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# Sustainment of Army Forces in Operation Iraqi Freedom

Battlefield Logistics and  
Effects on Operations

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## Summary

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### Introduction

By virtually every account, the major combat operations of Operation Iraqi Freedom (OIF) that toppled Saddam Hussein's regime were a remarkable success. However, there seems to be some belief within the Army and the broader defense community that this success was achieved despite severe logistics problems. Although legitimate issues did arise, the great success of major combat operations in Iraq could not have been achieved without historically noteworthy logistics support.

This seeming paradox may have resulted from several factors. Risk was accepted up front and did grow beyond what people are accustomed to, implying potential problems against a more effective adversary or in the event of major disruptions to logistics operations. Second, it is valuable to separate issues with logistics resources and processes themselves from issues with other facets of the planning for and the conduct of OIF, such as a concept of operations with unprotected supply lines, intelligence issues, or tactical communications difficulties, as they have markedly different implications for future force design and operational concepts.

There could be other cases, however, where the consequences of the types of sustainment issues encountered in OIF would have been more serious. To assess this, it is important to understand how logistics problems translate into operational effects; to drive improvement of future logistics capabilities, the underlying reasons for the problems or symptoms should be determined.

### Distribution Based Logistics

OIF marked a de facto application of what has become known as distribution based logistics (DBL). DBL means limited inventory to cover small disruptions in distribution flow and enough supply to cover consumption between replenishments. The primary reliance is placed on frequent, reliable distribution rather than on large forward stockpiles. This is roughly how OIF combat operations were conducted. Except for small buffer stocks, such as one or two days of food and water at logistics support

areas, supplies stayed at an intermediate support base (ISB) (i.e., Kuwait) and were not pushed forward in large amounts. Even forward fuel supplies, while richer, were limited to a few days, but this was generally considered to represent a “healthy” situation. Further, the supply levels at the ISB remained limited in comparison to some past campaigns. For example, when ground operations began in Operation Desert Storm, forward logistics bases near the Iraqi border had 29 days of rations and 45 days of ammunition stockpiled to support operations, in addition to what was farther back at theater bases.<sup>1</sup> By contrast, in OIF, meals-ready-to-eat (MRE) stocks at the port and at the general support food warehouse were down to less than a day of supply early in combat operations, with as little as five days of supply contained in on-hand stocks within units, supply at logistics support areas (LSAs), and MREs in the distribution pipeline en route to units.<sup>2</sup>

But although inventory was reduced, many of the enablers of DBL were not in place, such as good in-transit visibility of supplies. Nor were many of the supporting processes, such as load building in the continental United States (CONUS), aligned with DBL concepts. In short, many of the critical elements of a DBL system were not in place or suffered problems, being overcome only by “superhuman” efforts and likely increasing risk.

The experience points to numerous issues, but several observations should be highlighted. Operating under the DBL paradigm may not always be comfortable for commanders and the troops, especially if this is not what they are used to, whether from training or from previous deployed operations. This is particularly true without complete, accurate, and real-time information about current and projected supply levels, which raises the perceived level of risk when relying on distribution rather than large stockpiles. And problems can develop quickly. To counter potential risk, commanders need to quickly know about and resolve any distribution flow issues. Thus, to reduce uncertainty and support operational decisionmaking and to control the system, DBL demands solid logistics situational awareness.

With a supply point model of support, the various portions of the supply chain can be somewhat disconnected for periods of time as units live off relatively large stockpiles. But if the stockpiles have the wrong things or do get drained, significant problems can result, as the system is relatively inflexible and unresponsive. In contrast, a DBL system may be at greater risk for spot shortages, but if well executed, it should be able to respond quickly to problems, minimizing their severity and duration. In such a system, planning and execution must be integrated across the entire

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<sup>1</sup> Army Materiel Command (AMC), *Theater Logistics in the Gulf War*, 1994. The goal was actually 60 days of fuel, food, and ammunition.

