

**MSFC ISO REGISTRATION AUDIT SCRIBE NOTES - Feb 98'**

**THIS AUDITOR'S MAIN FOCUS WAS ON ISO ELEMENTS: \***

4 - DESIGN CONTROL

20 - STATISTICAL TECHNIQUES

11 - INSPECTION, MEASURING & TEST EQUIPMENT

**\* Other generic issues were discussed as appropriate during the audit, (i.e., Quality Policy, Management Representative, etc.)**

**Date: Feb. 26 - 28, 1998**

**Auditor: Auditor #5 (N)**

**????? - sanitized , replaced an individual's name**

Date: February 25, 1998

ISO Element: 4. Design Control

Auditee Organization Code: EB41

Building: 4487

N: This is SXI? (looking at document provided) (**\*Note: Participants looked at various documents during scribing.**)

Escort: Explained that before ISO and out of scope but control process was in place.

N: Do you have anything that is in scope through PDR Phase?

A1: No

N: This is what you follow?

A2: Yes

N: I want to see project plan for requirements.

A2: I gave you the software requirement specs.

N: What does this experiment do?

A2: It takes pictures of the Sun and projects solar forecasts.

N: Walk me through the main areas.

A2: It shows detailed software requirements and test plan.

N: This was before PDR?

A2: I think it was before 93 - or maybe concurrently. Management plan was before PDR and the Systems Level Requirements were before CEI spec.

N: What spec?

A2: CEI

N: What would you build first?

A2: Management Plan

N: Right before design?

A2: Yes

N: Is this the Management or the Test Plan?

A2: Three plans together.

N: Is this all the requirements and change requests?

A2: This document tells how it is tested.

N: Explain how you will test and how you will build if not by requirements.

A2: Take the software requirements and ????? will show how it reflects back to tests (showed auditor another document). It tells the resources, timeframe, Board structure, etc. The Requirements Document would tell you what you need to do.

N: Does it show the change control process?

A2: yes

N: Why in a Test Plan?

A2: Its actually three documents in one: software management, development, and test plan.

N: Is CDR first thing?

A2: You have the PDR.

N: Right. So the CDR is not the first thing. Where is the software design phase? Is it in the manual?

A2: Yes, it should show how we tailored it.

N: Show me the different levels.

A2: (Takes document) Shows N 3.5 Management Review and points out the Requirements and Design

N: What is SDF?

A2: Software Development (?) which the implementer keeps.

N: Did you have PDR?

A2: yes

N: Can I see the sign off sheet?

A1(plus others): That is a quality record kept by the Project Office.

N: Can you find it?

A1: (Tells another individual in room to call ????? ).

N: Lets look at the Software Test Plan. Do you have test objectives? (Looks at the document)

A3: (Points at in document)

N: Don't see plan

A3: (Pointed out again)

N: Where are the test case definitions?

A3: Are you looking for the procedures (checks document)?

N: Was software reviewed and approved?

A1: Yes

A1: Yes (these are the actual proceedings)

N: Let's talk about the document. Does it show responsibility for tests? (A2. Yes)

Define test levels? (A2. Yes) Define test procedures (A2. Yes) Management

Techniques (A2. Yes) Maintain test logs (A2. Yes) Test Report Section (A2. Yes)

N: What about deviations?

A3: We have SDR's.

N: SDR procedures?

A2: Yes - Software Discrepancy Reports.

N: Let me look at (documents are handed to N)

N: Dated September 7, 1995?

N: Test Plan is dated 95. What happened between 93 & 95?

A1: In 93 the Software Management and Development Plan and in 95 the Test Plan was developed.

A1: We didn't know the details of the software at that time. By 95 we had gone through some other cycles.

A2: The Test Plan was part of the Requirements Review. (Brings in Requirement Review Summary)

N: This was for Software Management?

A2: Yes - for the Requirements Review. The software requirements were reviewed.

N: How does Image play into this?

A2: These are our system level requirements.

N: They have to be put in place for build? Was there a System Requirements Review?

A3: Yes - Projects Office would have had.

N: What is the date on the software spec?

A2: 4-22-94

N: Is that the Image one?

A2 & A1: That was the only one.

N: Software Requirements is 211 B?

A2: Yes

N: This is CEI 2082?

A2: This is Image - baselined October 94.

N: Do you have Systems Level Requirements?

A2: Yes

N: Do you have the document?

A2 & A1: ????? would have. A1: But Bushman is not on project now.

N: Do documents go to Document Control?

A1: yes

N: Do we need numbers?

A2: yes

N: Lets see PDR.

