**1.    Processing for MESA Actigraphy Files**

1.1.    Find new actigraphy studies.   Actigraph studies will have the following naming convention: **ParticipantIDAcrosticTechID**.  PSG studies will "_PSG" added on the file name to distinguish them from actigraphy files.

1.2.    Unzip the folder using the encryption password.

1.3.    Open the folder and check for an AW5 file (actigraph) and PDF file (sleep journal).  There should be a single AW5 file and PDF file per submitted folder, each bearing the same naming convention as the folder.  The PDF file will have "_SJ" added to the end of the file name.
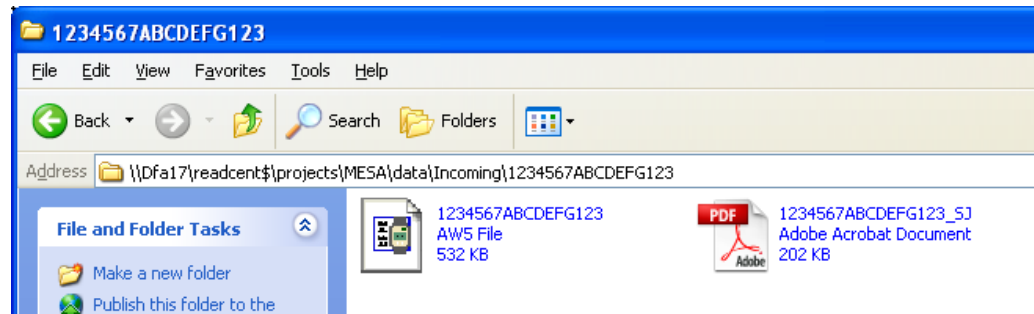


1.4.    Print the Sleep Journal.

1.5.    Rename the folder with "_raw" at the end of the original file name.

1.6.    Enter participant diary information into weekly site report spreadsheet.

**2.    Begin MESA Actigraphy QS Form**

2.1.    Open Respironics Actiware 5 Software.

2.2.    Open the Participant Database.
2.2.1.    Select **File** > **Database** > **Open**.
2.2.2.    Locate the MESA Actigraphy directory.
2.2.3.    Locate and open the participant folder.  Select and open the participant database (AW5 file).

2.3.    Make sure the Database Viewer and Properties Viewer are open.  If not, select **View** > **Database Viewer** or **View** > **Properties Viewer**.

2.4.    Open the Participant Study.
2.4.1.    Under the Database Viewer, expand the participant file by selecting the '+' located next to the Subject Head Icon.
2.4.2.    Expand the study list by select the '+' located next to the Actiwatch Icon.
2.4.3.    Double click New Analysis in order to view the participant's actogram.

2.5.    Open a new MESA QS Form.

2.6.    Fill out the Study Receipt Information.

| | |
|---|---|
| **Participant ID** | Participant ID |
| **Acrostic** | Acrostic |
| **Date Received** | MM/DD/YY |
| **Week Ending Date** | MM/DD/YY (The **FRIDAY** of the week study is received) |
| **Tech ID** | Tech ID |
| **Unit ID** | Actiwatch Serial Number |

2.6.1.    In order to determine Unit ID…
2.6.1.1.    Under the Properties Viewer, expand Actiwatch Data by selecting '+' next to it.
2.6.1.2.    Locate Actiwatch Serial Number: S0XXXX

2.7.    Fill out the Scoring Information.

| Date Scored | MM/DD/YY | | |
|---|---|---|---|
| Scorer ID | Scorer ID | | |
| Data Collection Started | MM/DD/YY | Time | HH:MM  AM/PM |
| Data Collection Ended | MM/DD/YY | Time | HH:MM  AM/PM |
| No. Nights Recorded | | | |

2.7.1.    In order to determine Data Collection Start Time and Data Collection End Time…

2.7.1.1.    Under Properties Viewer, expand Actiwatch Data by selecting '+' next to it.

2.7.1.2.    Locate Data Collection Start Time and Data Collection End Time.

2.7.2.    In order to determine the number of nights recorded…

2.7.2.1.    Review the actogram and count the number of NIGHTS recorded.  Do not include continuous nights of 'wrist off' recordings in your count.

