

by

Steve Nied  
nied\_stephen@bah.com

Barry Jaruzelski  
jaruzelski\_barry@bah.com

Frank Jones  
jones\_frank@bah.com

Ed Frey  
frey\_ed@bah.com

# High Tech's Inventory Overhang

Managing Off-Balance-Sheet Inventory Liabilities

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## Managing Off-Balance-Sheet Inventory Liabilities

In fiscal 2001 manufacturers throughout the high-tech supply chain took massive restructuring charges to write off excess inventory. Still, manufacturers have only just begun to tackle the problem. Now that the first wave of balance sheet liabilities has crashed on shore, we can begin to assess the even larger tidal wave of off-balance-sheet inventory liabilities (OBSILs) looming behind it. This report examines the proactive steps high-tech manufacturers can take to reduce their exposure to potential supplier claims now and in the future.

Fiscal 2001 was not kind to high-tech balance sheets. Glutted with excess capacity and inventory, manufacturers at every level in the supply chain — original equipment manufacturers (OEMs), contract equipment manufacturers (CEMs), and component suppliers — were forced, collectively, to take billions of dollars in write-offs. Original equipment manufacturers alone wrote off more than \$5 billion in inventory and purchase commitments in 2001 (see Exhibit 1) — and that's on top of the inventory they wrote down in the normal course of business.

After years of chasing surging demand and maneuvering to secure scarce supply, OEMs found themselves awash in inventory just as the market for their equipment dried up. Because of the long lead times for certain components on allocation and because supply chains did not scale down as readily as hoped, manufacturers were not able to react quickly enough to reduced levels of demand. The result: days of inventory supply rapidly mounted.

This rapid boom-and-bust cycle is depicted in Exhibit 2, which shows the dramatic growth in OEM and CEM inventories over the past two years relative to revenues. Although revenue growth for this sample of 18 high-tech companies (10 OEMs, 8 CEMs) was strong, it could not support the even steeper escalation in inventories across the supply chain. The year-ending inventory balances (before extraordinary charges) for these 10 major OEMs climbed 79 percent, from \$14.5 billion in fiscal 1999 to nearly \$26 billion in fiscal 2001, while revenues grew only 31 percent. Inventory efficiency bottomed out in fiscal 2000 as OEM inventory turns fell to a low of 4.7 from 5.4 in the prior year.

