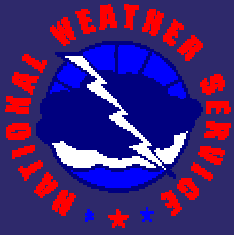


Hazardous Incident Support Tool

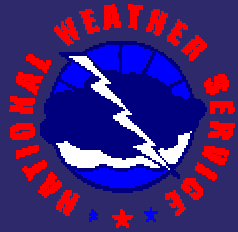
National Weather Service - Memphis, TN

Jonathan Howell – Michael Scotten



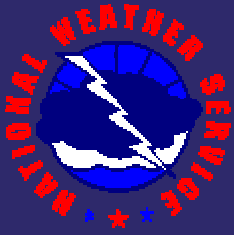
Hazardous Incident Response Tool

- **Tool Created to Improve Weather Dissemination During Hazardous Incidents**
- **Created for Use by Emergency Management / Incident Commanders**
 - *Provides Hourly Weather Information for User at Point of Incident*
 - *HAZ Grid Output Mirrors CAMEO Inputs*
- **Provides Standardized Template for Ease of Use by Customers & NWS Forecasters**
 - *HAZ Grid Created in GFE (Graphical Forecast Editor)*
 - *HAZ Grid Output Transmitted to Emergency Manager / Incident Commander via Secure Web Link*
- **Improves Forecaster Response Time**
 - *Product Created & Disseminated ~ 15 Minutes or Less*



Hazardous Incident Response Tool

- **HAZ Grid can Support Wide Ranging Functions**
 - *Utilized for Off Site Phone – Web Briefing between Forecaster & Emergency Manager / Incident Commander*
 - *Used for On Site Support – NWS Command Briefings & Inputs into Dispersion Models*
 - *Provides Hourly Weather Information & Indicates Important Weather Changes at Hourly Time Intervals*
 - Wind Shifts w/ Fronts
 - Lowering / Lifting Inversions
 - Onset of Precipitation
 - *HAZ Grid can be Accompanied by Hysplit Model Output (via NCEP) & Short-Term Weather Graphics (via FXC)*
- **Emergency Manager / Incident Commander Can Enter Current Data Directly Into CAMEO**



Hazardous Incident Response Tool

HAZ Grid Provides Near Real Time Weather Observations (CAMEO)

- *Observed Temperature*
- *Observed Relative Humidity*
- *30 Foot & 1000 – 5000 Foot Wind Speed & Direction*
- *Stability Class **
- *Sky Cover **
- *Inversion Height **

** Upgrade Scheduled Next Week*

Atmospheric Options

Wind Speed is : Knots MPH Meters/sec

Wind is from : Enter degrees true or text (e.g. ESE)

Measurement Height above ground is :

OR enter value : Feet Meters

Ground Roughness is :

Open Country OR Input Roughness (Z₀) : in cm

Select Cloud Cover :

OR enter value : (0 - 10)

complete cover partly cloudy clear

Atmospheric Options 2

Air Temperature is : Degrees F C

Stability Class is : A B C D E F

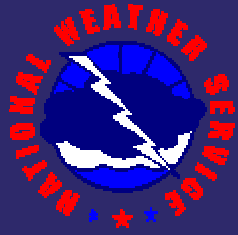
Inversion Height Options are :

No Inversion Inversion Present. Height is : Feet Meters

Select Humidity :

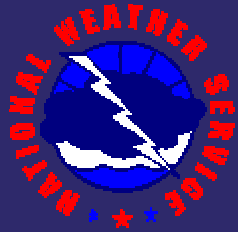
OR enter value : % (0 - 100)

wet medium dry



Hazardous Incident Response Tool

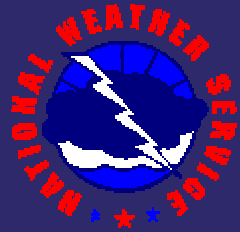
- **HAZ Grid Outputs Hourly Forecast Weather Information**
 - *Surface Temperature & Relative Humidity*
 - *30 Foot Wind Speed / Direction / Gusts*
 - *1000-5000 Foot Winds & Direction*
 - *Sky Cover*
 - *Weather Type / Coverage / Chance of Precipitation*
 - *Inversion Height*
 - *Stability*
- **Assists ICS Planning Section During Incident Operations**
- **HAZ Grid / Output Currently Operational**



Responding to a Hazardous Incident Support Request



Incident Response Command Center on 4/30



WFO Memphis Response

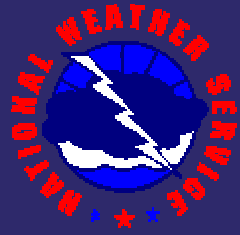
- **All WFO Memphis Forecasters Can Provide Off-Site Support (Majority of Events)**

- *Small to Medium Scale Incidents*
- *Assisting Decision Support Meteorologists during Large Scale Incidents*

- **Decision Support Meteorologists – Provide On-Site Support (Less Common Event)**

- *Large Significant Incidents Requiring Local, State, & Federal Support*
- *Ongoing Response & Recovery Impacted by Significant Weather*
- *Currently: Rich, Andy, Jim Branda, & Jon*



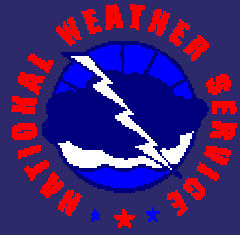


WFO Memphis Response

– *WFO Memphis Incident Response*

- **Emergency Manager / Incident Commander Requests Weather Assistance**
- **Senior Forecaster Determines if Off-Site or On-Site Response is Necessary Based Upon:**
 - *Magnitude / Significance of Event*
 - *Significant Weather Impacts*
 - *Office Staffing*

