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Appendices

Appendix A
SEMATECH Mission, Vision, and Goals

SEMATECH is the short form of SEmiconductor MAnufacturing TECHnology.

SEMATECH Mission

As SEMATECH enters its second decade, its mission takes on added importance and urgency. During its first 10 years, SEMATECH worked with member companies and suppliers to develop the equipment and materials needed to advance existing technologies and to increase efficiency and cost effectiveness. The advances were incremental and designed to help suppliers and manufacturers stay on the historical industry productivity curve that led to smaller, faster, and more widely used computer chips. In 1997, the consortium also began to focus on non-incremental changes needed by the industry--large leaps in materials and processes. For SEMATECH members to continue to realize competitive advantage, new technologies will be demanded after the turn of the century. In order for companies to have the needed technologies, research must begin now to determine what will and will not work.

SEMATECH Vision

Chairman of the Board Bill Spencer has seen his vision become a reality while at SEMATECH. Member companies have sent some of their most talented employees to serve as assignees and advisors to the consortium. SEMATECH attracts its own talented employees by providing a quality workplace and an exciting learning environment. The many workshops and technical meetings sponsored by the consortium bring together technologists from industry, academia, and government. In 1996 and 1997, the International 300 mm Initiative (I300I) combined the talents of engineers from Asia, Europe, and the U.S. in an attempt to solve the technical challenges of converting to 300 mm wafers. The consortium is also active in worldwide efforts to bring answers as quickly as possible to other areas such as environmental, health and safety issues; industry standards; and next-generation lithography technologies.

SEMATECH Goals

At SEMATECH, goals supply energy to every organization, every team, every project, and every individual as they work to realize a common plan designed to accomplish the mission and sustain the vision. The SEMATECH business organization, headed by Senior Vice President and Chief Administrative Officer Frank Squires, provides the powerlines that keep the various technology areas connected and operating. Squires is responsible for the financial, legal, strategic supply management, human resources, information systems, consortia quality, environmental, and communications functions.

Appendix B

SEMITECH Year 2000 Test Scenario

This update includes very minor revisions to Version 2.0 of the SEMATECH YEAR 2000 Readiness Test Scenarios.

Modifications introduced during the V2.0 revision and this revision are detailed below. Please note that the original twenty test scenarios from Version 1.0 remain. Any modifications are marked and described below. Entries in the right hand margin identify changes to the tests and indicate in which revision additions or changes were made. Additional test scenarios were incorporated at the request of the SEMATECH member companies who determined that there were additional situations that could result in date related failures and were not tested by the original twenty scenarios.

This revision represents a consensus of the tests required by the following companies who agree to accept them as minimally sufficient to assure YEAR 2000 Readiness:

AMD	Digital Equipment Corporation	Hewlett-Packard Company
Hyundai Electronics	IBM Corporation	Intel Corporation
Lucent Technologies	Motorola	National Semiconductor Corporation
Philips Semiconductor	Rockwell International Corporation	ST Microelectronics
Siemens Semiconductors	Texas Instruments Incorporated	TSMC

Change Type	Test #	Explanation
Clarification	All Tests	When instructed to "set internal clock" in any of the tests, this refers to "all" internal clocks including operating system / bios, application maintained, programmable controllers, etc. Set all clocks to the required dates and observe their settings after executing the test.
Clarification	All Tests	Unless stated otherwise, all dates shown within the test scenario document are to be interpreted as MM/DD/YYYY.
Rewording	All Tests	The word "PASS" in the RESULT OF TEST column has been replaced with "ERA" which means "***expected results achieved.***"
Rewording	Many	In tests where a day-of-week is being checked, a change

	Tests	has been made to accommodate equipment where there is no concept of day-of-week.
Rewording	Tests 11 & 12	Many tools cannot complete a cycle in 2 minutes. This has been reworded to indicate 2 minutes or the minimal cycle time for the equipment. The primary concern is that the process begins before the date transition and completes after the date transition.
Rewording	Tests 13, 14, & 15	There is confusion surrounding the use of the phrase "short loop process." This has been reworded to say "short duration process." Select a minimal duration process that still provides a typical sample of screen responses and reports.
Rewording	Test 14	Many tools cannot complete a cycle in 10 minutes. This has been reworded to indicate 10 minutes or the minimal cycle time for the equipment. The primary concern is that the process begins before the date transition and completes after the date transition.
Revision	Tests 18 &19	In Version 1.0, failing test 16 automatically guaranteed failure of tests 18 and 19. Test 18 and 19 have been revised to permit the test to proceed in the absence of a TIMEFORMAT equipment constant.
New	Tests 21 & 22	Are reserved for future expansion
New	Tests 23, 24, & 25	Added to verify that no date related problems exist around the transition from 1998 to 1999.
New	Tests 26, 27 & 28	Added to verify that no date related problems exist around the transition from 2000 to 2001.
New	Tests 29, 30 & 31	Added to verify that no date related problems exist around the transition from September 8, 1999 to September 9, 1999.

PRIMARY DATES OF CONCERN -a 2.0

These testing scenarios require date testing surrounding six main YEAR2000 dates of concern: -c 2.0 -c 2.0 -c 2.0

December 31, 1999 to January 1, 2000 (century change) -a 2.0

February 28, 2000 to February 29, 2000 (leap day) -a 2.0

February 29, 2000 to March 1, 2000 (leap day + 1) -a 2.0

December 31, 1998 to January 1, 1999 -a 2.0

December 31, 2000 to January 1, 2001

September 8, 1999 to September 9, 1999

ADDITIONAL DATES OF CONCERN -a 2.0

Additional dates may present problems with internal business systems or are beyond the scope of this testing. These dates should be considered by the supplier when examining their software: -c 2.0 -c 2.0 -c 2.01 -a 2.0 -a 2.0

April 9, 1999 - 99th day of 99th year (may have Julian date implications)

January 10, 2000- first time seven positions is required to represent the date

October 10, 2000- first time eight positions is required to represent the date

January 1, 2011 - some Microsoft application products will fail due to the method used to resolve YEAR 2000 issues. (i.e., year > 10 assumed to be in 20th century)

January 1, 2030 - some commercial products will fail due to the method used to resolve YEAR 2000 issues. (i.e., year > 29 assumed to be in 20th century)

January 19, 2038- many UNIX based products will fail due to overflow of the integer used to store the date

ERA -a 2.0

If an individual test results in the expected observations, enter **ERA** (Expected Results Achieved) in the Result of Test section. (In prior versions, this result was reported as "Pass") -a 2.0 -a 2.0

SECS/GEM -a 2.0

These scenarios will only test the YEAR 2000 Readiness of your product in stand-alone mode. It is also desirable to verify that the SECS-II messages created during these tests be reviewed to verify that the correct transactions are being generated and providing the properly formatted correct information across the automation link. It is also suggested that both the Human Interface and the SECS/GEM interface be used to set and check the dates of concern. -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0

Tests #16-18 verify compliance with the SEMI E5-0698 standard and are do not really diagnose YEAR 2000 Issues. With this in mind, please enter the results of these tests for information purposes. Disregard the test results for tests #16-18 when making the determination of the overall tool status. Test #19 is a YEAR 2000 test and its results will contribute to the overall tool status.

