National Space Transportation System (NSTS)
System Safety Milestones and Process Flow

INTRODUCTION

System safety assessment and engineering support for NSTS missions includes the efforts outlined in the following paragraphs.

Safety Plan

A written Safety Plan shall be created to assure that a comprehensive hazard analysis program is implemented for the entire life cycle of mission development and execution. The safety plan will include the safety organizational relationships; safety program milestones; safety requirements and criteria; and, safety data/reporting requirements.

DELIVERABLES

Flight and Ground Safety Packages

A Flight and a Ground Safety package shall be provided in accordance with the requirements of (NHB) 1700.7, "Safety Policy and Requirements for Payloads Using the Space Transportation System" and of (KHB) 1700.7, "STS Payload Ground Safety Handbook". The safety package will include a detailed description of hazardous and safety critical ground support and flight hardware equipment, systems, and materials and their interfaces. The document will also detail the design characteristics and actions taken to eliminate and control hazards during the life cycle of the payload. The PI team personnel will be responsible for providing the necessary supporting technical information related to the payload. The Flight Safety Package must be submitted to Johnson Space Center, and the Ground Safety Package must be submitted to Kennedy Space Center.

As a routine part of the development of the safety package, NASA NSTS Safety Panel reviews are held per the requirements of NSTS/ISS 13830, "Payload Safety Review and Data Submittal Requirements". This document defines the data that are to be included in each data package which is submitted in conjunction with each of the 4 successive JSC and KSC reviews.

The JSC and KSC ground safety review and ground certification **must be completed 30 days prior to delivery of the payload and any other equipment needed to process the payload.**

Mission Reviews

A safety overview and status presentation will be prepared for presentation at the System Level Preliminary Design Review, Critical Design Review, the Pre-Environmental Review, and the Pre-Ship Review.

Review of Test , Evaluation, and Handling Procedures

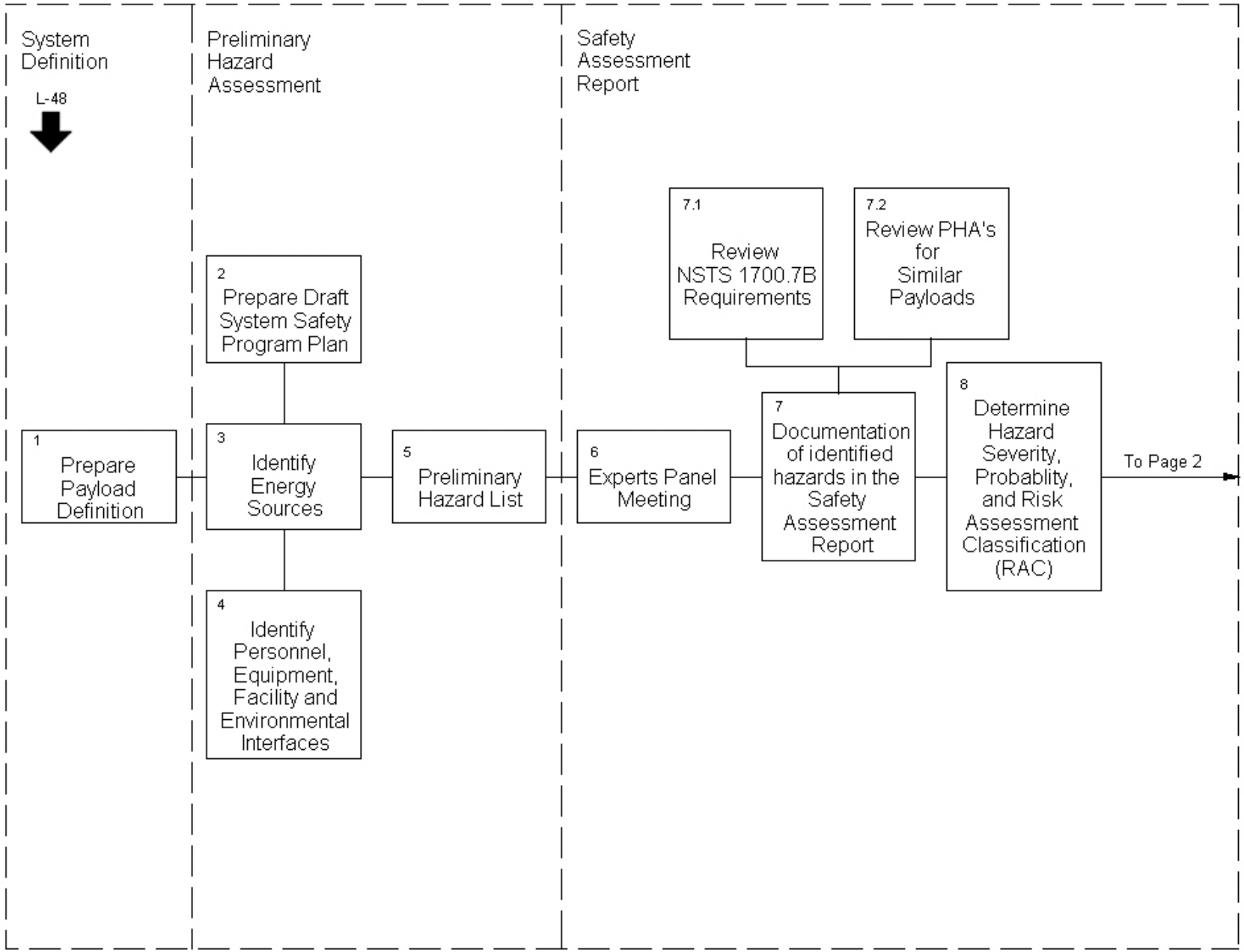
Before submittal for range approval, the Project Safety Engineer must review and approve all hazardous procedures. This step ensures proper format for smooth range approval, and that all pre-existing hazard mitigation agreements, that need to be implemented via procedural steps, have been met. All hazardous procedures must be reviewed and approved by the range prior to use. This assures that test procedures recommend actions to reduce, correct, or control hazards in the test and evaluation environment, and will assure inclusion of appropriate warnings, hazards and cautions.