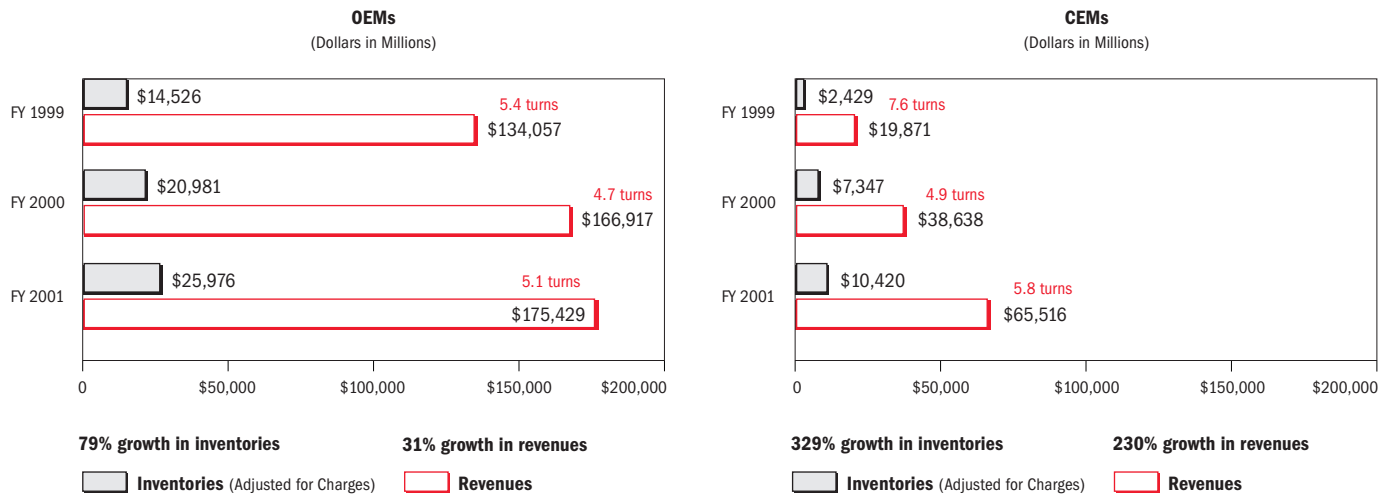
### Exhibit 1

Inventory and Purchase Commitments Written Off by High-Tech OEMs in 2001

OEM	Inventory Charges (Dollars in Millions)	Purchase Commitments (Dollars in Millions)
Ciena	51	0
Cisco	2,049	200
JDS Uniphase	511	60
Lucent	679	0
Motorola	933	0
Nortel	1,089*	0
Tellabs	91	78
<b>Total</b>	<b>\$5,403</b>	<b>\$338</b>

\*Includes \$750 million inventory charge preannounced for September 2001 financial reports.

Source: Company financial statements

**Exhibit 2****Inventories Grow Faster than Revenues As Inventory Turns Fall**

OEM sample: Alcatel, Ciena, Cisco, EMC, JDS Uniphase, Lucent, Motorola, Nortel, Sun Microsystems, Tellabs.  
 CEM sample: ACT Manufacturing, Benchmark Electronics, Celestica, Flextronics, Jabil, SCI Systems, Sanmina, Solectron.  
 Note: August year-end results included in first half of each year; fiscal years measured from August through the following July.

Source: Company financial statements

Adjusting for the \$5 billion in inventory write-downs that resulted, OEM inventory turns only partially rebounded in fiscal 2001. This rapid accumulation of inventory is all the more remarkable when one considers that these OEMs have been outsourcing more and more of their manufacturing to CEMs.

Thus it is not surprising that CEMs have also been struggling under the weight of excess inventory. Over the two-year time frame studied, CEM revenues among our eight sample companies increased 230 percent while inventories surged nearly 330 percent. Inventory turns dropped from 7.6 in fiscal 1999 to only 4.9 one year later. Inventory turns recovered somewhat in 2001 as stockpiled inventory was slowly worked down or expensed. But both CEMs and OEMs know they have only begun to dive into this problem.

### **Looming Liabilities: What the Balance Sheet Doesn't Tell You**

High-tech manufacturers' balance sheets convey only part of the inventory saga. As jarring as the past year's inventory charges and write-downs have been, they were but a precursor to the wave of OBSILs hitting in fiscal 2002. Manufacturers have signed contracts with suppliers

and placed orders for materials that are not currently reflected on the manufacturers' balance sheets. Even though the buyers no longer need this inventory, the supply chain has already been set in motion. Looking at semiconductors and electronic components alone, as much as \$24 billion in orders have been canceled, according to U.S. Census Bureau data (see Exhibit 3).

How does a high-tech company make these commitments go away? Who absorbs the cost, and how is it paid? How does the company manage its continuing exposure? Traditional inventory accounting captures only what is on the balance sheet, so these potential liabilities are invisible to shareholders — even to management, in many cases. But the liabilities are very real to cash-strapped suppliers and contract manufacturers, which are increasingly likely to press buyers to make good on their promises.

The key to managing these commitments is to understand and address them early and proactively. Recent high-profile bankruptcies demonstrate the disastrous potential of failing to disclose liabilities generated from off-balance-sheet financing. Furthermore, once a supplier makes an actual claim, a manufacturer's options are

extremely limited and the likelihood of a cash payout is quite high, so getting in front of them is critical. Traditional purchasing departments, with buyers distributed throughout the organization, often make the mistake of handling claims on a case-by-case basis — thus failing to wield the advantages of corporate leverage and potential tradables. Moreover, supply chain organizations don't always pay sufficient attention to demand shortfalls and looming unfulfilled contracts until they become substantive claims. By then it is often too late to negotiate them away.