<sup>2</sup> From General Support (GS) supply daily status reports covering the theater distribution center, the food warehouse, and the seaport. It is possible that not all MRE inventory in the port was accounted for, but then again, if not accounted for, it could not be issued.

system from CONUS to consuming units, requiring adequate lift capacity balanced across distribution segments, seamless transfer of loads at distribution nodes, and load configuration aligned with distribution node capabilities. Without large stockpiles of items with high demand variability, such as spare parts, units need to always be connected physically and electronically so that they can order and “pull” such items when they use the few they have. Such items cannot be effectively “pushed” like items with low demand variability that are used at relatively predictable rates, such as food.

Finally, the desired levels of acceptable risk and associated buffers need to be carefully examined. The sandstorm that occurred a few days into ground combat provided an example of how a two- to three-day disruption can affect a force that is operating with limited supplies. The system was able to handle the disruption, but just barely. The ensuing separate discussions of fuel and dry cargo supply and distribution systems illustrate different levels of risk acceptance in the planning process, with different buffer sizes in the two systems. However, other factors, as will be described, also account for differences in fuel and dry cargo sustainment performance.

## **Fuel Supplies Stayed Robust**

Actions and interviews across all levels make it clear that planners considered the need to get fuel right paramount for the success of the operation, which counted on a long, rapid advance. Unlike some other classes of supply, fuel shortages cannot be worked around without significantly changing the operational plan. Besides the greater emphasis that fuel received in planning and preparation than other classes of supply, other factors unique to fuel supply and distribution were important as well.

Starting in mid-2002, the theater planners proposed a number of preparatory tasks to set the conditions for force reception and rapid force buildup, primarily in terms of the infrastructure in Kuwait. An exception to the infrastructure or construction focus was the early approval for the mobilization and deployment of seven reserve component fuel truck companies. The early movement of fuel trucks combines with other preparatory tasks to suggest another focus beyond force reception: developing robust fuel supplies and distribution capabilities. Pipelines connected Kuwaiti refineries directly to the fuel farms and led virtually to the border with Iraq by the start of operations.<sup>3</sup>

Further evidence that fuel sustainment capability was believed to be critical can be seen in the results of the deployment planning process. In contrast to other types of distribution assets, fuel distribution assets have been generally acknowledged as

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<sup>3</sup> In COL (ret.) Gregory Fontenot, LTC E.J. Degen, and LTC David Tohn, *On Point: The United States Army in Operation Iraqi Freedom*, Fort Leavenworth, KS: Combat Studies Institute Press, 2004.

resourced at requested levels—all echelons received the assets they thought they needed to do the job. Additionally, as the force moved forward, large fuel farms were quickly put in place and filled.

Also in contrast to the classes of supply that had the most problems, determining what to send forward and how it should be consolidated across units is not an issue with fuel supply. The more complex and variable the demands for a given supply class are, the more critical this determination becomes, and there was a high correlation between class complexity and supply and distribution effectiveness in OIF.

## **Dry Cargo Distribution During Combat Operations**

Dry cargo distribution performance during major combat operations did not meet expectations. Consumed materiel was not replenished to the expected and desired levels, and materiel ordered on demand (e.g., a specific spare part to correct a mission-critical equipment fault versus food that any unit could use) was difficult if not impossible to get via standard distribution channels during this period. Additionally, distribution inconsistency and the limited visibility of in-transit and on-hand supplies combined with the low stockage levels in units led to anxiousness among commanders in the force that may have affected decisionmaking and thus operations in ways that cannot be clearly documented. However, by most accounts and available data, distribution performance was at least minimally sufficient for subsistence, enabling the force to conduct operations as intended and as driven by other factors, such as weather and enemy actions.

