

**BY ORDER OF THE COMMANDER  
EGLIN AIR FORCE BASE**

**EGLIN AIR FORCE BASE  
INSTRUCTION 48-151**



**3 AUGUST 2016**

***Aerospace Medicine***

***THERMAL INJURY  
PREVENTION PROGRAM***

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This instruction implements Air Force Policy Directive (AFPD) 48-1, *Aerospace Medicine Program*, references Air Force Instruction (AFI) 48-151, *Thermal Injury Prevention Program*, and provides supporting installation guidance for establishing and implementing an effective local Thermal Injury Prevention Program (TIPP). This instruction covers the dissemination of required information and training for Air Force employees. The intent of this instruction is to reduce the incidence of thermal injury by informing employees of the hazards associated with training in extreme temperatures and to implement proper preventive measures. This instruction applies to all Team Eglin personnel. Governing directives for the heat stress program implemented by this instruction are in AFI 48-151, *Thermal Injury Prevention Program*. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using Air Force (AF) Form 847, *Recommendation for Change of Publication*. Ensure that all records created because of processes prescribed in this publication are maintained IAW Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS).

## **1. Introduction**

1.1. This instruction outlines the implementation of procedures and responsibilities of commanders and organizations at Eglin AFB to implement an effective TIPP. The Eglin Range Complex utilizes a network of automated sensors to estimate the Wet Bulb Globe Temperature (WBGT) flag conditions and thus heat stress on the human body. These flag

conditions are used to balance mission execution with the health and safety risk to base personnel to ensure the proper risk management principles are applied. Due to the warmer climate of Eglin AFB, the risk of thermal injury due to cold temperatures is minimal and a flag system is not used to communicate this risk. Coordinated watches, warnings, and advisories for cold temperatures are outlined in the Eglin AFB Weather Support Plan 15-1. However, for reference a wind chill index chart and recommended precautions is included in Attachment 3.

1.2. The WBGT index is the thermal index used by DoD to measure heat stress on the human body. It takes into account temperature, humidity, solar load, wind, and the body's ability to sweat and cool itself. Flag Conditions determined by the WBGT index allow commanders to focus on identifying and reducing the risk of heat related illnesses and injuries. The WBGT is NOT the same as the heat index. The heat index only measures air temperature and relative humidity, and does not take into account the ability of the body to cool itself by sweating, and cooling due to wind and therefore is NOT a good indicator of heat stress risk.

## **2. Roles and Responsibilities**

### **2.1. Unit/Organizational Commanders.**

2.1.1. Are responsible for disseminating the WBGT Flag Condition throughout their respective organization.

2.1.2. Enforce work-rest cycles and hydration requirements (see Attachment 2).

2.1.3. Ensure supervisors and workers receive training at least annually concerning the early signs of heat stress, the methods to minimize associated effects, and techniques for prevention of heat related illness.

2.1.4. Ensure potable drinking water is available to meet the requirements of this instruction.

### **2.2. 96th Weather Squadron (96WS).**

2.2.1. The 96 WS is Eglin's primary source for WBGT and other environmental information. Current WBGT readings from KVPS (Eglin main), KEGI (Duke Field), and Remote Automated Weather Stations (RAWS) across the Eglin Range are available from the Improved Weather Dissemination System (IWDS), via the desktop client and at <https://eglinweather.eglin.af.mil/IWDS/WetBulb.aspx> IAW EAFB Plan 15-1, *Base Weather Support Plan*. WBGT is calculated with every observation (at least hourly), and changes to flag conditions are reported more frequently as environmental conditions dictate.

2.2.2. The reported flag condition will be based on heat categories established in Table A2.1. and Table A2.2. of Attachment 2. The procedures outlined in Table A2.1. and Table A2.2. of Attachment 2 contain the SGBP recommended work and (or) rest cycles and preventative guidance for the various WBGT stages based on acclimatized and un-acclimatized trainees.

