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Report No. D-2010-004

October 29, 2009

Inspector General

United States
Department of Defense



Cost Increases Related to the Producer Price Index for Titanium Mill Shapes on DOD Multiyear Contracts

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Acronyms and Abbreviations

ATI	Allegheny Technologies Incorporated
BLS	Bureau of Labor Statistics
DFARS	Defense Federal Acquisition Regulation Supplement
FAR	Federal Acquisition Regulation
IG	Inspector General
PGI	Procedures, Guidance, and Information
RTI	RTI International Metals, Inc.
TIMET	Titanium Metals Corporation
VSMPO	Verkhnyaya Salda Metallurgical Production Organization



INSPECTOR GENERAL
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October 29, 2009

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION,
TECHNOLOGY, AND LOGISTICS
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Cost Increases Related to the Producer Price Index for Titanium Mill Shapes
on DOD Multiyear Contracts (Report No. D-2010-004)

We are providing this report for your information and use. We considered management comments on a draft of this report in preparing the final report.

Comments on the draft of this report conformed to the requirements of DOD Directive 7650.3 and left no unresolved issues. Therefore, we do not require any additional comments.

We appreciate the courtesies extended to the staff. Please direct questions to me at
[REDACTED]

Richard B. Jolliffe
Assistant Inspector General
Acquisition and Contract Management

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Results in Brief: Cost Increases Related to the Producer Price Index for Titanium Mill Shapes on DOD Multiyear Contracts

What We Did

Our overall audit objective was to determine whether cost increases related to the producer price index for titanium mill shapes on DOD multiyear contracts with economic price adjustment clauses corresponded with increased costs incurred by the contractor for titanium parts. We reviewed how titanium costs were built into the contracts for the Navy F/A-18 E/F Super Hornet, the Air Force F-22 Raptor, and the F-35 Joint Strike Fighter. We also assessed the effectiveness of using the Bureau of Labor Statistics producer price index for titanium mill shapes in DOD multiyear contracts.

What We Found

Economic price adjustments related to titanium materials on the Navy F/A-18 E/F contract generally corresponded with increased costs incurred by the contractor. However, we determined that DOD did not have effective internal controls over the use of the Bureau of Labor Statistics producer price index for titanium mill shapes in DOD multiyear contracts with an economic price adjustment clause. We found the index to be outdated, too narrow, and not transparent to its users, thus causing DOD contracts using the index to be affected by extreme market volatility.

We also determined that DOD had not effectively mitigated its risk for titanium material price increases on Defense aerospace weapons systems. The market prices had increased from \$5.35 per pound in 2004 to as high as \$34.54 per pound in 2006. DOD was subject to this market volatility because it does not have a strategic purchasing program for titanium. We calculate, for example, that DOD could save from \$100 million to

\$300 million annually if DOD purchased half of its annual titanium requirement (10 million to 15 million pounds) on a long-term contract priced at about \$10 per pound, instead of at market prices ranging between \$20 to \$30 per pound.

What We Recommend

We recommend that the Director, Defense Procurement and Acquisition Policy, determine whether it is appropriate to use a narrow index such as the Bureau of Labor Statistics producer price index for titanium mill shapes in economic price adjustment clauses on DOD multiyear contracts or whether it is more effective to develop an economic price adjustment methodology based on published market prices. We also recommend that the Deputy Under Secretary of Defense for Industrial Policy, in conjunction with the Administrator, Defense National Stockpile Center, Defense Logistics Agency, develop a strategic purchasing program for titanium materials.

Management Comments and Our Response

The Director, Industrial Policy (responding also for the Director, Defense Procurement and Acquisition Policy), and the Administrator, Defense National Stockpile Center, Defense Logistics Agency, agreed with the report recommendations. The comments were responsive and no additional comments are required. Please see the recommendations table on the back of this page.

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Recommendations Table

Management	Recommendations Requiring Comment	No Additional Comments Required
Director, Defense Procurement and Acquisition Policy		1
Deputy Under Secretary of Defense for Industrial Policy		2
Administrator, Defense National Stockpile Center, Defense Logistics Agency		2

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Introduction

Objective

Our overall audit objective was to determine whether contract cost increases related to the Bureau of Labor Statistics (BLS) producer price index for titanium mill shapes on DOD multiyear contracts with economic price adjustment clauses corresponded with increased costs incurred by the contractor for titanium products. We identified the Navy F/A-18 E/F Super Hornet aircraft contract with The Boeing Company (Boeing) as including an economic price adjustment clause using the producer price index for titanium mill shapes. We also reviewed titanium pricing information for the Air Force F-22 Raptor aircraft and the F-35 Joint Strike Fighter aircraft contracts with Lockheed Martin Corporation (Lockheed Martin); however, these contracts did not include economic price adjustment clauses using the producer price index for titanium mill shapes. See Appendix A for a discussion of the scope, methodology, and prior coverage.

Background

We conducted this audit as a follow-on to DOD Inspector General (IG) Report No. D-2008-099, “Effect of Payments Into Boeing Pension Funds on Economic Price Adjustment Clauses in DOD Contracts,” May 28, 2008. The audit identified that Boeing’s pension fund contributions reported to BLS caused the BLS aircraft manufacturing index to spike, resulting in significant unjustified cost increases that were not related to economic behavior on DOD multiyear contracts with Boeing for the Army AH-64D Apache Longbow helicopter, the Navy F/A-18 E/F Super Hornet aircraft, and the Air Force C-17 Globemaster III aircraft. During the audit, we also determined that the materials portion of the Navy F/A-18 E/F Super Hornet contract economic price adjustment clause increased primarily due to the significant increase in the BLS producer price index for titanium mill shapes.

Bureau of Labor Statistics

The U.S. Department of Labor, BLS “is the principal fact-finding agency for the Federal Government in the broad field of labor economics and statistics.” It “is an independent national statistical agency that collects, processes, analyzes, and disseminates essential statistical data to the American public, the U.S. Congress, other Federal agencies, State and local governments, businesses, and labor.” BLS provides an array of data on inflation and consumer spending; wages, earnings, and benefits; productivity; safety and health, international labor statistics, and price indexes; occupational outlooks; demographics; and employment.

BLS Producer Price Index

BLS publishes the producer price index, which is a family of indexes that measures the average change over time in selling prices received by domestic producers of goods and services. Producer price indexes measure price change from the perspective of the seller. Uses of the producer price index data include contract escalation, indication of overall price movement at the producer level, measurement of price movement for particular

industries and products, comparison of industry-based price data to other industry-oriented economic time series, and forecasting.

Economic Price Adjustment

The purpose of an economic price adjustment clause is to provide adjustments to the contract price as a result of changes in the economic behavior of the national economy. The objective is that the contractor shall neither realize economic benefit nor incur economic loss by reason of abnormal economic fluctuations. Federal Acquisition Regulation (FAR) Section 17.109, “Contract Clauses,” states that a contracting officer should include an economic price adjustment clause in a multiyear contract likely to warrant a labor-and-material costs contingency in the contract price. FAR 16.203-2, “Application,” states that fixed-price contracts with an economic price adjustment may be used when there is doubt concerning stability of market or labor conditions during the extent of contract performance. Specifically, price adjustments should be limited to contingencies beyond the contractor’s control.

The Defense Federal Acquisition Regulation Supplement (DFARS) Procedures, Guidance, and Information (PGI) 216.203-4, “Contract Clauses,” provides guidelines for contract adjustments based on cost indexes of labor or materials. DFARS PGI 216.203-4 recommends three general series published by BLS when constructing an index for an economic price adjustment, one of which is the industrial commodities of the producer price index. The guidance states that the “basis of the index should not be so large and diverse that it is significantly affected by fluctuations not relevant to contract performance, but it must be broad enough to minimize the effect of any single company, including the anticipated contractor(s).” It also states that for adjustments based on cost indexes of labor or material, normally contracting officers should not use more than two indexes, that is, one for labor and one for material.

Titanium

Titanium is a strong, lightweight metal that is corrosion resistant. Titanium compounds and alloys have a huge range of applications, from the manufacture of toothpaste and false teeth to the development of artificial hip joints and deep-diving submarines. The aerospace industry is the largest market for titanium products primarily due to the exceptional strength-to-weight ratio, elevated temperature performance, and corrosion resistance. Titanium applications are most significant in jet engine and airframe components that are subject to temperatures up to 1100 degrees Fahrenheit and for other critical structural parts. Usage is widespread in most commercial and military aircraft.

In 2007, an estimated 76 percent of domestic titanium metal was used in aerospace applications. The titanium industry is extremely competitive on a worldwide basis. Producers of melted and milled titanium are located primarily in the United States, Japan, France, Germany, Italy, Russia, China, and the United Kingdom. There are three major competitors in the U.S. aerospace titanium market: Allegheny Technologies Incorporated (ATI); RTI International Metals, Inc. (RTI); and Titanium Metals Corporation (TIMET). A Russian company, Verkhnyaya Salda Metallurgical Production Organization (VSMPO),

is the world's largest manufacturer of titanium and a major competitor to the U.S. titanium producers in commercial aerospace.

