

Lawrence Davis, 09:07 AM 2/10/2003 -0500, Questions to be answered

X-Sender: lawrence_davis@mail.dfrc.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 5.0.2
Date: Mon, 10 Feb 2003 09:07:06 -0500
To: jlemke@hq.nasa.gov, Pete Rutledge <prutledg@hq.nasa.gov>
From: Lawrence Davis <lawrence.davis@dfrc.nasa.gov>
Subject: Questions to be answered

Pete & John

I've received this too late to react, but the two things that have caught our attention for landing are:

1. The lakebed runway support has been deleted. That decreased options for landing with crosswinds, in particular, for very little savings.
2. Some of the procedures are under revision relating to towing the Shuttles from the runway to the Dryden Facility because of a reduction of personnel sent here before a landing. Consideration was being given to towing without electrical power, as I understand it, which means the internal information would not be monitored in the control room at all during that tow period. A 2500 foot keep away zone was in question also.

This is quick and not as factual since the time is already late. Lawrence

Mark Kowaleski, 08:18 AM 2/10/2003 -0500, Fwd: stress/thermal analysis request

X-Sender: mkowales@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 10 Feb 2003 08:18:32 -0500
To: linda.j.ham@nasa.gov
From: Mark Kowaleski <mkowales@hq.nasa.gov>
Subject: Fwd: stress/thermal analysis request
Cc: stuart.l.mcclung@nasa.gov, boconnor@mail.hq.nasa.gov,
jilloyd@mail.hq.nasa.gov, prutiedg@mail.hq.nasa.gov,
mark.d.erminger1@jsc.nasa.gov, yolanda.y.marshall@nasa.gov

Hello Linda,

I work for Bryan O'Connor as the HQ Shuttle Safety Manger in Code Q. Stuart McClung said that I needed to request the STS-107 TPS Multi-Tile Loss Thermal Analysis data package from you (see note below). I have been trying to get this document for over a week and no one seems to either want to part with it or locate it.

We have the Foam Transport Assessment and the TPS Damage Assessment from Boeing. The requested analysis is referenced in the conclusion of the Boeing Orbiter TPS Assessment, dated 1-23-03.

Would you please get me a copy of the thermal analysis? We need it for the NASA Administrator's talking points for his testimony on Wednesday.

Mark

From: "MCCLUNG, STUART L. (JSC-MV6) (NASA)" <stuart.l.mcclung@nasa.gov>
To: "mkowales@mail.hq.nasa.gov" <mkowales@mail.hq.nasa.gov>
Subject: stress/thermal analysis request
Date: Sat, 8 Feb 2003 17:41:18 -0600
X-Mailer: Internet Mail Service (5.5.2653.19)

Mark, cut and pasted the note I sent to Linda, and the guys on the affected team.

stu

We provided HQ/Mark Kowaleski with copies of the 1/23 and 1/24 presertations on the debris impact and Orbiter assessment. They have requested the thermal analysis that is referenced on the last page in the conclusion. I've talked with McCormack and Rodney and they walked me thru the review of the analysis, and noted that we do not have copies of the acutal analysis that Mike and his team performed. Normal routine, actually.

HQ has requested copies of the analysis, and in my opinion, more for completeness than any of their own review. Fred told me that as of today these type of requests need to go thru the MRT, so I'm going to direct Mark to make the request thru that route, but I'd suggest that Mike and co., be ready for the request.

Wentworth Denoon, 07:23 AM 2/10/2003 -0500, Questions to be asked

X-Sender: wdenoon@pop300.gsfc.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 5.0.2
Date: Mon, 10 Feb 2003 07:23:52 -0500
To: prutledg@hq.nasa.gov
From: Wentworth Denoon <Wentworth.O.Denoon@nasa.gov>
Subject: Questions to be asked

Pete,
Here are some questions that may be asked.

Wentworth



Columbia STS-107 questions.doc

James Lloyd, 12:28 PM 2/10/2003 -0500, Code Q Response to Congressional Q's

X-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 10 Feb 2003 12:28:21 -0500
To: bcherry@hq.nasa.gov
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Code Q Response to Congressional Q's
Cc: Michael Greenfield <michael.greenfield@hq.nasa.gov>, prutledg@hq.nasa.gov,
jlemke <jlemke@hq.nasa.gov>, hcat@hq.nasa.gov, cac <cac@hq.nasa.gov>,
jmannix@hq.nasa.gov, wfrazier@hq.nasa.gov

Barbara,

This is the Code Q contribution to the answers for the Joint House/Senate Shuttle Hearing questions posed this morning. We have also worked these answers with Codes M and G who will have to do some degree of melding or changing to reflect the composited answers that we suggest.



Hearing Questions 2 12-03111.doc

Jim

HCAT, 12:57 PM 2/10/2003 -0500, Re: Fault tree for CAIB

X-Sender: hcat@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 10 Feb 2003 12:57:38 -0500
To: Pete Rutledge <prutledg@hq.nasa.gov>
From: HCAT <hcat@hq.nasa.gov>
Subject: Re: Fault tree for CAIB
Cc: jllloyd@hq.nasa.gov, mstamate@hq.nasa.gov, fchandle@mail.hq.nasa.gov,
mkowales@mail.hq.nasa.gov

We've asked for it -- will send when we get it.
bba for Bill H.

At 12:14 PM 2/10/2003 -0500, Pete Rutledge wrote:
HCAT,

Would it be possible for us (Code Q) to see (as soon as available) the fault tree that has been prepared for a presentation to the CAIB on Wednesday? We would like to see it from the viewpoint of fault tree methodology, as well as hardware, software, and human error modeling. We have people with the necessary expertise here. And certainly we all want the best and most thorough product for the CAIB.

Thanks,

Pete

Peter J. Rutledge, Ph.D.
Director, Enterprise Safety and Mission Assurance Division
Acting Director, Review and Assessment Division
Office of Safety and Mission Assurance
NASA Headquarters, Code QE, Washington, DC 20546

ph: 202-358-0579
FAX: 202-358-2778
e-mail: pete.rutledge@hq.nasa.gov

Mission Success Starts with Safety!

