



# INTERNAL AUDIT REPORT

AVIATION AND MARINE MAINTENANCE SHOPS INVENTORY

JANUARY 1, 2015 – OCTOBER 31, 2015

ISSUE DATE: FEBRUARY 22, 2016  
REPORT NO. 2016-02

## TABLE OF CONTENTS

TRANSMITTAL LETTER.....	3
EXECUTIVE SUMMARY .....	4
BACKGROUND .....	5
FINANCIAL HIGHLIGHTS.....	6
AUDIT SCOPE AND METHODOLOGY .....	6
SCHEDULE OF FINDINGS AND RECOMMENDATIONS.....	8
1. INTERNAL CONTROLS TO IDENTIFY AND REMOVE INVENTORY THAT IS OBSOLETE, EXCESSIVE, OR HAS NO MARKET VALUE ARE NOT ALWAYS EFFICIENT OR EFFECTIVE. ....	8

## TRANSMITTAL LETTER

Audit Committee  
Port of Seattle  
Seattle, Washington

Internal Audit has completed an audit of inventory program at Aviation and Marine maintenance shops.

We reviewed inventory activities from January 1, 2015 - October 31, 2015.

Our performance audit was conducted in accordance with Generally Accepted Government Auditing Standards and the International Standards for the Professional Practice of Internal Auditing. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

We extend our appreciation to the management and staff of the Aviation and Marine Maintenance Departments for their assistance and cooperation during the audit.

A handwritten signature in black ink that reads "Kirangi".

Joyce Kirangi, CPA, CGMA  
Internal Audit, Director

AUDIT TEAM	RESPONSIBLE MANAGEMENT TEAM
Dan Chase, Senior Internal Auditor	Skip Himes, Interim General Manager – Marine Maintenance Stuart Mathews, General Manager – Aviation Maintenance

## EXECUTIVE SUMMARY

### AUDIT OBJECTIVES AND SCOPE

To determine if controls are operating adequately to ensure the effectiveness of the inventory process in the following areas:

- How stock items are created
- How much to purchase
- What to purchase
- When to purchase
- Obsolete inventory

We reviewed information for the period January 1, 2015 - October 31, 2015.

### BACKGROUND

Marine Maintenance (MM) and Aviation Maintenance (AVM) provide facilities and equipment maintenance.

MM supports the Real Estate Department and Maritime Line of Business within the Port of Seattle with 14 specialized craft functions to respond to customer requests. MM maintains an inventory valued at approximately \$290,000, which represents 4,700 stock keeping units (SKU). Each SKU can have multiple inventory items.

AVM is responsible for all airport facilities. As the largest Port of Seattle Line of Business, AVM supports 14 functional maintenance shops with over 300 craft personnel. The inventory is valued at approximately \$6.5 million and is comprised of approximately 30,000 SKU's.

### AUDIT RESULT

Processes are not always efficient or effective at identifying and removing inventory that has not been used in over 12 months as required by Accounting Policy 13 - *Disposition of Property*. Disposition of inventory within this time frame facilitates cost savings while maximizing return on investment.

Additionally, purchasing practices could be enhanced so that inventory that has already been purchased and available for use is used before additional purchases of inventory are made for the same item. See Finding 1.

Further, with phase II of the reorganization, both Maintenance shops have a matrixed reporting relationship to the Strategic Initiatives Department. If implemented effectively, this organization change could facilitate a collaborative approach, using expertise and knowledge from each department to further develop best purchase and disposition practices.

## BACKGROUND

Marine Maintenance (MM) provides facilities and equipment maintenance and service to customers and community. MM has 14 craft or specialized functions to support the Real Estate Department and Maritime Line of Business within the Port of Seattle. MM has approximately 4,700 stock keeping units (SKUs), which is comprised of 2,900 stock and 1,800 non-stock items. These stock and non-stock items are valued at about \$290,000.

Aviation Maintenance (AVM) ensures all airport facilities, equipment, and systems function properly 24 hours a day 365 days a year. Its guiding principle includes the optimal use of equipment and inventory and the ability to leverage technology. AVM has 14 functional maintenance shops with 32 satellite locations. AVM has 29,816 SKUs, which represents 10,824 stock and 18,992 non-stock items. The 29,816 SKUs are valued at approximately \$6.5 million.

