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Operations and Services
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WFO AIR QUALITY PRODUCTS SPECIFICATION

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Signed David B. Caldwell 6-4-08

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Director Office of Climate, Water, and
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Date

WFO Air Quality Products Specification

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1. **Introduction.** This procedural instruction provides product specifications for external air quality messages relayed by National Weather Service (NWS) Weather Forecast Offices (WFOs). This instruction neither changes the method of interactions between NWS and state and local air quality forecasters, nor requires NWS forecasters to initiate messages for state and local air quality forecasters. This instruction provides a standardized template for relaying air quality messages generated by state and local air quality forecasters should they request their local WFOs to do so. Template specifications include the guidelines associated with these products, detailed content, and format for each product type. Air quality alerts and statements are not prepared directly by WFO staff. The function of initiating and issuing air quality messages is performed by state and local air quality forecasters. The NWS' sole function in this process is providing, on request, a means of disseminating these state and locally issued air quality messages.

2. **Air Quality Statement (AQI).** The AQI product is used by WFOs to relay routine air quality messages issued by state and local agencies.

2.1 **Mission Connection.** The AQI is a non-technical product which relays routine air quality information compiled by state and local air quality agencies. The content of this message varies widely from state to state, and often from jurisdiction to jurisdiction. Some examples of information contained in these messages include:

- Pollen Count
- Environmental Protection Agency (EPA) Air Quality Index (AQI)
- Gross Mold Count
- Air Quality Index Code Level for the day (Green, Yellow, Orange, Red)
- Source of Pollution (ozone, smoke, particulate matter (PM), etc.)
- Sky Condition relating to air pollution-induced haze

WFOs are only responsible for the dissemination of these messages, not the content. Any content issues must be relayed to the issuing state or local agency.

2.2 **Issuance Guidelines.**

2.2.1 **Creation Software.** The AQI should be composed using the Advanced Weather Interactive Processing System (AWIPS) Interactive Forecast Preparation System (IFPS) preformatted AQI shell, or other text editor.

2.2.2 **Issuance Criteria.** The AQI product will be relayed by WFOs for all routine air quality messages issued by the state or local agencies within the WFO's area of responsibility per state/local agency agreement. The following guidelines are to be used to delineate a routine and a non-routine product issuance.

2.2.2.1 **Routine Issuances.** All routine issuances of air quality messages will be disseminated under the AQI product header. A message should be considered routine when it is issued routinely for sub health-threatening threshold levels or is scheduled such as when:

- a. The EPA's Air Quality Index value is between 0 and 300 or higher (see Appendix for color-coded table and explanation of the EPA Air Quality Index)
- b. A "Code Level" or the "Level of Health Concern" is forecast to be Low or Moderate (green or yellow)
- c. The "Skycast" is forecast to be yellow or green
- d. It is issued daily at the request of the local/state air quality agency

Issuing agencies can set higher thresholds for areas which normally experience higher levels of pollutants.

If the above guidelines/thresholds are exceeded, then a non-routine message will be relayed with an Air Quality Alert Message (AQA) product header, which is described in Section 3 of this instruction.

2.2.3 Issuance Time. The issuance time of the AQI varies from WFO to WFO. It is dependant upon the frequency with which state or local agencies issue their messages. In some cases, products will be issued once per day in one WFO, while another WFO may relay hourly messages.

2.2.4 Valid Time. AQIs are valid from time of release until the next release or as specified by the issuing agency.

2.2.5 Product Expiration Time. AQIs are not required to contain a product expiration time. If a WFO wishes to put an expiration time on the product, it will require coordination with the state and local agency which issues the message.

2.3 Technical Description. AQIs should follow the format and content described in the following section.

2.3.1 Universal Geographic Code (UGC) Type. There is no UGC coding associated with the AQI product.

2.3.2 Mass News Disseminator (MND) Broadcast Instruction Line. There is no MND Broadcast Instruction Line associated with this product.

