

THE AASM MANUAL FOR THE SCORING OF SLEEP AND ASSOCIATED EVENTS

Respiratory and Cardio Rules

Respiratory Rules

- i. Technical Considerations
- ii. Event Duration
- iii. Apnea
- iv. Hypopnea
- v. RERA
- vi. Hypoventilation
- vii. Cheyne Stokes

Technical Considerations for Airflow

- i. Use a **thermal sensor** to detect apnea.
- ii. Use **nasal pressure** to detect hypopnea
 - A square root transformation may be used to correct a small bias for over scoring hypopnea.
- iii. Use **alternate sensors** if recommended sensor is **unreliable**
 - For hypopnea, inductive plethysmography is considered an alternate).

Technical Considerations for Respiratory Effort

- i. Use esophageal pressure or inductive plethysmography to detect respiratory effort.
 - Diaphragmatic/intercostal EMG is considered an alternative sensor for respiratory effort (no recording specifications are given).

Technical Considerations for Blood Oxygen

- i. Pulse oximetry should be used to measure blood oxygen.
- ii. The maximum acceptable moving average window is **3 seconds**.

Event Duration

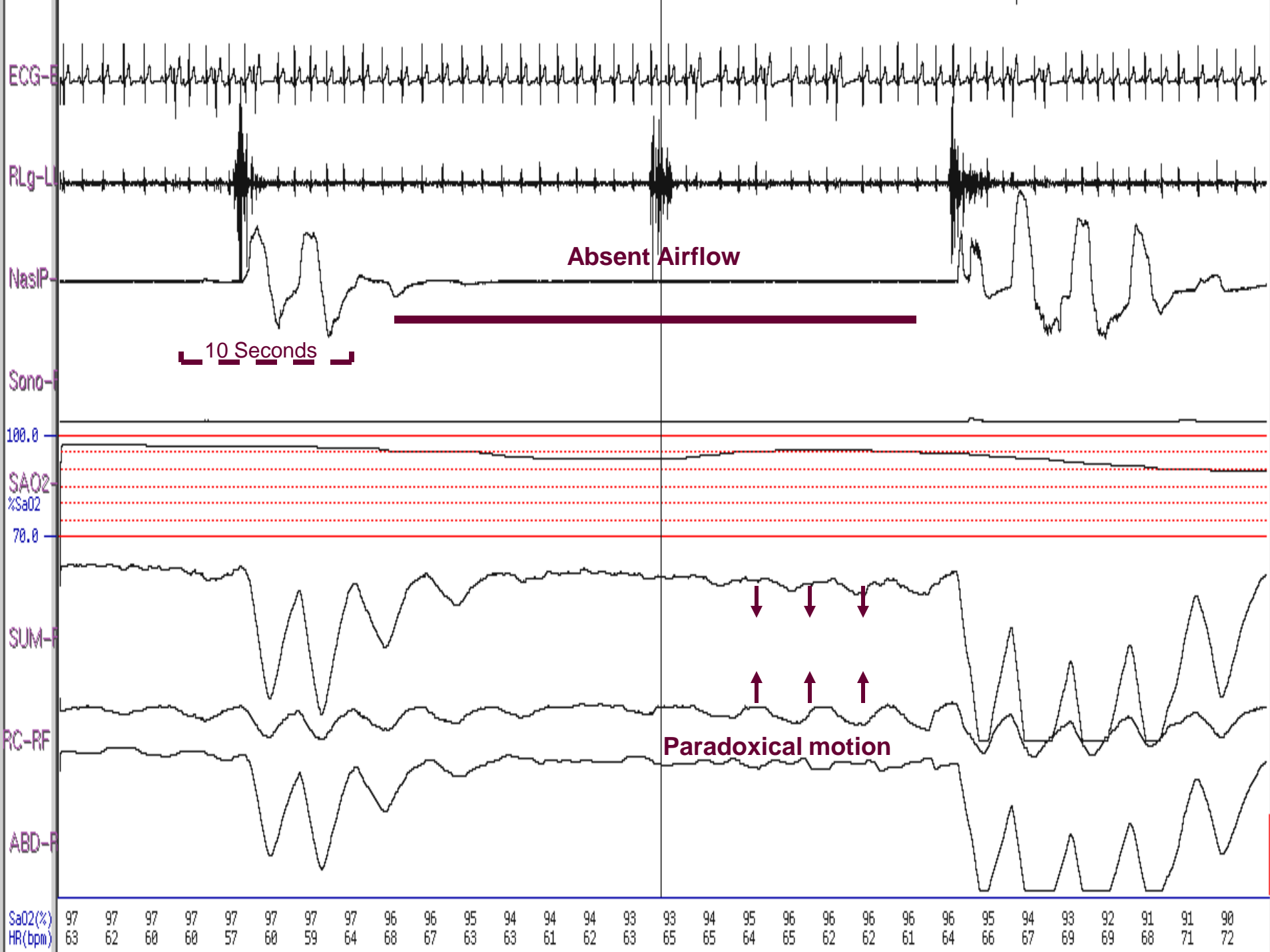
- i. **For apnea or hypopnea:**
 - Beginning of event is nadir preceding the first breath of event
 - End of event is beginning of first breath that approximates baseline (not defined).
- ii. **When baseline can't be determined, terminate:**
 - When there is a clear and sustained increase in amplitude.
 - When there is resaturation of at least **2%**.