AVM has an established process for adding new inventory items into the Maximo system. New stock inventory items are requested by each craft shop based on a need identified by system technical subject matter experts with Management oversight. This process includes identifying the inventory item's frequency of use, associated asset or system the item will be used on, and a documented justification to explain the necessity and criticality of the new inventory item being requested. This new inventory item request and approval process has been in use for several years. Non-Stock and Zero Value items do not generate automatic procurement actions. Although, balances may exist, the inventory management team monitors the non-stock category annually to assess future value in changing an inventory item from non-stock to stock.

The Aviation Maintenance zero value inventory contains spare parts received from capital projects many years ago prior to the change in the Port's capital policy, and excess direct buy items that were purchased but not used in entirety. The Zero Value Warehouse provides AVM with the opportunity to have visibility of these inventory items for use in future maintenance. Since these inventory items have already been purchased, they are not placed in the "active" inventory bins, they do not have a reorder point and are charged out at a zero cost.

Both MM and AVM use Maximo, an IBM software solution to record inventory purchases, usage, and disposition.

The inventory turnover ratio is a key measure for evaluating how efficiently inventory is being managed. The ratio reflects how many times inventory is sold/used and replaced over time. Generally, a high ratio is preferred because it indicates that more sales/repairs are generated given a certain amount of inventory. The ratio is calculated by the sum of the annual cost of inventory used divided by the average ending inventory balance over a 12-month period.

The days in inventory ratio is an efficiency ratio that measures the average number of days the organization holds its inventory before using it. The ratio reflects the number of days funds are tied up in inventory and measures how long it takes a company to use inventory. It is the inverse of the inventory ratio multiplied by 365 days. Generally, a low ratio is preferred.

INVENTORY TURNOVER RATIO AND DAYS IN INVENTORY RATIO							
YEAR ENDED	MARINE INVENTORY	MARINE TURNOVER	MARINE DAYS INVENTORY	AVIATION INVENTORY	AVIATION TURNOVER	AVIATION DAYS INVENTORY	
2012	\$ 327,992	1.05	347	\$ 6,503,823	0.47	770	
2013	345,476	0.99	368	6,341,000	0.47	782	
2014	358,218	0.84	433	6,487,198	0.49	747	
2015 (as of October 31	364,125	0.87	418	6,513,752	0.47	770	

Data Source: PeopleSoft Financials

## HIGHLIGHTS AND ACCOMPLISHMENTS

During the course of the audit, management achieved the following significant accomplishments:

- Aviation Maintenance set a goal of a 5% exception or a 95% success rate for the 2015 year-end inventory audit. The results at the Distribution Center as well as the shop locations received at least 95%. Seven of the locations received a 100% success rate.
- Marine Maintenance has begun the disposition process. They have also been actively reviewing purchase orders for items that already exist in inventory.
- Aviation Maintenance is familiar with the Port's existing AC-13 disposition policy and has been using the on-line disposition SharePoint tool since 2013, processing the completion of over 75 disposition forms. Additionally, the AVM department has an established method in place for leadership to review and authorize the disposition of materials or equipment in accordance with AC-13 - Disposition of Property.
- General Managers of Marine Maintenance and Aviation Maintenance were recipients of the 2015 safety award.

## AUDIT SCOPE AND METHODOLOGY

We reviewed information for the period January 1, 2015 - October 31, 2015, using a risk based approach from planning to testing. In order to gain a comprehensive understanding, we conducted interviews, analyzed inventory activity, reviewed policies and procedures, verified the existence of inventory, observed key processes and tested controls.

To assess operations that we deemed to pose the highest likelihood of significant risk, we performed the following audit procedures:

### 1. Inventory Aging

We prepared an aged inventory report and compared the ending inventory balance for each inventory item to the date the inventory was last issued. This procedure was performed to gain an understanding of how effective inventory is managed and to assess the likelihood/existence of obsolete or excess inventory.

### 2. Purchasing Activity

We identified purchases of stock and non-stock inventory that occurred subsequent to the date the items were last used. From this population, we selected 18 Marine Maintenance and 20 Aviation

Maintenance items with the largest variance between last used date and last purchase date and determined why the purchase occurred and if the item could have been used from existing inventory.

### 3. Zero Value Inventory Testing

We conducted a physical inventory review for a sample of 40 SKU's to verify that the inventory quantity and location agreed to Maximo records. We also used this sample to determine whether the same item in zero value inventory already existed in current inventory. Zero value inventory was deemed high risk because this inventory category is not included in physical inventory counts performed by management.

### 4. Year End Adjustments

To assess the accuracy of the January 1, 2015 balance, IA determined whether differences between Maximo and PeopleSoft were identified and explained prior to entry into the general ledger for the year ending December 31, 2014.

