LIGO-E960032-00-P

# FACSIMILE TRANSMISSION MESSAGE

**Jet Propulsion Laboratory**
**Quality Assurance, Section 506**

**DATE:** March 13, 1996 **TOTAL PAGES:** 5

**TO:** W. H. Tyler

**FROM:** Joanne J. Whitaker

**Telephone Number:** (818) 354-5191

**MESSAGE:**

Bill,

Here is the document. Please review and call with any recommendations.

Joanne

[redacted]

| TITLE: | REV: | DATE: |
|---|---|---|
| QAP141.10 | A | 03/13/96 |

# QUALITY ASSURANCE PROCEDURE

## PROCEDURE FOR USE OF THE JPL INSPECTION REPDORT FORM JPL-1898

APPROVED BY _____ DATE _____

APPROVED BY _____ DATE _____

LIGO
California Institute of Technology
1201 E. California
Pasadena, California 91125

# QUALITY ASSURANCE PROCEDURE

| REVISION NO: | DOCUMENT NO: |
|---|---|
| DATE: | PAGE 1 OF 15 |

## 1.0 SCOPE

This Quality Assurance Procedure (QAP) defines the procedure for use of the Inspection Report (JPL form 1898) for documenting discrepancies and other inspection results.

## 2.0 APPLICABLE DOCUMENTS

| | |
|---|---|
| QASP 10.2 | Stamp Control (Section 512) |
| QAP 144.1 | JPL Quality Assurance Material Review Board Action Notice |

## 3.0 FORMS

| | |
|---|---|
| JPL Form 0703 | Quality Assurance Material Review Board Action Notice |
| JPL Form 1898 | Inspection Report |
| JPL Form 1898-1 | Inspection Report Continuation Sheet |
| JPL Form 2916 | Assembly and Inspection Data Sheet (AIDS) |

## 4.0 RESPONSIBILITIES

4.1 Cognizant Technical Personnel (i.e. Task Leader, Group Leader) shall:

4.1.1 Provide disposition and preventive/corrective action instructions for each Inspection Report (IR) discrepancy.

4.1.2 Coordinate, as necessary, with the cognizant fabrication, assembly or test supervision to assure implementation of disposition and preventive/corrective action requirements.

4.2 Ligo Quality Assurance Officer or designee shall:

4.2.1 Assure cognizant QA and technical personnel are adequately instructed in the proper use of IRs.

4.2.2 Review completed IRs before distribution to assure that they are complete, correct, and legible.

4.2.3 Assure IRs are properly distributed per paragraph 6.5.

4.3 The Quality Assurance Engineer (QAE), or designee, shall:

4.3.1 Approve or concur with acceptable technical disposition and preventive/corrective actions.

4.3.2 Initiate a Material Review Board (MRB) per paragraph 5.2.6 when disposition agreement cannot be met.

4.4 Cognizant personnel generating the IR shall:

4.4.1 Initiate IRs in accordance with this QAP.

4.4.2 Coordinate with the Cognizant QA Engineer, or designee, whenever:

a. IRs are ready for disposition;

b. disposition instructions are not properly implemented;

c. preventive/corrective action requirements are not implemented or preventive/corrective actions have been discontinued.

5.0 GENERAL

5.1 All references in this document to the Facilities Group or Detector Group Tasks pertain to hardware supporting these tasks/activities. Surport equipment, handling fixtures, or test equipment shall also be considered part of the above mentioned tasks/activities.

5.2 Requirements

5.2.1. All entries shall be neat, legible, and entered using a dark ballpoint pen or a typewriter. Sufficient pressure shall be used so that each of the copies is legible.

5.2.2 Inspection stamp impressions shall be affixed to each IR copy with permanent black ink.

5.2.3 Each block shall contain an entry. If the information for a specific block does not exist, one of the following shall be entered:

a. —- (a dash or line)

b. NONE

c. N/A (not applicable)

5.2.4 If multiple entries are necessary in any heading blocks, enter words such as "see below", "as noted", etc., and enter the information in block 30, see Figure 1.

5.2.5 Any IR entry changes or deletions must be made with a ballpoint pen or typewriter; white out shall not be used. Changes or deletions must be initialed and dated by the person making them.

5.2.6 When the LIGO QA Engineer/LIGO QA Officer and the Cognizant Technical Person cannot agree on a discrepancy disposition, the complete discrepancy and proposed disposition shall be transferred to a Quality Assurance Material Review Board Action Notice, JPL form 0703.

5.2.7 To process IRs with MRBs, adhere to paragraph 6.4 of this QAP.

5.2.8 When insufficient space remains on the form to complete inspection, disposition, or preventive/corrective action entries, the continuation sheet shall be used as a supplement.

5.3 *Guidelines*

5.3.1 Information required to complete the IR form may be found on the AIDS, purchase order/ contract, LIGO drawing, design requirements, and specifications.

5.3.2 IRs are primarily used for recording discrepancies, but may also be used to record other inspection results.

5.3.3 Only original white or white duplicate copies should be used for permanent records; entries on color copies tend to fade when exposed to light or kept for long storage periods.

## 6.0 PROCEDURE

6.1 The IR form shall be completed as outlined in the following paragraphs. Block 1 corresponds to paragraph 6.1.1, etc. Figure 1 shows the location of each block described below.

6.1.1 PROGRAM -- Enter LIGO.

6.1.2 REF.DES. – Enter the Reference Designation of the item inspected.

FAC = Facilities
DET = Detector

6.1.3 NOMENCLATURE – Enter the name or title of the LIGO drawing or design specification.

6.1.4 PART NO. – Enter the part number and/or LIGO identification number including the dash number (drawing number) of the item inspected. Indicate LIGO or manufacturer's number by circling either JPL or MFR.

6.1.5 REV – Enter the drawing (part number) revision letter to which the inspection was made.

6.1.6 ECI / ECO -- Enter Document Change Notice (DCN).

6.1.7 QTY – Enter the quantity of items inspected.

6.1.8 SERIAL NO. – Enter the serial number(s) or range of serial numbers for the item(s) inspected.

6.1.9 LOT NO. – Enter the lot/traceability number of the item inspected.

6.1.10 DATE – Enter the date the IR form was initiated: month, day, year.

6.1.11 SUB. SYS. – Enter the subsystem name or acronym to which the item inspected belongs.

BT = Beam Tube
CC = Civil Construction
CDS = Control and Data Systems
ISC = Interferometer Sensing anad Control
LO = Laser and Optics
SI = Suspensions and Isolation
VE = Vacuum Equipment

6.1.12 COG. ENGINEER & EXT. – Enter the name and telephone extension for the cognizant technical person responsible for the item inspected.

6.1.13 TYPE OF INSP. – Enter the name of the inspection operation performed (e.g., receiving, in-process, final, shipping, assembly, test, etc.).

6.1.14 INSP. STD./SPEC. NO. – Enter the applicable inspection standard or specification number, and revision letter.

6.1.15 LOCATION – Enter the inspection site (i.e. SO, Washington--WA, Louisiana--LA, Caltech).

6.1.16 TYPE OF ITEM – Enter sub-task number.

6.1.17 PLANNING NO. – Enter planning document number

6.1.18 PO/CT NO. – Enter the purchase order or contract number.

6.1.19 LINE NO. – Enter the PO line item number.

6.1.20 REL./MOD. NO. – Enter the PO release or contract modification number.

6.1.21 RECEIPT NO. – Enter the packing slip number if applicable.

6.1.22 PROPERTY / ID – Enter the Caltech/LIGO property number.

6.1.23 WORK ORDER NO. – Enter the work order/task order number to which the inspection is being performed, as applicable.

6.1.24 SUBSYSTEM NO. – Enter the WBS number.

6.1.25 MANUFACTURER – Enter the manufacturer's alpha code, defined as original builder. If

6.1.26 SUPPLIER – Enter the equipment supplier's alpha code. If code is unknown, enter an asterisk, and enter an asterisk with the supplier's name in the description block (block 30).

6.1.27 ITEM – Enter the sequential number of discrepancies entered in block 30.

6.1.28 CODE – Enter the discrepancy code number. Reference Tables 1 and 2 for code numbers.

6.1.29 ZONE – Enter drawing zone coordinates identifying the specific requirement location associated with the description in block 30.

6.1.30 DESCRIPTION – Enter the description of the inspection results/findings including discrepancies and additional supporting information, as applicable. For inspection with no discrepancies, enter the words: NO DISCREPANCIES. For entering pending operations see paragraph 6.3.

6.1.31 DISP. – Enter the disposition abbreviation from block 35 for the discrepancy listed (see paragraph 6.1.35.1), or "ACC" for acceptance of pending operations (see paragraph 6.3).

6.1.32 DATE – Enter the date that the inspection stamp is applied in block 33.

6.1.33 STAMP – Apply the QA acceptance stamp for the acceptance of the rework, repair, etc. for discrepancies described in block 30. Entry is not required for "use as is" (UAI), and "limited use" (LU) dispositions.

6.1.34 ITEM – Enter the corresponding number(s) from block 27 identifying discrepancies for which disposition and preventive/corrective actions are given in block 35.

6.1.35 DISPOSITION/CORRECTIVE ACTION

6.1.35.1 The Cognizant Technical Person shall enter the disposition for each discrepancy, reference blocks 27, 30, 31, and 34. Authorized dispositions are as follows:

a. LIMITED USE (LU) – Used when an article is acceptable for use in some limited application, such as for "test use only". Detailed instructions and/or limitations must be included.

b. MATERIAL REVIEW BOARD (MRB) – Used when the Cognizant Technical Person and the QA Engineer/QA Officer cannot agree on a disposition, and MRB resolution is necessary (ref. QAP 144.1). The disposition must include the MRB number ref. paragraph 6.5).

c. REPAIR (RPR) – Used when the discrepant condition of an article can be corrected to a usable state, although its configuration will not be identical with drawing requirements. Detailed instructions must be included or referenced.

d. RETURN TO VENDOR (RTV) – Used to require return of the article being inspected to the vendor, supplier, or manufacturer for rework, repair, or replacement. Packing and shipping methods and requirements must be included.

e. REWORK (RWK) – Used when an article can be made to conform to drawing requirements. Detailed instructions must be included or referenced.

f. SCRAP – Used when an article is determined no longer suitable for use. "Scrap" dispositions must include written justification and disposal procedures. The hardware must be permanently identified, or be rendered unusable.

g. SUSPENDED ACTION (SA) – Used when discrepancy resolution is based on subsequent action, such as fit check or analysis, or when hardware is shipped on an open IR.

h. USE AS IS (UAI) -- May be used when a discrepancy does not adversely affect safety, reliability, durability, fit, performance, or interface requirements. Justification for such disposition must be included.

6.1.35.2 The Cognizant Technical Personnel shall examine each discrepancy to determine its cause, and as appropriate, assign and enter a timely and effective preventive/corrective action to prevent recurrences.

6.1.36 QTY.ACCPT. -- At the time of IR disposition enter the quantity of accepted items.

6.1.37 QTY.REJ. -- At the time of IR disposition enter the quantity of rejected items.

6.1.38 PARTS REC. BY + DATE -- At the time hardware accountability is transferred, the person receiving the items inspected shall enter signature and date signed, as applicable.

6.1.39 QADC -- LIGO Document Control Center (DCC). Used by LIGO Documentation personnel to indicate that appropriate data has been entered into the computer database.

6.1.40 COGNIZANT ENGINEER + DATE -- The signature of the Cognizant Technical Person authorized to make disposition and preventive/corrective entries in block 35, and the signature date shall be entered.

6.1.41 QA ENGINEER + DATE -- The signature of the QA Engineer/LIGO QA Officer authorized to approve or concur with disposition and preventive/corrective entries, and the signature date shall be entered.

6.1.42 INITIATED BY + STAMP -- The signature and stamp impression of the QA person initiating the Inspection Report shall be entered.

6.1.43 CLOSED BY + DATE + STAMP -- The signature and stamp impression of the QA person certifying completion of the IR (when all necessary actions have been accomplished and all blocks, except QADC, have been completed), and the signature and impression stamp date shall be entered.

6.1.44 PAGE 1 OF -- Enter the total number pages that comprise the complete IR, including attachment pages, if any.

6.1.45 ALERT CAND. - Enter N/A.

6.2 The IR Continuation Sheet form shall be completed as outlined in the following paragraphs. Figure 2 shows the location of each block described below.

6.2.1 PROGRAM -- Same as block 6.1.1.

6.2.2 PART NO. -- Same as block 6.1.4.

6.2.3 SERIAL # -- Same as block 6.1.8.

6.2.4 LOT # -- Same as block 6.1.9

6.2.5 INSPECTION REPORT # -- Enter the preprinted Inspection Report form number from page 1.

6.2.6 ITEM -- Same as block 6.1.27.

6.2.7 CODE -- Same as block 6.1.28.

6.2.8 ZONE -- Same as block 6.1.29.

6.2.9 DESCRIPTION -- Same as block 6.1.30.

6.2.10 DISP. -- Same as block 6.1.31.

6.2.11 DATE -- Same as block 6.1.32.

6.2.12 STAMP -- Same as block 6.1.33.

6.2.13 ITEM -- Same as block 6.1.34.

6.2.14 DISPOSITION/CORRECTIVE ACTION -- Same as block 6.1.35.

6.2.15 QADC -- Same as block 6.1.39.

6.2.16 COGNIZANT ENGINEER + DATE -- Same as block 6.1.40.

6.2.17 QA ENGINEER + DATE -- Same as block 6.1.41.

6.2.18 INITIATED BY + STAMP -- Same as block 6.1.42

6.2.19 CLOSED BY + DATE + STAMP -- Same as block 6.1.43.

6.2.20 Blank -- Enter the preprinted IR form number from page 1.

6.2.21 PAGE OF -- Enter the sequential page number and total number of IR pages.

6.3 Process and inspection operations pending after dimensional inspection of machined parts (e.g. surface treatment, penetrant inspection, etc.), where AIDS are not required, shall be documented on the IR as follows:

a. List pending operations in block 30.

b. Retain the IR until all pending operations have been completed.

c. Upon return of the article(s), perform an inspection of those specific operations. Document additional discrepancies on a separate IR and enter its number adjacent to the pending operation on the original IR. Both IRs shall remain open until the discrepancies have been resolved.

d. When a pending operations is complete and accepted, enter "ACC" in block 31, enter the date in block 32, and stamp block 33.

e. When all pengind operations have been accepted and all drawing requirements have been met, enter the word "final" in block 13.

6.4 Process MRBs on the IR as follows:

a. The discrepancy shall be transferred to a JPL Quality Assurance Material Review Board Action Notice (JPL Form 0703) by the LIGO QA Engineer/QA Officer.

b. The MRB Action Notice number shall be entered in block 35. See Figure 3.

c. If the MRB accepts the discrepancy "use as is", LIGO QA shall complete blocks 32, 33, and 43 per paragraph 6.1, closing the IR. See Figure 3, item 1.

d. If the MRB agrees to repair the discrepancy, "Repair per MRB instructions" shall be entered in block 35. When the repair is completed and acceptable, LIGO QA shall complete blocks 32, 33, and 43 per paragraph 6.1, closing the IR. See Figure 3, item 2.

e. If the MRB decision is to "Scrap" the discrepant article, the word "Scrap" shall be added to block 35. LIGO QA shall complete blocks 32, 33, and 43 per pargraph 6.1 for the purpose of closing the IR. See Figure 3, item 3.

6.5 Distribute IR copies as follows:

6.6.1 WHITE COPY - When the IR is closed, send to LIGO DCC.

6.6.2 GREEN COPY - Keep closed copy with the inspected article.

Note: If the IR is open and must be taken to another location for dispositioning, make a photocopy to leave with the inspected article.

6.6.3 CANARY COPY - When the IR is closed, forward to the Cognizant Technical Person responsible for the article inspected.

6.6.4 PINK COPY (extra copy) - When the IR is closed forward to the contract file.

## TABLE 1

Quality Assurance Hardware Defect Codes

1- CATEGORY

| | |
|---|---|
| 1- CONFIGURATION | Compliance with design documentation (e.g., use of correct parts or materials in the specified location and direction). |
| 2- DESIGN | Completeness and/or accuracy of the design documents/test procedures. |
| 3- WORKMANSHIP | Quality of work or process results. |

2- PROCESS

| | |
|---|---|
| A- Assembly/installation | L- Lead bending |
| C- Cleaning | O- Other |
| D- Documentation | P- Polymerics |
| M- Manufacturing/fabrication | S- Soldering |
| F- Finishing | T- Testing |
| I- Identification/marking | W- Wiring/cabling |

3- GENERAL DESCRIPTION

| | |
|---|---|
| 1- Broken | 6- Loose |
| 2- Damaged (but not broken) | 7- Missing, omitted |
| 3- Defective | 8- Unauthorized |
| 4- Excessive | 9- Wrong, incorrect |
| 5- Incomplete, insufficient | 0- Other |

### Some Examples of Three Level Defect Coding:

1A9 – Component installed in wrong location or wrong direction.
3A9 – Component installed incorrectly.
2D7 – Drawing does not specify torque value.
3S4 – Excessive solder.
1M8 – Hole drilled in chassis is not shown on drawing and is not required.
2M8 – Hole drilled in chassis is not shown on drawing but is required.
3P5 – Painting required on all sides. Chassis not painted on bottom side.
1T9 – Setup is different from that specified by test procedure. Procedure is correct.
3T9 – Test was conducted using setup different from that specified by test procedure.
2T8 – Test procedure not approved.
3W1 – Wire broken during wiring operation.
3A1 – Wire broken during assembly.

LIGO
California Institute of Technology
1201 E. California
Pasadena, California 91125

QUALITY ASSURANCE PROCEDURE

| REVISION NO: | DOCUMENT NO: |
|---|---|
| DATE: | PAGE 10 OF 15 |

## TABLE 2

CRITICAL CERTIFIED FASTENER DEFECT CODES

FD1 Trace elements, chemical certification

FD2 Material composition values, chemical certification

FD3 Strength/hardness, physical certification

FD4 Dimensional discrepancies

FD5 Physical condition

FD6 Physical identification

FD7 Manufacturing processes

FD8 Dry lube

FD9 Locking element

JPL Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
Pasadena, California 91109 - 8099

# INSPECTION REPORT 000000

| PROGRAM | REF DES | NOMENCLATURE | PART NO/ITEM | JPL ALT & REV | ECP/ECO | CONV | SERIAL NO | LOT/LOT NO | DATE/TIME |
|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |

| SUB SYS | COG ENGINEER'S EXT | TYPE OF INSP | INSP STD/SPEC NO | LOCATION | TYPE OF ITEM | PLANNING NO |
|---|---|---|---|---|---|---|
| (11) | (12) | (13) | (14) | (15) | (16) | (17) |

| WORK PO/TO NO | ONE NO | REF LOC NO | RECEIPT NO | PROPERTY ID | WORK ORDER NO | SUBSYSTEM NO | MANUFACTURER | SUPPLIER |
|---|---|---|---|---|---|---|---|---|
| (18) | (19) | (20) | (21) | (22) | (23) | (24) | (25) | (26) |

| ITEM | REF DESIG | ZONE | DESCRIPTION | CHG | DATE | STAMP |
|---|---|---|---|---|---|---|
| (27) | (28) | (29) | (30) | (31) | (32) | (33) |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| ITEM | DISPOSITION/CORRECTIVE ACTION |
|---|---|
| (34) | (35) |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

| QTY. ACCPT. (36) | QTY. REJ. (37) | PARTS REC. BY • DATE (38) | |
|---|---|---|---|
| QA/DC | COGNIZANT ENGINEER'S DATE | QA ENGINEER'S DATE | INITIATED BY • DATE • STAMP | CLOSED BY • DATE • STAMP |
| (39) | (40) | (41) | (42) | (43) |

INSPECTION REPORT 000000 PAGE 1 OF (44) SALVERY CARD (45) YES NO

DISTRIBUTION: WHITE - IF FLIGHT SYS - COG ENG; IF FLIGHT SYS - QA/QC
GREEN - ACCOMPANY HARDWARE
CANARY - COGNIZANT ENGINEER
PINK - FOR DATA RECORD PROCESSING - QA/QC

JPL Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
Pasadena, California 91109 - 2008

# INSPECTION REPORT
## CONTINUATION SHEET

| PROGRAM | PART NO. | JPL [illegible] NBR | SERIAL NO. | LOT NO. | INSPECTION REPORT NO. |
|---|---|---|---|---|---|
| (1) | (2) | | (3) | (4) | (5) |

| ITEM | CODE | ZONE | DESCRIPTION | DISP. | DATE | STAMP |
|---|---|---|---|---|---|---|
| (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| ITEM | DISPOSITION / CORRECTIVE ACTION |
|---|---|
| (13) | (14) |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

| QTY. ACCPT. | QTY. REJ. | PARTS REC. BY + DATE | |
|---|---|---|---|
| QA/QC COGNIZANT ENGINEER / DATE | QA ENGINEER / DATE | INITIATED BY / STAMP | CLOSED BY / DATE / STAMP |
| (15) (16) | (17) | (18) | (19) |
| INSPECTION REPORT | | (20) | PAGE OF (21) |

DISTRIBUTION: WHITE - IF FLIGHT SYS - QA/QC; IF GROUND SYS - QA/QC
GREEN - ACCOMPANY HARDWARE
CANARY - COGNIZANT ENGINEER
PINK - FOR SAS REQUIRED PROCESSING - QA/QC
- CITE/AUDIT - INITIATORS COPY

JPL 1896-1 R 4/93