**2.3. 96th Aerospace Medicine Squadron, Bioenvironmental Engineering Flight (SGPB).**

2.3.1. Oversees the overall heat and (or) cold stress program outlined in AFI 48-151, *Thermal Injury Prevention Program*, and supplements the 96 WS WBGT readings with additional readings when requested.

2.3.2. SGBP is responsible for measuring the WBGT index to supplement 96 WS calculations upon request. Requests for additional WBGT support must be submitted to the Bioenvironmental Engineering Flight at least 14 days prior to the event.

2.3.3. Supplemental monitoring will cease when SGBP determines the health risk is low; usually when the outdoor temperature drops below 85°F and the WBGT index drops below 82°F. Additionally, monitoring will cease during periods of inclement weather (heavy rain, high winds, lightning, etc.) Monitoring will resume when inclement weather ceases.

2.3.4. In the event of an emergency response requiring sustained Level A and (or) decontamination operations, SGBP will monitor WBGT conditions (adding 10F to the WBGT index due to additional personal protective equipment requirements) and provide the on-scene commander with health risk advice. Search and Recovery activities and Emergency Support teams will be monitored for thermal injuries when flag conditions exist.

**2.4. 96th Aerospace Medicine Squadron, Public Health (SGPM).**

2.4.1. Public Health will investigate and appropriately report occupational related illnesses.

**2.5. Occupational and Environmental Health Working Group (OEHWG).**

2.5.1. The OEHWG routinely reviews shop hazard data and makes decisions on any indicated worker education or occupational exams, to include thermal stress items. Shop supervisors are encouraged to attend the OEHWG meetings during which their shop is reviewed.

**2.6. Eglin Command Post (96 TW/CP).**

2.6.1. The command post shall relay WBGT flag condition information for KVPS via installation mass notification system(s) as deemed necessary.

**2.7. Duke Field Command Post (919 SOW/CP).**

2.7.1. The command post shall relay WBGT flag condition information for KEGI via installation mass notification system(s) as deemed necessary.

**2.8. Workplace Supervisors.**

2.8.1. Will obtain the WBGT flag condition valid for the site closest to their location. In addition, wind chill and other weather information is available from 96 WS IAW paragraph 2.2. during hot and cold weather conditions.

2.8.2. Shall implement personnel protective measures as listed in AFI 48-151 and consider implementing additional SGBP recommendations when notified by Command Post.

### **3. Water Intake**

3.1. Water intake levels should coincide with SGPB recommendations in accordance with Attachment 2, Tables A2.1. and A2.2., WBGT Stages, Temperature Ranges, and Flag Colors.

### **4. Prevention Measures**

4.1. The key to prevention of thermal illness and (or) injury is an awareness of thermal risk factors by commanders, supervisors, and individuals at all levels. Any training or task involving physical exertion in a hot or cold climate should be considered a high-risk activity. Risk of illness and (or) injury is based primarily upon environmental conditions, work rate, and clothing worn. When there is a thermal casualty risk, it is the commander's duty to ensure that resources are available to undertake an appropriate risk assessment and employ risk management actions. Attachment 4 provides Heat-Stress information for all to review, and health recommendations for commanders to consider and (or) implement.

CHRISTOPHER P. AZZANO, Brigadier General, USAF  
Commander

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFMAN 33-363, *Management of Records*, 1 March 2008

AFI 48-151, *Thermal Injury Prevention Program*, 7 April 2016

AFPD 48-1, *Aerospace Medicine Program*, 23 August 2011

EAFB 15-1, *Weather Support Plan*, 1 September 2014

***Adopted Forms***

AF Form 847, *Recommendation for Change of Publication*, 22 September 2009

***Abbreviations and Acronyms***

**AF**—Air Force

**AETC**—Air Education and Training Command

**AETCI**—Air Education and Training Command Instruction

**AFMAN**—Air Force Manual

**AFPD**—Air Force Policy Directive

**OEHWG**—Occupational and Environmental Health Working Group

**RDS**—Records Disposition Schedule

**WBGT**—Wet Bulb Globe Temperature

***Terms***

**Acclimatized**—An individual's body ability to adjust to different climates. Normally takes about three weeks to be acclimatized.