2.3.3 MND Product Type Line. The product header of the AQI varies from WFO to WFO, and is dependant on the product header issued by state and local agencies. However, all AQIs will always include the phrase "RELAYED BY NATIONAL WEATHER SERVICE (insert WFO name here)" under the product header or issuing agencies.

Some example product headers (determined by the issuing state/local agency or agencies) which appear on the AQI are:

- a. Air Quality Index Forecast
- b. Daily AQI Report
- c. Air Pollution Standard Index
- d. Air Quality Index
- e. Air Quality Report
- f. Air Quality Index Statement
- g. Pollution Index/Pollen Count
- h. Pollution Standards Index (PSI)

2.3.4 Content. As stated previously in this section, the content of the AQI will be determined by the issuing state or local agency. The WFO's sole purpose is to serve as a dissemination means for these routine air quality messages. Changes in content need to be coordinated with the issuing agency or agencies.

FXaaii cccc ddhhmm AQIxxx	WMO heading (AEUS7x) AWIPS ID
<u>Product Format</u>	<u>Description of Entry</u>
PRODUCT HEADER (see section 2 for examples) NAME(S) OF AGENCY (AGENCIES) ISSUING MESSAGE (optional) RELAYED BY NATIONAL WEATHER SERVICE city state time am/pm time_zone day mon dd yyyy	<i>(MND/NWS Product Name)</i> <i>(Issuing Agency or Agencies)</i> <i>(Issuing Office)</i> <i>(Issuing Time/Date)</i>
...[headline to highlight any topical forecast information]...	<i>(Topical Headline - Optional)</i>
[Content to be defined by issuing agency or agencies]	
## or \$\$	

Figure 1. Air Quality Statement (AQI) Product Format.

2.4 Updates and Corrections. Any updates or corrections to the AQI will be issued by the issuing state or local agency, or need to be coordinated with the issuing agency.

3. **Air Quality Alert Message (AQA).** The AQA product is used by WFOs to relay non-routine air quality alert messages issued by state and local agencies.

3.1 Mission Connection. The AQA is a non-technical product which relays non-routine air quality alerts and information compiled by state and local air quality agencies. As with the AQI product, the content of these messages, as well as the type of alerts, varies widely from state to state, and often jurisdiction to jurisdiction.

3.2 Issuance Guidelines.

3.2.1 Creation Software. For the majority of offices, the AQA should be created using the AWIPS GFE Formatter Launcher application. An AQA shell formatter has been developed by Eastern Region and made available to all Regions for local use. This formatter will likely not become part of the AWIPS baseline software until Build 9, scheduled for release in Winter 2009. In addition, a web interface has been developed that will allow the issuing state or local agency to send a work textfile directly to the WFO AWIPS workstation for automatic incorporation to the GFE Formatter Launcher.

3.2.2 Issuance Criteria. The AQA product will be relayed by WFOs for any requested non-routine air quality alert messages issued by the state or local agencies within the WFO's area of responsibility. The following guidelines are to be used to delineate a non-routine product issuance (routine product issuances are discussed in Section 2.2.2.1).

3.2.2.1 Non-Routine Issuances. All non-routine issuances of air quality alert messages will be disseminated under the AQA product header. A message should be considered non-routine

whenever any of the following conditions are met:

- a. A product received from the issuing agency contains a headline indicating that a watch/advisory/alert/warning is in effect
- b. The EPA's Air Quality Index value is 101-150 (Unhealthy for Sensitive Groups - please see Appendix 3 for color-coded table and explanation of the EPA Air Quality Index) or higher
- c. The "Code Level" or the "Level of Health Concern" is forecast to be High (orange, red, or purple)
- d. The "Skycast" is forecast to be red

Issuing agencies can set higher thresholds for areas which normally experience higher levels of pollutants. In addition, other unique alert thresholds from state and local agencies may also be utilized to trigger NWS AQA messages to meet local customer needs.

3.2.3 Issuance Time. The issuance time of the AQA varies from WFO to WFO. It is dependant upon the frequency with which state or local agencies issue their messages.