James Lloyd, 07:59 AM 2/7/2003 -0500, Corrected Minutes for 02_05_2003 Teleconference

X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-smadir using -f

X-Sender: jlloyd@mail.hq.nasa.gov

X-Mailer: QUALCOMM Windows Eudora Version 4.3.2

Date: Fri, 07 Feb 2003 07:59:50 -0500

To: smadir@hq.nasa.gov

From: James Lloyd <jlloyd@hq.nasa.gov>

Subject: Corrected Minutes for 02_05_2003 Teleconference

Cc: snewman@hq.nasa.gov, sharon.j.taylor1@jsc.nasa.gov

Sender: owner-smadir@lists.hq.nasa.gov

Dear SMA Director,

Please find corrected teleconference minutes attached. Unfortunately, I didn't pay much attention (actually none) to the attachment and at least one person's name was misrepresented. Sorry if anyone felt slighted but please understand that this was completely unintentional. "107 Team" intranet copy has also been replaced with the updated version.

Regards,



2-5-03 SMA teleconference Lloyd final correction 1.doc

Jim

**Safety and Mission Assurance (SMA)
TELECONFERENCE MEETING 12:00 PM CST
SHUTTLE COLUMBIA INVESTIGATION
MINUTES OF MEETING
FEBRUARY 5, 2003**

1.0 INTRODUCTION

1.1 General: The NASA S&MA representatives from the various centers met via teleconference at 12:00 PM CST on February 5, 2003, to discuss the Shuttle Columbia investigation. Attachment 1 lists attendees.

2.0 SIGNIFICANT SAFETY DISCUSSION

2.1 Day 5, February 5, 2003 10:00 AM EST NASA Directors' conference: Q/J. Lloyd provided the following overview of updates resulting from NASA Administrator S. O'Keefe's 10:00 AM EST conference this morning.

2.1.1 Investigation: HQ/A/S. O'Keefe provided the investigation status, reporting good progress to this point and cautioning attendees to avoid determining conclusions or identifying root causes to the incident too quickly. He further offered that all are aware the investigation focus remains on the left wing and the foam insulation but in his experience, more often than not, the first cause theories turn out to be erroneous; and that fault-tree analyses were being performed to narrow down all possible causes.

Mr. O'Keefe reiterated the need for free data exchange within the S&MA community and the investigation board; and directed the attendees to maintain focus on their principal business if not involved in Columbia accident analysis efforts directly and ensure that investigation workers get adequate rest.

2.1.2 International Space Station: ISS personnel assured the Administrator that they are comfortable that NASA is doing everything possible to further the investigation, that they are supplied to do their jobs adequately, and they have complete confidence in the space program.

2.1.3 Task Force: A new entity was formed today, a Task Force, which will work for the Columbia Accident Investigation Board (CAIB) to interface with the rest of the agency. HQ/M-4/Frank Buzzard will chair the Task Force and new organizational charts will reflect this new entity. MRT and MIT operations will be put more in line with the CAIB.

2.1.4 CAIB: The NASA Office of Inspector General (OIG), who works for the U.S. Congress, was added as an observer to the CAIB to ensure an independent investigative process and objective data acquisition and control. Questions arose regarding whether the addition of the OIG affected witness statement "privileged status" if the investigation went to a criminal category, with HQ/Q/J. Lloyd accepting an action to voice the concern to the NASA general legal counsel.

2.1.5 Mishap Response Teleconference (MRT): Mr. Lloyd offered that the MRT would be utilizing a more disciplined approach starting immediately and move away for a "war room" approach, including one-page daily summary statements. Their focus will be on the Mishap Investigation Team (MIT), who are detecting, documenting the location, photographing,

labeling, bagging, and gathering the shuttle debris for relocation to Barksdale Air Force Base, Louisiana.

Space Center (JSC) will create a list of critical hardware items to be held at Barksdale until JSC inspects them; and then taken to Kennedy Space Center (KSC).

2.1.6 Debris: The debris field has been extended to the US west coast, with findings in California, Nevada, and Texas. Dryden Flight Research Center, California and KSC will provide support in locating debris in California and Arizona respectively.

2.1.7 Vehicle: JSC, KSC, Marshall Space Flight Center (MSFC), and Michoud are performing vehicle engineering to analyze orbiter information. They are also using fault-tree analysis to initiate a process of elimination for possible causes.

JSC/NA/G. Johnson offered that JSC/MV/R. Roe's Vehicle Engineering Working Group shifted into a more formal role as a "board" and would provide information to outside boards. Their meetings will now be held at 3:00 PM CST daily. The teams will be broken down into individual working groups who will report to Mr. Roe. Mr. Roe will then report to the task force, which is headed by Mr. Buzzard.

2.1.8 Third-party information: Mr. Lloyd cautioned the attendees regarding processing any investigation information, such as photographs, videotapes, etc., provided by third parties (not federal government or NASA contractor employees). He offered that a legal issue could exist regarding protecting the ownership of the third parties' intellectual information if said third parties allow NASA to use their information for the investigation, but want exclusive rights for releasing the information to the public and/or media.

2.2 Headquarters: Mr. Lloyd stated that NASA is scheduled to provide investigation testimony to Congress on February 13, 2003. Headquarters is brainstorming possible questions and/or issues that may be addressed, and offered that additional support data may be requested from the various NASA centers. Code Q/Dale Moore provided a briefing regarding data that might be requested soon. This included staffing data for fiscal years (FYs) 2002, 2001, and 2000, as well as projections for FY 2003, to include civil servants, contractors, and prime contractors. Ms. Moore offered that a template defining S&MA functions would be forwarded for use when providing the data. She cautioned that the data request could have a turnaround time of 30 days or less. Mr. Johnson recommended that Ms. Moore relay this information to the attendees at the 2:00 PM Headquarters Meeting and the MRT to notify more people.

2.2.1 Data: Mr. Lloyd stated that HQ is using a Process-Based Mission Assurance (PBMA) Working Group "software environment," headed by HQ/QE/Steve Newman, to feed data and information developed at headquarters into the PBMA website. He raised concerns regarding data security, offering that the website would have secured access that would be arranged separately. Attendees may submit their PBMA membership information and requests to Mr. Newman or HQ/QE/P. Rutledge. Mr. Lloyd stated that he expects the first questions from S&MA directors for HQ/Q/Bryan O'Connor to be forwarded to the website shortly, with daily updates thereafter. Two packages will be prepared for Mr. O'Connor, one to provide the mishap investigation requirements and one for mishap investigation methods used by NASA. These will be posted to the PBMA intranet website under the name of "107 team."

