PHYSICAL INVENTORIES –PROCESS REQUIREMENTS UNDER THE FEDERAL ACQUISITION REGULATION GOVERNMENT PROPERTY CLAUSE

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All too many times we as Property Administrators have gotten the reputation of being bean counters. "Hey, George, how much property do we have at warehouse #3?" or "Gail, I need 100 bolts on the production line." Needless to say, we are **NOT** bean counters and the aforementioned remarks should not have been directed at us as Property Administrators. Yes, we as Property Administrators have responsibilities in regard to those quantities of material in the stock room and even that material out on the floor, but I repeat we are **NOT** bean counters. It may very well be that this image has been propagated by the concept that physical inventories were our responsibility and that may very well be true. We might also say that with the increased scrutiny the field of Government Property has been undergoing during the past few years that that has been the impression presented to the uninitiated public.

I would like to take the next few moments and discuss a number of areas regarding physical inventories. These topics include:

- The definition of a physical Inventory
- Physical Inventory Processes
- The contractual requirement for a contractor to perform a physical inventory
- Types and methods of performing a physical inventory
- Voluntary Consensus Standards (VCS) for physical inventory
- Reporting the results of a physical inventory, i.e., discrepancies
- Evaluation of Discrepancies
- Other contractual Requirements for physical inventories

DEFINITION OF A PHYSICAL INVENTORY

There are a number of different yet similar definitions of a “physical inventory.” These include:

- “Actual count of items in inventory, as contrasted with accepting the values shown on accounting records.”
  - Barron’s, Dictionary of Business Terms, 2nd Ed., 1995
- “The determination of inventory quantity by actual count.”
  - NPMA Standard Property Book, 1st Ed., 1999
- “The verification of the existence, location and quantity of property items.”
  - ASTM E2132-01, Practice for Physical Inventory of Durable Moveable Property, September 2004.

Notice that all seem to express or imply that a physical inventory requires an ACTUAL COUNT, vis-à-vis a records check. It means that someone, or a team, goes out and physically COUNTS the items. The ASTM standard applies to other terms "existence" and "location," a nice amplification that we will discuss later.

O.k., so we know the definition of a physical inventory. So what! Is it important? UNEQUIVOCALLY YES!!! This is not a Government unique requirement. In point of fact every business performs SOME FORM of physical inventory at some point in their course of business. Yes, there are LEGAL requirements from Governmental activities like the Internal Revenue Service, the Securities and Exchange Commission and even statutory requirements, like the Sarbannes-Oxley Act – referred to as SOX, have amplified the importance of this process requirement.

One does have to ask, "Why, are physical inventories important?"
The Answer, "Multiple Reasons."

Financial considerations are but one aspect. Businesses need to know where their capital is located – every item of property ties up some of the business' capital that could be used for other purposes. From a production standpoint, a physical inventory verifies the available for materials that can be consumed within the manufacturing process. Equipment is verified to ensure capacity. From a Taxation standpoint, many states tax businesses based upon their inventory as of a certain date. From a supply chain management standpoint a physical inventory may effect decisions relating to vendors.

The performance of a physical inventory also ensures the integrity and accuracy of the records maintained by that business or activity. Tersine (1994) states, "a physical count of items is necessary to verify the integrity and accuracy of inventory records. Inventory accuracy is a fundamental requirement of any inventory system. True record integrity requires a management policy intolerant of errors. Management must establish a climate of accuracy and the necessary tools for its achievement." (Page 494).

PHYSICAL INVENTORY PROCESSES

The American Society for Testing and Materials International (ASTM) is one the few organizations that has a Voluntary Consensus Standard applicable to the process of Physical Inventory. This standard is number E-2132-01 and is available from the ASTM Website at WWW.ASTM.ORG.

The ASTM VCS provides a framework for planning a physical inventory. Its outline sets forth the requirements as:

- Management and Accountability
- Key Results Required
- Population

Independence
Data Requirements
Validation Techniques
Result Validation
Period
Resources
Information Management
Training and Communication
Project Plan

The National Property Management Association in its Standard Property Book also sets forth a process and plan. In Chapter 8 of this text it provides the following form and structure:

Specify the Inventory Objectives
Specify Types of Property to be Inventoried
Specify Timeframe
Method of Inventory
Personnel
Inventory Strategy
Information to be collected
Conduct Inventory
Reconciliation
Reporting
Statistical Goals