2.7.2.2.    If there are less than 3 nights of recording, the study has failed.  Contact the site to see if the participant is willing to wear the Actiwatch again.

2.8.    Close the Database Viewer and Properties Viewer.

2.9.    Maximize the actogram window.

2.10.    Select **Interval** > **Clear All Rest Intervals**

2.11.    Set the Activity Scale Max (found on the right) to 100, in order to accentuate activity level.

2.12.    Adjust the Actogram Length (found on the right) to 7 days.

**3.        Scoring MESA Actigraph Files**

3.1.    Follow the following procedures for *each* night of recording.

3.2.    Based on the participant's sleep journal, indicate on the MESA QS form whether the recording was on a weekday, weekend, and/or work day by checking the appropriate boxes.

3.3.    Determine Sleep Latency Reliability

3.3.1.    Locate where the activity count significantly drops off by using the left/right arrow keys.

3.3.2.    Set activity count drop off time as the activity count *before* 0 is consistent.

3.3.3.    Compare the activity count drop off time with associated markers and determine if they are reliable.

- If the Event Marker, Sleep Journal, or Light Levels are within 15 minutes of the activity count drop off, marker is considered reliable.  Anything outside of 15 minutes will be considered unreliable.
- If ALL markers are not within the 15 minute range of the activity count drop off but within 15 minutes of EACH other, then the activity count is considered unreliable and all three markers are considered reliable.

If there are at least two associated reliable markers present, then the Sleep Latency for that night will be considered reliable.  If there are less than two reliable markers present, the Sleep Latency will be considered unreliable.

3.4.    Mark the Start Time of the Rest Interval

3.4.1.    Use the flow sheet below to determine the Start Time of the Rest Interval.

- If the Event Marker is considered reliable, use the Event Marker time as the Start Time of the Rest Interval.
- If the Event Marker is not reliable, but the Sleep Journal is considered reliable, use the indicated Sleep Journal Time as the Start Time of the Rest Interval ONLY if it occurs *before* the activity count drop off time.
- If the Event Marker and the Sleep Journal are both considered unreliable or if the Sleep Journal Time occurs *before* the activity count drop off time, use the Light Level time if it is considered reliable.  Use

the Light Level Time that is associated with a marked decrease in activity level as the Start Time of the Rest Interval.

```
                    ┌─────────────────────┐
                    │ Is the Event Marker │
                    │ within 15 minutes of│
                    │  the Activity Count │
                    │      drop-off?      │
                    └─────────────────────┘
                     /                    \
                 [YES]                    [NO]
                   │                        │
        ┌──────────────────┐   ┌─────────────────────────┐
        │ Use the Event    │   │ Is the Sleep Journal    │
        │ Marker Time as   │   │ within 15 minutes of the│
        │ the Start Time of│   │ activity count drop off?│
        │ the Rest Interval│   └─────────────────────────┘
        └──────────────────┘      /                  \
                             [YES]                  [NO]
                               │                      │
                ┌─────────────────────┐   ┌──────────────────┐
                │ Does the Sleep      │   │ Are the Light    │
                │ Journal Time occur  │   │ Levels Reliable? │
                │ before the Activity │   └──────────────────┘
                │ Count Drop Off Time?│      /            \
                └─────────────────────┘  [YES]          [NO]
                   /          \            │              │
               [YES]        [NO]    ┌────────────┐  ┌────────────┐
                 │                  │ Use the    │  │ Use the    │
        ┌──────────────────┐       │ Light Level│  │ Activity   │
        │ Use the Sleep    │       │ Time that  │  │ Drop Off   │
        │ Journal Time as  │       │ corresponds│  │ Time as the│
        │ the Start Time   │       │ with low   │  │ Start Time │
        │ of the Rest      │       │ activity   │  │ of the Rest│
        │ Interval.        │       │ level as   │  │ Interval.  │
        └──────────────────┘       │ the Start  │  └────────────┘
                                   │ Time of the│
                                   │ Rest       │
                                   │ Interval.  │
                                   └────────────┘
```

