

**Appendix B to Attachment J-03,  
Post Certification Mission (PCM)  
Milestone Acceptance Criteria and  
Payment Schedule**

## 1.0 INTRODUCTION

The PCM Milestone Acceptance Criteria and Payment Schedule provided in Section 3.0 details all the milestones, reviews and/or payment events which mark progress towards completion of CLIN 002 activities and is provided in response to and supports:

Section	Description
B.4	Post Certification Missions (IDIQ) CLIN 002)
G.8	Submission of Invoices for Payment
H.19	Post Certification Mission Payments, Milestones and Authority to Proceed (ATP) Criteria
H.21	Post Certification Mission Success Determination
I.11	52.232-32 Performance-Based Payments (Apr 2012) (Deviation), (Applicable to Interim Performance-Based Payments Events)
L-02	Draft Performance Work Statement, Section 4.0 Mission Review Milestones
Attachment J-03, Section 3.3	Performance Work Statement

## 2.0 POST CERTIFICATION MISSION (PCM) WORK PLAN (DRD 202)

The Contractor shall utilize the Post Certification Mission (PCM) Work Plan (WP), DRD 202, to describe for each milestone review and interim milestones:

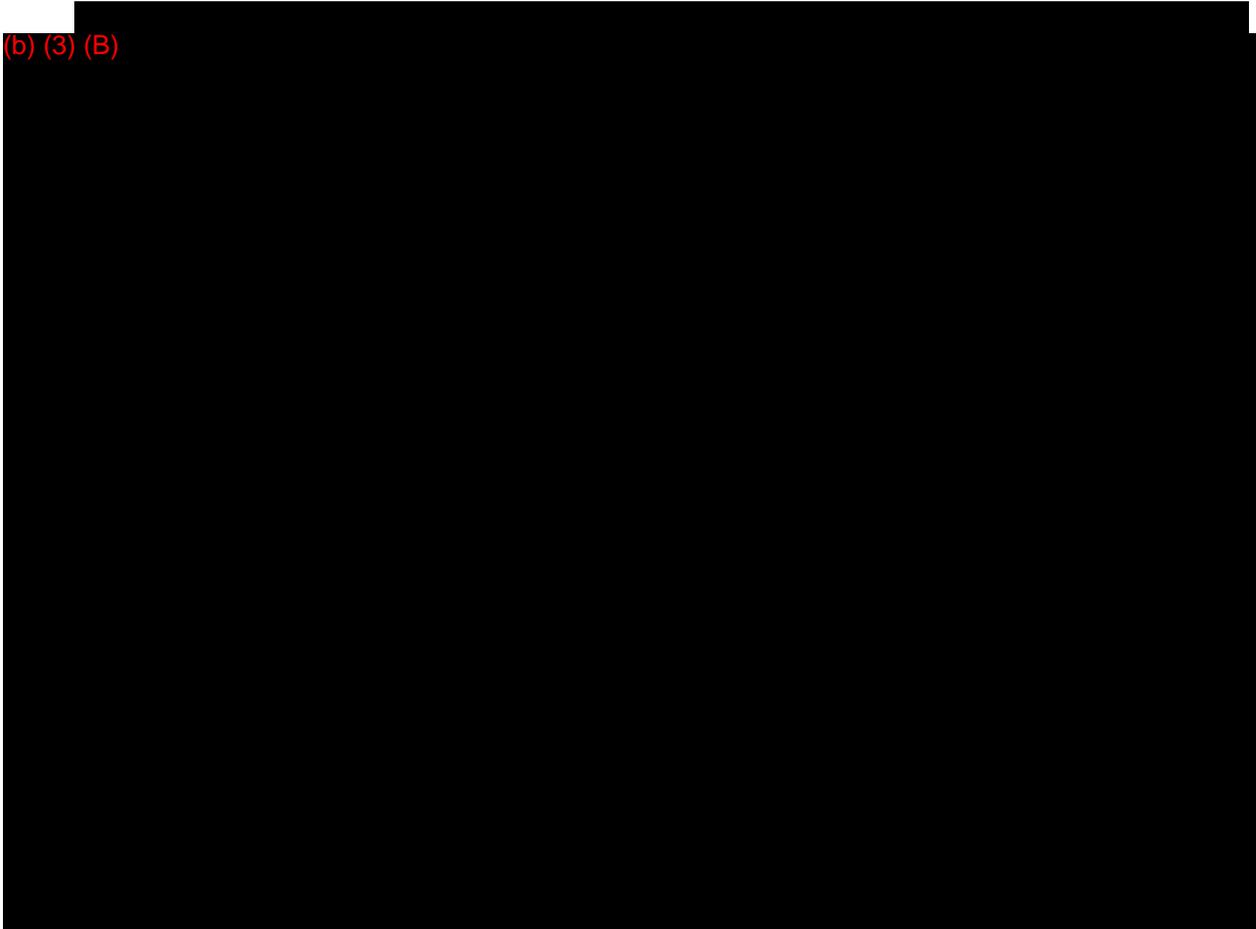
- the review process
- schedule
- location
- deliverables
- delivery dates
- method and timing by which data will be made available to NASA
- document review requirements
- presentation meetings
- pre-boards
- other logistics related information

In advance of the each milestone, the Contractor shall collaborate with NASA and document the mutually agreed to readiness indicators (also known as entrance criteria) and acceptance criteria (also called exit or success criteria) for the review in the PCM Work Plan document. The Contractor shall draw from the following requirements document set at a minimum to define the applicable milestone entrance and exit criteria:

- a) This document, Appendix B to Attachment J-03, PCM Readiness Indicators and Success Criteria
- b) NASA Systems Engineering Processes and Requirements, NPR 7123.1A
- c) Certification Plan, DCC1-00443-01

The Contractor shall submit the PCM Work Plan detailing the specifics for the next major event at the preceding interim milestone/milestone review to allow sufficient time for NASA approval of the PCM WP and subsequent execution of the plan detailed in the PCM Work Plan.