**Looking at semiconductors and electronic components alone, as much as \$24 billion in orders have been canceled.**

### OBSIL Management Methodology

The high-tech manufacturers who enjoy the greatest success in dealing with OBSILs apply a structured approach. They follow a five-step process that first reveals the magnitude of the potential liabilities and then provides a methodology for disposing of them effectively and efficiently:

1. Assess the wave of off-balance-sheet inventory and segment it by risk of cash impact.
2. Manage exposure by developing tailored strategies for each type of potential liability.
3. Negotiate at the corporate level with vendors, aggregating all potential liabilities.
4. Leverage tradables to reduce cash outlay.
5. Establish ongoing processes to monitor off-balance-sheet inventories and respond to potential liabilities.

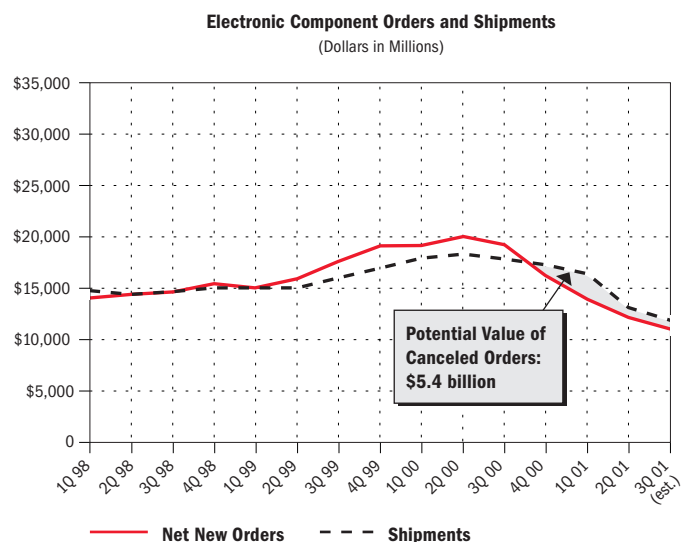
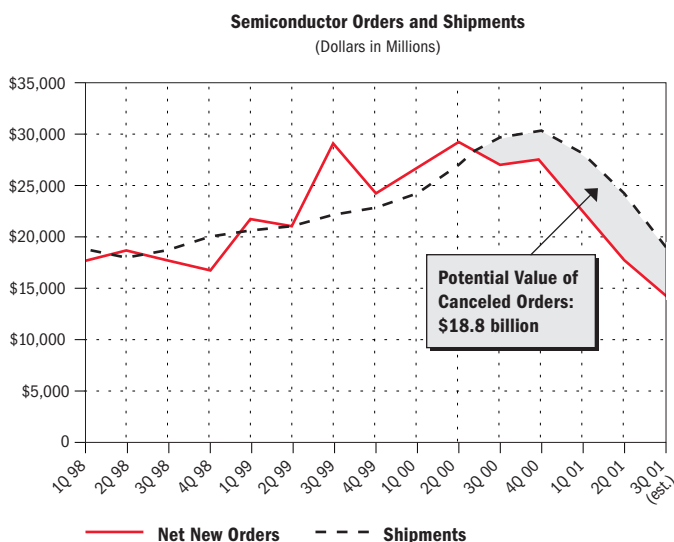
While this approach is designed for proactive management of potential OBSILs, it can also be used to develop a balance sheet accounting entry for supplier commitments.