The production of titanium sponge is the first step of the titanium process. The sponge is then melted with scrap and/or other alloying elements to produce titanium ingots. Ingots are forged to slabs or billets. Mill products result from the rolling or further processing of forged or cast slab or billet into plate, sheet, bar, rod, and wire. Figure 1 shows pictures of titanium sponge, ingot, billet, and sheet.

Figure 1. Pictures of Titanium Sponge, Ingot, Billet, and Sheet



Sponge



Ingot



Billet



Sheet

Defense National Stockpile Center

The Defense National Stockpile Center, a field activity of the Defense Logistics Agency, is identified by the FAR as the supply chain manager of strategic and critical materials for the Federal Government. Defense National Stockpile Center officials stated that it has the ability to manage materials, understand domestic and global market dynamics and the impact of technology changes on material needs, and assess the impact of supply and demand for materials and overall geopolitical issues affecting the supply of materials.

Review of Internal Controls

DOD Instruction 5010.40, "Managers' Internal Control (MIC) Program Procedures," January 4, 2006, requires DOD organizations to implement a comprehensive system of internal controls that provides reasonable assurance that programs are operating as

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intended and to evaluate the effectiveness of the controls. We identified an internal control weakness for the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics.

In DOD IG Report No. D-2008-099, we determined that Boeing's pension contributions explained more than 99 percent of the increase in the BLS aircraft manufacturing index, that Boeing comprised about [REDACTED] of the index, and that Boeing reimbursed BLS for the costs associated with collecting and publishing the aircraft manufacturing index through a contract with the Aerospace Industries Association. We recommended that DOD prohibit use of the BLS aircraft manufacturing index in DOD multiyear contracts with economic price adjustment clauses because Boeing had become the dominant force and could unfairly influence the index and the BLS data were not transparent to users of the index. In response to the report, the Director, Defense Procurement, Acquisition Policy, revised the DFARS PGI to prohibit the use of the BLS aircraft manufacturing index and stated that he would issue a general policy memorandum to the Service Acquisition Executives alerting them to closely monitor contract economic price adjustment provisions.

Similarly, in this report we found that the BLS producer price index for titanium mill shapes, used in the economic price adjustment clause of the Navy F/A-18 E/F Super Hornet contract, was outdated and subject to extreme market volatility, as it was primarily based on spot market prices. The index was also too narrow to be used in DOD multiyear contracts, as the [REDACTED] did not report titanium pricing information to BLS. Additionally, the BLS data are not transparent to users of the indexes; therefore, DOD does not know what information is included in index calculations. DFARS PGI 216-203.4 already directs DOD contracting officers to use caution when incorporating economic price adjustment provisions in contracts. Implementing Recommendation 1 will improve the internal control weakness identified in this report.

We will provide a copy of the report to the senior official responsible for internal controls in the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics.

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Finding. Titanium Pricing in DOD Aerospace Contracts

DOD had not effectively mitigated its risk for titanium material price increases on contracts for Defense aerospace weapons systems. Supplier costs for titanium ingot (prices per pound) used to manufacture Defense aerospace components delivered in 2004, 2005, 2006, and 2007 varied from \$5.35, to \$7.15, to \$34.54, to \$29.00, respectively. DOD was subject to this market volatility in titanium material pricing because:

- DOD suppliers of titanium components had not always secured titanium material on long-term contracts and material purchased at market prices carried a significantly higher price that got passed through to DOD contracts.
- DOD multiyear contracts that used the BLS producer price index for titanium mill shapes were not effective because the BLS index was outdated, primarily based on spot market prices, and too narrow an index.
- DOD does not have a strategic purchasing program for titanium to leverage buying power, take advantage of economies of scale, and secure prices on long-term contracts when acquiring titanium products.

As a result, Defense aerospace weapons systems were subject to higher market prices for titanium material based on supply and demand of titanium in the commercial marketplace. Various sources estimate that DOD requires between 20 million and 30 million pounds of titanium annually. The Office of the Deputy Under Secretary of Defense for Industrial Policy calculated that a 50 percent increase in titanium prices would increase the FY 2005 through FY 2011 buy of Defense aerospace systems¹ by more than \$200 million. We calculate, for example, that DOD could save from \$100 million to \$300 million annually if it purchased about half (10 million to 15 million pounds) of its annual titanium requirement on a long-term contract priced at about \$10 per pound instead of at market prices ranging between \$20 to \$30 per pound. (See Table 3 on page 21.)

Market Volatility in Titanium Pricing

According to a December 2005 study by the Office of the Deputy Under Secretary of Defense for Industrial Policy, titanium is not sold on market exchanges and is characterized by small market size, few producers, and one dominating end-sector. The study stated that the aerospace industry accounts for about half of world titanium consumption and over half of U.S. titanium consumption. Because of this, volatile

¹ The Office of the Deputy Under Secretary of Defense for Industrial Policy report, "China's Impact on Metals Prices in Defense Aerospace," December 2005, analyzed titanium price increases on Defense aerospace systems, including: the Air Force C-17 Globemaster III, the Navy F/A-18 E/F/G Super Hornet, the Air Force F-22 Raptor, and the F-35 Joint Strike Fighter.

swings in the aerospace industry drive large cycles in the titanium market. According to the study, the post-9/11 downturn in commercial aerospace weakened titanium demand considerably, but an upswing in Defense aerospace began to mitigate this decline in 2003. In 2004, titanium demand soared due to a rebound in commercial aerospace. Several new commercial aircraft designs, such as the Boeing Dreamliner 787 and the Airbus A380, use a large amount of titanium and when these programs enter production, titanium demand will strengthen, likely keeping prices high. In 2005 and 2006, demand for titanium on these commercial programs, in addition to DOD aerospace programs using higher percentages of titanium materials, caused a dramatic increase in the demand for titanium. U.S. titanium producers had a short supply of titanium sponge and scrap; therefore, the increased titanium consumption caused an increase in titanium market prices. In 2007 and 2008, U.S. titanium producers ramped up production and built new facilities to increase production and lift capacity. Recent economic conditions have led to delays in the production of commercial aircrafts, which has led to an increased supply of titanium sponge and scrap, and therefore, market prices have begun to decline.

Effect of Spike in Titanium Prices on the Navy F/A-18 E/F Super Hornet Contract

The Navy included an economic price adjustment clause using the BLS producer price index for titanium mill shapes in the F/A-18 E/F Super Hornet contract. This index spiked significantly because of the increase in titanium market prices. The economic price adjustment clause in the Navy contract included six different BLS producer price indexes for various materials; however, the majority of the materials' price adjustments under the economic price adjustment clause were due to price increases for titanium. At the time the Navy awarded the F/A-18 E/F contract, the BLS producer price index for titanium mill shapes was projected to increase by about 20 percent over the 5-year performance period from FY 2005 through FY 2009. However, because of the spike in the BLS producer price index for titanium mill shapes, the total cumulative escalation for titanium materials on the contract was 139 percent. The material price increase related to titanium costs for the FY 2007 through FY 2009 performance period was \$129 million, which accounted for more than 66 percent of the total material cost increases during that period of performance. The contract did not include any type of annual limits or caps on price escalation; therefore, the Navy was subject to payment of the entire cumulative increase in the titanium mill shapes index.

Titanium Costs for F/A-18 E/F Super Hornet Suppliers

The F/A-18 E/F Super Hornet economic price adjustment clause covered Northrop Grumman Corporation (Northrop Grumman) materials. According to Northrop Grumman titanium information, the spot market prices for titanium ingot reflected an increase of at least [REDACTED], from between [REDACTED] and [REDACTED] per pound in the second quarter of 2004 to approximately [REDACTED] per pound in the third quarter of 2006. Northrop Grumman stated that it had received requests for equitable adjustments from many of its titanium suppliers, with an overall average increase of [REDACTED] in titanium costs from the FY 2005 estimates.

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We met with six companies that supplied titanium parts to Northrop Grumman for the F/A-18 E/F Super Hornet program to determine whether their titanium prices had increased. All stated that they had experienced increases in costs for titanium materials. Some of the specific examples provided by the suppliers are as follows.

- One supplier provided purchase histories for three of its parts for the F/A-18 E/F Super Hornet. From 2004 through 2007, price increases for the three parts ranged from [REDACTED] to [REDACTED]. Additionally, this supplier submitted a request for equitable adjustment for [REDACTED] to Northrop Grumman because the cost of titanium materials had increased so much that the supplier would not be able to provide the parts at the original contract price.
- Another supplier was not able to provide copies of purchase orders, but stated that its price for titanium ingot had increased by [REDACTED] from [REDACTED] per pound in June 2003 to [REDACTED] per pound in July 2006.
- A third supplier provided copies of invoices for titanium for five F/A-18 E/F Super Hornet parts to demonstrate the increase in titanium costs. From 2004 through 2007, the price increases for the parts ranged from [REDACTED] to [REDACTED].
- Another supplier had a long-term agreement with Northrop Grumman dated February 2005. However, the agreement had a provision for adjustments for raw material price changes. The baseline prices (February 2005) for most of the parts for the F/A-18 E/F Super Hornet used titanium ingot priced at [REDACTED] per pound. However, the supplier needed to revise its prices due to significant increases in titanium prices. In August 2006, the supplier provided Northrop Grumman part price quotes that used a base ingot price of [REDACTED] per pound. In October 2006, just 2 months later, the supplier provided Northrop Grumman a change notice stating that titanium ingot prices had increased again due to raw material price increases to [REDACTED] per pound; an increase of [REDACTED] from the February 2005 titanium ingot price.