**3.0 PCM MILESTONE ACCEPTANCE CRITERIA AND PAYMENT SCHEDULE**

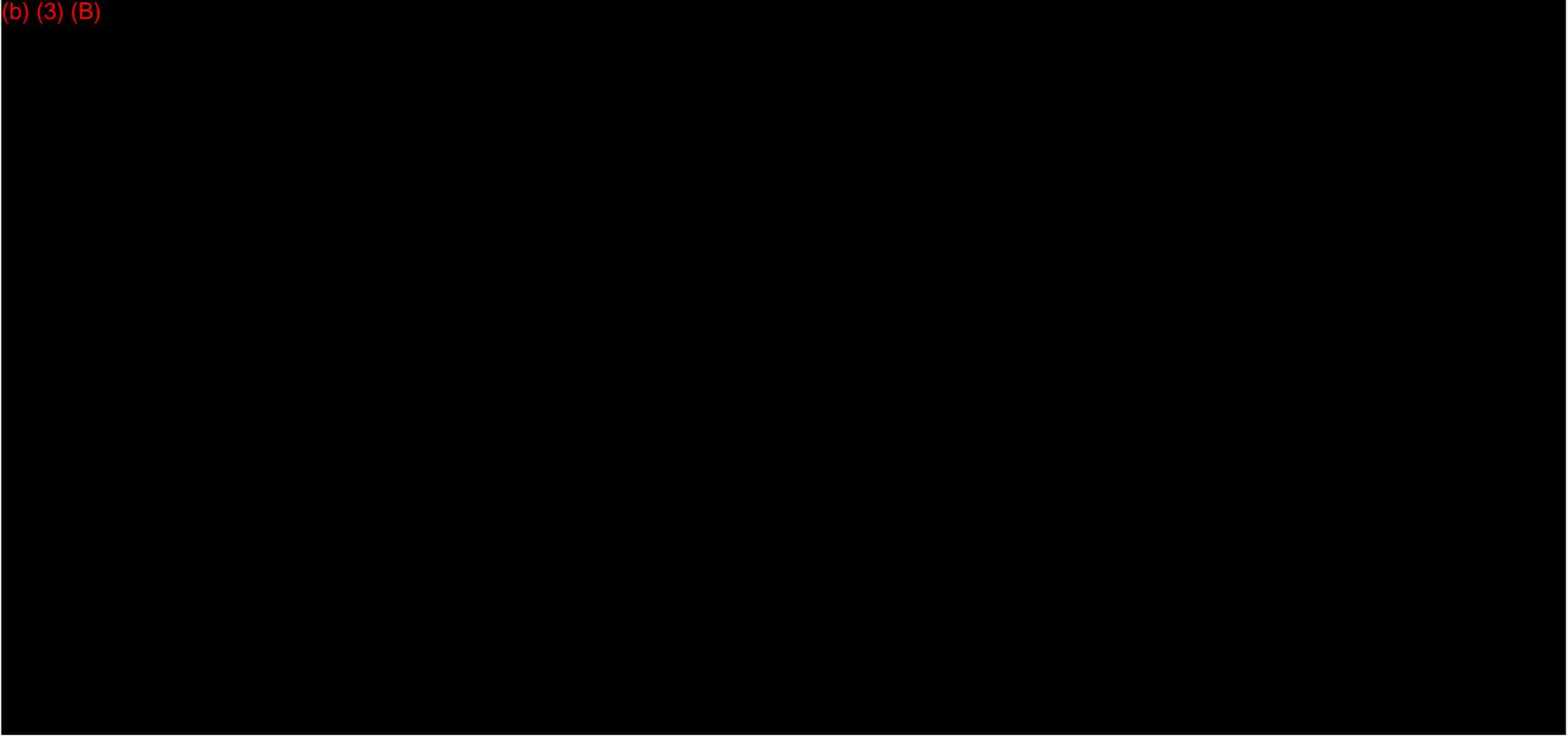


Legend:
Mandatory Government Interim Milestone
Contractor Proposed Interim Milestone
Mandatory Government Delivery Milestone