The United States Government Accountability Office (GAO) has published a wonderful report entitled "EXECUTIVE GUIDE - Best Practices in Achieving Consistent, Accurate Physical Counts of Inventory and Related Property," GAO-02-447G, March 2002. This report is available at **http://www.gao.gov/new.items/d02447g.pdf.**
Within this report GAO describes the best practices, which in our current FAR language could typify as INDUSTRY LEADING PRACTICES, analyzed the processes used by world class companies. The processes set forth in this report included:

Establish Accountability
Establish Written Procedures
Select an Approach
Determine Frequency of Counts
Maintain Segregation of Duties
Enlist Knowledgeable Staff
Provide Adequate Supervision
Perform Blind counts
Ensure Completeness of the Count
Execute Physical Count
Perform Research
Evaluate Count Results

Piasecki (2003) in his book entitled “Inventory Accuracy: People, Processes and Technology” sets forth a similar process of:

Attitude
Process Definition
Procedure Documentation
Employee Training
Employee Testing
Monitoring Processes for Compliance
Setting Standards
Tracking Accuracy
Accountability
Count, Count, Count
Re-evaluate

As you can see there are numerous processes in these few texts – I can assure you that there a THOUSANDS of articles out there in literature and the WEB discussing just this topic – so I encourage you to do some research in this area.

CONTRACTUAL REQUIREMENT FOR THE PERFORMANCE OF PHYSICAL INVENTORIES

O.k, in spite of the common sense requirement that the performance of a physical inventory is a GOOD thing, in spite of the good business sense requirement that the performance of a physical inventory is a good thing -- is the contractor CONTRACTUALLY REQUIRED to perform a periodic physical inventory?

Simply put, YUP!

The requirement for a contractor to have a process for performing a physical inventory **IS** a contractual requirement. FAR 52.245-1(f)(1)(iv) states “*Physical Inventory. The contractor shall periodically perform, record, and report physical inventories during contract performance. A final inventory shall be performed upon contract completion or termination. The Property Administrator may waive this final inventory requirement, depending upon the circumstances, e.g., overall reliability of the Contractor’s system or the property is to be transferred to a follow-on contract.”*

We see here, the contract language contained within the FAR Government property clause, the CONTRACTUAL REQUIREMENT for the contractor to perform a physical inventory with its commensurate reporting requirements.

TYPES OF PHYSICAL INVENTORIES

The easiest way to segregate physical inventories is to analyze **WHEN and HOW** they are performed. Traditionally, physical inventories have been performed either **periodically** or **cyclically**.

Periodic

Periodic physical inventories are performed during a set period of time, possibly a day, a week, a month or a period of months. In other words a period of time is set forth establishing the start and stop dates of the physical inventory where ALL of the property is inventoried. A Contractor Property Manager may state in their company's procedures that the physical inventory will be performed during the period of 1 May through 30 May. Upon determination of adequacy, by the Government Property Administrator, this would be the requirement that the contractor would be held to, more on this aspect later.

Open and Closed Stores Process. A subset of this periodic physical inventory would be the operation of the location. Let's refer to this as an "open" or "closed" stores operation. All of you have probably experienced a "closed" stores operation, or more specifically a "closed" stores periodic physical inventory. As a youngster my Mom would take me shopping. We really didn't have malls back in the 50s and 60s but we still had large department stores in New York City. We would drive to the department store; pull up in front of that store. Comment to myself, "Gee, the parking lot is empty." Reach the front door only to find a sign that says "Closed For Inventory - Will Reopen Tomorrow Morning." There is nothing more exciting to an eight year old than knowing he doesn't have to go shopping with Mom for clothes. Now don't laugh, this is really used to illustrate a point. This department store was, in essence, conducting a closed stores periodic physical inventory.

Lets try and explain why this is a "closed" stores periodic physical inventory.

1. They have ceased operation. They have "closed" their storeroom to allow for the taking of the physical inventory. The same might be true for the contractor's operation. They might be closing for a summer vacation and therefore the closing of the stockroom would not impact the production on the floor by not being able to issue any stock.

2. There is a set period of time during which this physical inventory will be performed. Again with the department store it might be done in one day while at the aforementioned contractor's facility it might take the whole two weeks of summer vacation, or longer.

One must consider though that it may not always be feasible, from either a production or economic standpoint, for the contractor to close down their operation. In this case an "open" stores periodic physical inventory may be more advantageous. Rather than cease all operations the stockroom remains "open."

Issues and receipts to and from the stockroom continue during the physical inventory. Yet in this scenario the physical inventory still has a timeframe, a period, established.

