

How to Further Utilize SAP Application to Achieve Future Results for Airgas, USA LLC's ERP (Enterprise Resource Planning) System

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Abstract:

The purpose of the following document is not to argue against SAP, but rather provide areas of refinement to fully give shareholders the maximum return. Through extensive case studies and modules, SAP's impact as an ERP system for Airgas, USA LLC was reviewed with the ability to look back two years after its hard launch and almost four and a half years after its initial announcement. Employees have identified several areas of concern that were explored and recommended for improvement. Airgas, like many large firms, find themselves relying more and more on technology to conduct their daily business. The following document compiles examples to support the conclusions that Airgas further customizes SAP to specifically meet their needs and changes a few standard operating procedures to foster a culture of accuracy with the supply chain.

Key Words: SAP, ERP, JIT, Production Planning, Real Time Inventory, Accounts Receivable

I. Introduction:

Airgas, USA LLC partnered with SAP to produce a version of their software that would cater to the exact needs of the firm. Airgas specializes in industrial and medical gases as well as the associated products that accompany. As a member of the Fortune 500 and a firm that ranks 42nd on return to investors [2], Airgas was motivated to fully capture an accurate picture of their business to achieve excellent shareholder returns. The objective of this report is to display information regarding how the SAP migration is meeting the goals that were set in the initial investment phase. Airgas tailored the system before the migration to best meet their needs, but given that there is some fine tuning that needs to be done, the key question will be how can this system be improved with now two years of data to draw upon?

Shareholders are currently satisfied with the short term results and returns but are unaware of the incredible strain on Airgas personnel given the constraints of the system. If the process can be freed up and streamlined, shareholders will potentially see a higher return on their investment because the technology will fully match the outputs.

Figure 1 [3]

Summary of SAP Implementation Benefits

Incremental Annualized Operating Income Upon Full Implementation

Accelerated Sales Growth:	\$25 to \$50 Million
Price Management:	\$40 to \$60 Million
Administrative and Operating Efficiencies:	\$10 to \$15 Million
Total:	\$75 to \$125 Million

1. Literature Review and Methods:

The research for this document was conducted primarily through the case study method which involved a lot of hands use of SAP and quite a few discussions with those who operate in the system daily. This project was started with the goal in mind of finding areas that Airgas could tinker with in their expensive SAP

system to maximize efficiency.

Case studies were built not to manipulate the system but to view its limitations. The assistance of a branch manager, plant manager, production supervisor, route driver, and a supply chain manager were all used throughout the study to compile the following information. The people who provided input are referred to by their titles or the general monikers of “employees” or “personnel.”

1.2 Just-In-Time Manufacturing:

A large benefit of the SAP migration was the ability to fully rely on just-in-time (JIT) manufacturing to meet all inventory related needs in the fill plants, warehouses, and branches. Just-in-time manufacturing was designed for firms that wanted to only buy or make only what was needed to fill immediate demands [1]. For a large production firm like Airgas, this meant not filling gas cylinders simply based on empty stock in production locations. Before the migration to SAP, Airgas was not efficiently producing their materials but instead relying on plant managers and personnel to physically review stock levels or fill based on the empty cylinders that were on hand.

Time and money were wasted in the strategy of turning around empty cylinders to sit in a warehouse where they may not even be needed. While no longer relying on this process as the sole way to manufacture, production facilities still have to rely on the “eye test” to see what stocks are low and therefore dictate what products need to be manufactured.

By tinkering with SAP, Airgas can set better safety nets of stock requirements to make sure that certain high use gases do not fall delinquent in supply levels. A blended just-in-time manufacturing approach may serve Airgas’ needs most efficiently. Mixing in better and more accurate safety stocks to the equation would fully eliminate the “eye test” that employees have been using.

Airgas knew from the onset that the scope of their business would not allow a complete conversion to just-in-time manufacturing as the only way to do business [1]. Safety stocks were set early on in the process and now would be the ideal time to revisit this data.

Figure 2:

A...	Date	MRP ...	MRP element data	Rescheduli...	E... Receipt/Reqmt	Available Qty	Pr...	Su...	Iss...	St...
	02/12/2015	SafeSt	Safety Stock		16-	23	7			
	02/12/2015	Delvry	8037306616/000010/0...		1-	6				F001
	02/12/2015	Delvry	8037333176/000010/0...		2-	4				F001
	02/12/2015	Delvry	8503864741/000260/0...		12-	8-				F001
	02/13/2015	PldOrd	0004065346/RS *		11	3	0001			F001
	02/13/2015	Delvry	8037306619/000010/0...		1-	2				F001
	02/13/2015	Delvry	8037312121/000010/0...		2-	0				F001
	02/13/2015	Delvry	8037333951/000010/0...		1-	1-				F001
	02/13/2015	PRdRel	1007764359/00010		2-	3-		N337	F001	
	02/16/2015	CusOrd	1033743394/000010/0...		2-	5-				

Figure 2, an actual screenshot from Airgas’ version of SAP, illustrates the point of why the safety stocks need to be edited. The safety stock is only set to 16 cylinders, but looking in the order history further down, orders of both 12 and 11 cylinders were placed on this gas.