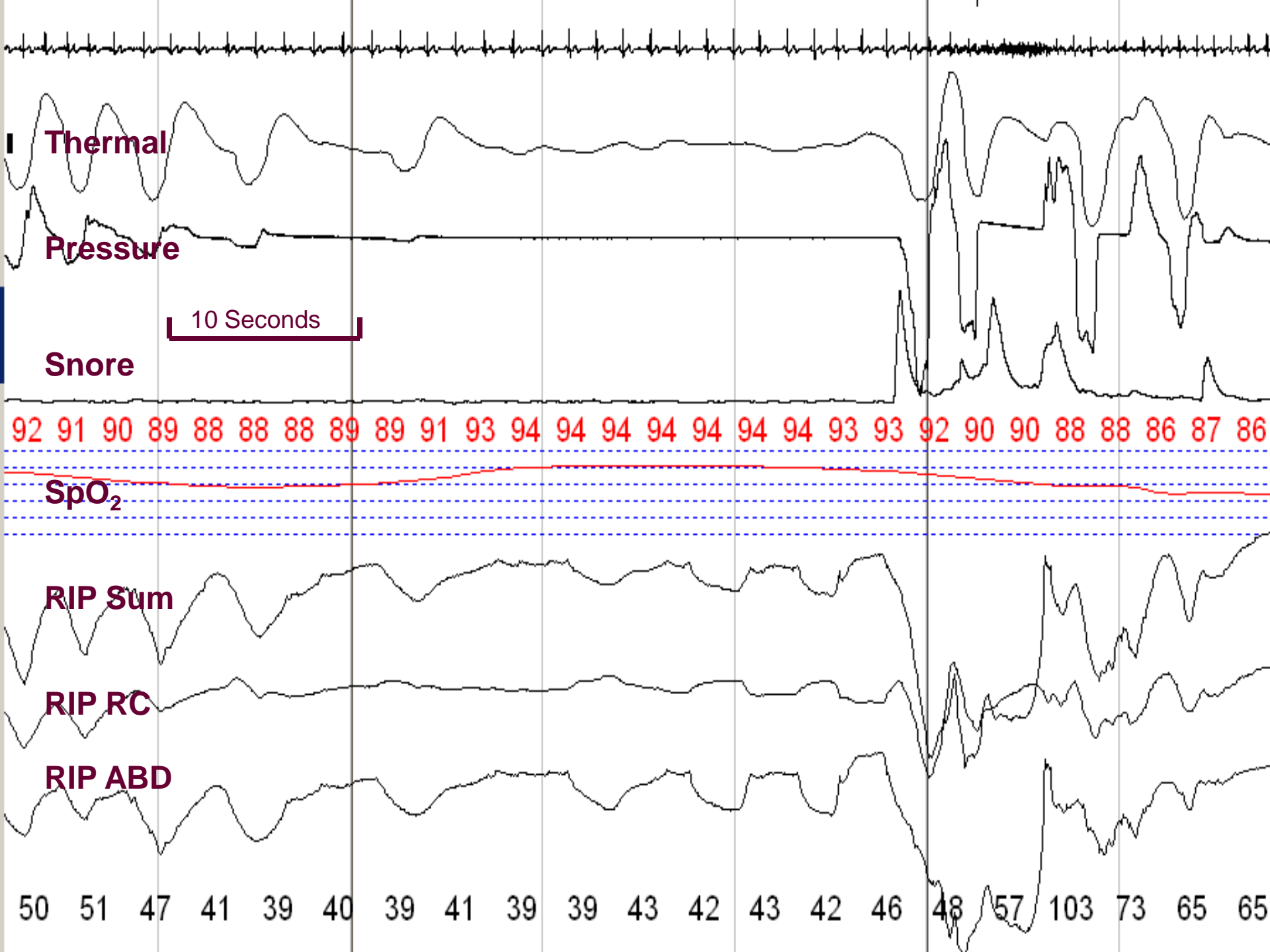
Apnea

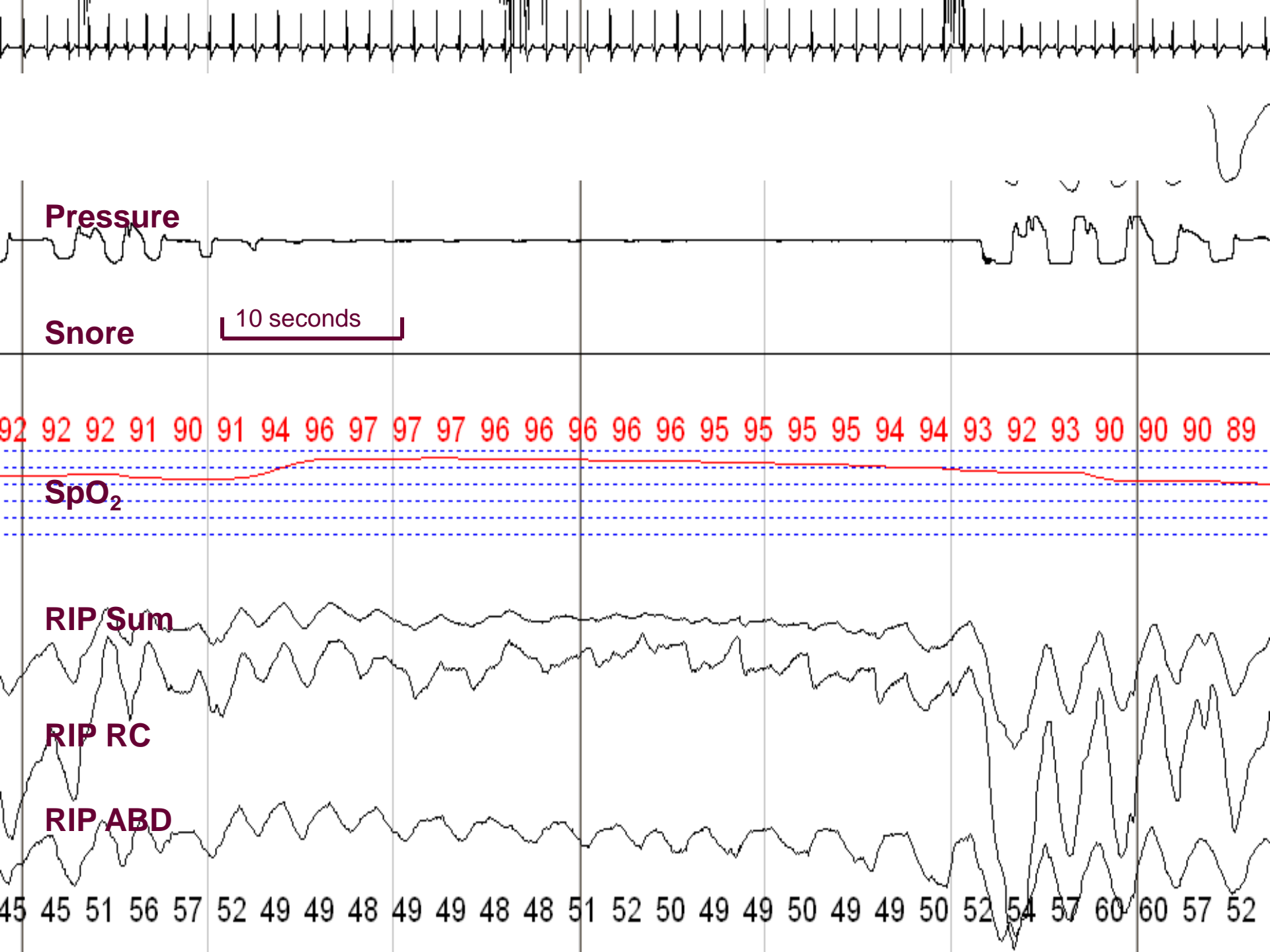
- i. Thermal sensor amplitude attenuated $\geq 90\%$.
- ii. Duration ≥ 10 seconds.
- iii. 90% of event meets amplitude criteria.
- iv. No saturation criterion.

Apnea

- i. *Obstructive* if sustained or increased inspiratory effort throughout.
- ii. *Central* if inspiratory effort absent.
- iii. *Mixed* if inspiratory effort initially absent but resumes in latter portion of event.







Pressure

Snore

10 seconds

92 92 92 91 90 91 94 96 97 97 97 96 96 96 96 95 95 95 95 94 94 93 92 93 90 90 90 89

