacity (such as maintenance, repair, housing, rent, property taxes, insurance, and depreciation) or to include salaries normally included in various indirect cost pools? In what way, if any, does the cause of the idleness influence the decision?

For cancellations and delays what consideration should be given to the availability of other work which could have used the capacity? Is there a difference between commercial and Government customers in this regard? (Appendix A)

Respondents, both contractor and others, generally agreed that the cost of idle capacity should be borne by the customer in the case of cancellations and customer caused delays. Idle capacity caused by strikes and natural disasters, most agreed, should have the cost allocated to all cost objectives involved. Several non-contractors objected to the government paying an abnormally high share of costs not resulting from government action (i.e., strikes, disasters, or other normal business risks).

Respondents were not in agreement as to what constituted capacity-related costs. Some indicated a preference for including only the physical elements of capacity (such as maintenance, repair, rent, taxes, insurance, and depreciation); however, a majority preferred to include both human and physical elements. This implies that salaries normally included in indirect cost pools are also capacity-related costs. The cause of the idleness has no bearing

on the determination of capacity-related costs, only on who bears the costs.

Most respondents agreed that, when cancellations or delays occur, the contractor should promptly take all reasonable action to mitigate the adverse cost effect. This includes finding alternate uses for resources (capacity), including the acceleration of back-log work to absorb idle capacity. Such action should be taken regardless of whether the customer causing the cancellation or delay is from the government or commercial arena.

The contractors group, predictably, indicated in many responses that this whole issue was one of procurement policy, adequately covered by existing regulations. They saw no need for the CASB to concern itself with allowability of costs.

#### J. WHAT OTHER POINTS SHOULD BE CONSIDERED?

As indicated in the covering letter, this paper represents a preliminary exploration by the CASB staff. The staff will appreciate your suggestions as to additional issues which should be considered in connection with capacity-related costs. (Appendix A)

Very few respondents provided other issues to be considered. The general response was that the issues paper was too broad and diverse already and that they had nothing to add. In order to provide as complete a representation of the responses as possible, the additional issues that were provided will be listed but without analysis or comment. No recurrence of any particular issue was observed.

(1) The question of the volume at which indirect cost allocations should be set.

(2) DCAA suggested a standard on "Accounting for Costs During an Abnormal Production Period," which would cover both excess capacity costs and other cost allocation problems peculiar to contract delays, disruptions, and terminations.

(3) Treatment of capacity-related costs in establishing standard overhead costs.

(4) The product mix of a business unit and the commercial, fixed-price, and other government business impact.

(5) Retention of idle capacity or idle facilities for use in periods of national emergency.

(6) Accounting treatment of losses resulting from write-downs of idle facilities to realizable value.

(7) Desirability of maintaining a reasonable level of idle capacity.

(8) Phase-down costs (i.e. severance costs, reduction-in-force costs as a result of over capacity from one contract period to another).

Item (1) from the above list was submitted by an accounting professor, item (2) from DCAA, and items (3) through (8) by contractors. Six other contractors used this issue to reiterate the fact that they saw no need for a CAS on capacity-related costs.

## V. CONCLUSIONS AND RECOMMENDATIONS

In order to reach a reasonable conclusion on the original research objective (the desirability and feasibility of a formal cost accounting standard on capacity-related costs), an analysis of two separate decisions is necessary. First, the desirability question must be addressed. What benefits would accrue to the contracting parties if a standard were developed? Would it promote the CASB's objective of increasing uniformity and consistency in accounting and, thereby, improve understanding and communication, reduce the incidence of disputes and disagreements, and facilitate equitable contract settlements? [15] Is this an appropriate subject for the CASB to be contemplating as a formal standard? These are the kinds of questions that must be considered in connection with the desirability analysis. Next, a feasibility analysis is appropriate. Even if it can be determined that good reasons exist for the development of a standard, the question of whether or not a standard can be written to accomplish the objective must be answered. The potential problems of implementation, precise definitions and measurement of capacity and costs, must be considered. The costs of developing and implementing a standard on capacity-related costs must be weighted against the benefits that may be provided. Certainly, no quantitative cost/benefit analysis is possible, but a subjective analysis is appropriate.

The analysis of the basic research question is complicated significantly by several factors:

(1) The impetus or vehicle for the research, the CASB issues paper, deals with many, not necessarily related, subjects ranging from specific to very general.

