

Adapting MRL Process for Sustainment (Depot/MRO)

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The Approach

- **Adapting MRL criteria can be effective when assessing Maintenance, Repair & Overhaul (MRO) activities in Depot operations (a.k.a., Sustainment)**
 - Mainly product related (MRLs 5-10)
 - Depots are an important part of the US Industrial Base
 - Depot terminology is a current stumbling block
- **Need to obtain experienced SME input in adapting criteria to MRO activities**
 - While Depot operations are not, generally, new product manufacturing; they ARE manufacturing operations
 - The MRL Deskbook criteria will support most Depot operations with only minor terminology adaptations

Need to preserve the basic MRL matrix framework



Example 1

- **Depot Activation**
 - C.3 for MRLs 6-7 would need wording to clarify that 'MS C' correlates to 'Depot Activation' event

Version 11.3		14-Jun-12		
		DoD Manufacturing Readiness Level		
Acquisition Phase		Technology Development (TD)		Engineering & Mfg I
Technical Reviews		SRR/SFR	PDR	CDR
Thread	Sub-Thread	MRL 5	MRL 6	MRL 7
	Technology Maturity	Should be assessed at TRL 5.	Should be assessed at TRL 6.	Should be assessed at TRL 7
	C.3 - Manufacturing Investment Budget	Program has updated budget estimate for reaching MRL 6 by MS B. All outstanding MRL 5 risk areas understood with approved mitigation plans in place.	Program has reasonable budget estimate for reaching MRL 8 by MS C. Estimate includes capital investment for production representative equipment by CDR and pilot line equipment by MS C. All outstanding MRL 6 risk areas understood with approved mitigation plans in place.	Program has updated budget estimate for reaching MRL 8 by MS C. All outstanding MRL 7 risk areas understood with approved mitigation plans in place.
Sub-assemblies and Sub-	D.1 - Maturity	Materials have been manufactured or produced in a prototype environment (may be in a similar application/program). Maturation efforts in place to address new material production risks for technology demonstration.	Material maturity verified through technology demonstration articles. Preliminary material specifications in place and material properties have been adequately characterized.	Material maturity sufficient for pilot line build. Material specifications approved.
	D.2 - Availability	Availability issues addressed for prototype build. Significant material risks identified for all materials. Planning has begun to address scale-up issues.	Availability issues addressed to meet EMD build. Long-lead items identified. Components assessed for future DMSMS risk.	Availability issues addressed to meet LRIP builds. Long lead procurement identified and mitigated. DMSMS mitigation strategies for components in place.