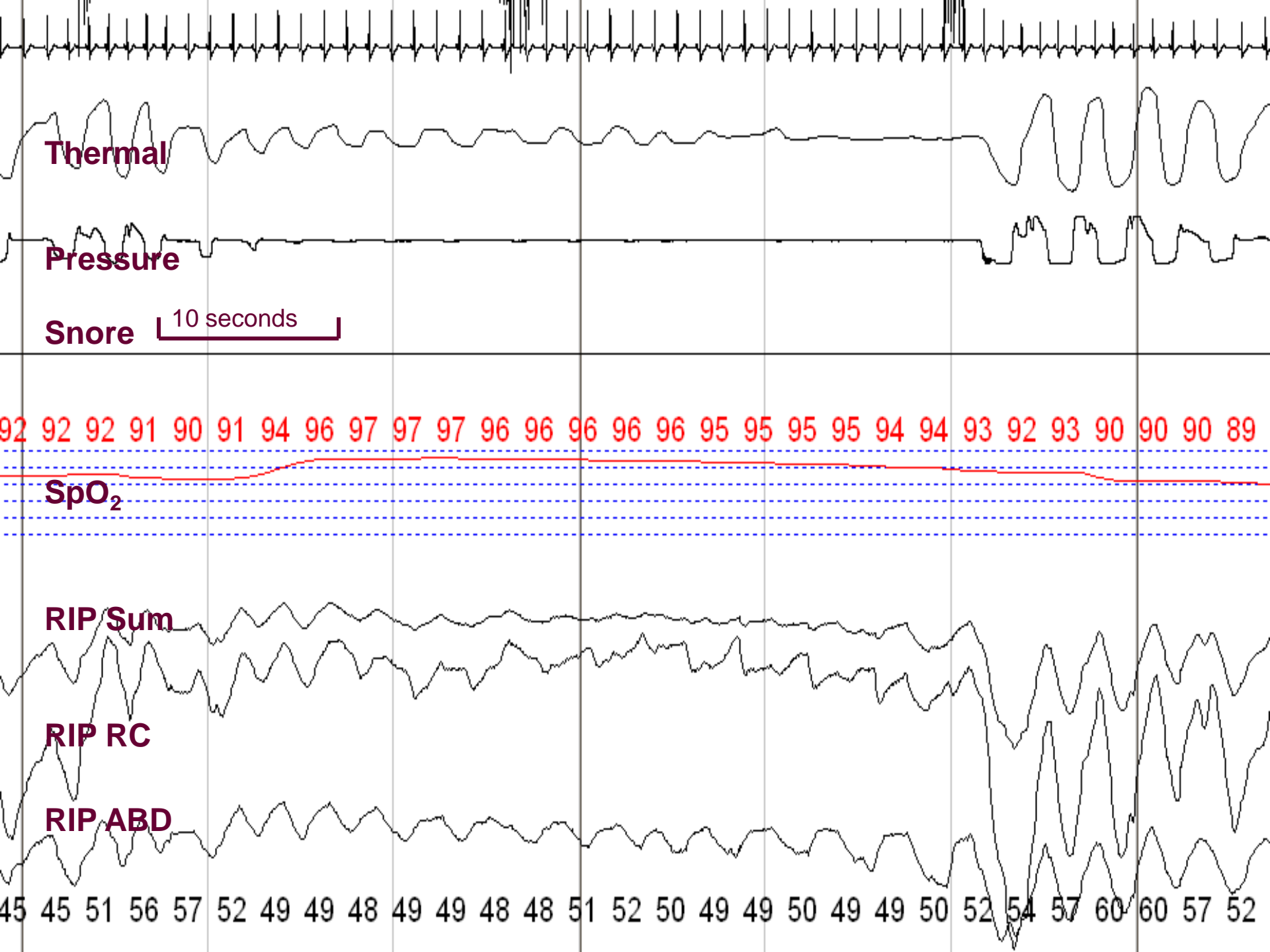
SpO₂

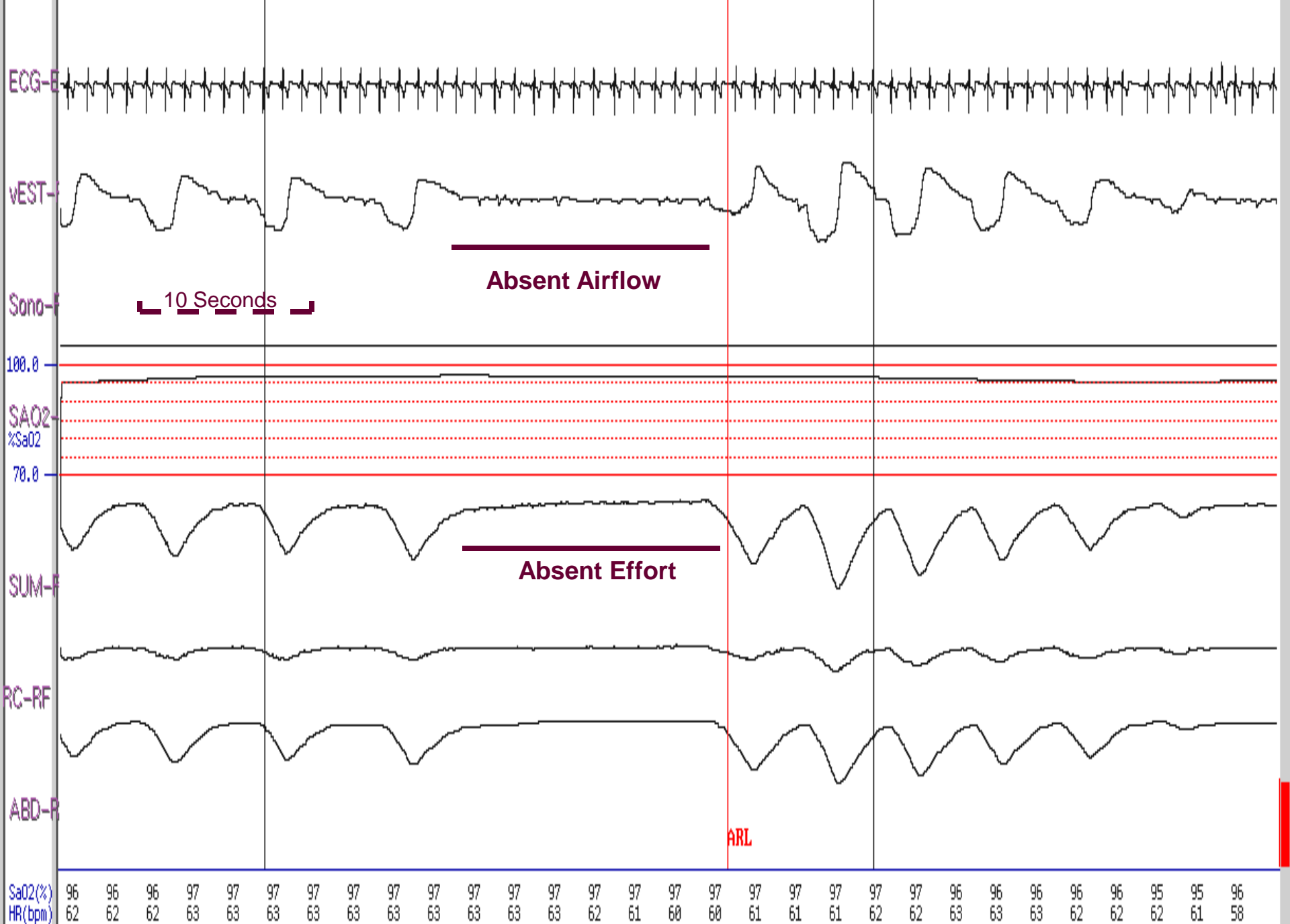
RIP Sum

RIP RC

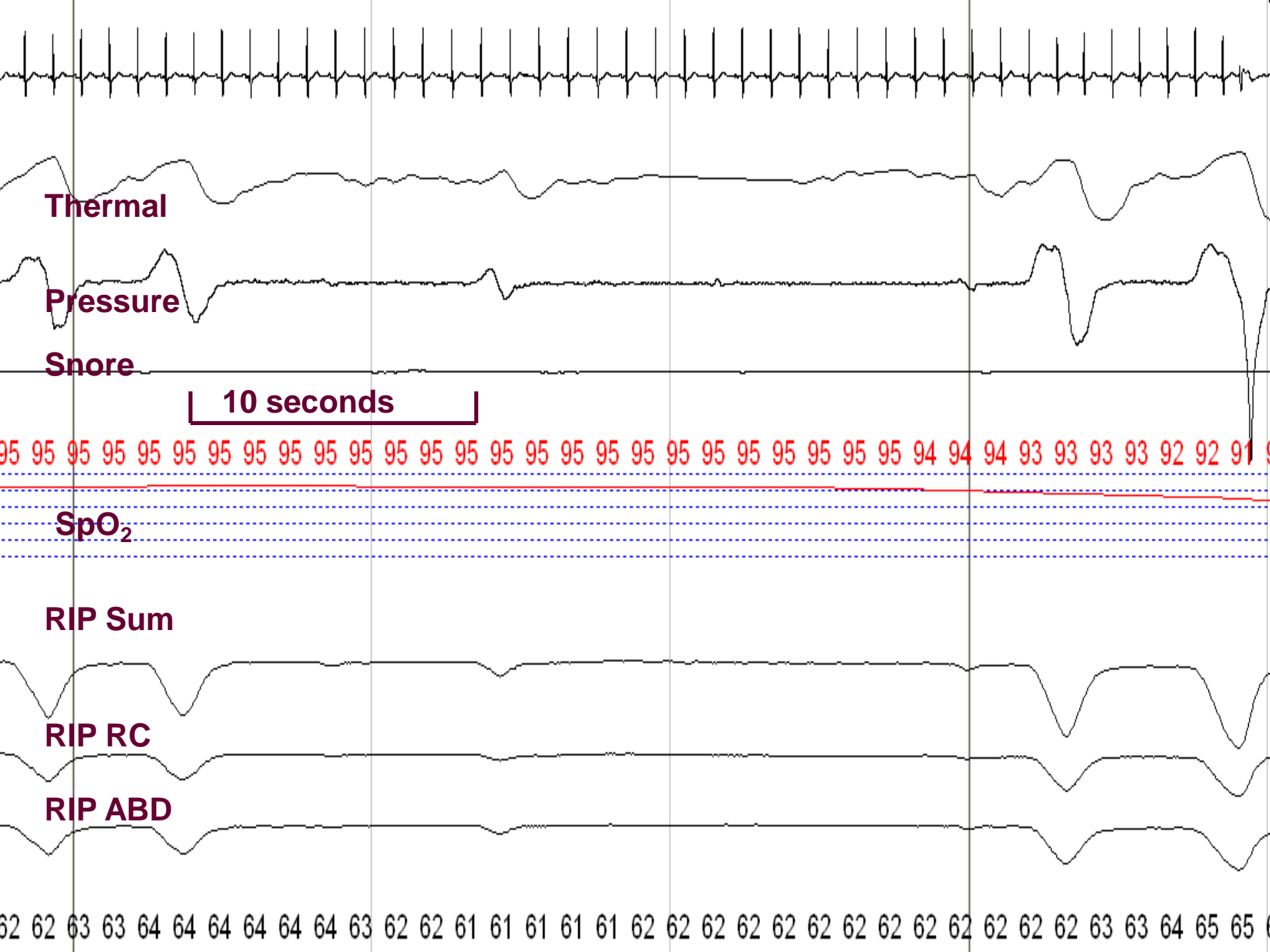