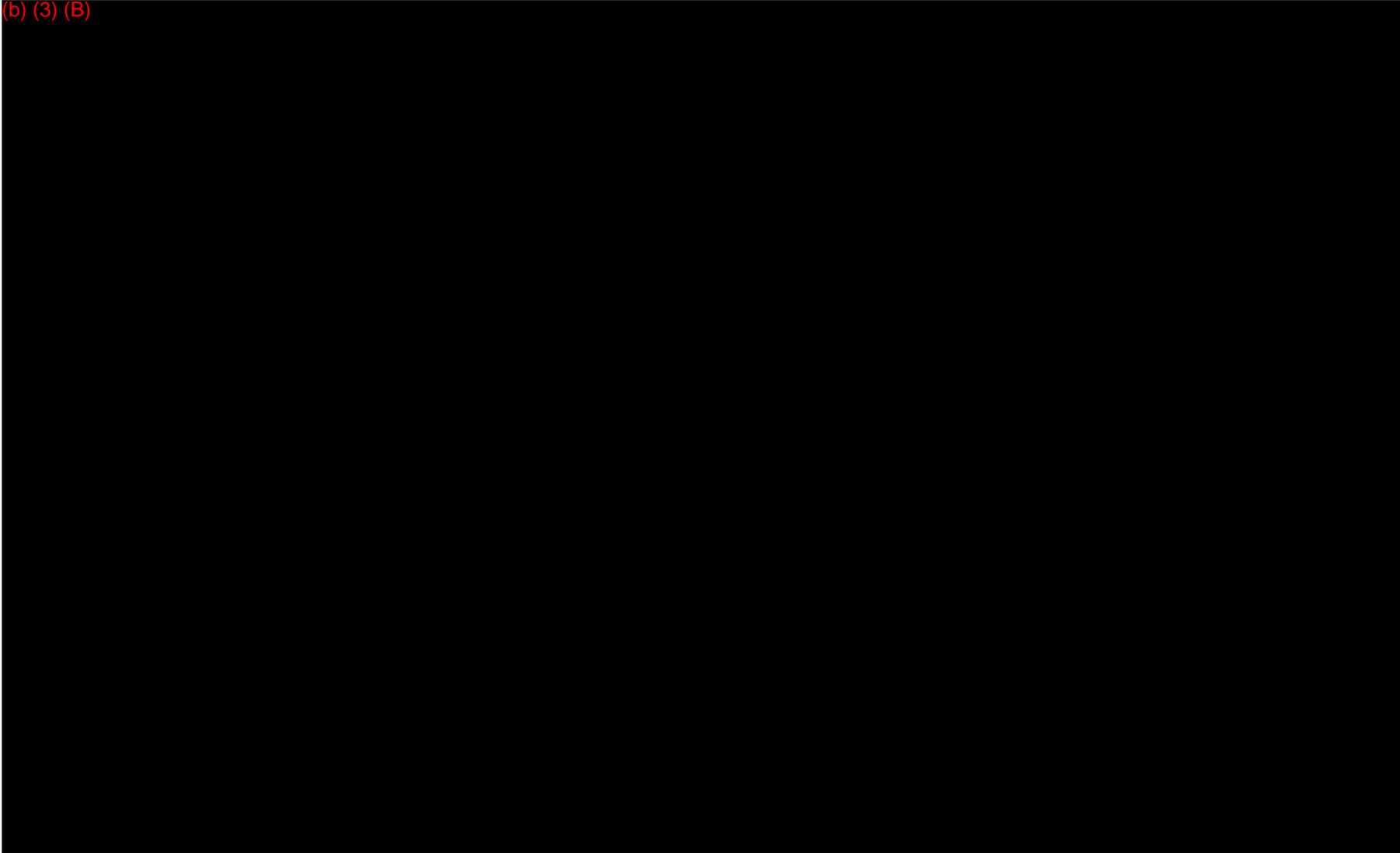
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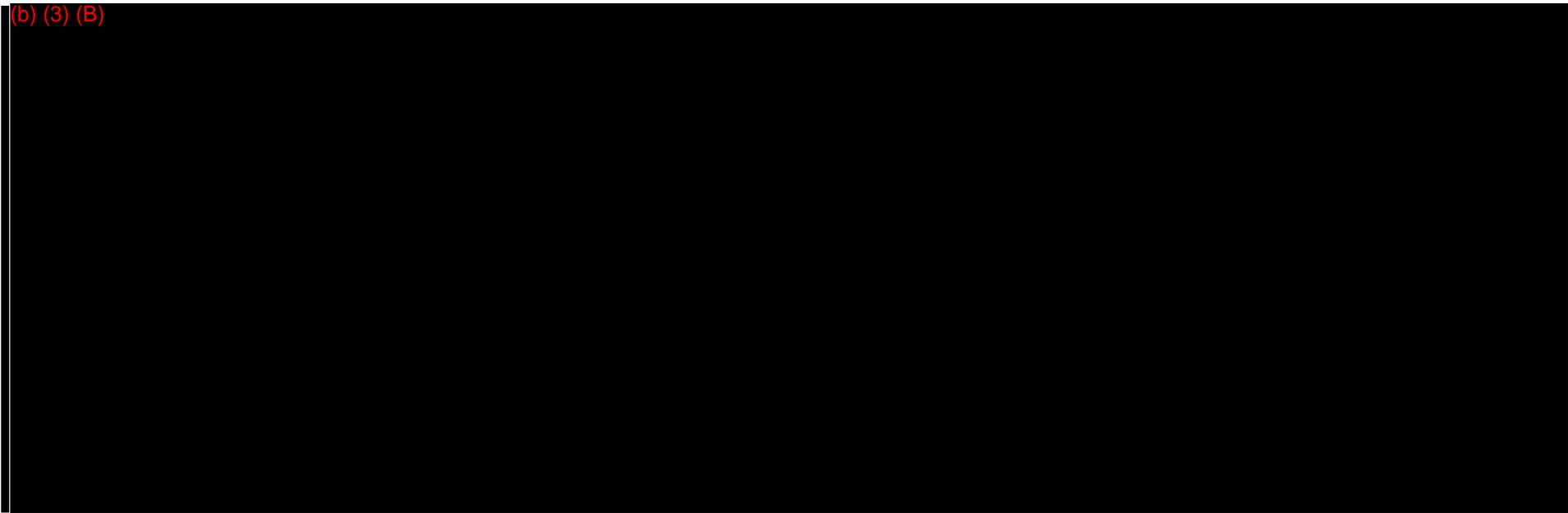
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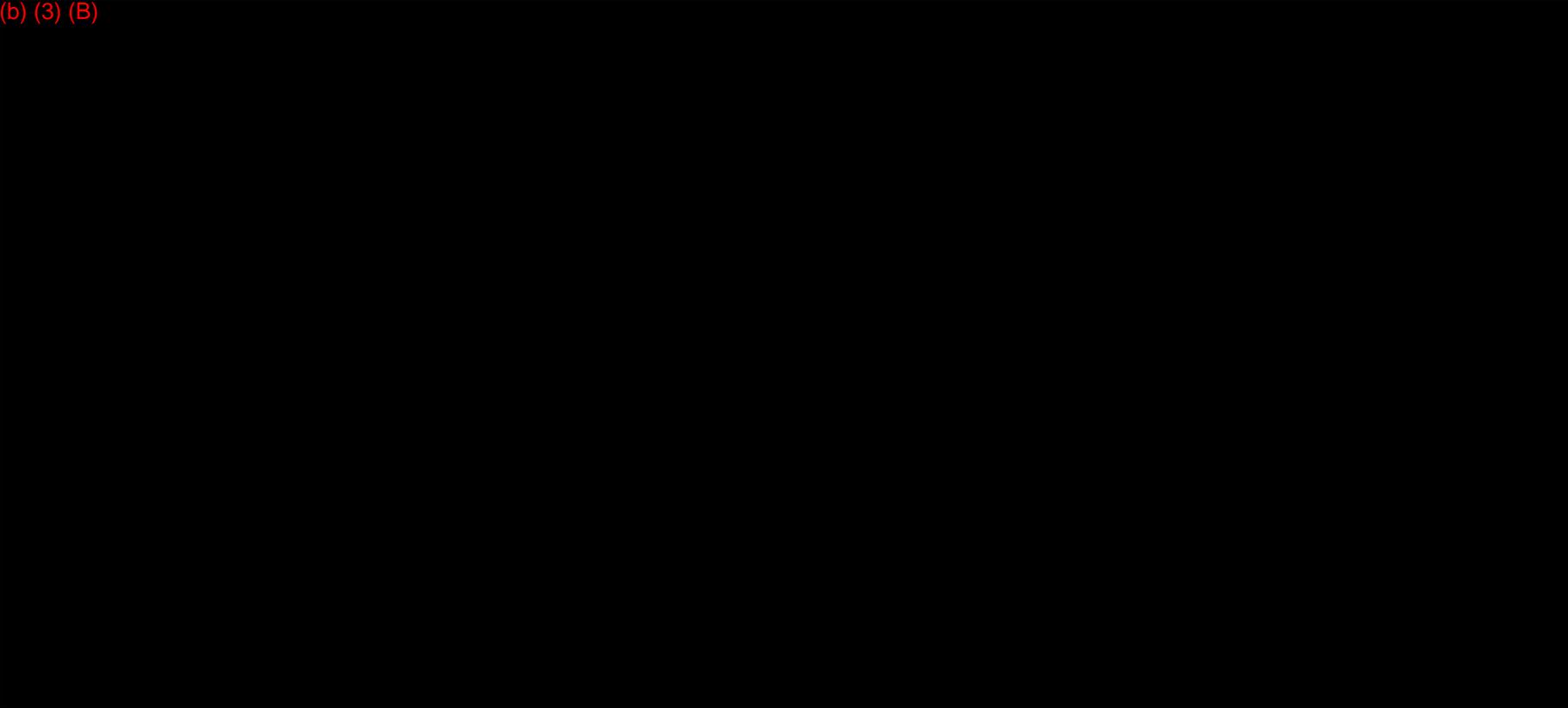
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(b) (3) (B)