HA/QE/Pam Richardson will compile and coordinate Code Q actions and data flow, including the S&MA directors' questions. Ms. Richardson stated that she categorizes each email containing investigation data, and then forwards it to Dr. Rutledge and Mr. Newman once per day. Each center's S&MA representatives in attendance at this teleconference agreed to provide Dr. Rutledge and Mr. Lloyd with information (email addresses, voicemail, pager numbers, etc.) regarding their respective points-of-contact and backups, so that communication and data requests could be processed more efficiently. Attendees were encouraged to work cooperatively to gather information and present questions to ensure a more forthright investigative process. They were also reminded that technical data requests should take precedence over data related to the S&MA process. Dr. Rutledge agreed to provide a refreshed Fault-Tree Analysis for Aerospace Handbook to attendees to expedite the investigation analyses.

Mr. O'Connor and HQ/AE/T. Bradley traveled to Barksdale AFB yesterday, February 4, 2003, to obtain a status of the shuttle debris retrieval process. They will travel to Houston today, and Houston will be the center of operations for the CAIB.

2.2.2 Headquarters Contingency Action Team (HCAT): Code M-1/W. Hill and Code QE/W. J. Bihner are coordinating the HCAT.

2.3 Legal: Mr. Lloyd reported that studies of shuttle safety performed since the Challenger incident of 1986 are being collected and may be requested later in this investigation process. He reminded attendees that all paper copies of any documents related to this investigation must stand separately to be archived as historical records in the future. Mr. Johnson suggested sending electronic copies of all the shuttle reports/studies to Mr. Newman for compilation.

2.4 Comments from NASA centers:

2.4.1 Ames Research Center: L. Doty requested a clarification regarding processing information received from third parties, including private citizens and the news media. Mr. Lloyd advised her to contact the AMES General Counsel for guidance, or to contact HQ/GS/J. Steptoe, who provided a briefing on this subject at HQ earlier today.

2.4.2 Glenn Research Center: B. Wessel provided a summary of GRC actions, including appraising their STS-107 Hazard Reviews for four payloads that were on Columbia. He offered that the GRC Director, D. Campbell, was impressed by the PBMA and has signed on to use it.

2.4.3 Langley: A. Phillips reported that they were reviewing JSC technical requirements and conducting Technical Interchange Meetings today to identify ways to support the investigation.

2.4.4 JSC: NS/S. Nakamura offered that the NASA Medical Office provided Enhanced Hazardous Materials Personal Protection Equipment (PPE) information to be relayed to debris recovery coordinators in the field, so that workers could use proper PPE when handling shuttle debris. The information was also sent to the Occupational Health organizations across the agency to be used to protect workers. He hopes to disseminate the information to the Federal Emergency Management Agency and their volunteers.

Mr. Nakamura also stated that White Sands Test Facility would be distributing pictures of shuttle hardware that may be contaminated with or contain hypergolic materials so that the public could more easily identify possible shuttle debris in their region.

2.4.5 KSC: QA/H. T. Garrido reported that about 220 people are working the shuttle investigation, and they have begun rotating shifts every two weeks to protect them from

excessive fatigue. KSC will coordinate with Code AM, the KSC Center Director, and Legal Office regarding time limits for recovery people; with the expectation of the release of a policy letter soon.

The KSC Columbia Crew Memorial Service will be held Friday, February 7, 2003, and should be attended by Mr. O'Keefe and Mr. Gregory.

The KSC hangar where the shuttle reconstruction will be performed is currently being cleared in preparation.

KSC/UB-F3/J. Dollberg reported that some payload customers were frustrated with the slow release of hardware due to the Columbia disaster. Also, recovery efforts located one intact payload locker for the Commercial Instrumentation Technology Associates Biomedical Experiments (CIBX).

Mr. Dollberg stated that they are using 1.5 years for the estimated time that hardware will sit on the ground as a result of the investigation, and reported that some hardware may need to be de-integrated due to its battery acid and/or ammonia contents.

2.4.6 MSFC: A. Adams reported that the MSFC Columbia Memorial Service was earlier today. He stated that MSFC requested the release of the Reusable Solid Rocket Motor (RSRM) hardware at this morning's MRT, so that engine personnel could test it before it corrodes. He reported that JSC/MA2/L. Ham approved the hardware processing today.

MSFC is compiling a list of resident S&MA experts who may assist in the investigation.

2.4.7 Stennis: Stennis personnel reported that their Columbia Memorial Service is tomorrow at 7:45 AM CST. He offered that Stennis personnel reached an effective compromise to process data collection for the investigation by requiring both the civil servant and contractor to sign off on the data release, with the expectation that the contractor will receive the data when the investigation is over.

2.5 Impoundment and data release: It was noted that this issue presented an obstacle across the agency, with the attendees agreeing to compile any notes regarding successful data management for the investigation process to be used as future lessons learned. The attendees were reminded that Ms. Ham is coordinating data release and that the CAIB is instrumental in this process. Mr. Nakamura offered that the institutional safety data was released. Most data was released after ensuring that the original and a copy were on hand, with only the copy being released.

3.0 CONCLUSION

The next S&MA teleconference meeting is scheduled for 12:00 PM CST tomorrow, February 6, 2003, with the same attendees.

