**GUIDANCE for developing a focus materials managemement plan**

**Version: #1**

***Guidance is intended to offer further explanation of the requirements in the R2 Standard along with examples and audit recommendations. However, this document is not auditable and cannot be cited in relation to any nonconformances. The explanations are intended to prevent misinterpretation of the R2 Standard, not to add to, subtract from, or modify the R2 Standard. The examples cited may not be the only way to fulfill a requirement of the standard.***

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When developing your Focus Materials Management Plan (FMMP), consider each of the steps and key questions highlighted below to help guide you through the process and facilitate the development of a comprehensive plan. Each section relates to a specific requirement or element of a requirement in the R2v3 Standard, so be sure to thoroughly assess all of the information provided.

***Note that the FMMP is unique to each R2 Facility and the specific operations performed, and must address all:***

* ***Types of used electronic equipment managed by the facility;***
* ***Focus Materials (FMs) managed, including those contained within electronic equipment and components;***
* ***Operations related to the processing of each FM and FM containing device; and***
* ***Downstream vendors used to process FMs and equipment containing FMs such as untested and non-functional devices.***

For each section below, note in detail how the questions and examples provided specifically apply to your facility’s operations. Also indicate any associated resources required to implement the R2 requirement or demonstrate conformance with it or the plan. Resources may include procedures, work instructions, checklists and forms (existing or to be developed) that support the management of focus materials under the control of your facility. Some sample notes have been provided in the form to demonstrate one method for capturing your responses, but other methods may be used. Also, it is important to note that the details indicated are examples only and must be expanded upon or revised as applicable to your facility’s operations.

Your responses in each of these sections will provide the initial framework for your FMMP, so provide as much detail as possible. And, keep in mind that the plan will need to be regularly reviewed and revised as necessary, particularly where there are any changes in equipment or materials managed, or the downstream vendors or processing methods used.

| **Step #1: Identify all Focus Materials (FMs) managed by your facility** |
| --- |
| **Reference** | **Key Questions & Considerations** | **Notes** |
| 8.(a) | The intent of the **Focus Materials Management Plan** (FMMP) is to ensure that R2 Facilities identify all FMs under their control and then manage the FMs, including any items containing FMs, in accordance with the R2 requirements. The FMMP applies not only to the R2 Facility’s operations, but also throughout the entire downstream recycling chain.In order to start the FM planning process, each R2 Facility must analyze the inbound electronic equipment, components and materials that it manages to determine which FMs the facility controls.What types of electronic equipment, components and materials does your facility manage? | *Note each type of electronic equipment, component and material that your facility manages. For example:*

|  |  |  |
| --- | --- | --- |
| ***Equipment*** | ***Components*** | ***Materials*** |
| * *Laptop computers*
 | * *Hard drives*
 | * *Batteries*
 |
| * *Cellular phones*
 | * *Power supplies*
 | * *Circuit boards*
 |
| * *Tablets*
 | * *Power adapters*
 | * *CRT tubes*
 |
| * *LCD Monitors*
 | * *etc.*
 | * *etc.*
 |
| * *Printers*
 |  |  |
| * *etc.*
 |  |  |

 |
| 8.(a) | Items that are considered **Focus Materials** (FMs), are identified in the *Definitions* section of R2v3 and they include the following items, as well as any used electronic equipment or components that contain any of these items: ***Polychlorinated biphenyls (PCBs); Mercury; CRT Glass; Batteries; Circuit Boards***.The types of FMs contained in electronic devices can vary significantly from device to device, as well as across different technologies.For example, a CRT TV or monitor would include leaded CRT glass and also circuit boards both of which are FMs. The transition to flat panel technologies enabled display devices to be produced without the use of CRT glass, however, some technologies use mercury containing lamps which are also a focus material. And, of course, even display devices produced without the use of CRT glass or mercury lamps will contain circuit boards.Another aspect to consider is that while some display devices may have a simple power cord with an internal power supply, other devices may have a cord with an attached power adapter that also contains a circuit board. So, as you can see, FMs can vary widely by device, so it is important to closely assess all inbound equipment, components and materials for FMs. For each of the inbound items identified in the previous step, what are the FMs related to those items? Be sure to include all untested and non-working items that contain FMs. | *For each type of equipment, component and material managed, identify the specific FMs related to that item. For example:*

|  |  |
| --- | --- |
| ***Item*** | ***FMs*** |
| *Laptop computers* | *Batteries* |
| *Circuit boards* |
| *Mercury lamps* |
| ***\**** *Untested or non-functioning laptops* |
| *Hard drives* | *Circuit Boards* |
| ***\**** *Untested or non-functioning hard drives* |
| *Lithium batteries* | *Batteries* |
| *etc.* | *…* |