"NOT APPLICABLE" -a 2.0

In some cases, individual tests are not applicable to the particular piece equipment being tested. In these cases the tester should use the test result NA (Not Applicable). A comment must be added to indicate the basis for determining that the test is not applicable. (e.g., Test # 16 is NA because "Tool does not support SECS/GEM communication" or Test # 20 is NA because "There is no time based purge mechanism") -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0

When reporting test results for a particular tool / software product, if the result for each test is either "ERA" or "NA" the overall tool status should be reported as "Ready Now".

FAILED TESTS WITH WORKAROUNDS

In some cases, an individual test may result in "FAIL" but there is a *simple, temporary* workaround that will allow the software to be used through one or more of the key date transitions. Because the test resulted in a failure, the overall status cannot be reported as "ready now". Instead:

- if there is no plan to provide a future version of the software that remedies the failure, report the overall tool status as Never Ready (NR) and provide comments to explain the workaround.
- if there is another software product already available that remedies this failure, report the overall tool status as Upgrade Available (UA) but also provide the comments to explain the workaround for the failed test.
- if there is a planned future software release that will remedy this failure, report the overall tool status as Upgrade Future (UF) but also provide the comments to explain the workaround for the failed test.

-a 2.0
-a 2.0
-a 2.0
-a 2.0
-a 2.0
-a 2.0
-a 2.0
-a 2.0
-a 2.0
-a 2.0
-a 2.0

Tests 1-5 validate the ability of your application to successfully set and hold dates after 1/1/2000 and use the appropriate calendar for day of week and day of month.

TEST DETAILS	RESULT OF TEST	
TEST 1 - Century Date set and hold 1. Set internal clock to 01/01/2000 01:01:01. 2. Is system date = 01/01/2000? 3. If system has concept of day of week, is day-of-week = Saturday?	If (Response to 2 = YES and (Response to 3 = YES or N/A) then **ERA** else **FAIL.**	-c 2.0 -c 2.0 -c 2.0
TEST 2 - Leap Day set and hold 1. Set internal clock to 02/29/2000 01:01:01. 2. Is system date = 02/29/2000? 3. If system has concept of day of week, is day-of-week = Tuesday?	If (Response to 2 = YES and (Response to 3 = YES or N/A) then **ERA** else **FAIL.**	-c 2.0 -c 2.0 -c 2.0
TEST 3 - Leap Day+1 set and hold 1. Set internal clock to 03/01/2000 01:01:01. 2. Is system date = 03/01/2000? 3. If system has concept of day of week, is day-of-week = Wednesday?	If (Response to 2 = YES and (Response to 3 = YES or N/A) then **ERA** else **FAIL.**	-c 2.0 -c 2.0 -c 2.0
TEST 4 - Century Date set and hold after reboot 1. Set internal clock to 01/01/2000 01:01:01. 2. Power machine off. 3. Wait 2 minutes. 4. Power machine on. 5. Is system date = 01/01/2000? 6. If system has concept of day of week, is day-of-week = Saturday?	If (Response to 5 = YES and (Response to 6 = YES or N/A)) then **ERA** else **FAIL.**	-c 2.0 -c 2.0 -c 2.0 -c 2.0
TEST 5 - Leap Day set and hold after reboot 1. Set internal clock to 02/29/2000 01:01:01. 2. Power machine off. 3. Wait 2 minutes. 4. Power machine on. 5. Is system date = 02/29/2000? 6. If system has concept of day of week, is day-of-week = Tuesday?	If (Response to 5 = YES and (Response to 6 = YES or N/A)) then **ERA** else **FAIL.**	-c 2.0 -c 2.0 -c 2.0 -c 2.0 -c 2.0

Tests 6-10 validate the ability of your application to successfully roll over into year 2000 and leap day 2000 and hold these dates even after a system shutdown.

TEST DETAILS	RESULT OF TEST	
Test 6 - Century Date basic rollover	If (Response to 3 = YES	
1. Set internal clock to 12/31/1999 23:59:00.	and (Response to 4 = YES	-c 2.0
2. Wait 2 minutes.	or N/A))	-c 2.0
3. Is system date = 01/01/2000	then **ERA**	-c 2.0
4. If system has concept of day of week, is day of week = Saturday.	else **FAIL.**	-c 2.0
Test 7 - Leap Day basic rollover	If (Response to 3 = YES	
1. Set internal clock to 02/28/2000 23:59:00.	and (Response to 4 = YES	-c 2.0
2. Wait 2 minutes.	or N/A))	-c 2.0
3. Is system date = 02/29/2000?	then **ERA**	-c 2.0
4. If system has concept of day of week, is day of week = Tuesday?	else **FAIL.**	-c 2.0
Test 8 - Leap Day + 1 basic rollover	If (Response to 3 = YES	
1. Set internal clock to 02/29/2000 23:59:00.	and (Response to 4 = YES	-c 2.0
2. Wait 2 minutes.	or N/A))	-c 2.0
3. Is system date = 03/01/2000?	then **ERA**	-c 2.0
4. If system has concept of day of week, is day of week = Wednesday?	else **FAIL.**	-c 2.0
Test 9 - Century Date basic rollover with reboot	If (Response to 5 = YES	
1. Set internal clock to 12/31/1999 23:59:00.	and (Response to 6 = YES	-c 2.0
2. Power machine off.	or N/A))	-c 2.0
3. Wait 2 minutes.	then **ERA**	-c 2.0
4. Power machine on.	else **FAIL.**	
5. Is system date = 01/01/2000?		-c 2.0
6. If system has concept of day of week, is day of week = Saturday?		-c 2.0
Test 10 - Leap Day basic rollover with reboot	If (Response to 5 = YES	
1. Set internal clock to 02/28/2000 23:59:00.	and (Response to 6 = YES	-c 2.0
2. Power machine off.	or N/A))	-c 2.0
3. Wait 2 minutes.	then **ERA**	
4. Power machine on.	else **FAIL.**	
5. Is system date = 02/29/2000?		-c 2.0
6. If system has concept of day of week, is day of week = Tuesday?		-c 2.0

Tests 11- 12 validate the ability of your application to successfully execute a process that straddles the change from 1999 to 2000 and Leap Day 2000.		
TEST DETAILS	**RESULT OF TEST**	
TEST 11 - Century Date with continuous process 1. Create test process recipe with a time parameter = 2 minutes or minimal tool cycle time whichever is greater. 2. Set internal clock to 12/31/1999 23:59:00. 3. Run/simulate process created in step 1. 4. Does process continue to completion? 5. At completion is system date = 01/01/2000? 6. Did process complete successfully in the time specified in step 1 ?	If (Response to 4 = YES and Response to 5 = YES and Response to 6 = YES) then **ERA** else **FAIL**.	-c 2.0 -c 2.0 -c 2.0 -c 2.0
TEST 12 - Leap Day with continuous process 1. Use test recipe from TEST 11. 2. Set internal clock to 02/28/2000 23:59:00. 3. Run/simulate process created in step 1. 4. Does process continue to completion? 5. At completion is system date = 02/29/2000? 6. Did process complete successfully in the time specified in step 1 of TEST 11?	If (Response to 4 = YES and Response to 5 = YES and Response to 6 = YES) then **ERA** else **FAIL**.	-c 2.0 -c 2.0 -c 2.0 -c 2.0 -c 2.0