RIP ABD

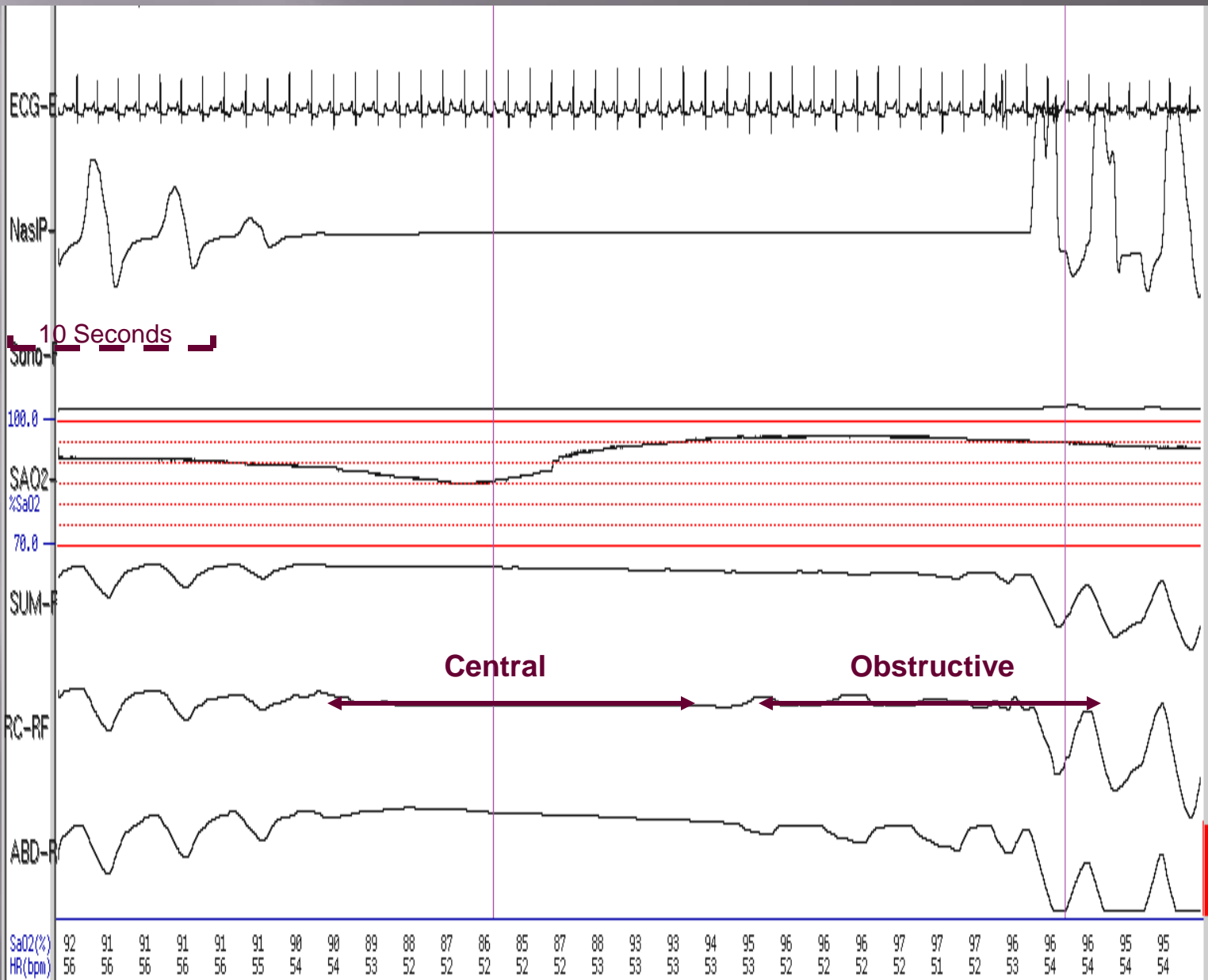
45 45 51 56 57 52 49 49 48 49 49 48 48 51 52 50 49 49 50 49 49 50 52 54 57 60 60 57 52