**Level A**—Sustained operations requiring full encapsulation while using a Self Contained Breathing Apparatus.

**Prolonged Moderate to Heavy Work**—Longer than two hours.

**WBGT**—A measurement used to capture whole-body dose to thermal stress. It takes into account temperature, humidity, solar load, and wind and the body's ability to sweat and cool itself.

**Phone Numbers**—**Bioenvironmental Engineering**-DSN 873-8607

**Public Health**—DSN 873-8612

**96 TW Command Post**—SN 875-4020

**919 SOW Command Post**—DSN 875-6701

**96 WS**—DSN 872-4800

## Attachment 2

## WET BULB GLOBE TEMPERATURE TABLE (WBGT)

Table A2.1. Training Guidelines for Average Acclimatized Airmen Wearing ABU, Hot Weather.

| F<br>l<br>a<br>g   | Temperature Range     | EASY WORK       |                                 | MODERATE WORK                              |                    | HARD WORK       |                    |
|--|-----------------------|-----------------|---------------------------------|--|--------------------|-----------------|--------------------|
|  | WBGT (F) <sup>2</sup> | Work/Rest Cycle | Water Intake Qt/Hr <sup>3</sup> | Work <sup>4</sup> /Rest <sup>5</sup> Cycle | Water Intake Qt/Hr | Work/Rest Cycle | Water Intake Qt/Hr |
|  | 78-81.9°F             | No Limit        | 0.5                             | No Limit                                   | 0.75               | 40/20           | 0.75               |
|  | 82-84.9°F             | No Limit        | 0.5                             | 50/10                                      | 0.75               | 30/30           | *1.0               |
|  | 85-87.9°F             | No Limit        | *0.75                           | *40/20                                     | *0.75              | *30/30          | 1.0                |
|  | 88-89.9°F             | No Limit        | 0.75                            | 30/30                                      | 0.75               | 20/40           | 1.0                |
|  | 90°F                  | 50/10           | 1.0                             | 20/40                                      | 1.0                | 10/50           | 1.0                |
| <p>1. The values displayed in the table will sustain performance and hydration for at least 4 hours of work in the specified heat categories. <b>Caution: Hourly fluid intake for both acclimatized and un-acclimatized personnel should not exceed 1½ quarts. Rapid ingestion of water, if greater than 1½ quarts per hour, may lead to hyponatremia, also known as acute water intoxication. This is a life-threatening condition that may lead to weakness, loss of consciousness, convulsions and death if not recognized and treated promptly.</b></p> <p>*2. Wearing body armor adds 5F to the measured WBGT.</p> <p>3. For all 3 work rates, individual water requirement may vary by +/- 0.25 qt/hr.</p> <p>4. When performing work/exercise with ground crew ensemble, fire-fighting gear, or other similar restrictive or impermeable clothing, arrangements should be made for remote site measurement of the WBGT and 10F added to the measurement before using Tables 3. Add 15F to the WBGT if also wearing combat armor.</p> <p>5. Rest means minimal physical activity, i.e., sitting or standing, accomplished in the shade if possible.</p> <p>6. Table does not take altitude into account.</p> |                       |                 |                                 |  |                    |                 |                    |

