

506-CD-500-001

EOSDIS Core System Project

Configuration Audits of the Science Data Processing Segment, Release 5A for the ECS Project

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February 2000

Raytheon Systems Corporation
Upper Marlboro, Maryland

Configuration Audits of the Science Data Processing Segment, Release 5A for the ECS Project

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Preface

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Abstract

This report is a documented account of configuration audits conducted on the Science Data Processing Segment, Release 5A during the period from July 12, 1998 through December 23, 1999.

The report includes:

- Planning process
- Conduct of configuration audits
 - Results of the Physical Configuration Audits (PCA) and the Functional Configuration Audit (FCA)
- Lessons learned from these audits

Keywords: Acceptance Test, Certification, Configuration audits, FCA, Functional Configuration Audit, PCA, Physical Configuration Audit, SRA, Site Readiness Assessment, Status Accounting

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Appendix A. Finding Form Process

Appendix B. COTS Software NCRs

Appendix C. OS Patches NCRs

Appendix D. Custom Software NCRs

Abbreviations and Acronyms

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1. Introduction

1.1 Identification

This Audit Report Document, Contract Data Requirements List (CDRL) Item 081, whose requirements are specified in Data Item Description (DID) 506/PA3, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract (NAS 5-60000).

1.2 Scope

This document describes the Audit Report results from the accomplishment of:

- ↑ Physical Configuration Audits (PCA) of the Science Data Processing Segment (SDPS), Release 5A.
- ↑ Functional Configuration Audit (FCA) of the Science Data Processing Segment (SDPS), Release 5A.

Collectively these audits will be referred to as the Release 5A configuration audits.

The audit period was from July 12, 1999 [initiation of commercial off-the-shelf (COTS) and operating system (OS) PCA] until December 23, 1999.

1.3 Objectives

Objectives of the configuration audits were as follows:

- ↑ Assure that the physical configuration of the software at each site conforms to the ECS Product Baseline for that site.
- ↑ Verify that the Science Data Processing Segment, Release 5A, as installed and tested at each site complies with the ECS Feature Group criteria contained in the ECS Product Baseline.
- ↑ Certify that software configurations audited were configured in accordance with the Product Baseline.

1.4 Purpose

This document provides the account of configuration audits conducted on the Science Data Processing Segment, Release 5A configuration during the reporting period.

1.5 Status and Schedule

This is a final report and is submitted in accordance with the requirement that it be released not later than 30 days after Site Readiness Assessment (SRA). The SRA schedule for the DAACs follows:

DAAC	SRA Held
GSFC	9/30/99
LaRC	10/7/99
NSIDC	10/21/99
EDC	11/04/99

1.6 Organization

This report is organized as follows:

Section 1 identifies the source requirement for this report, defines the scope, establishes the purpose, and provides the schedule for delivery.

Section 2 lists parent, applicable, and reference documents for this report.

Section 3 sets forth plans for the audits and the schedule as contained in the Audit Plan.

Section 4 describes how the audits were conducted; to include revised schedules followed. Appendices are provided to provide backup information.

Section 5 provides results of the audits.

Section 6 summarizes lessons learned from the audits.

2. Related Documentation

2.1 Parent Document

GSFC 423-41-01, Goddard Space Flight Center, ECS Core System Statement of Work

2.2 Applicable Documents

ECS Product Baseline technical documentation, to include:

2.2.1 General Baseline

COTS	5A - COTS Software Version Baseline	910-TDA-003-Rev17
All	Site-Host Map	910-TDA-005-Rev07

2.2.2 O/S and COTS Patch Baselines

OS	HP-UX Series 700 O/S Patches	911-TDA-001-Rev02
OS	HP-UX Series 800 O/S Patches	911-TDA-002-Rev01
OS	SGI IRIX6.2 O/S Patches	911-TDA-004-Rev05
OS	SUN Solaris 2.5.1 O/S Patches	911-TDA-007-Rev02
OS	Clearcase COTS Patches	911-TDA-008-Rev00

2.2.3 Site Specific Baselines

COTS	XRP HW/SW MAPS 5A Baseline	920-TDN-002Rev08
COTS	XRP HW/SW MAPS 5A Baseline	920-TDE-002Rev11
COTS	XRP HW/SW MAPS 4PY Baseline	920-TDG-002Rev10
COTS	XRP HW/SW MAPS 4PY Baseline	920-TDL-002Rev09

2.2.4 Drop 5A Test Tickets

Feature Acceptance Tickets as they appear in the ECSVDB are available for download from the ECS Verification Website.

External URL: <http://ecsv.gsfc.nasa.gov/>

Internal URL: http://dmserver.gsfc.nasa.gov/relb_it/relbit.htm

2.2.5 Custom Code

Custom	Version 2 Drop 5A.03 Release for the ECS Project	914-TDA-119
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Custom	Build Plan for Version 2.0 Drop 5A Iteration	External URL: http://cmdm.east.hitc.com/baseline/
		Internal URL: http://pete.hitc.com/baseline/
Custom	Version 2 Drop 5A (Gamma) Patch Release for the ECS Project	914-TDA-107
Custom	Version 2 Release 5A.00 Version Description Document (VDD) for the ECS Project	814-RD-502-001

2.2.6 Test Documentation

All	ECS System Test Report for Release 4	412-CD-110-001
FCA	Acceptance Test and System Verification Procedures	
FCA	Acceptance Test Results in Electronic Criteria Logs and Verification Data Base (VDB)	
FCA	NCR Status from DDTS, the NCR database	

2.3 Reference Documents

Design specification(s) (e.g., DID 305, Segment/Design Specifications)
 Nonconformance reports
 Results of release verification testing (e.g., tailored listings from test database)

2.4 Information Documents

MIL STD 973 Configuration Management, dated 17 April 1992

3. Audit Process

Configuration audits for SDPS, Release 5A, were conducted during the period July 12, 1999 (initiation of COTS software PCA) through December 23, 1999. This process will be complete upon closure of all non-conformance reports (NCRs) and certification by ECS and ESDIS team members.

Configuration audits were conducted in two distinct phases:

COTS Software, OS Patches, and Custom Code Physical Configuration Audits. These audits were conducted at EDC, GSFC, LaRC, and NSIDC beginning on July 13, 1999 (kickoff meeting at Landover).

Functional Configuration Audits. These were conducted on Release 5A at the Landover site. The FCA process began on June 9, 1999 with the kickoff meeting at Landover.

3.1 COTS Software, OS Patches, and Custom Code Physical Configuration Audits

3.1.1 General

While the commercial off-the-shelf (COTS) software, operating system (OS) patch, and custom code PCA were conducted concurrently, the respective audit concept, team objectives, technical data package, milestones, and membership varied between audits to a considerable degree.