Example 2

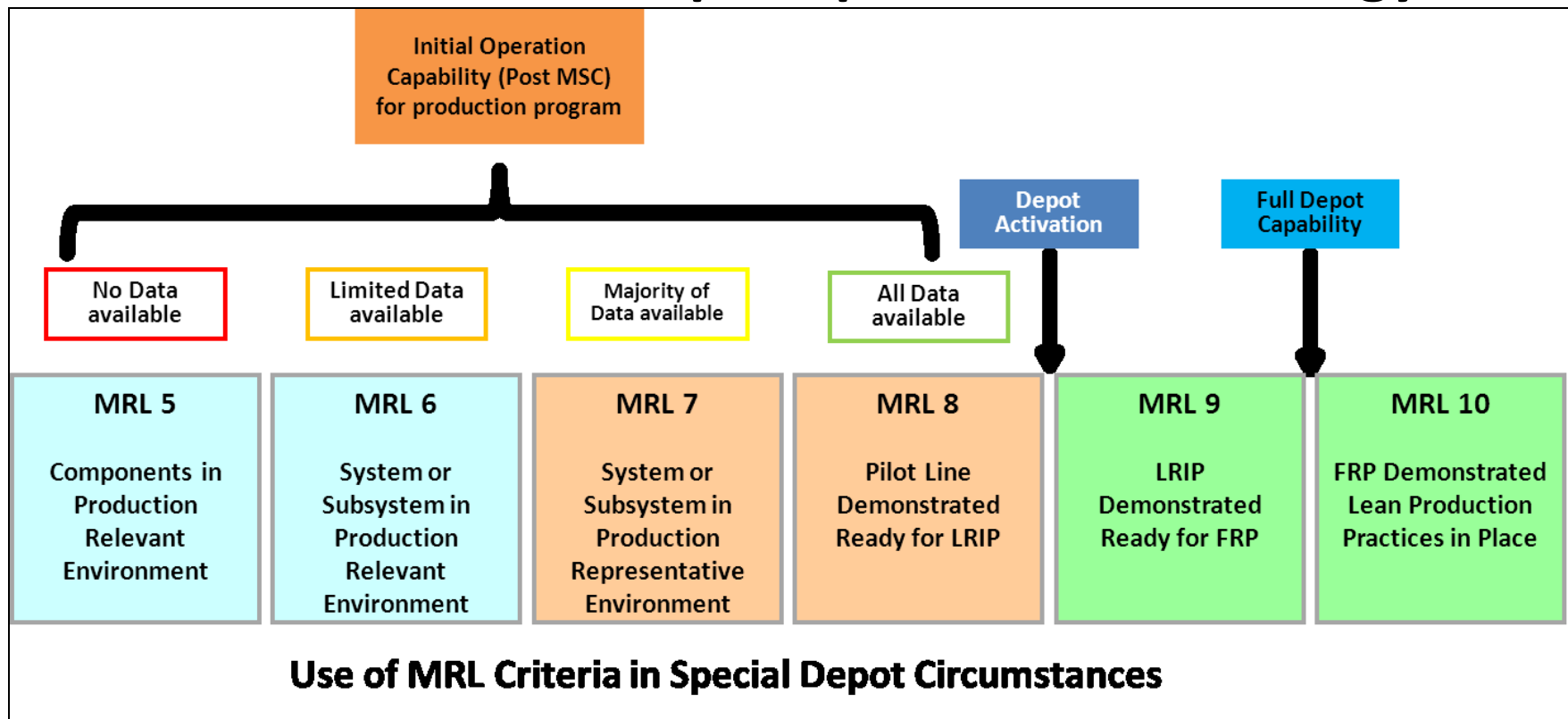
- Assessing a sub tier supplier (Ma and Pa)
 - E.1 – perhaps modeling and simulation is not needed or not a part of the process , i.e., N/A?

	A	B	G	H	I
1	Version 11.3	14-Jun-12			
2	DoD Manufacturing Readiness Levels (MRLs)				
3	Acquisition Phase		Technology Development (TD)		Engineering & Mfg I
4	Technical Reviews		SRR/SFR	PDR	CDR
5	Thread	Sub-Thread	MRL 5	MRL 6	MRL 7
6		Technology Maturity	Should be assessed at TRL 5.	Should be assessed at TRL 6.	Should be assessed at TRL 7
18	ss Capability & Control	E.1 - Modeling & Simulation (Product & Process)	Initial models/simulation (product or process) developed at the component level and used to determine constraints.	Initial models/simulation developed at the sub-system or system level, and used to determine system constraints.	Models/simulation used to determine system constraints and identify improvement opportunities.
19		E.2 - Manufacturing Process Maturity	Maturity has been assessed on similar processes in production. Process capability requirements have been identified for pilot line, LRIP and FRP.	Manufacturing processes demonstrated in production relevant environment. Begin collecting or estimating process capability data from prototype build and refine process capability requirements.	Manufacturing processes demonstrated in a production representative environment. Continue collecting or estimating process capability data and refine process capability requirements.



Example 3

- **Depot Activation/Full Depot Capability**
 - Some MRL criteria would need wording to clarify how the criteria correlates to ‘Depot Activation’ event and other Depot operation terminology





Conclusion

- **The MRL Deskbook criteria will support most Depot operations with only minor terminology adaptations**
 - **Keys:**
 - *Preserving the basic MRL matrix framework*
 - *Making it relevant to MRO activities*
 - *Ensuring the adaptations have adequate rationale and traceability to MRL Matrix (thru 'MRL Users Guide')*
- **Goal - Providing instructions and best practices for adapting MRLs to more effectively and efficiently implement MRLs for Depot operations**
- **Note – basic MRL Matrix should be able to handle most situations with only minor adaptations**