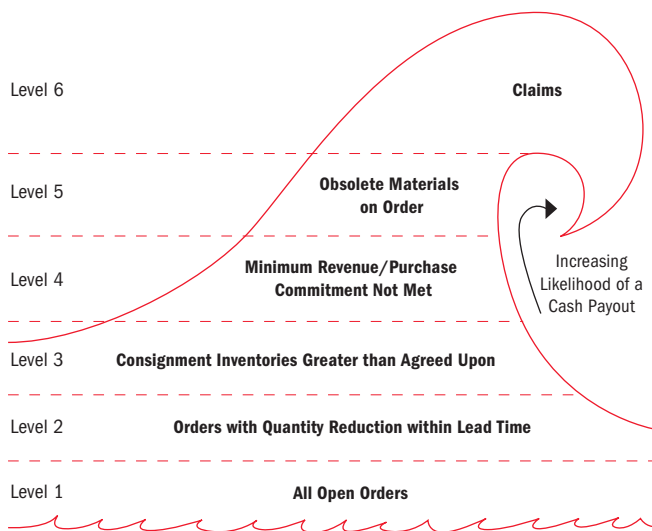
### Step 1: Assess and Segment the Wave

The first step in effectively dealing with OBSILs is to develop some perspective on their magnitude and risk. Think of these potential claims as a wave that is six levels high (see Exhibit 4). At the top are legally documented claims — for instance, a frustrated supplier has initiated collection proceedings. The best one can do here is to negotiate well, because a cash payout is almost certain. On the fifth level are obsolete materials on order: the order has been placed, but since then the product has been redesigned or discontinued. Suddenly,

### Exhibit 3

#### Canceled Supply Orders Mount



**Exhibit 4****The Wave of OBSILs Crests**

Source: Booz Allen Hamilton

even though the buyer has no use for this component, it has a relatively hard liability. The fourth level from the bottom is made up of situations in which the buyer has not met minimum revenue or purchase requirements stipulated in a supplier contract. On the third level are consignment inventories that exceed the buffer that the buyer and supplier have agreed upon. Second from the bottom are firm orders that are reduced in size within the quoted lead time. The bottom level is the ocean of open orders that the buyer has placed.

The closer a purchase commitment is to the crest of the wave, the harder the liability and the greater the risk of a cash payout. Higher risk potential liabilities are, as a rule, shorter term in nature and more difficult to negotiate. They will cost more. Liabilities that fall lower on the wave can often be negotiated down; in some cases, they can be negotiated completely away. In fact, these lower risk OBSILs can often be handled without ever entering into a dialogue with the supplier.

Understanding the payout risk associated with each level of potential liability is essential. Once detailed and documented, a supplier claim (level 6) cannot be long ignored, and claims usually have some validity. Typically, the buyer has canceled a firm order or has changed an order without providing adequate notice. Suppliers that

file claims often have strong negotiating positions and are likely to receive payments of some sort. The other five levels of liability are softer, increasingly so as one descends from the crest.

Getting a handle on potential OBSILs can be a challenge, especially the first time. Traditional manufacturing and procurement systems often do not aggregate this kind of data; it must be synthesized based on a survey of purchasing locations (both manufacturing and distribution sites), centralized procurement operations, and supply chain management systems. Buyers should resist the temptation to contact suppliers for this data. The cardinal rule in managing OBSILs is this: Avoid creating a liability where one does not already exist!

**Step 2: Manage Exposure by Intelligently Playing the Odds**

If ignored, potential OBSILs tend to rise toward the crest of the wave, increasing the likelihood of a cash payout. In general, if anticipated obsolescence and forecast reductions are not communicated to suppliers in a timely fashion, they are more likely to turn into claims. That said, there is no reason to go out and look for liabilities. Many commitments will not turn into hard claims, or they may take a long time to do so. In those cases, it might be worth taking the risk of a wait-and-see approach; the supplier may not even realize a potential liability exists.

However a buyer chooses to play its existing liabilities, the focus should be on avoiding or containing new ones. In short, stop creating more risk! Every day that a buyer fails to address an open order or an oversized kanban will increase the likelihood that the buyer will have to pay for it. As soon as a buyer knows that a commitment will not be met, the buyer should communicate that information and ratchet back the supply chain *immediately*. Anticipating the fallout of proposed engineering changes enables buyers to get in front of the liabilities that might result.

Once a liability is created, however, the situation becomes fuzzier, and the best course of action is more ambiguous. Buyers have two options: settle impending obligations proactively or play wait-and-see. If the potential liabilities are dealt with early, the buyer might well be able to reduce the size of the

ultimate payout. However, there is always the chance that a supplier will let the matter drop if the buyer doesn't bring it up. If the buyer avoids a payout altogether, then waiting-and-seeing was, of course, the best approach. It's a calculated bet, the elements of which are described in Exhibit 5.