Based off this information, seven cylinders would have to be ordered before SAP called for another production run. But if consecutive orders of 12 and 11 cylinders come, not enough product will be on hand to meet the need.

2.2 Production Planning:

Another great benefit of the initial migration was the implementation of a production planning module that would take the onus off of plant and production managers to dictate manufacturing runs. SAP would do instead auto populate each night with production to match orders or replenish stock.

The issue within this system involves the same day orders (usually covered with safety stocks) and future planning which SAP is not currently forecasting. More often than not, large orders are placed a few days in advance, but SAP would not issue planned production until the day the shipment was due to leave the facility.

For instance, for an account like a nuclear power plant operating during a shutdown would require a large amount of high pressure hydrogen cylinders on hand (usually about 50-60). Since nuclear shutdowns are scheduled far in advance, the account manager would have the order into the system with the delivery date set in the future. Instead of incrementally building up stock to prepare for the upcoming large shipment, SAP would only issue the production run for the morning of delivery. This problem now ties back to the safety stocks which may or may not have been set high enough to cover this delivery.

Assume that the safety stock was high enough, but now a production operator has to fill enough cylinders to immediately replenish or a red flag pops up for his manager. This operator is stretched thin trying to produce that high volume along with his other filling duties and may also fall delinquent now that he is focusing only on hydrogen. If SAP could be altered to plan out and stagger future activity, a gain would be had in efficiency and ultimately a higher return.

2.3 Real-Time Inventory:

While the first two items discussed how SAP's technology impacted production facilities that need the most accurate and efficient ways to perform their duties, the third item deals with the impact on the sales end of the industry.

If the plants can effectively manage inventory and manufacturing, then counter salesman and account managers will be able to convey the most up to date and accurate information to customers. Currently, salespeople can open the SAP interface on a computer and view inventory when placing orders. Inventory on the surface appears to be real time when in reality several key factors are not taken into consideration. Large production facilities produce the gases that supply several different retail outlets. With how SAP handles these interdepartmental transfers, there is a lapse in accuracy.

The Stock Transfer Orders are placed a day in advance so a can loader can fill the picking ticket. Once the shipment is full, it is ready for a driver to deliver to the location which usually happens later that day or the next day.

Problems can arise in terms of inventory accuracy because SAP will not move the cylinders on the picking ticket out of plant until an employee at the receiving branch has posted that the shipment arrived.

Figure 3:

Stock/Requirements List as of 11:09 hrs

Material: OX USPEA, Plant: N309, MRP type: VM, Material Type: ZGHL, Unit: CL

A...	Date	MRP ...	MRP element data	Rescheduli...	E...	Receipt/Reqmt	Available Qty	Pr...	St...
	02/13/2015	Stock					41		
	02/13/2015	SafeSt	Safety Stock			28-	13		
	02/12/2015	Delvry	8037333941/000020/0...			8-	5		F001
	02/13/2015	Delvry	8037312121/000020/0...			5-	0		F001
	02/13/2015	Delvry	8037312130/000010/0...			6-	6-		F001
	02/13/2015	Delvry	8503870322/000180/0...			19-	25-		F001
	02/16/2015	PldOrd	0004065218/RS			26	1	0001	F001
	02/18/2015	CusOrd	1033753794/000010/0...			6-	5-		

As a Figure 3 indicates, this plant currently shows 41 cylinders on hand, but in the past few days has had both sales orders that account for 19 cylinders and an interdepartmental transfer for 19 more (MRP Element Data numbers beginning in “803” are Sales Orders and numbers beginning in “8500” are Stock Transfer Orders).

To keep inventory live, SAP should have deducted the 19 cylinders from the plant’s stock once they were picked, but instead the system had to wait until February 13th when stock transfer was received at the branch creating a lapse in live reporting.

This matters to a counter salesman or an account manager because given the daily orders for 19 that were already in the system and the transfer of another 19, only a small amount of wiggle room would be available for sale or on hand. Figure 3’s material is Medical Oxygen, a material that cannot be produced quickly due to FDA restraints, and therefore needs to be accurately reflected in inventory reports to the best serve customers.

The other issue presented with live time inventory is the managing of guaranteed quantities within the system. Different customers who know that they will be consuming slighter rarer gases will sign a take or pay agreement to guarantee that their delivering facilities always maintain stock of their specific item. The problem with these quantities is that they are not reserved for the customer who signed the agreement, meaning that if another customer needs the gas SAP will not flag the order for dropping below the guarantee.