Original signed by:

JSC/NC44/S. J. Taylor
Technical Writer

Safety and Mission Assurance (S&MA)
 Daily 12:00 PM CST Teleconference
 Shuttle Columbia Investigation

Date: February 5, 2003

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
AMES	Laura Doty			
	Bob Navarro			
GRC	Bill Wessel			
	Ken O'Connor			
	John Reagan			
HQ/QS	Bill Loewy			
QE	Mike Card			
QE	Pam Richardson			
QE	Eric Raynor			
QS	Jim Lloyd			jilloyd@mail.hq.nasa.gov
Q	Will Harkins			

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
QS	Pete Rutledge			prutledg@mail.bq.nasa.gov
Q	Lynne Loewy			
QS	Wayne Frazier			
QS	John Lyver			
Q	Dale Moore			
QE	Pepper Phillips			
QE	Faith Chandler			
QS	Tom Whitmeyer			
QS	Martha Wetherholt			
QE	Steve Newman			stnewman@mail.bq.nasa.gov
QS	Jonathan B. Mullin			
JSC/ NA	Gary Johnson			
NA	Frank Culbertson	SAIC		
NA	Joyce Abbey	SAIC		

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
NC	Sharon Taylor	SAIC		
NS	Stacey Nakamura			
KSC/ UB-F3	John Dollberg			
QA	H.T. (Bert) Garrido			
Langley	Alán Phillips			
	Don Porter			
MSFC	Alex Adams			
	Laura Malone			
Stennis	John Stealey			
	Mike Smiles			

TAYLOR, SHARON J. (JSC-NC) (SAIC), 10:45 AM 2/6/2003 -0600, 02-05-03 S&MA Noon Teleconfer

From: "TAYLOR, SHARON J. (JSC-NC) (SAIC)" <sharon.j.taylor1@jsc.nasa.gov>
To: "jlloyd@mail.hq.nasa.gov" <jlloyd@mail.hq.nasa.gov>,
"snewman@mail.hq.nasa.gov" <snewman@mail.hq.nasa.gov>,
"prutledg@mail.hq.nasa.gov" <prutledg@mail.hq.nasa.gov>
Cc: "NAKAMURA, STACEY T. (JSC-NS) (NASA)" <stacey.t.nakamura@nasa.gov>,
"JOHNSON, GARY W. (JSC-NA) (NASA)" <gary.w.johnson@nasa.gov>,
"TAYLOR, SHARON J. (JSC-NC) (SAIC)" <sharon.j.taylor1@jsc.nasa.gov>
Subject: 02-05-03 S&MA Noon Teleconference Minutes
Date: Thu, 6 Feb 2003 10:45:51 -0600
X-Mailer: Internet Mail Service (5.5.2653.19)

<<2-5-03 SMA noon teleconference_.doc>>

Sharon Jo Taylor
NASA-JSC/SR&QAPayload Safety
Bldg. 45, Rm. 613
sharon.j.taylor1@jsc.nasa.gov
281-483-9551 Office

"A person is not old until regrets take the place of dreams."



2-5-03 SMA noon teleconference .doc

**Safety and Mission Assurance (S&MA)
TELECONFERENCE MEETING 12:00 PM CST
SHUTTLE COLUMBIA INVESTIGATION
MINUTES OF MEETING
FEBRUARY 5, 2003**

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Original signed by:

JSC/NC44/S. J. Taylor
Technical Writer

Safety and Mission Assurance (S&MA)
 Daily 12:00 PM CST Teleconference
 Shuttle Columbia Investigation

Date: February 5, 2003

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
AMES	Laura Doty			
	Bob Navarro			
GRC	Ken O'Connor			
	John Reagan			
	Bill Russell			
HQ/QS	Bill Loewy			
QE	Mike Card			
QE	Pam Richardson			
QE	Eric Raynor			
QS	Jim Lloyd			jilloyd@mail.hq.nasa.gov
Q	Will Harkins			

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
QS	Pete Rutledge			prutledg@mail.hq.nasa.gov
Q	Lynne Loewy			
QS	Wayne Frazier			
QS	John Lyver			
Q	Dale Moore			
QE	Pepper Phillips			
QE	Faith Chandler			
QS	Tom Whitmeyer			
QS	Martha Wetherholt			
QE	Steve Newman			snewman@mail.hq.nasa.gov
QS	Jonathan B. Mullin			
JSC/ NA	Gary Johnson			
NA	Frank Culbertson	SAIC		
NA	Joyce Abbey	SAIC		

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
NC	Sharon Taylor	SAIC		
NS	Stacey Nakamura			
KSC/ UB-F3	John Dollberg			
QA	H.T. (Bert) Garrido			
Langley	Alan Phillips			
	Don Porter			
MSFC	Alex Adams			
	Laura Malone			
Stennis	John Stealey			
	Mike Smiles			

James Lloyd, 06:14 PM 2/6/2003 -0500, Re: 02-05-03 S&MA Noon Teleconference Minutes

X-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Thu, 06 Feb 2003 18:14:54 -0500
To: "TAYLOR, SHARON J. (JSC-NC) (SAIC)" <sharon.j.taylor1@jsc.nasa.gov>, <"snewman@mail.hq.nasa.gov" <snewman@mail.hq.nasa.gov>
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Re: 02-05-03 S&MA Noon Teleconference Minutes
Cc: "NAKAMURA, STACEY T. (JSC-NS) (NASA)" <stacey.t.nakamura@nasa.gov>, "JOHNSON, GARY W. (JSC-NA) (NASA)" <gary.w.johnson@nasa.gov>, prichard@hq.nasa.gov, "prutledg@mail.hq.nasa.gov" <prutledg@mail.hq.nasa.gov>

Sharon,

Thanks for taking the excellent notes. I made a few changes where I was probably not speaking as clearly as I should or jumping from thought to thought and you captured it faithfully! We will post on the 107 team intranet and forward to the SMA Directors.

Sincerely,

At 10:45 AM 2/6/2003 -0600, TAYLOR, SHARON J. (JSC-NC) (SAIC) wrote:
<<2-5-03 SMA noon teleconference_.doc>>

Sharon Jo Taylor
NASA-JSC/SR&QAPayload Safety
Bldg. 45, Rm. 613
sharon.j.taylor1@jsc.nasa.gov
281-483-9551 Office

"A person is not old until regrets take the place of dreams."

