

From: Robert Hill, JASPPA Chairman
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***JG-PP Lead-Free Solder Project
Technical Teleconference Minutes
November 1, 2001***

***JG-PP Project Lead: Robert Hill, NASA KSC
Telecon Chairperson: Brian Greene, CTC***

Comments:

Below are the minutes from the November 1, 2001, Lead-Free Solder Technical Telecon. If you have questions about the minutes please contact Robert Hill, Brian Greene or Tess Flynn. Please further distribute as necessary.

MEMORANDUM FOR RECORD

1. Mr. Brian Greene, Concurrent Technologies Corporation, called the meeting to order at 2:04 pm. The following answered the roll call:

Amitav Pattnaik, WR-ALC/TIECT
Anne Meinhold, SEA (ITB)
Bob McDonald, HQ AFMC/LGP-EV (ITB)
Bob Vanderwiel, Lockheed-Martin
Chelsea Calhoun, JG-PP Working Group, Corpro Companies
Dave Hillman, Rockwell-Collins
David Carlton
Denny Jarvi NASA AP2 Program Office (ITB)
Doug Romm, TI
Doug Wilson, Army
Dr. Duane Napp, NCMS
Dr. Suresh Verma, NAVAIR
Gail Grafton, SEA (USA)
Gene Jeunelot, HQ AFMC/LGP-EV (SAIC)
Jeff Bradford, Raytheon Systems Company
Joe Felty, Raytheon Systems Company
John Nelson, USN China Lake
Keith DeGroot, TACOM
Kelly Marlo
Kurt Kessel, NASA AP2 Program Office (ITB)
Lorraine Wass, NAVAIR
Mark Feathers, AMCOM
Mark Stibitz, WR-ALC, F-15 SPO

Martha Shuster, AMCOM, Redstone Arsenal
Michael Puskar, Hamilton Sundstrand
Nalni Dhar, AFMC/LGP-EV (SAIC)
Robert Hill, NASA AP2 Program Office, JG-PP Working Group Chair
Tess Flynn, NASA AP2 Program Office (ITB)
Tom Woodrow, Boeing-Seattle

2. Mr. Brian Greene, NDCEE/*CTC*, stated that one of the primary objectives of the teleconference call was to solidify the date and length for a project face-to-face meeting. Ms. Tess Flynn, NASA/ITB, provided the feedback received from a survey of potential meeting attendees. The date with the most respondents available was November 14 with 16 people available and 9 not available on that date. Raytheon has indicated a willingness to host the meeting and has made arrangements with Texas Instruments to use one of their facilities again. Mr. Felty said he is contemplating on using the same meeting location (at the TI campus) as the last project meeting and the same hotel near the airport for accommodations. He will also check through the security requirements to allow access of the attendees into the TI facility. Mr. Greene asked the teleconference call attendees who might attend. NASA, Navy, the OEMs and suppliers can all send a representative to the meeting. The Air Force may only be able to send one representative, from Robins AFB. Mr. Greene then discussed the length of the meeting. Mr. Bob Hill, NASA KSC, JG-PP Working Group Chairman, stated he wanted to ensure a well-structured agenda was created that would keep the group on focused to meeting the objective of building two Joint Test Protocols, one for new manufacturing and one for rework/repair. Mr. Joe Felty thought the meeting will take a day and a half in order to provide sufficient time to reach consensus on building two JTPs. The group settled on a full-day meeting on November 14, with a continuation of the meeting on the morning of November 15. Mr. Greene assigned an action item to himself and Mr. Felty to develop the meeting agenda and announcement.
3. JTP Discussion. Amitav Pattnaik, WR-ALC, asked how the JTP will be put together, will there be a Phase I followed by a Phase II? The question generated considerable discussion on previous discussions, e-mails, and minutes.
 - a. Mr. Hill indicated that in past JG-PP projects, Phase I was often comprised of screening tests, from which successful materials would proceed onto Phase II.
 - b. Considerable discussion took place about the tests necessary to ensure the lead-free solders will work at depot-level rework, which the currently posted JTP does not address. Mr. Mark Stibitz (WR-ALC, F-15 Program), Mr. Pattnaik, and NASA all indicated interest in lead-free solder repair issues to the forefront of this project. Repair concerns, such as interactions between lead and lead-free solders and tin-whiskers inside hybrids, were discussed. Mr. Stibitz recommended that component-level specifications, such as MIL STD 883, M-38510, and MIL-PRFs, also be addressed. He enumerated several tests that the F-15 Program would likely require (based on OEM specifications): 1) functional check; 2) following stabilization bake, temperature cycling; 3) mechanical shock; 4) particle impact noise; 5) hermeticity; and 6) after burn-in, accelerated life testing to elucidate tin whiskering. He thought many of these are common with new acquisition, but many others are unique to depot-level rework.