3.4.2.    Use the left and right arrow keys to locate the determined Start Time of the Rest Interval.

3.4.3.    Enter **R** to insert the 'Start REST' flag.

3.5.    Determine Overnight Reliability

3.5.1.    Locate where the activity count significantly rises by using the left/right arrow keys.

3.5.2.    Set activity count rise time as the activity count *after* 0 is consistent.

3.5.3.    Compare the activity count rise time with associated markers and determine if they are reliable.

- If the Event Marker, Sleep Journal, or Light Levels are within 15 minutes of the activity count drop off, marker is considered reliable. Anything outside of 15 minutes will be considered unreliable.

- If ALL markers are not within the 15 minute range of the activity count drop off but within 15 minutes of EACH other, then the activity count is considered unreliable and all three markers are considered reliable.
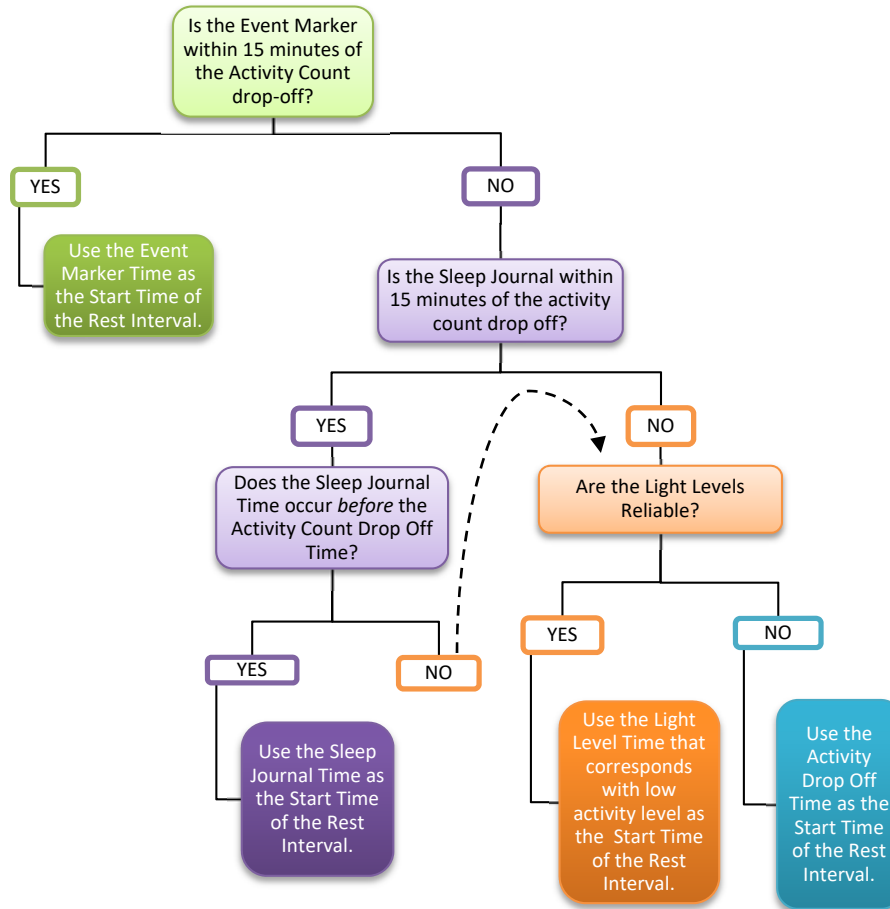
If there is at least one associated reliable markers present, then Overnight Reliability for that night will be considered reliable. If there are 'off wrist' periods that last greater than 1 hour, Then Overnight Reliability is considered unreliable.