Market Prices Compared to Long-Term Contract Prices

DOD was subject to market volatility in titanium material pricing because DOD suppliers of titanium components had not secured titanium material on long-term contracts and material purchased at market prices carried a significantly higher price that got passed through to DOD contracts. Because they were such small companies and only produced a few parts for the aircraft, most of the suppliers did not have long-term contracts with the titanium producers, and therefore paid market prices for titanium materials used for parts on the F/A-18 E/F Super Hornet program. Some of the suppliers we met with also stated that it was difficult to secure long-term contract pricing with the titanium producers for DOD contracts because DOD requirements were only defined and funded on a yearly basis, thus putting too much risk on the supplier to establish long-term pricing arrangements for titanium materials.

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One of the companies that we met with supplied titanium parts for the F/A-18 E/F Super Hornet, the F-22 Raptor, and the F-35 Joint Strike Fighter programs. This supplier maintained long-term contracts with the three U.S. titanium producers. Table 1 is a comparison of the supplier's market and long-term contract pricing for titanium ingot for the DOD programs. As seen in the table, the supplier received better prices for titanium ingot when purchasing from the U.S. titanium producers under long-term contract than on the spot market.

Table 1. Market and Long-Term Contract Titanium Ingot Prices (Per Pound)						
Year	Producer 1 Pricing		Producer 2 Pricing		Producer 3 Pricing	
	<u>Market</u>	<u>Contract</u>	<u>Market</u>	<u>Contract</u>	<u>Market</u>	<u>Contract</u>
2003						
2004						
2005						
2006		*				
2007		*				
2008		*		*		
* price based on BLS index.						
** Price for other DOD Aerospace Programs.						

According to this company, it has a contract with Producer 1 that includes the BLS producer price index for titanium mill shapes in the formula used to calculate price adjustments. Producer 1 also reports pricing information to BLS. As shown in Table 1, prices for titanium increased from [REDACTED] in 2005 to [REDACTED] in 2007, or about [REDACTED] using the BLS index. Consequently, Producer 1 was directly impacting its own titanium selling prices by reporting prices to BLS that caused the BLS producer price index to increase, causing Producer 1's selling prices to increase, which would in turn cause the BLS index to further increase—a vicious circle affecting DOD titanium prices.

F-22 Raptor and F-35 Joint Strike Fighter Contracts

In contrast to the F/A-18 E/F Super Hornet contract, which used an economic price adjustment clause with the BLS producer price index for titanium mill shapes, neither the Air Force F-22 Raptor nor the F-35 Joint Strike Fighter contracts with Lockheed Martin included economic price adjustments for materials in the contracts.

Different Methods to Buy Titanium

The following are some of the methods used by different companies to purchase volatile commodities, such as titanium:

- Take-or-Pay Model – An agreement between a buyer and seller that obligates the buyer to pay a minimum amount of money for a product or service, even if the

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product or service is not delivered. Boeing Commercial and Airbus buy direct on take-or-pay contracts from several producers, allocate material to service providers and users, and contract with service providers to manage and allocate material.

- **Right-to-Buy Model** – A contractual agreement between a producer and suppliers, where the suppliers forecast requirements to the producer and the producer manages the material inventory. Lockheed Martin maintains a requirements contract with a titanium producer and the producer uses right-to-buy provisions with suppliers.
- **Spot Market Purchases** – The purchase of titanium on the spot market is the least favorable method because of the volatility in the titanium industry. Without pricing agreements and caps on price escalation, DOD is subject to the extreme price increases of titanium, as seen in the F/A-18 E/F Super Hornet contract.

Lockheed Martin maintains long-term contract arrangements with the U.S. titanium producer RTI for the F-22 Raptor and F-35 Joint Strike Fighter programs using its right-to-buy model. According to a report by the Office of the Deputy Under Secretary of Defense for Industrial Policy, Lockheed Martin took a proactive position to work with its suppliers and put into place material management risk mitigation actions and plans. According to Lockheed Martin, its right-to-buy model reduces administration costs, follows the year-to-year DOD contracting method, and allows suppliers to dictate start size most efficiently, encouraging cost containment. Lockheed Martin also stated that the take-or-pay model increases termination liability to DOD.

F-22 Raptor Long-Term Contract Arrangement

Lockheed Martin and Boeing Integrated Defense Systems have a joint long-term right-to-buy contract with RTI for titanium sheet and plate on the F-22 Raptor program through the year 2015. Sheet and plate prices are significantly higher than ingot prices because sheet and plate result from additional processing of ingots, such as forging and rolling. Under the long-term contract, Lockheed Martin will pay less than market prices for titanium sheet and plate. According to an April 2008 Lockheed Martin presentation, Lockheed Martin paid about [REDACTED] to [REDACTED] per pound for titanium plate in 2004 through 2008, while market prices during the same period ranged from about [REDACTED] to [REDACTED] per pound. The agreement also includes price escalation provisions that are limited to an increase or decrease of [REDACTED] annually.

However, Lockheed Martin did not maintain all titanium requirements for the F-22 Raptor program under long-term contract with RTI. Table 2 shows the pricing for titanium ingot that Lockheed Martin purchased for aircraft forgings from a different U.S. titanium producer.

Table 2. Lockheed Martin F-22 Raptor Titanium Ingot Agreement				
Year	2005	2006	2007	2008
Ingot price (per pound)	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

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F-35 Joint Strike Fighter Long-Term Contract Arrangement

Lockheed Martin also maintains a long-term contract with RTI for titanium sheet, plate, and billet on the F-35 Joint Strike Fighter program through the year 2020. Like the F-22 Raptor agreement, this agreement includes price escalation provisions that are limited to an increase or decrease of [REDACTED] annually. Using a market price forecasted by Global Insight,² Lockheed Martin stated that it will also pay less for sheet, plate, and billet under the F-35 long-term contract with RTI, averaging about [REDACTED] to [REDACTED] per pound from 2007 through 2020, while market prices are forecasted to be about [REDACTED] to [REDACTED] per pound during the same period.

Annual Price Escalation Caps

Even though market titanium prices began to decrease, according to Lockheed Martin, it will still be paying less than market prices under its long-term contracts with the [REDACTED] escalation cap by mitigating the escalation in titanium costs. The Navy F/A-18 E/F Super Hornet contract baseline included a cumulative escalation of about 20 percent for titanium costs over the 5-year performance period of the contract. However, the cumulative escalation on the contract was significantly higher at 139 percent. Without an annual cap on escalation, DOD multiyear contracts may experience significant price increases. Had the Navy included a cap on titanium price escalation in the F/A-18 E/F Super Hornet contract, it would have avoided the extreme contract price increases caused by the volatility of the titanium market. These caps would then need to flow down to the titanium producers to be effective.

DOD Contracts Using the BLS Producer Price Index for Titanium Mill Shapes

DOD multiyear contracts that used the BLS producer price index for titanium mill shapes were also not effective because the BLS index was outdated, primarily based on spot market prices, and too narrow an index. The Navy F/A-18 E/F Super Hornet contract is the only DOD multiyear contract we identified using the BLS producer price index for titanium mill shapes in its economic price adjustment clause.

BLS Titanium Mill Shapes Index

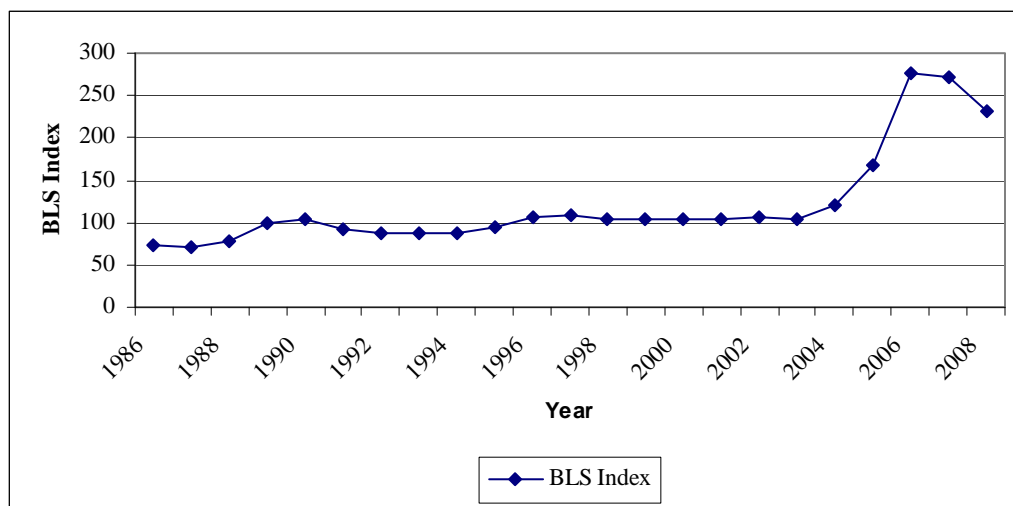
According to the BLS Producer Price Index, Branch of Industry Pricing Chief, producer price indexes measure the average change in prices received by domestic producers. The producer price index is an output price index, thus, the index for titanium mill shapes reflects prices received by U.S. commercial mills for their output. Producer price index data are based on selling prices reported by companies of all sizes selected by probability sampling, with the probability of selection proportionate to size. Individual items and transaction terms from these companies are also chosen by probability proportionate to size sampling methods. For example, the likelihood of selecting a long-term contract

² Global Insight is an independent economic forecasting company that provides comprehensive economic, financial, and political information to support planning and decision making for various countries, regions, and industries, including both private industry and DOD.

versus a spot sale is proportional to the share of company revenue each represents in a given product line. Consequently, to the extent that transactions in the industry are characterized by long-term supplier contracts, the producer price index sample will reflect that. However, even though BLS requests pricing data for the producer price index for titanium mill shapes from specific titanium producers, cooperation with the producer price index survey is voluntary.