**Table A2.2. Training Guidelines for Average Un acclimatized Airmen Wearing ABU Hot Weather.**

| F<br>l<br>a<br>g | Temperature Range     | EASY WORK              |                                       | MODERATE WORK                                     |                          | HARD WORK              |                          |
|------------------|-----------------------|------------------------|---------------------------------------|---|--------------------------|------------------------|--------------------------|
|                  | WBGT (F) <sup>2</sup> | Work/<br>Rest<br>Cycle | Water<br>Intake<br>Qt/Hr <sup>3</sup> | Work <sup>4</sup> /<br>Rest <sup>5</sup><br>Cycle | Water<br>Intake<br>Qt/Hr | Work/<br>Rest<br>Cycle | Water<br>Intake<br>Qt/Hr |
|                  | 78-81.9°F             | No Limit               | 0.5                                   | 50/10   | 0.75                     | 30/30                  | 0.75                     |
|                  | 82-84.9°F             | No Limit               | 0.5                                   | 40/20   | 0.75                     | 30/30                  | *1.0                     |
|                  | 85-87.9°F             | No Limit               | 0.75                                  | 30/30   | 0.75                     | 20/40                  | 1.0                      |
|                  | 88-89.9°F             | 50/10                  | 0.75                                  | 20/40   | *0.75                    | 10/50                  | 1.0                      |
|                  | 90°F                  | 40/20                  | 1.0                                   | 10/50   | 1.0                      | Not Allowed            | Not Applicable           |

1. The values displayed in the table will sustain performance and hydration for at least 4 hours of work in the specified heat categories. **Caution: Hourly fluid intake for both acclimatized and un-acclimatized personnel should not exceed 1½ quarts. Rapid ingestion of water, if greater than 1½ quarts per hour, may lead to hyponatremia, also known as acute water intoxication. This is a life-threatening condition that may lead to weakness, loss of consciousness, convulsions and death if not recognized and treated promptly.**

\*2. Wearing body armor adds 5F to the measured WBGT.

3. For all 3 work rates, individual water requirement may vary by +/- 0.25 qt/hr.

4. When performing work/exercise with ground crew ensemble, fire-fighting gear, or other similar restrictive or impermeable clothing, arrangements should be made for remote site measurement of the WBGT and 10F added to the measurement before using Tables 3. Add 15F to the WBGT if also wearing combat armor.

5. Rest means minimal physical activity, i.e., sitting or standing, accomplished in the shade if possible.

6. Table does not take altitude into account.

**Table A2.3. Examples of Workload Determination.**

| EASY WORK  | MODERATE WORK  | HARD WORK  |
|--|--|--|
| <ul style="list-style-type: none"> <li>-Walking on hard surface at 2.5 mph with 30 lb load</li> <li>-Weapon Maintenance</li> <li>-Manual of Arms</li> <li>-Marksmanship Training</li> <li>-Drill and Ceremony</li> </ul> | <ul style="list-style-type: none"> <li>-Walking on hard surface at 3.5 mph with &lt; 40 lb load</li> <li>-Walking on loose sand at 2.5 mph with no load</li> <li>-Patrolling</li> <li>-Low crawl, high crawl</li> <li>-Defense position construction</li> <li>-Field Assaults</li> </ul> | <ul style="list-style-type: none"> <li>-Walking on hard surface at 3.5 mph with 40 lb load</li> <li>-Walking on loose sand at 2.5 mph with load</li> <li>-i.e.: PFT tests or training</li> </ul> |

Attachment 3

WIND CHILL TEMPERATURE INDEX CHART REFERENCE VALUES

Table A3.1. Wind Chill Index.