(2) The issues paper deals with many subjects that are beyond the scope of cost accounting and are specifically in the area of procurement and contracting policy. Many issues addressed appear to be concerned with "allowability" rather than "allocability" of costs for government contracts.

(3) Many respondents provided information to the issues paper that clearly indicated that they were looking at something more than a possible change in their accounting procedures. Rather, they viewed the proposal as something that could affect future contract negotiations and even profit margins on future negotiated contracts.

(4) The largest single obstacle to the analysis, which will be discussed in more detail later, is the consideration of the various issues while remaining within the framework of the full absorption costing approach, which existing contracting regulations require. The CASB, of course, is also committed to full absorption costing.

#### A. DESIRABILITY ANALYSIS

Why would the CASB want to develop a formal standard on capacity-related costs? What objectives would be served by the standard? Although the CASB issues paper on capacity-related costs addresses a wide spectrum of ideas, two basic concepts are dominant and warrant listing as the primary issues involved in the establishment of a standard:

(1) The measurement of capacity and the determination of the costs of that capacity. Included in measurement of capacity is the designation of unused capacity as either idle or excess.

(2) The introduction of the concept of fixed and variable costs in costing government contracts. This is a basic concept in cost accounting but one that traditionally has been ignored in government contract costing.

Concern over the measurement of capacity and its associated costs is undoubtedly driven by interest in conserving the financial resources of the federal government. The Gansler report discussed in Chapter I cited the magnitude of the problem--the government payment to contractors of \$300 to \$500 million annually for excess capacity in the aircraft industry alone [18]. No one knows what the amount might be if all industries were considered. The expenditure of funds for unnecessary capacity in a time of spiraling costs and huge deficits in government spending should be of concern to government procurement officials. Few could argue against the idea that those funds could be well spent in other areas, if they were made available. There is certainly no implication that some amount of capacity in excess of current requirements in industries vital to the well-being of the country is not necessary. The point remains that excess capacity and its associated costs need to be identified so that a conscious decision can be made as to whether or not the government will support the excess capacity. The method of how the excess capacity will be supported--either through high-level government procurement policy or congressionally

approved subsidies--is not as important as the fact that the information necessary for decision making could be derived.

The respondents to the issues paper strongly indicated that a CAS was not necessary and that no problems really existed so as to require a standard. From the contractors' standpoint, this is perfectly understandable, because they could see the issues paper leading to action that would eventually have an adverse effect on corporate profits. No one could expect support from those who could see no benefits for themselves but only reduced profits. The fact that only minimal support for a standard was received from the government agencies which responded to the issues paper was not quite as predictable. The DOD response relating to capacity-related costs was particularly significant, since the Gansler report singled out DOD as bearing the majority of the excess costs of the aircraft industry. Of course, many of the reasons for opposition or lack of support for a CAS stem from feasibility or implementation considerations, problems which will be discussed later in this chapter.

Many respondents to the issues paper objected to a standard on capacity-related costs on the basis that it was unnecessary because DAR provided adequate workable definitions to cover varying situations. However, an examination of the applicable sections of DAR reveals fairly general definitions and concepts. It does contain a basic policy that costs of idle capacity are allowable as contract

costs while costs of idle facilities are not. However, the definitions cannot really be classified as workable. There are no criteria for the measurement of capacity, no specific distinction between idle facilities and idle capacity, and no guidelines or illustrations for the determination of costs to be associated with capacity. The DAR provisions appear to be very general guidelines, and the allowability of capacity-related costs requires negotiations between the contracting officer and the contractor for each individual contract. Although the issues paper did not specifically address the issue of contractor recovery of capacity costs, an inference was drawn that the contractors were recovering all of their capacity-related costs by allocating those costs to final cost objectives, including government contracts. Most contractors indicated that they were aware of the provisions of DAR that disallowed costs of idle facilities (excess capacity) as a contract cost; however, the responses to the question of how idle plant costs should be distributed to production indicated that they were fully allocable either directly or through some special overhead pool. This was interpreted to mean that contractors were not absorbing any capacity costs but were recovering them under the full absorption concept. The conclusion must be drawn that the DAR does not contain adequate provisions to provide for the proper cost accounting to make the necessary decisions concerning capacity-related costs. Something more

is needed, and a CAS is, potentially, an appropriate vehicle to provide the necessary cost accounting information.