Tests 13-15 validate the ability of your application to provide equivalent feedback whether it is based on activities before or after the change from 1999 to 2000.		
TEST DETAILS	**RESULT OF TEST**	
TEST 13 - Equivalent Feedback without straddle 1. Set internal clock to 12/31/1999 10:10:00. 2. Run a short duration process. 3. Observe and record all feedback (i.e., extract and save a representative sample of screens and reports). 4. Set internal clock to 01/01/2000 10:10:00. 5. Repeat short duration process from step 2. 6. Did the process proceed identically? 7. Is feedback "equivalent"? 8. Does all timestamped information from both sides of the year change sort correctly? (i.e., in most-recent-first sorting order, year 2000 records appear prior to any 19XX records) 9. Does all timestamped information from year 2000 appear with a human understandable representation? (2000 -or- 00)	If (Response to 6 = YES and Response to 7 = YES and Response to 8 = YES and Response to 9 = YES) then **ERA** else **FAIL**.	-c 2.0 -c 2.0 -c 2.0 -c 2.0 -c 2.0
TEST 14 - Century Date process with straddle 1. Set internal clock to 12/31/1999 10:10:00. 2. Run a short duration process with a time parameter =□10 minutes or minimum tool cycle time whichever is greater. 3. Observe and record all feedback (i.e., extract and save a representative sample of screens and reports). 4. Set internal clock to 12/31/1999 23:55:00. 5. Repeat short duration process from step 2. 6. Did the process proceed identically? 7. Is feedback "equivalent"? 8. Does all timestamped information from both sides of the year change sort correctly? (i.e., in most-recent-first sorting order, year 2000 records appear prior to any 19XX records) 9. Does all timestamped information from year 2000 appear with a human understandable representation? (2000 -or- 00)	If (Response to 6 = YES and Response to 7 = YES and Response to 8 = YES and Response to 9 = YES) then **ERA** else **FAIL**.	-c 2.0 -c 2.0 -c 2.0 -c 2.0 -c 2.0 -c 2.0
TEST 15 - Cumulative History 1. Set internal clock to 12/31/1999 10:10:00. 2. Run three short duration processes. 3. Extract and save a representative sample of all	If (Response to 7 = YES and Response to 8 = YES and Response to 9 = YES and Response to 10 = YES)	-c 2.0 -c 2.0

historical screens and reports for the time period covering the past **24** hours. 4. Set internal clock to 01/01/2000 10:10:00. 5. Run three short duration processes. 6. Extract and save a representative sample of all historical screens and reports for the time period covering the past **48** hours. 7. Is feedback "equivalent"? 8. Does the feedback from step 6 include all data from step 3? 9. Does all timestamped information from both sides of the year change sort correctly? (i.e., in most-recent-first sorting order, year 2000 records appear prior to any 19XX records) 10. Does all timestamped information from year 2000 appear with a human understandable representation? (2000 -or- 00)	then **ERA** else **FAIL**.	-c 2.0 -c 2.0 -c 2.0

Tests 16-19 validate your application's conformance to SEMI E5-0698 (formerly E5-97)	-c 2.0
NOTE: The results of tests 16-18 should be shown for information purposes but excluded when assigning the overall tool status. Results for test 19 should be shown and must be considered in assigning the overall tool status.	-a 2.0 -a 2.0

TEST DETAILS	RESULT OF TEST	
TEST 16 - TIMEFORMAT Equipment Constant ID 1. What is the equipment constant id (ECID) number that the application uses to represent the new indicator TIMEFORMAT?	If (Response to 1 = UNKNOWN) then **FAIL** else **ERA.**	-c 2.0

TEST 17 - TIMEFORMAT request
1. Simulate the SECS-II Stream 2, Function 13 (Equipment Constant Request) using the ECID identified in Test 16. Tool will return a SECS-II Stream 2, Function 14 (Equipment Constant Value).
2. Is returned value = 1?
3. Is returned value = 0?
4. Is returned value = <L> (empty list)?
	If (Result of TEST 16 = FAIL)
	then **FAIL**
	else
	If (Response to 4 = YES)
	then **FAIL**
	else
	If (Response to 2 = YES or Response to 3 = YES)
	then **ERA**
	else
	FAIL.
		-c 2.0
		-c 2.0
		-c 2.0

TEST 18 - Current Time Request
1. Simulate / emulate the SECS-II Stream 2, Function 17 (Date and Time Request). Tool will respond with a SECS-II Stream 2, Function 18 (Date and Time Data).
2. In TEST 17, was returned value = 1?
3. In TEST 17, was returned value = 0 -or- is the TIMEFORMAT ECID *unknown*?
4. Is response = the current date/time (within a reasonable tolerance) and formatted as YYMMDDHHMMSS*?
5. Is response = the current date/time (within a reasonable tolerance) and formatted as YYYYMMDDHHMMSSCC*?
 	
* **Y=Years Digit, M=Months Digit, D=Days Digit, H=Hours Digit,**
M=Minutes digit, S=Seconds Digit, C=Centi-seconds Digit
	If (Response to 2 = YES and Response to 5 = YES)
	then **ERA**
	else
	If (Response to 3 = YES and Response to 4 = YES)
	then **ERA**
	else **FAIL**.
		-c 2.0
		-c 2.0
		-c 2.0
		-c 2.0
		-c 2.0

TEST 19 - YEAR 2000 Time Request 1. Set internal clock to 10/10/2000 03:04:05. 2. Simulate / emulate the SECS-II Stream 2,	If (Response to 3 = YES and Response to 6 = YES) then **ERA**	-c 2.0 -c 2.0 -c 2.0

Function 17 (Date and Time Request). Tool will respond with a SECS-II Stream 2, Function 18 (Date and Time Data)
3. In TEST 17, was returned value = 1?
4. In TEST 17, was returned value = 0 -or- is the TIMEFORMAT ECID *unknown*?
5. Is response = 0010100304SS*?
6. Is response = 200010100304SSCC*?
 	
*** S=Seconds Digit, C=Centi-seconds Digit**
	else
	If (Response to 4 = YES
	and
	Response to 5 = YES)
	then **ERA**
	else **FAIL**.
		-c 2.0
		-c 2.0
		-c 2.0

Test 20 validates your application's data retention/purge routines.		
TEST DETAILS	**RESULT OF TEST**	

TEST 20 - Data Retention during purge
1. Backup all tool data to a secure medium.
2. Set internal clock to 10/10/2000 03:04:05.
3. Execute system data purge routines to remove/archive all data that was recorded on or before last Monday.
4. Is any data from last Tuesday through 12/31/1999 in the purge data log?
5. Is any data from 1/1/2000 through 10/09/2000 in the purge data log?
6. Is any data prior to last Tuesday in the purge data log?
7. Restore data from backup.
 	
