

SUMMARY MEMO

Strategic and Critical Materials 2017 Report on Stockpile Requirements

Strategic Context

Congress created the National Defense Stockpile (NDS) Program in the summer of 1939. In the world war that followed, the United States shouldered extraordinary costs to secure adequate supplies of foreign-produced and limited-source strategic and critical materials. The cash cost of obtaining these materials is readily apparent but masks the true burden imposed by constrained access to strategic and critical materials. Rather than seeking-out the enemy, U.S. military forces deployed to protect overseas mineral supply lines. Rather than lifting war materiel to combat zones, U.S. flagged merchant ships carried raw ores and metals to North American factories. Most of all, the U.S. lost precious time mobilizing the industrial base for war.

From this beginning to the present, the NDS Program's mission remains to guard against military and essential civilian manufacturing shortfalls caused by constrained access to foreign-produced and limited-source strategic and critical materials. Effectively, the NDS Program is the nation's insurance policy between the onset of a national emergency and full industrial mobilization. However, the U.S. industrial base and the geopolitical environment have not remained static and, as a result, the NDS Program continues to evolve to match these changing dynamics.

The *Strategic and Critical Materials 2017 Report on Stockpile Requirements* ("the 2017 Requirements Report") summarized in this memo is an essential tool of the NDS Program to inform Congress, the Department of Defense (DoD), and the military services about the supply chains for strategic and critical materials. These supply chains may be sufficiently resilient, stressed, or altogether broken during the military conflict scenarios established by the Office of the Secretary of Defense (OSD), as well as more intense alternative conflict scenarios.

In keeping with previous reports to Congress on NDS Program requirements, the Defense Logistics Agency (DLA) Strategic Materials investigated the supply chains of 130 minerals and processed materials. The NDS Program has assessed some of these materials, also known as "Group 1" materials, for decades. In general, Group 1 materials consist of bulk commodities, industrial metals, and some rare metals.

Beginning in 2009 in response to congressional direction and the shifting needs of the industrial base, DLA Strategic Materials embarked on a reorganization and modernization program to expand its research efforts into non-traditional strategic and critical materials, also known as "Group 2" materials. Group 2 strategic and critical materials consist of semi-processed materials and components found in U.S. weapons.

Assessment Process

DLA Strategic Materials' assessment consists of the following basic steps:

1. Monitoring of strategic and critical material supply chains;
2. Filtering monitored strategic and critical materials according to vulnerability metrics;
3. Collection of open- and closed-source supply chain data;

DISTRIBUTION A. Approved for public release: distribution unlimited.

4. Modeling collected data via the verified and validated Risk Assessment and Mitigation Framework for Strategic Materials (RAMF-SM)¹; and
5. Application of supply-side and demand-side Market Responses².

DLA Strategic Materials actively monitors more than 170 minerals and processed materials on a watch list. This watch list is updated regularly with input from the defense industrial base and stakeholders across the DoD and the military services. DLA Strategic Materials developed a series of vulnerability metrics based on U.S. government and industry proprietary benchmarks and uses these metrics as initial assessment filters. Any material that meets at least one vulnerability benchmark advances into the data collection phase, and in the case of the 2017 Requirements Report, 130 of the 170 materials met one or more of these criterion.

Data collection efforts for the materials modeled in RAMF-SM differ depending on the nature of the material, its principal end uses, and data availability. Ultimately, DLA Strategic Materials modeled 88 of the 130 materials meeting the vulnerability criterion. DLA Strategic Materials did not model the balance of 42 materials because (1) DLA Strategic Materials modeled a given material in a previous edition of the Requirements Report, (2) risk mitigation programs for a given material are underway, or (3) data was insufficient to model reliably. For the 88 materials that were modeled, the U.S. Geological Survey and the Department of Commerce provided key inputs for 59 Group 1 materials, and DLA Strategic Materials conducted complete, bottom-up investigations for the 29 Group 2 materials.