The introduction of the concept of fixed and variable costs is really a separate issue from the measurement of capacity; however, it is really a prerequisite if the costs of capacity, including excess and idle capacity, are to be determined. The introduction of this concept is certainly not a revolutionary idea. The Vatter study, which was prepared for use with and included in the GAO feasibility study for adopting uniform cost accounting standards, strongly advocated the distinction between fixed and variable costs. His contention that cost measurement should be based upon objective evidence, that cost assignments should be made only when statistically verifiable, and that equity and fairness considerations have no place in measuring costs are just as relevant today as they were in 1969 when the report was prepared. His contention that it is better to leave some costs unassigned to final cost objectives and subject to negotiation, if they cannot be assigned with statistical confidence, is extremely appealing when considering the subject of capacity-related costs [14]. Why not identify and assign to final cost objectives (contracts) those costs which can be measured? And why not negotiate some appropriate portion of the contractors' capacity costs rather than cloud the issue by allocating fixed costs to final cost objectives and having volume changes or fluctuations significantly affect the unit costs? Contracts are already subject to negotiation;

therefore, negotiating a government payment for capacity costs rather than having those costs buried within the product cost through some arbitrary allocation process seems quite logical. The only major obstacle to such an approach is that it is contrary to full absorption costing, which is the concept in use for government contract costing and to which the CASB is committed. There is no intention here to conclude that the variable (direct) costing technique is superior in all aspects to the full absorption technique. That controversy has remained unresolved for many years and will likely continue unresolved for many more. The discussion of these two costing techniques, as contained in Chapter III, shows that either is perfectly logical when considered individually and neither is necessarily superior to the other. There are numerous proponents of both concepts. The important consideration seems to be the use for which the information is intended. Management should be aware of the alternatives available in cost accounting techniques and use whichever is most advantageous for its purposes. In the case of contract costing, the federal government has selected the full absorption costing technique; however, the variable costing technique, with its distinction between fixed and variable costs, might have some advantages.

To demonstrate some of the accounting alternatives that would be available and some of the effects on overall contract costs that identification of capacity and

capacity-related costs would allow, consider the following example, which, by necessity, contains a number of simplifying assumptions.

Assumptions:

(1) A contractor produces output solely under negotiated government contracts.

(2) A CAS on capacity-related costs provides the criteria to establish the following capacity levels, volume levels, and costs.

Annual capacity costs total \$10 million.

Fixed costs are applied to production based on direct labor hours (DLH).

Capacity is measured by direct labor hours (DLH).

	<u>DLH</u>
Theoretical (maximum) capacity	1,300,000
Practical (normal) capacity	1,000,000
Normal volume	750,000
Budgeted (expected actual) volume	500,000
Actual volume	500,000
Excess capacity (practical capacity less normal volume)	250,000
Idle capacity (normal volume less budgeted volume)	250,000

Accounting Alternative #1: Fixed (capacity) costs applied to production based on expected (budgeted) volume. This is the preferred allocation based in accordance with proposed CAS 419.

Fixed overhead rate = \$10 million ÷ 500,000 DLH = \$20/DLH

Actual production = 500,000 DLH  
 Overhead rate x \$20 /DLH  
 Overhead applied \$10,000,000

Variance = 0

Government share of capacity costs = \$10 million

(Note: If actual volume were less than budgeted volume, a volume variance would be generated and would be applied to final cost objectives in the same proportion as the original allocation of fixed costs.)

Accounting Alternative #2: Fixed (capacity) costs applied to production based on normal volume.

Fixed overhead rate = \$10 million ÷ 750,000 DLH = \$13.33/DLH

Actual production = 500,000 DLH  
 Overhead rate x \$13.33/DLH  
 Overhead applied \$6,666,667

Volume variance = \$10 million - \$6.67 million = \$3.33 million

(Note: Volume variance applied to final cost objectives in the same proportion as original allocation of fixed costs.)

Government share of capacity costs = \$10 million

Accounting Alternative #3: Fixed (capacity) costs applied to production based on practical capacity. Volume variance for idle and excess capacity allocated to final cost objectives.

Fixed overhead rate = \$10 million ÷ 1,000,000 DLH = \$10/DLH

Actual production = 500,000 DLH  
 Overhead rate x \$10/DLH  
 Overhead applied \$5,000,000

Idle capacity variance = \$2.5 million  
 Excess capacity variance = 2.5 million

(Note: Both idle capacity variance and excess capacity variance allocated to final cost objectives.)