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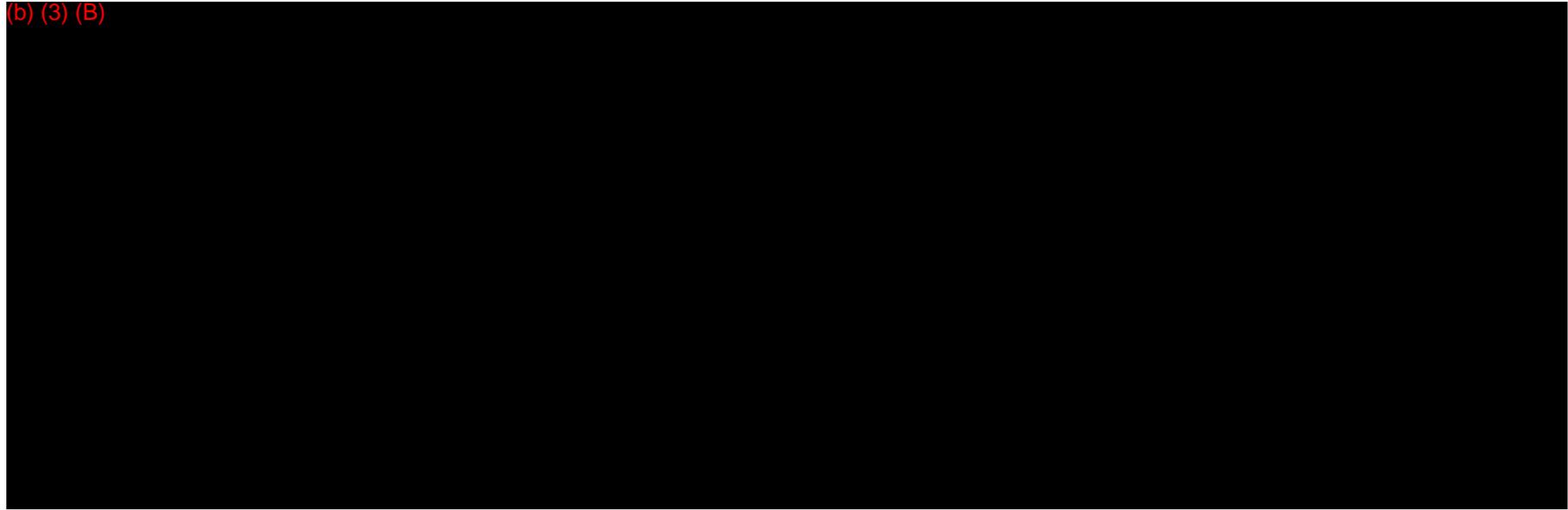


<b>Vehicle Baseline Review (VBR) Interim Milestone for PCM-1</b> <b>(As proposed, interim NASA milestone in support of PFR)</b> <b>PFR Interim Milestone 02A.1</b>		<b>Planned Start Date and Completion Date (mo/yr):</b> (b) (3) (B) <b>No Final RID Board</b>
<b>Objective:</b> At no later than 18 months prior to launch (L-18 mo), the Contractor shall co-chair a Vehicle Baseline Review (VBR) with NASA that establishes the integrated mission CTS configuration (launch vehicle, orbital vehicle, and ground systems) that accommodates NASA requirements for crew and cargo transportation. The intent of the VBR is to establish the baseline CTS for the mission and identify any design or operation changes from the previous and the corresponding plans for executing and verifying these changes. The content for the VBR shall include:		
<b>Indicators of Milestone Readiness:</b>	<b>Data / DRDs to be provided:</b>	<b>Delivery of Data/DRDs (mo/yr)</b>
The Contractor shall, at this review:		
Mission Baseline CTS:		
a) Baseline the post certification mission objectives, to include crew and cargo complement, and associated baseline CTS configuration, including ground accommodation specific interfaces and service agreements, so that mission integration efforts have definite configuration, environments and performance capabilities identified.	Data to be transmitted IAW DRD 202 PCM WP	(b) (3) (B)
b) Reconfirm the launch window as defined per Clause H.20, Adjustments to Post Certification Mission Schedule.	Data to be transmitted IAW DRD 202 PCM WP	(b) (3) (B)
c) Provide, if necessary, an updated DRD 201, Mission Integration and Operations Management Plan (MIOMP), and if necessary, an updated DRD 202, Post Certification Mission (PCM) Work Plan.	(MIOMP) Data to be transmitted IAW DRD 201 (PCM WP) Data to be transmitted IAW DRD 202 PCM WP.	

<b>Vehicle Baseline Review (VBR) Interim Milestone for PCM-1</b> <b>(As proposed, interim NASA milestone in support of PFR)</b> <b>PFR Interim Milestone 02A.1</b>	<b>Planned Start Date and Completion Date (mo/yr):</b> <b>(b) (3) (B)</b> <b>No Final RID Board</b>	
d) Provide, as required, an update to the mission specific instrumentation plan and the Vehicle Interface Definition Document (IDD) in accordance with DRD 203, Vehicle Interface Definition Document (IDD).	Data to be transmitted IAW DRD 203	IAW DRD 203
Design And Operation Changes From Prior Mission Baseline CTS: The Contractor shall, at this review, identify any design and operation changes from the previous mission baseline CTS.		(b) (3) (B)
a) Identify all CCT-1100 series and SSP 50808, ISS to Commercial Orbital Transportation Services (COTS) Interface Requirements Document(IRD), requirements that require re-verification and have been allocated to the appropriate system, subsystem and/or component level. Demonstrate requirements flow down is adequate to verify compliance with CCT-1100 series and SSP 50808.	Data to be transmitted IAW DRD 202 PCM WP	
b) Identify any hazards, controls, or verifications that are affected by design changes.	Data to be transmitted IAW DRD 202 PCM WP	
c) Discuss analyses and tests to be performed to execute these designs and operation changes and include their methodology, assumptions and results, along with comparisons to any similar proven designs.	Data to be transmitted IAW DRD 202 PCM WP	
d) Show how these changes affect performance, reliability and environments and associated risks.	Data to be transmitted IAW DRD 202 PCM WP	
e) Discuss how previous In-Flight Anomaly (IFA) and previous production non-conformances affect the mission baseline.	Data to be transmitted IAW DRD 202 PCM WP	
f) Present the status or results of any mission unique or special study task assessments requested by NASA.	Data to be transmitted IAW DRD 202 PCM WP	

<b>Vehicle Baseline Review (VBR) Interim Milestone for PCM-1</b> (As proposed, interim NASA milestone in support of PFR) <b>PFR Interim Milestone 02A.1</b>	<b>Planned Start Date and Completion Date (mo/yr):</b> (b) (3) (B) <b>No Final RID Board</b>	
g) Provide a schedule to complete all work required to accomplish the design changes and close requirement verifications prior to Mission Certification Review (MCR).	Data to be transmitted IAW DRD 002	(b) (3) (B)
h) Provide updates to design margins (spacecraft and launch vehicle) if margins changed.	Data to be transmitted IAW DRD 202 PCM WP	(b) (3) (B)
i) Identify updates to the overall system architecture including ground accommodation specific interfaces and service agreements.	Data to be transmitted IAW DRD 202 PCM WP	(b) (3) (B)
j) Identify any mission unique and unproven processes, risks and mitigation plans.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
k) Present the operations concept to satisfy mission objectives.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
l) Identify updates to operational products, personnel certification, facilities changes, and provide any scope and/or schedule changes for crew training.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
m) Status crew related items to be proposed by the Contractor in the MIOMP.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
<b>Acceptance Criteria:</b>		
(b) (3) (B)		

(b) (3) (B)

