MANUFACTURING OPERATIONS:
Allegations Regarding the United States Mint's Golden Dollar Production Process Were Not Substantiated

OIG-02-067 **March 21, 2002**

Office of Inspector General

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The Department of the Treasury

Contents

Abbreviations

GAO	U. S. General Accounting Office
Mint	U. S. Mint
OIG	Office of Inspector General
SBA	Susan B. Anthony

March 21, 2001

Henrietta Holsman Fore
Director
United States Mint

On February 1, 2001, the U. S. General Accounting Office (GAO), through its FraudNET, received allegations concerning (1) the acquisition and disposition of coin production equipment for the Mint's new Golden Dollar coin and (2) a senior Mint official suffering a negative career impact. GAO referred the complaint letter to our office for review.

Our objectives were to determine how the Mint handled the acquisition and disposition of the equipment in question and whether there was merit to the complaints.

We interviewed the complainant, Mint employees at the Mint's Headquarters in Washington, D.C., and Mint facilities in Denver, Colorado; and Philadelphia, Pennsylvania. We also analyzed files maintained at the Mint Headquarters and the Denver and Philadelphia Mint locations. Our fieldwork was performed from April 2001 through November 2001. A more detailed description of our objectives, scope, and methodology is provided as Appendix 1.

Results in Brief

Our review found that the Mint's decision to purchase new burnishers for the production of the new Golden Dollar was a reasonable business decision and consistent with the facts known to the Mint at the time the decision was made. In addition, we found no evidence that a senior Mint official suffered a negative career impact because of alleged resistance to implementing the Golden Dollar production process directed by Mint Headquarters.

We recommend that the Mint reevaluate its need for the single barrel burnisher now sitting idle at the Philadelphia Mint and determine whether future needs of the Mint justify the retention of this asset. If not, the burnisher should be properly disposed of.

The Mint responded that it had conducted a thorough evaluation of production needs at the Philadelphia Mint and would use the idle burnisher to replace a leased machine at that facility. The action planned and taken by the Mint meets the intent of our recommendation. The complete text of the Mint's response is provided in Appendix 2.

Background

In a letter dated April 11, 2001, the GAO referred a complaint letter to Treasury's Office of Inspector General that concerned mismanagement at the Mint. According to the Complainant, this alleged mismanagement resulted in the unnecessary expenditure of $3.5 million for equipment used in the production of the Golden Dollar at the Mints in Philadelphia and Denver.

According to the Complainant, the Mint purchased and deployed new burnishers to process Golden Dollar blanks for circulation. The Complainant alleged that a burnisher (single barrel) was purchased for the Philadelphia Mint at a cost of $500,000, which turned out to be inadequate for its purposes. A larger (dual barrel) replacement burnisher was then purchased for the Philadelphia Mint at a cost of $1 million. A third burnisher (dual barrel) was purchased for the Denver Mint, at also a cost of $1 million. The Complainant further stated that an estimated $1 million was spent installing the burnishers.

The Complainant also stated that in trial runs, the Denver Mint showed that the burnishers were not needed to produce a high quality circulating coin. Further, existing burnishing equipment could adequately process the dollar material with a change in chemicals used in the burnishing or cleaning cycle.

According to the Complainant, the Golden Dollar process development took place at both the Philadelphia and Denver Mints. However, the Golden Dollar production process developed by Denver was largely ignored. Consequently, Mint Headquarters mandated that Denver follow the same process used in Philadelphia to process the Golden Dollar.

The Complainant also inferred that a senior Mint official had been negatively affected because he/she did not go along with the direction provided by Mint Headquarters, presumably concerning the Golden Dollar production process.

For review purposes, we summarized the allegations into two issues. These issues and the results of our review are detailed in the following section of this report.

Allegations and Review Results

Reservations Expressed About the Mint's Purchase of New Golden Dollar Burnishers

The Mint purchased new burnishers for the production of the new Golden Dollar coin that were unnecessary due to a poor development process employed by the Mint. These burnishers are now sitting idle.

Our review showed that the Mint's decision to purchase new burnishers for the production of the new Golden Dollar was a reasonable business decision and consistent with the facts known to the Mint at the time the decision was made. Although all the burnishers were idle at the conclusion of our review, the Mint's process for producing the Golden Dollar had not changed. The burnishers were, therefore, still considered necessary for future production of the Golden Dollar.