 2-5-03 SMA teleconference_Lloyd final.doc

James D. Lloyd - (Jim)

Acting Deputy Associate Administrator
Office of Safety and Mission Assurance
Headquarters Room 5U11
desk phone 202-358-0557

fax 202-358-3104

"Mission success stands on the foundation of our unwavering commitment to safety"
Administrator Sean O'Keefe January 2003

Safety and Mission Assurance (S&MA)
TELECONFERENCE MEETING 12:00 PM CST
SHUTTLE COLUMBIA INVESTIGATION
MINUTES OF MEETING
FEBRUARY 5, 2003

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Technical Writer

Safety and Mission Assurance (S&MA)
 Daily 12:00 PM CST Teleconference
 Shuttle Columbia Investigation

Date: February 5, 2003

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
AMES	Laura Doty			
	Bob Navarro			
GRC	Ken O'Connor			
	John Reagan			
	Bill Russell			
HQ/QS	Bill Loewy			
QE	Mike Card			
QE	Pam Richardson			
QE	Eric Raynor			
QS	Jim Lloyd			jilloyd@mail.hq.nasa.gov
Q	Will Harkins			

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
QS	Pete Rutledge			prutledg@mail.hq.nasa.gov
Q	Lynne Loewy			
QS	Wayne Frazier			
QS	John Lyver			
Q	Dale Moore			
QE	Pepper Phillips			
QE	Faith Chandler			
QS	Tom Whitmeyer			
QS	Martha Wetherholt			
QE	Steve Newman			snewman@mail.hq.nasa.gov
QS	Jonathan B. Mullin			
JSC/NA	Gary Johnson			
NA	Frank Culbertson	SAIC		
NA	Joyce Abbey	SAIC		

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
NC	Sharon Taylor	SAIC		
NS	Stacey Nakamura			
KSC/ UB-F3	John Dollberg			
QA	H.T. (Bert) Garrido			
Langley	Alan Phillips			
	Don Porter			
MSFC	Alex Adams			
	Laura Malone			
Stennis	John Stealey			
	Mike Smiles			

X-Authentication-Warning: spinoza.public.hq.nasa.gov; major-dom set sender to owner-smadir using -f

X-Sender: jllloyd@mail.hq.nasa.gov

X-Mailer: QUALCOMM Windows Eudora Version 4.3.2

Date: Thu, 06 Feb 2003 18:16:49 -0500

To: SMAdir@hq.nasa.gov

From: James Lloyd <jllloyd@hq.nasa.gov>

Subject: Minutes from February 5 Columbia SMA Teleconference

Sender: owner-smadir@lists.hq.nasa.gov

Here are the finalized minutes from yesterday's teleconference.



2-5-03 SMA teleconference Lloyd final1.doc

Jim

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X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-smadir using -f

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MINUTES OF MEETING
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Date: February 5, 2003

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AMES	Laura Doty			
	Bob Navarro			
GRC	Ken O'Connor			
	John Reagan			
	Bill Russell			
HQ/QS	Bill Loewy			
QE	Mike Card			
QE	Pam Richardson			
QE	Eric Raynor			
QS	Jim Lloyd			jllloyd@mail.hq.nasa.gov
Q	Will Harkins			

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
QS	Pete Rutledge			prutledg@mail.hq.nasa.gov
Q	Lynne Loewy			
QS	Wayne Frazier			
QS	John Lyver			
Q	Dale Moore			
QE	Pepper Phillips			
QE	Faith Chandler			
QS	Tom Whitmeyer			
QS	Martha Wetherholt			
QE	Steve Newman			snewman@mail.hq.nasa.gov
QS	Jonathan B. Mullin			
JSC/ NA	Gary Johnson			
NA	Frank Culbertson	SAIC		
NA	Joyce Abbey	SAIC		

NASA Mail Code	Name	Employer (if not NASA)	Phone Number	Email Address
NC	Sharon Taylor	SAIC		
NS	Stacey Nakamura			
KSC/ UB-F3	John Dollberg			
QA	H.T. (Bert) Garrido			
Langley	Alan Phillips			
	Don Porter			
MSFC	Alex Adams			
	Laura Malone			
Stennis	John Stealey			
	Mike Smiles			

prichard@hq.nasa.gov, 02:06 PM 2/4/2003 -0500, Fwd: Questions for Brian O'Connor's consideration

To: prichard@hq.nasa.gov
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Fwd: Questions for Brian O'Connor's consideration:
Cc:
Bcc:
Attached: C:\Documents and Settings\prutledg\My Documents\Data\attach\107 Board Questions.doc;

Pam, Nice collection from Bert.

Pete

From: "Garrido-1, Humberto (Bert)" <Humberto.T.Garrido@nasa.gov>
To: "snewman@hq.nasa.gov" <snewman@hq.nasa.gov>
Cc: "Lebron-1, Edmundo (Eddie)" <Edmundo.J.Lebron@nasa.gov>, Toledo-1 Oscar <Oscar.Toledo-1@nasa.gov>, "jilloyd@hq.nasa.gov" <jilloyd@hq.nasa.gov>, "prutledg@hq.nasa.gov" <prutledg@hq.nasa.gov>
Subject: Questions for Brian O'Connor's consideration:
Date: Tue, 4 Feb 2003 13:58:41 -0500
X-Mailer: Internet Mail Service (5.5.2656.59)

<<107 Board Questions.doc>>

Steve-

As requested by Jim and Pete we have polled the KSC SMA community to suggest potential questions for Brian. Here is what we have to date. We will pass to you any additional suggested questions as we receive them.

Regards,

Bert

Garrido-1, Humberto (Bert), 02:05 PM 2/4/2003 -0500, Re: Questions for Brian O'Connor's consid

To: "Garrido-1, Humberto (Bert)" <Humberto.T.Garrido@nasa.gov>
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Re: Questions for Brian O'Connor's consideration:
Cc:
Bcc:
Attached:

Thanks, Bert. These will go in tomorrow's e-mail shipment to Bryan. We just sent him a first batch.

Pete

At 01:58 PM 2/4/2003 -0500, you wrote:
<<107 Board Questions.doc>>

Steve-

As requested by Jim and Pete we have polled the KSC SMA community to suggest potential questions for Brian. Here is what we have to date. We will pass to you any additional suggested questions as we receive them.

Regards,

Bert

James Lloyd, 01:35 PM 2/4/2003 -0500, Re: Fwd: Questions for Your Consideration and Use

To: James Lloyd <jlloyd@hq.nasa.gov>
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Re: Fwd: Questions for Your Consideration and Use
Cc:
Bcc:
Attached:

Great! Thanks, Jim. We accomplished our first volley.

Pete

At 01:18 PM 2/4/2003 -0500, you wrote:

I realized as I pushed the send button that I intended to put you both on for a copy furnished.
Sorry.

This has been sent. Note that I also sent it to HCAT and Dr. Greenfield; I believe it is only fair to do this.

