

January 2014

IBM PROBLEM STATEMENT SCRIPT

Stewart: Good morning everyone. We're still having that intermittent problem with the etching process where a small area at the edge of the substrate is significantly under etched. It's only happened a few times and on different machines over the last five months. That makes the problem harder to find and solve.

Stewart: As you know, in the etching process, gasses flow through the seal plate and then through the holes in the three baffles below. We need a uniform flow through the showerhead and onto the substrate in order to have uniform etching. Something must be causing the gas flow to be uneven.

Don: We checked out the chambers that had the problem and everything looked pretty normal except that we noticed the baffles were loose on one side and that caused them to drop down a bit.

Jack: OK, how can we prove that loose baffles are what's causing our problem?

Cathy: I have an idea.... we can try loosening the screws on the opposite side of the baffles to see if our signal moves accordingly.

Jack: While we're conducting that test, what other tests should be looking at? Are the screws being torqued to the spec we defined?

Don: Before they remove the screws we can have the technicians record how many turns it takes to get them back to torque spec.

Stewart: In the meantime, what other things can we check that might contribute to the problem? Are we seeing a variation in screw length or baffle thickness? Does it matter if the baffles are new or old? We need to use a structured approach to solving this problem so we can find the root cause. Otherwise we'll be right back here in a couple of months.

(a few days later)

Stewart: So what data have we gathered? Were you able to run that check to see if the signal moves when the baffles drop down on the opposite side?

Dave: Yes, we ran that experiment and we confirmed that the loose baffles are causing our problem.

Stewart: Excellent! Now we need to figure out why the baffles are coming loose. Jack, what did you find out about the variation in the length of the screws and thickness of the baffles?

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Jack: Well, I measured 20 screws from our supply and I also checked the thickness of the baffles and after reviewing the data, I've concluded that neither of these has enough variation to cause our problem.

Dave: I looked through our stock of old baffles and picked the worst looking ones. We put them into the tool to see how they performed compared to a brand new set. We first ran a new set of baffles that were tightened to spec. We then loosened them on one side and ran them again. We then repeated this with a set of damaged baffles. The results were identical.

Stewart: So we've collected quite a bit of data and it shows that most of the screws require some turning to get them back to torque spec. Many require more than 1/4 turn! If screws are being torqued properly to begin with, why are we finding so many loose when we go to remove them?