Figure 4:

A.. Date	MRP ...	MRP element data	Reschedull...	E..	Receipt/Reqmt	Available Qty	Su...	St...
02/13/2013	Stock					0		
06/26/2013	FOCDly	1015904571/000060/0...			2-	2-		
02/12/2013	CusOrd	1033758894/000010/0...			1-	3-		
03/02/2013	POItem	4506016740/00020	06/26/2013	10	1	2-	N321 F001	
03/09/2013	POItem	4506056921/00020	06/26/2013	10	2	0	N321 F001	

Figure 4 shows a gas that a customer has placed a guaranteed quantity on, but the supplying plant currently does not have any of the cylinders on hand.

Figure 5:

Item	Material	Order ...	Un	Description	Plant	ItCa	CnTy	Crcy	Unit Price	Unit	per	U...	Ret Ovr	Unit	per	U...	MPP Price
10	602MI99E15A0093		1	CL EP 110PPM NC / NI 15A	N309	2	Q	ZRET	USD	640.36	USD	1	CL	0.00	USD	0	0.0
20	602MI99E15A0147		1	CL EP 50PPM NC / NI 15A	N309	2	Q	ZRET	USD	0.00	USD	1	CL	0.00	USD	0	0.0
21	602MI99E15A0048		1	CL EP 55PPM NC / NI 15A	N309	2	Q	ZRET	USD	459.40	USD	1	CL	0.00	USD	0	0.0
30	602MI99E15A0076		2	CL EP 180PPM NC / NI 15A	N309	2	Q	ZRET	USD	640.36	USD	1	CL	0.00	USD	0	0.0
40	602MI99E15A0786		1	CL EP 5% OX / NI 15A (DOMINION-DG76-	N309	2	Q	ZRET	USD	304.75	USD	1	CL	0.00	USD	0	0.0
50	602MI89E15A0235		1	CL EP 11% OX / NI 15A	N309	2	Q	ZRET	USD	640.36	USD	1	CL	0.00	USD	0	0.0
60	602MI80E15A3290		2	CL EPA 20% O2 / N2 15A	N309	2	Q	ZRET	USD	573.34	USD	1	CL	0.00	USD	0	0.0

Figure 5 shows a Guaranteed Quantity listing for Pfizer's Building 101, but Figure 4 shows that the supplying plant does not have one of their cylinders available.

Another account took the cylinder, but given the long lead times projected for the gas, Pfizer's account manager may quickly find himself in a damage control mode for a high-profile account because no protection was placed on the guarantee.

2.4 Invoicing and Accounts Receivable:

Inaccurate reporting in inventory is the root cause that ties into invoicing customers and streamlining the account receivable process. Logistics and supply chain are the most important areas of study on this topic [4]. Customers who choose to put orders on account are currently billed once a month for Airgas' services.

The main area of study in this regard involves cylinder rents and leases as the gas accounts will remain on track with the understanding that the order is entered correctly. Branch managers currently oversee the rents and leases, and if discrepancies arise at the end of the month, they often find themselves digging through old inventory records to try to piece together what a customer is being charged. Since rents and leases are charged on the quantity of cylinders, accuracy of what is delivered is critical for route drivers and the distribution managers.

Most of the gases supplied by Airgas come in a variety of physical sizes, and drivers must accurately report what sizes they return from a customer so monthly rent and lease reports can be accurate.

It may seem small, but issues can pop up to branch managers when they are researching old issues and trying to reconcile reports to avoid doing a costly offsite audit. An audit should be the last resort, but if the supply chain can be rectified from the root of the issue with inventory then rents will accurately be reported. This process would also free up accounts receivable to quickly receive and process payment.

Obviously, a customer who disagrees with their bill will not pay it on time. The more tiers that are explored along the issues with Airgas' use of SAP, the more a "trickle-down affect" or strain is placed on the system. By getting it right on the ground floor, the better all levels of the system will work.

2.5 File Management:

One area where studies did show SAP succeeding was in the area of file management where servers are maintaining all necessary information. Customers who previously placed an order with an account number can look up all their information and receipts online at www.airgas.com. This area was touted pre migration as a huge benefit to customers [6], and overall it has succeeded. Pre-study beliefs were expecting a lapse in services or issues, but as long as the data is entered correctly into SAP, it rolls over nicely into an account profile.

2. Results:

After observation, personal experience, and case studies, it becomes clear that SAP does work well for Airgas especially considering the resources that predated SAP. What the case studies showed was a need to further customize the system and update standard operating procedures. The system has benefits and pros such as accurate file management for managers and customers, an efficient way to report production runs (albeit an inefficient way to plan it), and a timely period from when inventory is produced to live time. If the main goal of enterprise resource planning is long term profitability then firms like Airgas are accepting that profit will initially drop during the investment and buildup phase [7].