3.2.4 Valid Time. AQAs are valid from time of release until the next release, or, until the alert is no longer in effect.

3.2.5 Product Expiration Time. State or local air quality officials should designate the product expiration time of the air quality alert message. If not designated, WFOs should coordinate with state or local air quality agencies to determine an expiration time.

3.3 Technical Description. AQAs should follow the format and content described in the following section.

3.3.1 UGC Type. All WFOs are to use zone coding as the UGC coding for the AQA product.

3.3.2 MND Broadcast Instruction Line. There is no MND Broadcast Instruction Line associated with this product.

3.3.3 MND Product Type Line. The product header of the AQA will always be "AIR QUALITY ALERT MESSAGE", and will also include the phrase "RELAYED BY NATIONAL WEATHER SERVICE (insert WFO name here)" under the product header or issuing agencies. The product header as received from the issuing state or local agency or agencies will serve as the headline for the text of the product. Some examples of headlines which will be used are:

- a. Ozone Alert
- b. Ozone Warning
- c. Air Quality Health Alert
- d. Air Quality Watch
- e. Air Quality Warning
- f. Air Quality Advisory
- g. Ozone Action Day
- h. EPA Air Quality Warning
- i. Air Quality Action Day

3.3.4 Content. As stated previously in this section, the content of the AQA will be determined by the issuing state or local agency. The WFO’s sole purpose is to serve as the dissemination means for these non-routine air quality messages. Changes in content need to be coordinated with the issuing agency or agencies.

FXaaii cccc ddhhmm AQAxXX st##...-ddhhmm-	WMO heading (AEUS7x) AWIPS ID <i>UGC zone coding/expiration time</i>
<u>Product Format</u>	<u>Description of Entry</u>
AIR QUALITY ALERT MESSAGE NAME(S) OF AGENCY (AGENCIES) ISSUING MESSAGE RELAYED BY NATIONAL WEATHER SERVICE city state time am/pm time_zone day mon dd yyyy	(MND/NWS Product Name) <i>(Issuing Agency or Agencies)</i> (Issuing Office) (Issuing Time/Date)
...[headline to highlight alert/watch/warning in effect] ...	(Topical Headline)
[Content to be defined by issuing agency or agencies]	
## or \$\$	

Figure 2. Air Quality Alert Message (AQA) Product Format.

3.4 Updates and Corrections. Any updates or corrections to the AQA will be issued by the issuing state or local agency, or need to be coordinated with the issuing agency.

APPENDIX – Product Examples and Air Quality Resources

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1. Air Quality Statement (AQI) Examples

a. Issuance with Expiration Time (time of next scheduled issuance):

AEUS71 Kccc 152032
AQIccc
ssZ022-162000-

AIR QUALITY INDEX FORECAST
RELAYED BY NATIONAL WEATHER SERVICE WFO NAME
430 PM EDT SUN JUL 15 2007

AIR QUALITY FORECASTS FOR THE EXAMPLE AREA ARE PROVIDED BY
THE STATE DEPARTMENT OF ENVIRONMENTAL QUALITY.

...THE EXAMPLE AREA FORECAST FOR MONDAY...
CODE LEVEL YELLOW WHICH IS MODERATE...POLLUTANT IS PARTICLES.
\$\$

b. Issuance with Issuing Agency listed in MND header:

AEUS74 Kccc 161350
AQIccc
ssZ025-161500-

AIR QUALITY INDEX STATEMENT
STATE DEPARTMENT OF ENVIRONMENTAL QUALITY
RELAYED BY THE NATIONAL WEATHER SERVICE WFO NAME
849 AM CDT MON JUL 16 2008

THE FOLLOWING STATEMENT WAS ISSUED BY THE STATE DEPARTMENT OF
ENVIRONMENTAL QUALITY.