As shown in Figure 2, the producer price index for titanium mill shapes was relatively stable from 1986 through the end of 2003. In April 2004, the index started to slowly increase, and by April 2006, the index significantly spiked. From December 2003 through December 2006, the index increased by 167 percent. From December 2006 to November 2008, the index had gradually decreased by about 20 percent.

Figure 2. BLS Producer Price Index for Titanium Mill Shapes



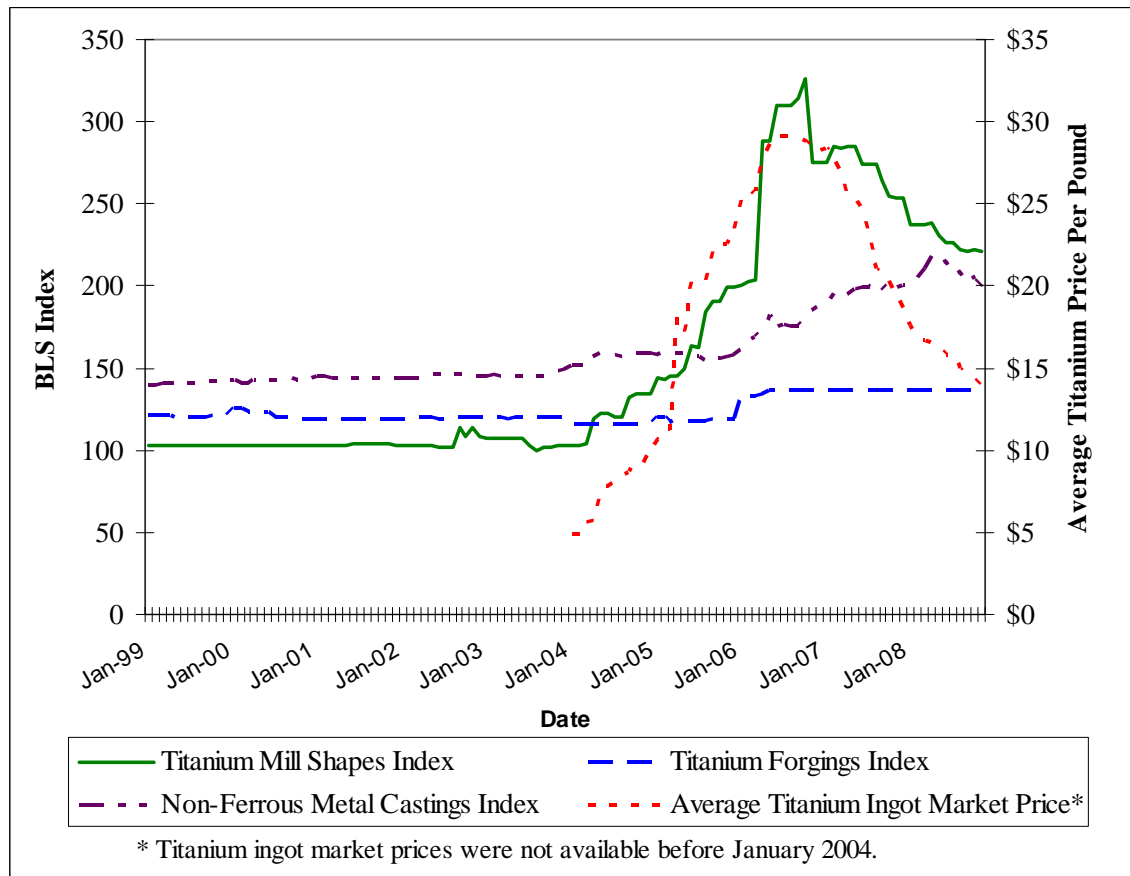
Titanium Mill Shapes Index is Outdated

According to BLS Producer Price Index officials, the industry sample for the titanium mill shapes index began in March 2002, when the industry had been stable for years. They stated that, on average, BLS re-samples an industry every 7½ years, but because the titanium industry had remained stable for so many years, BLS determined that it would re-sample the titanium industry every 9 years. In early 2002, however, there was not an emphasis on long-term contract pricing of titanium because market prices did not fluctuate as they have in recent years.

For comparison purposes, we reviewed the BLS producer price index for titanium forgings and the BLS producer price index for non-ferrous metal castings. According to BLS, both of these indexes were sampled in mid-to-late 2007, and therefore, most likely include more long-term contract pricing. Figure 3 shows the spike in the titanium mill shapes index and how it compares to the average spot market titanium ingot prices from American Metal Market and Metal Prices. The figure also shows how the titanium

forging and non-ferrous metal castings indexes did not have such significant spikes because more long-term contract prices were included in those indexes.

Figure 3. Comparison of Average Spot Market Titanium Ingot Prices and BLS Producer Price Indexes for Titanium Mill Shapes, Titanium Forgings, and Non-Ferrous Metal Castings



BLS officials we met with stated as titanium prices increased in recent years, more emphasis was placed on long-term contracts. Major titanium producers had long-term contracts with big commercial companies, such as Boeing and Airbus, to mitigate market risk. Because the BLS producer price index for titanium mill shapes was primarily based on spot market prices, DOD contracts using this index in economic price adjustment clauses were subject to higher escalation based on the index than actually occurred when long-term contract pricing arrangements were factored into the index calculations.

Transparency of BLS Data

BLS data are protected by the Confidential Information Protection and Statistical Efficiency Act of 2002, so users of BLS indexes have no insight into what information is contained in the indexes. The Confidential Information Protection and Statistical Efficiency Act of 2002 states that data collected under a pledge of confidentiality for

exclusively statistical purposes cannot be disclosed or used for any purpose other than a statistical purpose. The BLS pledge of confidentiality is as follows:

The Bureau of Labor Statistics, its employees, agents, and partner statistical agencies, will use the information you provide for statistical purposes only and will hold the information in confidence to the full extent permitted by law. In accordance with the Confidential Information Protection and Statistical Efficiency Act of 2002 (Title 5 of Public Law 107-347) and other applicable Federal laws, your responses will not be disclosed in identifiable form without your informed consent.

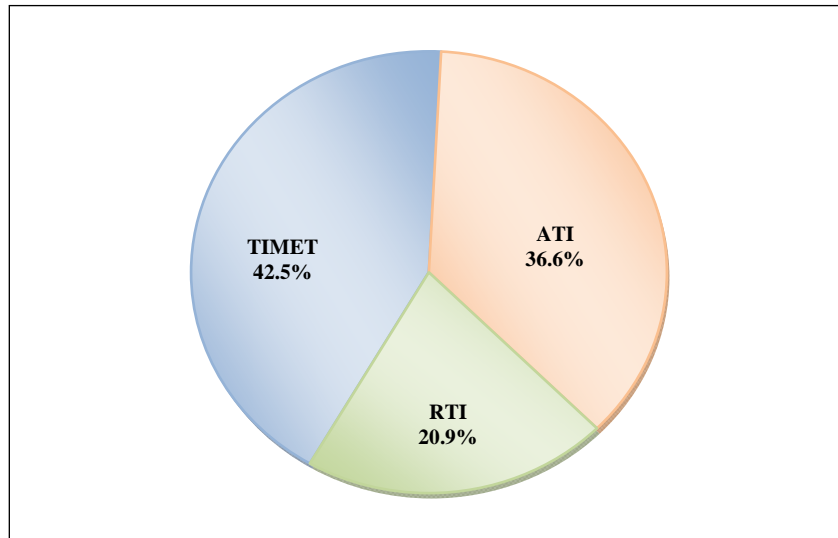
BLS does not disclose the contents or supporting data for the indexes that it publishes, including identification of company names, products, or transaction terms that constitute the sample for the producer price index for titanium mill shapes and would not provide the data regarding the producer price index for titanium mill shapes to the audit team. Therefore, the audit team obtained information reported to BLS directly from U.S. titanium producers.

U.S. Titanium Producers

We identified three major U.S. titanium producers: TIMET, ATI, and RTI. Both the TIMET and ATI annual reports stated that TIMET, ATI, and RTI are the major competitors in the U.S. titanium market. According to BLS, several smaller titanium milling companies contribute pricing data to the producer price index for titanium mill shapes; however, because BLS would not provide information on any company included in the producer price index for titanium mill shapes, we focused on the three major U.S. titanium producers.