3.1.2 Concept

Initial planning for the SDPS, Release 5A PCA was conducted in the summer of 1999. The concept remained the same for the 5A PCA as presented during the Release 4PX/4PY PCA. The plan called for splitting the software PCA into three parts (COTS software and shareware, OS patches, and custom code), identified the needed audit team composition, and announced that CMO would lead the PCA, supported by QO, while QO would manage the FCA, supported by CMO. Audit teams were formed, procedures were developed, and appropriate baseline documents were identified and reviewed by the audit team.

Three “sets” of audits were required for each of the sites to which Release 5A was to be installed.

Note: Release 5A COTS/OS software audits were not performed for GSFC, EDC, and LaRC. Release 4PX/4PY Software audits were conducted at these sites less than one month prior to the start of the 5A PCA.

Refer to *Configuration Audits of the Science Data Processing Segment, Release 4, for the ECS Project* (506-CD-100-001) for results of that audit.

Below was the schedule of the audits conducted:

Site	COTS/OS	Custom
EDC	N/A	01Dec99
GSFC	N/A	28Sep99
LaRC	N/A	06Oct99
NSIDC	13Jul99	22Nov99

These audits were conducted at Landover utilizing Unix command scripts querying each system in baseline. These interrogation scripts had been developed by CMO over a period of two years. The process is shown schematically in Figure 3-1.

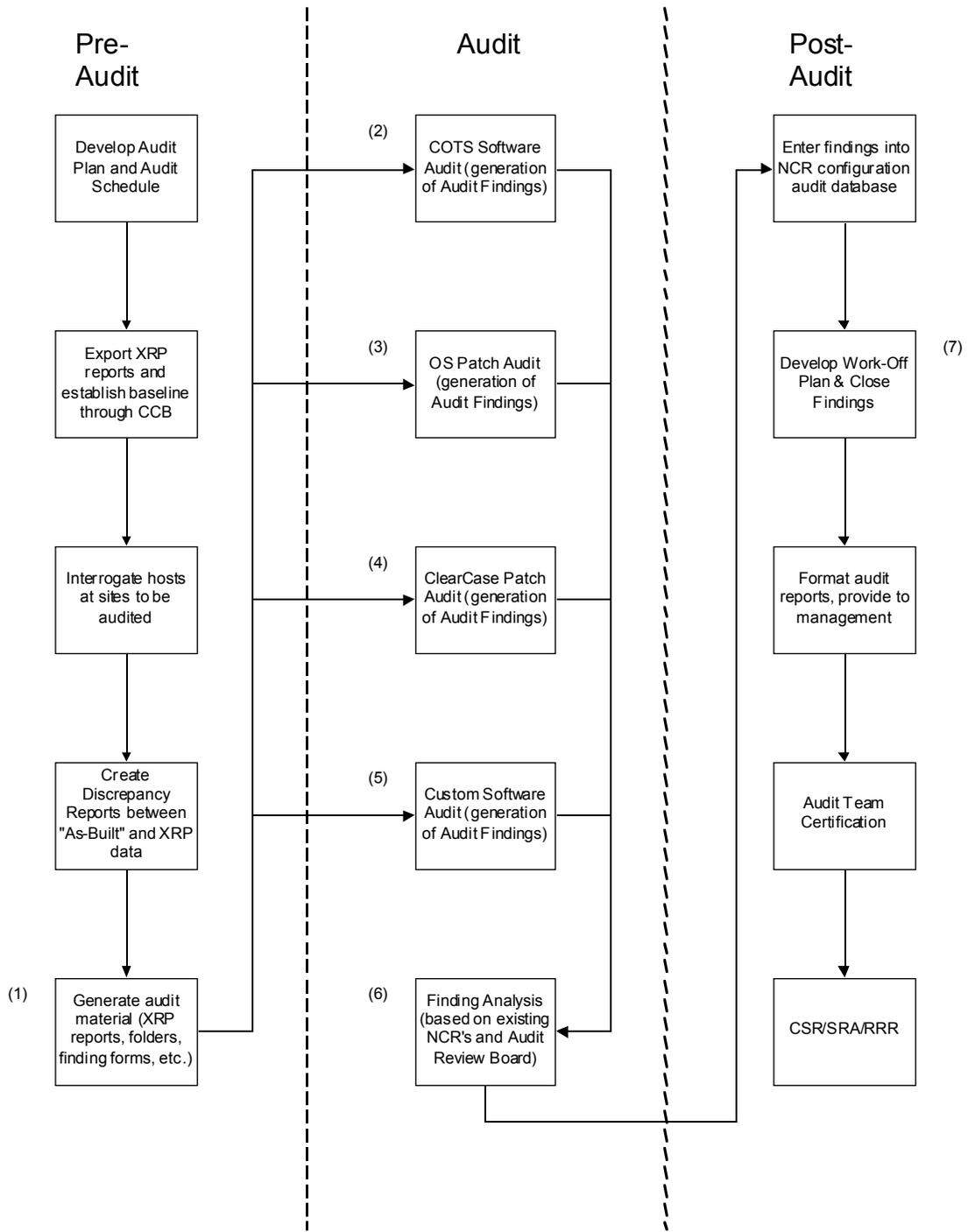


Figure 3-1. Software PCA Process Flowchart

3.1.3 Team Objectives

During each audit PCA team members were responsible to assure that the configuration audited was in accordance with Product Baseline and that all documentation of audit findings had been incorporated into the appropriate NCR.

3.2 COTS Software Configuration Audits

3.2.1 Activity

Once formed the audit team assembled baseline documentation, developed a process for conducting their audit (tailored from the Configuration Audit PI), worked with NSIDC DAAC to interrogate hosts on a non-interference basis and generated difference reports.

COTS Software Audit folder(s) comprised of:

- XRP Baseline Information
 - Site Hardware-Software Maps (920-TDx-002) used during interrogation
 - COTS Software Version Baseline Report (910-TDA-003) used during interrogation
- Current version of COTS Discrepancy reports for the site
 - Synopsis of COTS Discrepancy report
 - Complete output of Diff Scripts
- Audit finding COTS/OS software worksheet
- Existing NCR listing from appropriate DDTS database

3.2.2 Technical Data Package

See Applicable documents identified as “COTS”.

3.2.3 Milestones

These milestones were not applicable to GSFC, LaRC, and EDC DAACs.

Activity	NSIDC DAAC
Initiation of Activity	7/13/99
Interrogation	6/19/99
Audit Team Activity	7/13-8/17/99
ESDIS Certification	Pending

3.2.4 Team Members

Audit team members changed based upon availability during the performance of audits. Membership included representatives from CMO, SED, QO, site representatives, and ESDIS QA.

