Status **Scheduled** PolicyStat ID **11585938**

Beaumont

Origination	7/7/2022
Last Approved	6/7/2022
Effective	7/7/2022
Last Revised	6/7/2022
Next Review	6/6/2024

Document Contact	Brooke Klapatch
Area	Laboratory-Blood Bank
Applicability	Royal Oak

Response to an Alarm Condition - Blood Bank Royal Oak

Document Type: Procedure

I. PURPOSE AND OBJECTIVE:

The purpose of this document is to provide policies and procedures that will enable the Blood Bank staff to appropriately respond to an alarm caused by an abnormal temperature or power line voltage.

II. SCOPE:

A. The policies and procedures of this document are applicable in the following situations:
    1. When a Rees alarm is activated.
    2. When a storage device's alarm is activated.

B. During a general power outage, refer to the Transfusion Medicine policy, Blood Bank Emergency Management Plan - Royal Oak.

III. PRINCIPLE:

A. The Blood Bank is required to ensure that blood components, tissues, derivatives, samples, and critical materials are handled and stored in a manner that prevents damage and limits deterioration. These temperatures are defined in the *Quality Control* section of this document. For storage of blood components, the temperature must be continually monitored or, at a minimum, must be recorded at least every four hours.

B. The Rees Centron Presidio (the Rees) is used by the Blood Bank to monitor and record the temperatures of refrigerators, freezers, and the platelet rotator as well as the voltage of the power line to the Blood Bank computer. If the Rees detects an abnormal temperature or voltage reading, an audible alarm will be activated. In addition, most of the Blood Bank's electronic storage devices are also equipped with an alarm that will activate if the temperature

is abnormal. When an alarm is activated, appropriate action must be taken as described throughout this document.

IV. DEFINITIONS:

A. **Designee**: A Blood Bank technical director or transfusion medicine fellow.

B. **Beaumont Health Biomedical**: Performs repairs and some maintenance of equipment for Beaumont Health.

V. POLICIES:

A. Documentation of the Temperature Alarm Activation Log

1. The first time that a Rees temperature alarm or a storage device's alarm is activated, the *Temperature Alarm Activation Log*, should be documented.

B. Review of the Events Log

1. As part of the daily backup of the Rees, the daily *Events Log* is automatically printed. For each alarm activation, a Medical Technologist Lead shall review the *Temperature Alarm Activation Log* documentation and the corresponding *Events Log* for appropriate adherence to department policy.

C. Documentation of a Variance Report

1. A variance shall be submitted the fourth time that the Rees alarm or a storage device's alarm is activated (one hour from the initial alarm) regardless of the kinds of items stored in the device. Refer to the *Procedure* / Section A and B.
2. A variance shall also be submitted for the following, less frequent alarm occurrences. The technologist shall document the actions taken, as indicated in the applicable *Procedure* section.
    a. If the power to the former Blood Bank computer system (Hemocare) is interrupted; refer to the *Procedure* / Section C.
    b. If an open / shorted thermistor alarm is activated; refer to the *Procedure* / Section D.
    c. If the node power sensor alarm is activated (node 129), refer to the *Procedure* / Section E.
    d. If the data communication node alarms are activated (130, 132, 133, 134 or 135), refer to the *Procedure* / Section F.
3. In summary, a variance shall be submitted any time that the Rees or a storage device alarm has been active for one hour, or for any other type of alarm activation.

D. Considering Whether to Move Items From One

Storage Device to Another

1. When an alarm from the Rees or from a storage device is activated, consider the following factors when deciding whether to move the stored items from one storage device to another:
    a. The possible reason that the alarm was activated in the first place.
    b. Whether the temperature is trending closer to the acceptable range.
    c. Whether the observed temperature is within the acceptable range for the storage device and items stored in the device; refer to the *Quality Control* section of this document.
    d. The amount of time that has passed since the first alarm activation.
    e. The immediate availability of a suitable storage device where the items could be moved.
    f. The kinds of items stored in the device (blood components, reagents, dry ice, tissue products, etc.).
    g. Refer also to *Consulting the Medical Director or Designee Before Moving Stored Items or After One Hour of Alarm Activation*, below.

E. Taking the Temperature of a Storage Device

1. When taking the temperature of a storage device, the temperature should be observed from the storage device's external temperature display. If the device does not have an external display, then the internal temperature may be taken using the internal thermometer that is stored inside the device.

