PEGASUS
MACHINERY COMPANY

FEMA

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RE: October - December 1996 and January - March 1997 Technical Progress Report
Instrument No. DE-FG01-95-EE15637, ERIP Invention 637

Dear Fred,

As you will see in this report, the last six months have been extraordinarily hectic. Because I am so late with the report for the last quarter of 1996 I am submitting this as a report for the period of October '96 to March '97. I will now begin working on the final report.

We have a toe hold in the market. It now seems that inventing the Pegasus and making it work was the easy part. Proving the machine with farmers is very tough, but we made some headway.

A big change is that the Arizona Department of Agriculture approved whole stalk burial with the Pegasus as a qualified "plowdown". This greatly enhances our market position.

Here is the progress over the last six months, according to the statement of work in our contract:

Task 1: COMPLETE

Task 2:

4. Test a prototype with USDA-ARS Agricultural Engineer Lyle Carter at the Shafter Research Station in California.

The 1996 yield data (following our 1995 tillage work) showed no differences between any of the treatments. There was no evidence of any disease problems associated with whole stalk burial. In other words, we have not seen or measured anything adverse whatsoever with whole stalk burial. This rigorous science will help assure farmers that there is nothing wrong with what the Pegasus does.

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DISCLAIMER

In 1995 we had some problems with very hard and dry soil breaking out in large clods, hence we could only work the plot areas which had been irrigated to simulate a wet year. Conditions were extraordinarily hot and dry in 1995, and caused growers in the area to make several extra tillage passes to get acceptable seedbeds. To address the clod problem in 1996, we acquired two "Terratill" ripper shanks for testing. The Terratill ripper is designed to shatter soil without making large clods, hence our idea was to run the Terratill ahead of the Pegasus to pulverize the areas where the Pegasus moldboards run. We found that the Terratill will effectively shatter one side of the bed without dislodging the cotton stalks (if the stalks are dislodged the Pegasus will not work). The Pegasus worked beautifully behind the Terratill. However, it had rained the week before and there was enough moisture in the soil that the Pegasus did a good job without running the Terratill ahead of it. Therefore this work was promising but inconclusive. This may prove to be valuable later on when we enter market areas where large clods are a problem.

Before entering the plot areas, we spent some time working on improvements for whole stalk burial with the "plow" prototype. Lyle Carter continued to encourage me to press on with whole stalk burial as the ultimate use of the Pegasus. My inclination at the time was to proceed with marketing the Pegasus for burial of shredded stubble, and to tackle the whole stalks issue later on (product development is expensive). We did not make a lot of immediate progress in this exercise. But as it turned out, this work gave me ideas that proved to be valuable much sooner than I had imagined.

The work on the research plots went smoothly. We repeated each tillage treatment in the same plots. The plots with whole stalk burial had zones rich in organic matter where we had buried the whole stalks in '95. A hypothesis of this study is that the higher level of organic matter will prove to be beneficial over the long run.

In the last Technical Progress Report, I told you how difficult it would be to get the Arizona "plowdown" regulations changed to allow whole stalk burial. When running the Pegasus rental program to bury shredded stubble, I showed farmers pictures of whole stalk burial at the Shafter Research Station. After a day or two I would come back to find that the farmer had plowed under a few acres of whole stalks and wanted to do the rest of the farm that way. Farmers like whole stalk burial better because it makes a much cleaner seedbed. A bunch of them went to the Arizona Department of Agriculture and demanded that this be qualified for "plowdown". I was floored to find out that they got it done. I'll explain more about that in later sections of this report.

The work at Shafter has proven to be very valuable. It kept the idea of whole stalk burial alive until we could get it approved in Arizona. When the approval came, I already knew how to modify the machine to improve performance in whole stalks.

This research will also prove to be valuable when we enter the market in the San Joaquin Valley and are able to point to our three-year study at the Shafter Research Station.

In January we published two academic papers relating to the Pegasus (copies are enclosed). The paper titled Reduced Tillage Systems for Irrigated Cotton: Energy Requirements and Crop Response summarizes the research project in which we invented the Pegasus. The manuscript titled Pegasus Plow is the paper I presented at the 1997 Beltwide Cotton Production Conferences on January 8th in New Orleans.

Task 2 Summary: Complete, except for one more year of the study with USDA-ARS.

Task 3:

1. Test market acceptance of Pegasus...

We only sold two machines and they were the prototypes.

As reported before, Pima Gro purchased the six-row production prototype. They use it to plow under sewage sludge in the Marana area. Before having the Pegasus, Pima Gro did not charge for sludge applications to farmland. Now they charge $5 per acre for sludge applications with the Pegasus and had more farmers lined up for applications than they could get around to. The limit to how much acreage they can do is dictated by the volume of sludge available and how quickly the semi trucks can haul it to the fields. They can only cover 40 acres per day, with the Pegasus spending about half the time sitting in the turnrow awaiting the arrival of the next truck. The $5 per acre charge is only one benefit to Pima Gro. The Pegasus cuts their application costs in half.

One problem with Pima Gro is that they can't seem to find a driver that will go reasonably straight. This results in some awful zigs and zags in the rows, as if he was tacking a sailboat. The zigs and zags led some farmers to believe that there was some problem with the Pegasus. The manager also had a brain wave and decided to try removing the stuffer disks from the Pegasus. The result was awful, and the farmer customers asked him not to do that again.

The other sale was also in Marana. This started out as a rental of the four-row production prototype to Tom Glover. He watched it run about six rounds and decided to buy it. I was very surprised, because this guy has never bought new equipment. Most of his equipment is old enough to vote (he still uses a 1947 Farmall MD) and he drives an old beat up pickup. He is very happy with it and this sale has really gotten the attention of his neighbors. He has a driver who goes straight, this shows other local farmers that the machine is capable of making good rows.

We expected to make a sale to Kai Farms in Marana. However, the two brothers could not reach agreement on this (they rarely agree on anything). They had Pima Gro plow some of their fields and will grow cotton and wheat behind it before making a final decision. I also rented a machine for 244 acres to another farmer in the area.

I did most of the prototype testing in Marana; perhaps that is why our only sales were there in this first year. While I endured a few years of razzing about the "Thackerator" the locals got used to seeing it. Now the idea doesn't seem so radical.

We had very little interest or activity in Pinal County.

We did a lot of beta testing there last year and had some strong sales prospects. With a new machine such as this you always sell first to the innovators. The problem is that most of the innovators in that area have just switched to narrow row cotton. University data show that there is no yield benefit from switching to narrow rows at that elevation, but farmers are desperate to get yields up and are switching anyway. We don't yet have a machine for narrow rows. Almost everyone else is too broke to buy anything.

Pinal County seems to have suffered most of the Biblical plagues. Very hot summer temperatures reduced cotton yields for yet another disappointing year. Most farmers spent three bales per acre worth of inputs but only picked a 2.1 bale per acre crop. Insect problems have been hurting them for several years, although some new

pesticides are working much better (however they are very expensive). A long drought has nearly emptied the San Carlos Reservoir; farmers who rely on that for water are not buying anything. Farmers in other irrigation districts are still hurting from the financial burden of the Central Arizona Project (CAP).

As reported before, the equipment salesman I worked with most in this area is now selling Ford cars and trucks. I am not very encouraged or impressed with the other equipment salesmen in the area.

I did a few rentals in the area, working on my own (253 acres at $10 per acre). We might make some sales in the San Carlos Irrigation Project when there is some water behind the dam.

It is now time to plant and many Pinal County farmers have not secured crop financing. Several are in Chapter 11. I believe this will eventually turn around. The financial problems of the CAP are being resolved. Farmers from other areas are buying land (very cheap) and are getting started. There is a snowpack in the San Carlos watershed. I will minimize my efforts in Pinal County until things improve.

We are off to a good start with the Deere dealer in Maricopa County.

This is a coordinated market introduction effort with Pegasus, Bigham Brothers, Inc. and Arizona Machinery Company. The effort started with a field day on November 19th in Buckeye (west of Phoenix). We took some of the toughest ground in the area and cut the stalks. Arizona Machinery set up a shade canopy beside the field and served lunch. With about 20 farmers in attendance, we ran the Pegasus to plow under the shredded stubble. Then we ran the Bigham Brothers Paratill to demonstrate how to perform deep tillage under the beds without disturbing the stalks buried by the Pegasus. Finally, we ran the Bigham Brothers PrepMaster to show how the final seedbed preparation can be done in this seamless system.