To decide which way to bet, a company needs to weigh several factors and assign probabilities to likely outcomes. In the Exhibit 5 example, the buyer has determined that there is a 50 percent chance that a certain supplier will file a claim if left to its own devices. If a claim is filed, the buyer calculates that the likely payout is 70 percent of the contracted amount. Multiplying these probabilities, the buyer determines that the expected value of a payout with the wait-and-see strategy is 35 percent of the contracted amount, whereas if the buyer approaches the supplier and settles the liability now, the value of the expected payout will be 40 percent. The implication is obvious: the buyer should wait it out.

But that's presuming one has good information. The most critical assessment in this calculation is the probability assigned to a supplier's filing a claim, and that

**Exhibit 5**  
To Settle or Not to Settle: Weighing the Best Course of Action

	Option 1: Play Wait-and-See	Option 2: Settle Proactively
<b>Assessment</b>	$\left\{ \begin{array}{l} \text{Probability} \\ \text{supplier will file} \\ \text{a claim if nothing} \\ \text{is done now} \end{array} \right\} \times \left\{ \begin{array}{l} \text{Expected payout} \\ \text{on claim} \end{array} \right\}$	Expected payout from settling liability now
<b>Factors to Consider</b>	<ul style="list-style-type: none"> <li>▪ Buyer-supplier relationship</li> <li>▪ Supplier knowledge of buyer liability</li> <li>▪ Supplier motivation to pursue claim</li> <li>▪ Buyer track record with supplier</li> <li>▪ Relative negotiating capabilities of buyer and supplier</li> <li>▪ Supply criticality to buyer</li> </ul>	<ul style="list-style-type: none"> <li>▪ Buyer track record with supplier</li> <li>▪ Relative negotiating capabilities of buyer and supplier</li> </ul>
<b>Example</b>	$\{50\% \} \times \{70\% \} = 35\%$	40%
<b>Buyer's best course of action: Wait it out</b>		

Source: Booz Allen Hamilton

**Exhibit 6**  
Factors Influencing the Likelihood of a Claim

Buyer-Supplier Relationship	Supplier Knowledge	Supplier Motivation
<ul style="list-style-type: none"> <li>▪ Contract provisions</li> <li>▪ Duration of contract</li> <li>▪ Size of contract</li> <li>▪ Benefits of the relationship</li> <li>▪ History of the relationship</li> <li>▪ Nature of working relationship</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ability to track buyer's failure to meet commitments                             <ul style="list-style-type: none"> <li>– Processes</li> <li>– Systems</li> <li>– Personnel</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Financial health (cash position)</li> <li>▪ Nearing end of quarter or fiscal year</li> <li>▪ Revenue performance</li> <li>▪ Size of claim</li> </ul>

Source: Booz Allen Hamilton

probability will depend on a number of soft factors — namely, the nature of the buyer-supplier relationship, the supplier's knowledge of the buyer's liability, and the supplier's motivation to pursue a claim (see Exhibit 6).

Foremost among these soft factors is the nature of the relationship, in both the formal and informal senses. Some contracts specify how risks are shared between supplier and buyer; others have no such provisions. The more detailed the language on order-freeze windows or minimum quantities, for example, the more cause a supplier has to file a claim. Other relationship parameters documented in the contract — size, duration, and benefits — can mitigate that threat. Informal factors also play a large role. If the relationship is friendly and is characterized by mutual trust, the likelihood of a claim is reduced.

Second, the supplier has to have knowledge. To make a claim, the company has to have processes and systems in place to flag unfulfilled commitments and quantify them in a timely manner (not necessarily a given).

Finally, the supplier has to be motivated to pursue a claim. Nothing motivates as well as weak finances. Suppliers struggling with dwindling cash positions and lagging revenues as they approach the end of their quarter or fiscal year will be more likely to try to collect. In addition, it stands to reason that the bigger the potential buyer liability, the more motivated a supplier will be to file a claim. There's simply more at stake.

In assessing the appropriate course of action with each supplier, a buyer cannot simply take a snapshot of the situation and make long-term decisions accordingly. Buyers need to revisit assessments periodically, especially when trigger events change expectations. For example, a supplier that has just lost a major customer will be more aggressive in collecting from its remaining customers.