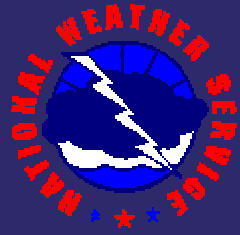




WFO Memphis Response

- **If On-Site Support is Required:**
 - ***Decision Support Meteorologist is Contacted & Dispatched to Scene w/ HAZMAT Equipment for ~ 12 Hr. Shift (Based on Staff Availability)***
 - ***Senior Forecaster to Schedule Relief Personnel (if available) for Deployments > ~12 hrs.***
 - ***Local Forecast Staff will Conduct Off-Site Support Duties to Assist Dispatched Decision Support Meteorologist***

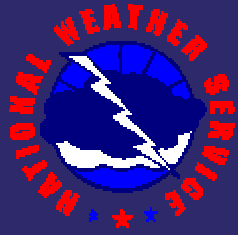




WFO Memphis Response

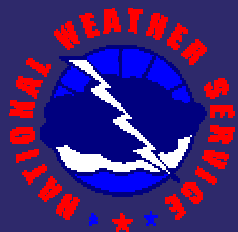
- **If Off-Site Support is Required:**
 - ***Operational WFO Staff will Initiate Off-Site Support Duties***
 - » **HAZ Formatter**
 - » **HYSPLIT (if required)**
 - ***Senior Forecaster may call in Additional Staff if Necessary / Available***





Hazardous Incident Support Integrating Use of HAZ Formatter

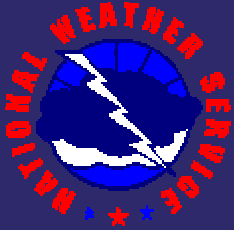




NWS Hazardous Incident Support Functions

- **Emergency Manager / Incident Commander Requests Weather Assistance**
 - *NWS Forecaster First Provides Critical Weather Information & Imminent Weather Threats*
 - *Forecaster will Request the Following Information for Use in HAZ Grid*
 - » **Name of Agency**
 - » **Name of Incident**
 - » **Date & Time of Incident**
 - » **Name of Agency Contact**
 - » **Location of Incident Including Lat. / Long.**
 - » **Height...Type...Size of Release**
- **Forecaster Will Then Initiate HAZ Formatter**





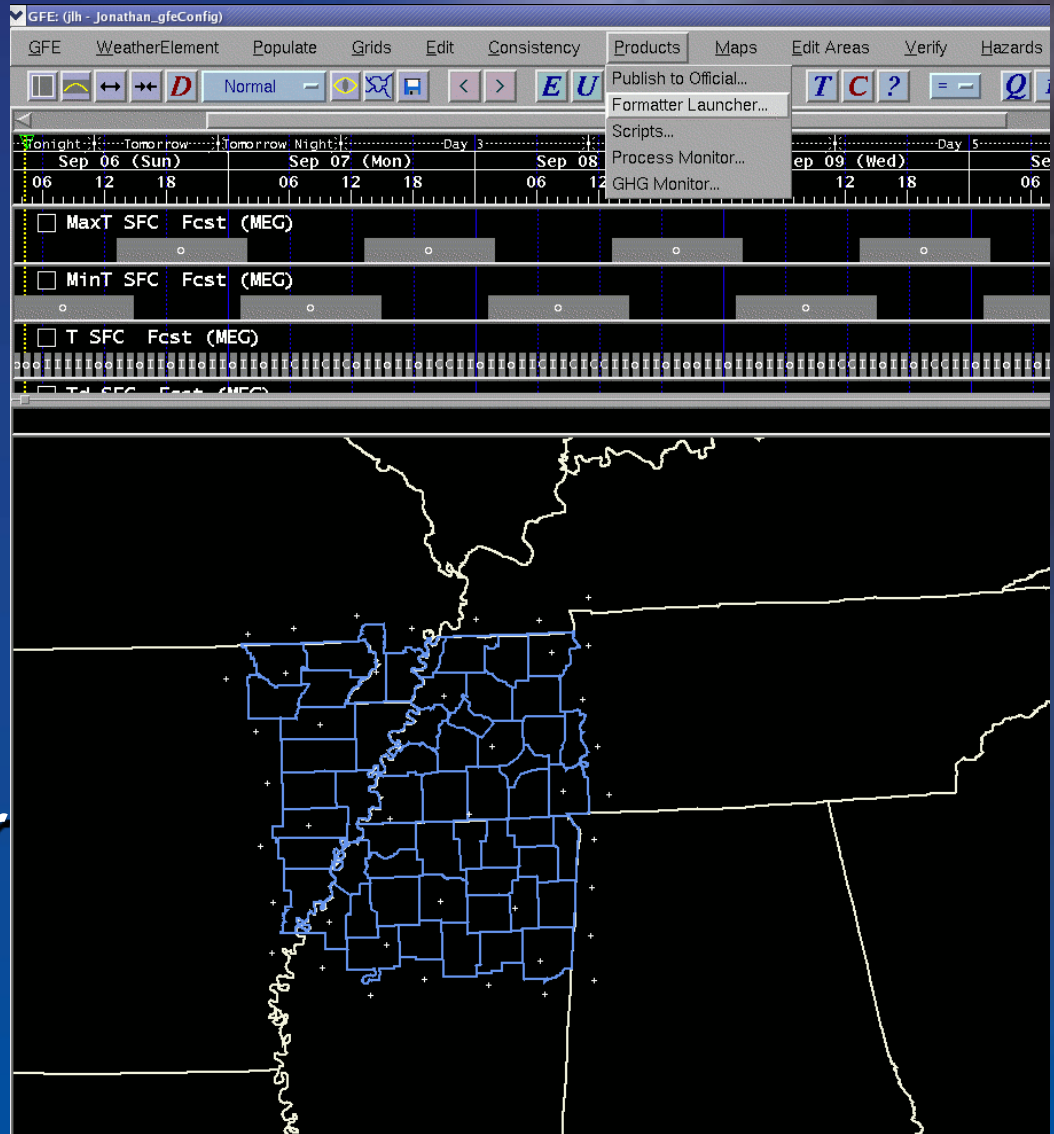
HAZ Formatter

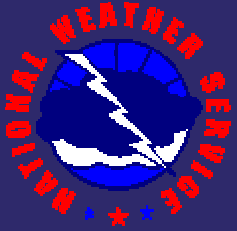
– **First....Forecaster will Ensure that the ISC Grids are Populated with Latest Forecast Information**

