

*Memo from the desk of:*  
*André J. Shye*

14 March 2001

Dr. Gayle,

I've tried to objectively review the *Non Volatile Residue On Cleaned Hardware: A Perspective*, and am not sure that I come to the conclusion offered, i.e., "that the value of the information provided by the NVR determination does not justify its cost."

In the white paper, we advocate that the monitoring or control of the cleaning process is adequate for verification of the NVR, and that the risk of a problem is, statistically, quite low. We also advocate that savings from elimination of the NVR would be abt. \$750k per year, or at least \$30 per sample.

In contrast, we show 58 failures during 3766 samples taken at PFC, which is a 2% failure rate on items coming from our process. This would seem to say that control of the process is not adequate, in that the cause of the failures is exemplified as lubricants are being liberated in soluble form, along with salts in quantities sufficient to fail the sample.

Given the cost of a sample, \$30 as we have offered, and the cost of a system's replacement, or those attributable to an outage for repair, the \$30 seems to be cheap insurance. On the other hand, I understand our offering, and believe that a probability of failure is quite low, but I'm not sure I accept our argument.

Have you thought about the fact that we are most often "re-cleaning" items which have been in "protective care". For these items, controlling the process through which they are moved for cleaning continues to maintain a low likelihood of a problem, and use of particulate validation for cleanliness at the completion of the process would seem to certify the low risk potential is assured, without a need to do an NVR. However, on items entering the process for the first time, a different set of circumstances may need to be considered, or for items moving from one service media (set of controls) to another.

In this instance, would it not be valuable to create coupons for various types of typical contaminants, and measure the effectiveness of the degreaser in the pre-clean process to remove them. It would seem that demonstrated process validation would enhance our argument, as "down-stream" processes, and controls would prevent the re-contamination of the item past the degreasing point of the cleaning procedure.

Also, what about the comparative cost regarding the use of a TOC Analyzer or similar process to the NVR process?

One last item, I believe that Wiltech is using a new solvent, beyond those which you have listed in the presentation.

A handwritten signature in black ink, appearing to read "Jack". The signature is written in a cursive style with a long, sweeping underline that extends to the left.