Why did distribution performance fall short? First, it is widely believed that there was an insufficient number of trucks. Changes in the deployment plan are widely attributed as one of the reasons for the truck shortage. The nature of these changes may have been influenced by the lack of adequate theater distribution planning tools. There was no integrating tool to enable comprehensive, consistent planning across echelons. The consequence of this is difficult to determine, but at the very least the planners could not rapidly analyze how changes in the deployment plan and flow or changes in logistics policies would affect distribution capability, and thus quickly show their impacts. Additionally, no one had responsibility for looking across the theater and establishing a complete, detailed theater distribution plan and requirements down to the maneuver brigade level. What were, in a sense, separate plans were not treated as one capability package by the senior echelons of the chain of command. Additionally, this may have impeded seamless rebalancing of assets across echelons of distribution when the plan was not executed fully or needed to change because of unexpected conditions.

Reports indicate that distribution assets were deleted from the deployment plan or shifted in the deployment flow through a series of planning conferences and in the

request for forces process. Widespread interviews relate that units such as truck companies were often treated as individual elements in the deployment planning process. Without documentation of a comprehensive theater distribution plan and how each element fit within it, the reported result was cuts in these units.

Beyond what was in the force flow was the question of timing. A majority of combat service support units are in the reserve component, requiring about 90 to 120 days to mobilize and deploy.<sup>4</sup> Thus, in order to get ready by the start of combat operations they would have had to mobilize prior to the December 2002 holiday season. To avoid this, it was decided to delay some mobilizations.

Beyond whether the force had sufficient distribution assets to support the plan, there were a series of factors that changed distribution system requirements and available assets from planning estimates. Road conditions were not as good as expected, slowing movement rates. Convoy disruptions further reduced throughput. The *shamal* or sandstorm temporarily limited movement. Bottled water unexpectedly became the norm for the entire operation, consuming more distribution capacity than planned for.

The sum of these issues resulted in distribution limited to basic subsistence. Food, water, and ammunition were the priorities.<sup>5</sup> Choices had to be made, and there was room for little else except on an absolute emergency basis. This included spare parts. However, units were generally able to maintain combat power with on-hand spare part stocks and creative maintenance during combat operations.

## Supply Levels During Combat Operations

The 3rd Infantry Division's plan was to start operations with five days of supply of food and water in all units, with an additional one to two days in the support battalions. The plan was to get the first resupply on G+2 at Objective RAMS near An Najaf (see Figure S.1), with distribution flowing from that point on, keeping the division basically at or close to the initial full load of supplies.<sup>6</sup> As a result of the factors affecting distribution throughput, the first replenishment of food and water, along with limited quantities of other materiel, did not arrive until G+6.<sup>7</sup> At this point, some units were down to a day or less of supplies.

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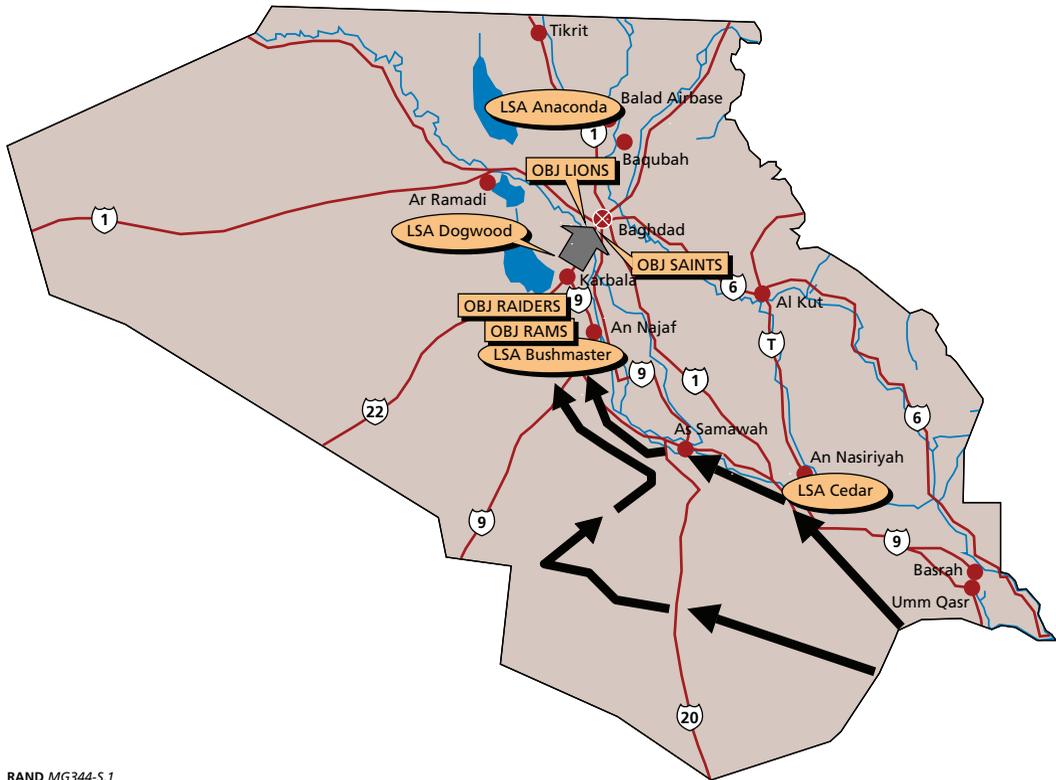
<sup>4</sup> Based upon actual times for OIF.