- 1000 – 5000 Ft Wind Grids
- QC Important Forecast Grids for Accuracy (Ex. Sfc. Winds)

– **In GFE...Forecaster Initiates HAZ Formatter**

- Select Products
- Choose Formatter Launcher

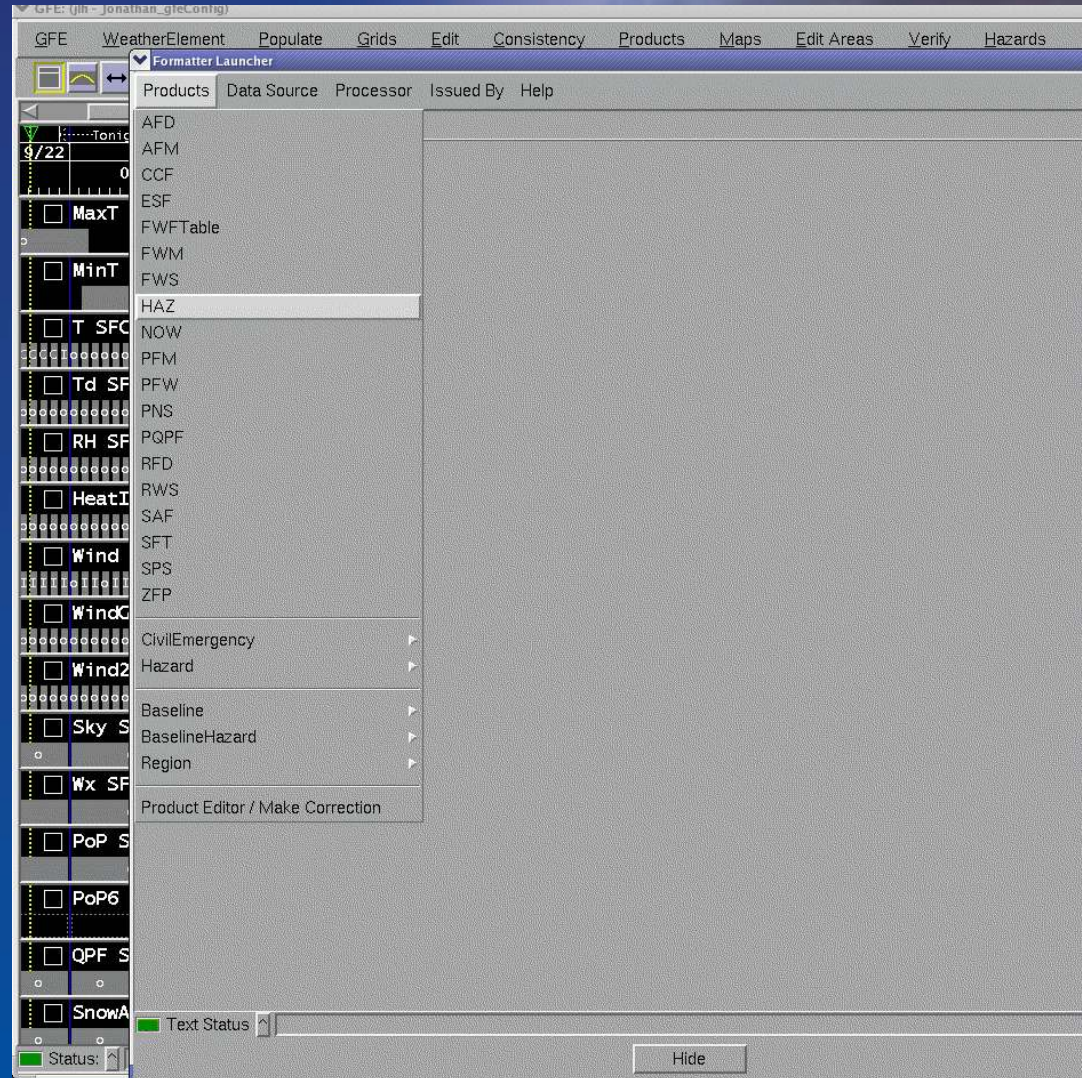


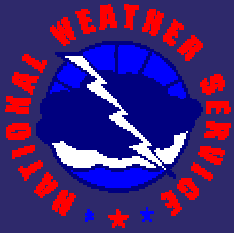


HAZ Formatter

In GFE to Initiate HAZ Grid

- From Products Menu in Formatter Launcher → Select HAZ
- This will Initiate the HAZ Formatter