|            |    | Temperature (Deg F) |    |    |    |    |     |     |     |     |                 |     |     |     |     |     |     |     |     |
|------------|----|---------------------|----|----|----|----|-----|-----|-----|-----|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|
|            |    | Ca<br>lm            | 40 | 35 | 30 | 25 | 20  | 15  | 10  | 5   | 0               | -5  | -10 | -15 | -20 | -25 | -30 | -35 | -40 |
| Wind (mph) | 5  | 36                  | 31 | 25 | 19 | 13 | 7   | 1   | -5  | -11 | -16             | -22 | -28 | -34 | -40 | -46 | -52 | -57 | -63 |
|            | 10 | 34                  | 27 | 21 | 15 | 9  | 3   | -4  | -10 | -16 | -22             | -28 | -35 | -41 | -47 | -53 | -59 | -66 | -72 |
|            | 15 | 32                  | 25 | 19 | 13 | 6  | -0  | -7  | -13 | -19 | -26             | -32 | -39 | -45 | -51 | -58 | -64 | -71 | -77 |
|            | 20 | 30                  | 24 | 17 | 11 | 4  | -2  | -9  | -15 | -22 | -29             | -35 | -42 | -48 | -55 | -61 | -68 | -74 | -81 |
|            | 25 | 29                  | 23 | 16 | 9  | 3  | -4  | -11 | -17 | -24 | -31             | -37 | -44 | -51 | -58 | -64 | -71 | -78 | -84 |
|            | 30 | 28                  | 22 | 15 | 8  | 1  | -5  | -12 | -19 | -26 | -33             | -39 | -46 | -53 | -60 | -67 | -73 | -80 | -87 |
|            | 35 | 28                  | 21 | 14 | 7  | 0  | -7  | -14 | -21 | -27 | -34             | -41 | -48 | -55 | -62 | -69 | -76 | -82 | -89 |
|            | 40 | 27                  | 20 | 13 | 6  | -1 | -8  | -15 | -22 | -29 | -36             | -43 | -50 | -57 | -64 | -71 | -78 | -84 | -91 |
|            | 45 | 26                  | 19 | 12 | 5  | -2 | -9  | -16 | -23 | -30 | -37             | -44 | -51 | -58 | -65 | -72 | -79 | -86 | -93 |
|            | 50 | 26                  | 19 | 12 | 4  | -3 | -10 | -17 | -24 | -31 | -38             | -45 | -52 | -60 | -67 | -74 | -81 | -88 | -95 |
|            | 55 | 25                  | 18 | 11 | 4  | -3 | -11 | -18 | -25 | -32 | -39             | -46 | -54 | -61 | -68 | -75 | -82 | -89 | -97 |
|            | 60 | 25                  | 17 | 10 | 3  | -4 | -11 | -19 | -26 | -33 | -40             | -48 | -55 | -62 | -69 | -76 | -84 | -91 | -98 |
|            |    | CAUTION             |    |    |    |    |     |     |     |     | EXTREME CAUTION |     |     |     |     |     |     |     |     |

Table A3.2. Recommended Precautions and Guidance in Cold Environments.

| Wind Chill Condition | Recommended Precautions and Hourly Work/Warming Cycle <sup>1</sup><br>Follow Water Intake Levels for Heat Stress Conditions   |
|----------------------|---|
| Standard 31 – 36     | Wear gloves and cover metal handles and bars with thermal insulation.   |
| Moderate 20 – 30     | Follow Standard precaution, no outdoor operation with water (vehicle/aircraft washing), wear gloves and total body protection, avoid heavy sweating change wet clothes immediately, and implement the 'buddy' system. In the event of precipitation, wear Gore-Tex™ or ponchos over field jackets.<br><b>50 MINUTES WORK/20 MINUTES WARMING</b> |
| Caution (-17) – 19   | Follow both Standard and Moderate precautions, wear mittens not gloves. Replace BDU cap with pile cap.<br><b>40 MINUTES WORK/20 MINUTES WARMING</b>   |
| Danger (-98) – (-18) | Follow Standard through Caution actions.<br><b>30 MINUTES WORK/30 MINUTES WARMING</b>   |
| Extreme              | <b>MISSION CRITICAL WORK ONLY<sup>2</sup></b>   |

<sup>1</sup> Warming must be in an indoor, heated environment.

<sup>2</sup> The Unit Commander will determine which tasks are mission critical.

Attachment 4

EGLIN TEST AND TRAINING RANGE WET BULB GLOBAL TEMPERATURE DISPLAY

A4.1. WBGT Map Display <https://eglinweather.eglin.af.mil/IWDS/WetBulb.aspx>.

Figure A4.1. WBGT Map Display.