3.3 OS Patches Physical Configuration Audits

3.3.1 Activity

Once formed this audit team assembled baseline documentation, developed a process for conducting the audit (tailored from the Configuration Audit PI), worked with each site to interrogate hosts on a non-interference basis, generated difference reports.

OS and ClearCase Patch Audit Folder comprised of:

- XRP Baseline Information
 - HP-UX, Series 700 Patch List (911-TDA-001)
 - HP-UX, Series 800 Patch List (911-TDA-002)
 - SGI IRIX Patch List (911-TDA-004)
 - Sun Solaris Patch List (911-TDA-007)
 - ClearCase Patch Baseline (911-TDA-008)
- OS Patch (HP, SGI, and Sun platforms) Discrepancy reports (*Note:* ClearCase Patch discrepancies are located within the COTS Discrepancy reports)
 - Synopsis of COTS Discrepancy report
 - Complete output of Diff Scripts
- Audit finding COTS/OS software worksheet for OS patches (HP, SGI, and Sun platforms) and ClearCase patches
- Existing NCR listing from appropriate DDTS database

3.3.2 Technical Data Package

See Section 2.2, Applicable Documents identified as “OS”.

3.3.3 Milestones

These milestones were not applicable to GSFC, LaRC, and EDC DAACs.

Activity	NSIDC
Initiation of Activity	7/13/99
Interrogation	6/19/99
Audit Team Activity	7/13-8/17/99
ESDIS Certification	Pending

3.3.4 Team Members

During conduct of the audits team members changed based upon availability. Membership included representatives from CMO, SED, QO, site representatives, and ESDIS QA.

3.4 Custom Code Configuration Audits

3.4.1 Activity

Once formed this audit team assembled baseline documentation, developed a process for conducting their audit (tailored from the Configuration Audit PI), worked with each site to interrogate hosts on a non-interference basis and generated difference reports.

3.4.2 Technical Data Package

See Section 2.2, Applicable Documents identified as “Custom”.

3.4.3 Milestones

Activity	EDC	GSFC	LaRC	NSIDC
Initiation of Activity	12/01/99	9/28/99	10/06/99	11/22/99
Interrogation	10/24/99	9/06/99	9/29/99	11/12/99
Audit Team Activity	12/01-12/15/99	9/28-10/4/99	10/6-10/11/99	11/22-12/09/99
ESDIS Certification	Pending	Pending	Pending	Pending

3.4.4 Team Members

During conduct of the audits team members changed based upon availability. Membership included representatives from CMO, SED, QO, site representatives, and ESDIS QA.

3.5 Functional Configuration Audits

3.5.1 Objectives

FCA sought to confirm that the ECS verification status is correct, traceable, and substantiated by original test records and artifacts.

Feature Criteria is properly mapped from test procedures to baseline tickets and ultimately to the VDB.

NCRs created during test execution are properly accounted for in DDTS (the NCR database).

Test completion status as recorded on the Test Execution form is correct and substantiated by test records and artifacts.

3.5.2 Scope

CSR related activities performed:

- 42 additional Drop 5A FC and EC test folders from the VATC were audited.

- No End-to-End (ETE) tests on ECS Verification Reports were audited.
- The VDB was reconciled with test records and ticket criteria.

3.5.3 Process

Joint ECS and ESDIS audit teams reviewed test folders, original artifacts, reports; and recorded findings. These were traced from original site test records through interim reports to the VDB.

3.5.4 Activity

Once formed this audit team assembled baseline documentation, coordinated activity with test personnel to assure availability of latest information, developed a process for conducting their audit (tailored from the Configuration Audit PI), assembled folders, and broke into sub-teams but used detailed procedures and close coordination to assure conformity.

Specific activity included assuring that test cases were mapped to Feature Group/Tickets auditing test results to confirm Feature Criteria verification status, reviewing open NCRs to confirm status, and verifying that NCR bookkeeping was current and complete.

3.5.5 Technical Data Package

Available on SVAT and VDB web sites.

3.5.6 Milestones

Initiation of Activity	6/9/99
Audit Team Activity	6/9/99 - 7/21/99
ESDIS Certification	Pending

3.5.7 Team Members

During conduct of the audits team members changed based upon availability. Membership included representatives from QO, CMO, and ESDIS (QA, IV&V).

3.6 Audit Procedures

Conducted IAW PI CM-1-009, Configuration Audits

3.7 Presentation of Results

Results presented in CSR Review.

3.7.1 Consent to Ship Review

On July 21, 1999 ECS provided a final summary review of the Science System Release 5A status to support the AM-1 launch and early operations at EDC, GSFC, and LaRC.

This report utilizes information used to support the final Release 5A CSR.

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4. Conduct of Audits

4.1 COTS Software Configuration Audits

4.1.1 Folders

COTS Software Audit folders were developed by team leaders and assigned to individual teams. Folders contained the XRP Baseline data (Hardware-Software Map, COTS Software Version Baseline Report, and COTS Discrepancy Reports) necessary to conduct the audit.

4.1.2 Procedures

Sub-teams performed a preliminary check of the Hardware-Software Maps to the COTS Discrepancy report to ensure that all COTS software is represented. Once complete they proceeded with a line-by-line inspection of the discrepancy report. See "Completing a COTS Software or ClearCase Patch PCA Finding Form" at Appendix A for additional guidelines.

Non-conformances were recorded on the finding form. When appropriate, auto-mounted COTS were identified. Finding forms were unique by COTS software. However, multiple hosts could be listed on a single finding form.

4.1.3 Non-compliance

Non-conformances were recorded as follows:

- Problem Code "**BWP**" - BL COTS Software installed in wrong path - list path found
- ↑ Problem Code "**BWV**" - BL COTS Software installed with wrong version - list version found
- Problem Code "**NBI**" - Non-BL COTS Software installed on host - list path and version
- ↑ Problem Code "**MI**" - COTS Software found at multiple locations on host - list path(s) and versions(s)
- Problem Code "**BNF**" - BL COTS Software not found on host

It was recognized that certain non-conformance problem code combinations could exist on one finding form: BWP & BWV, BWP & MI, BWV & MI, NBI & MI, or BWP, BWV, & MI.

4.1.4 Records

When a folder was completed, the team sorted all finding forms by the COTS Software name, then by the problem codes (i.e., BWP, BWV, NBI, MI, BNF, BWP/BWV, BWP/MI, BWV/MI, NBI/MI, BWP/BWV/MI), and finally by the first host circled on the form (A-Z). The forms were sequentially numbered and recorded by the auditors' end time on the time sheet contained in that

folder. Completed folders were entered into a database for detailed accounting. The process is shown schematically in Figure A-1.

4.2 OS Patches Physical Configuration Audit

OS Patch Discrepancy reports were organized into HP, SGI, and Sun Platforms. (ClearCase and DCE patches were assessed concurrently with OS patches. Procedures were similar.