Sleep onset Central Apnea



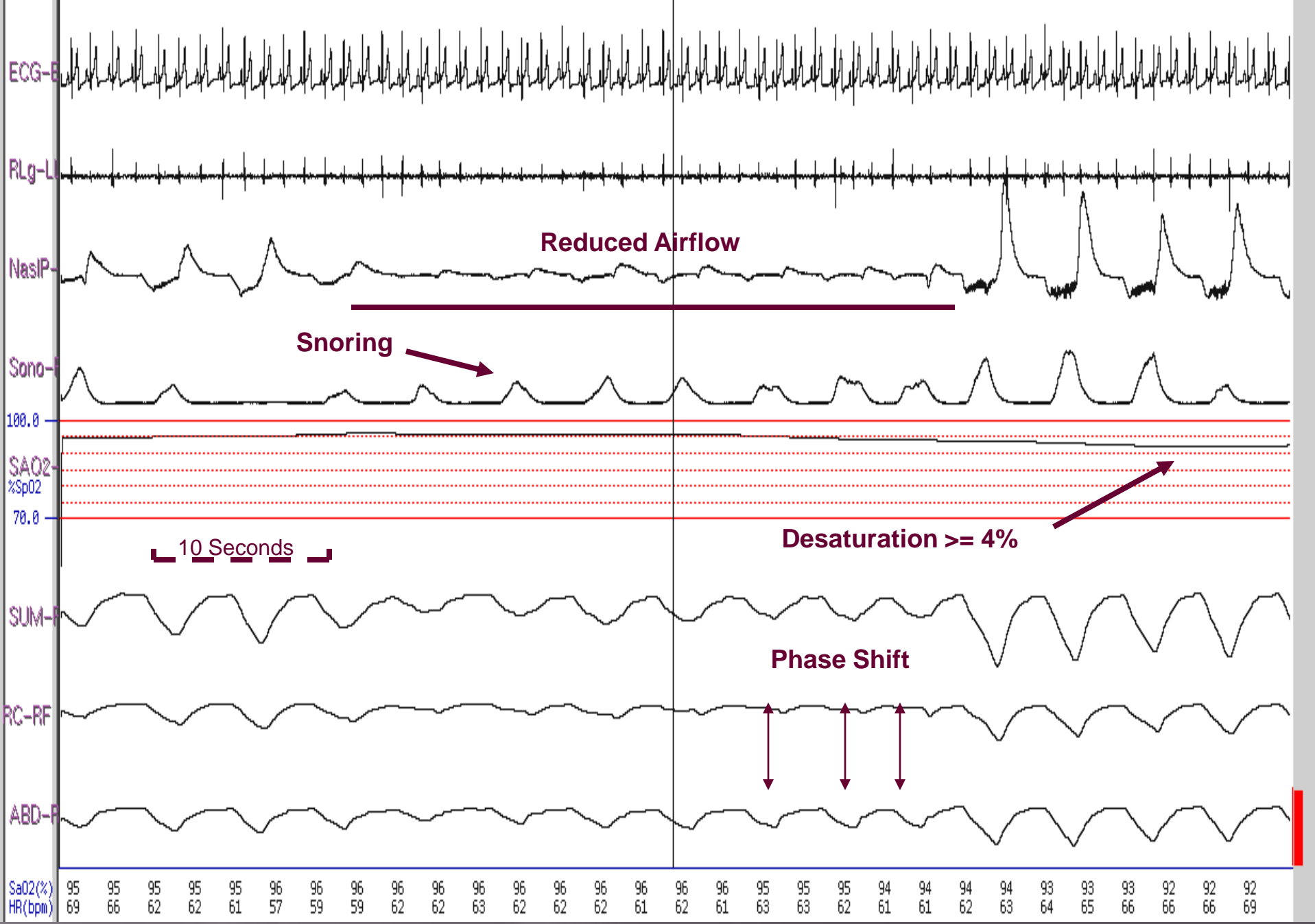


Mixed Apnea

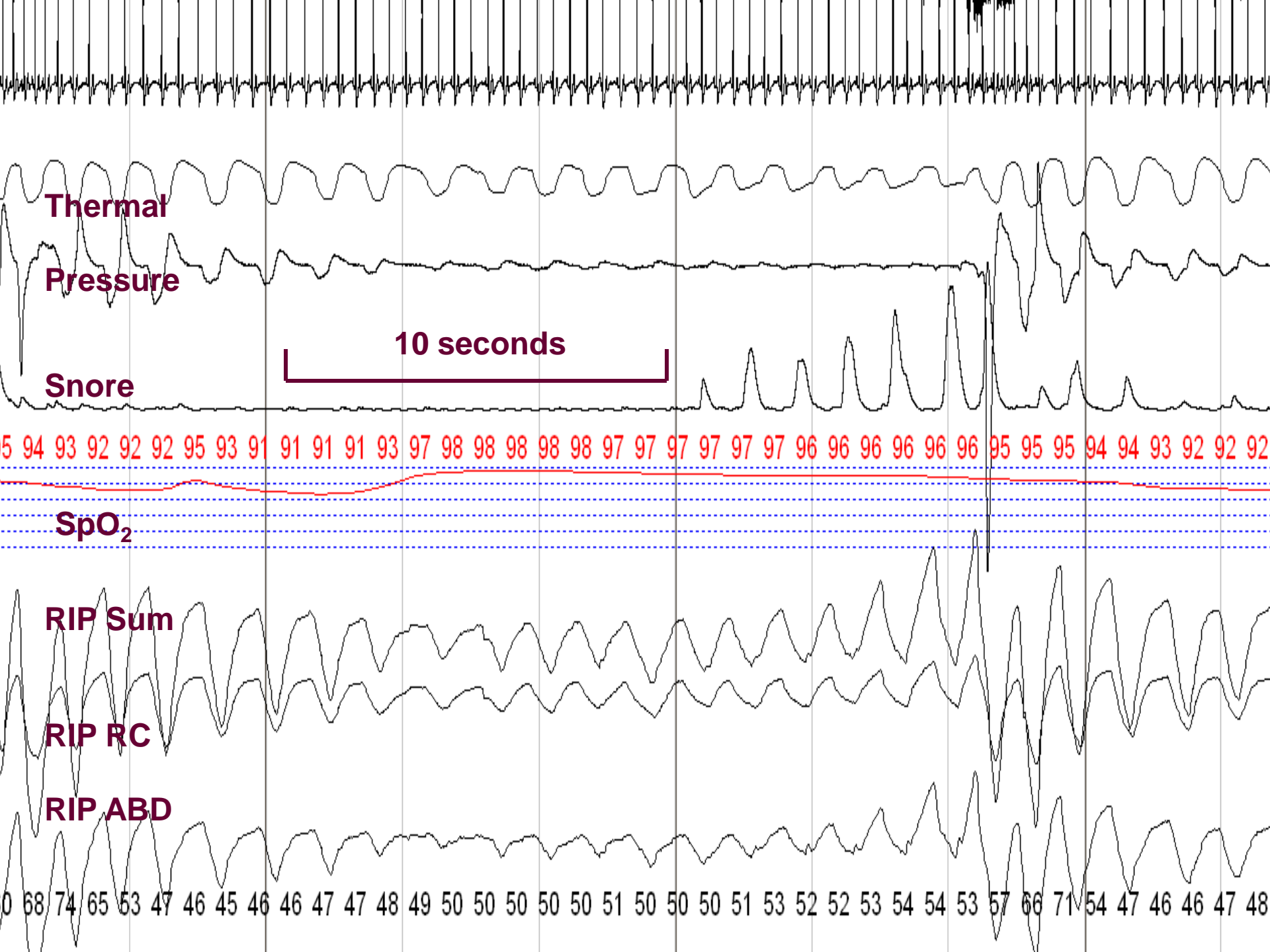
Hypopnea

Recommended

- i. Reduction of nasal pressure amplitude of \geq 30%.
- ii. Duration \geq 10 seconds.
- iii. Desaturation \geq 4% below pre-event baseline.
- iv. 90% of event meets amplitude criteria.