<sup>5</sup> Interview with BG Charles Fletcher, former commanding general of 3rd COSCOM, 22 October 2003.

<sup>6</sup> Interview with LTC Steve Lyons, former commander of 703rd MSB, 3rd ID, 28 October 2003.

<sup>7</sup> Ibid.

**Figure S.1**  
**Major V Corps Routes of Advance to Baghdad, Objectives, and Logistics Support Areas**



RAND MG344-S.1

The plan was to launch the advance to cordon Baghdad with robust quantities of supplies available in units and at forward logistics support areas. The original concern was that from this point forward, supply lines would be at high risk, so immediate resupply could not be counted upon. It was the intent not to launch into the Karbala Gap toward Baghdad until LSA Bushmaster at Objective RAMS was established and it could support the advance.<sup>8</sup> However, many sources report the perception that distribution capacity was insufficient to rebuild supplies back to the five-day level. Instead, for example, maneuver units in the 3rd Infantry Division (ID) report beginning to get sustainment flows at barely sufficient levels to keep them going, let alone build their supplies back up, generally keeping them at 1+ days of supply. This is consistent with the flow of supplies, which appear sufficient for subsistence but not to replenish the initial on-hand levels. Additionally, it does not seem that the resupply pattern became immediately clear to 3rd ID personnel. With limited in-transit

<sup>8</sup> Interview with LTG William Wallace, former commanding general of V Corps, Fort Leavenworth, Kansas, 6 April 2004.

visibility at their level, supplies seemed to just show up, increasing the perceived level of risk.

Snapshots of the on-hand levels at LSA Bushmaster suggest that direct support (DS) food supply was built up to the target level of two days, but bottled water supplies were thin. We do note that the 3rd Corps Support Command's (COSCOM) daily briefings indicate different supply levels of food and water in 3rd ID than suggested by the 3rd Brigade Combat Team's supply status reports: 4 to 5 days of supply on 4 and 5 April in the 3rd COSCOM reports for the 3rd ID versus 1 to 2 days reported at the brigade level. This may reflect the amount of materiel at division level and/or en route to brigade combat teams as opposed to the brigade-level view, since corps throughput was to the division support area and not directly to brigades.

What is revealed by the combination of the limited situation reports, commander's update briefings, and brigade supply reports and interviews is that the intent was to build supplies in divisional and other major units back up to the original line-of-departure level, with two days of backup at LSA Bushmaster. In the case of food, it appears this was almost achieved, but limited distribution capability from the division support area forward to units did not make it look that way to front line maneuver units. Water remained scarcer.<sup>9</sup> The overall reports that reached corps commander level likely indicated a stabilizing and sufficient supply situation with respect to the commander's intent to advance forward through the Karbala Gap toward Baghdad, but these reports remained interspersed with reports of local shortages, as shown in Figure S.2.