The United States $1 Coin Act of 1997, dated December 1, 1997, required the Secretary of the Treasury to place into circulation a new one-dollar coin upon the depletion of the Government's supply of Susan B. Anthony (SBA) coins. The 1997 Coin Act further provided that the new dollar coin would be golden in color; have a distinctive edge; have tactile and visual features that make the denomination of the coin readily discernable; and have similar metallic, anti-counterfeiting properties as other coinage in circulation.

To avoid having to produce additional SBA coins and to take advantage of the "Year 2000" promotions, the Mint wanted to get the new dollar coin (hereafter referred to as the Golden Dollar) into production as early as possible in calendar year 2000. Consequently, Mint personnel were initially given approximately 30 months to design, develop, and begin production of the new Golden Dollar coin.

During this intervening 30-month period, Mint personnel met on numerous occasions with various stakeholders to ensure that the design and qualities of the Golden Dollar coin would meet with public approval and the needs of the commercial markets. Based on the legislated requirements for the new coin and input received from its stakeholders, the Mint had two major hurdles to overcome in developing its production process for the Golden Dollar.

The first hurdle stemmed from the requirement that the new dollar coin have a "golden color." This requirement meant that the Mint had to develop a new alloy in order to produce the new coin. A complicating factor was the strong desire by the vending machine industry, the primary market for the new Golden Dollar coin, that the Golden Dollar have the same electro-magnetic signature[1] as the

[1] Coin changers on vending machines use magnetic impulse to distinguish coin denominations. This magnetic pulse is referred to as the coins electro-magnetic signature.

SBA dollar. According to industrial estimates, it would cost vendors about $800 million to convert their vending equipment if the electro-magnetic signature of the Golden Dollar did not match the signature of the SBA.

Because of the unusual coloring and its desire to match the electro-magnetic signature of the SBA coin, it took the Mint about 24 months to develop an alloy with the appropriate golden color that would provide lasting quality. This alloy development process took Mint personnel much longer then was originally anticipated.

The second hurdle stemmed from the requirement that the new coin have a distinctive edge that tactilely would make the new coin readily discernable from other denominations. Based on meeting with its stakeholders and focus groups, the Mint decided the new dollar coin would have a wider border. This wider border was determined to be especially helpful to the blind in identifying the Golden Dollar by touch. The wider border, however, presented new challenges in developing a production process.

This wider bordered coin required a relatively large amount of metal to be moved during the stamping process, much more then previous coins had required. Thus, it was necessary to stamp the border, called upsetting, before the coin was annealed.[2] As a result of the wider boarder, the annealing process left a residue on the coin that proved difficult to remove. The burnishing[3] process previously used by the Mint for all other coin denominations was incapable of cleaning the inside rim of the wider border of the Golden Dollar.

With time running out until the Golden Dollar was to be introduced into the consumer market, the Mint was forced to address this second hurdle in an expedited manner. Both the Philadelphia and

[2] Annealing is the process of heating the coin blanks to soften the metal prior to striking the die images onto each face.

[3] Burnishing is the process of cleaning coin blanks after they have been annealed. The annealing process leaves a hard residue on the coin, especially around the raised rim.

Denver Mints became engaged in the research and development of a new production process that would ensure the Golden Dollar met the needs of the public. The Philadelphia Mint was to “lead” this developmental effort. Although the production approach taken by the two Mints were distinctly different, the success of both approaches hinged on their ability to effectively clean the annealed coins. [4]

Over a 2-month period, Mint engineers consulted with chemical experts and experimented with different cleaning solutions to remove the residue left by the annealing process. In the end, the Mint rejected the use of chemicals for cleaning the Golden Dollar because it was unable to duplicate the Denver process at the Philadelphia Mint, the chemicals were hazardous to the workers, and the resultant by-products from the process presented the Mint other environmental problems. As a result, Mint Headquarters personnel believed that the only proven method was to use a burnisher that used small stainless steel ball bearing as polishing media.

Two manufacturers made suitable burnishing equipment that used steel bearings as a polishing media. Only one of the two companies identified by the Mint made a dual barrel capacity machine that would meet the then projected demand of more than 1 billion Golden Dollar coins per year. This same company also had a single barrel capacity machine immediately available for lease. The usual lead-time for the construction of this type of burnisher was 6 to 9 months.

To meet its target production schedule, the Mint entered into a lease agreement for the single barrel burnisher for a period not to exceed 12 months and a purchase agreement for a dual barrel

[4] The process developed by the Denver Mint followed the normal coin production process (i.e., blanking, annealing, burnishing, upsetting, stamping) with only a change in the chemicals used in the burnishing process. The process developed by the Philadelphia Mint and Headquarters engineers (i.e., blanking, upsetting, annealing, burnishing, and then stamping) required the use of burnishers that used ball bearings as a cleaning media.

burnisher of higher capacity to be delivered to the Philadelphia Mint when constructed.