A2: (Shows document)

N: PDR 2113? Dated 8-2-93? Was it reviewed?

A2: Yes, but not baselined. A1 & A2: It was a project level review (????? mentioned again).

A2: There were no RID's.

N: Were there preliminary design issues?

A2: This was as build.

A1: This was a snapshot of PDR.

N: We have to go to Document Control for review?

A2 & A1: Yes

N: Do we have original signature page?

A2: No, it was not baselined for PDR but reviewed for PDR.

N: Is this a working copy?

A2 & A1: Yes

N: Do we have a software test plan review?

A2: We had a software readiness review. May have had at Division level.

A1: There was no formal review.

N: (reads from document) Preliminary PDR 8-2-93, Test Plan 9-7-95, Is this procedure followed?

A1: Yes, it is generic for all projects and then tailored.

N: Do you write deviations?

A1: The management plan states how the software is developed.

N: Can I see the Management Plan? (document is provided)

N: Who is the instrument engineer?

A2: ?????

N: 5-3-93 Software requirements review?

A2: Yes

N: Software specs was 94?

A2: Baselined in 94

N: Preliminary requirements specs, you had review and baselined?

A2: Yes

N: What is the preliminary design spec no?

A2: SXI (?)

A1: Requirements spec you mean?

N: Yes

N: Preliminary requirements prior to, you don't keep until baselined? After PDR, CDR?

A2: Yes

N: (reads document) You did have CDR? (asks to see)

A2: The chief engineer has.

A1: (shows document reviewed for CDR)

N: What came from the review? Any changes?

A2: No changes from CDR.

A1: If discrepancies, Project Office would have record.

N: Asks to see minutes of meeting.

A1: ????? has the official records of CDR. It's not just the minutes but RID's written, presentation of RID's, maybe Board meeting that dispenses RID's.

N: Does ????? keep or archive?

A1: ????? should keep.

N: Then there's a test readiness review?

A2: Yes. A Division level review.

N: What test document were you reviewing at this point?

A1: At test readiness review?

N: Yes

A2: Test plan and test procedures.

N: Do you match the documents at review to determine if all procedures are being tested?

A2: yes

N: Is the final test plan followed?

A1: (Finds document) These are our procedures.

N: Were they reviewed?

A3: Reviewed at TRR.

N: What is the document number?

A3: SX1003. This is a quality record from today's environment standpoint. Dated 3-20-97

N: Is this the updated one?

A2 & A1: Yes. This is Revision C.

N: When was Revision A?

A3: (Left to locate document)

N: What about your configuration inspection? Do you have anything on that?

A2: (reads document)

A3: (Returns with document)

N: What is the date of Review A?

A3: 5-20-96 was date it was first run.

N: Let's get back to the configuration inspection.

A2: Reviews were conducted concurrent with pre ship review.

N: (Asks to see pre ship document)

A4: (Leaves room to locate)

N: What is the number for the software validate test?

A2: (Points out number in document)

N: 5-9-97, SX1 05?

A2: Yes, sounds right.

N: In the pre ISO CDR, did you have safety requirements?

A2: Yes, there was a safety review.

N: The agenda should tell who talked about safety. You had a CDR?

A2: Yes, on the requirements spec.

N: What about the design spec?

A2: (looks at document) Requirements start at 4.0. Should find in 1.2 of design spec.

N: (cross references documents with A2).

A2: 4.1 is design requirements but better test may be 4.2.

N: 4.2?

A2: 4.2 1a

N: You're referring to the initialization?

A1: You are tracing the requirements to the design.

A2: Yes

N: Can we go to 4.2 1c, initialization function....?

A2: (Cross referencing) - Not numbered the same.

N: Why did you leave 4.3 2 in?

A2: (Looking at document) Left in so Yvette would not have to renumber each time changes were made.

N: (N ask about previous information requested from Sherry)

Escort: Explains that documents are being located.

N: What do you have for CC(?)?

A2: (Looks through document) We are comparing a numbering scheme that may be off.

N: We need to match the two documents to ok CDR.

A1: (explained the numbering scheme)

A4: (leaves to find other documents)

N: Is this the design spec? What is the date?

A2: This will match 5-97

N: The test was from 5-97?

A2: Yes, the requirements test.

N: What am I looking at?

A2: Requirements, Rev A

N: What is the date of the spec?

A2: October 94

N: 5.4.1 Is this the image patent display? A, B, C, etc?

A2: No, that is EGSE requirement. We are talking about flight.

N: What is 4.4.6?

A2: That is the flight control task.

N: The 97 design and this should be identical. If the two were compared, would I see marked changes?

A2: No, because more than 25% of the document was changed.

N: Were the changes documented?

A2: Yes

N: Can I see?

A2: Yes, we have discrepancy reports such as problems with codes plus requirements.

Don't have SDR for requirements change.

N: I want to see something that went through the change process.

A2: (showed one that went through process) This one went through Changes Board and we got a waiver.

N: What is this? (showed A2 a document)

A2: This document shows formal procedures on instrument and "they" wrote a quality discrepancy report. We write discrepancies report internally. We then fix the problem or get a waiver. On this one we got a waiver. (Number TR 068002) The TDR references the SDR.

A1: This is part of the corrective action system. DR is part of the quality correction system.

A2: We got a DR because the Software Division (internal) wrote the discrepancy report. We asked for a waiver on this one.

N: Is there another part to the problem description and analyses?

A2: No

A2: (shows N another SDR). This shows internal tracking. This SDR shows requirements spec - what's in the code doesn't match requirements spec. (showed N implementer's response).

N: Was there an ECR on this one?

A2: One ECR would encompass several changes.

A1: In order to expedite.

A2: I have all ECR's written. There was a total of 3.

A2: (shows DR with problem with data box, shows software change request, shows requirements change also, shows internal records indicating changes. Points Rev A, change, etc)

N: Where is the ECR?

A1: The official ECR is kept in Configuration Control area.

A2: (shows document with code, version and validation. Also shows fix) This is a code change not a requirements change.

A4 (left room and returned with their copies of ECR's)

A2: (shows copies of ECR to N) This shows Rev B to software requirements spec.

A1: SAIL Lab will have the original.

N: This is 9701? (looking at document)

A2: Yes

N: That matches with CBBD(?)?

A1 & A2: Yes

N: What is the MSFC Release Desk?

Escort: That is in my shop.

N: You have 4020-5?

Escort: Yes

A2: (shows N pre ship review mentioned earlier)

N: The date on that is 5-28-97?

A2: Yes. The end result of this is whether or not you can ship.

N: Who signed off?

Escort: We are looking for that? Either ????? or ?????.

A2: (pointed out waiver presented at pre ship review)

N: Did safety and mission attend?

A2: Yes, they are on the review team. (looked through a document for a name on the agenda) ????? was S&MA.

N: (asked for combination management, development, and test plan discussed earlier).

A2: (located document)

N: Do you go through review in the document?

A2: Yes - but within EB not at S&E level.

N: All changes go through review?

A1: Yes, after baselining.

N: Is procedure now "large" or "small" book (holds up combination document)?

A1: A "small" book based on the OWI.

(Three additional individuals arrive to participate in the audit)

N: You are with SX1?

A5: Yes, I am the chief engineer.

N: You had a system requirements review?

Escort: That person is in (?)

N: You had a Spec 2082 review?

A5: What is that?

A2: CEI

N: You had a review?

A5: Not formal but we baselined. ????? has all official documents.

N: Where is the PDR review document?

A5: We have the agenda and plan.

N: Where is the official records and agenda of review?

A5: (provides copy of agenda)

N: What am I looking at?

A5: Different systems

N: Page 214? I am looking for safety (looks through document). In your procedure, do you show who is to attend?

A5: Yes, there is a list that includes safety, etc. I put the list in the folder.

N: We have a design certification and ship review (looks in document). What will this be?

Escort: This would be design validation.

A6: (provides PDR plan along with 2 day attendance list).

N: Could you tell what departments were represented ?

A5: Yes

N: That is the attendance list?

A5: Yes (also showed copies of signed RID's).

N: You had a response date of September 24. You got a response?

A5: Yes - all have to be closed before CDR.

N: I would like to see the attendance sheet and the CDR plan.

A7: (left room to get documents) (Returned with CDR documents and shows minutes of CDR)

N: This is CDR?

A5: This is the plan.

N: When was CDR held?

A5: 10-94

A5: (shows N board members and review)

N: This schedule A1? (looks through document)

A7: Yes, it shows all disciplines involved.

A5: (shows minutes to N from board meeting)

Escort: It shows closure of RID.

A5: The attendance list is on the back.

N: What is this disapproved?

A5: Different levels of dispositioning occurred. The only ones that came to the board involved money or manpower.

N: What were some of the disapproved? Anything to do with design or safety?

A5: No, safety was not an issue.

N: Review was 10-27?

A7: No, November 15 and 16 of 95. Plan was done earlier.

N: I have plan 10-94. Test readiness review was 10/24/95, before CDR?

A7: Not system level, but software.

ISO Element(s): Statistical Techniques (20)

Auditee Location: Rm 1010, Bldg. 4612

Auditees: A1- EH21

A2 - EH43 Fastrac EP lead engr

N - Asked about A1's procedure.

A1 - He reported EB WI-011 was his procedure. He described how 30 degrees of freedom would properly test the variance of the measurements.

N - Is the procedure signed?

A1 - Yes

N - He asked about the manner in which it is signed.

A1 - Because it is an OWI, it does not have to be signed in the manner that MSP's are signed.

N - He requested that a report be provided demonstrating usage of the statistical techniques.

A1 - This procedure is new and he is working on the first report now.  
He does have some partial trending data that he would be willing to show.

N - Do you have any test results?

A1 - He showed test results resident on his computer, described the data, and how the program performs analyses.

N - New procedure?

A1 - Yes, this is the 2/98 version.

N - He requested to see a copy of the bulletin that is being used as a guideline.

A1 - He produced a Rocketdyne document for review.  
He gave further descriptions for how the technique works.

N - He wanted to see a report demonstrating the procedure had been performed.

A1 - He did not have a file with enough data loaded into the program that would allow a report to be finalized and available. He explained techniques that will be used to ultimately generate the report.

N - What procedures have you used in the past?

A1 - Mil handbook 5.

N - What was used to document results in the past?

A1 - Memos were used to document the results, a specific procedure was not utilized.  
Now there is a procedure for use.

N - Where in the OWI does it state what is to be done?

A1 - He read the procedure (as it applies to him) to N.

He described the decision process using guidelines from Handbook 5 for when they do the statistical process and what samples, etc. will be used. (environmental conditions, etc.). He reported he has 1 file showing one example of how the statistical techniques will be applied to process the data and generate a report. (He was never able to locate this data file). He described the program capabilities. He is preparing data from Fastrac program in his program that (after inclusion of more data) will be run with the program and he will then write the report.

ISO Element(s): Statistical Techniques (20)

Auditee Location: Rm 1010

Bldg. 4612

Auditees: A1- EH21

A2 - EH43 Fastrac EP lead engr

N - Handbook 5 is called out?

A1 - Yes, it is called out in OWI, latest revision is 5G.

N - How many statistical procedures are you using out of the OWI?

A1 - 2 procedures: F-Test and Student T-Test.

N - Variance?

A1 - He explained what data results from the tests:

- 1) Differences in variances between data sets.
- 2) Differences in means between data sets.

N - Test data go into a report, then where does it go?

A1 - Fastrac engine office is his customer and he sends them the reports.

He mentioned that the EH lab lead engineer, EH43 receives the reports.

He reported that his submissions are described in the task agreement.

He used a test sample to describe the testing performed over time and how it results in formulating mechanical characteristics for the sample.

He produced memos for review that he considered to be quality records. He showed how he controlled them in his desk. He had a retention log.

N - He requested copies of the theoretical statistical technique that needs to be performed on the data, portions of the OWI that performs the technique, and the memo (quality record) reporting the results of the analysis.

**Observation** No finding or observation but he will see that this reporting is looked at in future audits since there is no objective evidence at this time.

A2 arrived at this point.

A2 - Provided a task agreement for A1's support.

N - He requested a copy of the draft task agreement.

A2 - He provided one.

After leaving 4612, N mentioned to E, AE, and S:

N reported that information is known at a high level, processes are known, and therefore, charts

and explanations should be available. This subject will be monitored during future audits since not enough data was available at this time.

ISO Element(s): Statistical Techniques (20)

Auditee Location: Rm 2138

Bldg. 4203

Auditee: A3- HEI

N - What department are you in?

A3 - Hernandez Engineering

N - Are you doing “in-scope” work?

A3 - Yes, supporting CR10, CR01 and work with the MSFC Corrective Action System

N - Do you use a procedure or work instruction?

A3 - Yes, several => MSP-14.1, OWI's.

N - He requested to see some of the MSP's or OWI's.

A3 - He mentioned he could access them on-line. He reported using S&MA documents 5 and 12. He printed them out.

N - He requested to see copies of some of the reports A3 works.

A3 - He produced some reports and described some of the trending analyses sections within the reports.

N - He requested to see some trending data and charts.

A3 - He reported the system has been in place since 11/97. He showed some charts (examples of how it will look). He described how the process results in charts and data.

N - Procedure not used anymore?

A3 - He showed him an example only.

N - He requested information on the B200K-004 procedure.

A3 - He explained how the process works. He used a problem report to illustrate trending for failure of a turbine blade through cracking.

N - He copied down identification characteristics of the report.

A3 - He explained the chart, raw data, and pointed out the problem source identification.

N - What procedure was used to generate this data?

A3 - S&MA-CR10-R-Y-005 was used. (HEI is a support contractor to S&MA). He described where computer program is located (mainframe computer). He described how the data is entered.

N - Are you upgrading procedures? Is this a new procedure to meet ISO-9000?

A3 - This procedure is the current version that was given an ISO # later. Procedure has been used for 5+ years.

N - Why is there an expiration date on the procedure?

A3 - Format of the document requires it.

N - MSP-P14.1 was noted as another procedure A3 uses. Who do reports go to?

A3 - Project managers, S&MA contacts.

The procedure has not been used very long but will result in trending data for failure mode and root cause determination. Presently, not enough objective evidence exists for these procedures.

N - Observation Procedures are Okay, no issues, very good.

AE - He explained how trending analyses are used to monitor performance of the testing.  
Regression analyses are used.

ISO Element(s): Statistical Techniques (20)

Auditee Location: Rm 1201

Bldg. 4203

Auditees: A4- CR50

A4 - He is the audit manager for MSFC.

He described his duties, showed trending data from internal audits, described his actions should problems result from study of trend analyses, and showed charts and data.

He demonstrated audit status on the computer.

N - He would not re-audit A4 since a detailed audit was already performed by a different auditor.

**Observations** None

Organization: EB41

N: Look at SDR : 358, 250, 055,349

A: [*Shows procedure EB41-SS-001, 2/98, rev. B “Software Development Process Description Document”*]

N: In-Scope projects to review requirements planning

A: [*Selects Space Readiness Coherent Lidar Experiment (SPARCLE)*]. This is an in-scope project at early stages.

N: Start with Project Management

A: We have CM plan & project plan

N: Has it been approved?

A: No, still in draft form.

N: The Project plan must be signed in order to start work. I would like to see the project plan reviews

since they are not signed.

A: SPARCLE is the only in scope project to show, and was developed in-house. [*Shows task agreement*]

N: [*Reviews document OWI-EB41-SS-01, quality records summary*] Has this been approved?

A: Yes, but has not yet been released.

N: I need to see evidence of this.

A: [*Shows documents, signature sheet.*]

N: Why wasn't this released sooner?

A: It just got out of Documentation repository. [*Shows approved configuration management plan, readiness review, letter of review, OWI JA51*]

N: What's the difference between the pre-review board and the review board?

A: Pre-board is lower level. The board is more senior management.

N: How about the Systems Requirement Document?

A: It came baselined out of review. [*Shows document*]

N: All the documents needed were signed. Quality policy? How do you do that?

N: Look at SPARCLE software management & development plan (preliminary)

A: We don't have anything through preliminary design that is in scope.

N: Have you had any training for project management?

A: Yes, courses

N: Where are the training records kept?

A: Personnel office.

N: Were people doing work for 10-11 years grandfathered?

A: Yes, its in the MSP.

N: Trying to track SDRs to ECRs

A: We need to find the #s, but this shouldn't be a problem.

N: Show me calibration records.

A: [*Shows reference documents, master list on computer*]

N: Where is the calibration procedure?

A: [*Shows P11.1, rev. B*]

N: How many categories do you have?

A: Three.

N: [*Looks over P11.1*] When do you use category II equipment?

A: [*Shows example of equipment records.*] Category II goes to calibration lab.

N: [*Goes to equipment room, checks serial number, calibration decal with records*]

Everything looks OK.

N: Show me the courtesy list from the calibration lab.

A: [*Shows the list*]

EB41

N: Anything on 358?

A: Problem found and waiver on the DR.

N: What was the TDR#?

A: [*gives #*]

N: An SDR was written. What was it?

A: [*Shows SDR*]

N: The next release fixes it? May I see the waiver?

A: [*Shows the waiver, tells what requirement not met (DAR)*]

N: How does the TDR match the SDR?

A: [*Shows SDR #, software spec. #*]

N: SDR 250...

A: Requirement spec., design, and code were changed and shown on document. [*Shows changes to requirement spec.*]

N: I want to see the ECR. How does it cross the SDR?

A: Each SDR correlates what needs to be done. [*Shows ECR, specifies what needs to be done from SDR.*]

N: O55...

A: Another TDR. It generated an SCR. Here is where we tweaked our process. Someone asked me to change the software code and requirements.

N: What about verifying changes?

A: We checked if the requirements corresponded to the code. Internal cross checks of changes were done.

N: Look at 349 (SDR) SCR/ECR ?

A: Just a code change. No SCR or ECR for code change.

N: The ECR contains multiple fixes. Is it possible that any one person can put together changes in the ECR?

A: There's an internal SRB. ECR's must go through the SRB.

N: Procedure for creating ECR's?

A: [*shows MSFC P04.2 - Configuration Management and OWI EB41-SS-001*]

ISO Element(s): 4.11

Auditee Organization Code: EP93 (East Test Area) Propulsion Test Division

Building: 4583 & 4522

(N) Do you have a list of all equipment that is calibrated?

(A) Gets written list for (N)

(N) Do you do a lot of calibration here or do you send out?

(A) states that it is sent out. (A) clarifies even when send out, is the calibration facility is here at MFSC.

(N) asked for a list of calibrated equipment for this building?

(A) clarifies this is the room that has test sensors that are issued out to the area.

(N) Do you get three month list of things that need to be calibrated?

(A) Yes. (Shows (N) the master calibration list.)

(N) When you put a check mark on the list, what does this mean?

(A) A check mark means that it is in this area. The highlighted portion means it is on recall, and if it is in calibration it states so.

(N) Look up M636273-S/N 12810 on the computer database?

(A) M636273-S/N is not shown on database as a record.

(Side note another (N) coming down in a cab)

(N) Do you keep a list of ones that are bad?

(A) They go to Cortez III, DK Boxes are not on this database.

(N) Try another one, 0062940?

(A) This is a MKS Instrument Inc. Manometer Capillary Tube in TV Room 124.

(N) Can we go see?

(A) Yes. (A look for In Storage Shelf Area)

(N) What is this lab? EP93

[(A) locates an article with calibration tag and test report]

[(N) looks over]

(N) asks why (A) leaves calibration pink copy of tag on the equipment? (A) just keeps the tags there until he distributes out to the areas. (N) locates an article that is exactly 30 days old 1/26/98 and states a new list (recall) will come out in a couple of days.

(N) Can we find S/N 1402240?

(A) Side note: This area is now the single point of contact for the east and west test area.

(A) states they go around and notify people when things are out of calibration.

(N) Can we look up S/N 0104458?

(A) states this is equipment is on the way to calibration lab. (S/N 1402240)

(A) states S/N 0104458 is in the basement of a test stand in the west test area.

(N) What does the question marks (?) mean ?

(A) said the equipment was not in the property database.

(N) Look these up in the database?

M630782 S/N 860531

M624336 S/N 930270

(A) states M630782 is in calibration lab as of 2/98 and M624336 is in the calibration lab since 11/20/97.

\* An observation about how many pieces of equipment not in the lab, when the ones are checked.

(A) If we can not find them, we try. The equipment has been combined from the east and west test areas.

(N) Suggest that EP may need a memo to go out stating what is missing.

(A) states that e-mail is sent out to engineers to try and help locate equipment. (A) states some sensors/equipment can be in the calibration lab.

(N) Look for M064686-S/N 890942?

(A) This went to calibration lab.

(N) Look for M626724-S/N A888?

(A) This one is still in question. (A) states that they are not notified that something is destroyed.

(N) Look for M624692-S/N 3650?

(A) states M624692-S/N 3650 is located at test stand 900 the calibration date is 1992.

(A) states that the remarks column tells where the equipment is located.

(N) Was questioning about things from the west side.

(A) said that just taking this side over 3 months ago.

[(N) looks around the room - (A) shows some equipment from the 1960's. (A) said some will be excessed. (N) looks at excess.]

[(N) looks at some issued equipment on the shelves. Finds one that needs calibration, but (A) states it has been calibrated. It just has the pick tag on the equipment.]

(N) ask what happens if (A) is out?

(A) The other employees knows what to do.

(N) Saw a tag that stated need repair.

(A) explains that the tag's white front copy tells that it needs to go to calibration lab. This tag is signed and dated by the tech who picks the equipment up and the tech gets the blue copy. The pink copy comes back from the calibration lab when the equipment is returned.

(N) Do you have any equipment that can not be used for anything?

(A) Yes, and it is segregated.

(N) Is any on the list?

(A) Yes, if it has a government tag.

(N) When was the last calibration? Tag says 12/10/97 was the calibration date.

(A) states M624692-BG50 is a accelerometer on Test Stand 500.

(N) Do you have a list of things in the calibration lab?

(A) Yes, and looks it up on the computer system.

(N) Looks at some sensors and ask where do you put stickers on these things?

(A) stickers go on the sides and it calibrated Class II.

(N) How do you calibrate these sensors?

(A) Send to the calibration lab and mails to who made the request to use. (Look at one that last calibrated in 1994 and these items are calibrated as needed. These are not used a lot.)

(N) Looks at ones that are used. What does 100 mean?

(A) 100 PSI (pounds per square inch.)

(N) Looks at Calibration Lab Work Request by the month. (N) Looks at list of equipment that is said to be out at calibration lab.

(A) Shows that M064868 is in the calibration lab and 890942 is ok.

(N) What are we looking at?

(A) Foxpro database that keeps the table of records. (A) states the comment field lets us know where it is located.

(N) and (As) have discussion on what test are running.

(N) asks to look at another?

(A) states S/N 930270 went to calibration on 11/20/97.

(N) How do you know the equipment ever came back from the calibration lab? Why do  
(A) destroy the list?

(A) keeps the 3 month list and states it will show up on the recall list -----

(N) When sending monthly list, it shows on the list as received.

(A) If still in bends in the area then it will not be on the list. It is on the recall list.

Example, send 200 transducers to calibration lab. (A) needs range and serial number and  
go to calibration lab to track.

(N) Show how everything is in calibration lab

(A) Not everything is in calibration lab. Because when it comes back to this area it is  
kept in a box until recorded and then put back in storage area. (A) takes serial number  
41031 from box to demonstrate still located in calibration lab until taken from the box.

(N) Reads off report and (A) has not notified because these are new.

(N) asked if (A) sent to the calibration last month correction?

(A) states, no.

(N) asked if this form has changed?

(A) did not think so.

(N) Do you have a procedure you follow or a work instruction?

(A) states there are FOPS and EP93-101, other (As) state there is no work instruction or  
procedures.

(E) states that EP lab has an overall work instruction but not specifically for this room.

(N) asked if only 2 work in this room?

(O) (A) Yes.

(N) asked if only deal with one calibration lab?

(A) Yes.

(N) Do you keep the certificates for calibration?

(A) Calibration Lab does all this. All this equipment is kept in house.

(N) If there is an emergency calibration, how do you let them know?

(A) We use Request for Priority Calibration form.

(N) Do you pay extra for the emergency calibration?

(A) No, but we may under full cost.

(A) Did we answer correctly?

(N) states not following instruction on recall sheets and need to have emergency procedures on how to do things.

(N) Do you know the Quality Policy?

(A) Yes, states the policy to provide quality products and services to our customers.

(N) How does the quality policy relate to you?

(A) That things are calibrated correctly.

(N) Found some minors that the report states a copy of any discrepancies should go back to calibration every month. Need a procedure for different types of things like emergency calibrations, things not to be calibrated, and missing things.

Group went to building 4522 to check location of accelerometer BG50.

(A) They had the box for BG50 but the accelerometer was not in the box. It is not in use in this building. It is possible that it could have been damaged during testing and the damage report has not made it back into the system.

(N) Found an accelerometer not in box. It was placed on a shelf in the storage cabinet.

(A) stated what they do with unboxed accelerometer.

(N) Why not send them back to lab without box?

(A) These are usually a one time use and these are expendable pieces of hardware. -----

(Could not hear the rest, the area was too loud.)

(N) states you might want to keep on cabinets in this area or the boxes "Do not use until calibrated".

(A) states that engineers do not let anyone down here that should not be in the area.

ISO Elements: 4.4 Design Control

Auditee Org. Codes: EB41, EB42

N: Wanted to walk through the life cycle of a complete design package for a mature product.

A: EB presented LCBT and SSFF. LCBT is in scope and SSFF out of scope. SSFF selected to look at being more mature, with more documentation available.

N: What is the quality policy at MSFC?

A: To provide quality products and services to our customer (Settle)

N: How do you implement this policy in your work?

A: Discussion of Software Simulation Branch responsibilities. Discussed structured process for developing software (SW). Presented OWI; EB41-SS-001 Rev. A for SW development process. Describes the process flow including development, PDR, CDR, flight simulation testbeds, etc. OWI also describes changes to process of SW development. Projects conduct PDR's and CDR's. ????? stated that EB41 was responsible for all flight software and discussed in-scope and out-of-scope in terms of project phasing. ????? gave overview of EB41-SS-001 by reviewing table of contents and basic process flow.

N: Asked if we had a copy of the MQM.

A: Provided a paper copy, and stated that the official was on the net.

N: Are we looking at the official copy of the OWI EB41-SS-001?

A: No, the official copy is on the net. All hard copies are reference only.

N: Question about approval signatures on the OWI.

A: Documents are signed and scanned into the approved document.

People who worked SSFF SW enter office with documentation. Show MSFC-PLAN-2353 dated 9/7/94. SSFF Software Document.

N: Describe the plan as we go through it.

A: ????? discussed project overview and software requirements.

N: Was 2353 prior to PDR?

A: The plan was provided to EB41 by the Project Office. It is a systems requirements document.

N: Did the design change over time? Were the changes documented? Show me.

A: The system requirements document (SRQ) should have changes documented when EB writes ECR's against the SRQ for changes.

N: Do you keep copies of the ECR's?

A: The project office keeps copies of the ECR's.

N: So we have to go somewhere else to see ECR's?

A: Yes.

N: Can I see your design control document?

A: Yes. Provided a copy of the Design Control Document, stating it was a reference copy only and the official was on the net. Also provided a copy of MSFC-SPEC-2334 A System Requirements Document. The parent document that gives system level requirements.

N: Do you have SW quality assurance representative inputs in the process?

A: Yes, ????? and ????? were the S&MA representatives for SSFF.

N: Does the detailed design document MSFC-SPEC-2446 contain changes?

A: Yes

N: What language is the program in?

A: Missed answer. Some type of C hybrid?

N: Is there a list of requirements in MSFC-SPEC-2446?

A: Yes, The requirements are cross referenced to MSFC-SPEC 2334, the basic system level requirements. Examples shown.

N: Where are the requirements in 2446?

A: Examples shown

MSFC-SPEC-2334 is provided to EB from the project office showing the system level requirements. MSFC-SPEC-2446 is the detailed design requirements specification.

N: Show the mapping of requirements between 2334 and 2446.

A: Gave several examples.

N: Checked dates on both documents to see if there was reasonable match in the delta between the dates of the documents.

N: Would like to see a copy of MM 8075.1

A: Reference copy provided.

N: Do you have more than one design control document?

A: Missed the answer.

N: Asked again about control of changes.

A: Project office owns the ECR's. Have to go there to review them.

N: Continued to map 2334 and 2446 requirements. It took a while. Additional personnel were able to show the match between the two documents.

N: Where is Appendix A of 2334?

A: Don't know. Didn't realize it was missing.

N: What is ICD-XX document?

A: It is an interface control document.

N: Asked again about Appendix A.

A: Don't know. Speculate that Appendix A refers to an add on to the project after some maturity. The program didn't get to the point where an Appendix A was needed.

N: Did the project go to completion?

A: No, the project was tabled due to lack of funding.

N: Then why is still continuing?

A: EB was given approval to get the SW to a clean point of stoppage. It is anticipated that the project will start back up in the next year or so. Didn't want to stop the work dead in it tracks. Wanted to stop at a logical point of maturity.

N: Still concerned about Appendix A missing.

A: Need to go to EL lab. They wrote 2334.

N: Asked about documentation of design change process.

A: Discussion of software problem reports (SPR's). Design team tool used during SW development. No signatures required at this level of maturity. After SW baselining, all SW changes go through a software review board (SRB) for official approval. Process described in EB41-SS-001.

N: Back to mapping requirements between 2334 and 2446.

A: Demonstrated mapping. 2334 para. 3.1.2.1 p-r didn't map. Speculated that these are experiment module (EM) specific and the project never got to the state where EM's were

considered in the SW design. Can't write a requirement if we don't know what EM is flying. Need to check with the project office regarding those specific requirements.

N: Did you have a PDR?

A: The Project office has a PDR and has all the records of such.

N: Did you have a formal CDR?

A: The project decided not to have a formal CDR because the project was being tabled. An informal CDR was held where it was decided to continue the SW development documentation to a savable state.

N: Asked about documented changes in the design again.

A: Showed example of software problem report (SPR) again. There are hundreds of them. They are used by the design teams to log problems as a record of daily activities. Mr. Settle explained SSFF was conducting development testing and writing SPR's. No official documentation of changes occurs per the OWI until later in the process.

N: Can we see minutes of meetings deciding not to have a CDR due to the shelving of the program?

A: Need to go to project office to see their records of the meetings.

N: Questioned SPR's not having approval signatures again.

A: SPR's are design team level tools. No approval signatures are required. SPR's are tracked in a configuration management system. They help the design team to iterate the design. As stated previously, official approval of changes occurs later through the software review board.

N: Do you have an OWI on meetings and meeting minutes?

Concerned that the project was shelved and no CDR was held, but no documentation exists to justify these facts.

A: No.

N: Do you have a software problem reporting system?

A: Yes, It is described in EB41-SS-001, Section 3.9. Auditor opened and read that paragraph.

N: Want to look at a more mature project.

A: Will look at SXI.