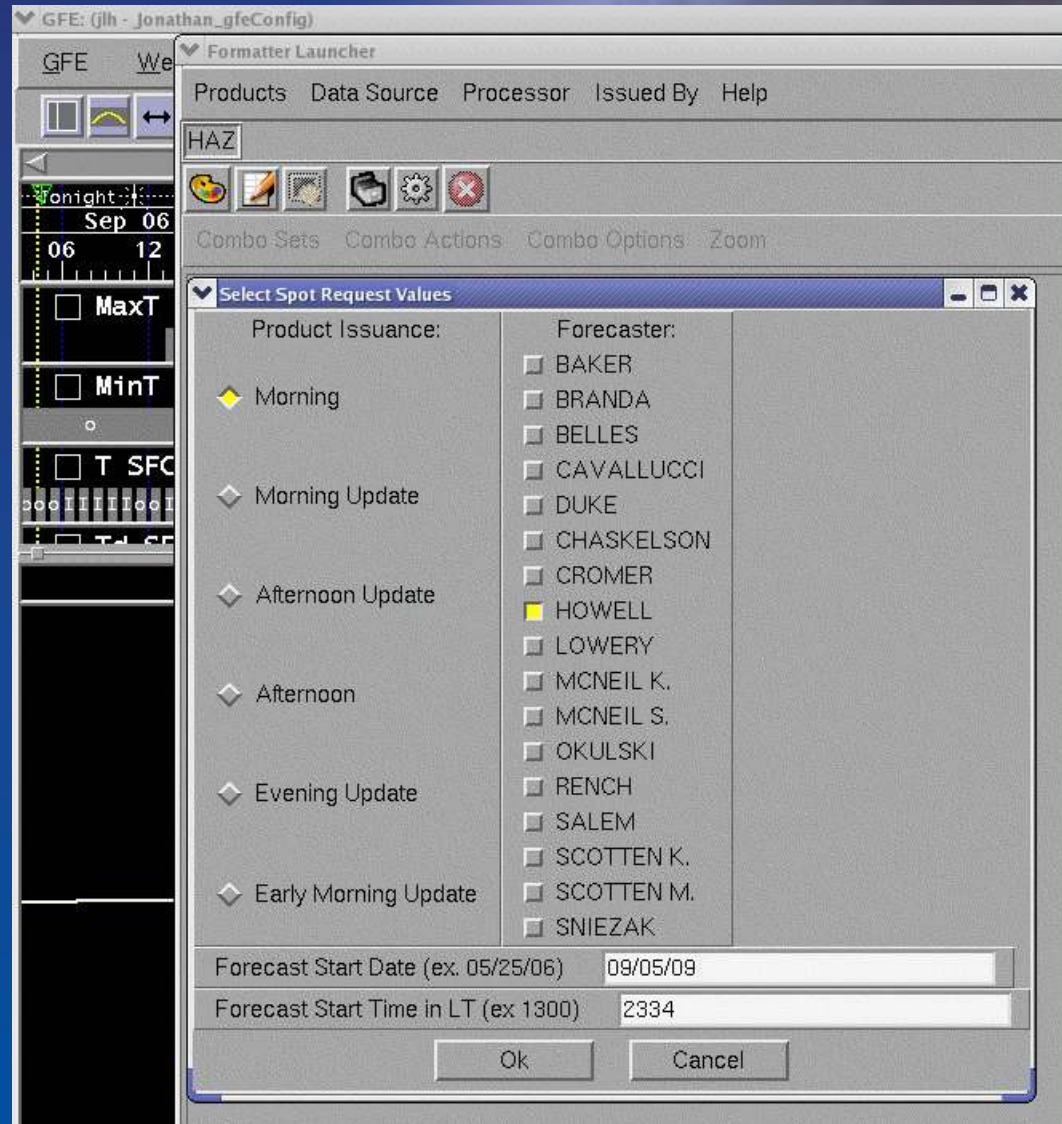


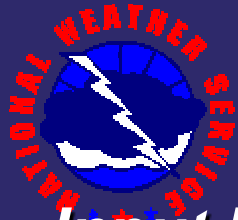


HAZ Formatter

Select Spot Request Values

- Choose Product Issuance Time
- Forecaster Selects Name from the Forecaster List
- Forecast Start Date & Time Should Load Automatically (Ensuring the correct start time)





HAZ Formatter

Input Info Values

- **Decide if Including Extended Forecast, & Tabular/Narrative**
- **Enter Incident Information (including HYSPLIT Inputs)**
- **Choose Forecast Weather Elements to Include in HAZ Product**
- **Enter Observed Temp., Humidity, Wind Speed/Dir. From Nearest Observation Site (ASOS, AWOS, Mesonet, RAWS)**

Input Info Values

Check Items to Include: Include Day 3-5 Extended?

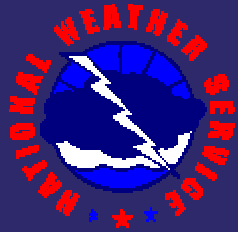
What Type of Forecast?
 Narrative Only
 Tabular/Narrative
 Tabular Only

Name of Agency..... xxx
Name of HAZMAT..... xxx
Time of HAZMAT..... 2152
Date of HAZMAT..... 10/12/09
Name of HAZMAT Contact..... xxx
Height of Release (Ft)..... xxx
Size of Release (Mi)..... xxx
Type of Release..... xxx
HAZMAT Latitude (Deg)..... 35
HAZMAT Longitude (Deg)..... 90

Today Elements	Tab Hrs	Tonight Elements	Tab Hrs	Tomorrow Elements	Tab Hrs
<input checked="" type="checkbox"/> SKY/WEATHER	<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> SKY/WEATHER	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> SKY/WEATHER	<input type="checkbox"/> 1
<input checked="" type="checkbox"/> TEMPERATURE	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> TEMPERATURE	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> TEMPERATURE	<input checked="" type="checkbox"/> 2
<input checked="" type="checkbox"/> HUMIDITY	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> HUMIDITY	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> HUMIDITY	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> SURFACE WIND	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> SURFACE WIND	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> SURFACE WIND	<input type="checkbox"/> 4
<input checked="" type="checkbox"/> POP	<input type="checkbox"/> None	<input checked="" type="checkbox"/> POP	<input type="checkbox"/> None	<input checked="" type="checkbox"/> POP	<input type="checkbox"/> None
<input checked="" type="checkbox"/> INVERSION HGT AGL	<input type="checkbox"/> None	<input checked="" type="checkbox"/> INVERSION HGT AGL	<input type="checkbox"/> None	<input checked="" type="checkbox"/> INVERSION HGT AGL	<input type="checkbox"/> None

Observed Surface Temperature (F).....
Observed Surface Relative Humidity (%).....
Observed Surface Wind Direction (N, NW, W, etc.).....
Observed Surface Wind Speed (mph).....