Government share of capacity costs = \$10 million

Accounting Alternative #4: Fixed (capacity) costs applied to production based on practical capacity. Volume variance for idle capacity allocable to final cost objectives, volume variance for excess capacity not allocable.

Fixed overhead rate = \$10 million ÷ 1,000,000 = \$10/DLH

Actual production = 500,000 DLH  
 Overhead rate x \$10/DLH  
 Overhead applied \$5,000,000

Idle capacity variance = \$2.5 million  
Excess capacity variance = 2.5 million

Government share of capacity costs = \$7.5 million

Accounting Alternative #5: Fixed (capacity) costs applied to production based on practical capacity. Neither volume variance for idle capacity nor excess capacity allocable to final cost objectives.

Fixed overhead rate == \$10 million ÷ 1,000,000 DLH =  
\$10/DLH

Actual production	=	500,000	DLH
Overhead rate	=	$\frac{\$10}{DLH}$	
Overhead applied	=	\$5,000,000	

Idle capacity variance = \$2.5 million  
Excess capacity variance = 2.5 million

Government share of capacity costs = \$5 million

Accounting Alternative #6: Fixed (capacity) costs are not applied to production; they are negotiated.

Government share of capacity costs = negotiable

The preceding accounting alternatives are not intended to represent all possible alternatives but only those in common use and those that could be used if a functional CAS could be developed. Alternative #1 represents the simplest and most direct method of allocating fixed costs. As long as actual volume equals expected volume, all fixed costs are allocated directly to final cost objectives and no variance exists. Alternative #2 basically is the same concept except for the introduction of a volume variance because actual volume is less than normal volume. Neither of the first two alternatives even considers total capacity, and both charge the government for all fixed (capacity) costs. Starting with alternative #3, capacity is recognized as a basis for allocating capacity costs and, in the example, the variance increases significantly. However, alternative #3 uses the

full absorption costing approach; and the government's share of the capacity costs remains unchanged. One advantage of this alternative is that idle capacity and excess capacity costs are, at least, identified. Alternative #4 adds the procurement policy decision that costs of excess capacity are not allowable as contract costs and, therefore, reduces the government's share of capacity costs by \$2.5 million. Alternative #5 represents the most extreme position in favor of the government and provides the government's lowest share of capacity costs. This alternative allows contractors to recover capacity costs for only that portion of capacity currently utilized. Alternative #6 was included as the alternative suggested by the Vatter study. The important point is that alternatives 3, 4, 5, and 6 are not possible without the information contained in the assumptions--information that is not available presently under the existing cost accounting procedures required of contractors and will not be available unless a CAS can be written that will allow the determination of the necessary capacity levels and costs. Whether or not the CAS can be written and implemented is the subject of the feasibility analysis in the next section, but, at least, the questions of benefit to the government and the propriety of the CASB dealing with the subject have been addressed and answered favorably in some respects. The benefit to the government is a potential savings of millions of dollars annually in excess capacity costs, and it appears to be perfectly

proper for the CASB to write a standard that would provide the appropriate cost accounting data to permit contracting officers to enforce the provisions of DAR. However, it is extremely doubtful that the CASB objectives of improved understanding and communication, reduced incidence of disputes and disagreements, and equitable contract settlements would be accomplished by a standard on capacity-related costs. In fact, the responses to the issues paper indicated that such a CAS would have just the opposite effect. There were really no potential benefits for the contractors identified in this study.

#### B. FEASIBILITY ANALYSIS

The determination of the feasibility of developing a CAS on capacity-related costs is a highly judgmental process, because the benefits must be weighted against the costs and neither benefits nor costs can be quantified. The feasibility question will, with some exceptions, have to be answered by relying heavily on the responses to the issues paper. Information in Chapter III on capacity-related costs is important to the consideration, but most of that information is theoretical in nature. It is important because it provides a background and offers different perspectives on various issues. However, it is the responses to the issues paper that provide the best available information on the specific issues of capacity-related costs and government contract costing. In analyzing the responses, it must

be kept in mind that contractors and contracting officers have different objectives and that the responses were generally provided from a particular viewpoint. It would be too much to ask that all respondents be completely objective in their responses.