Hypopnea



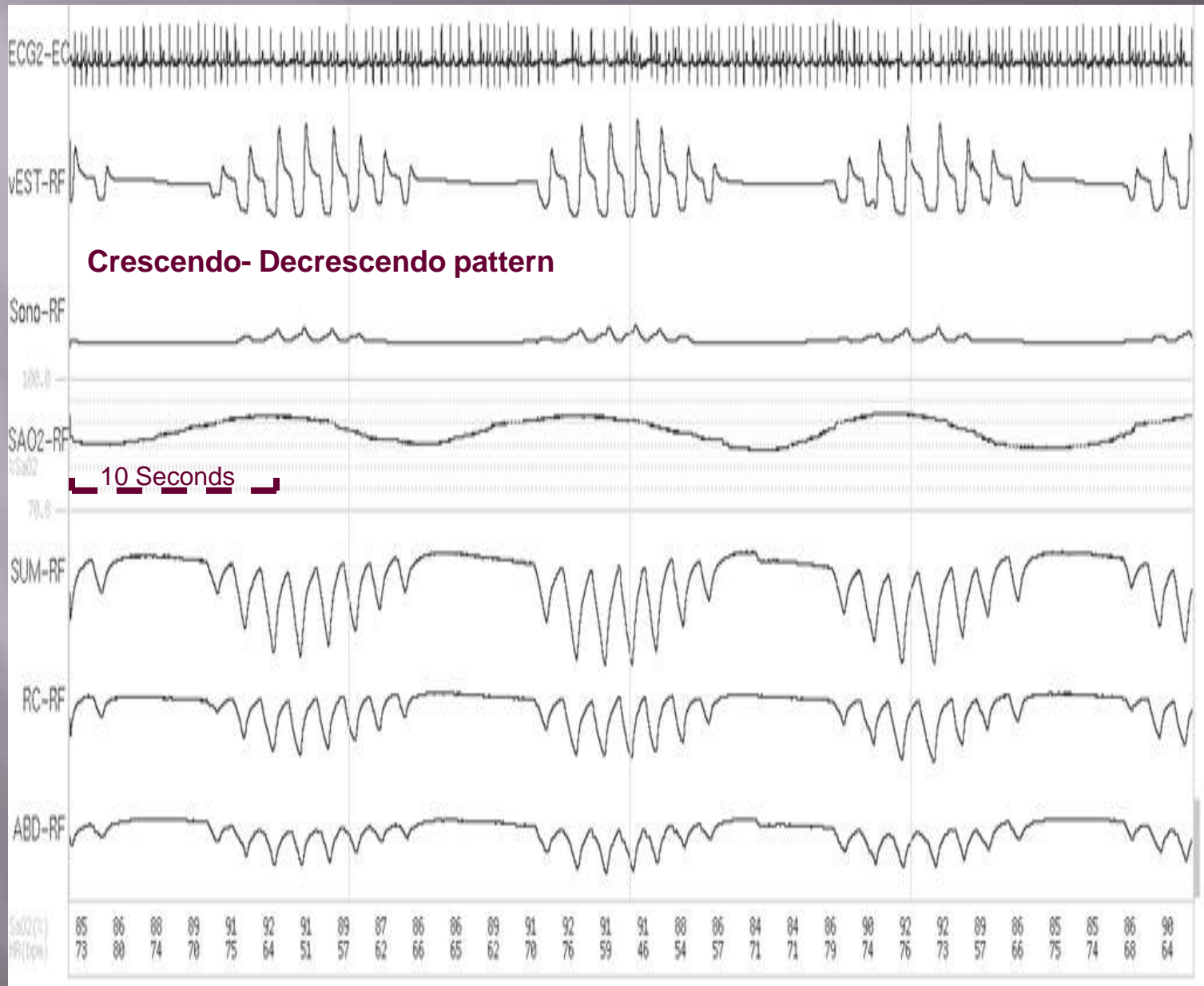
Hypopnea

Alternative

- i. Reduction of nasal pressure amplitude of \geq **50%**.
- ii. Duration \geq **10 seconds**.
- iii. Desaturation \geq **3%** below pre-event baseline
OR
- iv. The event is associated with arousal.
- v. **90%** of event meets amplitude criteria.

Cheyne Stokes Breathing

- i. Three consecutive cycles of cyclical crescendo-decrescendo change in breathing amplitude.
- ii. **AND**
 - Five or more central apneas or hypopneas per sleep hour.**OR**
 - Crescendo-decrescendo pattern has duration of **≥ 10 minutes**.