***\**** *Since the FM containing equipment or component is untested or non-functioning, it must be treated as an FM**Note: All FMs must be properly managed in accordance with the R2 requirements, however, they may not always be present in the form identified above – the next step is used to determine the processes that yield FMs and the form in which they are present* |

| **Step #2: Identify the processes that yield FMs and the form in which they are present** |
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| **Reference** | **Key Questions & Considerations** | **Notes** |
| 8.(a) | Knowing the FMs that must be managed and the devices that contain them, the next step is to determine how the FMs move through your operations, because processing can create new streams of FMs.For example, if processing laptops for materials recovery and intact screens with mercury containing lamps are removed and shipped to a downstream vendor (DSV) for processing and recovery, then the entire screen needs to be tracked and managed as an FM. But, if further processing by the R2 Facility involves removing the mercury lamps then they need to be managed as the FM.This also means that processing and recovery of all FMs from an item, such as the lamps and any circuit boards, can result in a component like a screen being no longer considered an FM. Another scenario where an item would no longer be considered an FM, is after the test and repair process when it has been verified to be functioning. Any functioning device, as determined through an *Appendix C Test and Repair* process, is no longer an FM and does not require any further R2 processing or DSV verification.However, items that do not pass the functionality test, must still be treated as an FM. There are several options for managing non-functioning devices that include repair and retesting, to parts harvesting and materials recovery, but all require that the device be managed as an FM. How does your facility process each of the inbound equipment, component and material streams identified previously? What are the outputs from the processes and what new streams of FMs are produced? | *For each type of equipment, component and material managed, note the specific processes that item undergoes and the outputs from each process, clearly identifying those outputs that are FMs. For example:*

|  |  |  |  |
| --- | --- | --- | --- |
| ***Item*** | ***Process*** | ***Output*** | ***FM?*** |
| *Laptop computer* | *Test & repair* | *Tested & functioning laptops* | *No* |
| *Non-functioning laptops* | ***\**** *Yes* |
| *Parts harvesting* | *Hard drives* | ***\**** *Yes* |
| *Memory* | ***\**** *Yes* |
| *Non-functioning components* | ***\**** *Yes* |
| *Materials recovery* | *Laptop screens (w/ mercury lamps)* | ***\**** *Yes* |
| *Batteries* | ***\**** *Yes* |
| *Wires* | *No* |
| *Plastic* | *No* |
| *Hard drives* | *Test & repair* | *Tested & functioning hard drives* | *No* |
| *Non-functioning hard drives* | ***\**** *Yes* |
| *etc.* | *…* | *…* | *…* |

***\**** *All non-functioning outputs containing FMs require further R2 processing and DSV verification* |

| **Step #3: Determine the appropriate disposition for each FM** |
| --- |
| **Reference** | **Key Questions & Considerations** | **Notes** |
| 8.(a) | After identifying all FMs managed and the form in which they are present, the next step is to identify the appropriate disposition for each, and there are several aspects to consider, including:* Whether there are any legal requirements around the disposition of the FM
* The hierarchy of responsible management strategies
* The point of final disposition where it is no longer considered and FM

Where there are legal requirements that dictate the disposition of an FM, they should be clearly identified in the facility’s legal compliance plan and used to determine the point of final disposition. Note that in some cases, a legal requirement may not define a specific disposition, but rather it could outline conditions such as export restrictions that may otherwise guide the disposition.Considering the hierarchy of management strategies, materials recovery processes must be the primary strategy for managing FMs, as other disposal options are only permitted in limited circumstances. And, where materials recovery is not possible, there must be adequate evidence, such as the applicable legal requirement, to justify the need for disposal.Based on the above disposition requirements, determine the appropriate point of final disposition for each FM, ensuring that it aligns with an acceptable disposition as defined in the *Focus Materials* definition – *When tracking requirement stops* (R2v3, p. 7). Has your facility clearly identified and considered all disposition requirements? Has the point of final disposition been identified for each FM, and does it align with a disposition identified in the Focus Materials definition for the that FM? | *For each FM managed, define the appropriate point of final disposition based on all key requirements considered. For example:*

|  |  |  |  |
| --- | --- | --- | --- |
| ***FM*** | ***Final Disposition Legal Requirements*** | ***Hierarchy Stage*** | ***Point of Final Disposition*** |
| *Circuit Boards* | *None* | *Materials recovery* | *Smelted* |
| *Batteries* | *Export restrictions…* | *Materials recovery* | *Separated & recovered* |
| *Mercury* | *Export restrictions…* | *Materials recovery* | *Retorted* |
| *CRT Glass* | *Export restrictions…* | *Materials recovery* | *Smelted* |
| *PCBs*  | *Licensed incineration…* | *Disposal* | *Incinerated* |