----------Alternate Test if no Purge Data Log is generated----------
 	
1. Execute steps 1 through 3 above.
2. Retrieve a sample history of activity beginning 30 days ago.
3. Is data from 1/01/1998 through 12/31/1999 in the history of activity?
4. Is data from 1/1/2000 through 11/22/2000 in the history of activity?
5. Is any data prior to last Tuesday in the history of activity?
6. Restore data from backup.
	If (Response to 4 = NO and
	Response to 5 = NO and
	Response to 6 = YES)
	then **ERA**
	else **FAIL.**
	
	---------- 	
	
	If (Response to 3 = YES and
	Response to 4 = YES
	and
	Response to 5 = NO)
	then **ERA**
	else **FAIL.**
		-c 2.0
		-c 2.0
		-c 2.0
		-c 2.0
		-c 2.0
		-c 2.0
		
		-c 2.0
		-c 2.0
		-c 2.0
		
		-c 2.0

Tests 21-22 Are reserved for future expansion

Tests 23-25 validates your application's ability to properly handle the date transition from 12/31/1998 to 01/01/1999

TEST DETAILS	RESULT OF TEST	
Test 23 - 01/01/1999 basic rollover 1. Set internal clock to 12/31/1998 23:59:00. 2. Wait 2 minutes. 3. Is system date = 01/01/1999 4. If system has concept of day of week, is day of week = Friday.	If (Response to 3 = YES and (Response to 4 = YES or N/A)) then **ERA** else **FAIL.**	-a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0
Test 24 - 01/01/1999 basic rollover with reboot 1. Set internal clock to 12/31/1998 23:59:00. 2. Power machine off. 3. Wait 2 minutes. 4. Power machine on. 5. Is system date = 01/01/1999? 6. If system has concept of day of week, is day of week = Friday?	If (Response to 5 = YES and (Response to 6 = YES or N/A)) then **ERA** else **FAIL.**	-a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0
TEST 25 - 01/01/1999 process with straddle 1. Set internal clock to 12/31/1998 10:10:00. 2. Run a short duration process with a time parameter =□10 minutes or minimum tool cycle time whichever is greater. 3. Observe and record all feedback (i.e., extract and save a representative sample of screens and reports). 4. Set internal clock to 12/31/1998 23:55:00. 5. Repeat short duration process from step 2. 6. Did the process proceed identically? 7. Is feedback "equivalent"? 8. Does all timestamped information from both sides of the year change sort correctly? (i.e., in most-recent-first sorting order, year 1998 records appear prior to 1999 records) 9. Does all timestamped information from year 1999 appear with a human understandable representation? (e.g., 1999 -or- 99)	If (Response to 6 = YES and Response to 7 = YES and Response to 8 = YES and Response to 9 = YES) then **ERA** else **FAIL.**	-a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0

Tests 26-28 validates your application's ability to properly handle the date transition from 12/31/2000 to 01/01/2001		
TEST DETAILS	**RESULT OF TEST**	
Test 26 - 01/01/2001 basic rollover 1. Set internal clock to 12/31/2000 23:59:00. 2. Wait 2 minutes. 3. Is system date = 01/01/2001? 4. If system has concept of day of week, is day of week = Monday?	If (Response to 3 = YES and (Response to 4 = YES or N/A)) then **ERA** else **FAIL.**	-a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0
Test 27 - 01/01/2001 basic rollover with reboot 1. Set internal clock to 12/31/2000 23:59:00. 2. Power machine off. 3. Wait 2 minutes. 4. Power machine on. 5. Is system date = 01/01/2001? 6. If system has concept of day of week, is day of week = Monday?	If (Response to 5 = YES and (Response to 6 = YES or N/A)) then **ERA** else **FAIL.**	-a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0
TEST 28 - 01/01/2001 process with straddle 1. Set internal clock to 12/31/2000 10:10:00. 2. Run a short duration process with a time parameter =□10 minutes or minimum tool cycle time whichever is greater. 3. Observe and record all feedback (i.e., extract and save a representative sample of screens and reports). 4. Set internal clock to 12/31/2000 23:55:00. 5. Repeat short duration process from step 2. 6. Did the process proceed identically? 7. Is feedback "equivalent"? 8. Does all timestamped information from both sides of the year change sort correctly? (i.e., in most-recent-first sorting order, year 2000 records appear prior to 2001 records) 9. Does all timestamped information from year 2001 appear with a human understandable representation? (2001 -or- 01)	If (Response to 6 = YES and Response to 7 = YES and Response to 8 = YES and Response to 9 = YES) then **ERA** else **FAIL.**	-a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0

Tests 29-31 validates your application's ability to properly handle the date transition from 9/08/1999 to 9/09/1999		
TEST DETAILS	**RESULT OF TEST**	
Test 29 - 09/09/1999 set and hold 1. Set internal clock to 9/09/1999 01:01:01. 2. Is system date = 9/09/1999? 3. If system has concept of day of week, is day of week = Thursday?	If (Response to 2 = YES and (Response to 3 = YES or N/A)) then **ERA** else **FAIL.**	-a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0
Test 30 - 09/09/1999 basic rollover 1. Set internal clock to 9/08/1999 23:59:00. 2. Wait 2 minutes. 3. Is system date = 9/09/1999? 4. If system has concept of day of week, is day of week = Thursday?	If (Response to 3 = YES and (Response to 4 = YES or N/A)) then **ERA** else **FAIL.**	-a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0
Test 31 -09/09/1999 basic rollover with reboot 1. Set internal clock to 9/08/1999 23:59:00. 2. Power machine off. 3. Wait 2 minutes. 4. Power machine on. 5. Is system date = 9/09/1999? 6. If system has concept of day of week, is day of week = Thursday?	If (Response to 5 = YES and (Response to 6 = YES or N/A)) then **ERA** else **FAIL.**	-a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0 -a 2.0

Reminder: Current tool information should be saved in a safe medium prior to Y2K test execution and restored from the backup upon test completion. The current date and time should also be restored after test completion.

Use the SEMATECH YEAR 2000 TESTING SCENARIOS - RESPONSE FORM to report test results for each software product / version tested.

Test Results are to be reported by test number and result (ERA, Fail, Not Applicable, Not Completed). An explanation is required for any "Fail", "Not Applicable" or "Not Completed" response. (e.g., Test 16 is "Not Applicable" because tool does not support SECS-II communication

Appendix C
SEMITECH Year 2000 Test Response Form

SEMATECH YEAR 2000 TESTING SCENARIOS - RESPONSE FORM

COMPANY: _____ EQUIPMENT: _____

SOFTWARE PRODUCT: _____ VERSION: _____ DATE: _____

TEST #	TEST DESCRIPTION	TEST RESULT*	EXPLANATION (IF FAIL, NOT APPLICABLE, NOT COMPLETED)
1	Century Date set and hold		
2	Leap Day set and hold		
3	Leap Day + 1 set and hold		
4	Century Date set and hold after reboot		
5	Leap Day set and hold after reboot		
6	Century Date basic rollover		
7	Leap Day basic rollover		
8	Leap Day + 1 basic rollover		
9	Century Date basic roll over with reboot		
10	Leap Day basic rollover with reboot		
11	Century Date with continuous process		
12	Leap Day with continuous process		
13	Recurrence Feedback without straddle		
14	Century Date process with straddle		
15	Cumulative History		
16	TIMEFORMAT Equipment Constant ID		
17	TIMEFORMAT request		
18	Current Time Request		
19	YEAR 2000 Time Request		
20	Purge		
23	01/01/1999 set and hold		
24	01/01/1999 set and hold after reboot		
25	01/01/1999 with continuous process		
26	01/01/2001 set and hold		
27	01/01/2001 set and hold after reboot		
28	01/01/2001 with continuous process		
29	09/09/99 set and hold		
30	09/09/99 basic rollover		
31	09/09/99 rollover with reboot		