Ok Cancel



HAZ Formatter

Based Upon Forecaster Input:

1000 – 5000 FT Wind Speed & Direction will be Automatically Input from Grids as “First Guess”

All Forecast Grids will Require Forecaster Attention

Forecaster Must Update Unrepresentative Data Prior to Sending to User

Requested HYSPLIT Information for NCEP SDM Added to Menu and Output

Input Info Values

Check Items to Include: Include Day 3-5 Extended?

What Type of Forecast?
 Narrative Only
 Tabular/Narrative
 Tabular Only

Name of Agency..... :xxxx
 Name of HAZMAT..... :xxxx
 Time of HAZMAT..... :2152
 Date of HAZMAT..... :10/12/09
 Name of HAZMAT Contact..... :xxxx
 Height of Release (Ft)..... :xxxx
 Size of Release (Mi)..... :xxxx
 Type of Release..... :xxxx
 HAZMAT Latitude (Deg)..... :35
 HAZMAT Longitude (Deg)..... :90

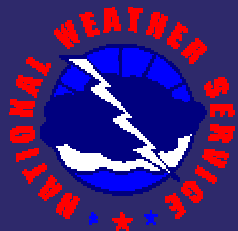
Today Elements	Tab Hrs	Tonight Elements	Tab Hrs	Tomorrow Elements	Tab Hrs
<input checked="" type="checkbox"/> SKY/WEATHER	<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> SKY/WEATHER	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> SKY/WEATHER	<input type="checkbox"/> 1
<input checked="" type="checkbox"/> TEMPERATURE	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> TEMPERATURE	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> TEMPERATURE	<input checked="" type="checkbox"/> 2
<input checked="" type="checkbox"/> HUMIDITY	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> HUMIDITY	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> HUMIDITY	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> SURFACE WIND	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> SURFACE WIND	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> SURFACE WIND	<input type="checkbox"/> 4
<input checked="" type="checkbox"/> POP	<input type="checkbox"/> None	<input checked="" type="checkbox"/> POP	<input type="checkbox"/> None	<input checked="" type="checkbox"/> POP	<input type="checkbox"/> None
<input checked="" type="checkbox"/> INVERSION HGT AGL	<input type="checkbox"/> None	<input checked="" type="checkbox"/> INVERSION HGT AGL	<input type="checkbox"/> None	<input checked="" type="checkbox"/> INVERSION HGT AGL	<input type="checkbox"/> None

Observed Surface Temperature (F).....
 Observed Surface Relative Humidity (%).....
 Observed Surface Wind Direction (N, NW, W, etc.).....
 Observed Surface Wind Speed (mph).....

Ok Cancel

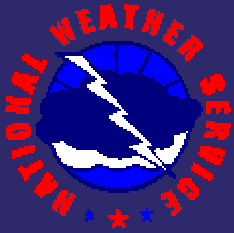
.REQUESTED NCEP HYSPLIT INFORMATION...

REQUESTING AGENCY....SHELBY COUNTY EMA
 AGENCY OFFICIAL.....NATHAN HOWELL
 INCIDENT NAME.....MEMPHIS - BROOKS ROAD CHEMICAL FIRE
 RELEASE HEIGHT (FT)..20
 RELEASE SIZE (MI)....4
 RELEASE TYPE.....CHLORINE



HYSPLIT Dispersion Model





HYSPLIT Model

Request for HYSPLIT Modeling

- Forecaster Determines if HYSPLIT Modeling is Appropriate for Incident***

If Plume Spread is > 3 mi. or Unknown – Initiate HYSPLIT through NCEP Senior Duty Meteorologist (301) 763-8298. Inform Responder that We Will Call Back with Model Results. ****Ask Responder if a Civil Emergency Message is Needed.****

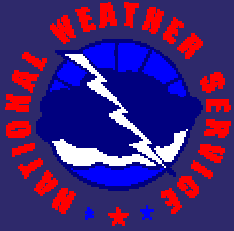
- If HYSPLIT Modeling is Necessary then NCEP will Run Local Plume Modeling for the Incident***

» **Model Run – ~ 15 Minutes**

- Local WFO Memphis Forecasters will Diagnose Model Output for Usefulness Based Upon Ongoing & Forecast Weather Situation***