Cyclic

So much for a periodic physical inventory, of either the "open" or "closed" store variety. Let's move on to the **cyclic** variety. I've chosen to discuss this type under the "when" heading, though I may get some complaints from you production types. I realize that this is not totally accurate but for the sake of illustration and description it makes life simpler. A cyclical physical inventory is a form of a periodic physical inventory in that there is a set start and stop date. The difference lies in how, not when, the inventory is performed. Cyclical Inventories break down the inventory process into manageable "chunks." The ASTM standard E 2132-01 does not define nor describe the concept of a Periodic or Cyclic inventory so we must go elsewhere for guidance as this process is the one embraced by most corporations today. The American Production Inventory and Control Society (APICS) has extensive literature and research into the process of physical inventories. The APICS Dictionary defines cycle counting as *"An inventory accuracy audit technique where inventory is counted on a cyclic schedule rather than once a year. A cycle inventory count is usually taken on a regular, defined basis (often more frequently for high-value or fast-moving items and less frequently for low-value or slow-moving items). Most effective cycle counting systems require the counting of a certain number of items every workday with each item counted at a prescribed frequency. The key purpose of cycle counting is to identify items in error, thus triggering research, identification, and elimination of the cause of the errors."*

Tersine (1994) in Principles of Inventory and Materials Management describes the cycle counting method as *"a physical inventory-taking technique performed continuously rather than periodically. It is a basic step toward controlling the accuracy of inventory records and maintaining it at a high level. Major profit improvements can be achieved by effective cycle counting through a reduction in production disruptions, improved customer service, reduced obsolescence, elimination of the annual physical inventory, and reduction in inventory shrinkage. Frequently, the cycle count method is less expensive than the disruptive periodic count method."* Page 495.

A wonderful WEB site with a large quantity of excellent articles discussing and describing the cyclical inventory process is found at http://www.inventoryops.com/index.htm. This site is RICH with information regarding cycle counting and many other aspects of the inventory process. Though I, as a Government employee, cannot endorse a product, I wholehearted encourage you to read some of the extensive material found on this site.

OTHER TYPES OF PHYSICAL INVENTORIES

I have discussed the usage of a periodic physical inventory with its subsets of open stores and closed stores as well as a cyclical physical inventory. There are other types of physical inventories that have and are being used by numerous companies. Let's stop for a minute and analyze the Government's performance of property administration. The Government Property Administrator is required to perform their System Survey of a contractor at least annually. Does the Government Property Administrator check every single item, not a sample from a lot, but every single item, in the category of physical inventory? No, they draw a sample from the contractor's records and tests that sample. The Government Property Administrator does not check every item of the hypothetical 10,000 line items of Government Property in the contractor's possession. It would be uneconomical and certainly disadvantageous to both the Government and the Contractor.

Sampling

This leads us to the concept of a **sampling** inventory. If the Government believes in the validity of its sampling methods why couldn't the same methods be used by the contractor? In fact, more and more corporations are using sampling inventories due to its reliability, validity, and economy. The Government Property Administrator might very well agree with the contractor conducting a sampling inventory utilizing the same sampling plan, as would the Government Property Administrator as specified in the Manual for the Performance of Contract Property Administration, DoD 4161.2-M, Appendix B. As with every thing else in life there are buts and excepts. When allowing the use of sampling inventories the Contractor should expect to be held to the same level of confidence that the Government is, specifically a 90% confidence level or a 10% risk level.

Stratified

Another type of physical inventory is called a **stratified** inventory. All of us have been confronted with the problem of having a mixture of Government Property: 20 line items of Industrial Plant Equipment, 30 of Special Test Equipment, 250 of Special Tooling and 1,000 of Material. Yet, with a closed store, periodic physical inventory the contractor will be expending just as much energy, translated time and money, to count a washer valued at 1 cent as they would verifying a $579,623.99 piece of STE. Seems incongruous, doesn't it? Well in some ways it is, and it is here that a stratified physical inventory might very well be useful. Stratify the property by dollar value:

Items valued at between $.01 and $4.99
Items valued at between $5 and $24.99
Items valued at between $25 and $49.99
Items valued at between $50 and $99.99
Items valued at between $100 and $999.99
Items valued at between $1000 and above.

The ASTM Standard on “Assessing Loss, Damage or Destruction of Property,” E-2131-01, provides some interesting example and guidance on this concept stating under paragraph 7.2.2.7 through 7.2.2.9,

> “7.2.2.7 Inventory all “A” coded items 3 times a year
> 7.2.2.8 Inventory all “B” coded items 2 times a year
> 7.2.2.9 Inventory all “C” coded items 1 time per year.”

Establishing not only stratification but the frequency with which items are physically inventoried.