TEST PLATFORM
Processor / Motherboard:
Operating System:
SECS/GEM Interface:
Other

NEXT EXPECTED DATE RELATED FAILURE

OVERALL TOOL STATUS
❑ Never Ready
❑ Upgrade Future
❑ Upgrade Available
❑ Ready Now

* TEST RESULTS	
ERA	Expected Results Achieved
F	Failed - (Explanation)
NA	Not Applicable (Explanation)
NC	Not Completed (Explanation)

Overall Tool Y2k Status | **Y2k Compliant** / **Y2k Ready** / **Y2k Fail** * | * Circle where appropriate. Note: Failure of shaded test is Y2k Ready

Company representative attesting to these results: _____ Title _____ Printed Name _____ Signature / Date

Appendix D
TSMC Company Information

Company Profile

Founded in 1987, Taiwan Semiconductor Manufacturing Company (TSMC) is a dedicated independent semiconductor manufacturing foundry based in Taiwan's "Silicon Valley," Hsin-chu Science-Based Industrial Park. The company is listed on the Taiwan Stock Exchange (TSE) and the New York Stock Exchange (NYSE) under the symbol TSM.

TSMC was the first pure integrated circuit (IC) foundry company in the world. Since its founding, the company has been dedicated to providing manufacturing services for advanced ICs. The company's charter prevents it from designing or making its own brandname IC products. TSMC therefore is a partner, not a competitor with other semiconductor companies. TSMC's success in the foundry business has served as a model for the many new entrants to the market. With TSMC as the engine of change, what was once only a concept -- a pure foundry -- is today a multi-billion dollar industry.

TSMC's vision is to be the most reputable, service-oriented and maximum-total-benefits silicon foundry in the world, and thus earn the reward of being also the largest and most profitable.

Building on its core competencies of manufacturing excellence and attentive customer support, TSMC offers a full range of manufacturing services on a broad range of technologies, including wafer manufacturing, wafer probing, assembly and testing, mask production, and design services. TSMC also provides consistent volume production levels of new generation technologies. TSMC offers a comprehensive set of technology processes, including processes to

manufacture CMOS logic, mixed-signal, volatile and non-volatile memory, embedded memory, and BiCMOS ICs.

TSMC focuses on process technology and manufacturing excellence, but places even greater emphasis on customer service. TSMC's objective is to become our customers' Virtual Fab. That is, to give our customers all the benefits of an in-house fabrication plant, without the associated expense or organizational complexity. TSMC's strategy is to improve service, develop a long-term competitive advantage by strengthening the bond between ourselves and our customers, and ensure our continued leadership in the global IC foundry business.

As a good corporate citizen, TSMC takes the job of community service and employee relations seriously. TSMC's concerted efforts have earned the company several awards from the Taiwan government for environmental protection, health and safety, employee benefits, employee training and social welfare. In addition, prestigious magazines in Taiwan and around the world have ranked TSMC as Taiwan's leading company. Its chairman, Dr. Morris Chang, has also received many individual honors. *Business Week* magazine, in its January 12, 1998 issue, selected Dr. Chang as one of the "Top 25 Managers of 1997." BancAmerica Robertson Stephens also honored Dr. Chang, citing him as one of the most significant contributors in the 50 years of semiconductor industry.

TSMC Milestones

- 1987/02 TSMC founded
- 1988/02 USA office established
- 1990/04 Fab2A opening

- 1991/06 Started E-Beam reticle making service
- 1991/04 Started ASIC design service
- 1992/06 Won National Invention Award
- 1992/06 Fab2B opening
- 1993/04 ISO-9001 certification
- 1993/10 Europe office established
- 1993/12 Fab3 ground breaking
- 1994/09 TSMC initial public offering
- 1995/04 Fab4 ground breaking
- 1995/08 Fab3 opening
- 1995/09 FORD Q1 preferred quality award
- 1995/11 Fab5 ground breaking
- 1995/12 Annual sales exceed US$1B
- 1996/08 ISO-14001 Certification
- 1997/02 Fab4 opening
- 1997/08 Ground Breaking in Tainan Science-Based Industrial Park
- 1997/10 ADR listed on NYSE
- 1997/10 Fab5 opening
- 1998/04 QS-9000 Certification
- 1998/05 Won National Invention Award
- 1998/06 Japan office established
- 1998/07 WaferTech shipped production qualified wafers
- 1999/06 SSMC (joint venture with Philips) ground breaking
- 1999/06 TSMC-Acer established

Current Status

TSMC currently operates two 6-inch wafer fabs (Fab 1 and 2) and three 8-inch fabs (Fab 3, 4 and 5), all located in Hsin-Chu, Taiwan. The company has broken ground in the new Tainan Park, which will house Fabs 6 and 7. In mid-1998,

WaferTech, TSMC's joint venture with several long-standing customers in the U.S., started shipping production qualified wafers to its customers. Recently, TSMC announced its participation in a $1.2 billion joint venture fab with Philips Semiconductor which is scheduled to open in Singapore in the year 2000

In addition to maintaining a competitive edge with continually- increased capacity, TSMC satisfies customers' needs by consistently providing volume production levels of new generation technologies. The company provides customers with the most advanced 0.25um and 0.18um process technologies, and is also capable of offering a comprehensive set of fabrication processes, including processes to manufacture CMOS logic, mixed signal, volatile and non-volatile memory and BiCMOS chips.

TSMC currently has 6,000 employees, over 50% of which hold a college or advanced degree. The average age of TSMC's employees is 28.

TSMC Year 2000 Project

Taiwan Semiconductor Manufacturing Company (TSMC) has taken a proactive approach to resolve the Year 2000 computer date issue, and has had a corporate Year 2000 project team working on this issue since December, 1997. Our strategies will keep us on schedule to meet the milestone dates we have set for the resolution of this issue.

To manage the Year 2000 issue, we have divided our focus into the following major program areas: IT Infrastructure, Commercial Software, In-house Applications, Manufacturing Equipment, Facilities, and Supply Chain (raw material suppliers, subcontractors , utilities, banks and others). TSMC's phased approach includes awareness definition, inventory assessment, impact analysis, action planning, software application conversion, unit testing, integration testing, redeployment, contingency planning and auditing.

Definition of TSMC Year 2000 Readiness

At TSMC, Year 2000 readiness means that the systems we use should accurately process date data (including, but not limited to, calculating, comparing and sequencing) from, into and between the twentieth and twenty-first centuries during the years 1999 and 2000.