F. Consulting the Medical Director Before Moving Stored Items or After One Hour of Rees Alarm Activation

1. The Medical Director (MD) or designee should be consulted:
    a. Before moving blood components, tissues, or reagents from one storage device to another, or
    b. If a Rees or storage device alarm has been active for one hour, which corresponds to the fourth alarm activation.
    NOTE: This communication and the MD's instructions shall be documented on the *Temperature Alarm Activation Log.*
2. Examples of directions that the MD may provide follow:
    a. If the temperature (as indicated by the storage device's external temperature display or the internal thermometer that is stored inside the device) is outside of the acceptable range (see the *Quality Control* section), then the MD will most likely instruct the Blood Bank to move any stored blood components or tissues.
    b. If the temperature is normal or is trending back towards the acceptable range yet the

Rees alarm is activated, the MD may instruct the Blood Bank to wait longer before moving any stored items and to record the temperature at specified intervals; e.g., every 15 minutes until it returns to the acceptable range.

c. The MD may instruct the Blood Bank to proceed to Transfusion Medicine policy, *Manual Temperature Monitoring* so that manual temperature(s) will be taken every 4 hours.

d. The MD may instruct the Blood Bank to put an *Equipment out of Service* form on the device and request service from Beaumont Health Biomedical or Rees.

VI. EQUIPMENT:

A. Rees Centron Presidio

VII. QUALITY CONTROL (QC):

A. The following table indicates the Rees node that is used to monitor each piece of storage equipment, the acceptable temperature range, and the items that are stored in the equipment.

Rees Node	Location / Storage Equipment	Items Stored	Rees Acceptable Range in °C (unless otherwise noted)		AABB Storage Requirements of Blood Components / Tissues
			Low	High	
01	HLA Freezer	HLA Items	-85	-55	NA
02	Freezer for frozen autologous tissue	Frozen autologous tissue	-90	-67	Per tissue provider
03	Freezer room	HLA / patient samples Luminex	-85	-66	≤-65°C
04	Freezer room	Frozen autologous / rare RBCs	-85	-66	≤-65°C
05	Freezer room	Frozen autologous / rare RBCs	-85	-66	≤-65°C
06	Platelet Rotator	Platelets	20.5	23.5	20 - 24°C
07	Triage area freezer	Frozen plasma	-50	-20	≤-18°C
08	Triage area freezer	Frozen tissues	-85	-67	Per tissue provider

09	Freezer room	Frozen plasma	-50	-20	≤-18°C
10	Triage area refrigerator	Crossmatch refrigerator	2.5	5.5	1 – 6 °C
11	Unused	Unused	Unused		NA
17	HLA Refrigerator	HLA items	2.5	5.5	NA
18	HLA Freezer PCR Room	HLA items	-30	-10	NA
19	Freezer in HLA room	HLA items	-85	-68	≤ -67°C
20	IS Power Line Monitor to Hemocare (former BB computer system)	NA	110V	125V	NA
21	Refrigerator under counter processing room	Liquid RBCs	2.5	5.5	1 – 6 °C
22	Refrigerator	Blood Bank reagents	2.5	5.5	Per manufacturer's instructions
23	Tissue/Transplant freezer	Bone, tissue, and specimens	-90	-65	Per tissue provider
24	Walk-in refrigerator	Liquid RBCs, reagents, and tissues	2.5	5.5	1 – 6 °C
25	Walk-in refrigerator	Liquid RBCs, reagents, and tissues	2.5	5.5	1 – 6 °C
26	Refrigerator education room	Reagents	2.5	5.5	Per manufacturer's instructions
33	Unused freezer, removed from Blood Bank	NA	Unused		NA
129	Node power sensor (above crossmatch printer)	NA	NA		NA
130*	Database watch	NA	NA		NA
132*	Wall mount over the crossmatch printer, MPXI, senses if the communication from the wall by crossmatch to the wall system by the Rees monitor is working.	NA	NA		NA
133*	Senses the battery voltage level for the 132 wall mount.	NA	NA		NA

134*	Wall mount in the blood processing room, MPXII, senses if the communication from the wall by crossmatch to the wall system by the Rees monitor is working.	NA	NA	NA
135*	Senses the battery voltage level for the 134 wall mount.	NA	NA	NA

B. *Follow the procedures for these nodes, Technical Support must also be notified at 1-609-406-0073. When probes 130 – 135 go off, the buffer is storing the data until communication can be reestablished. This communication needs to be reestablished as soon as possible.