From here we may proceed in a number of different ways. The first would be where the contractor does not, in their normal course of business, maintain an inventory for low dollar items. We might say, "Don't worry about keeping records and physically inventorying the low dollar value items, they aren't worth much anyway." But if the Government and the Contractor were to say that they would both be going against the regulations, specifically the requirements of the Government property clause FAR 52.245-1 which requires RECORDS for all property. Now, that does not mean that they must include ALL property within the physical inventory process – but they must have records of every item of government property.

Inventory by Exception

We can view a physical inventory by exception as performance by "touch." Whenever an item has been “touched,” if it is during the established time frame, it is considered physically inventoried. This "touching" may be accomplished by the performance of required calibration, maintenance, authorized utilization, move tickets, receipt of an item, issuance of an item, any of a number of ways. The one drawback to this methodology is that a number of items may be left over, that have not been touched and that have not been counted at the end of the established timeframe. These "leftovers" would then require a counting or physical inventory on their own. Now, there is a caution here – in my research I was able to find no validation or acceptance of this methodology through commercial practice, i.e., literature analyzing or discussing its use, other than from DOD sources or Department of Energy sources, but again with no support for its application.

Needless to say, from these few types of physical inventories we have seen that there are a number of different ways in which to perform a physical inventory. But, there is far more than just these general principles involved. We must now look at the FAR to see what requirements are imposed upon the Contractor by the Government and what guidance is given to the Government Property Administrator regarding Physical Inventories.

REQUIREMENTS FOR PHYSICAL INVENTORIES

For the sake of this discussion let us assume that the contractor has been awarded either a cost-reimbursement type contract or a fixed price contract with GFP that includes the Government Property Clause, FAR 52.245-1. With this information we can assume a number of things:

1. The Contractor will have Government Property in his or her possession.
2. The Contractor will have the requirements of the Government Property clause imposed upon them.

With this information we have already seen that there is a contractual requirement to perform a physical inventory.

Frequency of Performance of the Physical Inventory

I can't tell you how many times I have heard Property Administrators, from both sides of the fence, Government and Contractor alike, say that this means they must perform a physical inventory every year -- annually. I would hope that this article puts that notion to rest once and for all. Periodically **MAY** mean annually, but it **MAY ALSO MEAN** more frequently, weekly, monthly, quarterly, biannually (For clarification that means twice a year), and it **MAY ALSO MEAN** less frequently, biennially - every two years, triennially - every three years.

"Well," you say, "how do we decide how often a physical inventory should be performed?"

Here is the highly technical answer, "IT DEPENDS!"

This has been an area where there are as many different opinions as there are different types of cheeses.

In my travels I happened upon Hilo Hattie's in Honolulu – o.k., I was teaching a class out there and Dr. Paciorek, whom you should all know by now, and he wanted to buy something for his wife – so we stopped in. Now, I'm really not a shopper, so I was leaning unobtrusively on a pole out of the way, when I noticed three women at the jewelry counter. Really, they were BEHIND the jewelry counter and they were, well … counting! So, being the outgoing gregarious individual that I am I approached them and asked, "Ladies, what are you doing?" They explained that they were taking INVENTORY of the jewelry in the counter. WOW, I thought – property management in Hilo Hattie's. O.k., I know, I get excited about small things in life. Seriously, I continued my questioning of them, how often did they do the inventory, and why three of them, etc? They explained that they did an inventory THREE TIMES A DAY – opening, mid-day and closing and that the three people were there – one to count, one to record, one to verify. Interesting commercial practice – as there was no Government requirement

for them to do this. A THRICE DAILY PHYSICAL INVENTORY! And they inventoried EVERYTHING in the cases – earrings costing $5, rings costing hundreds of dollars, bracelets costing THOUSANDS of dollars! I was impressed.

Another example, in Army Regulation AR 190-11 entitled Physical Security of Arms, Ammunition and Explosives one section on Museum Arms and Ammunition, it states "personnel will inventory weapons by physical count weekly and serial and catalog numbers quarterly. (b) A disinterested officer will conduct a semiannual inventory of all weapons except those stored in banded containers."

WOW!!! A weekly inventory!

In the Department of Defense Manual for Physical Security of Sensitive conventional Arms, Ammunition and Explosives, DOD 5100.76-M there are requirements for physical Inventories. It states, "Physical Inventories shall be conducted in accordance with reference (k), as indicated below:

Unit Level. 100 percent monthly count. 100 percent quarterly inventory by UII.

Depot Level shall do a 100 percent annual physical count.

O.k., so now we're up to an annual basis. "But," you say, "Come on Doug – a 100 percent physical count on an annual basis. That's too expensive!"