Every farmer took the wait-and-see approach with none stepping forward to buy. Nevertheless, they are frustrated with the eight to ten tillage passes they now make and are very interested in the idea of cutting down to three passes.

Even without any sales it was a successful field day. Farmers could see in one time and place how the whole system works from stalk shredding to planting. Several farmers signed up to rent the Pegasus to try it on their own fields. Arizona Machinery developed a three-step rental program. First they rented the Pegasus as a complete implement and tractor combination. Then they rented a Paratill as a complete implement and tractor combination (fitted with injection equipment for the preplant soil fumigant commonly used in the area). Finally, they rent the PrepMaster together with a tractor.

This is the first time we have had a coordinated effort at introducing this new technology. I have been run off from equipment dealerships for having an invention which threatens to reduce sales of conventional tillage implements and high horsepower tractors. With Arizona Machinery, we have a dealer who is working to implement this new technology with the idea of helping cotton farmers stay in business. Deere is about to introduce a six-row cotton picker that will cost $250,000. This dealer sees the need to keep cotton farming alive so they can sell pickers.

The owners of Arizona Machinery challenged me to prove this new invention to their customers. Prove it to the farmers they said, and they will adopt the Pegasus into their line. All of the Pegasus machines on rental are our own inventory, and Arizona

Machinery is passing all of the rental revenues straight through to Pegasus with no overhead or transaction charges ($10 per acre plus the customer pays for wear parts used up). In November when we agreed to this rental program, Arizona Machinery expected it to encompass about 600 acres total.

Proving the Pegasus to farmers on this rental program was a big challenge indeed. This is a very tough market area. Most farmers in the region "dry plant" with a sled planter. This is a planter married to a bed sled which forms the precise bed and furrow shapes desired. These planters do not tolerate much plant residue and will pile up huge wads of cotton stalks in the front of the sled. At the field day, the biggest concern of farmers was "Can we sled plant these beds?" A few farmers "wet plant" into pre-irrigated beds and are not nearly as concerned about crop residue.

With all of the farmers taking the wait-and-see approach, my only hope of keeping the company alive was to make the most of the rental program. Most farmers only committed to rent the Pegasus to try it on 40 or 80 acres. I managed to get some of them to keep using the machine for several hundred acres each. Plowing under cotton stubble for rotation to wheat turned out to be a popular use and accounted for a lot of acreage. One farmer who "wet plants" rented a machine for all of his cotton acreage.

We also had a farmer in Chapter 11 rent a machine. We knew this would be risky, but we can always get the plow back. He plowed 3600 acres in a very short period of time by running it around the clock. So far we have only collected $10,000 of the rent. Arizona Machinery is trying to collect more rent and will try to structure this as a sale when we hopefully collect for the entire value of the machine (plus 10% interest) when his crop comes in next fall. The plow is still in reasonably good shape in spite of the very abrasive and rocky ground he plowed with it. At the very least this was an intensive durability test.

I have not seen the final acreage rental numbers yet. In addition to the farmer in Chapter 11, rentals for the others through Arizona Machinery will total 1200 to 1300 acres. This and the few rentals in Pima and Pinal Counties will help keep the company alive until next season. Even then, I was getting very discouraged. We must make more sales to survive.

The Arizona Department of Agriculture (ADA) approved whole stalk burial with the Pegasus.

This was the big break that came unexpectedly. Because we were working in a tough market area where farmers require excellent residue burial, the issue came to a head. Some farmers in the Buckeye and Gila Bend areas were plowing under whole stalks on in a clandestine manner to try it. The residue burial is much better and it gets rid of the stalk shredding operation, hence they like it much better. A bunch of them went to ADA officials and challenged the requirement that the stalks be "shredded". They pointed out that there is no science showing that stalk shredding enhances insect pest abatement (pest abatement is the reason for "plowdown" regulations). I was floored to find out that the ADA granted the farmers' request. Evidently these are some very influential farmers.

The approval came on January 23rd. The plowdown deadline is February 15th in Maricopa County. A few growers parked their stalk shredders and wanted to go full speed ahead with a Pegasus rental. Things really got hectic. We had a lot of ground to cover in a short period of time.