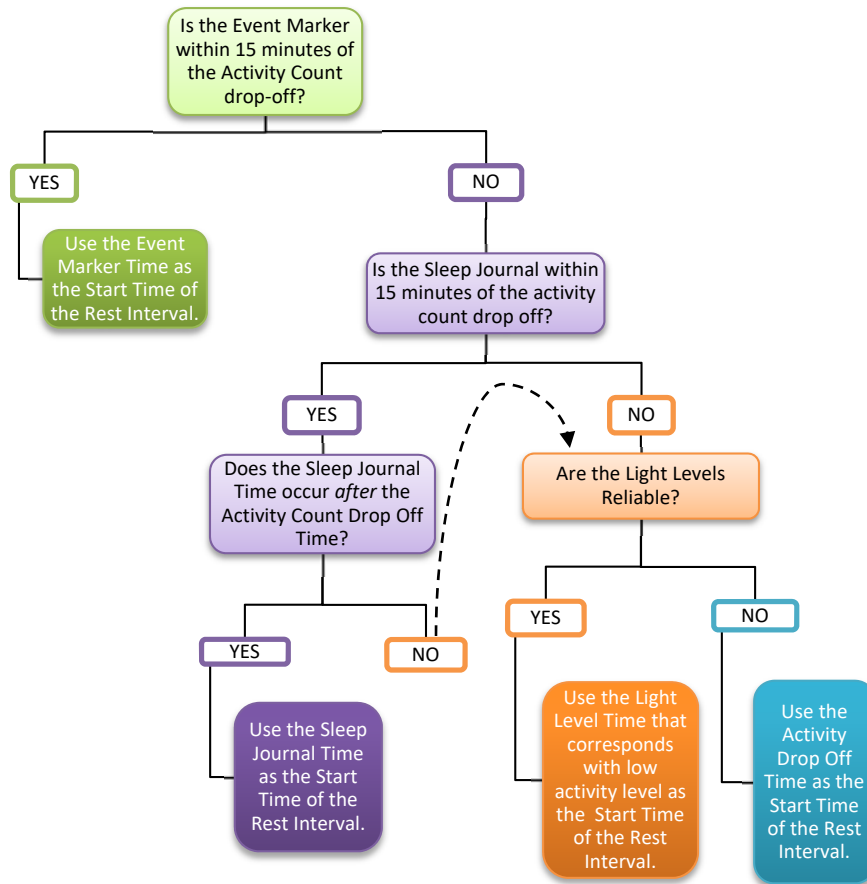3.5.4.    Fill out the following information on the MESA QS Form

3.5.4.1.    Indicate whether the Overnight Reliability for the corresponding night is reliable or unreliable.

3.5.4.2.   Check the boxes of the associated reliable markers, if any.

3.6.   Mark the End Time of the Rest Interval
3.6.1.   Use the flow sheet below to determine the End Time of the Rest Interval.

- If the Event Marker is considered reliable, use the Event Marker time as the End Time of the Rest Interval.
- If the Event Marker is not reliable, but the Sleep Journal is considered reliable, use the indicated Sleep Journal Time as the End Time of the Rest Interval ONLY if it occurs *after* the activity count rise time.
- If the Event Marker and the Sleep Journal are both considered unreliable or if the Sleep Journal Time occurs *after* the activity count rise time, use the Light Level time if it is considered reliable.  Use the Light Level Time that is associated with a marked increase in activity level as the Start Time of the Rest Interval.

```
                    Is the Event Marker
                    within 15 minutes of
                    the Activity Count
                        drop-off?

          YES                              NO

   Use the Event                   Is the Sleep Journal within
   Marker Time as                  15 minutes of the activity
   the Start Time of                    count drop off?
   the Rest Interval.
                           YES                          NO

                    Does the Sleep Journal         Are the Light Levels
                    Time occur after the               Reliable?
                    Activity Count Drop Off
                          Time?
                                                 YES              NO
                    YES           NO
                                            Use the Light      Use the
                 Use the Sleep             Level Time that    Activity
                 Journal Time              corresponds        Drop Off
                 as the Start              with low           Time as the
                 Time of the               activity level as  Start Time
                 Rest Interval.            the  Start Time    of the Rest
                                           of the Rest        Interval.
                                           Interval.
```