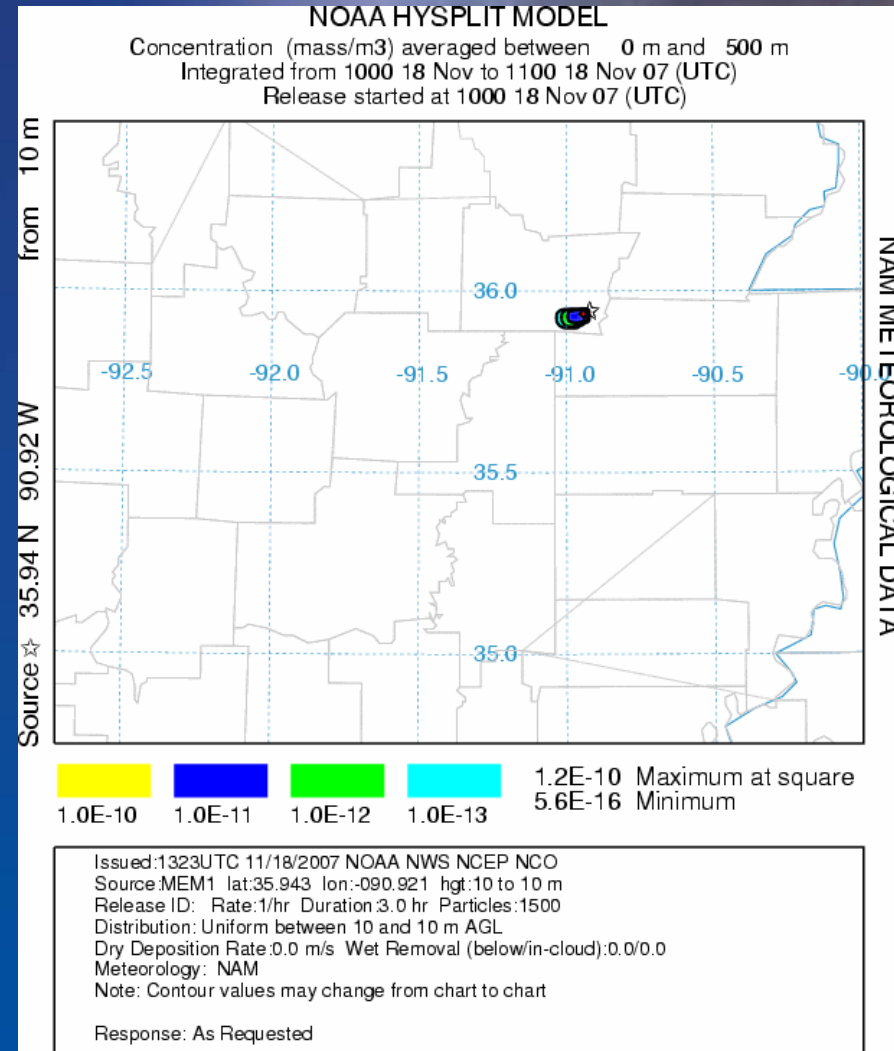
» **Forecaster Injects Own Forecast Using Model Output as Guidance Only**



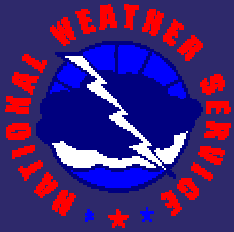


HYSPLIT Model

- **Forecaster will Explain Weather Factors Influencing HYSPLIT Output to Emergency Responders**
- **If Forecaster Believes Hysplit Is Not Representative of Weather Situation – Model Output Will Not Be Sent**
- **Forecaster will Brief on Any Weather Changes that May Change Expected Output Displayed**



Users Web Interface



NWS - Windows Internet Explorer
http://www.srh.noaa.gov/meg/hazmat

File Edit View Favorites Tools Help

Favorites Suggested Sites Jon Free Hotmail RealPlayer Web Site Gallery

NWS

National Weather Service Weather Forecast Office
Memphis, TN

Home Site Map News Organization Search for: NWS All NOAA

Local forecast by
"City, St" or Zip Code
City, St Go

XML RSS Feeds

Current Hazards
Local
Nationwide
Outlooks

Forecasts
Local
Forecast Discussion
Activity Planner
Graphical
Tropical Weather
Fire Weather
Aviation Weather
Weather Briefing

Current Weather
Observations
Satellite Images
Rivers/Lakes
Hydrology
Precipitation Estimate
Hourly Precip
Estimate

Radar Imagery
Nationwide
Memphis
Columbus

Climate
Local
National
More...

Top News of the Day

- How to Measure Snow (A CoCoRaHS Tutorial)
- Road Conditions
- Summary of the major winter storm of January 28th and 29th
- Skywarn Spotter Training Classes

Watches & Warnings Observations Forecast Graphics Rivers & Lakes Climate Fire Weather

Click on the map below for the latest forecast.

Read watches, warnings & advisories

Zoom Out

- Winter Storm Warning
- Flood Warning
- Winter Weather Advisory
- Flood Advisory
- Lake Wind Advisory
- Wind Advisory
- Hazardous Weather Outlook
- Short Term Forecast

Last map update: Tue, Feb 9, 2010 at 2:51:53 am CST

Graphical Forecasts Radar Satellite Weather Map



<http://www.srh.noaa.gov/meg/hazmat>



Memphis, TN

Local forecast by "City, St" or Zip Code

City, St

XML RSS Feeds

Current Hazards

- Local
- Nationwide
- Outlooks

Forecasts

- Local
- Forecast Discussion
- Activity Planner

- Graphical
- Tropical Weather
- Fire Weather

- Aviation Weather
- Weather Briefing

Current Weather

- Observations
- Satellite Images
- Rivers/Lakes
- Hydrology
- Precipitation Estimate
- Hourly Precip Estimate

Radar Imagery

- Nationwide
- Memphis
- Columbus

Climate

- Local
- National
- More...