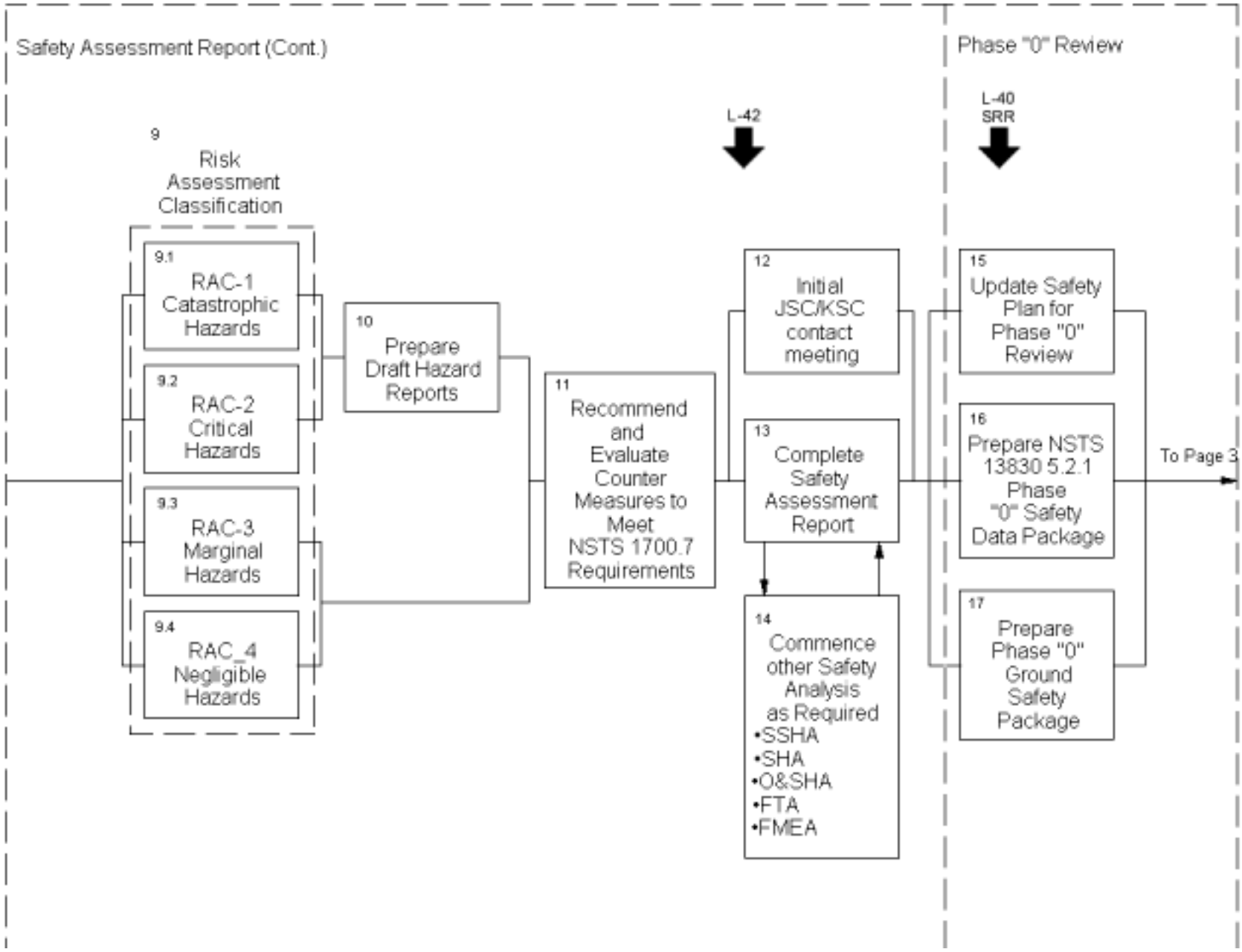
On Site Support

On site safety support must be provided during delivery of the payload to the range and as needed during range processing to assure the Range Safety Office that any open safety issues are resolved in a timely manner and to assure that the mission flight hardware is processed safely.

SCHEDULE

A conceptual flowchart that is consistent with the NSTS safety process is provided below as an example of activities that may be used to produce the required deliverables. It will be necessary to time scale the flow chart to the actual mission development period and its uniquely scheduled milestones. Assistance with this planning process can be provided through the Explorers Program Office.


System Definition
L-48
Preliminary Hazard Assessment
Safety Assessment Report
1
Prepare Payload Definition
2
Prepare Draft System Safety Program Plan
3
Identify Energy Sources
4
Identify Personnel, Equipment, Facility and Environmental Interfaces
5
Preliminary Hazard List
6
Experts Panel Meeting
7.1
Review NSTS 1700.7B Requirements
7.2
Review PHA's for Similar Payloads
7
Documentation of identified hazards in the Safety Assessment Report
8
Determine Hazard Severity, Probablity, and Risk Assessment Classification (RAC)
To Page 2