I worked like hell to get two machines updated with the changes required to perform well in whole stalks. The first order of business was to fit the plows with Acura Trak guidance systems. Guidance is essential in whole stalks, because a 6-foot stalk will not flow around the wrong side of the moldboard when the plow is not aligned to the rows (it will plug up). Some farmers protested the addition of the guidance system to the Pegasus. I replied by asking "Would you rather run a stalk shredder?". The answer was always "Hell no!".

When plowing under whole stalks, the Pegasus stops traffic (Figure 1 and the brochure). We never had a shortage of spectators. It was the topic of discussion in the farmer coffee shops.

In retrospect, the ability to plow under whole stalks will probably make the difference between success and failure of this venture. Plowing under shredded stubble was just not good enough to make sales in this tough market area. Now we can offer good enough residue burial to ensure our success.

One of may main motivations for presenting a paper at the 1997 Beltwide Cotton Production Conferences in new Orleans was to help keep the idea of whole stalk burial alive. I never thought we would get this changed in only two weeks after the conference.

We expect to book some sales for next fall.

Four farmers in the Buckeye area who used the Pegasus to bury whole stalks are now seriously considering buying one. Before they will commit to buy they will have to plant cotton behind it and get a good stand to verify that there are no fatal flaws with this new system. This is why it is so important for me to follow through the planting and stand establishment to help ensure that there are no problems. With one grower, I showed up right after he started running the Paratill to do the deep ripping under the beds. The Paratill was not set up correctly and it was pulling whole stalks up out of the beds. He was making an impossible mess out of it and didn't even suspect it. Luckily, I caught the problem early and averted a disaster.

As I am writing this report, farmers are planting cotton behind the Pegasus. With whole stalk burial, farmers have not had any trouble with crop residue plugging the sled planters. These fields are difficult to tell from fields where ten tillage passes were made. This virtually assures that we will book orders.

Again, plowing under shredded stubble was just not good enough for this market area. Early in the fall I plowed 20 acres of shredded stubble for a farmer to try out (we did not have the OK for whole stalk burial at the time). It was a fiasco. It would not sled plant, so the farmer is now conventionally tilling the field.

We now have four machines which have been out on rental, and we will mark each machine down for one-half of the rental revenue from each particular machine. Two machines will be discounted almost $3,000 each and we expect to sell them first. We will not even broach the issue with the farmers until cotton stands are well established.

One thing that works against us in the market is the fact that several get-rid-of-the-stalks-in-one-pass machines have been introduced over the last fifty years. None have gained wide acceptance in the market or have stood the test of time. The machines were all root pullers of one type or another and either did not do a good job of getting rid of the stalks or proved to be impossible to maintain. Most of these machines are parked in

fence rows as monuments to failed efforts. This sticks out in the minds of farmers and is one reason they are so cautious. Some of these farmers own Sundance root pullers which will get parked in the fence row if they buy a Pegasus. They would also be parking stalk shredders, however most of the shredders are worn out and despised by the farmers.

1. Design a field support system...

Virtually all of our parts sales are now going through the three Arizona Machinery Company stores and Burris-White Machinery in Tucson. Arizona Machinery has been tracking parts sales to verify the durability of the Pegasus. All of the parts sales have been for the wear parts farmers expect to replace as they use the machine. These ground-engaging parts are not covered by warranty (this is typical in the industry), and are the farmer's responsibility as they wear out or are damaged by impacts with rocks or whatever (one farmer hit an old billboard foundation). Margins on parts are pretty good, so dealers like to have this kind of business.

What we don't want to see are failures that can be warranty claims. Dealers don't make much money on warranty work. The bottom line is that the Pegasus plows proved to be essentially trouble-free in tough soil conditions.

Technical support still consists of myself. I have been doing most of the field work and all of the deliveries and setup work for the rental program. This technical support does not end when the tillage season is over. I follow through with farmers when they run the Paratill, incorporate herbicide and plant behind the Pegasus. It is essential to insure that everything goes smoothly.

The dealers will not commit to developing their own technical support until we start making sales.