Once units secured Objectives RAMS and RAIDERS and stopped advancing, their organic trucks became more flexible. The trucks, really mobile warehouses, could be unloaded and sent back to pick up supplies. This same approach was feasi-

**Figure S.2**  
**The MRE, Water, and Fuel Pipeline During Combat Operations from About 26 March Onward**

		Estimated days of supply				
	"Strategic" pipeline	GS/ port	Distribution pipeline	DS/ LSA	Division LRP/transit	BCT
MRE	Ship	0–3	2(–)	1–2	0–2	1–2
Water	Local supplier/ship	4–15	2(–)	0–1	0–2	0–1
Fuel	Refinery and oil field	3+	Pipeline to Tallil	3		3–4

RAND MG344-S.2

<sup>9</sup> 1st BCT Orange supply status reports, 3rd COSCOM daily commander update briefings.

ble after the advance resumed, as support battalions did not initially cross the Euphrates River and because the advance was no longer continuous and rapid. Similarly, once Baghdad was cordoned, the limited movement requirements gave units the flexibility to use their organic trucks to pick up supplies. At times this divisional truck asset flexibility became important and probably helps explain why the distribution problems were surmountable. Organic division and brigade truck assets became an unplanned part of the theater distribution system.

### **Ammunition Supply During Combat Operations**

Ammunition support during combat operations is more problematic in general, because consumption of ammunition is much more variable and unpredictable than that of food and water; moreover, resupply determination is more complex, depending upon the type of ammunition needed. This need is based on both what has been expended and what types of fights the unit expects to engage in. A term like “days of supply” has no relevance, since a full load of some types of ammunition could go in less than an hour or last more than a week, depending upon the situation. Additionally, the need for ammunition resupply can be absolutely immediate, without warning, and develop while in contact. Thus, critical spot shortages are more likely to develop for ammunition than for other supply classes, and they can develop in difficult resupply situations, which did occur. But a general, overall shortage did not develop, at least in terms of having some ammunition available, if not always the munitions of choice.<sup>10</sup>

### **The Pause in the Advance at Objective RAMS**

By 23 March, the 3rd ID’s 2nd Brigade Combat Team (BCT) had secured Objective RAMS just south of An Najaf, and 1st BCT moved north of RAMS to Objective RAIDERS. However, the 3rd BCT had to counter the unexpectedly heavy resistance in As Samawah that had been interdicting the main supply route and then remained there to protect the lines of communication (LOCs). Then on 24 March, the “Mother of All Storms” began, limiting offensive and other operations through the 26th. During this time, 1st BCT, 2nd BCT, and the divisional cavalry squadron (3-7 CAV) were engaged with enemy forces in the vicinity of An Najaf. Additionally, it became apparent that An Najaf could not be bypassed without incurring undue supply line risk. Similarly, the continued, unexpected resistance by *Fedayeen* along the supply lines led to a change in plans. The route from Kuwait to An Najaf could not be left unprotected. However, with the rolling start to the operation that limited

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<sup>10</sup> Interview with BG Charles Fletcher, and interview with MG Buford C. Blount, Commanding General, 3rd Infantry Division (Mechanized), 18 November 2003.

available forces when operations commenced, no combat forces had been following the 3rd ID to secure the rear areas; this was a risk that had been accepted. Thus, the 3rd BCT of the 3rd ID stayed back to secure critical areas near As Samawah. Plans had to be quickly developed for its relief to enable the 3rd ID to be at full strength for the assault toward Baghdad. Similarly, the *Fedayeen* operating from An Najaf posed too much of a threat for the 3rd ID to continue its advance without another force securing LSA Bushmaster and the supply lines in this area.