Calculating the expected value of individual payouts is an imprecise science at best. Playing wait-and-see, in particular, leaves a lot to chance. However, the uncertainty surrounding any individual liability is smoothed, to a certain extent, by the behavior of the full portfolio of potential liabilities.

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### Suppliers struggling with dwindling cash positions will be more likely to try to collect.

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#### **Step 3: Negotiate at the Corporate Level with Vendors**

Although the primary objective in negotiating any potential inventory liability is to minimize the cash payout, the overall goal of a high-tech manufacturer's vendor management program is to create a flexible, low-cost supply chain. Achieving both attributes can be tricky. Squeezing key suppliers too hard is never the right practice, but it's important to remember that in the short term these negotiations are, by their nature, redistributive. If one side gains, the other side necessarily loses. Therefore, establishing the best possible negotiating stance is critical; that means aggregating all potential liabilities for each supplier and managing them at the corporate level to avoid getting picked apart by multiple individual claims across the organization and over time.

Many high-tech companies have already taken steps in the right direction by centralizing their supplier selection and contract negotiation processes. However, once corporate-wide contracts are in place, corporate purchasing usually steps back and individual manufacturing locations handle day-to-day transactions, such as issuing purchase orders and material releases and

authorizing payment. Many suppliers are wise to this approach and deliberately file small claims with their local manufacturing contacts — claims that fly under the radar of corporate purchasing. This strategy maximizes a supplier's chances of getting paid, since suppliers are dealing with that part of the customer organization where personal relationships are strongest and negotiating leverage is weakest. Knowledge is strictly local. At Booz Allen Hamilton we've seen situations in which a supplier successfully collects on a claim at one location where an order has been canceled, while failing to fulfill an outstanding order at another. A supplier will invariably prefer to start pursuing a claim at the local level — and will escalate to corporate only if necessary.

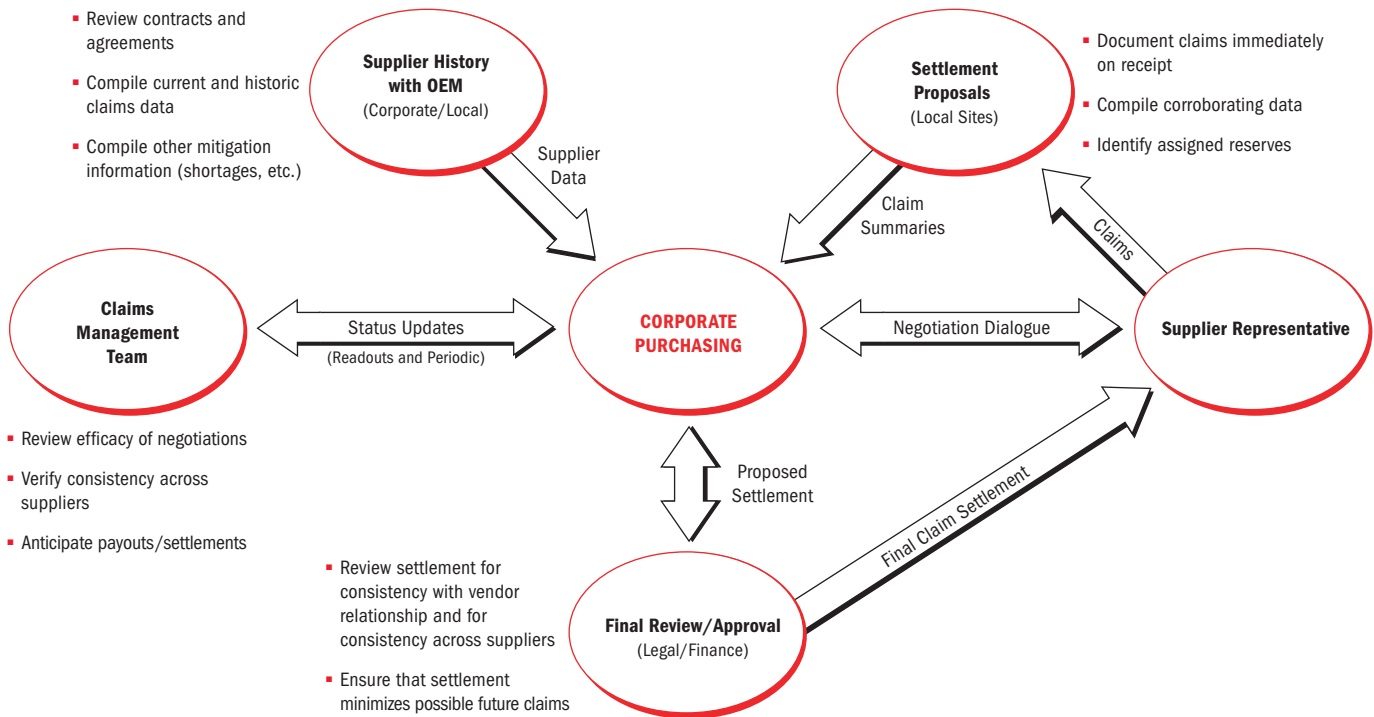
To effectively counter this supplier strategy, high-tech manufacturers must aggregate data across sites and involve the corporate purchasing group in the claims process (see Exhibit 7). Because they have key insights and knowledge, local buyers do need to be involved, but negotiations should be led by those who possess corporate-wide information on the full extent of the supply relationship. This makes sense. Why assume a weaker negotiating posture on inventory liabilities than on new contracts?