Date: Tue, 04 Feb 2003 13:16:10 -0500
To: boconnor@mail.hq.nasa.gov
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Questions for Your Consideration and Use
Cc: hcat@hq.nasa.gov; "Dr. Michael A. Greenfield" <michael.greenfield@hq.nasa.gov>

Bryan,

I am attaching the first batch of questions/issues for your use as *ex officio* on the Columbia Accident Investigation Board. These are a combination of inputs from SMA Directors and from OSMA staff members; Pam Richardson is pulling them together and maintaining the list here in Code Q. We would propose that we send these to you at least daily--but only the new questions/issues (to minimize e-mail download time on your end). The questions are numbered sequentially and in chronological order of receipt, so it will be easy to send just the new ones. The list of questions/issues has been sent to all OSMA staff members as seeing these questions/issues may prompt thoughts of new ones. I am also sharing these questions with HCAT to prompt their consideration as we all try to assure that "no stone goes unturned."

Regards,

Jim

t.l.trexler@nasa.gov, 01:13 PM 2/4/2003 -0500. On-orbit tile repair

To: t.l.trexler@nasa.gov
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: On-orbit tile repair
Cc: prichard@hq.nasa.gov
Bcc:
Attached:

Tony,

Pamela Richardson of my staff has informed me that Mr. John Gleason of your staff has knowledge of historical studies at the NASA Langley Research Center regarding Shuttle on-orbit tile repair. This has been the subject of recent discussions here and was the subject of a memo from John Young at JSC just a couple of months ago. This subject is even more important as a result of the Columbia mishap. Could you please authorize time for Mr. Gleason to search for this information and forward it as soon as possible to:

Pamela Richardson
NASA Headquarters, Code QE
300 E. Street SW
Washington, DC 20546

I can be reached at 202-358-0579 if you have any questions.

Thank you very much,

Pete

prichard@hq.nasa.gov, 12:22 PM 2/4/2003 -0500, Fwd: MIB Ideas

To: prichard@hq.nasa.gov
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Fwd: MIB Ideas
Cc:
Bcc:
Attached: C:\Documents and Settings\prutledg\My Documents\Data\attach\Columbia MIB Suggestions for Bryan O'Conner.doc;

Pam,

This one is an outline more than a question or issue, but a nice job. Let's add it in.

Pete

From: "ERMINGER, MARK D. (JSC-NC) (NASA)" <mark.d.erminger@nasa.gov>
To: "H - O'Connor Bryan (boconnor@mail.hq.nasa.gov)"
<boconnor@mail.hq.nasa.gov>
Cc: "h - Rutledge Pete (h - Rutledge, Pete)" <prutledg@hq.nasa.gov>,
"H - Kowaleski Mark (mkowales@mail.hq.nasa.gov)"
<mkowales@mail.hq.nasa.gov>
Subject: MIB Ideas
Date: Tue, 4 Feb 2003 10:29:15 -0600
X-Mailer: Internet Mail Service (5.5.2653.19)

See attached

Lloyd Jim, 12:20 PM 2/4/2003 -0500, Fwd: Questions/issues for Bryan's use

To: Lloyd Jim
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Fwd: Questions/issues for Bryan's use
Cc: code-q
Bcc:
Attached: C:\Documents and Settings\prutledg\My Documents\Data\attach\questionsforbryan.doc;

Jim,

Attached is first batch of questions/issues for Bryan's use on the Columbia Accident Investigation Board. These are a combination of inputs from SMA Directors and from OSMA staff members; Pam Richardson is pulling them together and maintaining the list. We would propose that you send to Bryan daily--only the new questions/issues (to minimize e-mail download time on Bryan's end). They are numbered sequentially and in chronological order, so it will be easy to send just the new ones. By means of this e-mail, I'm sending the list of questions/issues to all OSMA staff members. As Ron Moyer suggested, seeing these questions/issues may prompt thoughts of new ones.

Suggest sending this batch to Bryan ASAP.

Thanks,

Pete

X-Sender: prichard@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 04 Feb 2003 11:19:40 -0500
To: Pete.Rutledge@hq.nasa.gov
From: Pamela Richardson <prichard@hq.nasa.gov>
Subject:

Pamela F. Richardson
Aerospace Technology Mission Assurance Manager
Enterprise Safety and Mission Assurance Division, Code QE
Office of Safety and Mission Assurance, NASA Headquarters
300 E. Street, S. W., Washington, DC 20546
phone: 202-358-4631, fax: 202-358-2778

"The meek can *have* the Earth. The rest of us are going to the stars." --- Robert Heinlein
"We have to learn to manage information and its flow. If we don't, it will all end up in turbulence." --- RADM Grace Hopper

prichard@hq.nasa.gov, 10:47 AM 2/4/2003 -0500, Fwd: Re: Support for Bryan O'Connor on Colum

To: prichard@hq.nasa.gov
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Fwd: Re: Support for Bryan O'Connor on Columbia Accident Investigation Board (CAIB)
Cc:
Bcc:
Attached:

Pam,

Looks like 1 would be an SME, while 2 thru 5 I would include as issues on the questions/issues listing.

Pete

X-Sender: lawrence_davis@mail.dfrc.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 5.0.2
Date: Mon, 03 Feb 2003 15:40:01 -0500
To: Pete Rutledge <prutledg@hq.nasa.gov>,
"Bryan O'Connor" <boconnor@mail.hq.nasa.gov>
From: Lawrence Davis <lawrence.davis@dfrc.nasa.gov>
Subject: Re: Support for Bryan O'Connor on Columbia Accident Investigation Board (CAIB)

Bryan & Pete

Additional ideas:

1. The AFFTC has offered their resources to help any efforts.
2. The Dryden Range Safety personnel in association with the AFFTC have a software prediction algorithm to predict the profile of an object falling through the atmosphere. Larry Schilling has volunteered to help with that analysis, even backtracking through any photos to intersect the positional data. Variations in estimates of anything that might have fallen free will provide a larger footprint but at least it will be limited somewhat. We used this capability to find the ER-2 hatch a while ago and it led us directly to the hatch.
3. The Range here collected data from the Columbia as it traveled north of our position, although not tasked to do so. We have impounded that data. We have that data, if you need it. We were at work supporting a UCAV mission, anyway. Analog tracking radar such as recorded here may provide a secondary return enabling establishment of actual separation events with size, velocity and time.
4. Bill Shelton, AFFTC, and our Range personnel also are pursuing working with the doppler FAA radars to correlate any secondary returns in the re-entry path with our radar tracking data.
5. NORAD may have data to establish space debris patterns.