2. Incorporate any last-minute commercial design modifications of the Pegasus.

In the last report I said this was complete. That was true for a machine intended to plow under shredded stubble. We had it nailed. However, plowing under whole stalks required some changes:

Different Stuffer Teeth: The old stuffer teeth had a square-cut outer corner. Whole stalks would slip off the end of the teeth as the stalks were pushed down into the slot. Some stalks would get inside the teeth as they rotated back up out of the soil; this would pull stalks back out of the ground. Stalks would also wrap around the stuffer disk stub axle. We solved this with new stuffer teeth which have hook-like extensions on the ends (Figure 2). Stalks do not slip off the ends of these teeth. These extended teeth interfered with the stuffer disk scraper and the 2" x 2" tube the scraper assembly mounts to. We cut the mounting tube off for clearance and discarded the stuffer disk scrapers. We do not expect to need a scraper for the stuffer disk in whole stalks because the teeth are now engaging more wood than soil.

New Stalk Deflector: This new stalk deflector engages the stalks above the soil line (Figure 2). The purpose of this part is to keep stalks from getting between the stuffer disk and the plow unit. If that happens, stalks will wrap around the stuffer disk hub. This part proved to be completely effective. It does need to be hardfaced on the edge where stalks rub against it.

A Clearance Notch in the Plow Unit: The longer stuffer teeth barely cleared the long 3/8" plate of the plow unit as the teeth started rotating upward from the bottom of the arc. Sometimes the teeth would catch a stone and lock up against the plow unit. Flame cutting a small notch in the 3/8" plate solved the problem.

Different Settings for the Plow Units: We used to set the plow moldboards to run at three inches from the cotton stalks. This caused the stalks to lean outward from the plow unit as the plow cut its way through the soil. This was not a problem with shredded stubble, but this leaning tendency kept the whole stalks from being completely engaged by the stuffer disk. This left the stalks partially buried, with the tops of sticking out of the beds. We solved this by moving the plow units to run four inches from the cotton stalks (further away). This was counter-intuitive, but it stopped the leaning problem.

Changes in the Clearing Disk Assembly: For shredded stubble, we were using two clearing disk blades in front of the moldboards. One 18" disk blade was positioned nearest to the stalks. An additional 20" disk blade was positioned to cut soil about halfway down the side of the bed. The sole purpose of the additional 20" blade was to help slice up the shredded stalks and reduce clod sizes. The new settings on the plow units made the 20" blades almost touch each other and thus became a plugging problem. The fact that we are not dealing with shredded residue negated one justification for those 20" blades. We simply removed the blades (Figure 3). Figure 3 shows the cast iron plates (near the gang bolt nuts) used as spacers. We will shorten the disk gang bolts and eliminate those plates as well.

Clearing Disk for the Stuffer Disk: This is the same 18" clearing disk used in front of the moldboards. It cuts soil off the side of the bed right ahead of the stuffer disk. This leaves the whole stalks on a narrow pinnacle of soil that is much easier to stuff. Two things brought this change about. The first is that on most fields, there is a low end where irrigation water stands. The cotton tends to get over 6 feet tall there, and that's a lot of material to stuff under. We had some problems with the stuffer disk stalling in very large stalks. The second reason is that one farmer wanted to run the Pegasus very deep with a powerful tractor. He was running the stuffer disks at hub depth in the beds, but the stuffers could not handle the large volume of soil. The clearing disk gets rid of some soil and keeps the stuffer disk from stalling. This is a change I had been thinking about for a long time because it also helps funnel the stalks into the stuffer disk. I was reluctant to make this change because of cost, but now that we are burying whole stalks the extra cost is easily justified.

Install a Guidance System: Early in the rental program I did not use guidance systems because they are not essential in shredded stubble. Moving the guidance systems around and training the drivers is a huge time sink. For whole stalks, guidance is essential because the Pegasus will not tolerate mis-alignment to whole stalks. I had researched this before, and knew that the Acura Trak was the best choice. The only problem was that the Acura Traks were not shielded for working in whole stalks. Whole stalks are a severe operating environment, and they quickly tear up any exposed wires and hoses. I quickly designed and built some shielding for the most vulnerable wiring on the Acura Trak, but did not have time to make a complete "armor kit". As a result, we were constantly tearing up wires and hydraulic hoses. I had to stay close to the machines with a lot of spare parts, baling wire and duct tape to get through this. We will have a complete armor kit by next fall.