Safety Assessment Report (Cont.)
Phase "0" Review
L-42
L-40
SRR
9
Risk Assessment Classification
9.1
RAC-1 Catastrophic Hazards
9.2
RAC-2 Critical Hazards
9.3
RAC-3 Marginal Hazards
9.4
RAC_4 Negligible Hazards
10
Prepare Draft Hazard Reports
11
Recommend and Evaluate Counter Measures to Meet NSTS 1700.7 Requirements
12
Initial JSC/KSC contact meeting
13
Complete Safety Assessment Report
14
Commence other Safety Analysis as Required
•SSHA
•SHA
•O&SHA
•FTA
•FMEA
15
Update Safety Plan for Phase "0" Review
16
Prepare NSTS 13830 5.2.1 Phase "0" Safety Data Package
17
Prepare Phase "0" Ground Safety Package
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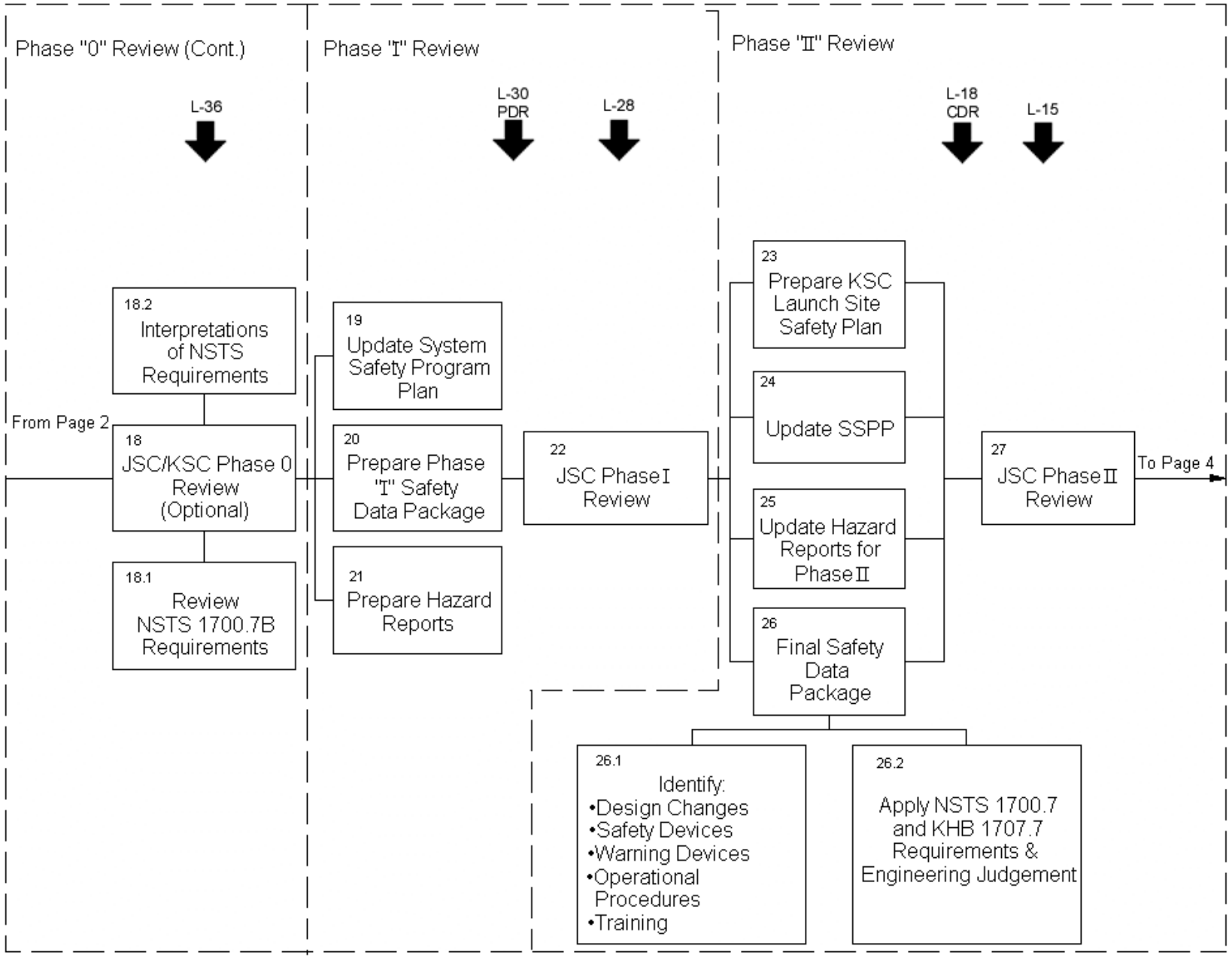
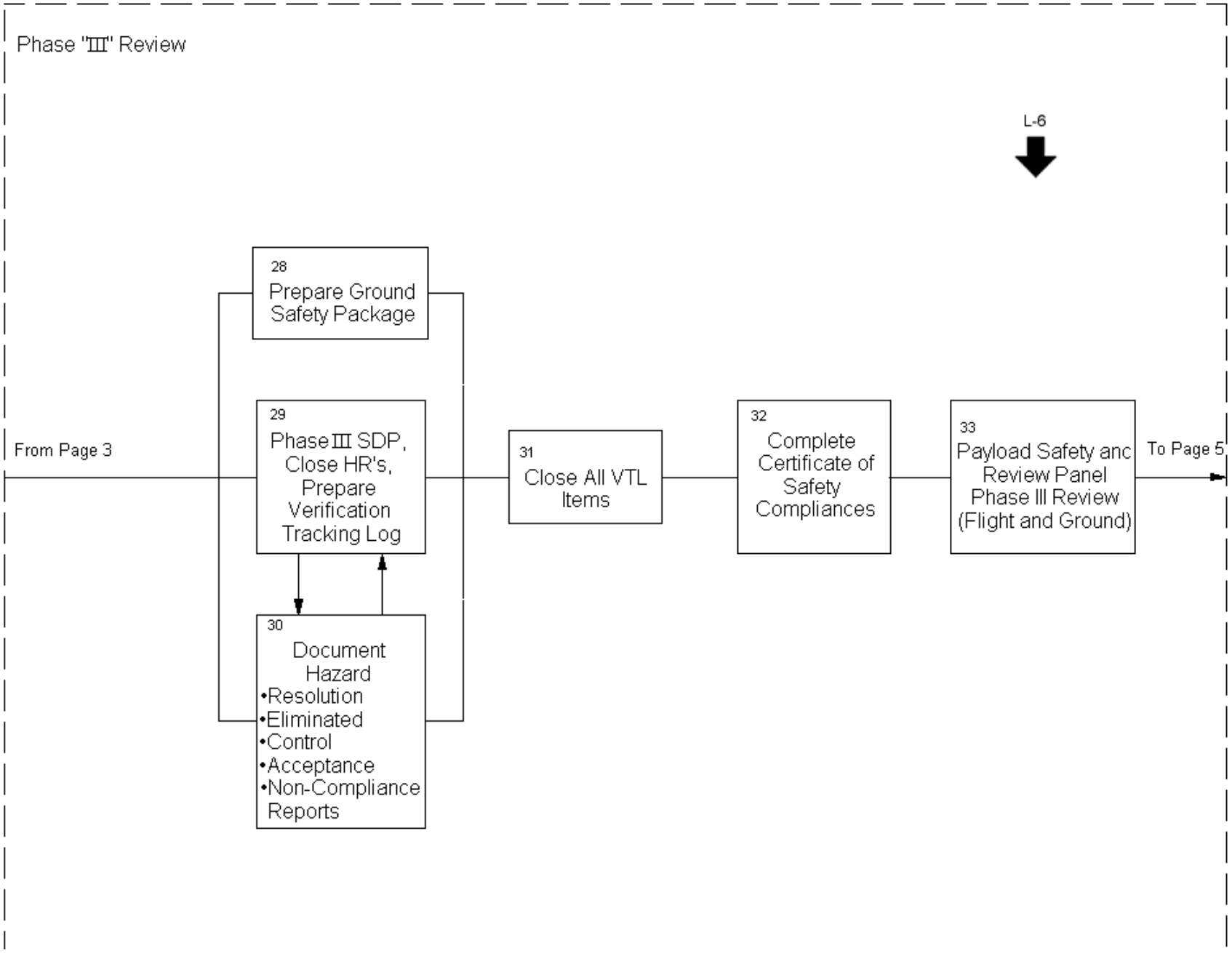
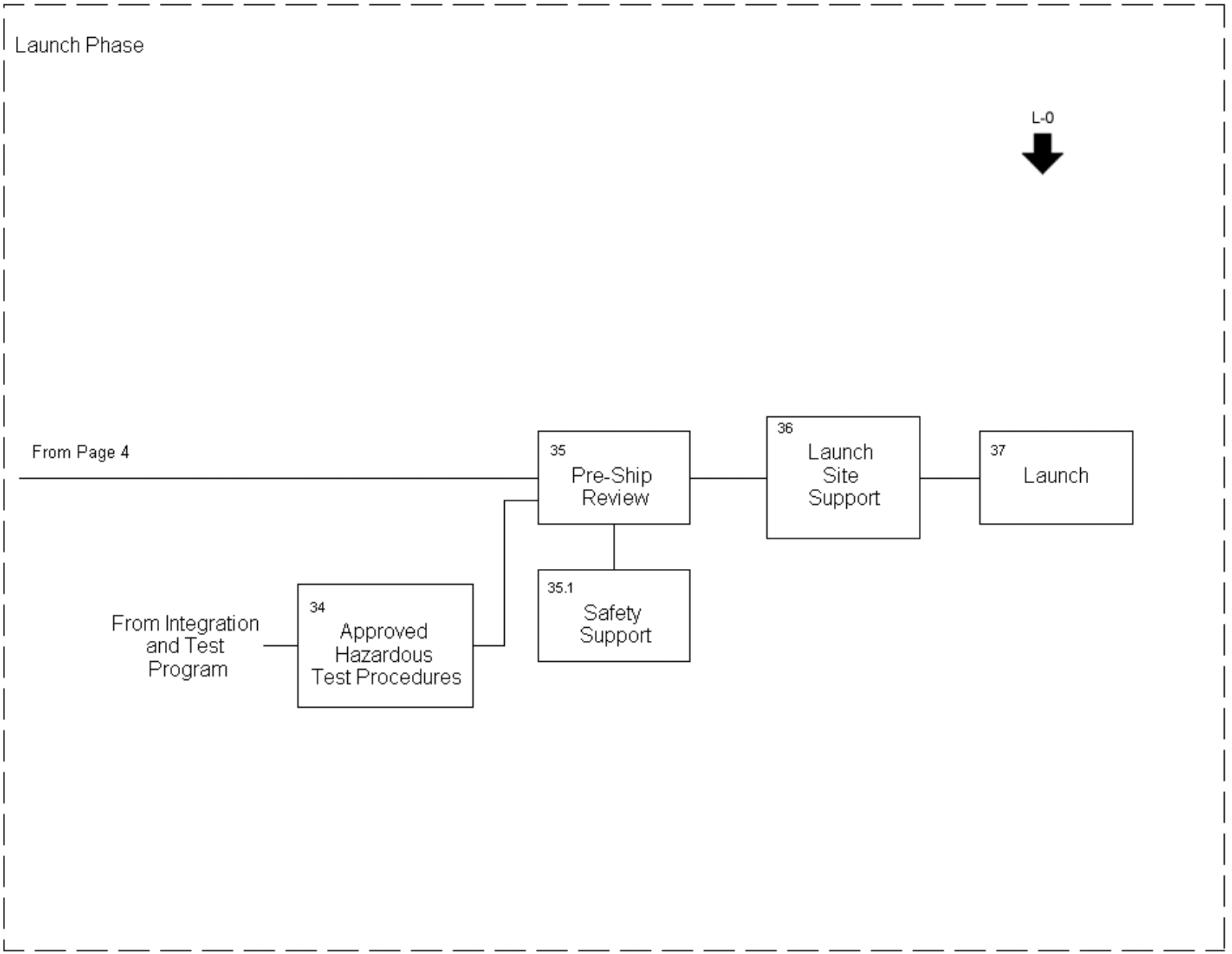