Within 7 months of awarding its first contract for a dual barrel burnisher, the Mint entered into another contract for a second dual barrel burnisher to be delivered to the Denver Mint. At about this same time, the Mint decided to purchase the single barrel burnisher that was currently being leased at the Philadelphia Mint. The Mint's justification for purchasing these two machines was:

- The leased burnisher had proven to be the only successful way to polish the Golden Dollar.

- The dual barrel machine would allow production of the Golden Dollar at Denver and ensure that the Denver Mint would have similar Golden Dollar production capacity to prevent numismatic rarity.[5]

- A cost benefit analysis had been performed and supported the purchase (See Appendix 5 for details).

- The single barrel burnisher would serve as a backup in Philadelphia for the Golden Dollar and if production dropped off the equipment could be used in a numismatic or a circulating capacity.

Because of the steady increase in demand for all coin denominations, including the demand for the Golden Dollar, and the Mint's inability to keep pace, the Mint ceased all commercial oriented marketing programs for the coin soon after it was introduced.

Due to the downturn in the economy in early 2001, the Mint experienced a sudden and dramatic decline (from more than 1

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[5] The Mint's practice is to spread its production evenly between facilities to avoid "numismatic rarities." Numismatic rarities result if only a few coins (less than 35 percent of the total) are made in one Mint compared to the other Mints, collectors buy the fewer/rarer coins and remove them from circulation.

billion in FY 2000 to less than 90 million in FY 2001) in shipments of Golden Dollars. And early indications are that shipments of Golden Dollars may decline even more in FY 2002. As a result, the Mint ended FY 2001 with about 324 million Golden Dollar coins in storage, which should satisfy shipments to the FRB for the next few years. Thus, the Mint no longer has a need for the single barrel burnisher as a backup for the Golden Dollar production process.

In summary, we found no evidence that the Mint's decision to procure burnishers was inconsistent with prudent business practice or with facts available to management at the time the purchase decision was made. Despite the dramatic drop in production demand for the Golden Dollar, the Mint still has a need for the dual barrel burnishers in the production of dollar coins.

Recommendation

1. The Mint Director should ensure that the Mint reevaluates its need for the single barrel burnisher now sitting idle at the Philadelphia Mint and determine whether future needs of the Mint justify the retention of this asset. If not, the burnisher should be properly disposed of.

   Management Comments. The Mint stated that a thorough evaluation was conducted of its production needs and a decision was made to retain the single barrel burnisher. The Mint plans to use this burnisher in its Numismatic coin production operation at the Philadelphia Mint.

   OIG Comment. We consider this recommendation to have a management decision; however, the Mint needs to establish a target completion date for installation of the single barrel burnisher and for recording final Mint action in the Inventory, Tracking and Closure System.

Concern Surfaced About a Possible Negative Career Impact

A senior management official at the Mint suffered a negative career impact because he/she resisted the implementation of the Golden Dollar process directed by the Mint.

Our review did not substantiate that the senior management official identified in the complaint suffered a negative career impact because of alleged resistance to implementing the Headquarters directed Golden Dollar production process.

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We would like to extend our appreciation for the cooperation and courtesies extended to our staff during the review. If you have any questions, please contact me at (202) 927-5904 or William S. Schroeder, Audit Manager, at (202) 927-5419. Major contributors to this report are listed in Appendix 3.

Thomas E. Byrnes
Director, Manufacturing Operations

Our review objectives were to determine how the Mint handled the acquisition and disposition of the machinery in question and whether there was merit to the allegations.

Our review included interviews with the Complainant, Mint employees at the Mint's Headquarters in Washington, D.C., and the Mint facility's in Denver, Colorado; and Philadelphia, Pennsylvania. Interviews were conducted with plant engineers, program and project managers, legal counsel, and die shop personnel. We also analyzed documents maintained at the Mint Headquarters and the Denver and Philadelphia Mint locations. Documents obtained and analyzed during our review included but were not limited to purchase justifications, cost evaluations, procurement requests, purchase orders and contracts, production and inventory records, and demand data. Our fieldwork was performed from April 2001 through November 2001.

We conducted our audit in accordance with generally accepted government auditing standards.