4.2.1 Folders

OS Patch folders were developed by team leaders and assigned to individual teams. Folders contained the Baseline data for the applicable host.

4.2.2 Procedures

Sub-teams performed a preliminary check of their folder to ensure all necessary documents were present. Once complete they proceeded with a line-by-line inspection of the discrepancy report. See Appendix A, "Completing a COTS Software or ClearCase Patch PCA Finding Form" for guidelines used by auditors.

4.2.3 Non-compliance

Non-conformances were recorded on the finding forms as follows:

- Problem Code "**BNF**" - BL patch not found on host (field will be "Red")
- Problem Code "**NBI**" - Non-BL patch installed on host (field will be "Gray")

Anomalies were also recorded:

- Problem Code "**A**" - Required, reported as "Gray"
- Problem Code "**B**" - Not required, reported as "Green"
- Problem Code "**C**" - Not required, reported as "Red"
- Problem Code "**D**" - Required, reported as "White"

Finding forms will be unique by host. However, multiple patches can be listed on a single finding form.

4.2.4 Records

When a folder was completed, the team sorted all finding forms by type host, then by the problem codes, and finally by the first host circled on the form (A-Z). The forms were sequentially number and recorded by the auditors end time on the time sheet contained in that folder. The process is shown schematically in Figure A-1.

4.3 Custom Code Configuration Audits

4.3.1 Folders

One Custom Code Audit folder (notebook) was developed for each DAAC. The notebooks contained XRP baseline data from the Hardware-Software map, Site-Host Map Report, XRP discrepancy reports (from interrogation scripts), and the blank finding/observation forms.

4.3.2 Procedures

An automated process was used to generate the Problem Description Code data for the Host Problem Report. The script validated (each executable by host) all non-conformances identified (by the Custom Diff scripts) against the defined problem description codes. The audit team analyzed all reported problem codes.

4.3.3 Non-compliance

The process for identifying and recording the non-conformances is an automated process. Scripts were used to generate a Host Problem Report. The findings are as follows:

- Problem Code "**BNF**" - BL patch not found on host
- Problem Code "**NBI**" - Non-BL patch installed on host
- Problem Code "**WVC**" - Wrong version of the file installed on host
- Problem Code "**MVI**" - File missing version ID
- Problem Code "**MT**" - File missing from delivery tape

The audit team validated the findings and noted any findings that needed further investigation. For each non-conformance a box is checked for the proposed fix code (manual process). The Proposed Fixed Codes are identified as follows:

- Proposed Fix Code "**AB**" - Add file to BL
- Proposed Fix Code "**RB**" - Remove file from BL
- Proposed Fix Code "**IH**" - Install or fix on host and/or tape
- Proposed Fix Code "**RH**" - Remove file from host
- Proposed Fix Code "**SE**" - Script error

4.3.4 Records

When the notebook was completed, the data was entered in an MS Access database. The results were calculated by adding the number of findings for each problem type. Then a single NCR for each problem type was entered into DDTS. The process is shown schematically in Figure A-2.

4.4 Functional Configuration Audits

4.4.1 Folders

FCA checklists were developed by team leaders and placed in 5A test folders assigned to individual teams (ECS and ESDIS personnel paired to make up each team). Folders contained the complete test results and all applicable baseline documents.

4.4.2 Procedures

Teams performed a preliminary check of the folders to assure that all required information was present. Once complete they proceeded with a line-by-line inspection of the folder and completion of the checklist.

4.4.3 Findings

Observations were recorded on the checklist, there were no criteria verification mapping on ticket findings.

5. Audit Results

5.1 COTS Software Configuration Audits

5.1.1 Findings

The following specific findings were recorded. The number in parenthesis is the relative percentage of each type of finding.

Finding	NSIDC
Properly Installed	502 (52.3%)
Baseline not found	163 (17.0%)
Incorrectly installed	201 (20.9%)
Not Baseline, Installed	94 (9.8%)

5.1.2 NCR Summary

To determine which findings were the most critical ECS Development reviewed preliminary results and stated that 22 COTS products were required for the release to operate properly. Findings against these products were considered to be medium severity; the remaining findings were considered low severity.

The COTS products required for the system to operate correctly were:

- ACSLs
- AMASS
- AutoSys
- DCE
- Exabyte Driver
- FlexLM
- HDF Libraries
- HP Openview
- HP_UX
- IMSL Libraries
- IRIX (no findings)
- Netscape Enterprise Server
- RAID Driver
- RAID PROM
- Rogue Wave tools (DBTools,h++, Tools.h++, Net.h++)
- Secure Shell (ssh)
- Solaris
- Spatial Query Server (SQS)

SQL Server and Monitor
 Sun Volume Manager (no findings)
 Sybase OpenClient
 Veritas

There were 93 COTS related NCRs. 67 NCRs were severity 3, 2 severity 1, and 24 severity 2.

5.2 OS Patches Physical Configuration Audits.

5.2.1 Findings (Sun/HP/SGI)

The following specific findings were recorded. (The number in parenthesis is the relative percentage of each type of finding.)

Finding	NSIDC		
	SUN	HP*	SGI
Properly Installed	2569 (.921)	N/A	263 (.628)
Baseline not found	151 (.05)	N/A	125 (.298)
Incorrectly installed	0 (0)	N/A	0 (0)
Not Baseline, Installed	70 (0.025)	N/A	3 (.074)

5.2.2 NCR Summary

ECS Development reviewed preliminary results and discrepancies to these products were considered to be low severity.

There were 21 OS related NCRs. All NCRs were severity 3.

5.3 Custom Code Configuration Audits

5.3.1 Findings

The following specific findings were recorded. (The number in parenthesis is the relative percentage of each type of finding.)

Problem Codes	EDC	GSFC	LaRC	NSIDC
BNF	50	423	151	233
NBI	133	41	64	103
WVC	294	63	342	117
MVI	Not reported for 5A			
MT				
Total Executables	1079	1016	1026	652

5.3.2 NCR Summary

ECS Development reviewed preliminary results and discrepancies to these products were considered to be low severity.

Findings were documented in 6 NCRs. These NCRs were all severity 3.

EDC	GSFC	LaRC	NSIDC
3	0*	0*	3

**Note:* The preliminary findings were analyzed and submitted to the respective DAACs. All findings have been resolved pending verification by CM. As a result no NCRs were written.

5.4 Workoff Plan

After dissemination of NCR by DDTs, site personnel work in conjunction with audit team representatives to close as many NCR as were possible. Below you will find the workoff plans proposed at SRA, and comments as to their status.