THIS MORNING AT 8 AM, THE AIR POLLUTION STANDARD INDEX FOR STATE SITE
WAS 45... WITH THE AIR QUALITY RATED GOOD. THE PRIMARY
POLLUTANT WAS OZONE.
\$\$

FOR FURTHER INFORMATION, TELEPHONE THE STATE DEPARTMENT OF
ENVIRONMENTAL QUALITY AT 405-702-4100.

WHEN THE AIR POLLUTION STANDARD INDEX IS LESS THAN 100, NO
PRECAUTIONS ARE NECESSARY.
\$\$

c. Hourly Issuance of Product:

AEUS73 Kccc 161440
AQIccc
CITY STATE AIR QUALITY INDEX
ISSUED BY CITY METRO AIR POLLUTION CONTROL DISTRICT
RELAYED BY NATIONAL WEATHER SERVICE WFO NAME
1038 AM EDT MON JUL 16 2008

10:00 AM INDEX 59

ELEVATED POLLUTANT FINE PARTICULATES

CURRENT CATEGORY MODERATE RANGE

SHORT TERM FORECASTS OZONE: MODERATE RANGE.
FINE PARTICULATES: MODERATE RANGE.

\$\$

2. Air Quality Alert Message (AQA) Examples

a. Counties listed in body of message:

AEUS71 Kccc 091818
AQAccc
ssZ063>066-110500-

AIR QUALITY ALERT MESSAGE
STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
RELAYED BY NATIONAL WEATHER SERVICE WFO NAME
218 PM EDT MON JUL 9 2008

...AIR QUALITY ALERT IN EFFECT FROM 1 PM TUESDAY TO 1 AM WEDNESDAY...

THE STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION HAS ISSUED
AN AIR QUALITY HEALTH ADVISORY FOR THE FOLLOWING COUNTIES...

COUNTY1...COUNTY2.

AIR QUALITY LEVELS IN OUTDOOR AIR ARE PREDICTED TO BE GREATER
THAN AN AIR QUALITY INDEX VALUE OF 100 FOR THE POLLUTANT OF
OZONE. THE AIR QUALITY INDEX...OR AQI...WAS CREATED AS AN EASY
WAY TO CORRELATE LEVELS OF DIFFERENT POLLUTANTS TO ONE SCALE. THE
HIGHER THE AQI VALUE, THE GREATER THE HEALTH CONCERN.

WHEN POLLUTION LEVELS ARE ELEVATED...THE STATE DEPARTMENT OF HEALTH
RECOMMENDS THAT INDIVIDUALS CONSIDER LIMITING STRENUOUS OUTDOOR
PHYSICAL ACTIVITY TO REDUCE THE RISK OF ADVERSE HEALTH EFFECTS.
PEOPLE WHO MAY BE ESPECIALLY SENSITIVE TO THE EFFECTS OF ELEVATED
LEVELS OF POLLUTANTS INCLUDE THE VERY YOUNG, AND THOSE WITH
PRE-EXISTING RESPIRATORY PROBLEMS SUCH AS ASTHMA OR HEART DISEASE.
THOSE WITH SYMPTOMS SHOULD CONSIDER CONSULTING THEIR PERSONAL
PHYSICIAN.

A TOLL FREE AIR QUALITY HOTLINE HAS BEEN ESTABLISHED SO STATE
RESIDENTS CAN STAY INFORMED ON THE AIR QUALITY SITUATION. THE TOLL FREE
NUMBER IS: 1 800 123 4567.

\$\$

b. Counties listed in header:

AEUS71 Kccc 101552

AQAccc

AIR QUALITY ALERT MESSAGE
STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
RELAYED BY NATIONAL WEATHER SERVICE WFO NAME
1152 AM EDT TUE JUL 10 2008

ssZ067-068-110500-
COUNTY1-COUNTY2-
1152 AM EDT TUE JUL 10 2008

...AIR QUALITY ALERT IN EFFECT FROM 11 AM THIS MORNING TO 1 AM EDT
WEDNESDAY...

THE STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION HAS
ISSUED AN AIR QUALITY HEALTH ADVISORY...IN EFFECT FROM 11 AM THIS
MORNING TO 1 AM EDT WEDNESDAY.