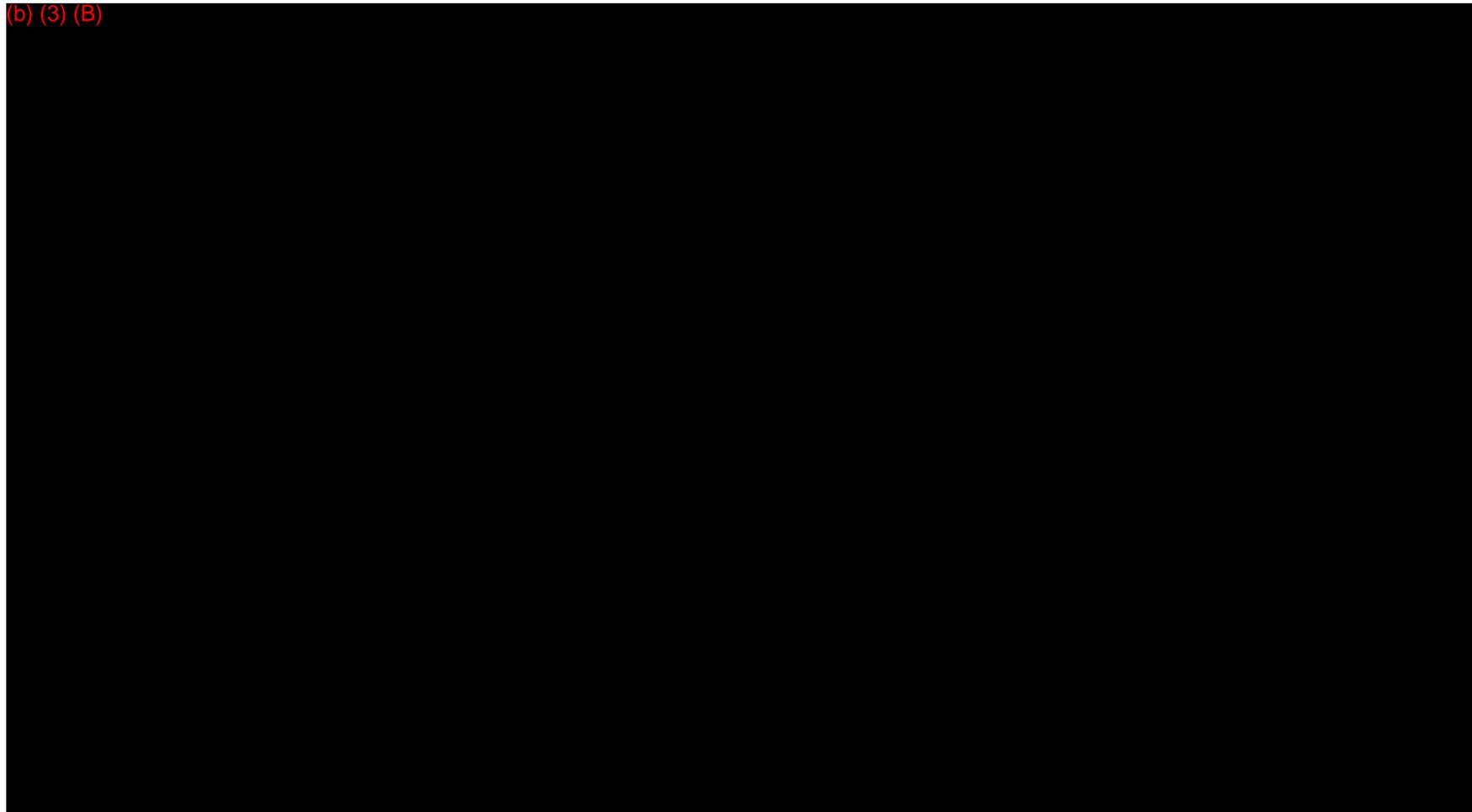


<b>Mission Integration Review (MIR) Interim Milestone for PCM-1</b>		<b>Planned Start Date and Completion Date (mo/yr):</b>
<b>(As proposed, interim NASA milestone in support of PFR) PFR Interim Milestone 02A.2</b>		<b>(b) (3) (B)</b> <b>No Final RID Board</b>
<b>Objective:</b>		
At no later than (NLT) thirteen (13) months prior to launch (L-13 mo), the Contractor shall co-chair a Mission Integration Review (MIR) with NASA with a current mission integration status. NASA and Contractor will review and baseline the conditions and inputs for mission specific analytical assessments. The Contractor shall demonstrate CTS operations and production activities support the launch date. A status of all open items presented at VBR shall be presented at this review. For open items, schedule plans for completion shall be presented. All milestones to this point shall have been met. The content for the MIR shall include:		
<b>Indicators of Milestone Readiness:</b>	<b>Data / DRDs to be provided:</b>	<b>Delivery of Data/DRDs (mo/yr)</b>
A. Mission Baseline CTS:. The Contractor shall, at this review:		
a) Reconfirm the launch window as defined in Table H.20.1, Launch Windows for PCM ATP Prior to ISS DCR, or defined in Table H.20.2, Launch Windows for PCM ATP After ISS DCR, per Clause H.20, Adjustments to Post Certification Mission Schedule.	Data to be transmitted IAW DRD 202 PCM WP	(b) (3) (B)
b) Provide, as required, an update to DRD 203 Vehicle Interface Definition Document (IDD) and an update to the mission specific instrumentation plan for the Vehicle Interface Definition Document (IDD).	Data to be transmitted via DRD 203	(b) (3) (B)
c) Provide initial data and parameters for Mission Success Determination per Clause H.21, Post Certification Mission Success Determination.	Data to be transmitted IAW DRD 202 PCM WP	(b) (3) (B)
d) Provide, if necessary, an updated DRD 201 Mission Integration and Operations Management Plan (MIOMP) and if necessary, an updated DRD 202 Post Certification Mission PCM Work Plan.	Data to be transmitted via DRD 201	(b) (3) (B)

<b>Mission Integration Review (MIR) Interim Milestone for PCM-1</b> <b>(As proposed, interim NASA milestone in support of PFR)</b> <b>PFR Interim Milestone 02A.2</b>	<b>Planned Start Date and Completion Date</b> <b>(mo/yr):</b> <b>(b) (3) (B)</b> <b>No Final RID Board</b>	
e) Provide initial DRD 204 MRAD	Data to be transmitted via DRD 204	IAW DRD 204
<b>B. Design Changes From Prior Mission Baseline CTS: The Contractor shall:</b>		
a) Present designs and their supporting analyses that implement mission unique requirements.	Data to be transmitted IAW DRD 202 PCM WP	(b) (3) (B)
b) Present progress in manufacturing and lay out remaining milestones and risks to accomplishing them.	Data to be transmitted IAW DRD 202 PCM WP	(b) (3) (B)
c) Present progress towards closure of CCT-1100 series and SSP 50808 requirements, and lay out remaining milestones and risks to accomplishing them.	Data to be transmitted via DRD 002	(b) (3) (B)
d) Present progress of ISS integration and integrated safety hazard assessments. Integrated safety analysis identifying any remaining hazards and proposed resolution per CCT-PLN-1120, Section 4.5, Integrated Safety Review Process.	Data to be transmitted via DRD 110 and DRD 111	IAW DRD 110 and 111
e) Present progress for changes identified at VBR for:		
(1) The overall system architecture including ground accommodation specific interfaces and service agreements.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
(2) Mission unique and unproven processes, risks and mitigation plans.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)