The feasibility question has several important factors, the most significant of which are the measurement problems that are anticipated by many of the respondents. A majority of the respondents, both contractor and others, did not believe that a standard could be written that would have applicability to the wide spectrum of defense contractors. The difficulty is not in developing adequate conceptual definitions for capacity levels and capacity costs. Although differences and variations exist, those could be resolved fairly easily. The definitions developed in Chapter III could serve appropriately. The problem arises when an attempt is made to quantify a specific defined level, such as practical capacity. It is subject to too many variables to be measured like the volume of a container. Capacity is not static; capacity places an upper limit on production but only as long as all conditions are fixed. Additional shifts, overtime, the contracting-out of work, and other actions can affect capacity. Added to those problems is the human element of non-specific productive capacity.

Establishing a quantitative level for capacity is difficult enough, but not nearly difficult as distinguishing

between idle and excess capacity. More questions than answers appear when those two concepts are considered. Excess capacity was defined earlier as greater productive capacity than the company can reasonably expect to use. The term "reasonably" implies that judgement or negotiation must be employed to measure excess capacity. The problem with designating unused capacity as either idle or excess is that future demand for a company's products is a factor in the determination process. Suppose, for example, that a company expands its facilities in anticipation of increased demand for its products. But suppose also that the increased demand is not realized or that the increase was less than expected. Is the unused capacity to be designated as idle or excess? The company would be justified in classifying the unused capacity as idle if the idleness is considered to be temporary and the increased demand will eventually be realized. If, on the other hand, there is uncertainty as to whether the increased demand will ever be realized, then classification as idle or excess capacity becomes a matter of judgement; and either alternative might be defended.

An almost insurmountable problem seems to exist when considering developing a CAS that would enable an accurate measurement of capacity for all companies. Each industry is different and each company within an industry is unique with respect to operating practices. Each would require specific sets of criteria in order to measure capacity accurately. Obviously, developing specific criteria for

each government contractor is impractical because of the large number of companies involved. The only reasonable choices are either no standard at all or one that is worded in such general terms as to provide no real guidance in individual cases.

Not quite as severe as the capacity measurement problem is the issue of cost determination. Most companies already distinguish between fixed and variable costs, direct and indirect costs, and other classifications of costs. The use of flexible budgets, standard costs and the variable (direct) costing technique for management use is not uncommon in industry. All of these uses require a distinction between fixed and variable costs and some understanding of capacity costs. Although the contractors expressed some valid objections to introducing the concept of fixed costs to contract costing (such as the lack of a clear distinction between fixed and variable costs), the concept is so widely understood and utilized in cost accounting systems that it is suggested here that those objections may have been exaggerated.

One area that might present significant difficulty is the association of capacity costs with various levels of capacity. In the example used in the desirability analysis, there was an implied assumption that the relationship between capacity and capacity costs was linear. The assumption was that if capacity costs for 1,000,000 DLH was \$10,000,000, the appropriate share of capacity costs

for \$750,000 DLH was \$7,500,000. This linear relationship is not likely. It is more likely that the costs to provide capacity of 750,000 DLH would be less than the cost of providing 1,000,000 DLH of capacity, but not proportionately less. Twenty-five percent less capacity might result in five to ten percent less costs. Of course, the situation would vary with each individual production facility. It is doubtful that a standard could be written that would allow for the accurate measurement of the costs applicable to the various levels of capacity.

Another consideration for the development of a standard is whether or not the principle of full absorption costing for government contracts is to be rigorously adhered to in the future. This really is not as much a feasibility consideration as it is one of practicality. If all costs are to be allocated to final cost objectives, then, as was demonstrated in the accounting examples, the government's share of capacity costs is the same. As was stated earlier, additional information would be available; but, without some tangible benefits, the development of a standard would seem inappropriate.

The strongest objection to the CASB study on capacity-related costs was that a standard in that area would cause accounting procedures to become unduly complex and result in excessive administrative costs. This view is accepted and considered to be pertinent to the feasibility study.

Certainly, the modifications to cost accounting systems, the added reporting requirements, increased negotiations, and settlement of disputes over the issue would be costly. How great a cost would be involved is not a question that can be answered at this time; however, it seems safe to assume that the costs would be borne by the government through the allocation of indirect costs to final cost objectives.

Even if a standard were developed for capacity-related costs, there is the question of whether or not contracting officers could administer it effectively. The LMI report cited in Chapter II indicated that a major problem of CAS's is the difficulty contracting officers experience in executing CAS requirements. The average contracting officer lacks the formal accounting education required and generally has not received adequate training and guidance. Since the area of capacity-related costs is a highly theoretical one, administration problems could certainly be expected.