3.6.2.   Use the left and right arrow keys to locate the determined Start Time of the Rest Interval.
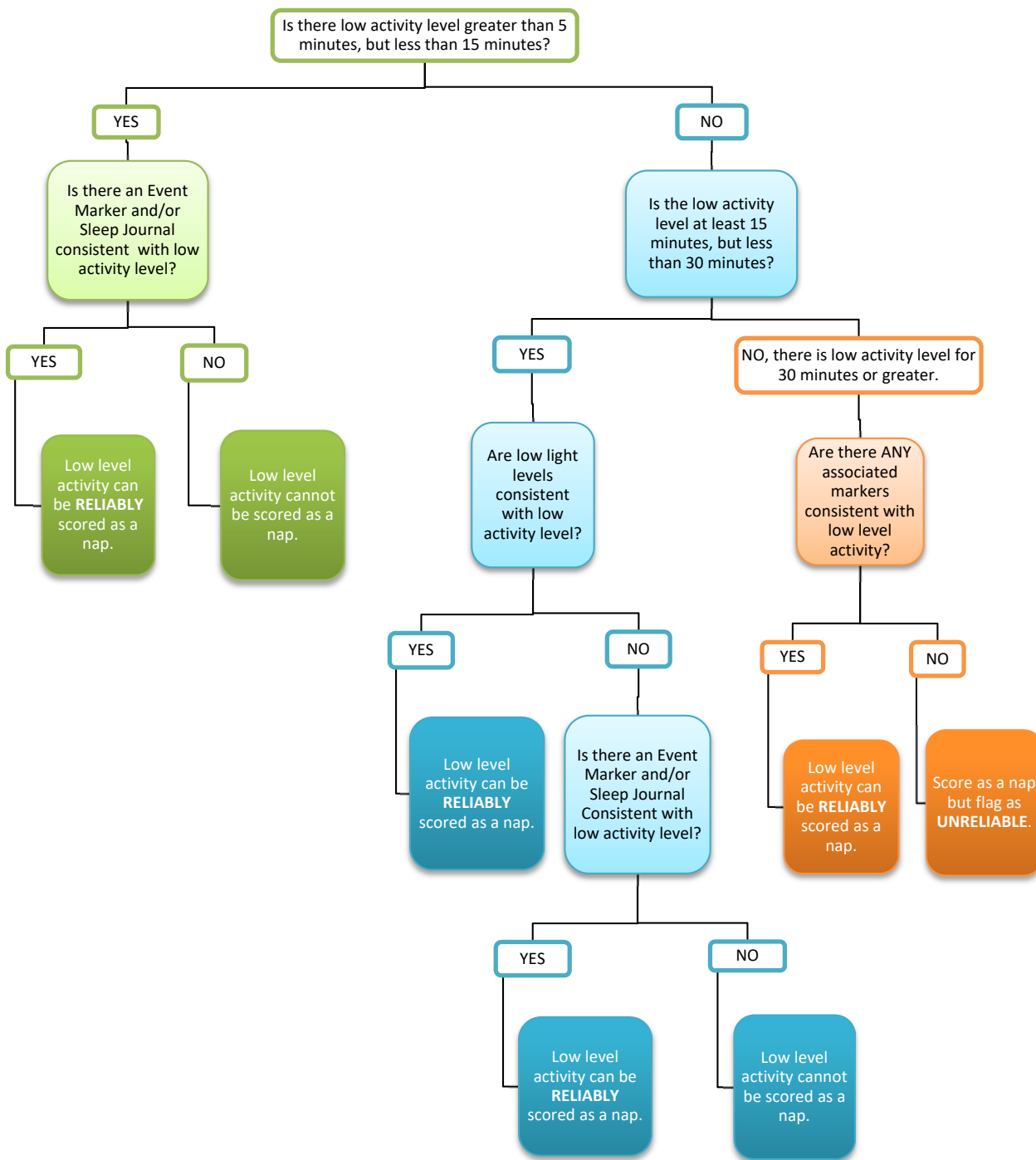3.6.3.   Enter **Shift+R** to insert the 'End REST' flag.
3.6.4.   Enter **Ctrl+R** to insert the Rest Interval.