DEPARTMENT OF THE TREASURY
UNITED STATES MINT
WASHINGTON, D.C. 20220

MAR 1 9 2002

MEMORANDUM FOR THOMAS E. BYRNES
DIRECTOR, MANUFACTURING OPERATIONS

FROM: Jay Weinstein
Associate Director/Chief Financial Officer

SUBJECT: Inquiry into Allegations Regarding the United States Mint's Golden Dollar Production Process

The U.S. Mint has reviewed the subject draft report dated February 12, 2002 which recommended the U.S. Mint reassess the continued need for one of the burnishing machines and dispose of the machine if appropriate. Our comments are provided below.

After a thorough evaluation of the needs for production at the Philadelphia Mint facility, the Mint has decided that it will retain the single barrel burnisher. Currently, the burnisher has been taken out of the Philadelphia warehousing facility and brought back into the Philadelphia Mint to be prepared for use within the Numismatic coin production area. This burnisher will replace leased equipment within that area.

We appreciate the opportunity to review and comment upon the draft audit report.

Thomas E. Byrnes, Director, Manufacturing Operations
William S. Schroeder. Audit Manager
Andras Schneider, Auditor

The Department of the Treasury

Office of Strategic Planning and Evaluations
Office of Accounting and Internal Control
Office of Budget

U.S. Mint

Director
Audit Liaison

Office of Management and Budget

OIG Budget Examiner

Purchase of Denver Burnisher

Background

Using a dual barrel burnisher the Philadelphia Mint would not be able to meet the projected demand of more than two billion Golden Dollar coins per year. One alternative was to ship coin blanks to Canada for burnishing at the Canadian Mint. Another alternative was to purchase a second burnisher for the Denver Mint at an approximate cost of $900,000. The following assumptions were made by the Mint in performing its cost benefit analysis that lead to the procurement of a dual barrel burnisher for the Denver Mint:

1. The Golden Dollar would be made at Denver and Philadelphia.

2. The round trip costs of shipping blanks from Philadelphia to either Denver or the Canadian Mint would be $7000 per 2 million blanks.

3. The cost to burnish blanks at the Canadian Mint would be .0055 per blank ($11,000 per 2 million).

4. A total of 2.5 billion coins per year would need to be processed.

The following chart shows the cost benefit calculations made by the Mint and those made by the OIG.

	PRODUCTION QUANTITIES		
COST DESCRIPTION	2.5 BILLION(B)	1.8 B *	1.3 B*
BURNISHING	$4.1(million)	0.5	0.0
SHIPPING	$3.6	3.2	2.2
TOTAL	$7.7	3.7	2.2
PURCHASE COST	$0.9	0.9	0.9
RETURN ON INVESTMENT	859%	416%	247%

* We did not find support for making a cost comparison against a potential demand of 2.5 billion coins. The highest demand projection we found was for 1.845 billion coins, and a probable net demand of 1.270 billion. We, therefore, made independent cost benefit calculations for these lower demand figures to determine whether they would support a different business decision (i.e. ship excess coin blanks to Canada for burnishing and to Denver for stamping or purchase a second dual barrel burnisher for the Denver Mint).

Auditors Note: Any of the three cost benefit analysis presented in the above chart would have resulted in a management decision to purchase the dual barrel burnisher for Denver instead of shipping burnished coins to Denver from Philadelphia. Under a worse case scenario, dollar coin demand would have to be in the 500 million range for the project to exceed a 1 year payback, assuming Philadelphia burnished all blanks and ships half (250 million) to Denver for minting.

Purchase of Leased Burnisher

Background

To meet the Mint's Golden Dollar production schedule for issuing the new dollar coin in January 2000, the Mint leased a single barrel burnisher for its production operations at the Philadelphia Mint. This leased burnisher, along with augmenting shipments of Golden Dollar blanks to the Canadian Mint for burnishing, was the Mint's interim production solution until a duel barrel burnisher could be built and delivered to the Philadelphia Mint.

The following assumptions were made by the Mint in performing its cost benefit analysis that lead to the procurement of the single barrel burnisher leased by the Philadelphia Mint:

1. The Mint would lose 1 days production capacity per month due to a breakdown of equipment

2. The purchase cost of the leased burnisher would be $450,000

	PRODUCTION QUANTITIES	
COST DESCRIPTION	**5.6 MILLION ***	**4.0 MILLION**
SHIPPING COST/MONTH	$23,100	$16,500
COST PER YEAR	$277,000	$198,000
PURCHASE COST	$450,000	$308,043 **
RETURN ON INVESTMENT	62%	64%

* Mint used 5.6 million coins as a daily production figure, but the Philadelphia Mint's demand was not that large, only 4.0 million coins per day (at the 2.5 billion coins per year level)
** Actual cost to mint to break lease and purchase burnisher was $308,043