We used data from the 2007 annual report from each of the three major U.S. titanium producers that we identified to calculate the percent of titanium sales. As shown in Figure 4, we calculated that out of the combined sales of the three major U.S. titanium producers, TIMET had the largest portion, at 42.5 percent. ATI had the second largest portion at 36.6 percent, with RTI following at 20.9 percent.

Figure 4. Percent of Titanium Sales From 2007 Annual Reports



We met with representatives from the titanium producers and requested copies of the data they provided to BLS for the titanium mill shapes producer price index. [REDACTED]

[REDACTED], did not report titanium pricing information to the index, while [REDACTED] and [REDACTED] reported data for different titanium products.

The [REDACTED] stated that he was not aware of anyone in the company who provided data to BLS for purposes of the producer price index and BLS had not requested that [REDACTED] provide information on its titanium prices for the producer price index for titanium mill shapes. Therefore, although [REDACTED] it did not report data to BLS for the titanium mill shapes producer price index.

The [REDACTED] stated that [REDACTED] reported to BLS on a monthly basis. We obtained from [REDACTED] the titanium pricing data reported to BLS from December 2004 through February 2008. The [REDACTED] stated that BLS requested that [REDACTED] report pricing data to BLS for the following types of titanium: [REDACTED]. [REDACTED] stated that the prices reported to BLS were an average of both market and long-term contract prices for the types of titanium specifically requested by BLS; however, [REDACTED] produced several other types of titanium that were not reported to BLS. Because the industry sample for the titanium mill shapes index was selected in early 2002, the titanium products BLS selected for [REDACTED] to report pricing information may not be the current [REDACTED] high-selling items.

Also, if [REDACTED] did not sell a reported type of titanium in a given month, [REDACTED] would report the previous month's price to BLS. For example, if [REDACTED] sold a titanium ingot in

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January 2004 for [REDACTED] per pound and did not receive another order until April 2004, it would report [REDACTED] each month until a new order was received, even though the market price may have increased in February 2004 to [REDACTED] per pound. The BLS producer price index information collection form stated that if there was no shipment during the given month to “estimate the price you would have charged.” However, based on the way that [REDACTED] completed the form, a significant increase or decrease in titanium pricing would not be accurately reflected in the BLS index, potentially distorting the titanium market for companies using BLS indexes.

[REDACTED]
The [REDACTED] stated that [REDACTED] reported titanium pricing data to BLS on a monthly basis. We obtained from [REDACTED] the titanium pricing data reported to BLS from January 2004 through December 2007. [REDACTED] reported pricing data for the following types of titanium: [REDACTED] According to the [REDACTED] [REDACTED] only reported market prices to BLS, as its long-term contract prices were considered company confidential information. [REDACTED] would not disclose the percentage of sales on long-term contract to the audit team. However, according to 2006 and 2007 [REDACTED] annual reports, [REDACTED] had a large long-term contract with [REDACTED] a long-term contract with [REDACTED] and several long-term contracts for commercial aerospace programs. Based on our calculations from these documents, [REDACTED] had at least 28 percent to 55 percent of sales on long-term contract. In comparison, the [REDACTED] 2007 annual report stated that [REDACTED] had about 50 percent of sales on long-term contract, and the [REDACTED] stated that [REDACTED] had about 70 percent of sales on long-term contract.

The BLS Producer Price Index, Branch of Industry Pricing Chief stated that the producer price index sample would reflect the extent that transactions in the industry were characterized by long-term supplier contracts. However, [REDACTED] only reported market prices to BLS, not long-term contract prices; therefore, the index would not accurately reflect the industry pricing.

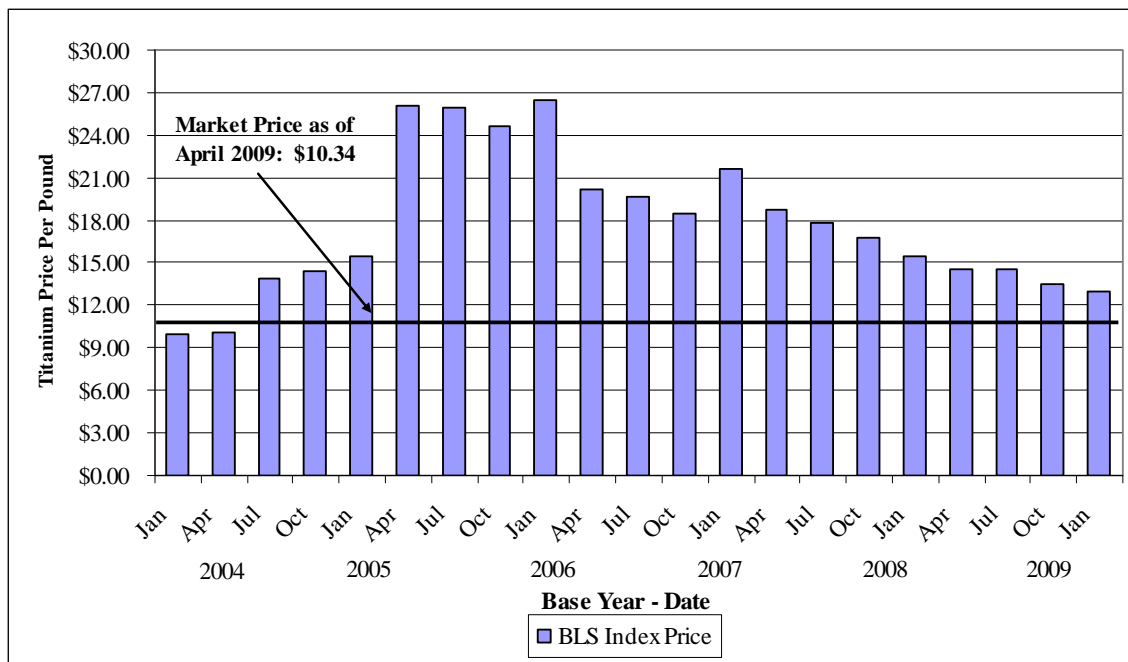
Titanium Market Prices

We obtained titanium ingot market pricing data from American Metal Market and Metal Prices through the Defense National Stockpile Center. American Metal Market is an international daily metals news service that provides up-to-date pricing information for industrial materials included in the ferrous and non-ferrous metals markets. Metal Prices is a metal pricing utility specifically targeted to anyone responsible for tracking the raw material value of any metal product. Defense National Stockpile Center officials stated that they use prices reported by American Metal Market and Metal Prices to track market pricing of commodities like titanium that are not sold on market exchanges. For example, the Defense National Stockpile Center included an economic price adjustment clause for titanium ingot in a contract awarded to TIMET in November 2008. The economic price adjustment calculation was primarily based on the combined average of quarterly ingot pricing from American Metal Market and Metal Prices.

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We used the data from American Metal Market and Metal Prices to identify the combined average price for titanium ingot each month from February 2004 through April 2009. We then inflated the prices using the percentage change in the BLS producer price index for titanium mill shapes. As shown in Figure 5, the combined average April 2009 titanium ingot market price was \$10.34 per pound. If a DOD multiyear contract included the BLS producer price index for titanium mill shapes in its economic price adjustment clause, and the contract baseline date was anywhere from July 2004 through March 2009, DOD would be paying more than the market price for titanium in April 2009. For example, if the contract was awarded in January 2006 and titanium prices were inflated using the BLS producer price index for titanium mill shapes, the contract price in April 2009 would be \$26.46. However, the spot market price in April 2009 was only \$10.34. The contract price was about 156 percent more than the spot market price at the same date.

Figure 5. Comparison of Base-Year Ingot Prices Inflated With the BLS Index to Average April 2009 Market Prices



When pricing titanium in multiyear DOD contracts using an economic price adjustment clause with the BLS producer price index for titanium mill shapes, the titanium price at the base year of the contract is especially important. Volatility in the BLS producer price index for titanium mill shapes could cause DOD to pay more (or less) in multiyear contracts with an economic price adjustment clause depending on the contract baseline date. If DOD entered into a contract when the titanium prices were at a high level, that price would be captured in the contract baseline, and then because the BLS producer price index for titanium mill shapes lags behind market prices, DOD would be affected by the high price again through the index. The index also does not decrease as quickly as market prices, so DOD would continue to pay the higher price under an economic

adjustment clause using the BLS producer price index for titanium mill shapes even though market prices were lower.

The DFARS PGI 216.203-4, “Contract clauses,” cautions contracting officers when using economic price adjustment provisions in contracts that the “provisions can result in significant and unanticipated price increases which can have major adverse effects to a program.” It also states that, for adjustments based on cost indexes of labor or material, “the basis of the index should not be so large and diverse that it is significantly affected by fluctuations not relevant to contract performance, but it must be broad enough to minimize the effect of any single company, including the anticipated contractor(s).” Additionally, the guidance states that for adjustments based on cost indexes of labor or material, normally contracting officers should not use more than two indexes, that is, one for labor and one for material.