5.4.1 EDC

- 3 Custom PCA NCRs open
 - Assignee needs to evaluate and address NCRs, documenting in DDTs

5.4.2 GSFC

- No outstanding NCRs, corrections made by DAAC
- Waiting verification by CM and QO

5.4.3 LaRC

- No outstanding NCRs, corrections made by DAAC
- Waiting verification by CM and QO

5.4.4 NSIDC

- 114 COTS/OS PCA NCRs open
- 3 Custom PCA NCRs
 - Assignee needs to evaluate and address all NCRs, documenting in DDTs

5.5 Functional Configuration Audit Results

5.5.1 Verification Status of FC and EC for CSR

100% of FCs and ECs were confirmed as correct in VDB. These were drawn from the 42 acceptance test and system verification test folders that had been audited.

5.5.2 FCA Conclusions

FCA objectives were achieved.

During Drop 5A Acceptance Testing the quality of test records continued to improve. The VDB contains accurate criteria verification status.

5.6 Certification

5.6.1 PCA, COTS Software and Shareware

Ongoing activity

5.6.2 PCA, OS Patches

Ongoing activity

5.6.3 PCA, Custom Software

Ongoing activity

5.6.4 FCA

Ongoing activity

6. Lessons Learned

6.1 PCA Team Members Comments

6.1.1 Interrogation Scripts

The audit team learned that the script approach provided reliable information and feel that the scripts can be further automated to reduce the person-hours required performing audits.

The team learned that the audit process can be confusing and that it is necessary to have a well defined process and I think we came up with one.

They also learned that the importance of verifying which version of the baseline the scripts were run on and which version of the scripts were run.

6.1.2 Database

A custom-made reporting and tracking database was developed by QO using MS Access. This made it easier to report the metrics of the PCA and it gave greater insight into the verification activities.

6.1.3 Process Definition

Defining the process for determining the specific outputs (discrepancies) of the audit made the audit repeatable for any team member.

6.1.4 Verification Benefits

The PCA provided a verification process for determining the correctness of the (a) ECS baseline, (b) Installation, and (3) Interrogation scripts for COTS SW and OS and application patches. [From it] a determination is made of the proper COTS product, version, path, and patches on particular site hosts.

The results of the PCA provide the statistics to management and technical personnel of the extent of installation, baseline, or script problems for each machine. It also provides insight on certain systematic problems that have to be corrected.

6.1.5 Manual Process

The manual process for performing the PCA has been reduced approximately 80 percent. More automation or semi-automation is still recommended.

6.1.6 Metrics Automation

The COTS and OS PCA for NSIDC was conducted prior to the automation of metrics reporting. However, the COTS, O/S, and Custom patch metrics were automated for the Release 5A PCA.

6.1.7 Additional Reports Needed

The discrepancy reports philosophy is to report host by host, for each DAAC. As the scripts were originally designed to determine a baseline, and not perform auditing. Another format could be implemented on a per COTS basis, as NCRs were generated using this philosophy.

6.1.8 Custom Code

Auditors learned that the custom code audit was for executable file placement only. There is some lag time between approval for the release of custom code and the update of the XRP database.

6.1.9 Similarity of Discrepancies

Many NCRs had the same root problem between the DAAC.

NCRs assigned to engineers were not evaluated rapidly. This contributed to the amount of time required to close discrepancies.

6.1.10 Benefits of Audits

8% of the design changed as a result of the audit. Many paths and versions were changed in accordance with design inputs.

The audit forced these issues:

- Compiler placement on the hosts
- Automounting versus local installations
- Version changes

6.2 FCA Team Member Comments

6.2.1 Test Folders

Perform test folder audits incrementally rather than all at the end

6.2.2 Overall Process

The following comments were made regarding process improvements:

- Feedback findings to test as you go rather than at the end. Give them the opportunity to improve their processes as needed and fix the problems.
- Be flexible and able to react to process changes along the way
- Accept help whenever offered but train them well
- Keep your customer fully informed and involved

Appendix A. Finding Form Process

A.1 Completing a COTS Software or Clearcase Patch PCA Finding Form

The process flow for completing a COTS Software or ClearCase Patch audit is depicted in Figure A-1.