<b>Mission Integration Review (MIR) Interim Milestone for PCM-1</b> <b>(As proposed, interim NASA milestone in support of PFR)</b> <b>PFR Interim Milestone 02A.2</b>	<b>Planned Start Date and Completion Date (mo/yr):</b> <b>(b) (3) (B)</b> <b>No Final RID Board</b>	
(3) Operational products, including personnel certification, facilities and crew training.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
f) Discuss how technical problems and anomalies have been resolved and effects of design changes on system performance, reliability and safety..	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
g) Discuss how simulations and prototyping results for CTS do not present any potential mission risks.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
h) Present defined test plans for CTS.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
i) Status crew related items to be proposed by the Contractor in the MIOMP.	Data to be provided IAW DRD 201	(b) (3) (B)
<b>Acceptance Criteria:</b>		
(b) (3) (B)		

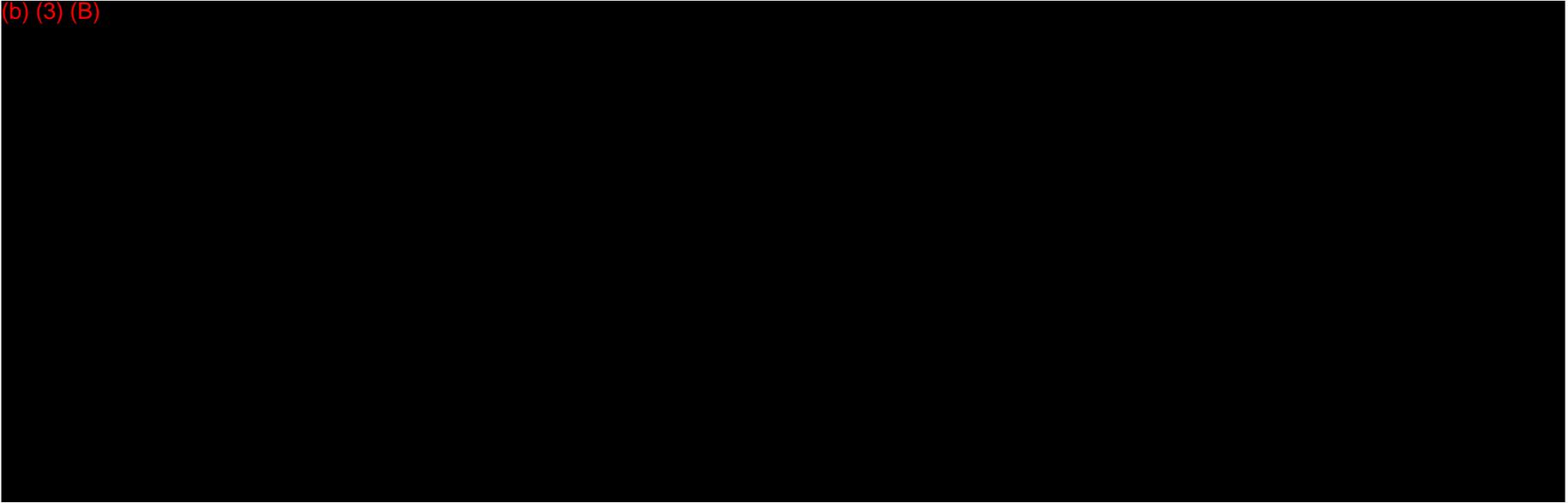
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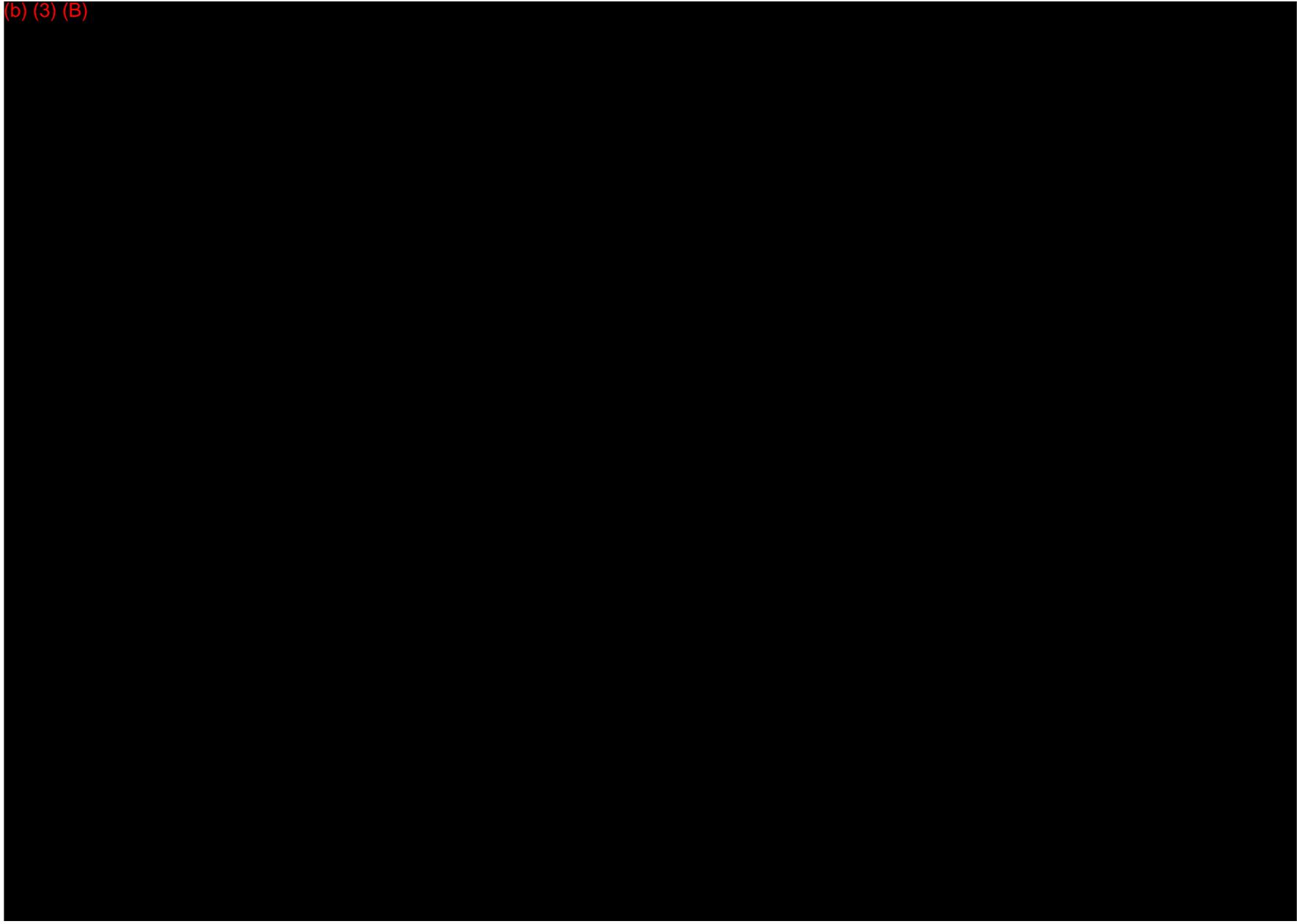
(b) (3) (B)