*Note: Where FMs are commingled (e.g. circuit boards containing batteries), the requirements for each FM continue to apply. For example, if there is a prohibition on the export of batteries but not circuit boards, then all circuit boards must be free of batteries prior to export.* |

| **Step #4: Determine the steps and processes required to get the FMs to final disposition** |
| --- |
| **Reference** | **Key Questions & Considerations** | **Notes** |
| 8.(a)(2) | Since each FM has unique handling and disposition requirements, a network of qualified processors is generally required to manage these items to final disposition.As a result, for each FM containing equipment and material output that the R2 Facility generates, it must determine the subsequent processing steps in order to direct the FMs to their intended disposition.Depending on the state that the FM is in, such as recovered circuit boards or batteries, it may be possible for the R2 Facility to transfer the FMs directly to the final process. In other cases, such as for non-functioning whole devices, further downstream processing may be required to separate FMs before final disposition.One exception to managing the entire downstream recycling chain is if a facility uses an R2v3 Certified DSV and chooses to stop their downstream tracking and verification at that R2v3 Certified facility. In this case, the R2 Facility is only required to track their output to the R2v3 Certified vendor, however, any other FM outputs to other non-R2v3 DSVs must still be tracked to final disposition.Considering each of your facility’s FM containing equipment and material outputs, which can be directed to final disposition, and which require additional processing or management to get them to final disposition? What are the specific processes that are required to recover the FMs and ensure they reach final disposition? | *List all FM containing outputs from each of your facility’s processes. For each output, indicate the next processing step required along with the FMs to be recovered and whether it is the final disposition for the FM or not. For example:*

|  |  |  |  |
| --- | --- | --- | --- |
| ***R2 Facility’s Outputs*** | ***Next Step in Processing*** | ***FMs to be Recovered*** | ***Final Disposition?*** |
| *Non-functioning laptops* | *Manual dismantling & materials recovery* | *Circuit Boards* | ***\**** *No* |
| *Batteries* | ***\**** *No* |
| *Mercury* | ***\**** *No* |
| *Hard drives* | *Mechanical shredding & materials recovery* | *Circuit Boards* | ***†*** *R2v3 DSV* |
| *Lithium batteries* | *Thermal treatment & materials recovery* | *-* | *Yes* |
| *etc.* | *…* | *…* | *…* |

***\**** *Where the FM has not reached final disposition, further assessment of downstream process is required – See table below****†*** *Once transferred to an R2v3 DSV further downstream tracking or verification may not be required – See R2v3 Appendix A (4)(b) for conditions**Where the FMs have not reached final disposition through the first step in processing as identified above, list each subsequent step and the processing methods required until final disposition. For example:*

|  |  |  |  |
| --- | --- | --- | --- |
| ***DSV Process Outputs*** | ***Next Step in Processing*** | ***Output FMs*** | ***Final Disposition?*** |
| *Circuit boards* | *DSV Brokering* | *Circuit Boards* | *No* |
| *Circuit boards* | *DSV Smelting* | *-* | ***‡*** *Yes* |
| *Batteries* | *DSV Brokering* | *Batteries* | *No* |
| *Batteries* | *DSV Thermal treatment & materials recovery* | *-* | ***‡*** *Yes* |
| *Mercury lamps* | *DSV Mercury retorting* | *-* | ***‡*** *Yes* |
| *etc.* | *…* | *…* | ***…*** |