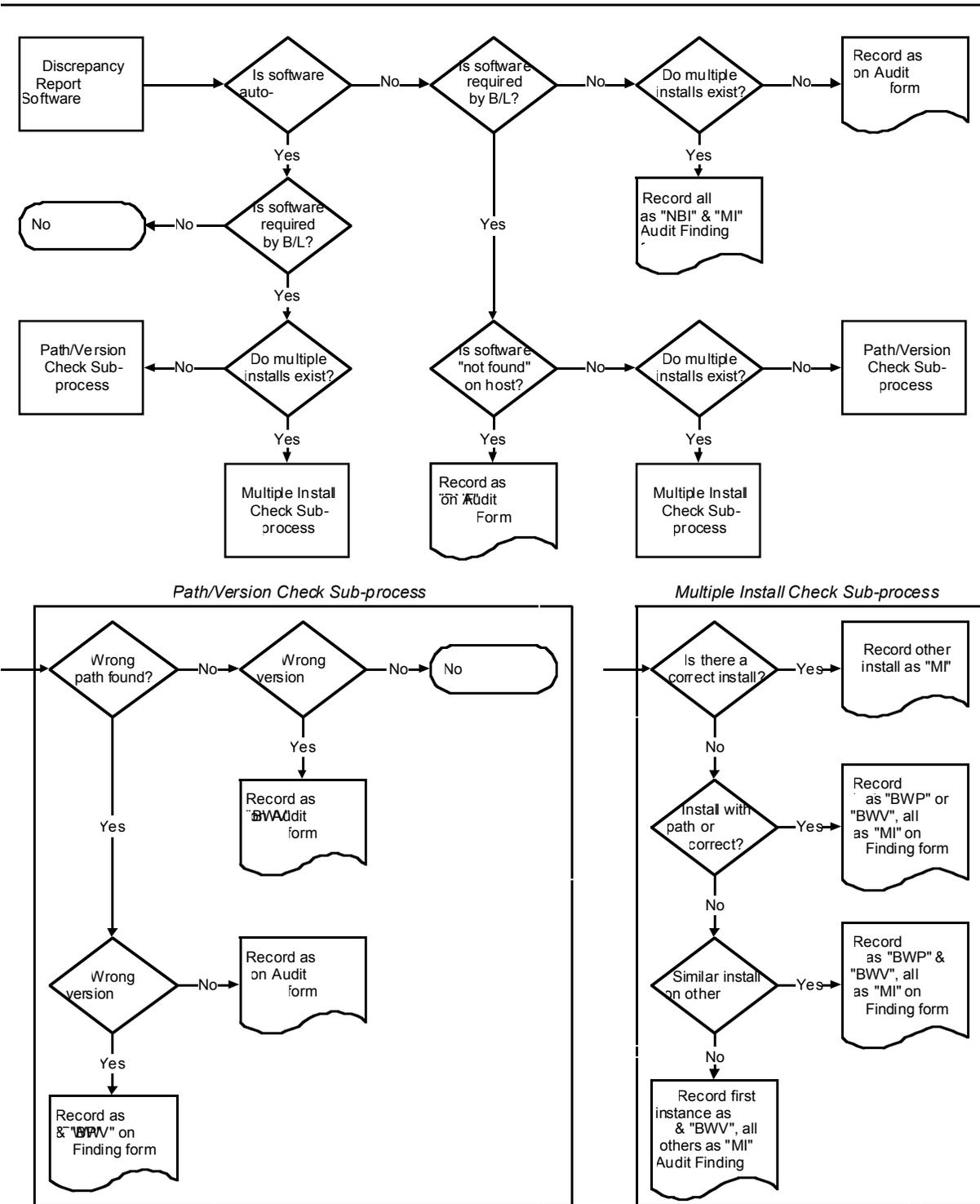


Figure A-1. Completing a COTS Software or PCA ClearCase Patch Finding Form

A.2 Custom Software Audit

The process flow for completing the Custom Software Audit is depicted in Figure A-2.

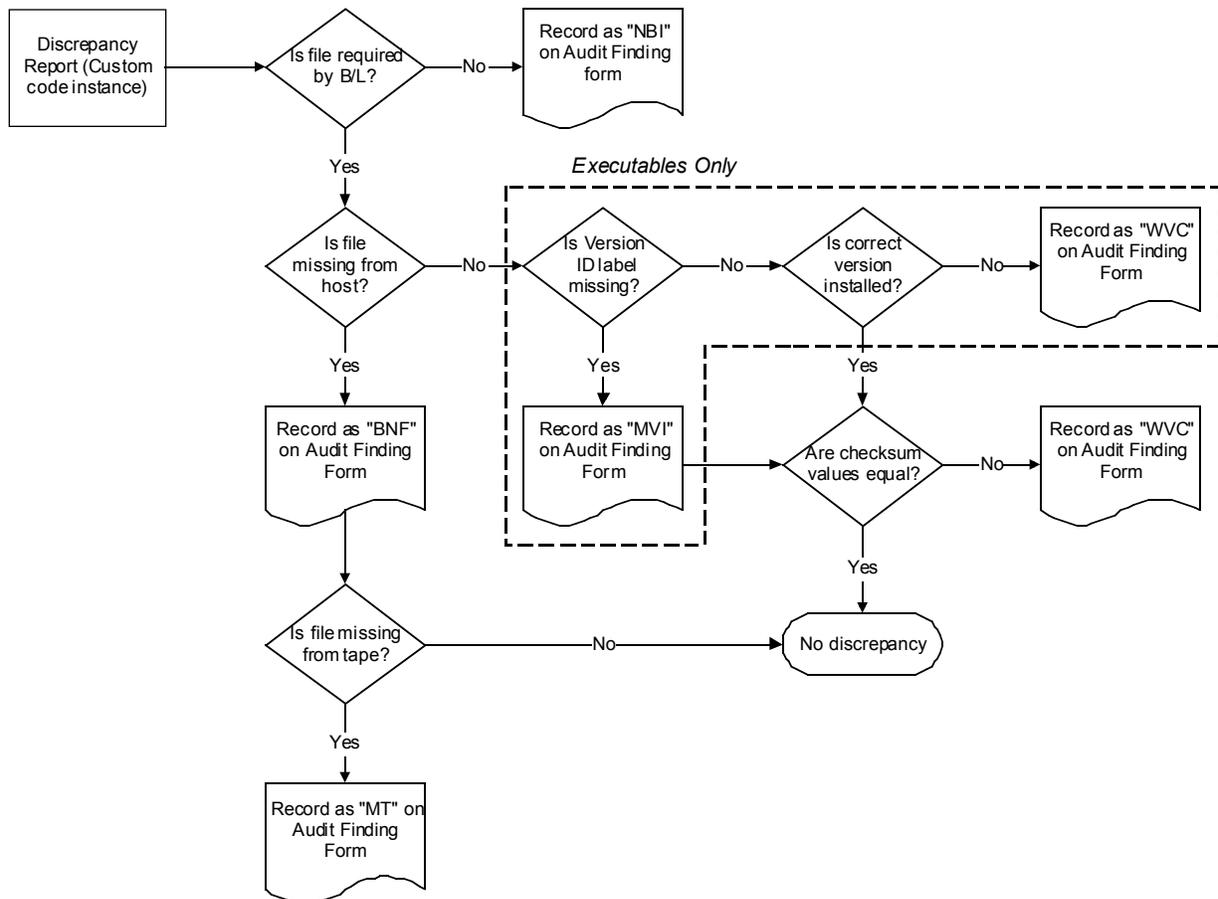


Figure A-2. Completing a Custom Software PCA Finding Form

A.3 Work-Off Plan and Discrepancy Closure

The process flow detailing the work-off plan and discrepancy closure process is depicted in Figure A-3.