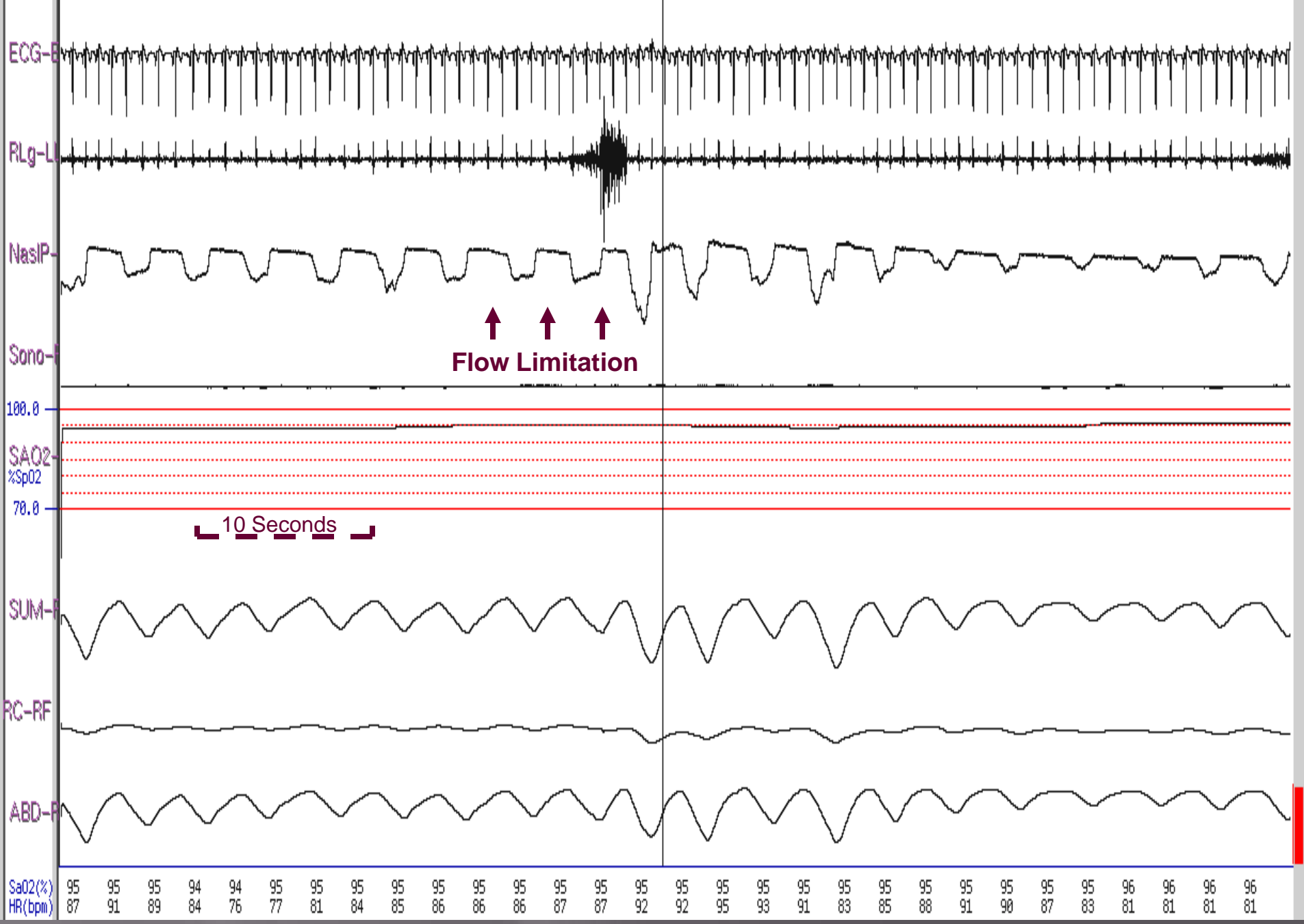


Cheyne Stokes Breathing

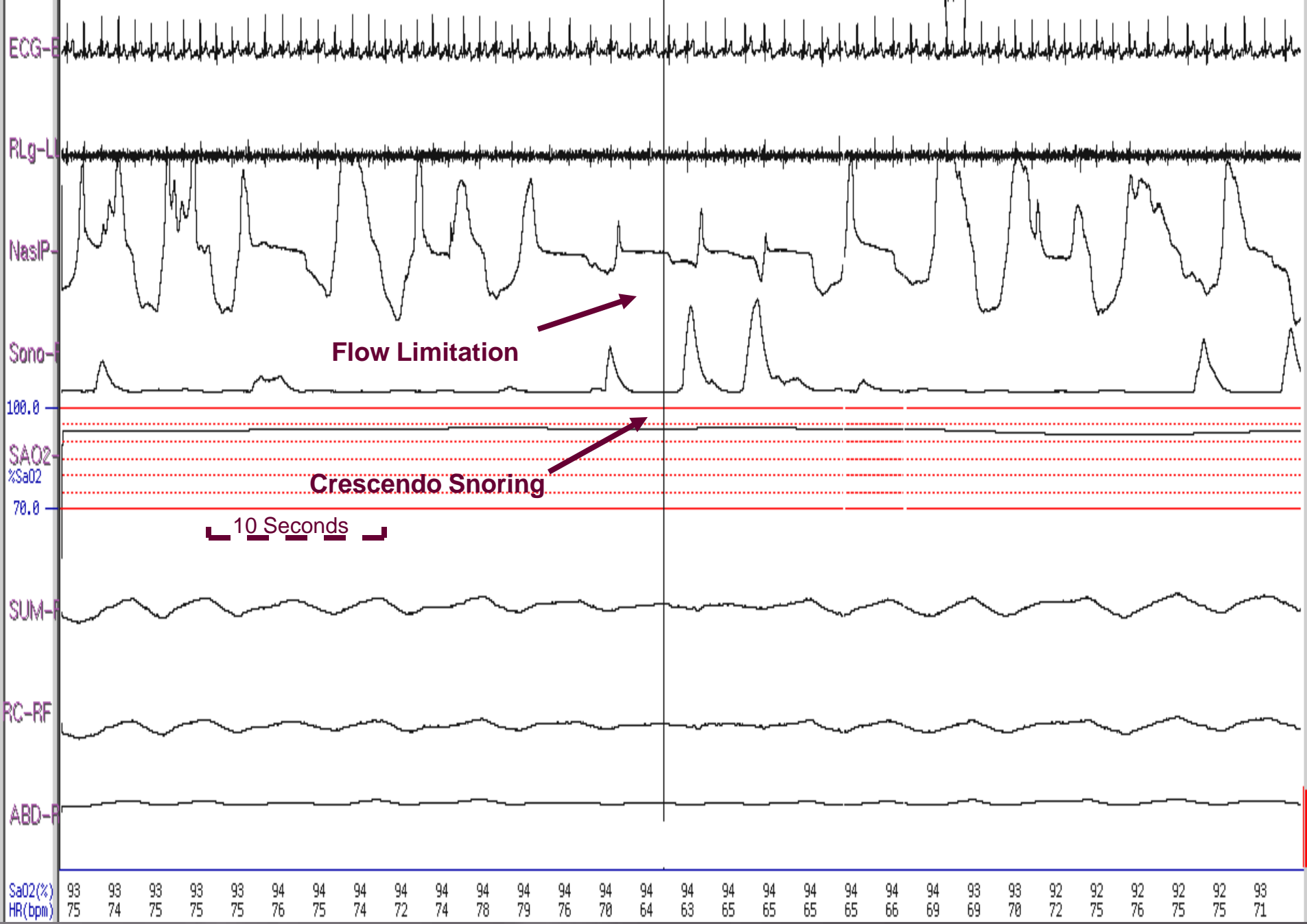
Respiratory Event Related Arousal (RERA)

OPTION

- i. Ten or greater second sequence of breathes.
- ii. Evidence of increased respiratory effort, flow limitation or both.
- iii. Terminal arousal.
- iv. Does not meet apnea or hypopnea criteria.