Lawrence

richardson_pamela, 10:27 AM 2/4/2003 -0500, Question for Bryan

To: Richardson Pamela

From: Pete Rutledge <prutledg@hq.nasa.gov>

Subject: Question for Bryan

Cc:

Bcc:

Attached:

What is the failure mode of Shuttle tires overheated to the point of overpressurization? Do they fail in a benign manner or do they explode? Could a small, survivable thermal lead into the wheel well have resulted in fire explosion, resulting in unsurvivable structural damage to the underside of the Orbiter?

Vernon W Wessel, 10:02 AM 2/4/2003 -0500, Re: Supporting Bryan on the Columbia Accident Inve

To: Vernon W Wessel <Vernon.W.Wessel@nasa.gov>
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Re: Supporting Bryan on the Columbia Accident Investigation Board (CAIB)
Cc: Richardson_Pamela
Bcc:
Attached:

Thank you, Bill, will add your below thoughts to the list and await the input from your staff. Yes, there are often gems in such a collection.

Pete

At 08:00 AM 2/4/2003 -0500, you wrote:
Good Morning Pete,

I sent a request to our entire OSAT staff yesterday as to questions they might ask. I'll compile them and send to you in the next couple of days. Sometimes there are a few gems in lists like this. My question would be the construct on the event mishap sequence timeline probably only looking a reentry to vehicle loss initially. Probably has been accomplished but can lead to real insight when placed against the 100 plus data points of successful vehicle return. Then of course the tougher issue is the finalization of the set of failure events for the fault trees and MORT diagrams. Assume Bryan is on top of this and with no more information than I have I cannot do much more than think process.

Here Lois has been working the PBMA element of the investigation with Steve, and Frank is looking into a Payload Hazard Summary. I'll get the listing of possible questions to you ASAP. If nothing else it will let you know the things in the mind of a somewhat educated public.

Thank You,
Bill

At 07:40 AM 2/3/2003 -0500, you wrote:
Pete,

Just to let you know, I have requested from Yolanda's folks the ET TPS hazards (received this AM) and the PRA scenarios that lead to early entry-LOV. Soon, all our requests will be focused through a single point of contact called the NASA Task Force Action Center. But for now, it's a bit of a flail. It will be easy, if we are not careful, to overwhelm the system, so once that system is up and running, all our ins and outs will be run through that entity.

By the way, I'm very impressed with our Board and especially its chairman. We are up and running a full 4 weeks at least ahead of schedule compared to the Challenger BRP. Having said that, the board has a lot of work to do before they are smart enough to begin to digest...but I am optimistic.

Best,

At 07:49 PM 2/2/2003 -0500, you wrote:
Code Q staff members,

As you may know Bryan is the ex-officio member of the Columbia Accident Investigation Board. He left for Barksdale AFB this afternoon around noon time. That is where he will meet up with the other CAIB members.

One of our main jobs in the immediate future will be to support him. We can support him in at least three ways: 1. We can respond to his requests. 2. We can collect, on our own initiative, data that could be of use to him (but we need to proceed most carefully on this one). 3. We can suggest questions or avenues of investigation that he might be able to inject into the work of the board.

Attached is a rough list we prepared today of investigative areas--for the most part these are areas in which the SMA community has some special expertise. For each area we have tentatively named an OSMA lead (and in some cases more than one person to work together). If you can think of other areas that we have not captured, and should, let me know. If we've associated you with the wrong area(s) or failed to associate you with the

Vernon W Wessel, 10:02 AM 2/4/2003 -0500, Re: Supporting Bryan on the Columbia Accident Inve

right area(s), let me know. We don't want to disrupt the investigation--we want to be prudent; we want to help Bryan. Think about whether and how you might be able to be helpful in these areas; then, before you take any action, write down your plan in a clear, concise manner, and send it to me--state what you might be able to do and how you would propose to do it. Then wait for a go-ahead from Jim or me. Keep in mind that we have asked the SMA directors at JSC, MSFC, KSC, LaRC, ARC, and SSC to work with us as needed, so this can be part of your plan, if appropriate.

We have also asked all 10 SMA directors to think of questions or issues that Bryan might pursue with the CAIB. I will be collecting these inputs. Your questions and issues are solicited, as well. Put your investigator hat on, think about this, do your own personal fault trees and hazard analyses; send me your ideas. I'll collect them up, as well, to send to Bryan.

Let's do a great job for Bryan on this important matter.

Thanks,

Pete

Peter J. Rutledge, Ph.D.
Director, Enterprise Safety and Mission Assurance Division
Acting Director, Review and Assessment Division
Office of Safety and Mission Assurance
NASA Headquarters, Code QE, Washington, DC 20546

ph: 202-358-0579
FAX: 202-358-2778
e-mail: pete.rutledge@hq.nasa.gov

Mission Success Starts with Safety!

O'C

Bryan O'Connor
Associate Administrator
Office of Safety and Mission Assurance

Vernon W. (Bill) Wessel
Director, Safety and Assurance Technologies Directorate

National Aeronautics and Space Administration
John H. Glenn Research Center
Mail Stop: 3-6
21000 Brookpark Road
Cleveland, Ohio 44135

Phone: (216) 433-2350
FAX: (216) 977-7005
E-Mail: Vernon.W.Wessel@grc.nasa.gov

Mission Success Starts With Safety

To: Mark Kowaleski <mkowales@hq.nasa.gov>
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Re: STS-107 OSMA data
Cc: Lee_Arthur, Newman Steve
Bcc:
Attached:

Art Lee should be giving you a copy of the OEP report (the draft as of Feb. 1 would be appropriate) on Michoud Assembly Facility from December and Steve Newman should give you IA on super lightweight tank. I'll let you know of anything else I run across.

Pete

At 09:55 AM 2/3/2003 -0500, you wrote:
Jim & Pete,

I gathered together all the STS-107 OSMA-related data that OSMA touched, saw, or responded to.

Jim: As requested, I will hand it over to you when I see you in person.