Weather Safety

- Get Prepared
- Weather Radio
- SKYWARN
- StormReady

Top News of the Day

- Snowfall Accumulations from February 8th-9th**
- Skywarn Spotter Training Classes

- Watches & Warnings
- Observations
- Forecast Graphics
- Rivers & Lakes
- Climate
- Fire Weather

Connect to www.srh.noaa.gov

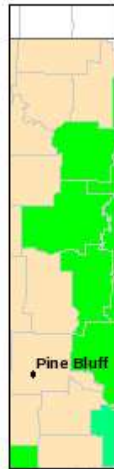


The server www.srh.noaa.gov at Restricted Area requires a username and password.

Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).

User name:

Password:



Last

[Lead watches, warnings & advisories](#)



- [Flood Warning](#)
- [Flood Advisory](#)
- [Wind Advisory](#)
- [Special Weather Statement](#)
- [Hazardous Weather Outlook](#)
- [Short Term Forecast](#)

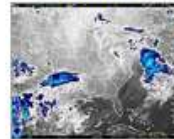
Graphical Forecasts



Radar



Satellite



Weather Map



Timmy the Twister
says
No Hazards Today

Latest observation from the NWS office at the Agricenter in east Memphis

Time	Temp	Dewpt	RH	Press
5:13 AM	24	17	75%	M

Username & Password Provided by NWS



Memphis, TN

Home Site Map News Organization Search for: NWS All NOAA

Local forecast by
"City, St" or Zip Code

XML RSS Feeds

Current Hazards

Local

Nationwide

Outlooks

Forecasts

Local

Forecast Discussion

Activity Planner

Graphical

Tropical Weather

Fire Weather

Aviation Weather

Weather Briefing

Current Weather

Observations

Satellite Images

Rivers/Lakes

Hydrology

Precipitation Estimate

Hourly Precip

Estimate

Radar Imagery

Nationwide

Memphis

Columbus

Climate

Local

National

More...

Weather Safety

Get Prepared

Weather Radio

SKYWARN

StormReady

TTAA00 KMEG 101107
HAZMEG

HAZARDOUS INCIDENT FORECAST FOR TEST
NATIONAL WEATHER SERVICE MEMPHIS TN
507 AM CST WED FEB 10 2010

FORECAST ISSUED AT 0446 CST ON FEBRUARY 10.
IF CONDITIONS BECOME UNREPRESENTATIVE...CONTACT THE NATIONAL WEATHER
SERVICE.

.DISCUSSION...

TEST...TEST...TEST...

.OBSERVED CONDITIONS...

SURFACE TEMPERATURE (F) : -99
SURFACE RELATIVE HUMIDITY (%): -98
30 FT WIND DIRECTION : -98
30 FT WIND SPEED (MPH) : -98

.INITIAL WIND CONDITIONS...

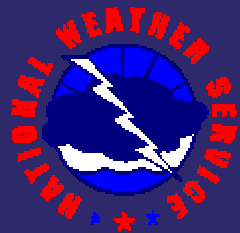
	1000 FT	2000 FT	3000 FT	4000 FT	5000 FT
WIND DIRECTION :	NW	NW	NW	NW	NW
WIND SPEED (MPH):	28	32	32	33	33

.FORECAST CONDITIONS...

.TODAY...

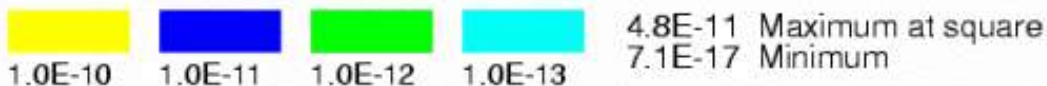
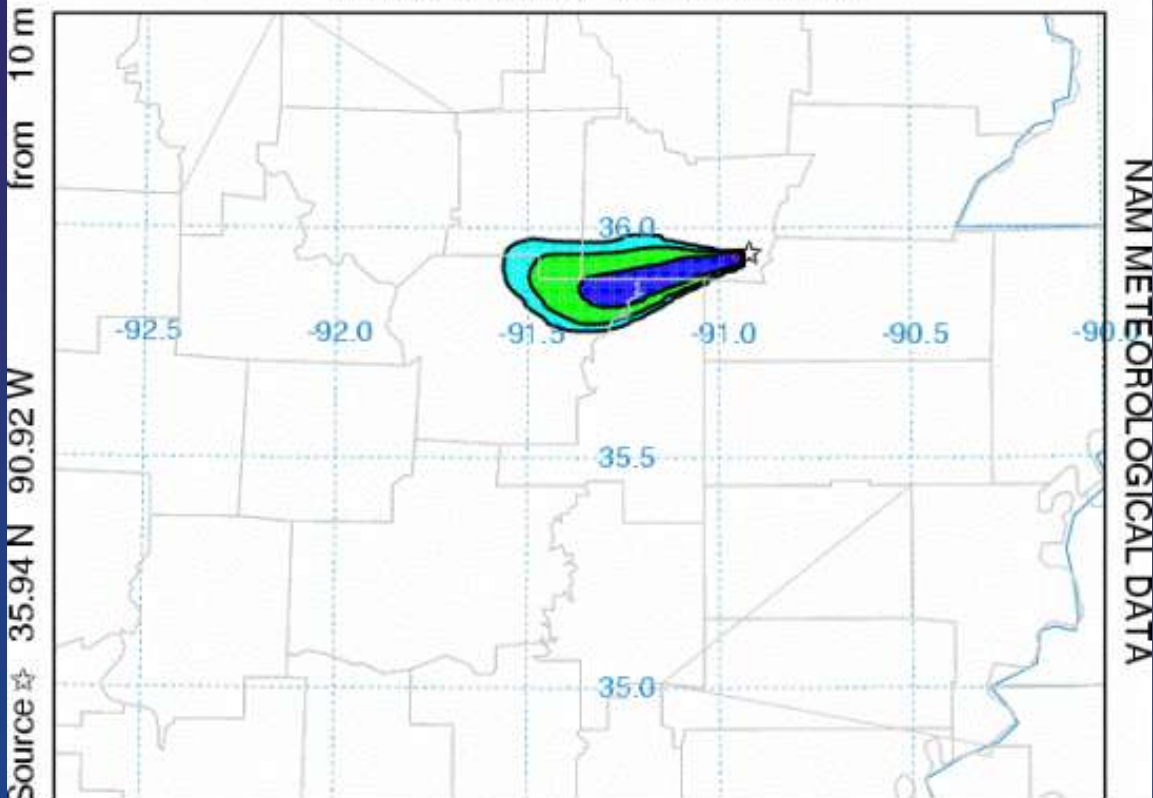
TIME (CST)	6AM	7AM	8AM	9AM	10A	11A	12P	1PM	2PM	3PM	4PM	5PM
SKY COVER.....PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
WEATHER COV.....												
WEATHER TYPE....												
TEMPERATURE.....	25	25	26	27	29	30	31	32	32	32	32	30
RH (%).....	71	73	72	70	65	60	58	57	57	58	59	61
30 FT WND DIR...NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
30 FT WND SPD...9	9	9	9	9	9	8	8	8	8	8	8	8
30 FT WND GST...12	12	12	12	12	12	11	11	11	11	11	11	11