***‡*** *Once the FM has reached final disposition, no further downstream tracking or verification is required* |

| **Step #5: Determine the necessary abilities to process the FMs in the intended manner** |
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| **Reference** | **Key Questions & Considerations** | **Notes** |
| 8.(a)(1) | With each processing step identified through the entire recycling chain, the next aspect of the FMMP is to identify the key abilities that are required to process each device and FM in the intended manner at each stage in the process.In determining the necessary abilities, important aspects to consider are the specific types and levels of expertise and capabilities required. For example, consider whether there are specific skills, knowledge or experience required to safely and effectively process and recover the FM. Also, determine whether specific equipment, technology or operations are required not only for the processing, but also the handling and storage of FMs. As an example, there are a variety of different battery chemistries that can be found in electronic devices and they can have unique processing and recovery needs. So, when determining what is required to process the batteries, the unique needs for each specific chemistry managed must be considered, as opposed to treating all batteries the same. And, you must be sure to reflect these specific expertise and capability requirements in your DSV qualification process.For each processing step performed by your facility and each DSV, have the necessary expertise and capabilities for performing the process been identified?  | *For each processing step identified in the recycling chain, outline the necessary expertise and capabilities required to perform the process. Consider the following:** *Technical ability required to safely and effectively process and recover the FM including any equipment, technology or other resources necessary to support the process*
* *Skills, knowledge or experience related to the process*
* *Outputs and other results from the process that demonstrate effective processing through the intended method*
 |
| 8.(a)(2) | Another important aspect in the ability to perform the intended process adequately is having sufficient processing capacity. This means that the facility has the ability to receive and store the planned inbound volume of equipment or materials in a safe, secure and legally compliant manner, and also, the processing throughput to manage the volume in a timely manner.When assessing capacity needs, consider things like any regulatory limits on storage capacity and retention time; any levels established by permits or other approvals such as receiving or storage limits; and the R2v3 one-year storage limit for negative value materials.Has your facility identified the processing capacity requirements and any restrictions related to each process output?  | *For each processing step, determine any capacity requirements or other restrictions that may affect the ability to receive, store or process the inbound equipment or materials. Consider the following:** *The quantity of each equipment and material stream generated*
* *The duration of time from receipt to processing*
* *The process throughput quantities and duration*
* *Maximum inbound and processed material storage quantities*
* *Permitted, regulated or other storage limits on quantities and retention time*
* *One-year storage limit for R2 Controlled Streams and negative value items*
 |

| **Step #6: Record a flowchart of the downstream recycling chain for all FMs** |
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| **Reference** | **Key Questions & Considerations** | **Notes** |
| 8.(a)(3) | Once the DSVs have been appropriately qualified for each step in the process, the final aspect of the FMMP is to develop a flowchart detailing the downstream recycling chain for all FMs and FM containing equipment.The downstream flowchart demonstrates each FM containing output from the R2 Facility and the subsequent downstream processing and management steps, either to the point of final disposition, or the first R2v3 Certified facility.The downstream flow can contain some value information about the FMs and the handling processes, so be sure to include as much detail as possible, and also be specific. For instance, different battery chemistries will likely require different processing methods and therefore may go to different processors for final disposition. The flowchart must clearly identify each specific FM along with the related processing method and DSV. The flowchart must also clearly identify any international movements of FMs in order to know where import and export requirements may apply.Has a flowchart been developed to demonstrate all FMs and FM containing equipment output by your facility and each step in the downstream processing flow?Does the flowchart include all DSVs involved until final disposition? Or, if choosing to stop the downstream tracking and verification at the first R2v3, has that been recorded on the flow, and are you maintaining a way to track each DSVs certification status?Have international shipments of FMs been identified on the flow and are processes in place to ensure compliance of each shipment with any applicable import and export requirements? | *Compile the information captured in previous sections to develop the downstream recycling chain flowchart, including:** *Each FM containing output from your facility’s operations*
* *Each step in the downstream processing or management of the output until final disposition or the first R2v3*
* *Details of all DSVs including the location of the facility, the FMs managed, methods of processing and any FM outputs from their process*
* *Identifying any international movements of FMs*
 |

| **Step #7: Maintain the FMMP** |
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| **Reference** | **Key Questions & Considerations** | **Notes** |
| 8.(a) | Once the FMMP has been established, it is a valuable tool to guide the management and disposition of FMs and FM containing equipment throughout the entire recycling chain. However, the FMMP must be regularly maintained to ensure that it is current and reflective of all equipment, components and materials managed, the processes performed, and the outputs generated.Since any changes in inbound equipment or materials, processing methods or downstream vendors may necessitate an update to the FMMP, they should be planned for in advance and the FMMP revised accordingly prior to implementing any change.Does your facility have a method to identify new types of inbound equipment, components and materials prior to or upon receipt to assess them for FMs?Does your facility have a process to assess proposed changes in processes or operations against the requirements of the FMMP to ensure that necessary abilities have been assessed and are in place, and all FMs containing outputs have been identified? Does your facility have a process to review and update the FMMP prior to any changes in downstream vendors or processes performed?Has a process and schedule been developed to regularly review the FMMP and ensure that it is current and accurate? | *Ensure processes are in place to identify key changes in operations that may impact the FMMP, such as equipment or materials managed, processes performed or DSVs used. Consider the following:** *Processes are in place to identify any new types of equipment or materials that have not been included in the FMMP*
* *Processes are in place to assess planned changes in operations or processing methods to determine any potential impacts on FMs*
* *Processes are in place to qualify DSVs and any new processing methods before changes take place*
* *A schedule has been developed to conduct regular reviews of the FMMP*
 |