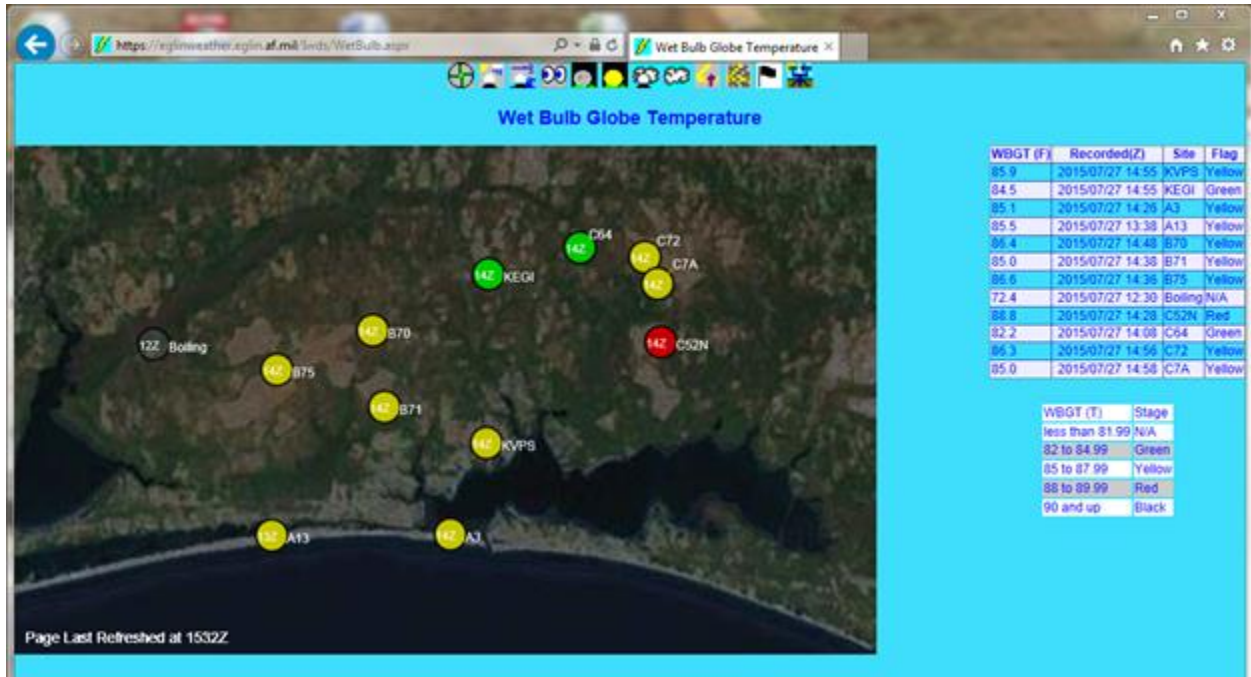
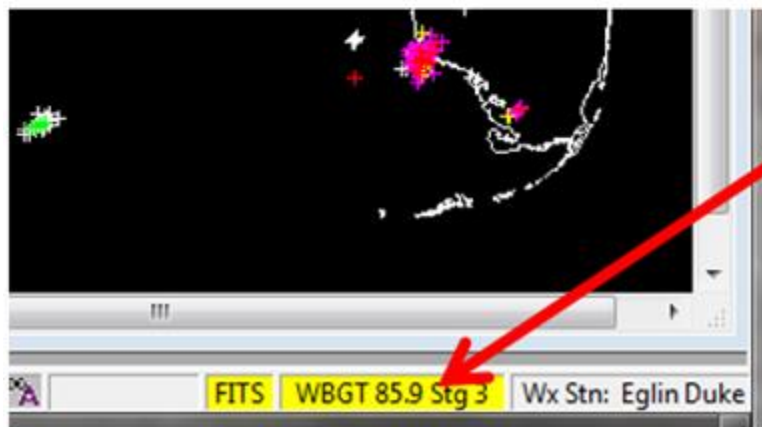
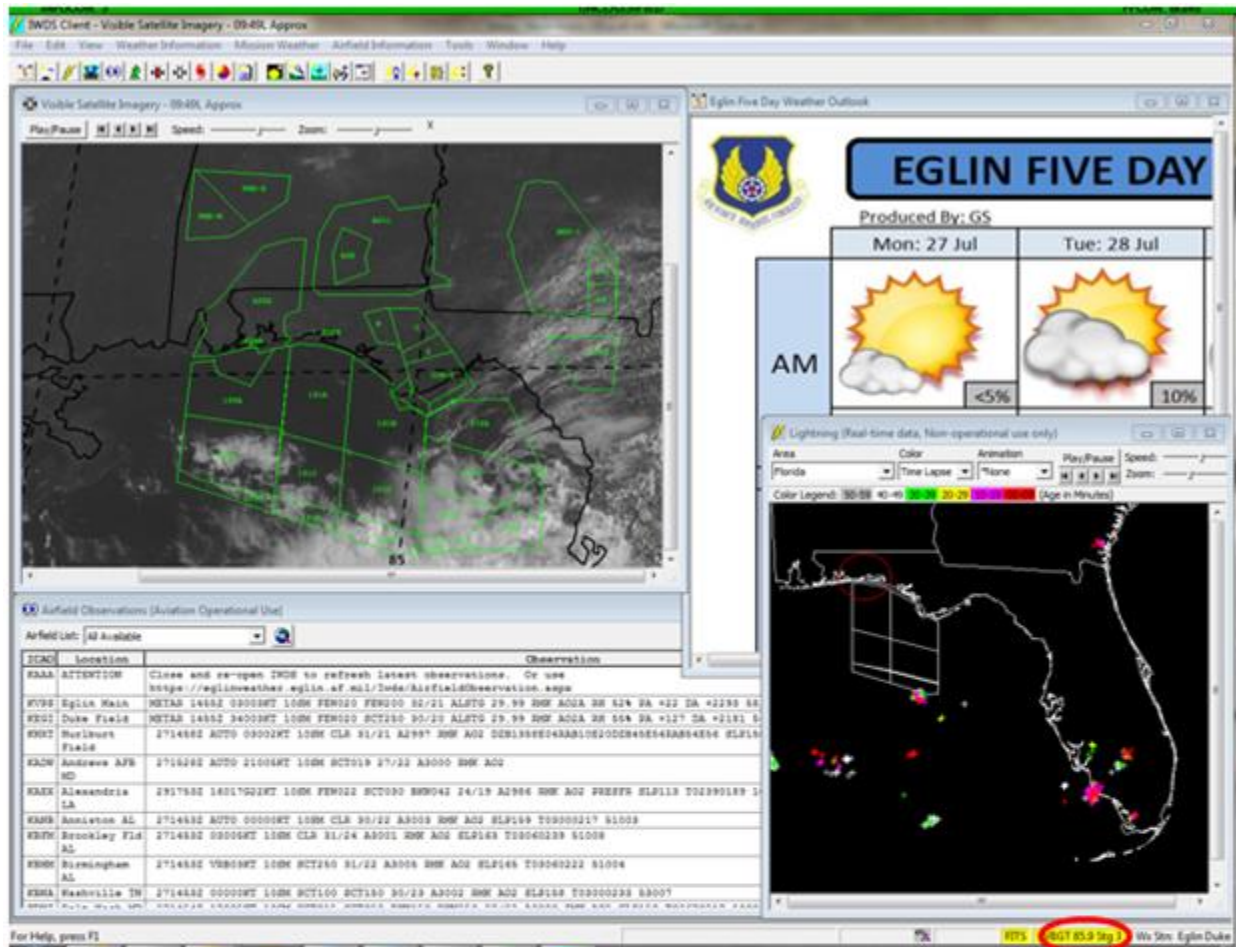


Figure A4.2. IWDS Client KVPS WBGT Display Only Valid For Eglin Main.



**\*\*KVPS only\*\***