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<b>Mission Certification Review (MCR) Interim Milestone for PCM-1</b> <b>(As proposed, interim NASA milestone in support of PFR)</b> <b>PFR Interim Milestone 02A.3</b>		<b>Planned Start Date and Completion Date (mo/yr):</b> (b) (3) (B) <b>No Final RID Board</b>
<b>Objective:</b> After NASA Certification has been granted, and no later than four (4) months prior to launch (L-4 mo), the Contractor shall co-chair with NASA a Mission Certification Review (MCR) that allows NASA to assess if the Contractor has completed certification of all requirements, has completed ISS integration, has all infrastructure, facilities, personnel, and services in place, and will be ready for the mission and for crewed operations, including agreement on cargo turnover and crew handover. A status of all open items presented in both the VBR and MIR shall be presented at this review. All mission unique design qualification and acceptance testing shall be complete. For open items, schedule plans for completion shall be presented. All milestones to this point shall have been met. The content for the MCR shall include:		
<b>Indicators of Milestone Readiness:</b>	<b>Data / DRDs to be provided:</b>	<b>Delivery of Data/DRDs (mo/yr)</b>
The Contractor shall, at this review:		
a) Reconfirm the launch window as defined in table H.20.1, Launch Windows for PCM ATP Prior to ISS DCR, or defined in Table H.20.2, Launch Windows for PCM ATP after ISS DCR, per clause H.20, Adjustments to Post Certification Mission Schedule.	Data to be transmitted IAW DRD 202 PCM WP	(b) (3)
b) Provide the final specific mission instrumentation plan and an update, as required, to DRD 203 Vehicle Interface Definition Document (IDD).	Data to be transmitted IAW DRD 203	IAW DRD 203
c) Present evidence of verification closures for mission unique designs and requirements.	Data to be transmitted IAW DRD 111	IAW DRD 111
d) Present evidence of verification closures for all open CCT-1100 series and SSP 50808 requirements.	Data to be transmitted IAW DRD 111	IAW DRD 111

<b>Mission Certification Review (MCR) Interim Milestone for PCM-1</b> <b>(As proposed, interim NASA milestone in support of PFR)</b> <b>PFR Interim Milestone 02A.3</b>	<b>Planned Start Date and Completion Date (mo/yr):</b> <b>(b) (3) (B)</b> <b>No Final RID Board</b>	
e) Provide all analytical assessments that show the compatibility of crew and cargo mass, when applicable, with the launch and spacecraft such as integrated loads, Launch to Activation thermal assessments, electromagnetic interference (EMI), propellant resources and power.	Data to be transmitted IAW DRD 204	IAW DRD 204
f) Present status of all anomalies and associated corrective actions showing low-risk closure plans in place to completion prior to ISS Stage Operational Readiness Reviews (SORR) / Flight Readiness Review (FRR).	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
g) Present evidence that all Safety Assessments have been approved by NASA.	Data to be transmitted IAW DRD 110, 113 and 207	IAW DRD 110, 113 and 207
h) Present evidence that all open items in both the VBR and MIR have been closed or present plans showing low risk to completion prior to SORR/ FRR.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
i) Provide final data and parameters for mission success determination.	Data to be transmitted IAW DRD 204	IAW DRD 204
j) Reach agreement on NASA identified Launch Commit Criteria (LCC) constraints concerning CTS, ISS, crew, and cargo.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3)
k) Present evidence that all operational products, plans, processes and training are complete or present plans showing low risk to completion prior to SORR/ FRR.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (b) (B)
l) Define the post flight data for review.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)
m) Present status of crew related items to be proposed by the Contractor in the MIOMP.	Data to be provided at meeting IAW DRD 202 PCM WP	(b) (3) (B)

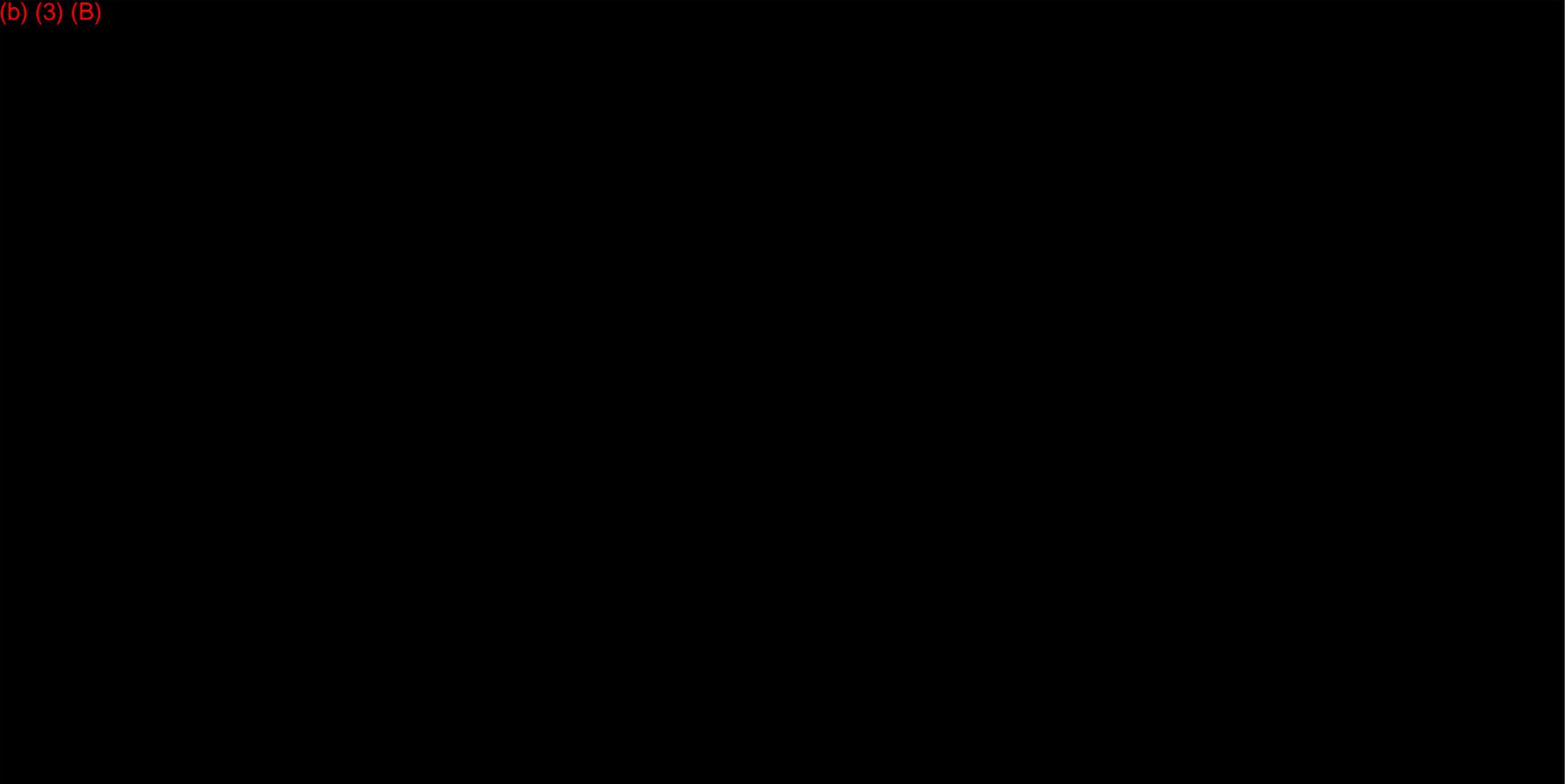
<b>Mission Certification Review (MCR) Interim Milestone for PCM-1</b> (As proposed, interim NASA milestone in support of PFR) <b>PFR Interim Milestone 02A.3</b>	<b>Planned Start Date and Completion Date (mo/yr):</b> (b) (3) (B)
n) Present status of acceptance testing (launch vehicle and spacecraft).	Data to be provided at meeting IAW DRD 202 PCM WP (b) (3) (B)
<b>Acceptance Criteria:</b>	
(b) (3) (B)	