## CONCLUSION

Processes are not always efficient or effective at identifying and removing inventory that has not been used in over 12 months as required by Accounting Policy 13 - *Disposition of Property*. Disposition of inventory within this time frame facilitates cost savings while maximizing return on investment.

Additionally, purchasing practices could be enhanced so that inventory that has already been purchased and available for use is used before additional purchases of inventory are made for the same item. See finding 1.

Further, with phase II of the reorganization, both Maintenance shops have a matrixed reporting relationship to the Strategic Initiatives Department. If implemented effectively, this organization change could facilitate a collaborative approach, using expertise and knowledge from each department to further develop best purchase and disposition practices.

## SCHEDULE OF FINDINGS AND RECOMMENDATIONS

### 1. INTERNAL CONTROLS TO IDENTIFY AND REMOVE INVENTORY THAT IS OBSOLETE, EXCESSIVE, OR HAS NO MARKET VALUE ARE NOT ALWAYS EFFICIENT OR EFFECTIVE.

Based on discussions with management, observation of store room locations, and review of usage history, the process to identify and remove inventory that has not been issued in over 12 months is not always efficient or effective.

Policy AC-13 Disposition of Property states (in part):

.02(b) Inventory is expected to be consumed within a year....

.03 Property should be disposed when it no longer serves its intended purpose, no alternate future use within 12 months exists, it is not considered a specialty item, and/or the Port no longer requires it to maximize the return on investment for the disposal of Port's property...

The Policy supports maximizing the return on investment for the disposal of Port of Seattle property while achieving cost savings to the Port of Seattle (taxpayers) through centralized redistribution and disposal of unneeded property.

A review of Marine and Aviation Maintenance (AVM) aged inventory identified a significant amount of inventory aged over 12 months. The table below reflects inventory balances and the year it was last used:

INVENTORY ITEM LAST ISSUED	AVIATION		MARINE	
	AMOUNT	PERCENTAGE	AMOUNT	PERCENTAGE
Within 1 year	\$ 1,841,488	28%	\$ 171,958	59%
Within 2 years	332,982	5	24,828	9
Within 3 years	348,445	5	18,646	6
Within 4 years	204,090	3	8,903	3
Over 4 years	3,851,203	59	66,636	23
<b>TOTAL</b>	<b>\$ 6,578,208</b>	<b>100%</b>	<b>\$ 290,970</b>	<b>100%</b>

Data Source: Maximo

Zero value inventory consists of items remaining after completion of capital projects and is not required to be reclassified to inventory from construction work-in-process. These items, however, are still required to be tracked for property stewardship and are expected to be consumed within 12 months. Similarly, 94% of zero value inventory (AVM only) has not been issued in over four years.

AVIATION MAINTAINANCE ZERO VALUE INVENTORY USAGE		
INVENTORY ITEM LAST ISSUED	SKU	PERCENTAGE
Within 1 year	101	2%
Within 2 years	84	1
Within 3 years	85	2
Within 4 years	68	1
Over 4 years	4,898	94
<b>TOTAL</b>	<b>5,236</b>	<b>100%</b>



Data Source: Maximo

Because a correlation between purchasing practices and disposition of excess inventory exists, we evaluated purchasing processes. Purchasing is essential to managing the two most important categories of inventory costs; ordering and carrying costs. Ordering costs are incurred on obtaining additional inventory such as communicating the order and transportation costs. Carrying costs are incurred from holding inventory such as storage and opportunity costs.

We determined that purchasing processes and controls are not always effective:

- AVM: Zero value inventory is expected to be used prior to purchasing additional inventory of the same item. However, 50% or 20 of the 40 items tested had the same inventory in both zero value and current inventory indicating that purchases are sometimes made without consideration for what is already available in zero value inventory.
- MM: Using a risk based sampling approach, we tested purchases from January 1, 2015 through October 31, 2015. Of the 18 purchases tested, 15 purchases were made for items that were already in inventory.

To reduce inventory costs, thereby increasing the efficiency at which inventory is used, procuring inventory should be made when the item is not available in the warehouse.

### Recommendations

1. Establish a sustainable and repeatable process which incorporates strong internal controls so that inventory is identified and dispositioned within Policy timelines.
2. Add an inventory efficiency metrics such as the inventory turnover ratio or days in inventory calculation to existing metrics.
3. Enhance the process so that additional inventory is not purchased when the material is already in current inventory (stock, non-stock, or zero value).