Plans were modified to relieve the 3rd ID as soon as possible given the available forces. The 2nd BCT of the 82nd Airborne Division was released to V Corps on 26 March, and it completed its relief of the 3rd BCT of 3rd ID on the 29th. Plans for the 101st Airborne Division (Air Assault) were changed, and it too was assigned to relieve the 3rd ID of LOC security roles. Responsibility for eliminating the threat from irregular forces in An Najaf was also given to the 101st, which completed its move to An Najaf by the 30th.<sup>11</sup> This series of actions enabled the 3rd BCT to move north, rejoining 1st and 2nd BCTs, enabling the entire division to prepare to restart the offensive before first light on 31 March. During this time, airpower worked to attrit Republican Guard units south of Baghdad and attacked command and control and intelligence targets in the Baghdad area, setting the conditions for the advance.<sup>12</sup>

Because of the limited distribution capacity and competing demands for the assets, the corps was not able to establish significant stockpiles at LSA Bushmaster. However, the pause in the advance still may have helped the logistics system become somewhat better prepared for further offensive operations. It likely enabled the distribution system to get untangled from the initial advance, and it kept the supply lines—and thus round-trip times—from getting even longer. Every day until the advance resumed was another day for trucks to become available for use as units continued to unload their equipment from ships and prepare for operations at camps in Kuwait. From 19 March to 1 April, the 3rd COSCOM's available trucks increased by 63 percent. So while the units and LSA Bushmaster did not fully achieve the desired level of days of supply for food and water, the pipeline from Kuwait north did begin to approach the desired levels of supply and could maintain a decent distribution flow by this time.

The pause was not caused by a wait to build up stockpiles, although it may have helped the distribution system to stabilize and improve its organization. This does not mean that the pause had nothing to do with logistics. One of the key proximate causes was the need to secure the supply lines in order to enable continued sustainment and even more extended LOCs. In this sense, beyond any shortfalls in combat service support units themselves, sustaining the force required much greater resources

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<sup>11</sup> Fontenot, Degen, and Tohn (2004).

<sup>12</sup> Ibid.

than anticipated: an entire division plus to secure the supply lines from Kuwait through An Najaf.

## Spare Parts and Packaged POL Support

Spare parts support to the 3rd ID suffered from a chain of problems: poorly configured prepositioned spare part sets, an inability to order parts while on the move, insufficient distribution system capacity, distribution system problems unique to pull-type items such as Class IX, and later by expectations about redeployment.

### Authorized Stockage Lists

The 1st and 3rd BCTs of the 3rd ID drew authorized stockage lists (ASLs) that were stored with prepositioned brigade set packages. The breadth of parts in these two ASLs produced little value for critical maintenance. An additional problem was that the parts were packed in the containers without separate dedicated bins and shelves for each part. Thus, the mobile warehouses had to be configured during the preparation for operations.<sup>13</sup> This would be particularly problematic in a rapid deployment and employment situation.

In this case the poor part mix was problematic because, with few exceptions, the only parts available through the fall of Baghdad were those that units carried with them.

Tactical stockage for units deploying with their ASLs from home station was generally better, at least during initial operations. These ASLs had broader and better mixes of parts. However, they were quickly depleted due to a complete gap in replenishment during combat operations and then very slow replenishment combined with high demand rates during stability operations.<sup>14</sup>

As soon as the supply support activities (SSAs) began moving, communications from the part-ordering system to the rest of the supply system ceased. Even when requests were submitted, the distribution time was too long for requests to the standard supply system to reach the 3rd ID during combat operations. In March and April, the distribution system was extremely turbulent, with parts often not making it to the ordering unit at all, regardless of the time. The primary driver of this turbulence was the fact that loads were shipped from CONUS in configurations poorly suited for the design of the theater distribution system and Army SSA capabilities.

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<sup>13</sup> See Kenneth J. Girardini and Eric Peltz, "Sustainment of Army Forces in Operation Iraqi Freedom: Prepositioned Authorized Stockage Lists," unpublished RAND research, August 2004, for an in-depth analysis of these two prepositioned ASLs.

<sup>14</sup> See Kenneth J. Girardini, Eric Peltz, Thomas Held, Art Lackey, and Candice Riley, *Sustainment of Army Forces in Operation Iraqi Freedom: Tactical Inventory*, Santa Monica, CA: RAND Corporation, forthcoming.