However, there is inherent risk in using BLS indexes in DOD contract economic price adjustment clauses because the indexes are not transparent to the users of the index. If a BLS index must be used in an economic price adjustment clause, DOD contracting officers should consider using a broad index to encompass all materials instead of a narrow, industry-specific index. The risk increases when using a BLS index that is as narrow as the producer price index for titanium mill shapes because the index covers an industry that consists of few producers and does not include the largest U.S. titanium producer. In instances such as this, it may be better for DOD to tie contract escalation to published market prices. According to the Defense National Stockpile Center, tying pricing to published pricing allows for greater oversight and control because it gives the Government the ability to objectively gauge changes in the market. We see no value in using the producer price index for titanium mill shapes versus an economic price adjustment methodology based on market prices. The Director, Defense Procurement and Acquisition Policy, should determine whether it is appropriate to use a narrow index, such as the BLS producer price index for titanium mill shapes in economic price adjustment clauses, on DOD multiyear contracts or whether it is more effective to develop an economic price adjustment methodology based on published market prices.

Strategic DOD Purchasing Program for Titanium Materials

DOD was subject to market volatility in titanium material pricing because DOD did not have a strategic purchasing program for titanium to leverage buying power, take advantage of economies of scale, and secure prices on long-term contracts when acquiring titanium products. Also, DOD had limited options when purchasing titanium because of the restriction on the acquisition of specialty metals under title 10, United States Code, section 2533b.

Boeing Commercial Titanium Purchasing Practices

One method that DOD could use as a model for its strategic purchasing program is the Boeing Commercial Airplanes practice. Boeing Commercial Airplanes has a centralized material handling function through [REDACTED] to manage strategic commodities, such as titanium, across the Boeing Commercial Airplanes supply chain. Boeing purchases titanium directly on a [REDACTED] contract from several titanium producers and has it delivered directly to [REDACTED]. Boeing then contracts with [REDACTED] to manage and allocate the titanium to the correct subcontractors. This allows Boeing integrated data management, mill performance management, and the ability to leverage total program demand. According to a May 2008 Boeing presentation to the audit team, the use of [REDACTED] to manage titanium assures appropriate raw material availability to support Boeing commercial production, prioritizes delivery of at-risk materials, and minimizes production line disruptions. It also allows for a direct partnership with titanium mills by enabling partnering, long-term capital investments, and technical collaboration.

According to Boeing, through this arrangement, Boeing Commercial Airplanes has the ability to match demand to supply and pace mill production to total aggregated requirements, resulting in improved forecasting [REDACTED]. Additionally, the arrangement offers stable pricing to the Boeing Commercial Airplanes supply chain by taking speculative escalation and risk out of supplier pricing, capturing the benefits of preferred pricing throughout the supply chain, and eliminating assertions and disruption costs.

Boeing Commercial Pricing

[REDACTED]

Effect of the Specialty Metals Clause

Title 10, United States Code, section 2533b, requires DOD to buy strategic materials critical to national security from American sources. It offers protection to U.S. producers by requiring that strategic materials purchased by DOD be melted or produced in the U.S.

³ [REDACTED]

It requires that all specialty metals, including titanium, used in products sold to DOD be of U.S. origin or from a list of qualifying countries. Therefore, DOD options for purchasing titanium are often limited during times of low supply and high demand. When the U.S. demand for titanium spikes and there is shortage of supply, the specialty metals clause requires the Military to purchase titanium from a U.S. producer, regardless of what the price increases to, while commercial programs may purchase titanium from a foreign origin at a more competitive price.

DOD Strategic Materials Protection Board

Section 843 of Public Law 109-364, “John Warner National Defense Authorization Act for Fiscal Year 2007,” October 17, 2006, requires the establishment of a Strategic Materials Protection Board to determine the need to provide a long-term domestic supply of strategic materials designated as critical to national security, and to analyze the risk associated with each material and the effect that non-availability from a domestic source would have on National Defense. Additionally, the House Armed Services Committee Report 109-89, accompanying the National Defense Authorization Act for FY 2006, contained a request to review DOD’s policy to dispose of material and determine whether the National Defense Stockpile should be reconfigured to adapt to current world market conditions to ensure future availability of materials required for Defense needs.

The April 2009 “Reconfiguration of the National Defense Stockpile (NDS) Report to Congress” concluded that transforming the National Defense Stockpile into a Strategic Materials Security Program would enable the Nation to adapt more quickly to world market conditions and to ensure the future availability of materials required for Defense and national security needs. The Strategic Materials Security Program would continuously monitor global markets, establish supply chain commitments with producers and suppliers, monitor performance to ensure timely availability of materials, and store limited amounts and types of materials. Further, the report stated that 11 materials used in the largest quantity by DOD, one of which was titanium, should be addressed as potential candidates for strategic sourcing.⁴ Titanium was also a material identified in the report as a material with supply problems that had already caused significant weapon system production delays for DOD.

According to the report, the Strategic Materials Security Program could have the programmatic flexibility to efficiently and effectively acquire the right materials and to ensure that essential strategic materials are available to respond to current and future needs and threats. This includes the ability to more fully project material needs and the ability to leverage the buying power of DOD and other Federal agencies by aggregating materials requirements and negotiating long-term strategic procurement arrangements. The report also stated that the Strategic Materials Security Program could aggregate materials requirements to move discreetly in and out of markets without causing undue

⁴ According to the “Reconfiguration of the National Defense Stockpile Report to Congress,” DOD defines strategic sourcing as “... the collaborative and structured process of analyzing [what] an organization spends and using the information to make business decisions about acquiring commodities and services more effectively and efficiently...”

market disruption while ensuring adequate supplies. The strategy employed could include securing materials via strategic sourcing, establishing partnerships with friendly nations, or stockpiling when appropriate. The potential benefits could result in shielding programs from surging market prices, reducing production delays and/or leadtimes, minimizing the impact of geopolitical issues that could disrupt the supply of materials, and economic benefits derived from bulk purchases.

Industry Analysis

According to the December 2008 “Steel and Specialty Metals Trend Analysis,” by the Defense Contract Management Agency, titanium prices fell steeply during the second half of 2008 and were anticipated to continue decreasing through the first half of 2009. However, because of the changing fundamentals in the global economy, metal prices would probably not go back to pre-2003 levels. Regardless of the downturn in the American economy projected for 2009, robust global growth in metals production and consumption was forecasted well into the next decade and metal prices would remain relatively high. The Defense Contract Management Agency stated that the continued delays in the Airbus A380, the Boeing 787, and the Lockheed Martin F-35 Joint Strike Fighter gave extra breathing space for buyers that were anticipating a shortfall in titanium availability. Additionally, the titanium manufacturers were somewhat protected from the effects of the downturn because of long-term contracts that were signed over the past 2 years. The report stated that the economic situation presents an opportunity for DOD to re-examine key programs’ cost structures to assess where savings could occur with respect to raw materials and metal products, such as forgings, engines, and airframes.

According to the Institute for Defense Analysis, “Assessment of Industry Investment in U.S. Domestic Production of Strategic Materials,” October 2008, special metals companies were investing for continued domestic production; and commercial demand, rather than Defense demand, appeared to dominate investment plans. The report stated the titanium sector was aggressively investing for an anticipated major increase in aerospace demand, as titanium and composites took an increasing share of the commercial aerospace materials market. Recent, publicly disclosed major expansions that were in process or planned include TIMET, ATI, and RTI investments to upgrade titanium sponge production at existing facilities, and to build new titanium sponge facilities.

The commercial aerospace industry, however, has historically been cyclical due to factors both external and internal to the airline industry. Those factors include general economic conditions, airline profitability, consumer demand for air travel, varying fuel and labor costs, price competition, and international and domestic political conditions, such as military conflict and the threat of terrorism. The length and degree of cyclical fluctuation is influenced by those factors and therefore is difficult to predict with certainty. Demand for titanium products is subject to those cyclical trends and was extremely high in 2005, 2006, and 2007. However, the recent economic conditions have caused delays in the commercial aerospace industry.

Conclusion

DOD is subject to the volatility in the titanium market when pricing titanium materials in its contracts for DOD aerospace programs because DOD does not have a strategic purchasing program for titanium. Long-term contracts with U.S. titanium producers could substantially mitigate the effect of unexpected price increases due to the market volatility of titanium pricing. Long-term contracts could also be beneficial to the U.S. titanium producers because the agreements provide a baseline volume, which is critical to establishing standardized processes, securing necessary capital, negotiating purchasing agreements with vendors, and planning manufacturing resources. The U.S. titanium producer investments to meet demand for titanium products, coupled with the delays in the commercial aerospace market, present an opportunity for DOD to negotiate long-term contracts at preferential rates.

Various sources estimate that DOD requires between 20 million and 30 million pounds of titanium annually. The Office of the Deputy Under Secretary of Defense for Industrial Policy calculated that a 50 percent increase in titanium prices would increase the FY 2005 through FY 2011 buy of Defense aerospace programs by more than \$200 million. (See Appendix B for details.) Titanium market prices have decreased over the past 2 years, U.S. titanium producers have increased production, and the global economic situation has resulted in delays in commercial aerospace markets; therefore, it is an opportune time for DOD to negotiate long-term titanium pricing arrangements with the U.S. titanium producers. Table 3 shows, for example, that if DOD purchased about half (10 million to 15 million pounds) of its annual titanium requirement on a long-term contract priced at about \$10 per pound instead of at titanium market prices at between \$20 to \$30 per pound, DOD could save from \$100 million to \$300 million annually.