Stabilize the Pegasus: This involved installing large disk stabilizers on the rear of the Pegasus (they look like giant pizza cutters and are on the machine shown in the

brochure). The stabilizers prevent lateral movement at the rear and make the implement respond accurately to the steering action of the Acura Trak. I had run Acura Traks on the Pegasus last year and had not noted any need for stabilizers, but this year we got into some very hard soils where the machines were unstable. The stabilizers we used are off-the-shelf units from Sunco. They are designed to be fitted to virtually any implement but are heavy and expensive. By next fall we will design and build stabilizers for the Pegasus that are more compact, lighter and less expensive.

Most of these changes were from ideas that had been rolling around in my head after the last trip to the Shafter Research Station. I did not expect to put them to use this soon.

3. Finalize dealer agreements...

The first task here is to prove the Pegasus to the farmers and dealers, in that order. These people have seen many get-rid-of-the-stalks-in-one-pass machines come and go. Once the dealers know for sure that there is a demand for the product we can formalize our relationship with a contract. My hope is that we will be able to require dealers to order a minimum number of plows per year to keep the contract in effect. We are still a year or two away from that point.

In Pinal County I am not impressed with any of the dealers and will wait until things improve there before making any firm commitments. In Pima County we will stick with Burris-White Machinery, Inc. in Tucson.

There is now doubt in my mind that I have made the right move in Maricopa County by starting with Arizona Machinery Company. If everything else is equal, we want to be with a Deere dealer because they usually have the biggest customer base. In Maricopa County, Arizona Machinery dominates the ag market. I have asked several farmers why. The reason is not that Arizona Machinery offers low prices (they don't) or that they are extraordinarily good at service and product support (they're good). The main reason is that the local Case and New Holland dealers are lousy at service and product support.

One of the issues in the dealer relationship is the retail pricing of the Pegasus machines. Arizona Machinery Company does not sell anything on the basis of low price. Their market position is high quality equipment with good service. In setting prices they aim for a 10% gross profit on Deere equipment. On short-line equipment they aim for a 15% gross profit. The reason for the difference is their experience with warranty claims. Deere has excellent quality and very good warranty support. Their experience with short-line equipment has not been as good. This is why proving the excellent durability of the Pegasus (by watching what goes over the parts counter) is so important. Arizona Machinery is considering selling Pegasus plows on lower margins because they are not expecting warranty problems. This may get the retail price for a new machine below $30,000. The thirty grand level seems to be a psychological barrier for a lot of farmers.

4. Make the first full-scale production run (we built way too many machines).

All of the bids from the contractors were to build a minimum of ten machines. Per unit costs on fewer numbers would be significantly higher. We had only one order (Mexico) when it was time to launch production. Bonita Steel Builders wanted to build

a minimum of ten (they had a big hole in their schedule to fill). I talked them down to eight at the same per unit cost.

As reported before, we lost the Mexico order because we could not deliver in time. One of the big holdups was deliveries of components from Bigham Brothers, Inc. They were working to fill a big order to the Former Soviet Union, and they were sandbagging us and many dealers on delivery times. We have got to get better control of our component sources. The machines were completed in mid-November.

We should have only built four machines, but it's too late to worry about that. We still own all eight of the 1996 machines, although we had four out on rental and they generated significant revenue. The other four machines are still sitting at Bonita Steel Builders and we are paying one percent per month interest on the unpaid balance. With this inventory burden there is now way we will build any machines in 1997. If we get an order for a four-row machine we will simply cut down a six-row.

We made a serious mistake, but we will survive it.

Task 4:

3. Expand marketing activities...

We cannot afford much paid advertising. Our print advertising is limited to product literature via direct mail and the dealers.

Editors of various farm periodicals are interested in the Pegasus. I'll work with them on feature articles (this is a spin-off from the Beltwide Cotton Conferences). A spread in the Progressive Farmer is now in the works. Another article will follow in Cotton Farming.

The environmental benefits of the Pegasus should give us some good public relations opportunities. The machine was invented as a means of reducing dust emissions from cotton tillage, and non-attainment of PM-10 standards in the San Joaquin Valley is a big issue looming over the cotton industry there. The fact that the Pegasus only requires 30% as much energy as conventional tillage is another news-worthy benefit. This kind of PR carries much more credibility than a paid advertisement.