But just because a firm went down the ERP path does not guarantee steady long term success. Instead of having profits resemble the Nike swoosh, dropping during the investment and rising after, firms are seeing semi effective ERPs that look more like the letter W, constantly ranging up and down [7]. Sustainability is the goal to maintain profitability.

3.1 Further Customization is Necessary:

The steps Airgas took initially were profitable but further customization to the software provided by SAP would fine tune the system. If production planning could be set to fully master the scope of Airgas' just in time manufacturing, more efficient results would follow.

Airgas needs to find the happy medium between just in time and conventional manufacturing.

Findings show that the main way to do this is through altering the safety stock nets that Airgas currently placed on production. With safety nets that can fully reflect what a maximum day of orders would be, plants would be better prepared for replenishment and sales teams would be able to accurately rely on their reporting screens.

Production planning can also be changed to accommodate for large orders seen in the future. By staggering production to slowly build up to a large order rather than deplete a safety stock and strain production personnel, manufacturing would gain efficiency. SAP's full ERP resources should be maximized and having a system with a strong AI component that can recognize production constraints would serve Airgas best. Since all daily work is entered into SAP, the system would know what maximum outputs were when plants were at full strength. Full strength outputs should be considered the top of line production standards meaning that SAP could predict future production better by staggering runs to meet high demand orders.

3.2 An Update to Standard Operating Procedures:

Currently, standard operating procedures maintain that a stock transfer cannot be received until the driver arrives on location with the order. As shown in Section 2.3, this does not foster any kind of accuracy in inventory levels. The cylinders set for transfer will still show in the original location which affects production runs because they cannot be populated correctly and sales personnel who think they have an item to sell but it has already been picked for another order. Changing when the stock order is processed will alleviate some of this strain and allow inventory to display up to date and in real time.

To take the issue further than just SAP in terms of invoicing, Airgas could also consider some kind of handheld scanner to issue drivers that could tie back into SAP. Section 2.4 described branch managers having issues with rents and leases that were mainly tied to drivers and distribution staffs having some problems with properly identifying and notating returns. If the drivers were issued a scanner, and cylinders were bar coded, all the driver would have to do is scan the cylinders on and off the truck to populate his manifest. When arriving back at the plant, his scanner could upload to SAP to maintain the accuracy of his route.

II. Discussion:

With sustainability as the goal, Airgas should apply the recommendations mentioned in Section 3 to keep profits trending up as opposed to constantly ranging from high to low on whims. Many of these issues could not have been foreseen, but hindsight allows a perfect view through a 20/20 lens.

Airgas needs to avoid complacency in this process now that they have a few years of experience to draw upon. By thinking of the big picture and future returns, Airgas would be well served by continuing to improve how they do business under the umbrella of SAP.

The truth for Airgas is that their inventory probably falls somewhere in the middle of JIT and conventional manufacturing, not strictly one or the other. The pros of both systems should be blended together to lessen the strain on the production teams. Having previously tried both approaches to manufacturing, Airgas should find little difficulty pulling the most relevant facets of both into their business strategy. More research needs to be put into establishing better safety nets on products that employees know will be moving basic gases like carbon dioxide for alcohol products and oxygen for cutting and welding.

Upper management must convey to shareholders that not everything can be produced just in time to be loaded on a truck and delivered. The nature of this business will always require an amount of on demand inventory available for sale. If sales people cannot commit a product to a customer because Airgas does not have it in stock, the company will eventually lose business.

Planned production needs to reflect these larger safety nets, and some human intuition needs to be placed on planned production reports. The beauty of blending both together will be cutting down on wasted time, as time is usually money in a manufacturing space [5].

JIT manufacturing at Airgas did cut down on product waste, but it also added a wasted time or overtime element to the manufacturing process. With a manufacturing system that blends both approaches together and overseen by the production manager, Airgas could eliminate production waste and maximize their time efficiency to make their goal of a \$75 million profit in operating costs.

III. Conclusion:

JIT manufacturing has almost been the norm since the 1970s, replacing conventional systems that maintain massive supply levels. Airgas followed suit with a conversion to SAP and a focus on planned production. While SAP has helped eliminate waste, large time constraints and a loss of human intuition were placed on production operators.

By using a blended approach and a balanced scorecard, Airgas could maximize their efficiency by tinkering JIT manufacturing to reflect sales levels and also take into account run times on production manifolds. By doing this, the upper management would have the ultimate justification for the expensive SAP migration as well as the ability to achieve maximum profits for shareholders.

By alleviating some of the issues in their plants, Airgas would free up their sales force to fully rely and have faith in the technology at their disposal. The end goal of maximizing efficient outputs would be had, and shareholders could rest easy knowing that the system was revisited and retooled to provide them with their highest return on investment. After all, to successfully operate under a resource planning module would entail having the best information on hand to formulate the best strategy.

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