Table 3. Titanium Price and Quantity Comparison (in Millions)				
Price Per Pound	5 Pounds	10 Pounds	15 Pounds	20 Pounds
\$10.00	\$ 50	\$100	\$150	\$200
15.00	75	150	225	300
20.00	100	200	300	400
25.00	125	250	375	500
30.00	150	300	450	600
35.00	175	350	525	700

The Strategic Materials Protection Board concluded that the National Defense Stockpile should reshape into the Strategic Materials Security Program. They stated that this program could have the programmatic flexibility to efficiently and effectively acquire the right materials and to ensure that essential strategic materials are available to respond to current and future needs and threats, including the ability to more fully project material needs and the ability to leverage the buying power of DOD and other Federal agencies by aggregating materials requirements and negotiating long-term strategic procurement

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arrangements. In line with the conclusions of the National Defense Stockpile April 2009 Report to Congress, the Deputy Under Secretary of Defense for Industrial Policy, in conjunction with the Administrator, Defense National Stockpile Center, Defense Logistics Agency, should develop a strategic purchasing program for titanium with U.S. titanium producers to leverage buying power, take advantage of economies of scale, and secure prices on long-term contracts when acquiring titanium products.

Recommendations, Management Comments, and Our Response

1. We recommend that the Director, Defense Procurement and Acquisition Policy, determine whether it is appropriate to use a narrow index such as the Bureau of Labor Statistics producer price index for titanium mill shapes in economic price adjustment clauses on DOD multiyear contracts or whether it is more effective to develop an economic price adjustment methodology based on published market prices.

Management Comments

The Director, Defense Procurement and Acquisition Policy, agreed. On September 9, 2009, he issued a policy memorandum advising contracting officers to use caution when incorporating economic price adjustment provisions in contracts for volatile commodities that have only a limited number of sources of supply. He stated that in these cases it might be appropriate to consider an alternate methodology, such as one based on published market prices, when incorporating economic price adjustment provisions.

Our Response

The Director, Defense Procurement and Acquisition Policy, action meets the intent of the recommendation, and no additional comments are required.

2. We recommend that the Deputy Under Secretary of Defense for Industrial Policy, in conjunction with the Administrator, Defense National Stockpile Center, Defense Logistics Agency, develop a strategic purchasing program for titanium materials with U.S. titanium producers to leverage buying power, take advantage of economies of scale, and secure prices on long-term contracts when acquiring titanium products.

Management Comments

The Director, Industrial Policy, and the Administrator, Defense National Stockpile Center, Defense Logistics Agency, agreed. The Director, Industrial Policy, stated that the April 2009 report to Congress recommended reconfiguring the National Defense Stockpile into the Strategic Materials Security Program to lead the DOD effort in establishing an integrated, interagency approach to strategic materials management. The program is to provide programmatic flexibility to efficiently and effectively acquire and maintain essential strategic materials, and allow DOD to leverage buying power by aggregating materials requirements and negotiating long-term strategic agreements. He stated that a legislative proposal for reconfiguration of the National Defense Stockpile is

being developed and will be submitted through the normal legislative cycle. The Administrator, Defense National Stockpile Center, Defense Logistics Agency, stated the Defense National Stockpile Center would operationally support a purchasing program for titanium once it has been approved by the stockpile manager.

Our Response

The Director, Industrial Policy, and the Administrator, Defense National Stockpile Center, Defense Logistics Agency, comments meet the intent of the recommendation, and no additional comments are required.

Appendix A. Scope and Methodology

We conducted this performance audit from May 2007 through July 2009* in accordance with generally accepted government auditing standards. 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 met with officials from the Naval Air Systems Command F/A-18 E/F Super Hornet Program Office; the Air Force Materiel Command F-22 Raptor Program Office; the Office of the Deputy Assistant Secretary of the Air Force for Contracting; the Office of the Deputy Under Secretary of Defense for Industrial Policy; the Office of Portfolio Systems Acquisition, Air Warfare; the Office of Defense Procurement and Acquisition Policy; and the National Defense Stockpile Center. We interviewed and obtained documentation on the F/A-18 E/F Super Hornet contract economic price adjustment clause from the personnel of Northrop Grumman Corporation, El Segundo, California; and the Naval Air Systems Command, Patuxent River, Maryland. We also interviewed and obtained documentation on the F-22 Raptor and F-35 Joint Strike Fighter contracts from the personnel of the Defense Contract Audit Agency Lockheed Martin Fort Worth Office and Lockheed Martin, Fort Worth, Texas; the Defense Contract Audit Agency Boeing Rainier Branch Office and the Boeing Integrated Defense Systems, Seattle, Washington; the F-22 Raptor Program Office, Wright Patterson Air Force Base, Ohio; and the F-35 Joint Strike Fighter Program Office, Arlington, Virginia. We met with officials from the Defense National Stockpile Center and obtained historical titanium pricing from American Metal Market and Metal Prices. We met with officials from BLS to obtain information on the producer price index for titanium mill shapes. In addition, we interviewed representatives from each of the three major U.S. titanium producers, TIMET, RTI, and ATI, to obtain an understanding of the titanium industry and the price increases they had incurred.

We reviewed the FAR and DFARS for guidance on economic price adjustment clauses in multiyear contracts. Specifically, we reviewed FAR 17.109, FAR 16.203-2, and DFARS PGI 216-203.4. We reviewed the multiyear contract economic price adjustment clause and the cost models used by the Navy to calculate the adjustments. Specifically, we reviewed economic price adjustment calculations for FY 2005 through FY 2009 for the Navy F/A-18 E/F Super Hornet. We reviewed long-term contracts for the Air Force F-22 Raptor and F-35 Joint Strike Fighter programs to determine how the contractors built titanium pricing into the contracts. We reviewed annual reports from each of the three major U.S. titanium producers and the titanium pricing data that ATI and RTI reported to BLS in order to determine percent of sales on long-term contract and

* A break in performance occurred from April 2008 through January 2009 because of personnel assignments to higher priority statutory projects required by sections 324 and 325 of the FY 2008 Defense Authorization Act.

increases in titanium costs. We reviewed titanium pricing information from American Metal Market and Metal Prices to calculate the average increase in market prices for titanium compared to the average increase in the BLS producer price index for titanium mill shapes. We reviewed industry documents to determine the annual DOD titanium requirements and calculated the amount DOD could save by developing a strategic sourcing program to purchase titanium at lower prices than the spot market price. BLS did not provide information on the producer price index for titanium mill shapes because the data are protected by the Confidential Information Protection and Statistical Efficiency Act of 2002.

Use of Computer-Processed Data

We did not use computer-processed data to perform this audit.

Prior Coverage

During the last 5 years, the DOD IG has issued one report discussing economic price adjustment clauses in DOD multiyear contracts. No reports have been issued discussing cost increases related to the producer price index for titanium mill shapes in DOD multiyear contracts with economic price adjustment clauses. Unrestricted DOD IG reports can be accessed at <http://www.dodig.mil/audit/reports>.

DOD IG

DOD IG Report No. D-2008-099, “Effect of Payments Into Boeing Pension Funds on Economic Price Adjustment Clauses in DOD Contracts,” May 28, 2008

Appendix B. Potential Increases in Aircraft Costs

In December 2005, the Office of the Deputy Under Secretary of Defense for Industrial Policy issued the report, “China’s Impact on Metals Prices in Defense Aerospace.” The following table shows the report’s analysis of potential increases in titanium costs in Defense aerospace weapons systems and the extent that different percentages of price increases would have on the unit cost and total cost of the systems. Specifically, a 50 percent increase in titanium prices would increase the FY 2005 through FY 2011 buy of Defense aerospace systems by about \$200 million.

Table. Potential Increases in Defense Aircraft Titanium Costs						
<u>Aircraft type</u>	Titanium Costs (Thousands of FY 2005 Dollars)					
	Base Unit Cost	Number of Aircraft	Total Cost	10 Percent Increase	25 Percent Increase	50 Percent Increase
C-17	\$1,056	42	\$ 44,352	\$ 4,435	\$ 11,089	\$ 22,177
F/A-18 E/F	183	190	34,770	3,483	8,707	17,414
F/A-18G	193	90	17,370	1,736	4,340	8,681
F-22A	2,547	104	264,888	26,491	66,227	132,454
F-35 (CTOL)	162	79	12,798	1,279	3,198	6,395
F-35 (CV/VSTOVL)	233	111	25,863	<u>2,583</u>	<u>6,456</u>	<u>12,913</u>
Total				\$40,007	\$100,017	\$200,034

Defense Procurement and Acquisition Policy and Deputy Under Secretary of Defense for Industrial Policy Comments



ACQUISITION,
TECHNOLOGY
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

SEP 30 2009

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL AND DIRECTOR,
DEFENSE FINANCIAL AUDITING SERVICE, DODIG

THROUGH: DIRECTOR, ACQUISITION RESOURCES AND ANALYSIS *ms 9/30/09*

SUBJECT: Response to DoDIG Draft Report "Cost Increases Related to the Producer Price Index (PPI) for Titanium Mill Shapes on DoD Multiyear Contracts" (Project No. D2007-D000CH-0182.000)

As requested, I am providing responses to the general content and recommendations contained in the subject report.