When shipments were made available for onward movement to the 3rd ID and other units in Iraq through the sorting process, spare parts and other items that came through the theater distribution center (TDC) were behind food, water, and ammunition in priority, limiting the frequency with which these items were shipped. Pushes of food and water would come through the TDC, and any available capacity was used to ship Class IX spare parts along with Class II, IIIP, and IV materiel. But such capacity was limited during major combat operations.<sup>15</sup>

As the operating tempo and scale of stability operations increased beyond expectations in the summer of 2003, the distribution time to the theater for CONUS-based supplies continued to worsen. The growing volume of spare parts and other requests outpaced the ability of Defense Distribution Depot Center Susquehanna, PA (DDSP), the primary distribution center for Army shipments from CONUS to the U.S. Central Command area of operations, to expand capacity. A backlog developed, and times worsened through the fall before finally recovering in February 2004 as capacity and demand became aligned and the backlog was eliminated. At the same time, the theater distribution system continued to struggle through November 2003 as a result of the load configuration issues.

The slow distribution times combined with high demand rates to limit the value of tactical stockage in Iraq in Army ASLs. The replenishment times were longer than the planning values, and the demand rates were higher than those used in planning, which in combination led to many empty shelves.<sup>16</sup>

The final factor was insufficient national inventories and production base response for items managed by Army Materiel Command (AMC). National war reserve secondary item requirements were missing many needed items or had too little depth, and only a small fraction of the requirements had been funded.<sup>17</sup> AMC could not respond in time by increasing procurements and repair to compensate, due to late authorizations to commit money for such actions. Before operations began, expectations about their scope and scale, along with limited awareness of war reserve shortfalls, led decisionmakers to discount requests to procure additional spare parts.<sup>18</sup> By the time the real demand rates were apparent, it was then too late to respond in time, owing to the long production lead times of many spare parts.

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<sup>15</sup> Interview with MAJ Thomas Murphree, TDC Commander (and previously CFLCC C-4 Battle Captain), interview with the author, 26 May 2004.

<sup>16</sup> See Girardini et al., *Sustainment of Army Forces in Operation Iraqi Freedom: Tactical Inventory*.

<sup>17</sup> See Kenneth J. Girardini, Eric Peltz, Art Lackey, Elvira Loreda, and Candice Riley, *Sustainment of Army Forces in Operation Iraqi Freedom: Army War Reserve Secondary Items*, Santa Monica, CA: RAND Corporation, forthcoming.

<sup>18</sup> Interviews at Tank Automotive and Armaments Command, feedback on briefing from Mr. Don Tison, Deputy to the G-8, Headquarters, Department of the Army, interview with Mr. Gary Motsek, Deputy G-3, Army Materiel Command.

Class IIIP (package petroleum, oil, and lubrication products) materiel also became a significant issue for 3rd ID and other units.<sup>19</sup> Stocks on hand to support rotational training and at the area support group in Kuwait were depleted during preparations for combat as training was conducted and the theater population grew in advance of combat operations. By 18 March, the general support (GS) on-hand levels of most IIIP items were zero for 64 of 77 items that were being tracked.<sup>20</sup>

## Equipment Readiness

During combat operations, units were able to maintain equipment well enough to keep combat power high. The equipment readiness standard was “shoot-move-communicate” (SMC): could the weapon system shoot, could it move, and could it communicate? The only parts that absolutely had to be replaced during combat operations were those that contributed to this standard. Given this change in the maintenance standard, units did just enough in preparation combined with the cannibalization and controlled exchange they could do to get them through major combat operations. Most key combat equipment fared well for the first few weeks, to include M1A1 tanks, Bradley fighting vehicles, Paladin self-propelled howitzers, and multiple launch rocket systems (MLRS). During this period, aviation across the corps was generally kept above peacetime readiness standards with less of a difference in peacetime and combat reporting, because of safety-of-flight issues. However, some low-density and older fleets experienced problems.