When all factors are considered, it does not appear feasible to write a cost accounting standard on capacity-related costs that could achieve the necessary objectives. The issue of accurate measurement of capacity levels would have to be resolved before a CAS would have any real significance. It is quite conceivable that industrial engineering studies could establish a practical capacity level for a particular firm; however, designating unused capacity as idle or excess is beyond the scope of any type of precise

measurement technique. The distinction between idle and excess capacity is difficult to make because it is really an economic concept and is subject to too many variables to allow accurate, quantitative measurement. The strong opposition evidenced by the responses to the issues paper is a clear indication that significant implementation problems would occur. It is quite possible that the writing of the standard, the implementation of the standard, the interpretation actions, and the resolutions of disputes between contractors and contracting officers might combine to cause greater costs to the government than any benefits that might be realized.

#### C. RECOMMENDATIONS

(1) Although a CAS on capacity-related costs may not be the solution to excess capacity costs to the government, the problem still exists. It is, therefore, recommended that contracting officials focus on this problem and attempt to generate more studies on excess capacity, such as the Gansler study. Although a precise measurement of excess capacity may be impossible, it may be feasible through objective, independent studies to identify widespread excess capacity in specific industries. If this can be accomplished, overhead rates and profit guidelines for negotiated contracts could be modified downward. If appropriate higher authority determines that some amount of excess capacity is necessary, then that issue should be addressed separately.

(2) If the CASB is to continue with studies such as the one on capacity-related costs, some relaxation of the full absorption costing approach is necessary. The advantages of other concepts such as variable (direct) costing are too widely known and recognized in the field of accounting to be disregarded by the CASB. It seems to be obvious that efficient, effective management should examine all available alternatives.

APPENDIX A  
COST ACCOUNTING STANDARDS BOARD  
441 G STREET, N.W.  
WASHINGTON, D.C. 20548  
Telephone: (202) 275-6111

ELMER B. STAATS  
Chairman



ARTHUR SCHOENHAUT  
Executive Secretary

November 17, 1978

Dear Sir:

The Cost Accounting Standards Board (CASB) is charged with the responsibility of promulgating "cost-accounting standards designed to achieve uniformity and consistency in the cost-accounting principles followed by defense contractors and subcontractors under Federal contracts." In furtherance of this responsibility, the Staff of the CASB has undertaken a study to explore the basic issues relating to the treatment of capacity-related costs for contract costing purposes.

This paper solicits your response to a number of issues. If you believe that there are other important issues relating to accounting for capacity-related costs which are not mentioned in the attached issues paper, we would appreciate your bringing them to our attention. Also if you, as a Government contractor, have experienced significant problems related to accounting for capacity-related costs, we would like to know the circumstances.

Your cooperation and assistance in our research effort is appreciated. Please let us know if you regard any information furnished to be privileged or confidential.

We would appreciate your response by January 31, 1979. If there is any matter you would like to discuss, please call J. J. Brunner, (202) 275-6136, or me (202) 275-5537.

Sincerely yours,

*Paul R. McClenon*

Paul R. McClenon  
Project Director

Attachment

ISSUES RELATED TO A POSSIBLE  
COST ACCOUNTING STANDARD

\* \* \* \* \*

ACCOUNTING FOR CAPACITY-RELATED COSTS

\* \* \* \* \*

INTRODUCTION

This paper is part of a research effort undertaken by the staff of the Cost Accounting Standards Board (CASB) dealing with capacity-related costs. This study involves inquiry into the procurement and accounting concepts which are involved in measurement of capacity and utilization rates. A going concern must have resources, both physical and human, in order to be able to perform on a contract. The continuing costs of having an available capability may be called capacity costs.

One of the points to be studied is whether it is desirable and feasible to develop additional definitions for these concepts. Within this paper we are using terms as they are used in existing regulations; we will, however, be interested in your comments on ways in which the present terminology might be improved. Some accountants use the terms "fixed cost" and "capacity cost" almost interchangeably. A cost which does not vary with business volume is considered to be a fixed cost. Such costs are not fixed in the sense that they do not fluctuate or vary; they vary, but from causes independent of volume.

These other causes are frequently related to short term or long term decisions about capacity. The present CASB research project involves an inquiry into the distinction, if any, between "capacity-related" and "fixed" costs.