I asked Bill to provide copies of any email and launch day notes that he may have. I'll add those to the binder when I get them.

Here is the outline of the two-volume data set:

Mark

STS-107 OSMA mission related data products

- 1) Volume I, STS-107 OSMA Data
 - a) Safety & Mission Assurance Report
 - i) FRR version
 - ii) PMMT version
 - b) Pre-flight Assessment Reviews (PFA)
 - i) RSRM-88 PFA
 - ii) SRB - BI116 PFA (SR&QA Review)
 - iii) SSME PFA
 - iv) ET-93 PFA
 - c) Preflight Assessment Review
 - i) PAR-5 Minutes Topics (PAR Planning Notes from JSC)
 - (1) Jan 10, 2003
 - (2) Jan 17, 2003
 - (3) Jan 24, 2003
 - ii) Pre-Flight Assessment Review

- iii) PFA - FRR Tag-up
- iv) PFA - PMMT Tag-up
- v) Range Safety Data Package

- 2) Volume II, STS-107 Email Exchange
 - a) Email-Exchange
 - i) Email MER daily status reports

 - ii) Email OSF status messages to Code Q
 - iii) Email SR&QA Reports
 - iv) Email Inter-office (OSMA)
 - b) Launch Operations Data (on-console)
 - i) Interim Problem Reports (Pre-tanking report)

- ii) ET Tanking Meeting SRB Special Topic
- iii) PMMT (L-1) and Launch Day Notes (Kowaleski)
PMMT (L-1) and Launch Day Notes (Bihner)

Nelson Keeler, 05:52 PM 2/3/2003 -0500, Re: Fwd: IV&V Items related to STS-107

To: Nelson Keeler <Nelson.H.Keeler@nasa.gov>
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Re: Fwd: IV&V Items related to STS-107
Cc:
Bcc:
Attached:

Thanks for closing the loop, Ned.

Pete

At 04:56 PM 2/3/2003 -0500, you wrote:

Pete:

As discussed Sunday, we have impounded all our Shuttle data, particularly as associated with STS-107, both by our contractors at JSC and all of us at the Facility. We have backed up all the soft copies and made additional copies of the hard copies.

Please note Steve Rague's email below. We have been asked to forward some of our data to Darrell Stamper at JSC. As I understand it, this is a proactive request and not the result of a request from one of the investigative boards.

Ned

X-Sender: rague@orion.ivv.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 5.1
Date: Mon, 03 Feb 2003 13:51:29 -0500
To: "Stamper, Darrell" <darrell.e.stamper1@jsc.nasa.gov>
From: Steven Rague <Steven.M.Rague@nasa.gov>
Subject: IV&V Items related to STS-107
Cc:
"Keeler, Nelson" <Nelson.H.Keeler@ivv.nasa.gov>

Darrell,

Just a note to ensure we understood what to deliver to you regarding STS-107. We will have hard copies of the following items to you by 4:00 pm CST tomorrow (Feb 4).

1. SRR reports and presentations for both the initial STS-107 SRR on 6/20/2002 and the final one on 12/12/2002.
2. Final SIRs related to STS-107 that were delivered with other SRR reports
3. All other SRR reports and presentations, and their related SIRs for OI-29.
5. TIMs related to STS-107 and OI-29
6. For analyst notes, fool reports, and preliminary SIRs, we will look for any information (especially entry related) that surfaced in these items that we feel should be noted to you as significant.

If I captured any of this incorrectly, please let me know.

-Steve

Steven M. Rague
NASA IV&V Facility
100 University Drive
Fairmont, WV 26554
Phone: 304-367-8216
Fax: 304-367-8203

Nelson (Ned) H. Keeler
Director, NASA IV&V Facility
(304) 367-8201

Michael Stamatelatos, 09:20 AM 2/3/2003 -0500, Re: Supporting Bryan on the Columbia Accident I

To: Michael Stamatelatos <mstamate@hq.nasa.gov>
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Re: Supporting Bryan on the Columbia Accident Investigation Board (CAIB)
Cc:
Bcc:
Attached:

Yes, as they know its your scenario and not from the MIB.

Pete

At 08:59 AM 2/3/2003 -0500, you wrote:

Pete:

Attached is a short description of a scenario that may be important for STS-107.

I have a telecon with the shuttle PRA group at 11:30 AM today.

Can I share this with them?

Michael

At 07:49 PM 2/2/2003 -0500, you wrote:

Code Q staff members,

As you may know Bryan is the ex-officio member of the Columbia Accident Investigation Board. He left for Barksdale AFB this afternoon around noon time. That is where he will meet up with the other CAIB members.

One of our main jobs in the immediate future will be to support him. We can support him in at least three ways: 1. We can respond to his requests. 2. We can collect, on our own initiative, data that could be of use to him (but we need to proceed most carefully on this one). 3. We can suggest questions or avenues of investigation that he might be able to inject into the work of the board.

Attached is a rough list we prepared today of investigative areas--for the most part these are areas in which the SMA community has some special expertise. For each area we have tentatively named an OSMA lead (and in some cases more than one person to work together). If you can think of other areas that we have not captured, and should, let me know. If we've associated you with the wrong area(s) or failed to associate you with the right area(s), let me know. We don't want to disrupt the investigation--we want to be prudent; we want to help Bryan. Think about whether and how you might be able to be helpful in these areas; then, before you take any action, write down your plan in a clear, concise manner, and send it to me--state what you might be able to do and how you would propose to do it. Then wait for a go-ahead from Jim or me. Keep in mind that we have asked the SMA directors at JSC, MSFC, KSC, LaRC, ARC, and SSC to work with us as needed, so this can be part of your plan, if appropriate.

We have also asked all 10 SMA directors to think of questions or issues that Bryan might pursue with the CAIB. I will be collecting these inputs. Your questions and issues are solicited, as well. Put your investigator hat on, think about this, do your own personal fault trees and hazard analyses, send me your ideas. I'll collect them up, as well, to send to Bryan.

Let's do a great job for Bryan on this important matter.

Thanks,

Pete

Peter J. Rutledge, Ph.D.
Director, Enterprise Safety and Mission Assurance Division
Acting Director, Review and Assessment Division
Office of Safety and Mission Assurance
NASA Headquarters, Code QE, Washington, DC 20546