Year 2000 Milestones

TSMC has target milestones for each of the following steps :

Phase I Assessment Phase	December 1997 - June 1998
Awareness Definition	March 1998
Inventory Assessment	April 1998
Impact Analysis	May 1998
Action Planning	June 1998
Phase II Implementation Phase	July 1998 - June 1999
Software Application Conversion	November 1998
Unit Test	December 1998
Integration Testing	February 1999
Re-deployment	April 1999
Contingency Planning	April 1999
Auditing	June 1999

The Scope of Year 2000 Project

Manufacturing Equipment

Manufacturing equipment includes equipment used in the integrated circuit (IC) manufacturing processes such as oxidation, lithography, etching, ion implantation, metal sputtering and other manufacturing processes.

Information Technology Infrastructure - Computer and Communication Equipment

The computer and communication hardware and software supporting TSMC's information management system functions include work stations, PC servers, desktop PCs, notebooks, printers, scanners, disks, routers, hubs, bridges, modems, firewalls and web servers.

Commercial Software

The commercial software packages are purchased from outside vendors. TSMC's commercial software packages include manufacturing management systems, enterprise resource planning systems, general office use packages, system development tools, database development tools, simulation tools and other miscellaneous applications.

In-house Applications

TSMC's in-house applications are designed to help people perform specific types of work. These applications include business transaction systems, factory automation systems, office automation systems and other miscellaneous applications.

Facilities

Facilities equipment includes: uninterrupted power systems, environmental monitoring equipment, elevators, security systems, air conditioning systems and other related equipment.

Supply Chain

Raw Material Suppliers

TSMC's suppliers are those companies that provide TSMC with direct and indirect raw materials, including, but not limited to wafers, gases, and processing chemicals.

Subcontractors

TSMC's subcontractors include IC assembly factories, IC package factories and IC probe factories.

Utilities

Utilities include ChungHua Telecom Corp, Chinese Petroleum Corp, Taiwan Power Corp, and others.

Banks

These include related banks or institutions supporting TSMC's financial functions including deposits, payroll, leasing, and other financial operations.

Other Vendors & Suppliers

Other types of companies include the forwarders, brokers and customs expediters who provide TSMC necessary business functions.

The Year 2000 Readiness Status of Year 2000 Project

As of August 6, 1999, TSMC's Year 2000 readiness status is as follows:

Category	Completed Percentage
Manufacturing Equipment	100.0%
IT Infrastructure	100.0%
Commercial Software	100.0%

In-house Application	100.0%
Total	**100.0%**

By the end of August, TSMC has completed 100% necessary tests and redeployment internally. Our current focus is the refinement and rehearsal for contingency plan and rollover plan.

Appendix E
CSM Y2K Assess Audit by Hewlett-Packard

CSM Y2K Assessment Audit

October 6 & 7, 1999

Sponsored by the ICBD Management Team

Executive Summary

Authors: Bob Trainer, Ryan Mattley, and Bob Crum (CSM Y2K Assessment Team)

Distribution: Manufacturing Staff & External Product Line Group

Last Revision: 10/20/1999

EXECUTIVE SUMMARY

"The CSM effort to prepare for the Y2K event was significant and in fact is still underway (98% complete). They have significantly reduced their exposure and are substantially compliant and in our opinion, are "Y2K Ready." Business continuity and Y2K contingency plans look very strong for CSM Fab #2 and #3. However, it is strongly recommended that CSM address the absence of Disaster/Recovery Plans (DRPs). If an unforeseen incident occurs (e.g., computer virus, sabotage, flood, or ??), a pre-agreed upon plan for ANY disaster response and a signed off contingency plan from your major user/customer ensures the ultimate "safety net" is in place. This is required to cover what could impact CSM's production capability, but was never thought of or planned for. Who knows what will happen?"

- The CSM Y2K Assessment Team

FACILITIES SUMMARY

Facilities Systems

We inspected the documentation of CSM's program for assuring that their Facilities Systems were Y2K ready and questioned them on their procedures.

We found that they have done a thorough job of analyzing their systems and investigating any potential problems. They compiled a comprehensive table of all system instrumentation that contained a date and could possibly hurt the manufacturing operation. They then systematically tested and verified each instrument to minimize the probability of failure. They worked with the local utility suppliers and discussed procedures to be followed to prevent problems.

CSM has a detailed plan for the days immediately before and after 1 Jan 2000 to insure that all of the proper personnel are available to deal with any problems or concerns. Some systems will be operated in manual mode at the critical moment. Each facility system will be checked by a maintenance team and factory representatives will be available if needed. All critical systems parameters will be closely monitored and validated before and after the event. A Facilities Systems Checklist will be used to verify operating conditions before releasing the Clean Room to operation.

Security

Extra security guards will be on duty and all personnel entering the premises will be validated by security clearance.

EQUIPMENT / PRODUCTION SUMMARY

Equipment

CONCLUSION: CSM's equipment program appears excellent. This is a very low-risk area.

COMMENTS: They have adopted SEMATECH's test suite and approach with good follow-through. They kept the test response sheets in several large, 3-ring b nders. They were able to quickly produce a response sheet when asked. Whenever possible, they had three people present at equipment testing and for sign-off of the response sheet: the equipment's in-house engineer, a vendor representative, and an in-house IT person. All the response sheets were from Fab 3 (the Fab 2 representative didn't bring them with him, instead concentrating on a higher-level approach). Transition plans reviewed were for Fab 2, presumably to be used elsewhere as well.

CONTINGENCY PLANNING: Their CIM department currently backs up all equipment recipes. The CIM department will be responsible for a final back up of recipes just prior to the Y2K roll.

SUMMARY: The only concern is their lack of completed, organized documentation. As mentioned, they have the response sheets easily accessible; however, I was not shown any coherent, high-level plan tying it all together. Their procurement department is in process with negotiating vendor on-site presence during the roll, as we are. They verbally reported that they have an established policy that equipment must be Y2K Compliant for purchase. Overall, their approach to equipment readiness is similar to the United States. There appears to be no unusual circumstances due to their location or culture that requires a radically different approach.

Subcontractors

CONCLUSION: This is a medium-risk area. It carries lower weight, however, when compared to other phases of fab operation. Its lower weight reduces its impact to the over all Y2K Readiness.

COMMENTS: CSM verbalized an excellent approach to Equipment Service Vendor availability – They plan to have one Field Service Engineer or tool representative on site for critical and/or high-risk tools. Any problems discovered and fixed in one fab will be quickly propagated to the other fabs. This should help relieve some pressure

on the vendors resulting in increased cooperation. As mentioned earlier negotiations for these reps are in process.

Access to vendor supported spare parts is not as clear. They are increasing storage of some parts, but leaving out others. For example, Quartz was considered critical at the Fort Collins site and additional quartzware is being ordered. CSM refused to store extra quartz on-site. They will have plenty of targets on hand, however. In general, CSM is depending quite heavily on its vendors to have plenty of parts on the island in case they are needed, very similar to our approach as well.

CONTINGENCY PLANNING: No DRP was verbalized for this topic. They took note of ours.