Phase "0" Review (Cont.)
Phase "I" Review
Phase "II" Review
L-36
L-30 PDR
L-28
L-18 CDR
L-15
From Page 2
18.2 Interpretations of NSTS Requirements
18 JSC/KSC Phase 0 Review (Optional)
18.1 Review NSTS 1700.7B Requirements
19 Update System Safety Program Plan
20 Prepare Phase "I" Safety Data Package
21 Prepare Hazard Reports
22 JSC Phase I Review
23 Prepare KSC Launch Site Safety Plan
24 Update SSPP
25 Update Hazard Reports for Phase II
26 Final Safety Data Package
26.1 Identify: •Design Changes •Safety Devices •Warning Devices •Operational Procedures •Training
26.2 Apply NSTS 1700.7 and KHB 1707.7 Requirements & Engineering Judgement
27 JSC Phase II Review
To Page 4


Phase "III" Review
L-6
From Page 3
28
Prepare Ground Safety Package
29
Phase III SDP, Close HR's, Prepare Verification Tracking Log
30
Document Hazard
•Resolution
•Eliminated
•Control
•Acceptance
•Non-Compliance Reports
31
Close All VTL Items
32
Complete Certificate of Safety Compliances
33
Payload Safety anc Review Panel Phase III Review (Flight and Ground)
To Page 5


Launch Phase
L-0
From Page 4
35
Pre-Ship Review
36
Launch Site Support
37
Launch
35.1
Safety Support
From Integration and Test Program
34
Approved Hazardous Test Procedures