<b>Mission Certification Review (MCR) Interim Milestone for PCM-1</b> <b>(As proposed, interim NASA milestone in support of PFR)</b> <b>PFR Interim Milestone 02A.3</b>	<b>Planned Start Date and Completion Date</b> <b>(mo/yr):</b>
[Redacted]	<b>(b) (3) (B)</b> <b>No Final RID Board</b>
<b>(b) (3) (B)</b>	[Redacted]

<b>Flight Readiness Review (FRR) Interim Milestone for PCM-1</b>		<b>Planned Start Date and Completion Date (mo/yr):</b>
<b>(As proposed, interim NASA milestone in support of PFR) PFR Interim Milestone 02A.4</b>		<b>(b) (3) (B)</b> <b>No Final RID Board</b>
<b>Objective:</b>		
At approximately two (2) weeks prior to launch, (4.62) the Contractor shall support the NASA Flight Readiness Reviews (FRRs). The Contractor shall provide a mission specific DRD 208, Flight Readiness Review Data Package in support of the FRR. The support will confirm the following.		
<b>Indicators of Milestone Readiness:</b>	<b>Data / DRDs to be provided:</b>	<b>Delivery of Data/DRDs (mo/yr)</b>
a) All critical items required to proceed into final launch countdown are ready.	Data to be transmitted IAW DRD 208	
b) All CTS systems have been verified for launch.	Data to be transmitted IAW DRD 111	IAW DRD 111
c) All previously held Contractor readiness review actions have been closed or resolved.	Data to be transmitted IAW DRD 208	(b) (3) (B)
d) Launch Site, Range, FAA, and recovery support organizations have committed to launch.	Data to be transmitted IAW DRD 208	(b) (3) (B)
e) Tracking and data support resources have committed to launch.	Data to be transmitted IAW DRD 208	(b) (3) (B)
f) Any open work or constraints to launch are identified and closeout plans and schedules are in place and supportable.	Data to be transmitted IAW DRD 002	(b) (3) (B)
g) Residual mission risks are known, documented, and presented for acceptance.	Data to be transmitted IAW DRD 208	(b) (3) (B)

<b>Flight Readiness Review (FRR) Interim Milestone for PCM-1</b> (As proposed, interim NASA milestone in support of PFR) <b>PFR Interim Milestone 02A.4</b>	<b>Planned Start Date and Completion Date (mo/yr):</b> (b) (3) (B) <b>No Final RID Board</b>	
h) Operational elements are ready to support all phases of the mission.	Data to be transmitted IAW DRD 208	
<b>Acceptance Criteria:</b>		
(b) (3) (B)		

(b) (3) (B)



<b>Post Flight Review Delivery Milestone for PCM-1</b>		<b>Planned Start Date and Completion Date (mo/yr):</b>
<b>(As proposed, NASA delivery milestone)</b>		(b) (3) (B)
<b>Delivery Milestone 02A.5</b>		<b>No Final RID Board</b>
<b>Objective:</b>		
<p>The Contractor shall conduct Post Flight Reviews with NASA participation to assess mission success supporting data in accordance with DRD 209 Post Flight Assessment Report. Following landing, the contractor shall assess CCTS system performance for ascent, rendezvous and docking; quiescent docked operations; undocking, entry and landing; post landing crew recovery. The review shall include a preliminary review of predicted vs. actual performance; evaluation of actual vs. predicted environments; a summary of any anomalies (flight hardware and ground systems) from start of LV tanking through crew recovery and their impacts on execution of the flight and preliminary assessment of flight crew and ground personnel training.</p>		
<b>Indicators of Milestone Readiness:</b>	<b>Data / DRDs to be provided:</b>	<b>Delivery of Data/DRDs (mo/yr)</b>
The Contractor shall, at this review:		
a) Landing completed		
b) Provide updated quick-look report in accordance with DRD 209, Post Flight Assessment Report. The contractor shall present their determination of meeting the mission success criteria that was finalized at MCR. A final written DRD 209 post flight report shall be provided NLT 60 days following landing, but submittal of that report is not a constraint on closure of this milestone.	Data to be transmitted IAW DRD 209	(b) (3) (B)
c) The contractor shall present their determination of meeting the mission success criteria that was finalized at MCR.	Data to be provided at review IAW DRD 202 PCM WP	
<b>Acceptance Criteria:</b>		
(b) (3) (B)		

The following table details the planned dates for the identical milestones/reviews for PCM-2.

**Table 4.0-1 Planned PCM-2 Dates**

Milestone Number	Milestone / Review	Date	Review Doc Delivery
(b) (3) (B)			
02B.1	PCM-2 Vehicle Baseline Review (VBR)	(b) (3) (B)	
02B.2	PCM-2 Mission Integration Review (MIR)	(b) (3) (B)	
(b) (3) (B)			
02B.3	PCM-2 Mission Certification Review (MCR)	(b) (3) (B)	
02B.4	PCM-2 FRR	(b) (3) (B)	
(b) (3) (B)			
02B.5	PCM-2 Post Flight Review	(b) (3) (B)	