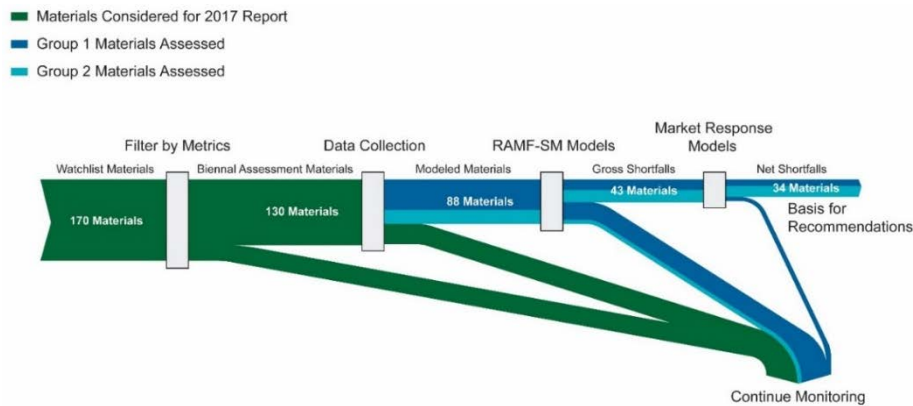
RAMF-SM estimates potential shortfalls in two ways – gross and net. Recognizing that shortfalls, both gross and net, are estimated under the tenets of approved national emergency planning scenarios is paramount to an understanding of the NDS Program’s statutory reporting requirements. That is, RAMF-SM intentionally perturbs the economic system by elevating material demand and restricting available supplies as a fundamental aspect of the national emergency planning scenarios. Gross shortfalls are simply material demands that available supplies cannot satisfy. After the application of market response factors³, DLA Strategic Materials identified net shortfalls for 22 percent of Group 1 Materials (13 materials) and 72percent of Group 2 materials (21 materials), illustrated in **Figure 1**. DLA Strategic Materials cannot publicly release results for individual strategic and critical materials due to a combination of the following factors: (1) proprietary data inputs from industrial base participants, (2) sensitive but unclassified data inputs from DoD and the military services, (3) classified inputs from DoD and the military services, and (4) export-controlled and / or classified results.

¹ This section may result in “gross shortfalls” to essential civilian and / or defense demand. Gross shortfalls are characterized by insufficient domestic production and imports to meet essential civilian and / or defense demand *without accounting for* private sector Market Responses to National Emergency scenario conditions.

² This section may result in “net shortfalls” to essential civilian and / or defense demand. Net shortfalls are characterized as a gross shortfall for which, after the application of private sector Market Responses to National Emergency scenario conditions, domestic production and imports remain insufficient to meet essential civilian and / or defense demand.

³ Market Response factors include material substitution, thrifting (i.e., economizing consumption), recycling, and “extra sales” of material from reliable sources in excess to typical peacetime U.S. market share.

Figure 1: DLA Strategic Materials Assessment Process



RAMF-SM’s findings form the basis of DLA Strategic Materials’ recommendations to include: (1) acquire material for or sell material from the NDS, (2) qualify a domestic supplier for defense use, (3) initiate recycling programs, (4) upgrade or rotate material within the NDS, or (5) conduct research and development.

Current Programs and Recommendations for Future Action

Table 1 below summarizes the status of acquisition programs approved by congress in the FY14 and FY17 National Defense Authorization Acts.

Table 1: Acquisition Program Status

NDAAs	Material	Action
FY 2014	Ferro-niobium	Acquisition Planning Complete, Delivery Complete
	Dysprosium	Acquisition Planning Complete, Delivery Complete
	Yttrium Oxide	Acquisition Planning Complete, Delivery Complete
	Cadmium Zinc Tellurium Substrates	Acquisition Planning Complete, Delivery Ongoing
	Lithium-Ion Battery Precursors (three materials)	Acquisition Planning Complete, Delivery Complete
	Triamino-Trinitrobenzene and Insensitive High Explosive Molding Powders	Acquisition Planning Complete, Delivery Complete
FY 2017	High Modulus and High Strength Carbon Fibers	Acquisition Planning Underway
	Tantalum	Acquisition Planning Underway
	Germanium	Acquisition Planning Underway
	Tungsten Rhenium Metal	Acquisition Planning Underway
	Boron Carbide Powder	Acquisition Planning Underway
	Europium	Acquisition Planning Underway
	Silicon Carbide Fiber	Acquisition Planning Underway

DLA Strategic Materials will request additional acquisition authority from Congress and other legislative reforms to the Strategic and Critical Materials Stock Piling Act (50 U.S.C. 98 *et seq.*) as appropriate to accomplish its mission.