Recommendation 1:

We recommend that the Director, Defense Procurement and Acquisition Policy (DPAP) determine whether it is appropriate to use a narrow index such as the Bureau of Labor Statistics producer price index for titanium mill shapes in economic price adjustment clauses on DoD multiyear contracts or whether it is more effective to develop an economic price adjustment methodology based on published market prices.

Response:

Concur. DPAP will issue a policy memorandum advising contracting officers to use caution when incorporating economic price adjustment provisions in contracts for volatile commodities, such as titanium mill shapes, that have only a limited number of sources of supply. In such cases, DPAP will advise contracting officers to consider an alternative methodology, such as one based on published market prices, when appropriate.

As agreed to by [REDACTED] of the OIG, the above response satisfies the required actions for DPAP. The memorandum sent to Defense Components in response to recommendation 1 (and recommendations in another OIG report) is attached.

Recommendation 2:

We recommend that the Director, Industrial Policy, in conjunction with the Administrator, Defense National Stockpile Center, Defense Logistics Agency, develop a strategic purchasing program for titanium materials with U.S. titanium producers to leverage buying power, take advantage of economies of scale and secure prices on long-term contracts when acquiring titanium products.

Response:

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Concur. The April 2009 report to Congress recommends reconfiguring the National Defense Stockpile (NDS) into the Strategic Materials Security Program (SMSP) which would lead the DoD effort to establish an integrated, interagency approach to strategic materials management. Titanium would be one of the many materials considered in this approach. The SMSP, as envisioned, would provide programmatic flexibility to efficiently and effectively acquire the right materials and to ensure that essential strategic materials are available to respond to current and future needs and threats. As proposed, the SMSP would also have the ability to leverage the buying power of the Department and potentially other cooperating federal agencies by aggregating materials requirements and negotiating long-term strategic procurement arrangements. The Congressional report contains several proposed authorities to provide flexibility in the manner in which materials are acquired and disposed, and to select and apply strategies to mitigate risks associated with essential materials. A legislative proposal for the reconfiguration of the NDS is being developed and will be submitted through the normal legislative cycle.

Please contact [REDACTED] if additional information is required.



Brett B. Lambert
Director, Industrial Policy



ACQUISITION,
TECHNOLOGY
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

SEP -9 2000

MEMORANDUM FOR COMMANDER, UNITED STATES SOUTHERN COMMAND
(ATTN: ACQUISITION EXECUTIVE)
COMMANDER, UNITED STATES TRANSPORTATION
COMMAND (ATTN: ACQUISITION EXECUTIVE)
DEPUTY ASSISTANT SECRETARY OF THE ARMY
(PROCUREMENT), ASA (ALT)
DEPUTY ASSISTANT SECRETARY OF THE NAVY
(ACQUISITION & LOGISTICS MANAGEMENT),
ASN (RDA)
DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE
(CONTRACTING), SAF/AQC
DIRECTORS, DEFENSE AGENCIES
DIRECTORS, DOD FIELD ACTIVITIES

SUBJECT: Follow-on Actions in Response to OIG Report Notification: 'Effect of
Payments into Boeing Pension Funds on Economic Price Adjustment
Clauses in DoD Contracts' (Project No. D2006-D000CH-0226.000)

The purpose of this memorandum is to reiterate the need to use caution when incorporating Economic Price Adjustment (EPA) provisions in contracts. As stated in PGI 216.203-4, EPA provisions can result in significant and unanticipated price increases which can have major adverse impacts to a program.

The situation described in the subject audit underscores the importance of ensuring EPA clauses are properly structured and carefully monitored after contract award. The Department of Defense Inspector General (DoDIG) found that Boeing's pension contributions between 2003 and 2005 disproportionately influenced the Bureau of Labor Statistics (BLS) index (ECI 3721) used in the EPA clauses of the Air Force C-17 Globemaster III, the Navy F/A-18 E/F Super Hornet, and the Army AH-64D Apache Longbow contracts. This situation only became apparent after contract award.

The basis of a BLS index, per DFARS PGI 216.203-4(6), should not be so large and diverse that it is significantly affected by fluctuations not relevant to contract performance, but it must be broad enough to minimize the effect of any single contractor. In addition, care should be exercised in those cases that deal with volatile commodities that have only a limited number of sources of supply. In these cases it may be appropriate to consider an alternative methodology, such as one based on published

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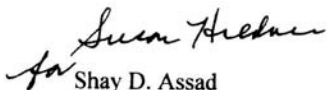
market prices. DoD contracting officers shall use caution when incorporating economic price adjustment provisions in contracts.

Since the ECI 3721 index failed both of the PGI tests, the DoDIG determined that use of this BLS index constituted a material internal control weakness (as defined by DoD Instruction 5010.40, "Managers Internal Control (MIC) Program Procedures," January 4, 2006). As a result of the audit recommendations, PGI 216.203-4 was revised to prohibit the BLS employment cost index for total compensation, aircraft manufacturing (NAICS Product Code 336411, formerly Standard Industrial Classification Code 3721, Aircraft) in any EPA clause in DoD contracts.

It is the policy of the Department that Multi-Year (MY) contracts with EPA clauses will be monitored to ensure that economic price adjustments are the result of normal economic behavior as intended by the clause. Accordingly, the Components are responsible for establishing local policies and procedures for reviewing and monitoring MY contracts with EPA clauses.

To ensure continued visibility, Components must also submit an annual report of Contract Data for MY contracts with EPA clauses in the attached format. The initial report of FY 2009 data is due October 30, 2009.

My point of contact for this memorandum is [REDACTED] and he can be reached at [REDACTED]


Shay D. Assad
Director, Defense Procurement
and Acquisition Policy

Attachment:
As stated

cc:
DCAA

DPAP Multiyear Contract Data Submission (revised FY2009)

	1	2	3
Contract Number			
Organization			
POC Name			
POC Number			
Program			
Contractor			
Contract Type			
Performance Period (Mo/Yr to Mo/Yr)			
Total Contract Price at Award			
Quantity at Time of Award			
"Current" as of date for below			
Current Total Contract Price			
Current (Revised) Quantity			
Current Incurred Costs			
Initial Projected Savings Amount to justify multiyear			
Initial Projected Savings Percentage to justify multiyear			
Negotiated Profit Rate			
Has EPA Index? (Note 1)			
EPA Index used (Note 2)			
Source of EPA Index (Note 3)			
EPA Adjustment Year 1			
EPA Adjustment Year 2			
EPA Adjustment Year 3			
EPA Adjustment Year 4			
EPA Adjustment Year 5			
Comments (if any)			

Please do not insert additional rows above the comment line

Notes:

- (1) Answer Y or N
- (2) If there is an index, state title, otherwise leave blank
- (3) State the source or publisher of the index, e.g., BLS, EIA, Global Insights, etc.

Attachment

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Defense National Stockpile Center, Defense Logistics Agency Comments



DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD, SUITE 3229
FT. BELVOIR, VIRGINIA 22060-6223

IN REPLY
REFER TO

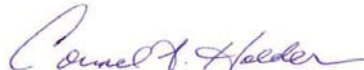
DNSC-D

AUG 17 2009

MEMORANDUM FOR MR. ANDY HAGENOW, DAB

SUBJECT: DoDIG Draft Report, "Cost Increases Related to the Producer Price Index for Titanium Mill Shapes on DoD Multiyear Contracts" (Project No. D2007-D000CH-0182.000)

We are providing the requested response to subject report. If you have any questions please contact [REDACTED]


CORNEL A. HOLDER
Administrator, DNSC

Attachment

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DoDIG Draft Report, "Cost Increases Related to the Producer Price Index for Titanium Mill Shapes on DoD Multiyear Contracts" (Project No. D2007-D000CH-0182.000)

Recommendation 2. We recommend that the Deputy Under Secretary of Defense for Industrial Policy, in conjunction with the Administrator, Defense National Stockpile Center, Defense Logistics Agency, develop a strategic purchasing program for titanium materials with U.S. titanium producers to leverage buying power, take advantage of economies of scale, and secure prices on long-term contracts when acquiring titanium products.

Response. Concur. The Defense National Stockpile Center is the operational element of the National Defense Stockpile. The Stockpile Manager continues to be the Under Secretary of Defense for Acquisition Technology and Logistics.

In April 2009 USD (AT&L) submitted a National Defense Stockpile Reconfiguration Report to Congress. The report addresses reconfiguring the NDS into the Strategic Materials Security Program and changing the Stockpiling Act. The changes to the Stockpiling Act would provide programmatic flexibility to efficiently and effectively acquire materials to ensure that essential strategic materials are available to respond to current and future needs and threats. The legislative proposal is being developed and will be submitted through the normal legislative cycle. DNSC would operationally support a purchasing program for titanium once it had been approved by the Stockpile Manager.

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Inspector General
Department *of* Defense



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