Well, that depends. What RISKS are involved – and what is the appropriate degree of BALANCE here? There are some items that are SO CRITICAL that I do not want ANY possibility of those items "disappearing" through an inventory adjustment – and therefore my tolerances are going to be, hopefully, at the six sigma level or error. But let's talk about some lesser degrees of risk. One commercial facility that we have visited numerous times is the Navistar Truck Manufacturing Facility in Springfield Ohio. It is an AMAZING production facility rolling close to 600 trucks a day off of the assembly line. They have a large on-site metal stamping plant. There are 1200 and 1600 ton, I repeat 1200 and 1600 TON stamping presses within this facility. How often should Navistar inventory THOSE stamping presses? Once a week? Once a month? Once a year?

NO!!!

How about once every THREE years?
Why? Because, pragmatically, they ain't goin' nowhere!!! The likelihood of those presses even MOVING is slim to none. As such their disappearance/shortage would most likely be IMMEDIATELY noticed AND acted upon.

A recent GAO Executive Guide entitled “Best Practices in Achieving Physical Counts of Inventory and Related Property” provides some wonderful insight into this area. It states, “The most desirable goal would be to count all of the inventory items at least once a year. However, maintaining accurate inventory records by counting items takes time and money. Since there are typically limits on these resources, the best way to balance control of the inventory and cost of the count is to focus on the items determined to be more important or of higher risk to the organization.” Page 24.

[NOTE – It is IMPERATIVE that Government Property Administrators read and become knowledgeable in the use of the ASTM Standard on Physical Inventory, E-2132-01, and/or any other standards that may be developed, as well the I would recommend the GAO Report found at http://www.gao.gov/new.items/d02447g.pdf.

Government Property Administrators must not lose sight of the fact that we are counting on the Contractor's experience, ability and expertise at managing their own business to manage the Government's Property. Therefore it would not be advantageous of the Government Property Administrator to come along and arbitrarily impose his or her own ideas. These ideas must be tempered with common sense, good judgment, and knowledge of the applicable regulations and RESEARCH available.

WORK IN PROCESS

There is an area that the FAR rewrite and the language in FAR 52.245-2 omitted and may lead to a problem. To answer this let's backtrack to the start of the OLD FAR 45.508 (REMEMBER – this version is now obsolete for NEW CONTRACTS awarded after the effective date of the new rule) where the **OLD** rule, and I need to REINFORCE – this is the OLD rule, stated:

> "The contractor shall periodically physically inventory all Government Property (except material issued from stock for manufacturing, research, design, or other services required by the contract)..."

The portion provides for the omission of what is often referred to as “work in process” from the act of physical inventory.

The APICS Dictionary defines WIP as “A good or goods in various stages of completion throughout the plant, including all material from raw material that has been released for initial processing up to completely processed material awaiting final inspection and acceptance as finished goods inventory. Many accounting systems also include the value of semi finished stock and components in this category. Work-in-process inventory.”

The ASTM standard E-2135-01 entitled Standard Terminology for Property and Asset Management defines WIP as, “material that has been released to manufacturing, engineering, design, or other services under the contract and includes undelivered manufactured parts, assemblies, and products, either complete or incomplete.” The two definitions read relatively equivalent – though I would note one small error in the ASTM definition that we should strike the word “contract” if we desire this definition to have a broader appeal. There are other applications than CONTRACT property – though that is our DOD application.

If material is issued to the floor for consumption in the manufacturing process must it be included in the physical inventory? Under the old rule – No! Under the new rule – it is silent and as such we need to look to a Voluntary Consensus Standard (VCS) or an industry leading practice.

As a VCS the ASTM standard of E2132-01 provides no guidance as its direction is in regard to “Durable, Moveable property.” As such work-in-process (WIP) is a “material” issue. I have searched the literature and I have found no discussion as either the inclusion or exclusion of “work-in-process” in the physical inventory process. I have seen an equal number of commercial applications where they INCLUDE WIP, and I have seen an equal number of commercial applications where they DO NOT include WIP. So it appears that this will need to be resolved on a case by case basis.

Physical Inventories at Subcontractors

We see that the FAR does not limit its scope to property in the possession of the prime contractor only but extends that requirement to property in the possession of the subcontractor; tasking the prime contractor to have the subcontractor do likewise. FAR 52.245-1(b)(3) which states, “The Contractor shall include the requirements of this clause in all subcontracts under which Government property is acquired or furnished for subcontract performance.” So, it is the PRIME’s responsibility to enforce the requirements of the Government property clause including the requirement that their subcontractors and vendors, when provided Government property, have a process for performing physical inventories.

ITEMS REQUIRED WITHIN A PHYSICAL INVENTORY

Great, for the sake of argument for the next few paragraphs, everybody is now a contractor. Considering all of the information we have just talked about we have decided what type of physical inventory will be performed and when and how often. But what exactly are we supposed to do. What do physical inventories consist of? Let's again look at an OLD requirement. The OLD FAR provided the requirement that, "Physical inventories consist of sighting, tagging or marking, describing, recording, reporting, and reconciling the property with the records."

Is this an outdated, outmoded approach? Not at all. What exactly does all of that mean? Breaking it down into its smallest components we find that it really is quite simple.

SIGHTING - the act of actually finding the property. Where is that *#@&$*#@% Government Property?
TAGGING OR MARKING - physically attaching a tag, sticker, bar code, label, even a splash or spray of paint may, in some instances, count as tagging or marking.
DESCRIBING - what is the name or nomenclature of the item?
RECORDING - writing on the appropriate sheets or forms, the appropriate description (Nomenclature, Quantity, Etc.).
REPORTING - providing the sheets or forms to a centralized location for action. This may even take the form of downloading a handheld bar code reader into a mainframe computer for reconciliation.
RECONCILIATION - the investigation of any discrepancies (Overages and Shortages) for clerical errors, miscounts, or mispostings.

All of these actions can be accomplished manually – but as we move into more and more sophisticated technologies other processes can accomplish these actions including bar codes and their readers, and Radio Frequency Identification (RFID) equipment and even in the not too distant future the potential use of nanotechnology.

Wonderful! We now know what types of physical inventories exist, some information on how frequently they need to be performed, and even what some of the steps are, but that still doesn't get me an adequate property control system, at least under the category of physical inventories. Who is responsible for preparing the procedures to be used by the contractor? We are (Remember, you are all still contractors)!!!

PLANS AND PROCEDURES

The contractor is responsible for developing and applying the plans and procedures to accomplish the process of physical inventories with the proper outcomes. It is our job, the contractor's job, to submit that property control procedure and within that procedure set forth how YOU propose performing the physical inventory, the type of physical inventory and the frequency of the physical inventory.

Let's go back to being neutral now so that we may consider these aspects. It is the contractor's job to submit that property control procedure as part of their property control system. That is their responsibility. It is the Government Property Administrator's job to review that system and determine its adequacy and compliance with the clausal requirements or recommend to the Administrative Contracting Officer the Government withdraw its assumption of risk based upon the inadequacy of the system.

IMPACT OF TYPES OF PROPERTY ON PHYSICAL INVENTORIES

We have already established that the type and frequency of inventory should be based on the contractor's established practices. There are three other factors to consider: Type and use of Government property involved, amount of Government property involved and its monetary value, and the reliability of the contractor's property control system. The analysis of these factors proves that they are logical, orderly and valid. Consider that the type and use of property may affect how frequently property is inventoried. Would you establish the same degree of control over 1,000,000 troy ounces of gold in bar stock form as you would over 1 item of Special Tooling worth $250? Of course not! You would probably establish a more frequent inventory for the gold than you would the Special Tooling. Using the same case we would apply the same thought to the amount of property involved and its monetary value. There would probably be more concern for $4,000,000 of property than for $250 worth of property. Lastly, how "good" is your, the contractor's, property control system? Do you suffer from major inventory adjustments that are considered unreasonable year after year, based upon standards found in the ASTM E2132-01 or other standards, or do you consistently meet your start and finish dates, your inventory adjustments are reasonable and there have been no major discrepancies in your system for the past three years? If you occupy a place in the latter description it might very well be that your Government Property Administrator will deem your system adequate/compliant with your system of conducting physical inventories every two or three years versus if you are in the former category, count on being required to perform a physical inventory, at a minimum, every year. These factors must be looked at in Toto and not as separate items to be individually evaluated.

This leads us to one last item regarding type and frequency. It is not necessary for every item to be counted every year. Here I am not just talking about frequency (Annual versus Biennial), but rather that physical inventories may establish schedules whereby material is inventoried annually, plant equipment biennially, and special tooling triennially. This is a long standing “best practice” in the property community.

Quite simply this is allowed for many reasons, which are self-evident. Material is a far more fluid commodity, subject to greater errors in counting and keeping. Special tooling is a more stable commodity subject to a lesser degree of error. Let's face it; it's a lot harder to walk off with a holding fixture from a 1200 ton press than it is one of those aforementioned bars of gold.

PERSONNEL PERFORMING THE PHYSICAL INVENTORY

One other area that rears its ugly head is that of the independence of the individuals conducting the physical inventory. The ASTM Standard E-2132-01 under Paragraph 3.10 entitled Resources states, “Determine the individuals who will perform and manage the inventory (in accordance with your independence requirements).” The GAO Report, GAO-02-447G, March 2002, presents the best practices in inventory states, “To best accomplish segregation of duties, the normal job activities of the person performing the physical count should not include

custodial activities such as receiving shipping, and storing physical assets. We found that the strongest control employed by leading edge locations was to exclude those with asset custody from the counting activity."

Now I don't mean to imply that there is anyone out there who is not of the highest caliber of honesty, integrity and ethical behavior. But, one must consider that we are human beings with all of the faults and foibles accorded us. Put simply, we mess up once in a while, some more often than others. And yet with all those faults we still want to look good to our boss. The government and industry, being aware of those faults, realizes that if we allow the same individual to perform the physical inventory as keeps the records there might be some, if I may use the term, fabrication. There exists the threat of tampering. And yet even with this practice we realize that it may, in some cases, be impossible for this to be practical. A case in point would be the small "Mom and Pop" shops. They just don't have the personnel to be able to comply. Mom keeps the books - Dad runs the drill press or vice versa. The larger contractors should have the necessary resources available to be able to comply with this requirement.

REPORTING THE RESULTS OF THE PHYSICAL INVENTORY

O.k., the contract has performed the physical inventory; they have reconciled the actual count with the records. Now what? Well the results of the physical inventory have to be reported to the Government Property Administrator. Remember the clause, 52.245-1, required the REPORTING of the results of the physical inventory as one of the OUTCOMES expected. In other words I want to see ALL of the shortages and Overages disclosed through the physical inventory. So, which are worse – shortages or overages?
They are both equally problematic as shortages AND overages are indicators that there is, potentially, a weakness in the system – whether that is lack of clerical control, lack of physical control, clerical errors or maybe even theft or pilferage. They may also provide an indication of the SEVERITY of that weakness due to the magnitude of shortages and overages.

EVALUATION OF DISCREPANCIES

The ASTM Standard E-2132-01 presents formulas for measuring the results of the physical inventories. Section 5.1 states, "Key results of physical inventory are measured by an annual loss rate by number or by value and an annual overage rate by number or value." There are calculations required for BOTH shortages and overages.

The ASTM Standard provides some guidance as to the discrepancy ratios. It states, "For populations with high consequences annual loss rate targets may be virtually 0 [sic zero] percent. For populations with very low consequences, annual loss rates of as high as ten percent may be acceptable. Typical acceptable annual loss rates vary from half a percent to five percent. The acceptable annual loss rate for a specific population should be the rate that minimizes the sum financial impact of the negative consequences of losses and cost of control."

Property Managers and Administrators need to be aware that the emphasis of this ASTM paragraph appears to be shortages to the exclusion of overages. If one is truly testing the efficacy of a SYSTEM both have impact on the process of physical inventories as well as being an indicator of property management system health and vitality. Therefore, it is important to note not only SHORTAGES in determining the adequacy of the physical inventory process but the OVERAGES as an indicator of system deficiencies.

Another element to this evaluation is the "Standard on Assessing Loss, Damage or Destruction of Property," E-2131-01 which provides acceptable loss, damage and destruction (LDD) ratios. Paragraph 7.1 states "This is a firm criterion, that exceeding the threshold is a cause for investigation." 7.1.1 determines the acceptable LDD for non-high risk Agency, Institutional or Company property is 2% based upon EITHER dollar value or quantity while for high risk property the ration is 0%.

One note of warning to the Government Property Administrator is this standard DOES NOT REPLACE the contractually imposed RISK OF LOSS provisions which the contractor is contractually bound to!

This standard MAY effect the Risk Rating applied to the contractor through the risk assessment process detailed in the Manual for the Performance of Contract Property Administration, DOD 4161.2-M.

Other Contractual Requirements for Physical Inventories.

We have seen that the Government Property clause, FAR 52.245-1, has a requirement for an outcome with a process of performing a physical Inventory. We have also cited a number of internal Government (DOD) regulations regarding the performance of a physical inventory(ies). The question remains, "Are there any other requirements imposed upon a contractor for the performance of a physical inventory?" One that immediately comes to mind is that of the DoD Material Management Accounting System, DoD Federal Acquisition Regulation Supplement (DFARS) 252.242-7004(e)(5) which requires the contractor to:

(5) Establish and maintain adequate levels of record accuracy, and include reconciliation of recorded inventory quantities to physical inventory by part number on a periodic basis. A 95 percent accuracy level is desirable. If systems have an accuracy level below 95 percent, the Contractor shall provide adequate evidence that—

(i) There is no material harm to the Government due to lower accuracy levels; and

(ii) The cost to meet the accuracy goal is excessive in relation to the impact on the Government;

Here we see a CONTRACTUAL requirement that provides a very specific standard of performance – a threshold below which the will take action. If this clause is in the contractor's contract then it interacts with and needs to be embedded within the contractor's Property Management System such that for material the clause overrules the VCSs while for durable, moveable property the ASTM standard may be applied.