SUMMARY: Again, contingency and DRP plans were verbalized and dic not appear documented. They have recently completed critical parts lists based on high-usage; however, they had not considered low-usage, but crucial parts. A Risk Analysis and Management approach with all the accompanying documentation may have been of great benefit in this area for identifying important considerations (e.g. assessing "Probability" and "Severity" of high-risk topics – Probability of occurrence could be very low, but a factor's *severity*, should it occur, may warrant appropriate preparation). They tended to group this topic with the "Consumable Supplies/Spare Parts" topic – See it below for more information.

Consumable Supplies/Spare Parts

CONCLUSION: This is a low-risk area.

COMMENTS: CSM routinely has 1 – 1.5 months of materials on hand. Presumably, this is due to long lead times for getting supplies and materials to the island. In many cases, they have increased the supply of material on hand to 2 months. This increase is adequate, as Fort Collins' Y2K Business Continuity approach has been to plan for a 15 to 30 day materials disruption. "On hand" means that the vendor has satisfied CSM that they have the supplies on the island. For example, they have planned to increase their in-house inventory of raw wafers for HP abou: 3x (from 2 to 3 days' inventory to 1 week's) and double warehouse storage from 1 month to 2 months. CSM verbally reported that they have performed on-site audits of several suppliers addressing wafers, process chemicals, and gases. They expressed confidence particularly in their bulk and high purity gas supplier. Included in their vendor audits was checking on two different world-wide locations for a single vendor to insure that if one location suffered Y2K-related setbacks, another location could deliver. CSM routinely second-sources material suppliers. In some cases, they

triple-sourced a consumable supplier for Y2K preparation. So high is their confidence in their suppliers' ability to deliver regardless of the situation, they've concentrated their efforts in to creating a manual system for ordering materials (i.e. a Purchase Request fax form). Over all CSM stated that they consider materials to be very low risk.

CONTINGENCY PLANNING: As is true in Fort Collins planning as well, their contingency planning is their preparation process in terms of ordering additional materials, supplies, and parts.

SUMMARY: Overall, CSM's approach to Consumable Supplies/Spare Parts is very similar to Fort Collins'. Lists of supplies and spare parts that they are ordering were presented for inspection. They have not, however, created a clear, comprehensive document reflecting all their plans and actions.

Planning / Inventory Control / Customer

CONCLUSION: This is a high-risk area. It carries lower weight, however, when compared to other phases of the fab operation. Its lower weight reduces its impact to over all Y2K Readiness.

COMMENTS: The planning people had a documented plan for Planning and Inventory Control. The best they can do is pull-up December 1999 deliveries of parts by 2 days. They will ship December parts by December 29th.

CONTINGENCY PLANNING: There is none. No build-ahead contingencies have been considered. When suggested, it was unequivocally rejected. CSM is producing at maximum capacity now, with absolutely no resources left for building ahead. Fort Collins' contingency plan was to count on CSM to help create build-ahead inventory. This cannot occur.

SUMMARY: HP Fort Collins ICBD IC Fab can not count on CSM to help with building ahead. The best CSM can do is pull up December parts shipment by 2 days.

Transition Management (Group)

SHOP FLOOR: Again, the shop floor appears to be in excellent shape. A formal plan was presented to be shut down by 2200 hours (10 PM) on December 31st 1999. They use Smithpods, so placing product in a protective state is not an issue They also presented formal documentation for a regimented started up for each module. Included in this documentation were details such as leak checks and completing monitor quals before releasing tools to production. It was verbally reported that

Facilities and IT would be responsible for giving an "all clear" for restart during the transition period. If there are no power glitches and all else appears OK, the plan is to begin restarting production at about 2 am on January 1st 2000, after the "all clear" has been heard and equipment has been setup.

OTHER: CSM's security representative presented an excellent plan for Disaster Management that is currently in use.

INFORMATION TECHNOLOGY SUMMARY

Testing

FAB SERVERS: Chartered Semiconductor Manufacturing (CSM) used integrated, block testing. They drew from the SEMATECH test suite for their trials. Among the servers tested are: Their "Lot Reservation Server" (i.e. WIP listing by flowline with selection of the best lot to process next); Automated Data Collection and Structured Query Language (ADC/SQL) server; and the Statistical Process Control (SPC) server. The SPC system is "Knights 3.5" running on a Sun server. CIM functions run with Oracle 7.3.4 (Y2K Compliant version). They also tested Knights Yield Management System 8.0. Digital VMS and Unix server platforms tested out Y2K Ready.

SHOP FLOOR CONTROL: PROMIS is CSM's primary shop floor control system for WIP tracking and equipment maintenance. PROMIS was tested with transactions that spanned December 31, 1999 to January 1, 2000, including scrap, bonus, and cycle time calculation functions. It proved Ready.

In addition to PROMIS, CSM uses an AMHS (Automated Material Handling System). Some testing of the AMHS was done locally in Fab 3. All the AMHS testing in Fab 2 was done locally with a battery of 13 tests by CSM and AutoSoft personnel. All results indicate a Y2K Readiness state. Contingency/Disaster Recovery plans are not unexpected: If the AMHS is unrecoverable for some time, operators will hand-carry lots. Operators are currently being trained in the manual retrieval of lots from the stocker. Additionally, all lot locations in the stocker will be printed at 10 PM as the fab goes in to an idle state.

The final addition to PROMIS for shop floor control that was audited is their Reticle Tracking system. It also is no concern.

PROCESS CONTROL SYSTEMS: CSM has an SPC system for tracking process data. As mentioned before, PROMIS tracks the state of equipment, whether "UP," "DOWN," "OTHER," etc. SPC Reporting, fab reports (WIP, hold, prototype, etc.), equipment state tracking, and the ADC-SPC interface all tested fine. In addition, FASTech CELLworks is used as a station controller for recipe and lot selection. It is declared "ready" as well.

EQUIPMENT INTERFACE: Continuing their use of the SEMATECH testing approach, SECS tests from the test suite were used on each tool where applicable (SEMATECH test suite numbers 16 - 19). CSM uses "CSP Station Works" which interfaces with PROMIS for automated equipment control and data collection (e.g. recipe selection followed by data collection). They use a batch context server by CELLworks. All these tested Y2K Ready.

Y2K Roll Preparation

CSM plans to create an IT "Disaster Recovery Center" that will back up the PROMIS server and network in addition to current back up systems. The plans are well thought-out and documented. They currently have scripts available that will shutdown their network in an orderly fashion within a 30 minute window. This would be very useful during a Y2K catastrophe. Their entire IT team will be on site during the Y2K rollover.

In addition to IT-specific actions, CSM also pointed out that site personnel are refreshed every 6 months on emergency procedures including CPR and fire training. Also noted was their use of FM200 gas for fire suppression in the clean room. Singapore produces its own electrical power. CSM also has a key account manager in POB with a link to Australia for early detection of major disruptions (the eastern portion of Australia is 2 hours ahead of Singapore). CSM plans to have a Command Center set up as illustrated by documents showing flow charts of information flow to management; customers; suppliers; among fabs and fab locations including Walkie-Talkie communications; and others. Worse case, CSM would use couriers to communicate with others during a Y2K disaster.

Contingency Planning

As mentioned earlier, CSM is currently drilling operators on manual lot retrieval from stockers and manual recipe selection. They will impose a freeze on system enhancements on December 1st. They plan to do a full system back up one week before the roll, followed by an incremental back up of the system after 10 PM on 12/31/99. They will print run sheets at least one day in advance. Finally, reports of product movement will be printed before midnight.