Centralizing the negotiating process does more than ensure that best practices are applied and all knowledge about the supplier is leveraged; it also levels the playing field. Suppliers in the same industry often form a knowledge-sharing community. A generous settlement issued to one supplier can create a domino effect in additional claims. Centralizing the oversight of these relationships helps manufacturers contain their liabilities and adjust their purchasing and supplier management behavior as trends shift.

#### **Step 4: Leverage Tradables to Reduce Cash Outlay**

For high-tech manufacturers, conserving cash has become a top priority. Heavy debt loads, stingy capital markets, and reluctant customers have made cash an increasingly scarce and coveted commodity. Paying out cash to settle inventory liabilities — even for a fraction of the original contract amount — can threaten a manufacturer's very viability. Recognizing the gravity

**Exhibit 7**  
The Central Role of Corporate Purchasing in Managing OBSILs



Source: Booz Allen Hamilton

of the situation and the impact on their own business if a customer goes under, many suppliers are willing to entertain compensation other than cash, to the extent that it enables them to survive as well. Others have to be persuaded.

Depending on the nature of the relationship, buyers may offer a carrot or a stick (or both) to defer or reduce their cash outlays (see Exhibit 8). Carrots might include consolidating spend with a given supplier or awarding it a new product or program. Sticks are more bare-knuckled negotiating tactics. Buyers might withhold a certification of quality from a supplier or reopen their contract to extract greater costs savings. Whatever the means, high-tech manufacturers will need to get creative with tradables as they contend with an ever-increasing cash crunch.

**Exhibit 8**  
Tradables in Lieu of Cash

Carrots	Sticks
<ul style="list-style-type: none"> <li>Consolidating commodity spend in favor of that supplier</li> <li>Awarding a new product or program</li> <li>Considering award of a new product or program</li> <li>Accepting higher pricing or more generous volume bands</li> <li>Upgrading to the next level in supplier preference</li> <li>Giving special recognition for service</li> </ul>	<ul style="list-style-type: none"> <li>Dropping supplier from consideration in the awarding of a new product or program</li> <li>Re-sourcing business currently awarded to that supplier</li> <li>Reopening contracts to negotiate required cost savings</li> <li>Demanding stricter quality, delivery, or service requirements</li> <li>Withholding certification for quality, performance, etc.</li> </ul>

Source: Booz Allen Hamilton

### **Step 5: Establish Ongoing Processes to Respond to Threats**

Contending with OBSILs is not a one-time-only event. Although the recent tech bust is unprecedented in terms of its sudden timing and extreme proportions, we can anticipate future fluctuations in demand and further backups of inventory. More than ever the high-tech world has to focus on managing its supply chains to optimize inventory levels. Flexible supply chain management is becoming all the more critical for three reasons:

- *The relative popularity of specific configurations of high-tech products have become increasingly unpredictable.* Bigger bets are necessary to capture the considerable upside. Buyers will have to offer commitments to suppliers that threaten to become bottlenecks. Likewise, suppliers will have to be willing to assume a greater share of the volume risks involved to avoid the buildup of excess inventories we saw in fiscal 2001.
- *Outsourced manufacturing and consignment programs shift inventory off the balance sheet.* As OEMs increasingly outsource their manufacturing operations to CEMs and as suppliers furnish their customers with components on consignment, inventories will continue to migrate off the balance sheet. A new set of inventory management tools and metrics will be needed to effectively manage these mounting OBSILs.
- *The deintegration of the high-tech supply chain exacerbates traditional conflicts of interest between buyers and sellers.* The way that buyer-supplier agreements are structured often sets up conflicting objectives and incentives that result in financial liabilities between layers of the supply chain, OBSILs being a perfect example. As the supply chain expands to include a third level — OEM, CEM, and component supplier — these natural tensions, as well as the inter-level liabilities, will only mount. To develop successful working relationships, players at every level will need to set up mutually beneficial partnerships that appropriately share both objectives and risk.

For all these reasons, monitoring off-balance-sheet inventories is an increasingly critical part of managing high-tech supply chains. Although today these efforts focus on staving off the inventory overhang created

by the boom-and-bust cycle of fiscal years 2000 and 2001, in the future manufacturers will manage OBSILs long before they get to the crest of the wave.

### **Preventing OBSILs**

Institutionalizing and automating the collection of hard data on these liabilities is but the first step. Companies will need to create new policies and procedures to leverage this information effectively and proactively. The objective is to prevent a forecast from becoming a commitment and to prevent a commitment from becoming a bona fide claim.

*The best way to avoid an OBSIL is to prevent it from occurring in the first place.* That means developing supply chain and product management processes that are focused on running lean instead of scaling up — quite a change in orientation. Buyers can prevent OBSILs by following five rules of thumb:

1. Set analytical standards for off-balance-sheet inventories to minimize inventory at appropriate service levels, update the standards religiously, and make sure suppliers adhere to them.
2. Rigorously incorporate engineering changes and product phaseouts into forecasting, production planning, and inventory planning.
3. Adjust forecasts (and resulting orders) as soon as changes are known.
4. Work with suppliers to shorten lead times and commitment windows.
5. Align incentives to explicitly share with suppliers the risks of excess materials and unfulfilled demand.

### **Conclusion**

OBSILs pose a serious and often hidden risk to the ongoing viability of high-tech equipment manufacturers. Traditional inventory management techniques and metrics do not provide an adequate view of this looming problem, nor do they help managers assess potential payouts. If not managed proactively, this wave of liabilities could beach many companies in the near future, draining them of cash swiftly and unexpectedly. In this environment, it's every company for itself.

This report has laid out a process and a set of frameworks for managing OBSILs, with the goal of minimizing cash payouts within the context of a balanced and flexible supply chain. Achieving this goal requires that manufacturers first understand the magnitude of the wave they confront and then deal with it in a holistic and coordinated manner. This effort will require a new set of capabilities and a major shift in focus for many high-tech manufacturers.

Dealing with emerging inventory liabilities is the order of the day. Moving forward, though, the best way to avoid them is to prevent their occurrence in the first place. The key to prevention is a leaner and more flexible supply chain. The recent past rewarded manufacturers that could scale up and phase in new products quickly. The near future will reward those running supply chains that can scale *down* as quickly and as flexibly as they scale up.

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**Ed Frey**, a Vice President in Booz Allen Hamilton's San Francisco office, focuses on operations strategy, manufacturing, and supply chain transformation, primarily for clients in industries with rapidly shifting technologies and markets.

**Barry Jaruzelski**, a Vice President in Booz Allen Hamilton's New York office, leads our global computers and electronics consulting efforts, working with high-tech clients across a range of strategy and transformation issues.

**Frank Jones**, a Vice President in Booz Allen Hamilton's New York office, consults with clients in manufacturing and engineering-intensive industries on operations strategy and performance improvement.

**Steve Nied**, a Principal in Booz Allen Hamilton's Chicago office, consults with clients in the high-tech industries on operations strategy and performance improvement.

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