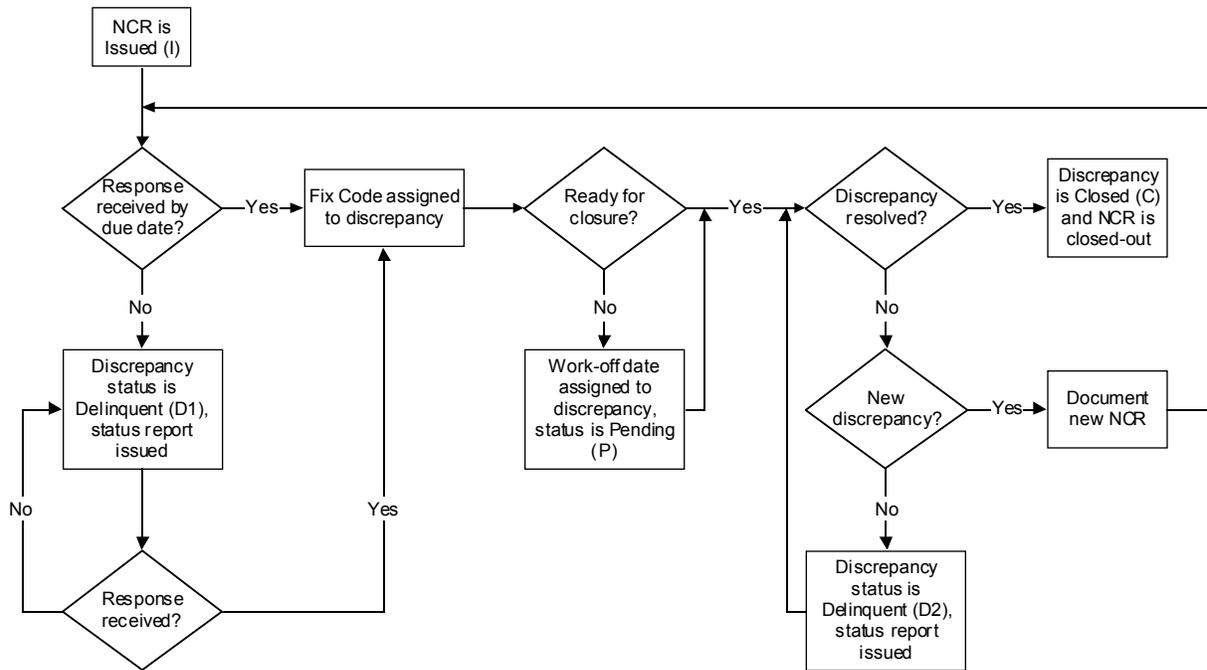


Figure A-3. Work-Off Plan and Discrepancy Closure

Appendix B. COTS Software NCRsÄ

Type	Site	ID	Status	Severity	Headline
COTS	NSIDC	23408	A	2	AMASS: Non-B/L product installed
COTS	NSIDC	23413	A	3	ANLPASSWORD: B/L prod. wrong ver. & B/L prod. not found
COTS	NSIDC	23415	A	3	ARCINFO: B/L product not found
COTS	NSIDC	23418	A	2	AUTOSYS_REMOTE_AGENT: Non-BL prod. install&BL prod. wrong path&ver.
COTS	NSIDC	23417	A	2	AUTOSYS: Non-B/L prod. not found, B/L prod. wrong path and ver.
COTS	NSIDC	23420	A	3	AUSTOSYS_XPERT: Non-BL prod. install & BL prod. wrong path & ver.
COTS	NSIDC	23437	A	3	BDS: B/L product not found
COTS	NSIDC	23438	A	2	BuilderXcessory: B/L prod. wrong path & Multiple prod. install
COTS	NSIDC	23439	A	3	CDE: Non-B/L product install
COTS	NSIDC	23444	A	3	ClearCase: Non-B/L & Multiple prod. install and B/L prod. not found
COTS	NSIDC	23448	A	3	Crack: B/L product not found
COTS	NSIDC	23449	A	3	Creator Graphics: Non-B/L product install
COTS	NSIDC	23452	A	3	DBTools.h++: Multiple product install
COTS	NSIDC	23453	A	3	DBVision: B/L product not found
COTS	NSIDC	23454	A	2	DCE_APP_Develop_Tool_Kit:Non-BL & Multi prod install/BL prod.not found
COTS	NSIDC	23455	A	2	DCE_Cell_Manager_Host_Agent: B/L prod wrong ver./BL prod not found
COTS	NSIDC	23456	A	2	DCE_Client:Non-B/L product install
COTS	NSIDC	23457	A	3	DDTS: B/L product wrong version
COTS	NSIDC	23458	A	3	Epak/GraphPak: B/L product wrong path
COTS	NSIDC	23460	A	2	Exabyte_Driver: B/L prod wrong ver. and B/L prod not found
COTS	NSIDC	23463	A	2	FLEXlm: B/L prod wrong ver. & Non-B/L product install
COTS	NSIDC	23461	A	3	Flare_Code_(RAID_Controller): B/L product wrong version
COTS	NSIDC	23462	A	3	Flare_Code_(SGI_RAID_Controller): B/L product not found
COTS	NSIDC	23464	A	3	FORCHECK: Non-B/L product install
COTS	NSIDC	23465	A	3	Fortran_77_Compiler: B/L product not found
COTS	NSIDC	23466	A	3	Gnu_Unzip: B/L prod. wrong version and B/L prod. not found
COTS	NSIDC	23467	A	3	Gnu_Zip: B/L product not found
COTS	NSIDC	23468	A	2	HDF_Libraries: BL prod wrong path/Non-BL prod install/BL prod not found
COTS	NSIDC	23575	A	3	HP_Openview: B/L product wrong version and wrong path
COTS	NSIDC	23469	A	3	HiPPi_Adapter_firmware: B/L product not found
COTS	NSIDC	23470	A	3	IDL: B/L Product not found
COTS	NSIDC	23473	A	2	IMSL_FORTRAN_Libraries: B/L product not found
COTS	NSIDC	23472	A	2	IMSL_LC_Libraries: B/L product not found
COTS	NSIDC	23474	A	3	JetAdmin: B/L product not found
COTS	NSIDC	23478	A	3	Kerbnet: B/L product not found
COTS	NSIDC	23480	A	3	Legato_Networker_Client: B/L product not found
COTS	NSIDC	23481	A	3	Legato_Networker_Server: B/L product wrong version
COTS	NSIDC	23482	A	3	MIPSpro_C_+_Compiler: B/L product wrong path
COTS	NSIDC	23483	A	3	MIPSpro_C_Compiler: B/L product wrong path
COTS	NSIDC	23485	A	3	MIPSpro_FORTRAN_90_Compiler: NON B/L Product install
COTS	NSIDC	23484	A	3	MIPSpro_Fortran_77_Compiler: Non-B/L product install
COTS	NSIDC	23486	A	3	NCDWare: Non-B/L product install
COTS	NSIDC	23487	A	3	Net.h++: Multiple product install
COTS	NSIDC	23490	A	2	Netscape_Enterprise_Server: B/L prod wrong ver&path-Non-B/L pro install
COTS	NSIDC	23499	T	3	Open_Client/C_: B/L product not found
COTS	NSIDC	23491	T	3	Open_Client/C: Non-B/L prod. install/ B/L prod. not found