Are there other contractual requirements? Time and space limitation preclude discussing and analyzing the myriad of requirements for physical inventories – some based upon law, others on regulations. I would recommend to the contracting community that they perform an essential act, a CRITICAL ACT – READ THE CONTRACT!!!

Commentary

There are major process improvement methodologies emerging in today's business world replacing the concepts of Total Quality Management (TQM) and Zero Defects. These include improvement techniques such as Six Sigma and Lean. The physical inventory process is one ripe for analysis through Six Sigma and through the application of Lean --- hmmmm – how about looking to improve your physical inventory process through LEAN SIX SIGMA. Again, in my travels around the country and the world I have seen numerous physical inventory processes that could greatly benefit from a Lean Six Sigma review.

One other area that I found interesting was some emerging theories regarding inventory control and the accuracy rates. I am seeing a growing trend that asks the question, "What IS inventory accuracy?" The answer is not the accuracy of the dollars. That is an accounting measure. Rather the question should be, "Is inventory where I think it is, in the correct quantity, when I need it?" From a MATERIAL viewpoint – that is the best single measure of effectiveness of inventory accuracy. Since the performance of a physical inventory is a PROCESS with an accuracy rate espoused by a number of standards, i.e., ASTM, GAO and DOD of 95%, there are a number of concepts that can help us visualize whether of not 95% accuracy is good enough. But let's up that accuracy rate to 99%. If such was the case here are some examples of accuracy problems:

Nearly 2.7 billion retail prescriptions were dispensed in 1999 in the USA. A 99% accuracy rate would mean 73,900 prescriptions filled WRONG each day.

880 million Social Security checks, tax refunds and other federal payments were sent in 1999 by the Treasury Department; at 99% accuracy, 24,100 would be wrong each day.

In fiscal year 2002, the USPS sorted and delivered nearly 203 billion pieces of mail, about 670 million pieces a day; at 99% accuracy, 5.6 million pieces would be delivered wrong each day

The electric, gas, and water utilities in our town deliver their products 8,760 hours each year. If they were only 99% accurate, we would all be in the dark almost 88 hours each year (almost 4 full days!)

Just think about if your services or product were one of those "shortages?" Now, I am CERTAINLY NOT advocating that EVERY ITEM requires a 99% accuracy rate. And if the electric company in my town only provided service 99% of the time – how would I dry my hair after a shower. Think about THAT picture!!! But what empirical evidence do we have that 95% is "good enough?" We need to start RESEARCHING topics that will help provide EMPIRICAL DATA to support our contentions rather than continue to voice opinions.

In this article I have tried to provide a foundation – not of MY opinion but through the citation of literature, attempting to build a literary base from which we can grow and mature on our quest of becoming a true PROFESSION!

Respectfully submitted,
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REFERENCES AND FURTHER READINGS

RECOMMENDED STANDARDS

ASTM STANDARD E-2132-01
Standard Practice for Physical Inventory of Durable, Moveable Property
(Note: May not apply to Material)

ASTM STANDARD E-2131-01
Practice for Assessing Loss, Damage or Destruction of Property

WEBSITES:

http://www.inventoryops.com/

http://www.effectiveinventory.com/articles.html

http://www.gao.gov/new.items/d02447g.pdf

http://www.astm.org

http://www.apics.org

http://www.nmpa.org

TEXTS

APICS Dictionary, 11th Edition
Editors, John Blackstone and James Cox
Publisher: APICS, Alexandria, VA ISBN: 1-55822-195-6

Inventory Accuracy: People, Processes, & Technology.
David J. Piasecki.
Publisher: Ops Publishing, ISBN: 0-9727631-0-4

Principles of Inventory and Materials Management
Richard J. Tersine, 4th Edition
Publisher: Prentice Hall, 0-13-457888-0

Production and Inventory Control Handbook.
Editor, James Greene, 2nd Edition.
Publisher: McGraw-Hill, ISBN: 0-07-024321-2

Purchasing and Materials Management.
Dobler, Burt and Lee, 5th Edition.
Publisher: McGraw-Hill, ISBN: 0-07-037047-8

Production and Inventory Management.
Fogarty, Blackstone, and Hoffman, 2nd Edition.
South-Western Publishing, Cincinnati. ISBN 0-538-07461-2