VIII. PROCEDURE:

Upon the first activation of an alarm from the Rees or a storage device, refer to the attached flowchart *Response to an Alarm Condition* and determine the applicable section of the *Procedure* to which to proceed.

A. Response to a Rees Alarm due to Abnormal Temperature

1. Note that the steps of Section A are also formatted as a flowchart; refer to *Response to a Temperature Alarm* attached to this document.
2. Upon the Rees First Alarm Activation:
    a. Access the Rees System program on the Rees computer (located in the back of the Blood Bank near the clerk desks) and determine the storage device and node that is in alarm.
    b. Document the storage device and the node number on the *Temperature Alarm Activation Log*.
    c. Disable the Rees alarm for 15 minutes (0.25 hours) as follows:
        i. Double click on the input that is in alarm (it will be red).
        ii. Disable alarm for 15 minutes / click OK.
        iii. Enter your username and password.
            i. A generic username and password are kept by the Rees computer in case of an emergency.
    d. Observe and document the displayed Rees temperature for the corresponding storage device.
    e. Observe and document the temperature as indicated on the storage device's external temperature display. If the storage device does not have an external temperature display, then take the temperature with the internal thermometer that is stored inside

the device.

f. Attempt to ascertain the reason that the alarm was activated; e.g. the door was open for a few minutes while searching for a blood product. Document the possible reason.

g. After 15 minutes, determine whether the alarm re-activates.

i. If the alarm does not re-activate after 15 minutes, then the investigation is complete. Documentation on the *Temperature Alarm Activation Log* is complete.

ii. If the alarm re-activates after 15 minutes, proceed to step 3.a.

3. Upon the Rees Second Alarm Activation:

a. Disable the Rees alarm for **15 additional minutes**.

b. Observe and document the temperature as displayed on the Rees and the storage device (steps 2.d and 2.e above) and then proceed to step 3.c (below).

c. Consider whether to move the stored items to another storage device, refer to the *Considering Whether to Move Items From One Storage Device to Another* section of this document.

d. After 15 minutes, proceed as follows.

i. If the items are moved to another storage device, then the investigation is complete. Complete the *Temperature Alarm Activation Log* accordingly. NOTE: Refer to the *Consulting the Medical Director Before Moving Stored Items or After One Hour of Alarm Activation* section of this document.

ii. If the alarm does not re-activate after 15 minutes, then the investigation is complete. Documentation on the *Temperature Alarm Activation Log* is complete.

iii. If the alarm re-activates after 15 minutes, proceed to step 4.a.

4. Upon the Rees Third Alarm Activation:

a. Disable the Rees alarm for **30 additional minutes**.

b. Observe and document the temperature as displayed on the Rees and the storage device (steps 2.d and 2.e above) and then proceed to step 4.c (below).

c. Consider whether to move the stored items to another storage device, refer to the *Considering Whether to Move Items From One Storage Device to Another* section of this document.

d. After 30 minutes, proceed as follows.

i. If the items are moved to another storage device, then the investigation is complete. Complete the *Temperature Alarm Activation Log* accordingly. NOTE: Refer to the *Consulting the Medical Director Before Moving Stored Items or After One Hour of Alarm Activation* section of this document.

ii. If the alarm does not re-activate after 30 minutes, then the investigation is complete. Documentation on the *Temperature Alarm Activation Log* is complete.

iii. If the alarm re-activates after 30 minutes, proceed to step 5.a.

5. Upon the Rees Fourth Alarm Activation:
    a. Observe and document the temperature as displayed on the Rees and the storage device (steps 2.d and 2.e above) and then proceed to step 5.b (below).
    b. Consult the MD or designee as indicated in the *Consulting the Medical Director Before Moving Stored Items or After One Hour of Alarm Activation* section of this document.
    c. Document a variance.
    d. Proceed as directed by the Blood Bank MD or designee.
    e. Indicate the manner in which the investigation is completed in the *Upon Fourth Alarm Activation or MD/Designee Consultation / Resolution* section of the *Temperature Alarm Activation Log.*