- c. Mr. Felty warned against building the test matrix too encompassing and too large; this could result in a large set of tests and drive up the cost of the program. Mr. Greene suggested the JTP needs to be a stand-alone document that has everyone's requirements included. What the eventual cost of a corresponding testing program will be and who will pay for it will be addressed as a separate issue in the future. But potential testing costs should not minimize the content of the JTP.
 - d. Mr. Hill suggested to the group that two JTPs should be built, one for new acquisition/manufacturing and one for depot-level repair/rework. He went on to say that everyone who sends in a test requirement needs to identify which of these four major considerations based on the detail level of the test and the age of the end item the test is intended: board level for new acquisition, component level for new acquisition, board level for depot level repair, and component level for depot level repair. He went on to say a test matrix will be built that captures all of the tests for both JTPs to shake out the duplicity that might occur and array the tests to take advantage of the earlier tests as necessary to reduce the cost of testing as much as possible. He queried the group on the proposal and obtained unanimous concurrence. He then tasked the group to ensure the tests they request are identified to be targeted for one of the four considerations.
 - e. Mr. Woodrow suggested a good scrub of the test descriptions needs to be done to clarify what the test is. He stated some of the tests in the military and commercial specifications are not specific and can result in different tests depending upon how one interprets the written description. For example, in reviewing MIL-STD-810 (vibration tests), one cannot really determine which vibration spectra to use. Vibration spectra are usually generated by each program, anyway. Mr. Hill asked that the JG-PP Working Group representatives contact their weapon system program offices and ask them to make their vibration test spectra available for the November 14-15 meeting, either by having a service technical representative bring it to the meeting or sending it to Mr. Greene and Mr. Hill before the meeting for distribution. A future task will then likely be to either pre-select those spectra that represent both nominal and worst-case environments. Mr. Felty also suggested the option of running a 3-axis vibration scan of the test board, identifying the resonances and setting on them, and vibrating the board at those resonances.
4. Mr. Stibitz asked the group if he should get the C-130 stakeholders involved in the project. Mr. Hill thanked him and asked him to please make them aware of the project and to invite them.
5. Mr. Greene said the group has thus far been concentrating on flight worthy equipment and asked the group if ground based equipment should be included. The TACOM representative said they had an interest in both flight-hardware (to address Army missiles) and ground support equipment, but they saw no need to establish a separate JTP for ground equipment. Mr. Hill asked that, when group members are identifying critical performance requirements for the JTP, they should indicate the types of systems that the performance requirement is addressing (e.g., aerospace, ground vehicle, test equipment). He said that this will help sort out if a separate JTP is needed.
6. Potential Alternative Report (PAR) Discussion.

- a. Mr. Pattnaik stated that everyone should be aware that a lead-free solder alloy that is suitable for one application (e.g., new boards) may not be suitable for another application (e.g., rework). Mr. Stibitz agreed that each JTP, and each soldering method within each JTP, will likely have its own list of potential alternatives.
 - b. Mr. Tom Woodrow, Boeing, stated he would like the latest alloys from NCMS to be added to the PAR list. Mr. Greene said they would be added and available when the group meets on November 14. This large list could then be examined for elements that are in short supply or are highly toxic. The alternatives that contain these elements could then be struck from the list of alternatives to be tested. Mr. Greene stated that *CTC* has begun constructing a matrix with candidate alternatives on one axis and with key decision attributes on the other axis. He plans to have that available for the group at the November 14 face-to-face meeting.
 - c. Mr. Hill stated that the normal JG-PP process is to focus on building the JTPs first, then determine how the testing will be executed (e.g., in phases). Use of screening tests may be a good way to narrow down the number of alternatives going into later, more expensive, testing.
7. Test Board Design.

Some discussion occurred concerning establishing a rationale for why each component is on the test board and why it is either a dummy or a live part.

 - a. Mr. Woodrow stated that such descriptions are included in an appendix to the JG-PP CCAMTF JTP on the JG-PP Web site. Mr. Dave Hillman, Rockwell-Collins, stated that it is also in the original Low Residue Task Force report, in the first chapter.
 - b. Mr. Woodrow suggested some simple screening boards could be assembled and used to screen the alternatives to reduce the number of alternatives to be tested in later tests. Mr. Hill stated this was a normal JG-PP process, that screening tests are commonly devised, more stringent but less costly tests prescribed and finally high cost tests for the few alternatives that survive to that point. Mr. Hill went on to say the key is getting the JTP built and accepted, getting the PAR built, and then test those alternatives in the PAR against the tests prescribed in the JTP.
 - c. Mr. Doug Romm, Texas Instruments, indicated that he would like to be informed when the test board design is finalized, since TI is willing and able to supply lead-free components for potential testing.
8. Action Item Review. The action item assigned to Dave Johnson to create an Advisory Board was closed following an AFRL and HQ AFMC/LGP-EV meeting. This meeting clarified the role of AFRL in the project.
9. Mr. Hill briefed the group on his briefing at the IPC Conference. He said following his presentation he received business cards from 12 component manufacturers and suppliers who wish to join the JG-PP lead-free project. When asked if he received any new DoD groups, or heard of any other DoD groups pursuing Led-Free Solder, he said no.
10. Mr. Hill said he provided the JG-PP Working Group members with the EPA-IPC request to participate in the two-year life cycle cost study but has not heard back from them.

11. Mr. Hill briefed the group on JG-PP's involvement with the European Union (EU). The EU-U.S. early customer interface meeting, originally scheduled for October, was postponed due to the terrorist attacks on the Pentagon and the World Trade Center. He said the meeting location will likely shift to London and will likely take place in January 2002. He said the Europeans have been looking at the JG-PP web page and are making their decisions on what they plan to do.
12. Mr. Felty told the group that Dr. Jenny Wang, a member of IPC, has written a book on lead free solders. He recommended the members read the book since it is a good compilation of information.

New Action Items

LFS.01.11.01

Date Due: 11/08/01

Responsibility: Brian Greene

Required Action: Each service and agency indicates who will help in building a strawman depot level rework JTP. He suggested this group could have a teleconference call before the November 14-15 meeting and have a skeletal framework started by then.

Comments:

LFS.01.11.02

Date Due: 11/08/01

Responsibility: Brian Greene and Joe Felty

Required Action: Create the meeting announcement, join-up instructions, and agenda for the November 14-15 meeting.

Comments:

LFS.01.11.03

Date Due: 11/08/01

Responsibility: Joe Felty

Required Action: Prepare a draft rationale for why each component is included on the proposed test board (e.g., its function, what data will be collected).

Comments: