Procurement Quality Assurance

Jet Propulsion Laboratory, California Institute of Technology

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Procurement Quality Assurance Overview

- Audits
- ASL
- Supplier Search

- Quality Clauses
- Rec. Insp. Plans
- Source Insp. Plans

- Source Inspection
- Receiving Inspection

- Supplier Rating System
- Corrective Action & Training
- Performance Information
- Supplier Quality Board
- PQA Supplier Awards

Scope

- PQA controls are applied to the purchase of JPL Critical Items (JCI)
- Procurement JCI is defined as:
  - Flight Hardware
  - Research and Development or Prototype with Flight potential

Provide
Qualified Supplier Base

Provide Qualified Supplier Base

- Audits
- ASL
- Supplier Search

Verify Quality

- Source Inspection
- Rec. Inspection

Evaluate & Improve Supplier Base

- Supplier Rating System
- Corrective Action & Training
- Performance Information
- Supplier Quality Board
- PQA Supplier Awards

Approved Supplier List

What are the minimum requirements for a supplier to get on the ASL?

- A Supplier must have one of the following Quality Management Systems (QMS)
  - ISO9001, AS9100, AS9120, AS9003, ISO17025, ISO13485, or ISO/TS 16949
- Some commodities/processes require a process audit or a Nadcap certification in addition to a QMS

How are suppliers added to the ASL?

1. 3rd Party Reciprocity
2. JPL Audit to verify compliance – 2 year approval
3. Supplier Exemption – One-Time and Multiple Exemptions

Supplier Audits

Provide Qualified Supplier Base

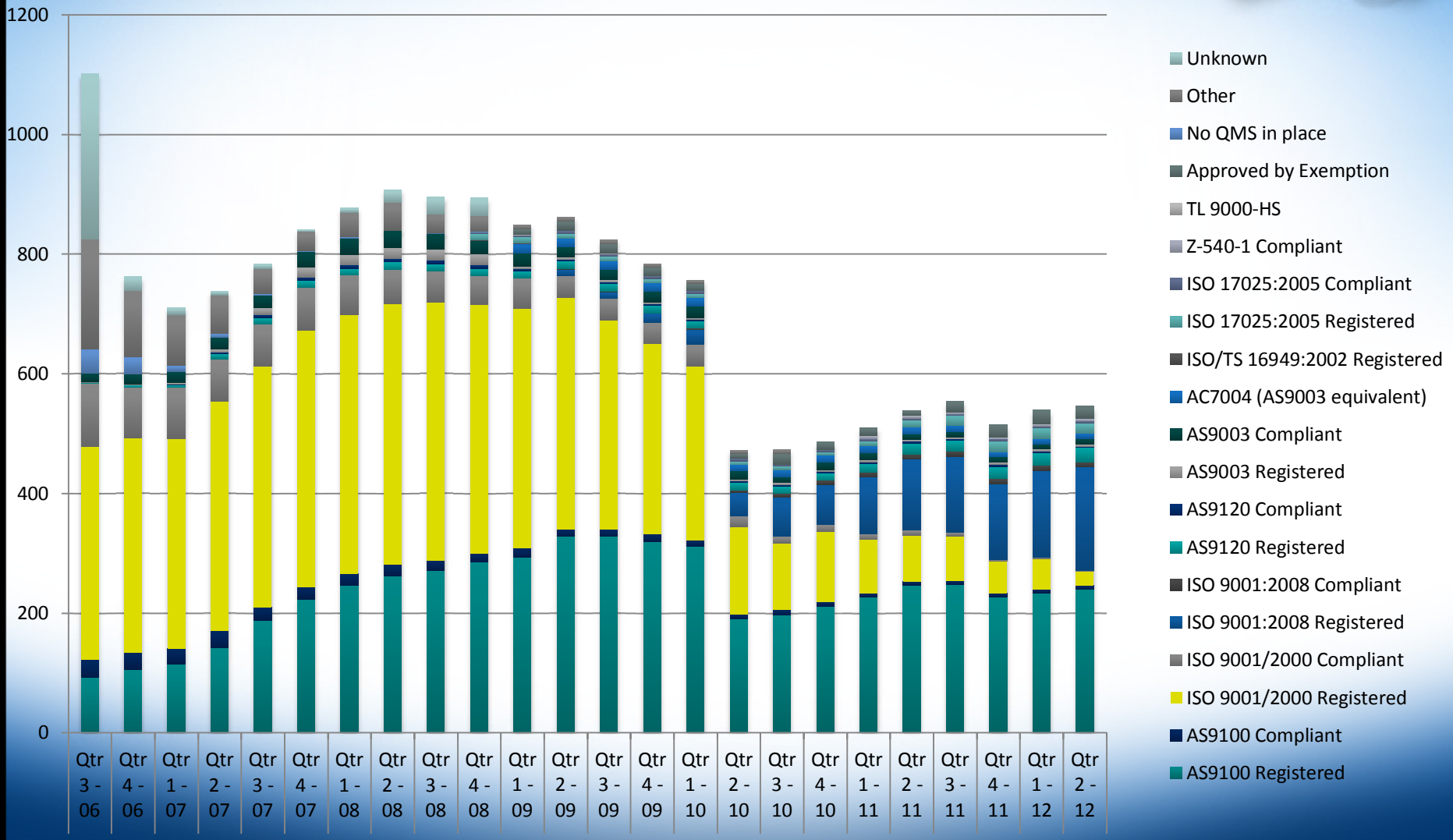
1. 3rd Party Reciprocity
   - Registrar must be certified by ANAB or IAF
   - Not all Registrars are accepted
2. JPL Audit
   - Supplier is audited for compliance to one of the appropriate approved standards
   - 2 day audit is standard
   - Audited to applicable standard, contract requirements, and supplier's procedures
3. Supplier Exemption
   - Generally used for suppliers who are not certified, and will not pass an audit
   - Risks are identified and mitigations are put into place to protect JPL from those additional risks
   - One-Time Exemptions are for 1 procurement, while a Multiple Exemption is used for many procurements from one Project
   - Signatures Required: PQA, Project QA, Mission Assurance, Cog-E, QA Section Management (Multiple only), and Project Manager (Multiple only)

Registrars

- PQA keeps a list of registrars whose certifications are not accepted at face value.
- Registrars are placed on the watch list based on issues found on previous audits of certified organizations
  - This is not a do not accept list, but every time we see a supplier with one of those registrars, we make a risk-based audit decision
    - Factors assessed can include: Risk of hardware we're buying, frequency of business with that supplier, location of the supplier, and past quality performance history.
    - Based on these factors we can apply other mitigations or simply audit them

Approved Supplier List

Provide Qualified Supplier Base



Audit Workload Metrics

Provide Qualified Supplier Base

Metric Objective

- To keep up with audits.

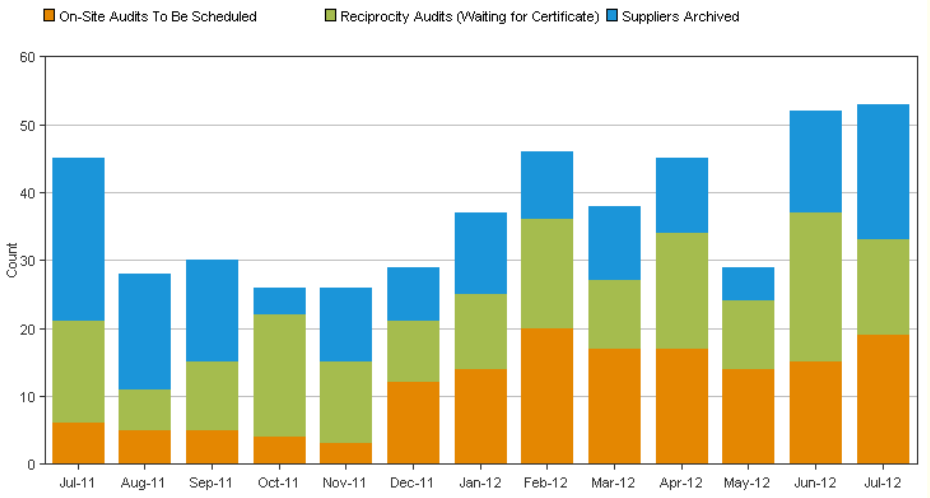
Maintenance Schedule

- Metric to be maintained on a monthly basis, as of the month end, during the first week of the following month.

Data Source

- Includes On-Site, Audits to be Scheduled and Reciprocity Audits (waiting for certificates).
- Data is recorded after the supplier audits have been conducted.

Audit Administrative Workload Chart



	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12
On-Site Audits To Be Scheduled	6	5	5	4	3	12	14	20	17	17	14	15	19
Reciprocity Audits (Waiting for Certificate)	15	6	10	18	12	9	11	16	10	17	10	22	14
Suppliers Archived	24	17	15	4	11	8	12	10	11	11	5	15	20
Totals	**45**	**28**	**30**	**26**	**26**	**29**	**37**	**46**	**38**	**45**	**29**	**52**	**53**

Supplier Audit Metrics

Provide Qualified Supplier Base

Metric Objective

- To provide breakdown of audits performed.

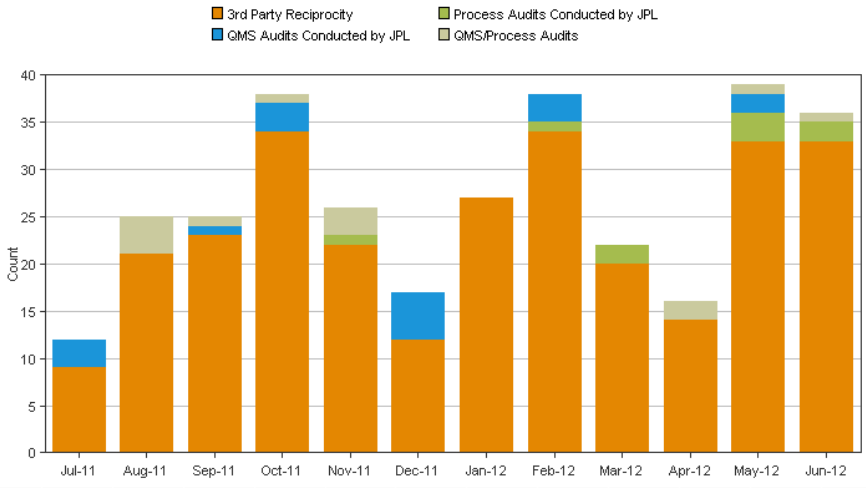
Maintenance Schedule

- Metric to be maintained on a monthly basis, as of the month end, during the first week of the following month.

Data Source

- Includes Third Party, Process Audits, QMS Audits, and QMS/Process Audits.
- Data is recorded after the supplier audits have been conducted.

Breakdown of Supplier Audits Conducted Chart



	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12
3rd Party Reciprocity	9	21	23	34	22	12	27	34	20	14	33	33
Process Audits Conducted by JPL	0	0	0	0	1	0	0	1	2	0	3	2
QMS Audits Conducted by JPL	3	0	1	3	0	5	0	3	0	0	2	0
QMS/Process Audits	0	4	1	1	3	0	0	0	0	2	1	1
Totals	**12**	**25**	**25**	**38**	**26**	**17**	**27**	**38**	**22**	**16**	**39**	**36**

Future Audit Workload Metrics

Provide Qualified Supplier Base

Metric Objective

- To understand workload.
- To plan ahead for expiration dates of suppliers.

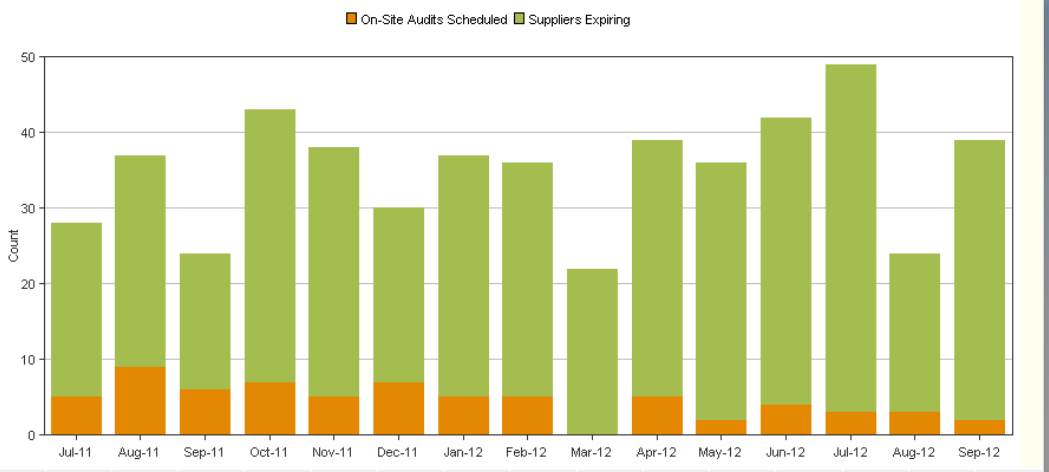
Maintenance Schedule

- Metric to be maintained on a monthly basis, as of the month end, during the first week of the following month.

Data Source

- Report Data is generated from JPL's Approved Supplier List Database
- Excludes archived and withheld suppliers

Future Workload Chart



	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12
On-Site Audits Scheduled	5	9	6	7	5	7	5	5	0	5	2	4	3	3	2
Suppliers Expiring	23	28	18	36	33	23	32	31	22	34	34	38	46	21	37
Totals	**28**	**37**	**24**	**43**	**38**	**30**	**37**	**36**	**22**	**39**	**36**	**42**	**49**	**24**	**39**

Process Audit Checklists

- Process Audit Checklists:
  - Brazing - Aluminum and Alloys
  - Chemical Film
  - Heat Treatment of Steel Parts
  - Heat Treatment of Titanium
  - ESD Control Survey
  - Liquid Penetrant
  - Magnetic Particle
  - Hybrid Microelectronic
  - Printed Wiring Boards
  - Stress Relief Cycling Criteria of Common Structural Metals
  - Connector Supplier Audit
  - Printed Wiring Board
  - Inspection (Mechanical)
  - Raw Material
  - Cable
  - Anodize
  - Counterfeit Parts
  - Lubricant Dry Thin Film
  - Bolts and screws self-locking non-metallic locking element
  - Machine Shop Audit Checklist

Audit Checklists

Provide Qualified Supplier Base

NASA's Machine Shop Audit Checklist

#	ATTRIBUTE	METHOD OF VERIFICATION	Results	REMARKS
3	Programming Process			
	Question	Guidance	Accept/ Concern	Audit Notes
3.1	Maintain documented procedures that define the method for controlling manufacturing, applicable service, production and installation processes.	Review procedures for controls during manufacturing, fabrication, assembly, processing, testing, etc. shop travelers or other control media; or incorporated by reference to drawings, specifications, etc.		
3.2	NC & CMM Programs	Inspect shop area for samples or visual aids and verify approval indicated with date and appropriate signature. Revision level control is critical. If a drawing appears to have too many redlines, ask how often drawing is rolled up to the next revision.		
3.3	Manufacturability Analysis	Who does it and how are they qualified. Interview personnel in the engineering department.		
3.4	Software used for programming machines	Compatibility with machines being programmed Solid Modeling CAD drawings		
3.5	Revision control prior to release to machine	Interview personnel in engineering and/or operations departments and verify how they ensure only the current rev. drawing is released for use.		
3.6	The supplier shall maintain accountability and configuration control of all parts during all phases of production.	Verify and review procedure for configuration control. Verify how the supplier maintains engineering changes.		
3.7	Tool Sheet	The supplier shall have procedures and maintain records that demonstrate care and control of tooling, including customer supplied tooling.		

RESULTS CODES;

M = MAJOR NONCONFORMANCE
N = MINOR NONCONFORMANCE
O = OBSERVATION

C = COMMENDATION
S = VERIFIED SATISFACTORY
N/A = NOT AUDITED

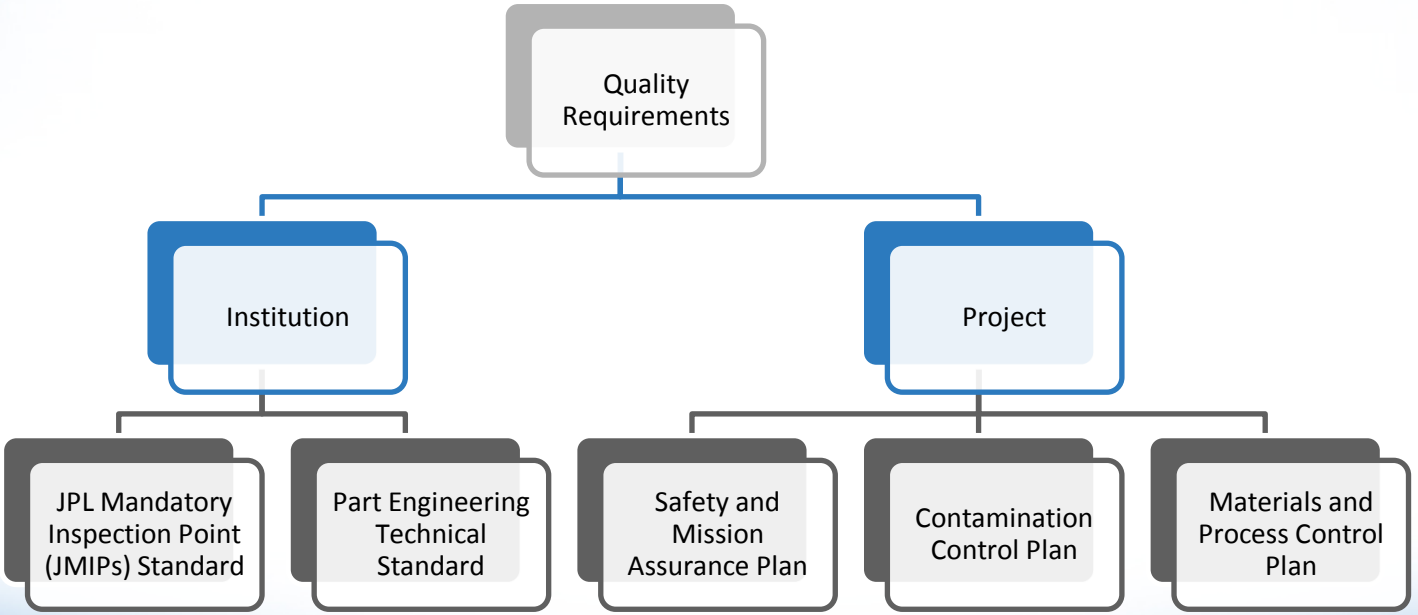
Plan
Supplier Quality

Plan Quality

- Quality Clauses
- Rec. Insp. Plans
- Source Insp. Plans

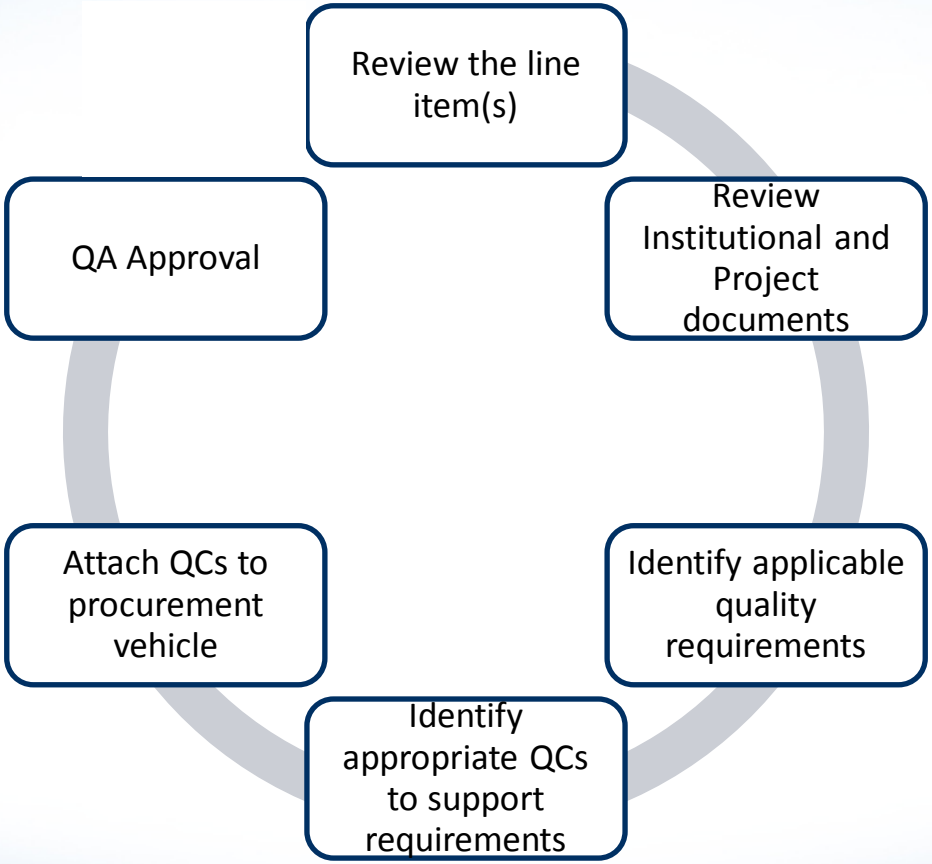
Quality Planning

- Responsibility
  - Flow down Institutional and Project quality requirements onto JPL Critical Item (JCI) procurement contracts



PQA Procurement Flow Diagram

Plan Quality



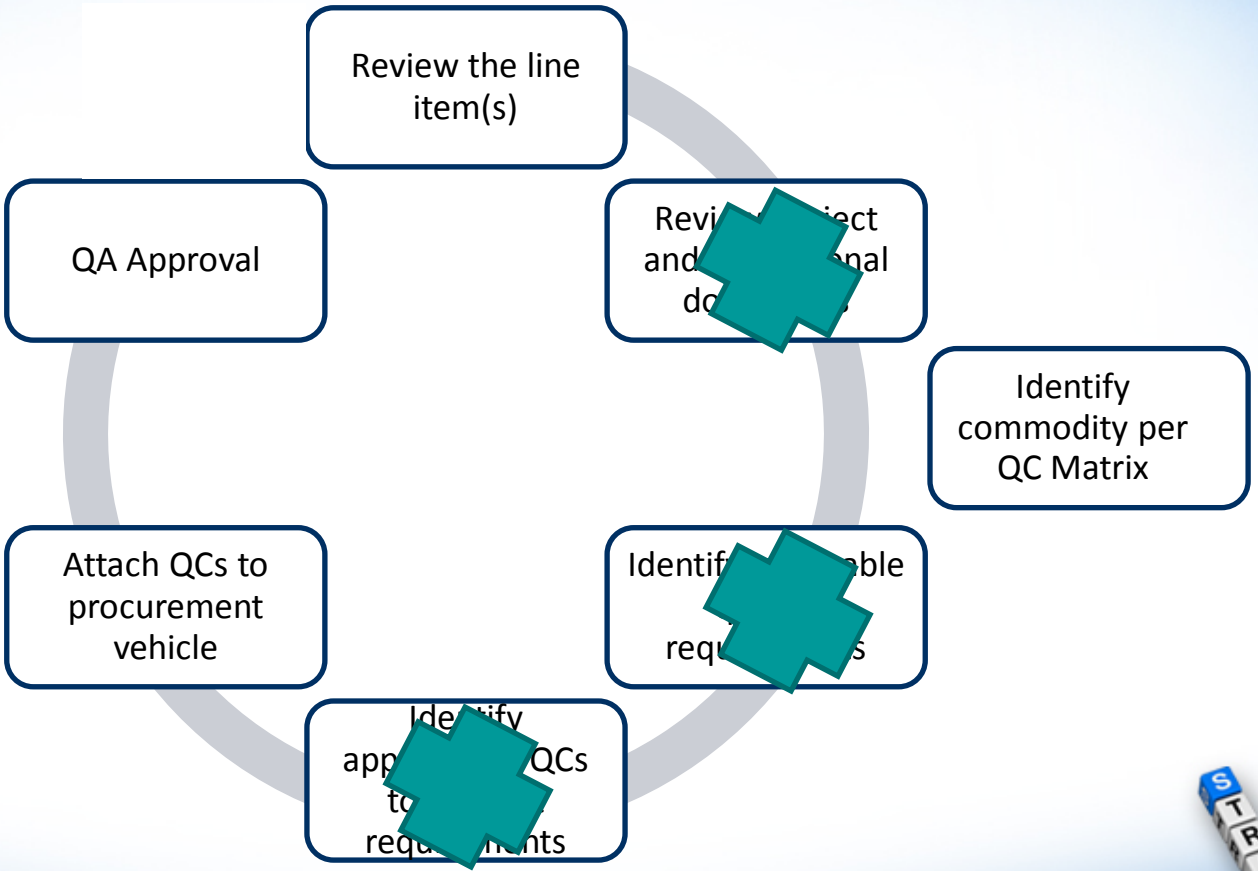
NOTE: Typical PQA PR review for projects not having a Quality Clause Requirements Document

Quality Clause Requirements Document (QCRD)

- Purpose
  - Capture all quality requirements into one document
- Benefits
  - QA
    - Provides a guideline to flow down project requirements
    - Clausing consistency of flowing down the appropriate QC requirements
  - Project
    - Increases procurement efficiency
      - Pre-identify procuring commodities and their associated quality requirements
      - Increases project awareness of quality requirements prior to start of procurement
      - Decreases time for procurement QC placement
  - Risk mitigation
    - Ensures quality assurance standards are flowed down.

PQA Procurement Flow Diagram

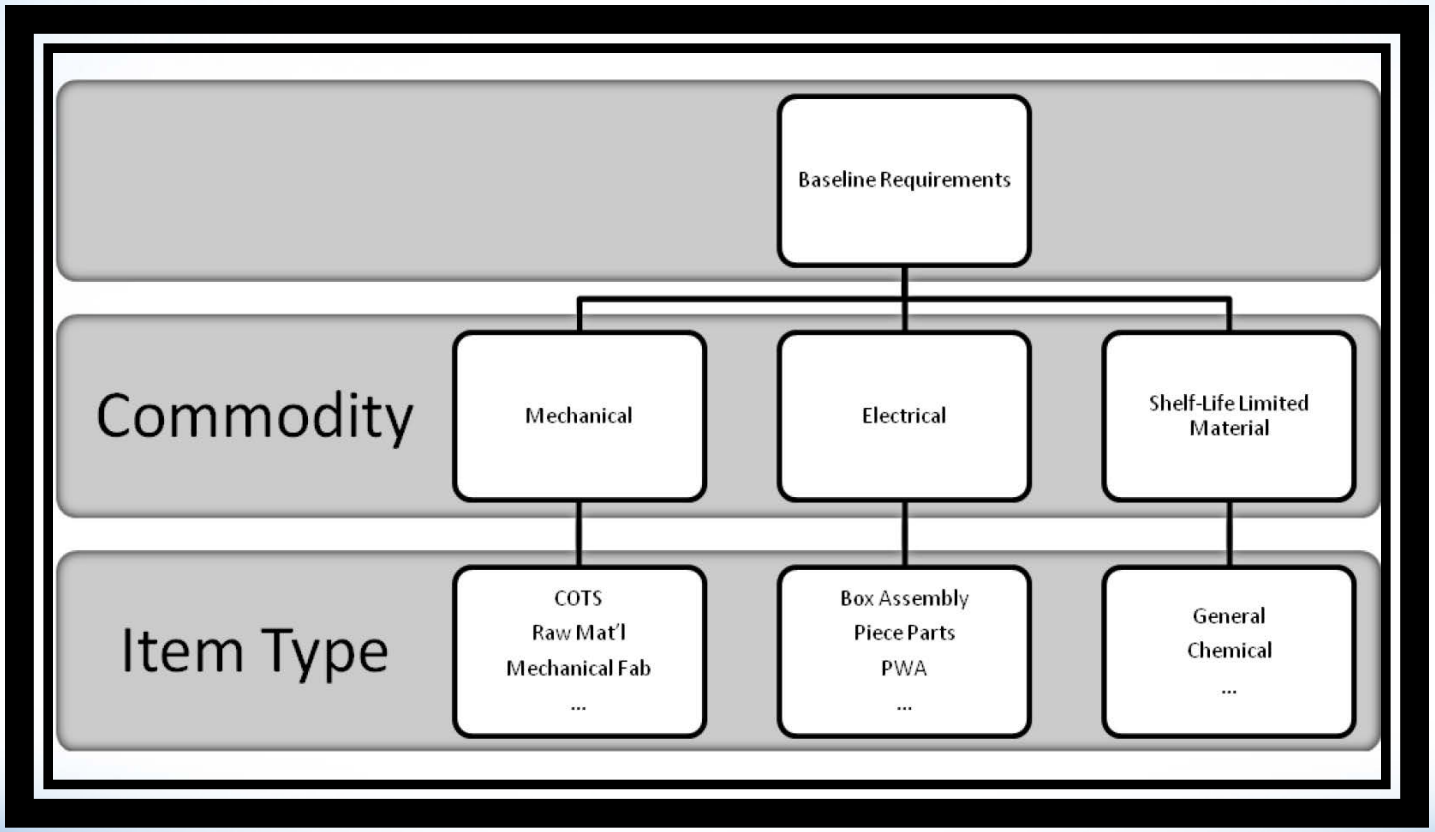
Plan Quality



NOTE: Typical PQA PR review for projects having a Quality Clause Requirements Document

QC Matrix Guidance

Plan Quality



Typical Quality Clauses – All JCI Procurements

Only the Quality Clause (QC) title is provided, the complete description of the QC can be found at http://qa.jpl.nasa.gov/PQA/external, or click on the title (hyperlinked to the QC).

Quality Clause	Description	Requirement Intent
QAC01a	Quality Preamble	It requires the contractor to adhere to all quality clauses that have been imposed on the purchased order. JPL has the right to perform inspection to verify compliance and acceptance.
QC01-N	Material Identification, Damage & Count	Prohibits material or process substitutions, quantity variations, or splits from the purchase order and that each delivered article will have positive identification with the part number ordered.
QC02c	Certificate of Compliance (C of C)	A signed Certificate of Compliance allows for a traceability and verification of contract compliance to JPL requirements.
QC34-N	Packaging Requirements	Contractor is required to take all necessary precautions to preclude damage to hardware. Procurements shall be packaged properly so as to prevent damage until delivered to the intended destination.
QC113	Quality Management System (QMS) Requirement	Contractor to be certified to an accepted Quality Management System (QMS).

Typical Quality Clauses – Mechanical

In addition to the quality clauses as specified for "ALL JCI PROCUREMENTS", the following quality clauses are imposed for mechanical commodities.

Quality Clause	Description	Requirement Intent
QC06b	Raw Material Traceability	All materials used for the build require material test reports and certifications indicating that materials being provided are in compliance with the requirements of the procurement documents.
QC39a	Nonconformance Reporting	Contractor to report (document [per Form 7178 (Supplier Non-Conformance Reporting)] and notify JPL), prior to shipment, of any known nonconformance (deviation of procurement vehicle) of hardware.
QC41c	Limited Material Review Board (MRB) Authority Granted	Contractor is granted limited MRB authority and is required to include JPL for specific MRB dispositions. Contractor is authorized to perform rework to meet JPL contractual requirements. Additionally, it requires the contractor to submit all MRB proceedings to JPL for concurrence on use-as-is, repair, and scrap (JPL supplied material or impacts delivery commitment) dispositions.

Typical Quality Clauses – Electrical

In addition to the quality clauses as specified for "ALL JCI PROCUREMENTS", the following quality clauses are imposed for electronic commodities.

Quality Clause	Description	Requirement Intent
QC35a-N	Electrostatic Discharge (ESD) Control Program	Contractor shall properly handle and package ESD-sensitive items per industry standard, ESD protocols.
QC63	Right of Access	Contractor to provide JPL with the right to perform surveillance/inspection at contractor site during contract on pre-negotiated conditions.
QC105c	Prohibited Materials	Contractor shall not supply material as detailed in the QC. Furthermore, Contractor shall provide material information with delivery.
QC106	Electrical, Electronic, And Electromechanical (EEE) Part Traceability	Contractor shall provide traceability certification to the Original Component Manufacturer (OCM) [e.g. the OCM C of C].

Typical Quality Clauses – Shelf-Life Limited

In addition to the quality clauses as specified for "ALL JCI PROCUREMENTS", the following quality clauses are imposed for shelf-life limited commodities.

Quality Clause	Description	Requirement Intent
QC12a-N	Limited Life and Age Controlled (Shelf Life) Items	Contractor shall provide material that has a remaining shelf-life of at least 75% upon shipment. Additionally, Contractor shall provide shelf life information: •Date of manufacture, if shelf life is based on date of manufacture •Date of shipment from manufacturer, if shelf life is based on date of shipment •Date of expiration
QC43	Chemical and Material Safety Data Sheet (MSDS)	Contractor shall provide the MSDS of each material with shipment.
QC69-N	Packaging, Handling & Labeling	Contractor is required to take all necessary precautions to preclude damage to hardware. Procurements shall be packaged properly so as to prevent damage until delivered to the intended destination.

Verify
Supplier Quality Requirements

- Audits
- ASL
- Supplier Search

- Quality Clauses
- Rec. Insp. Plans
- Source Insp. Plans

- Source Inspection
- Receiving Inspection

- Supplier Rating System
- Corrective Action & Training
- Performance Information
- Supplier Quality Board
- PQA Supplier Awards

Scope

- PQA controls are applied to the … Items (JCI)
- Procurement JCI is defined as:
  - Flight Hardware
  - Research and Development or Prototype with Flight potential
  - DSN JCI

Inspections

- Source Inspection
  - Source Inspector/QAE conducts source inspection when called out on contract (Q-Clause QC-46A)
  - Performed using MIP QAI, Drawing/Specification, Source Inspection Plan, project requirements, etc.
  - Inspection results documented on IR and certifications and SIP attached
  - Guidance: Source Inspection should be performed when a characteristic cannot be verified during final inspection or it makes business sense to inspect at the suppliers facility

Inspections

- Receiving Inspection
  - All JCI/Flight goes through Receiving Inspection
  - The requisition writer will receive an email when the item hits the dock (see following page) – Priority can be requested through the email
  - Jobs logged into Inspection Queue
    - Tracks jobs, provides status, prioritizes and feeds metrics
      - Cycle Time, Backlog, and Aging tracked
      - *Real Time inspection queue provided to customers on PQA web site (Type PQA in browser)*
  - Receiving Inspector performs receiving inspection
    - Inspection performed using Receiving Inspection Plan, Contract Requirements, Drawings, Specifications, etc.
    - Inspection results are captured on an Inspection Report

Inspections

Verify Quality

NASA | CALTECH | JPL | JPL SPACE | DAILY PLANET | QA | NBS | ASL

5128 INSPECTION
FOR ALL YOUR INSPECTION NEEDS

Home | Inspection Queues | Electronic | Mechanical | Receiving | Resources | Metrics | About

Username: Password: Log In

Available Queues | Building 103 | Building 170 | Building 241

Items to Show: Open Items | Closed

Building 170: MECHANICAL Open Items

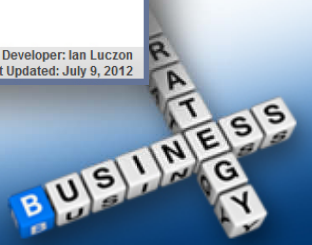
Show / hide columns

Filter Queue:

Showing 1 to 6 of 6 entries

Priority	Receive_Date	Days Old	SO #	Job #	Part_Number	Qty	OP #	Nomenclature	Project	Comments	Requester	Inspector	ME	PO	Line	Supplier	(FIFO) Est Completion Date	Location	Complexity	Sampling
FIFO	07-12-2012	4		166769.006	10328355-1RW1	6	70	SS2 COVER, DOWNCONVERTER CONTINUATION FROM LAST CHARGE NUMBER	SMAP PHASE CD IMPLEMENTATION (105138)	IN PROCESS INSPECTION-CHEM FILM					1		07-13-2012	JPL-170		
FIFO	07-12-2012	4	130001	165650.027	10330220-1	30	50	WEIGHT, TRIM	HRDF - Phaeton (PEIN05)	PLEASE WEIGH EACH PART ONLY.. NO DIMENSIONAL INSPECTION REQUIRED							07-12-2012	JPL-170		
FIFO	07-16-2012	0	130020	166781.003	10311130-1-RW1	1	100	LAUNCH VEHICLE ADAPTER (LVA)	SMAP PHASE CD IMPLEMENTATION (105138)								07-18-2012	JPL-170		
FIFO	07-16-2012	0		166788.005	10330779-2	50	40	SCREW|MICRO D CONN MTG|W/BKSHL	SMAP PHASE CD IMPLEMENTATION (105138)	100% INSPECTION							07-17-2012	JPL-170		
FIFO	07-16-2012	0		166771.002	10346808-1RW1	1	70	CHASSIS, TORQUE DRIVE ELECTRONICS CONTINUED FROM LAST CHARGE NUMBER	SMAP PHASE CD IMPLEMENTATION (105138)								07-17-2012	JPL-170		
FIFO	07-16-2012	0		166772.002	10256307-1RW1	1	70	BOTTOM COVER, RCE CHASSIS, FM CONTINUED FROM LAST CHARGE NUMBER	SMAP PHASE CD IMPLEMENTATION (105138)								07-17-2012	JPL-170		

Website Developer: Ian Luczon
Last Updated: July 9, 2012



Counterfeit Parts Avoidance / Detection / Reporting Process

- Procure from Original Component Manufacturers and/or Authorized Distributors when possible
- Include a handful of trusted Independent Distributors on the Approved Supplier List
  - Trusted = supplier visit/audit and/or successful procurement history with JPL
- Receiving Inspection
  - All personnel have Counterfeit Parts Awareness Training
  - Dedicated Inspection Plan for goods procured from Independent Distributors or items that are suspect counterfeit

Counterfeit Parts Avoidance / Detection / Reporting Process

- Receiving Inspection (continued)
  - Use of Nondestructive Test Equipment
    - X-ray fluorescence equipment
    - DTEK system
- Reporting Process
  - GIDEP Alert System
  - JPL GIDEP Representative is also co-instructor for JPL Counterfeit Parts Awareness training class

Evaluate & Improve

Supplier Performance

Evaluate & Improve Supplier Base

- Supplier Rating System
- Corrective Action & Training
- Performance Information
- Supplier Quality Board
- PQA Supplier Awards

Scope

- PQA controls are applied to the purchase of JPL Cr
- Procurement JCI is defined as:
  - Flight Hardware
  - Research and Development or Prototype with Flight p
  - DSN JCI

Supplier Rating

Evaluate & Improve Supplier Base

- All Supplier-Related Inspection Reports are flowed into the Supplier Corrective Action System and the Approved Supplier List
  - Inspection Report information on the Approved Supplier List forms one part of the overall supplier rating (Part Quality)
  - Inspection Report data and link are available in the Approved Supplier List for engineers to be able to view past history with the supplier

Supplier Rating

Evaluate & Improve Supplier Base

- A Suppliers overall rating has no number associated with the top level rating. A supplier will be Green, Yellow, or Red
  - The rating is an average of 5 Sub-Ratings
    - Part Quality Rating (Red: 0-64%, Yellow: 65-84%, Green: 85%+)
    - CA Grade (Red: F, Yellow: D-C, Green: B-A)
    - Customer Feedback (Red: 1-2 Stars, Yellow: 3 Stars, Green: 4-5 Stars)
    - Inspector Feedback (Red: 1-2 Stars, Yellow: 3 Stars, Green: 4-5 Stars)
    - Auditor Feedback (Red: 1-2 Stars, Yellow: 3 Stars, Green: 4-5 Stars)

Supplier Rating

Evaluate & Improve Supplier Base

- Each of the sub-ratings will provide a green, yellow, or red grade and will be scored like this:
  - Green : 3
  - Yellow: 2
  - Red: 1

Sub-Rating	Grade
Part Quality	1
CA Grade	2
Customer Feedback	3
Inspector Feedback	3
Auditor Feedback	3

- These scores will be averaged up to create the overall Quality Rating. In this case the average is (1+2+3+3+3)/5 = 2.4
  - If there is no score for one of the sub-ratings it is simply not counted for the rating

Supplier Rating

Evaluate & Improve Supplier Base

- The Overall Quality Rating will be given a color depending on the average score:

Supplier Rating

Evaluate & Improve Supplier Base

Supplier A

Sub-Rating	Grade
Part Quality	1
CA Grade	3
Customer Feedback	
Inspector Feedback	2
Auditor Feedback	

Supplier B

Sub-Rating	Grade
Part Quality	1
CA Grade	
Customer Feedback	3
Inspector Feedback	2
Auditor Feedback	3

Supplier C

Sub-Rating	Grade
Part Quality	3
CA Grade	3
Customer Feedback	
Inspector Feedback	2
Auditor Feedback	1

Supplier D

Sub-Rating	Grade
Part Quality	3
CA Grade	
Customer Feedback	3
Inspector Feedback	2
Auditor Feedback	

Supplier Rating

Evaluate & Improve Supplier Base

- Red Supplier Review
  - Our ASL and Supplier Rating System automatically bring red rated suppliers to our attention via the Red Supplier Review Report
    - This report tracks all red suppliers and shows the subset of suppliers who have had additional data added since the last review
    - The report allows us to maintain the supplier based on improvements or send the supplier to the Supplier Quality Board for further evaluation
  - All actions are documented and available on the ASL for future review and to help in action determination

Supplier Corrective Action

Evaluate & Improve Supplier Base

- All supplier-related nonconformances are filtered into the Supplier Corrective Action System
  - 3 options: Supplier Information Notice, Supplier Corrective Action Request, or No Action
  - Meetings are held twice a week to determine the appropriate action
  - Subject Matter Experts (SME) are frequently asked to attend the meeting or to provide feedback prior to decisions being made
  - Decisions are based on: SME input, impact/severity, cost, reoccurrence, complexity, and frequency of business

Supplier Corrective Action

Evaluate & Improve Supplier Base

JPL SUPPLIER CORRECTIVE ACTION REQUEST

SCAR No: JPL-SCAR-2012-100	**IR No:**
Supplier:	**Reference Contract No:**
Date Corrective Action Sent: 01/09/2012	**Sent To:**
Date Corrective Action Due: 02/09/2012	
Supplier Quantity Rejected: 3	

NONCONFORMANCE		
Zone:	**Serial No:** 19415A001, 19415A002, 19415A003	**Part No:** 500-21298-03

Description:
REQUIREMENT: Acceptance of parts is contingent upon review and acceptance of all required test data by part specialist.

CONDITION: Part specialist has not reviewed test data.

Disposition: RTV-Return to Vendor

JPL COMMENTS

Corrective Action is requested by JPL in order to prevent future occurrences. Please respond with the root cause, corrective action and objective evidence by the due date indicated at the top of the form.

Corrective Actions that have not been responded to by the due date shall be closed out and a failure to respond will be noted on the supplier's scorecard in the JPL approved supplier list (ASL) database. The Supplier responses shall be ranked from a thru per the table below.

The response ratings will be visible in the JPL ASL and used in evaluation overall supplier performance. The evaluations may be reviewed during the monthly supplier quality board (SQB) meetings.

Criteria	Corrective Action Grade				
	A	B	C	D	F
1. Corrective Action Submitted	x	x	x	x	x
2. Addresses Root Cause and any immediate causes	x	x	x	x	
3. Objective evidence submitted (Training logs, updated planning, etc.)	x	x	x		
4. Processes evaluated and any systemic issues addressed	x	x			
5. Assessment made to determine if similar issues exist on delivered or in process jobs and JPL notified.	x				

JPL SUPPLIER CORRECTIVE ACTION REQUEST

SCAR No: JPL-SCAR-2012-100	**Supplier:**

IMMEDIATE ACTION TAKEN TO ADDRESS NONCONFORMANCE

ROOT CAUSE OF NONCONFORMANCE

CORRECTIVE ACTION TAKEN TO PREVENT THE RECURRENCE OF NONCONFORMANCE

SIGNATURE OF SUPPLIER PERSONNEL VERIFYING COMPLETION OF ABOVE ACTION IS REQUIRED. ANY FORMS RECEIVED BY JPL WITHOUT SIGNATURE WILL BE RETURNED TO THE SUPPLIER FOR THE REQUIRED SIGNATURE.

Signature:	Title:	Date:

THE FOLLOWING FIELDS MUST BE COMPLETED BY THE JPL PQA REPRESENTATIVE

Supplier Response Grade:

Reason For Grade:

Supplier Corrective Action

Evaluate & Improve Supplier Base

- Supplier are sent Corrective Actions via e-mail
  - PQA follows up with the supplier after a few days in order to verify that they received the Corrective Action and that the supplier understands the nonconformance
- Suppliers have 30 days to respond
  - Additional time can be given upon request
- Responses are reviewed by PQA and graded according to the following chart:

Criteria	Corrective Action Grade				
	A	B	C	D	F
1. Corrective Action Submitted	x	x	x	x	x
2. Addresses Root Cause and any immediate causes	x	x	x	x	
3. Objective evidence submitted (Training logs, updated planning, etc.)	x	x	x		
4. Processes evaluated and any systemic issues addressed	x	x			
5. Assessment made to determine if similar issues exist on delivered or in process jobs and JPL notified.	x				

Supplier Development

Evaluate & Improve Supplier Base

- Partnering With Supplier (PaWS)
  - New Suppliers will be contacted by the Clauser in order to ensure they understand the clauses
  - New clauses are sent out to our supplier base to familiarize them with the new requirements
  - PQA performs Process Audits to help suppliers find deficiencies in their systems
  - Corrective Action Training
- When companies get in trouble, we generally have the technical expertise available to correct the situation
  - JPL has specialists that can quickly form tiger teams to quickly solve issues

Supplier Development

- Supplier Trust and Recognition Awards
  - Given to recognize suppliers who have exceeded expectations or performed well over an extended period of time
  - Nominations are taken from anyone at JPL
  - Nominations are vetted and ranked by the Supplier Quality Board

Challenges

- Maintaining the Number of Suppliers
- Maintaining Management buy-in of continuous process improvements and tool improvement
- Funding
  - The way that we are funded
  - Single-point failures