Transition Plans

For the transition itself, all server OS's will remain up, but with all applications shutdown. Production will be idle for about 2.5 hrs: 10 PM - 12:30 AM, then checks will begin. If all checks show now concerns, IT will give an "all clear" to the fabs by 1 AM. Production resumption is planned for 2 AM. With the resumption of production, priority lots will be run for the first 12 hours after the roll, followed by normal production.

CLOSING SUMMARY

The most glaring item noted is the lack of documented DRPs. Each of the 73 High Risk Factors (or "areas" or "topics") assessed should have its own, specific DRP, or reference one that is applicable. Disaster Recovery Plans should be constructed with the input of the closest partners or customers. The customer or partner should approve the final product with perhaps an actual signature procured documenting their approval. IT has good, documented disaster recovery planning, and this is needed for the other areas as well (i.e. Facility / Utility Infrastructure; Security; Equipment; Subcontractors; Consumable Supplies / Spare Parts; Social / Management; and Planning / Inventory Control / Customer). Even so, the IT DRP which includes the DRC appears to be largely still in the planning stages, so it would be best if CSM made sure that hardware, people, and processes are in place for the IT DRP *before the roll.*

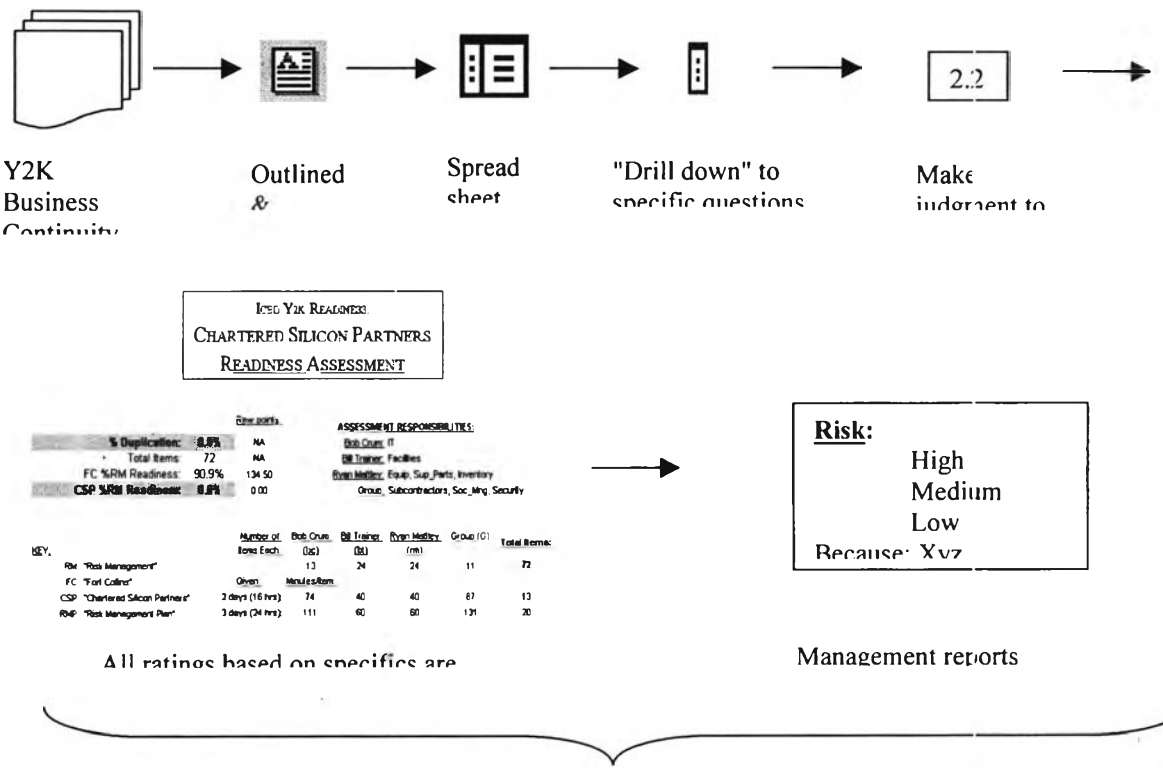
Another significant area of concern is Planning / Inventory Control. *Please note from earlier statement: This area carries* ***lower weight*** *when compared to other phases of fab operation. Its lower weight* ***reduces its impact to over all Y2K Readiness.*** Many of the SEMATECH member companies are building-ahead as a contingency against Y2K disruptions. CSM is not doing so, nor does it appear that they've tried to creatively investigate any possibilities to help circumvent this issue. Additionally, HP Fort Collins' contingency plan for this topic was to depend on CSM for build-a heads, if needed. This is no longer an option, thus impacting a partner. Fort Collins will have to reconsider the issue.

Overall, there appears to be a lot of duplicated in effort between Fort Collins' IC Fab and CSM's Singapore IC Fab. For the first time, it may be stated that duplication of effort is good! Both fabs have considered, tested, and investigated the same concepts, similar hardware, and actions.

This says a lot about the rationality and practicality of the actions take by both fabs.

CSM ASSESSMENT PROCESS

The above is provided to assist with understanding how the Y2K



CONSTANT TERMINOLOGY

Advantages of entire process:

>No time consuming bottlenecks - Most work done real-time.

>Constant terminology creates complete understanding to maximize accuracy and communication among us & with others (EPL &

Readiness Assessment was carried out. It is an illustration that briefly describes the assessment process. We used the Fort Collins' "Fab Capacity Development Group - Y2K Business Continuity and Contingency for the Fort Collins Semiconductor Fab, Test, Assembly and Bump Operation - Scenario" document as a "baseline" or starting point. This document is a comprehensive record of the Fort Collins' Manufacturing Y2K Business Continuity Council's activities, plans, and conclusions regarding Y2K Readiness for the manufacturing areas listed. It was created from input by a multifunctional team including representatives from finance, procurement, equipment maintenance from each manufacturing area, facilities, human resources, management, security, planning, and IT. Each area gave input regarding high risk subjects in their area. They then rated each subject for Probability of occurrence and its Severity should it occur. The subjects chosen for the CSM Y2K Readiness Assessment were gleaned from this list, using only

the Risk Factors of higher Probability or Severity - Not all were used. The Assessment Team did *not* expect that CSM would duplicate our process or forms exactly! The Team merely looked for similar trends or thought patterns, only using the list of Risk Factors as a catalyst for discussion.

W greatly appreciate the time, attention, and cooperation CSM gave us for completing this work. Thank you.

- The CSM Y2K Assessment Team
Bob Crum (Information Technology)
Bob Trainer (Facilities)
Ryan Mattley (Equipment / Production)

Biography

Surawut Sukcharoensin was born on January 11th, 1975 in Bangkok, Thailand. He finished his High School from Concord High School, New Hampshire, USA as an exchange student. He Graduated from Assumption University in 1996 with a Bachelor degree in Electronics Engineering. He has been working with few Wafer Fabrication Companies in Thailand as Equipment Engineer and Singapore as Process Engineer since 1996.