We will not be doing many free demonstrations. We consider the rental program to be essentially a series of paid demonstrations. Nothing is really free and we can't afford to give away a lot of valuable machine time. The only free demo we are contemplating is with The University of Arizona at the 1997 Cotton Field Day in mid-October. This is usually well attended and will get us some very good exposure.

We will make a sales video. I have about an hour of good 8MM videotape of the Pegasus in whole stalks. I'll storyboard the video and seek some professional help and/or advice on editing. The intent is to give these tapes to dealers to show to customers. It won't be very polished and will have to suffice for 1997.

4. Expand accessibility of machine with loan and lease programs...

The rental program is what saved the company this year. It was also instrumental in getting our product out where farmers can evaluate it. We would not have gotten the approval to plow under whole stalks if we did not have some farmers using the machines.

However, an intensive rental program is not something I will be able to keep doing when sales start to pick up. Renting plows is extremely time-consuming. The logistics of moving these things around is atrocious. This is especially bad now that we are plowing under whole stalks and must use a guidance system. Before putting the plow on the trailer, I must spend about two hours removing the guidance system and related parts. Then it takes about an hour to load the plow on the trailer (if I really hustle). Then I tow the whole thing down the road to the next farmer. Another hour to unload the plow from the trailer, and another two or three hours to re-assemble the guidance system.

We're not through yet. I must train the driver on both the Pegasus and the Acura Trak. I must address all of the safety admonitions. It takes about half a day to train a driver on the Acura Trak. The farmer is only renting, so he does not pay much attention to these details. A day or two later, I'll get a phone call. "Jose is sick (or in jail, whatever). How in the hell do you run this guidance system?" Keeping those machines on rental sucked up all of my time, and I worked some atrocious hours.

I did not charge rent for the use of the Acura Trak guidance systems. There were new systems which Sunco Marketing is flooring with me. I had to put them on the plows to get the whole stalk burial story out there. Then I had to repair the damage the whole stalks did the wires and hoses; and sold the systems at a demonstrator discount. In any future rental program I will charge for the use of the guidance system.

Rentals are even more problematic with all of the different row spacings and configurations farmers have. It never ceased to amaze me how farmers could devise so many different configurations. They have four row, six row and eight row setups. They have different row spacings and several setups are "variable row" with alternating wide and narrow row spacings. Setting up a Pegasus can involve stripping the machine down to the bare frame and putting it back together. This requires several hours with a forklift or a shop crane.

I ran the rental program because it kept the company alive. A rental is just as much work as a retail delivery on two implements, but it does not generate nearly as much revenue. We are contemplating raising the per acre price because some farmers are talking about just renting indefinitely rather than buying. For what the Pegasus does, the current $10 per acre rental is a steal. The rental is not very attractive to us in view of the amount of time and effort it demands. I definitely cannot continue to run this program if we are going to pioneer new market areas. Hopefully, the rental program is only something we will have to do when going into a new market area.

One good thing the rental program does is allow us to discount the price of the plows as they generate revenue. A lot of high ticket equipment is sold this way; first you get it out on rental to run some value out of it and then make some farmer a reduced price deal on it (price is typically reduced for half of the rental revenue). This is how I sold the plow to Tom Glover, he probably would not have come up with the full purchase price.

The way Arizona Machinery Company is going to approach this in the future is that the farmer will have to commit to buy before they will go through all of the motions of delivering and setting up a machine. The dealer will agree an advance to take the machine back if it does not perform satisfactorily. I think this will work well once we have some farmers in the area owning and using Pegasus plows.

Another way to expand accessibility to the technology is through "custom work". That is when one farmer performs field work for another for a price per acre. This is very applicable to the Pegasus because it is capable of covering a lot of acreage. A Pegasus owner can bring in additional revenue by plowing cotton for someone else. Typical customers are farmers who want to try the technology and/or do not have a large enough acreage to justify the investment in their own Pegasus. The beauty of custom work is that it does not require any of my time.

