**MEMORANDUM**

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| **DATE:**  | June 15, 1998  |
| **TO:**  | Bob Anderss  |
| **FROM:**  | John Blinneley  |
| **RE:**  | Progress report on quartz etch rate project.  |

Bob, here is the update on the quartz etch rate project that you requested. I've included some general overview of the project, a review of its subject and scope along with details on the progress we've made on each objective in the project. I conclude with a tentative outline of the report.

**Project Overview**

**Subject.** The project will develop a method for obtaining quartz etch rates from the Polyflow vertical quartzware cleaner. A report on the findings will be delivered to you and the diffusion engineering staff. A procedure for collecting this data in the future will be created.

**Purpose.** The purpose of the project is to obtain quartz etch rate data for future reference. Instructions will be provided that will insure accurate results when followed.

**Progress Overview**

There was some initial difficulty getting the necessary supplies for the test, but the project has run smoothly after these problems were overcome. The project is approximately 85% completed. I am currently running 7 weeks behind schedule according to the project checkpoint dates I provided in my January 1, 1998 memo. It will not take as long to analyze and summarize the information as I initially believed due to computer software that I was unaware of when the proposal was created. Time saved, due to the computer's ability to analyze the data, will improve schedule by 3 weeks. You will have the presentation on August 5, 1998.

There are three main phases for this project:

1. Obtaining test materials, researching quartz etch, developing of etch procedure, writing recipes for the Polyflow, and training on software available for use.
2. Performing the etch rate tests.
3. Analyzing etch rate tests using statistical process control, authoring preliminary report for approval, revising preliminary report and submit for departmental review, and completing the final report and update tool specification to include new etch procedure.

The first objective is completed. The second objective is 75% complete. All etch rate tests will be done by the end ofthe month. I have begun to enter data from the etch tests into the computer for automatic statistical process analysis. There is also a completed outline of the report which has beenenclosed. Most of the time has been spent on the first phase of the project.

**Objective 1: Material and Information Acquisition**

*Work Completed.* Immediately upon your approval of the project, I ordered the quartz chips for the etch tests from Heraus. As you know, there was some difficulty getting the purchase order approved due to recent cut backs in spending at AMD. It was necessary to get approval for the purchase of these chips from the fabrication director, Raphael Lunga. This delayed the process by 3 weeks. Your assistance in obtaining approval was invaluable. Heraus was approximately 3 weeks late shipping the quartz etch test disks. There was a problem with the quartz polishing tool and they were backlogged with orders. During the time I was waiting for approval for purchase and delivery of the quartz disks, I was able to do extensive research on quartz cleaning. The additional time was used to create various etching recipes on the Polyflow, discuss surface roughness testing with the development center, and locate and train on engineering test software that has enabled me to perform this test more efficiently.

**Objective 2: Performing Etch Rate Tests**

*Work Completed.* Execution of the etch rate tests has been flawless. A method for measuring the disks for thickness and surface roughness was adopted. This method allows for some disks to be in all phases of the testing process at once (pre-measurement for thickness, pre-measurement for surface roughness, etching, post measurement for thickness and post measurement for surface roughness.) Detailed instructions were created which allows anyone to repeate procedure. Several operators were asked to perform and etch test using only the written instructions and no further information. They were able to repeat the test without error.

*Work Remaining.* 31 of the 39 necessary etches have been performed. The remaining 8 tests will be completed by the end of the month.

**Objective 3: Analysis of Data and Report**

*Work Completed.* All data from completed etch tests have been entered into the computer for automatic analysis. An outline for the report has been completed.

*Work Remaining.* Write, and submit for approval, project report. Add etch rate procedure to the Polyflow operation specification. According to the revised schedule the report will be submitted on August 5, 1998.

**Report Outline**

Here is a working outline of the final report I intend to produce:

1. Introduction
	1. Reason for testing
	2. Brief Description of test
2. Testing
	1. Information about new quartz test disks
		1. Technical information
			1. Average thickness
			2. Average surface roughness
		2. Cost
	2. Information about measurement tool
		1. Ease of use
		2. Repeatability
	3. Results
		1. Thickness
		2. Surface roughnes
3. Summary
	1. Recommendation of testing
		1. Successful results
		2. Repeatable results
	2. Recognition for assistance
		1. Jack Warnnes, Technical advisor. Heraus—Austin, TX
		2. Darnell Johnlin, Equipment Engineer. Polyflow—Sylmar, CA
		3. Michael McBree, Senior Engineer. AMD—Austin, TX

With the exception of the time delays at the beginning of the project, there have been no problems. If you wish to see any of the actual data from the testing, let me know. If you have any suggestions or concerns, please let me know so that I may address them before I write the report.

Regards,

John Blinneley
Manufacturing Technician, Diffusion