Type	Site	ID	Status	Severity	Headline
COTS	NSIDC	23492	T	3	Open_Client/C_(isql_&_bcp): BL prod. wrong path/ver.&mult. prod install
COTS	NSIDC	23498	T	3	Open_Client/C_(no_isql_&_bcp): B/L product not found
COTS	NSIDC	23752	A	1	n0msh03: OS Patch problems from PCA
COTS	NSIDC	23753	A	1	n0msh10: OS Patch problems from PCA
COTS	NSIDC	23765	A	3	n0acg01: OS Patch problems from PCA
COTS	NSIDC	23782	A	3	n0acg02: OS Patch Problems from PCA
COTS	NSIDC	23828	A	3	n0pls03: OS Patch problems from PCA
COTS	NSIDC	23829	A	3	n0spg01: OS Patch problems from PCA
COTS	NSIDC	23830	A	3	nospg03: OS Patch problems from PCA
COTS	NSIDC	23831	A	3	n0sps08: OS Patch problems from PCA
COTS	NSIDC	23827	A	3	n0pls02: OS Patch problems from PCA
COTS	NSIDC	23500	A	3	Performance_Co_Pilot_Collector: Non-B/L product install
COTS	NSIDC	23501	A	3	ProDev_Workshop: Non-B/L product install
COTS	NSIDC	23502	A	3	Purify: B/L product not found
COTS	NSIDC	23503	A	2	RAID_Driver: Non-B/L product wrong version & B/L product not found
COTS	NSIDC	23504	A	2	RAID_PROM: Non-B/L product installed & B/L product wrong path
COTS	NSIDC	23511	A	3	Remedy_ARS: B/L product wrong path
COTS	NSIDC	23513	A	3	Replication_Server: B/L prod wrong ver. & Non-B/L prod. install
COTS	NSIDC	23514	A	3	SATAN: B/L product not found
COTS	NSIDC	23515	A	3	SOFTBENCH for C++: B/L product not found
COTS	NSIDC	23518	T	2	SQL Server Monitor: B/L product wrong path & version
COTS	NSIDC	23533	T	2	SQL_Monitor: B/L product not found
COTS	NSIDC	23534	T	2	SQL_Server: Non-B/L product install
COTS	NSIDC	23535	T	2	SQL_Server_11.0.3.3: B/L product not found
COTS	NSIDC	23516	A	3	Spatial_Query_Server_(SQS): B/L product not found
COTS	NSIDC	23539	A	3	TCP Wrappers: B/L prod wrong path & B/L product not found
COTS	NSIDC	23540	A	3	Tivoli_Admin: B/L product wrong version
COTS	NSIDC	23541	A	3	Tivoli_Courier: B/L product wrong version
COTS	NSIDC	23543	A	3	Tivoli_Sentry: B/L product wrong version
COTS	NSIDC	23546	A	3	Tivoli_Server:T/EC_Adapter: B/L product not found
COTS	NSIDC	23547	A	3	Tivoli_Server:_T/EC_Rule_bid: B/L product not found
COTS	NSIDC	23545	A	3	Tivoli_Server:_Enterprise_Cons: B/L product not found
COTS	NSIDC	23548	A	3	Tools.h++: Multiple product install
COTS	NSIDC	23549	A	3	Tripwire: B/L product not found
COTS	NSIDC	23542	A	3	Trivoli_Ent_Console_Log: B/L prod. wrong vers.& B/L prod not found
COTS	NSIDC	23550	A	2	Veritas: B/L product wrong path and version
COTS	NSIDC	23551	A	2	Visual_Workshop: B/L product not found
COTS	NSIDC	23553	R	3	XRP-II: Non-B/L product install
COTS	NSIDC	23552	A	3	Xedit: B/L product not found
COTS	NSIDC	23471	A	3	iFOR/LS: NON-B/L Product install
COTS	NSIDC	23475	A	3	jre: B/L product wrong version
COTS	NSIDC	23536	A	3	ssh secure shell comrel server: B/L product not found
COTS	NSIDC	23537	A	3	ssh secure shell free client: B/L Product not found
COTS	NSIDC	23538	A	3	ssh secure shell free server: BL prod wrong ver./Non-BL prod install

Appendix C. OS Patches NCRs

Type	Site	ID	Status	Severity	Headline
OS	NSIDC	23783	A	3	n0acs03: OS Patch problems from PCA
OS	NSIDC	23784	A	3	n0acs04: OS Patch problems from PCA
OS	NSIDC	23786	A	3	n0acs05: OS Patch problems from PCA
OS	NSIDC	23787	A	3	n0acs06: OS Patch problems from PCA
OS	NSIDC	23788	A	3	n0ais01: OS Patch problems from PCA
OS	NSIDC	23789	A	3	n0aqg01: OS Patch problems from PCA
OS	NSIDC	23793	A	3	n0aqg02: OS Patch problems from PCA
OS	NSIDC	23794	A	3	n0ess02: OS Patch problems from PCA
OS	NSIDC	23796	A	3	n0dis01: OS Patch problems from PCA
OS	NSIDC	23800	A	3	n0dis02: OS Patch problems from PCA
OS	NSIDC	23801	A	3	n0dms04: OS Patch problems form PCA
OS	NSIDC	23802	A	3	n0drg01: OS Patch problems from PCA
OS	NSIDC	23803	A	3	n0drg02: OS Patch problems from PCA
OS	NSIDC	23804	A	3	n0ins01: OS Patch problems from PCA
OS	NSIDC	23805	A	3	n0ins02: OS Patch problems from PCA
OS	NSIDC	23806	A	3	n0mss01: OS Patch problems from PCA
OS	NSIDC	23807	A	3	n0mss02: OS Patch problems from PCA
OS	NSIDC	23808	A	3	n0mss05: OS Patch problems from PCA
OS	NSIDC	23809	A	3	n0mss20: OS Patch problems from PCA
OS	NSIDC	23810	A	3	n0mss21: OS Patch problems from PCA
OS	NSIDC	23826	A	3	n0pls01: OS Patch problems from PCA

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Appendix D. Custom Software NCRs

Type	Site	ID	Status	Severity	Headline
CUST	EDC	23393	N	3	Checksums differ between the host and tar file
CUST	EDC	25013	T	3	5A Custom Code Has Incorrect Version Installed on Hosts"
CUST	EDC	25018	T	3	5A Custom Code Not Installed on Host
CUST	NSIDC	24982	A	3	5A Custom Code Not Installed on Host
CUST	NSIDC	24984	A	3	5A Custom Code not in baseline, but installed on host
CUST	NSIDC	24985	A	3	5A Custom Code has wrong version installed

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Abbreviations and Acronyms

CCB	Change Control Board
CCR	Configuration Change Request
CDRL	Contract Data Requirements List
CI	Configuration Item
CM	Configuration Management
CMO	Configuration Management Office
COTS	Commercial Off-The-Shelf
CSCI	Computer Software Configuration Item
CSR	Consent to Ship Review
DAAC	Distributed Active Archive Center
DDTS	Distributed Defect Tracking System
DID	Data Item Description
DMO	Data Management Organization
ECS	EOSDIS Core System
EDF	ECS Development Facility
EOSDIS	Earth Observing System Data and Information System
FCA	Functional Configuration Audit
GSFC	Goddard Space Flight Center
HP	Hewlett Packard
HWCI	Hardware Configuration Item
M&O	Maintenance and Operations
MIL STD	Military Standard
NASA	National Aeronautics and Space Administration
NCR	Non-Conformance Report
NLT	Not Later Than
OS	Operating System

PCA	Physical Configuration Audit
PI	Project Instruction
QO	Quality Office
RAID	Redundant Array of Inexpensive Disks
RRR	Release Readiness Review
SDPS	Science Data Processing Segment (ECS)
SIG	Silicon Graphics, Inc.
SOW	Statement of Work
SRA	Site Readiness Assessment
VCATS	Vendor Cost And Tracking System
VDD	Version Description Document
WBS	Work Breakdown Structure