3.7.   Determining Nap Reliability
3.7.1.   Use the flow sheet below to determine Nap Reliability

- Periods of low level activity greater than 5 minutes must be consistent with at least a light level data, Event Marker and/or Sleep Journal to be considered reliable.
- Periods of low level activity greater than 30 minutes without any consistent associated markers are considered unreliable.

Is there low activity level greater than 5 minutes, but less than 15 minutes?

YES

Is there an Event Marker and/or Sleep Journal consistent with low activity level?

YES

Low level activity can be **RELIABLY** scored as a nap.

NO

Low level activity cannot be scored as a nap.

NO

Is the low activity level at least 15 minutes, but less than 30 minutes?

YES

Are low light levels consistent with low activity level?

YES

Low level activity can be **RELIABLY** scored as a nap.

NO

Is there an Event Marker and/or Sleep Journal Consistent with low activity level?

YES

Low level activity can be **RELIABLY** scored as a nap.

NO

Low level activity cannot be scored as a nap.

NO, there is low activity level for 30 minutes or greater.

Are there ANY associated markers consistent with low level activity?

YES

Low level activity can be **RELIABLY** scored as a nap.

NO

Score as a nap but flag as **UNRELIABLE**.

3.7.2.    Fill out the MESA QS Form with the following information.
    3.7.2.1.    Indicate on the QS Form whether the marked naps for the corresponding night, if any, are reliable or unreliable.
    3.7.2.2.    Enter the amount of naps marked in the space provided, if any.

3.8.    Marking Naps
    3.8.1.    Mark naps with the same guidelines used for overnight sleep periods, as described in Section 3.3 and Section 3.5.

3.9.    Determining Study Quality
    3.9.1.    Fill out the following information on the MESA QS Form regarding Sleep Diary Quality.
        3.9.1.1.    Indicate whether the sleep diary was present or absent.
        3.9.1.2.    Indicate whether the sleep diary was mostly complete, incomplete, or absent.
        3.9.1.3.    Indicate whether the sleep diary was mostly consistent, inconsistent, or absent when compared to activity levels.
    3.9.2.    Fill out the following information on the MESA QS Form regarding Event Marker Quality.
        3.9.2.1.    Indicate whether the event marker was present or absent.
        3.9.2.2.    Indicate whether the event marker was mostly complete, incomplete, or absent.
        3.9.2.3.    Indicate whether the event marker was mostly consistent, inconsistent, or absent when compared to activity levels.
    3.9.3.    Fill out the following information on the MESA QS Form regarding Light Data Quality.
        3.9.3.1.    Indicate whether the light levels were mostly consistent, inconsistent, or absent when compared to activity levels.
    3.9.4.    Use the table below as a guide to determining completeness and consistency.

At least 75% of the marker data in question has to be complete and consistent, in order to be considered complete or consistent, respectively.

| Number of Nights Recorded | Number of Nights Needed to be Considered Complete or Consistent |
|---|---|
| 3 | 2 |
| 4-5 | 3 |
| 6 | 4 |
| 7 | 5 |
| 8-9 | 6 |

For example – if there are 7 Nights of recording and the Sleep Diary was consistent with the data for only 4 days, the Sleep Diary would be considered Inconsistent.

    3.9.5.    Fill out the following information on the MESA QS Form regarding Overall Study Quality.
        3.9.5.1.    Indicate the overall study quality by following the guidelines provided on the QS form.