However, the division’s adaptations could work for only so long. Whatever extra parts they procured and placed in things like off-the-books ASL push packages were generally consumed by the fall of Baghdad. Deferred maintenance can only be deferred for so long before equipment becomes non-combat-capable. Across V Corps, deferred maintenance, continued problems with spare parts distribution, and a change in the standard to something closer to fully mission capable during stability operations resulted in all combat systems falling below 80 percent readiness by early July.<sup>21</sup> The very heavily worked distribution assets started showing signs of stress earlier, with many falling below 75 percent.<sup>22</sup>

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<sup>19</sup> Interviews with 1/3 ID, 2/3 ID, 3rd ID DISCOM, and 3rd ID DIVARTY.

<sup>20</sup> TDC status report, 18 March.

<sup>21</sup> 3rd COSCOM readiness briefing, 14 July.

<sup>22</sup> Ibid.

## Effects During Stability Operations

Continued supply and distribution problems as stability operations became extended led to quality-of-life problems and affected morale. The sense conveyed by troops in interviews is that they understood issues with getting parts and not getting hot food during combat operations, but continued delays with things like spare parts and slow improvements in quality of life were disappointing and harder to understand. In particular, limited hot meals through June for some units has been highlighted. Soldier readiness fell as well in terms of having sufficient personal gear and supplies.

Beyond contributing to the equipment readiness degradation, national-level supply problems also led to increased costs due to the need for expedited deliveries and excessive use of strategic air to move supplies.<sup>23</sup>

## Effects on Combat Operations

No direct operational consequences from a supply shortfall have been identified, in terms of either a mission failure or a changed course of action. However, the level of risk rose above the comfort level of combat commanders and the troops. Risk arose from relatively low on-hand supply levels in front line units, uncertainty as to actual supply status, and lack of information or logistics situational awareness. This risk likely weighed on commanders' minds, possibly affecting decisionmaking, although no specific examples have been cited. Similarly, it may have bounded the considered decision space.

There was a large logistics-related effect, but it was the result of the combination of the operational plan, the associated deployment flow, and an intelligence failure. The initial advance by the Army's V Corps to An Najaf was extremely rapid. However, the *Fedayeen* along the supply lines from Kuwait to An Najaf, particularly around the cities, posed an unanticipated threat to both supply line operation and the personnel in the convoys. 3rd ID became committed to fights against the *Fedayeen*, and then it was decided that the 3rd ID could not continue its offensive toward Baghdad without its rear area and the supply lines being secured. Combined with the severe *shamal* from 24 to 26 March, this held the 3d ID in place for about a week, although it was heavily engaged for much of this period. Since no combat forces were following immediately behind the 3rd ID, the delay resulted from the preparation and movement of units to relieve the 3rd ID, which was done by a brigade from the 82nd Airborne Division and the 101st Airborne Division (Air Assault).

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<sup>23</sup> For a discussion of shipping costs, see Marc L. Robbins and Eric Peltz, *Sustainment of Army Forces in Operation Iraqi Freedom: End to End Distribution*, Santa Monica, CA: RAND Corporation, forthcoming.

Spare parts shortfalls did lead to significant deferred maintenance during major combat operations and subsequent significant degradation in equipment capabilities. This did not produce documented adverse effects in OIF operations. However, the question has been frequently posed about how much longer 3rd ID could have been effective in high-intensity combat if the regime had not collapsed. As little as two weeks has been posited, but the answer depends very much on what 3rd ID might have been asked to do had combat operations continued. And had the 3rd ID remained the main effort in continued combat operations, it is likely that it would have received greater distribution priority, potentially providing the ability to correct some of the deferred maintenance deficiencies.

## **Implications for the Future**

Perhaps more than the actual effects in OIF, logistics issues in OIF could have important implications for future force operational concepts. At a process level, there are tremendous numbers of lessons for joint doctrine, organization, policy, tactics, techniques, and procedures (TTPs), equipment, and information systems. There are at least three critical questions for the future force's design.

1. To what degree can support over noncontiguous lines of communications be counted on to sustain distributed operations?
2. What level of sustainment risk are commanders willing to accept in order to achieve mobile tactical formations and rapid deployment and employment?
3. How much will better logistics situational awareness change the risk dynamic?