The general idea of capacity-related costs is well recognized in management accounting, but its applicability is not clear under the full absorption approach which has been used over the years for contract costing. The present CASB research project inquires into possible techniques for defining capacity, for measuring capacity, and for relating costs to capacity, all within the general framework of full absorption costing.

This research includes inquiry into the conceptual nature of idle capacity, which is typically considered to be a part of the normal fluctuations of the rate at which capacity is utilized. Many people feel that idle capacity, if widespread throughout a facility, may warrant special attention in cost accounting. This research includes inquiries into the nature of the situations which would indicate when "normal" idleness has been exceeded.

Some analysts classify capacity costs in two categories, "committed costs" and "managed costs." Costs in the committed category may be represented by housing, rent, property taxes, insurance, depreciation, and similar costs. Once established, the annual levels of costs for these elements may remain stable for long periods of time. The managed category is represented, in commercial work, by functions such as

advertising; the function can be staffed by salaried employees or provided by purchase of service. Costs of this category may vary in response to decisions made from year to year or even within shorter time periods. This CASB research effort inquires into both categories of capacity-related costs, with particular reference to the contract costing environment.

#### ISSUES

The CASB staff will be interested in your opinions on the broad issues which are presented below. The subsidiary questions are intended to show the nature of the overall points under consideration; there is no requirement to reply to all of them.

1. What is the conceptual nature of capacity?

a. Does the concept of capacity apply only to manufacturing facilities? Under what circumstances does it apply to a research laboratory? To a warehouse? To service industries?

b. Does the concept of physical capacity of a facility differ from the concept of productive capacity of humans? If so, how?

2. How should capacity be measured?

a. With respect to physical facilities, what is the appropriate level for identification of capacity? Under what circumstances should it be the business unit? Cost center? Assembly line? Is the capacity of each physical resource relevant or should capacity only be measured for groups of resources?

b. What business practices need to be specified (or assumed) in defining capacity? (5-day week? multi-shift? preventive maintenance policy? prevalence of overtime?)

c. What circumstances determine the appropriate unit of measure? (e.g. machine hours, units of output?) How about unit of measure for capacity of human resources?

3. How are costs (direct and indirect) linked to capacity?

a. Over what time span should capacity be considered to be fixed?

b. How do you determine which specific costs are linked to capacity?

c. What happens if utilization differs from that which was expected?

d. How can capacity-related costs be treated under a full absorption concept? Under what circumstances should idle plant costs be distributed to production? What are the alternatives?

4. What are the advantages and disadvantages of introducing the concept of fixed costs to contract costing?

a. Are they the same as capacity-related costs? What types of cost could be considered "fixed" for contract costing? Are all direct costs variable?

b. Under what circumstances could the parties agree on a "fixed" portion of each significant indirect cost pool?

c. Does an activity which is carried on at a fixed level without regard to changes in production levels (possible example: research laboratory) represent a fixed cost?

5. What impact on contract pricing techniques could be expected if capacity-related costs were well identified?

a. If a specific level of capacity utilization could be forecast, would it be feasible (desirable?) for the parties to agree on a predetermined share (or amount) of capacity-related costs for the contract, without regard to actual capacity utilization during contract performance?

b. If the contract's portion of fixed cost were thus predetermined, what would be the implications as to entrepreneurial risk-taking and therefore as to weighted guidelines for profit objectives?

6. How should present definitions and policies be clarified or improved?

a. What are the practical techniques appropriate to identify the point at which idle capacity becomes so widespread as to warrant identification as idle facilities.

b. What is the concept of "standby" capacity or facilities? How is this best distinguished from idle capacity and idle facilities?

c. What suggestions do you have with regard to definitions?

d. What changes should be made in costing concepts with respect to capacity-related costs?

7. How should capacity-related costs be considered when idleness is occasioned by external happenings such as contract cancellations or delays caused by a customer, strikes and natural disasters?

a. Should capacity-related costs be defined to include only the costs directly related to physical elements of capacity (such as maintenance, repair, housing, rent, property taxes, insurance, and depreciation) or to include salaries normally included in various indirect cost pools? In what way, if any, does the cause of the idleness influence the decision?

b. For cancellations and delays what consideration should be given to the availability of other work which could have used the capacity? Is there a difference between commercial and Government customers in this regard?

8. What other points should be considered? As indicated in the covering letter, this paper represents a preliminary exploration by the CASB staff. The staff will appreciate your suggestions as to additional issues which should be considered in connection with capacity-related costs.

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