4. Investigate other applications of the technology.

Pima Gro has used their machine to plow under sewage sludge in grain sorghum stubble. It does a reasonably good job, but the lousy driver left the beds with such zigs and zags that the farmer decided to disk the field flat and start over again. This machine has not been updated for whole stalk burial and would probably work better with the update.

Another potential use is to plow under vegetable crops. We plowed some radish beds near Phoenix, and the result was that the following radish crop did just as well as with the conventionally tilled beds. This can save two or three passes over the field. However this did not represent enough acreage for that farmer to justify buying a Pegasus.

In Yuma, cotton is grown as a rotational crop between the winter vegetables. After harvesting the vegetables, farmers re-work the existing beds to make a cotton seedbed. This requires six to ten passes. On March 5th we plowed lettuce beds in the Yuma Valley with the Barkley Company. They like what it does and can see a savings of at least three passes (worth something on 1500 acres of cotton). We did part of a field and staked it out. The Barkley Company will continue to evaluate it in comparison to their present practices.

This summarizes the technical progress over the last six months.

The sales were very disappointing but the rental program was red hot. The rental program generated enough revenue to cover our overhead for the last few months plus enough to pay interest on our inventory at Bonita Steel Builders until next fall. We also have enough funds to convert the other six machines for whole stalk burial.

We will start out next fall with all of the machines ready to bury whole stalks. There will be no design changes that have to be made in a big hurry. Other market areas are not nearly as demanding as Maricopa County, therefore we expect to do well when we go into new areas where farmers are reasonably solvent (such as Graham County).

I will address future plans for the Pegasus in the Final Report.

Guidance systems are our off-season business.

We are a dealer for Acura Trak guidance systems. Sunco Marketing is flooring a substantial inventory of guidance systems with us. Since the end of the tillage season I have sold six systems. That's about one a week, however I need to double the pace. We have just launched a direct mail campaign with cotton farmers to try to generate more sales leads. I have also made finder's fee arrangements with some of the Deere dealers ($200 for each buyer they send to Pegasus).

Guidance systems have a high level of technology content. As a relatively low-ticket item, they don't merit much attention with the dealer salesmen or service technicians. User training is essential and must often be done in Spanish. This is why dealers don't do well with this technology. The few sales they have made turned out to be more trouble than they were worth. I have straightened out some of their fiascoes at a $40 per hour charge. This is why most dealers are happy to send the guidance business my way.

I can do well with guidance because I specialize in it. Our margin is 20 + 8%, which amounts to $1600 to $1800 per sale. This compares to a base salary plus 2% commission for a Deere salesman (low ticket items aren't worth much of their time). I'm fluent in Spanish and can thoroughly train the Mexican tractor drivers. Good user training minimizes call-back problems.

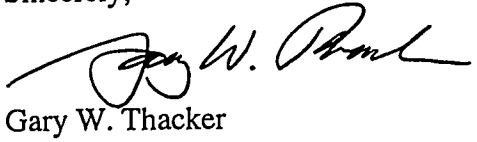
My target is to sell 20 more systems in the next three months. After June it will be to late in the year for most cotton farmers to buy one (if a farmer plans to buy a Pegasus he will want to get the Acura Trak early enough in the year to cultivate with it). This means that the bulk of the sales for the year must come in the next three months.

If the guidance system sales fall short there's a hole card to play. One of the pest control advisors in Marana has retired and I could pick up his accounts (I was the County Agent there for 11 years). This is a consulting service of monitoring insect populations in cotton fields and recommending control measures when needed. It involves a lot of slogging through the mud with a sweep net. I'm not an entomologist but can do a competent job of "bug chasing". A problem with this is that it would keep me tied up through October when we need to be getting our ducks in a row for the next tillage season. I would much rather sell Acura Traks.

More reports will be on the way soon.

The SF-272 for the last quarter of 1996 is enclosed. I will send the SF-272 for the first quarter of 1997 as soon as the March bank statement arrives. I am outlining the Final Report and will begin working on it.

Sincerely,



Gary W. Thacker

Enclosures:

Figures 1 through 3
"Plow Under Whole Stalks" brochure
1997 Beltwide Cotton Conferences manuscript
Applied Engineering in Agriculture article
SF-272

Copies:

DOE Office of Placement and Administration'
DOE-OSTI
Pegasus Stockholders