### *Management Response*

#### Marine Maintenance

*Marine Maintenance has received and reviewed the findings of the internal audit and concurs with the recommendations. We will use an inventory report that identifies turnover ratios and will create an internal policy for dispositioning aged inventory by December 31, 2016.*

*The policy will outline the process and procedure for reviewing aged and stagnant inventory. This will include a collaborative review by the Materials and Inventory Specialist, Purchasing and Inventory Supervisor and Crew Chiefs. The results of the review will be submitted to the Senior Logistics and Finance Manager for final approval.*

*The Material acquisition process will be revised by requesting a review by the Material and Inventory Specialists for available stock, non-stock and zero value inventories prior to the submission of the Maximo Purchase Requisitions. Marine Maintenance will continue to procure materials in the most cost efficient manner. This may include ordering materials that are currently in our inventory due to insufficient quantity on hand or direct delivery to job site.*

*Marine Maintenance welcomes the opportunity to strengthen our process and strives to increase our efficiency. We welcome a collaborative approach with AV Maintenance to share expertise and knowledge to improve our purchasing and disposition procedures.*

### *Aviation Maintenance*

*1) We concur with the auditor's recommendation #1 and we have begun to take proactive steps to work towards an established process prior to the completion of this audit.*

*In November of 2015, Aviation Maintenance proactively initiated a comprehensive review of active inventory SKUs not issued in four (4) or more years. The list of inventory SKUs was generated using the auditor's query. The objective of this comprehensive review is to: 1) assess if the materials identified on the list are still required to keep because it serves an intended purpose at the Airport or 2) identify SKUs on the list that can go through the disposition process. The Aviation Maintenance leadership teams and their shop technical subject matter experts (SMEs) completed a physical walk of the AVM distribution center and satellite storerooms, focusing on the inventory items identified on the list.*

*Each maintenance functional team is to complete the review process and provide the AVM senior leadership team with:*

- A documented justification of items on the list that will remain because they directly support the airport's aging facilities and infrastructure. These inventory items have limited availability in the market, considerable lead time, or have been rendered obsolete in many cases.*
- A list of items that can go through the disposition process as they no longer serve a purpose in maintaining the airport's facilities and systems.*

*This comprehensive review of inventory by each maintenance group is targeted to be completed at the end of Q2 2016. The items identified to go through disposition will be tagged and processed with a target of completing the full list by year end 2016.*

*To ensure this process is sustainable and repeatable, we intend to implement this comprehensive inventory review procedure annually. Repeating the steps noted above will allow us to keep inventory on-hand that only serves an intended purpose in maintaining the facilities and systems at the airport.*

*We concur with the auditor's recommendation #2 and will proceed with the following steps.*

*We will implement one of the two efficiency metrics mentioned - the 'Inventory Turnover Ratio' by end of Q2 2016. We will utilize the Port's Tableau reporting tool to make this metric readily accessible to the AVM department leadership and other POS stakeholders in real time.*

*In addition, we will research and implement an industry best practice metric to measure the effectiveness of our Economic Order Quantities (EOQ) (i.e. inventory reorder points). This metric will help us refine our EOQ over time allowing us to manage our reorder and replenishment process so that we only order the required amounts of inventory items based on historical information. Upon completion of our research we will implement the most practical method based on industry best practice and will begin measuring by the end of Q3 2016.*

*We concur with the auditor's recommendation #3. Aviation Maintenance actively reviews purchase orders for items that already exist in inventory and aims to use up these items prior to purchasing*

*new ones. In addition, we will implement the following steps to be completed by the end of Q3 2016 to aid in the utilization of zero value inventory prior to material purchase.*

- a) Create a query or report that identifies all zero value items that have balances and an associated active inventory item number in the Maximo system. This report will be used primarily by the AVM Procurement Supervisor and the DC procurement staff to identify what's available in the zero value warehouse to be used first, to allow supply to the requesting shop while reducing the need to proceed with a purchase of a new item.*
- b) Conduct refresher training for all AVM staff to query the Maximo system for available on-hand inventory items (including zero value), prior to placing a new request for purchase of additional inventory.*
- c) Implement a monthly report that highlights inventory item purchases, where the items purchased had an existing balance in the zero value warehouse. This report will be reviewed monthly by the AVM Senior Management team to provide visibility to all management levels, and to ensure that appropriate actions are consistently taken to prevent the ordering of inventory items that have an existing balance in the zero value warehouse.*

*The Aviation Maintenance department intends to fully collaborate with our counterparts at Marine Maintenance on inventory management metrics and best practices to ensure consistency and standardization between our departments.*