B. Storage Device's Alarm is Activated (Rees Alarm is not Activated)

1. If the alarm of a storage device is activated (and the Rees alarm is not activated), follow the same procedure described in Section A, *Response to a Rees Alarm due to an Abnormal Temperature* or the corresponding flowchart with the following differences:
    a. Consider the likely possibility that the temperature probe inside of the storage device has been moved during inventory management. Reposition the probe to determine whether the temperature returns to the acceptable range.
        i. Low water or glycerol levels for the thermometer should be considered as a potential cause.
    b. Consider the possibility that the storage device's alarm needs a battery replacement; notify a Medical Technologist Lead or Beaumont Health Biomedical for this replacement.
    c. When a Rees alarm is disabled for a specific amount of time, it will automatically re-activate if the temperature is still outside the acceptable range after the time elapses. When only the storage device's alarm is activated (and Rees is not activated) there is no Rees alarm to disable. Disable the alarm of the storage device, but note that it will not automatically re-activate after the specified time. Set a timer, and then re-enable the alarm after the specified time elapses to see whether the alarm re-activates.
    d. If a storage device's alarm is activated, one would expect the Rees alarm to activate, too. If the Rees does not activate, consider the possibility that communication to the Rees node was interrupted or that the thermistor has failed.
    e. Document the *Temperature Alarm Activation Log / Upon Fourth Alarm Activation or MD/Designee Consultation / Resolution* section as E (other) and indicate the manner of resolution; e.g., probe repositioned.

C. Rees Alarm - Power to the Hemocare Blood Bank Computer Line has been Interrupted (Input #20)

1. Access the Rees System program on the Rees computer.
2. Select input #20 and disable the alarm for 15 minutes.
3. Contact Facilities Management to assess the expected length of time before power may be restored. If Facilities Management indicates that power will not be restored within 5 minutes:
    a. Shutdown the Hemocare computer system.
    b. Disable input # 20 for a longer time period, as necessary.
4. Once power is restored, re-enable the Rees alarm as follows:
    a. Double click on input # 20.
    b. Enable the alarm.
    c. Enter your username and password.
5. Submit a variance report; indicate which input alarmed and the actions that were taken.

D. The Rees Open / Shorted Thermistor Alarm is Activated

1. If a thermistor is shorted or open circuited, a “beep” message will appear on the Series II display panel. The message will tell whether the probe is shorted or open and which probe is involved.
2. Access the Rees System program on the Rees computer.
3. Disable the alarm for the affected input for 24 hours.
4. Initiate manual temperature monitoring for the affected storage device, as described in Transfusion Medicine policy, *Manual Temperature Monitoring* and initiate the *Manual Temperature Monitor* form.
5. Contact Facilities Maintenance to investigate the integrity of the cable between the Rees node and the affected input thermistor. If the communication cable is intact, then call Rees and initiate replacement of the thermistor.
6. Continue manual temperature monitoring until the thermistor has been replaced or repaired, and is no longer in alarm.
7. Submit a variance report; indicate which input alarmed and the actions that were taken.

E. Node Power Sensor Alarm is Activated (Node #129)

1. The node power sensor is located above the tagging station.
2. Initiate manual temperature monitoring for all storage devices, as described in Transfusion Medicine policy, *Manual Temperature Monitor* and initiate the *Manual Temperature Monitor* form.

3. Call the Rees Technical support at 609-406-0073 (the phone number is located on the cabinet located above the Rees Computer near Medical Technologist Lead desk).
4. Continue manual temperature monitoring until instructed by Rees that the problem has been resolved and the alarm is no longer active.
5. Disable input #129 for the duration, until Rees is able to resolve the problem.
6. Submit a variance report; describe the problem and the actions that were taken.

F. Data Communication Alarm is Activated (Nodes #130, 132, 133, 134, 135)

1. The data communication nodes are located above the crossmatch printer and in the blood processing room.
2. See *Procedure* / Section A *Response to a Rees Alarm due to Abnormal Temperature*.
3. Call technical support at 1-609-406-0073 as soon as the alarm is activated.

IX. REFERENCES:

1. AABB, *Technical Manual*, current edition.
2. AABB, *Standards for Blood Banks and Transfusion Services*, current edition.

Attachments

Response to a Temperature Alarm

Response to an Alarm Condition

Temperature Alarm Activation Log

Approval Signatures

Step Description	Approver	Date
	Ann Marie Blenc: System Med Dir, Hematopath	6/7/2022
	Jeremy Powers: Chief, Pathology	6/7/2022
Policy and Forms Steering Committe (if needed)	Gail Juleff: Project Mgr Policy	5/31/2022

Policy and Forms Steering Committe (if needed)	Brooke Klapatch: Medical Technologist Lead	5/31/2022
	Rebecca Thompson: Medical Technologist Lead	5/31/2022
	Brooke Klapatch: Medical Technologist Lead	5/25/2022