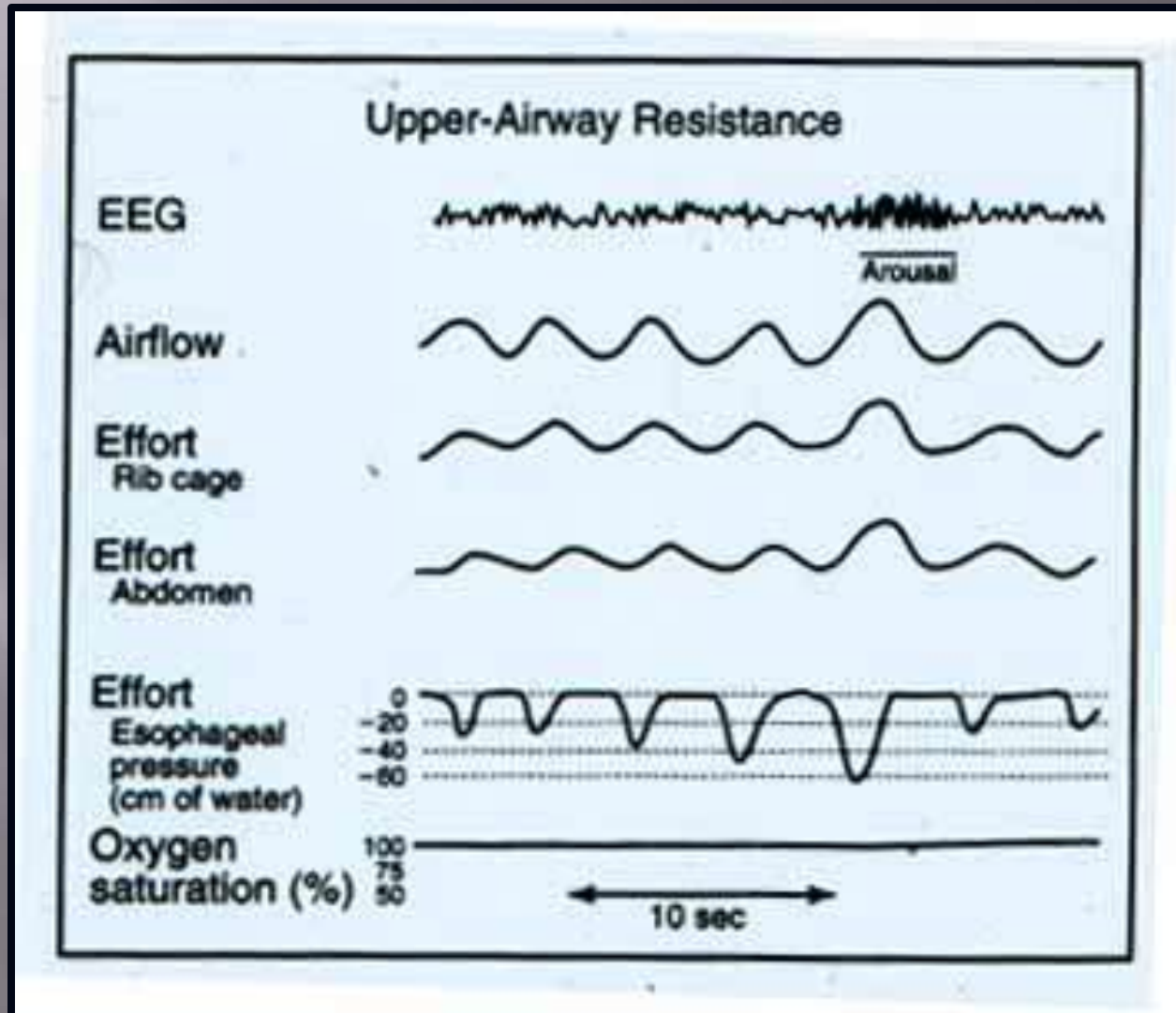


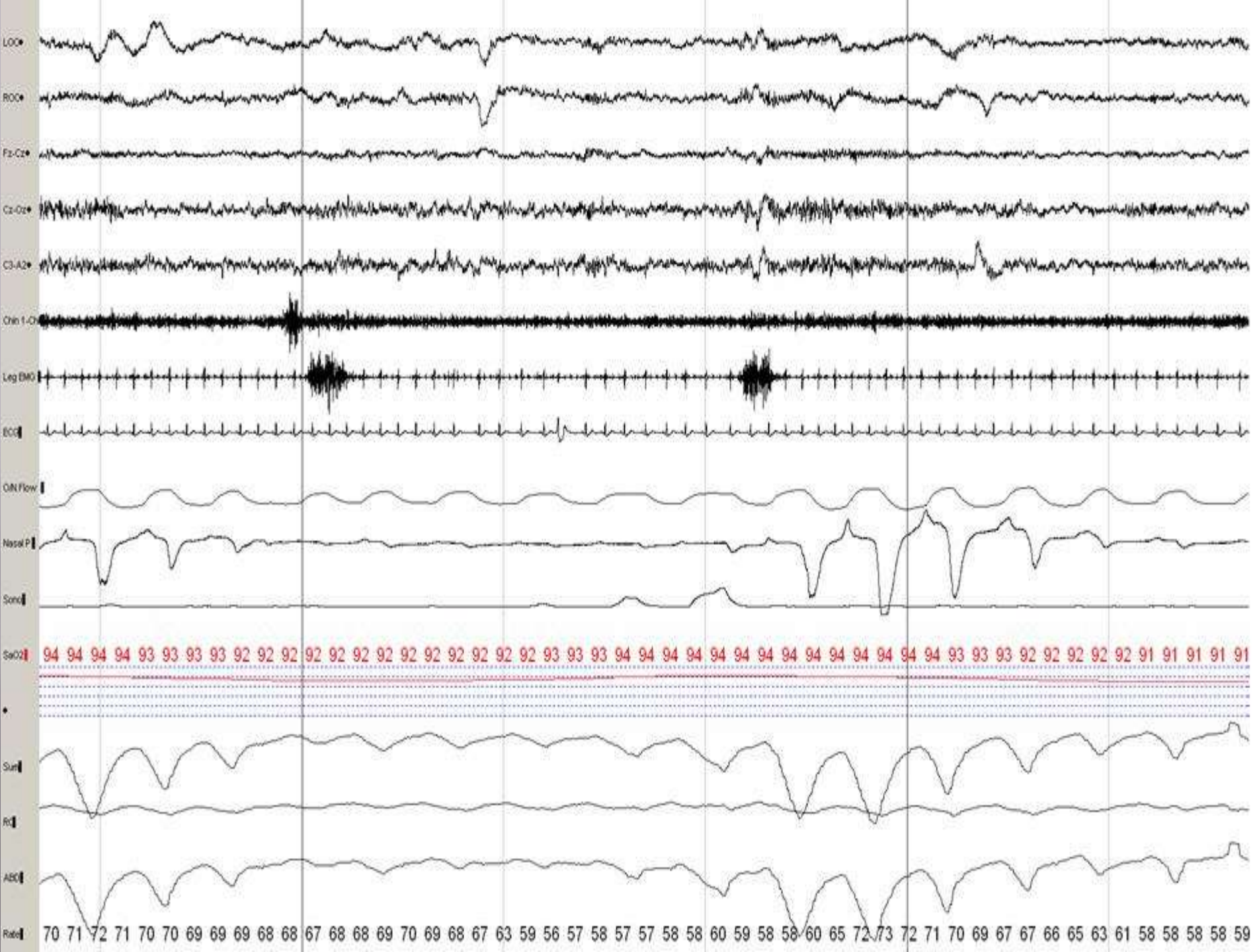
Respiratory Effort Related Arousal



Respiratory Effort Related Arousals

RERA





Hypoventilation

OPTION

- i. Ten mm Hg or greater increase of PaCO₂ during sleep compared to wake (supine).
- ii. May be measure with end tidal or transcutaneous capnometry.

The AASM Manual for the Scoring of Sleep and Associated Events

Cardiac Events

ECG LEAD

- i. Modified Lead II.
- ii. Right arm lead placed on R shoulder.
- iii. Left leg lead placed on torso (sixth intercostal space).

Scoring Rules

- i. Sinus tachycardia when sustained sinus rate > 90 BPM.
- ii. Bradycardia when sustained sinus rate < 40 BPM.
- iii. Asystole when cardiac pauses > 3 seconds.

More Scoring Rules

- i. Wide complex tachycardia* when:
 - 3 consecutive beats or more.
 - rate > 100 BPM.
 - QRS duration ≥ 120 msec.
- ii. Narrow complex tachycardia when:
 - 3 consecutive beats or more.
 - rate > 100 BPM.
 - QRS duration < 120 msec.

One Last Scoring Rule

- i. Atrial Fibrillation when:
 - irregularly irregular ventricular rhythm.
 - no P waves
 - rapid oscillations of variable size, shape and timing.