OUTDOOR AIR QUALITY INDEX...OR AQI...VALUES IN EXCESS OF 100 ARE
EXPECTED WITH OZONE BEING THE PRIMARY POLLUTANT. THE AQI WAS
CREATED AS AN EASY WAY TO CORRELATE LEVELS OF DIFFERENT POLLUTANTS
TO ONE SCALE. THE HIGHER THE AQI VALUE, THE GREATER THE HEALTH
CONCERN.

WHEN POLLUTION LEVELS ARE ELEVATED...THE STATE DEPARTMENT
OF HEALTH RECOMMENDS THAT INDIVIDUALS CONSIDER LIMITING STRENUOUS
OUTDOOR PHYSICAL ACTIVITY TO REDUCE THE RISK OF ADVERSE HEALTH
EFFECTS. PEOPLE WHO MAY BE ESPECIALLY SENSITIVE TO THE EFFECTS OF
ELEVATED LEVELS OF POLLUTANTS INCLUDE THE VERY YOUNG, AND THOSE WITH
PRE-EXISTING RESPIRATORY PROBLEMS SUCH AS ASTHMA OR HEART DISEASE.
THOSE WITH SYMPTOMS SHOULD CONSIDER CONSULTING THEIR PERSONAL
PHYSICIAN.

A TOLL FREE AIR QUALITY HOTLINE HAS BEEN ESTABLISHED SO STATE
RESIDENTS CAN STAY INFORMED ON THE AIR QUALITY SITUATION. THE TOLL
FREE NUMBER IS: 1 800 123 4567.
\$\$

3. Air Quality Resources

3.1 Environmental Protection Agency's Air Quality Index

The Air Quality Index (AQI) is an index for reporting daily air quality. It tells how clean or polluted air is, and what associated health effects might be a concern for the public. The AQI ranges from 0 to 500. An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level EPA has set to protect public health. AQI values below 100 are generally thought of as satisfactory. When AQI values are above 100, air quality is considered to be unhealthy-at first for certain sensitive groups of people, then for everyone as AQI values get higher.

AQI colors

EPA has assigned a specific color to each AQI category to make it easier for people to understand quickly whether air pollution is reaching unhealthy levels in their communities. For example, the color orange means that conditions are "unhealthy for sensitive groups," while red means that conditions may be "unhealthy for everyone," and so on.

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0-50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51-100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101-150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151-200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201-300	Health alert: everyone may experience more serious health effects.
Hazardous	> 300	Health warnings of emergency conditions. The entire population is more likely to be affected.

Figure 3. EPA's Air Quality Index Colors

3.2 Air Quality Guidance Products. NOAA's NWS produces daily air quality forecast guidance which is used by EPA, state and local agencies to assist them with issuing their forecasts and alerts. Two types of guidance are produced: 1-hour and 8-hour average ozone concentrations and smoke forecast guidance from 0 to 48 hours for the contiguous U.S. These products are described in detail in NWS Instruction 10-516, National Non-Precipitation Weather Products Specification , Section 6.

3.3 Useful Air Quality Weblinks/Information. The following are a list of useful resources for additional air quality information:

NWS Air Quality Forecast Guidance:

Operational Products

<http://www.weather.gov/aq/>

Experimental Products

<http://www.weather.gov/aq-expr/>

NWS National Air Quality Forecast Capability:

http://www.weather.gov/ost/air_quality/

EPA's AIRNOW webpage:

<http://airnow.gov/>

Basic Air Quality Training

http://www.wdtb.noaa.gov/modules/Air_Quality/player.html

Information on Air Stagnation Advisories (NPW Product):

<http://www.nws.noaa.gov/directives/sym/pd01005015curr.pdf>

Note: The NPW product is an advisory issued by NWS WFOs to describe meteorological conditions that yield stagnating air. AQA/AQI products are relayed by the NWS at the request of a local or state air quality agency.