Web HAZ Grid Output – Text Weather Information



NOAA HYSPLIT MODEL

Concentration (mass/m³) averaged between 0 m and 500 m
Integrated from 1300 18 Nov to 1400 18 Nov 07 (UTC)
Release started at 1000 18 Nov 07 (UTC)



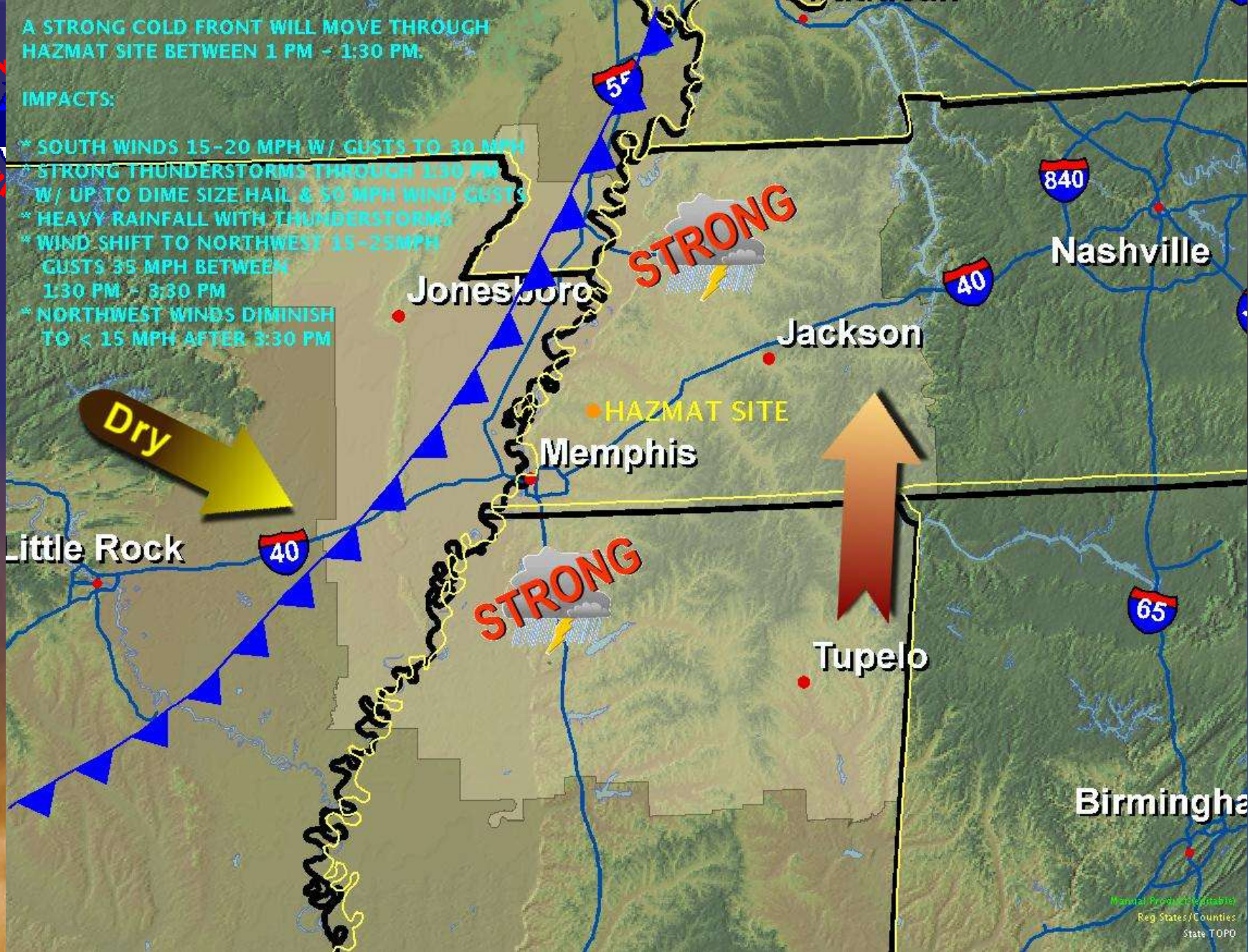
Issued:1323UTC 11/18/2007 NOAA NWS NCEP NCO
Source:MEM1 lat:35.943 lon:-090.921 hgt:10 to 10 m
Release ID: Rate:1/hr Duration:3.0 hr Particles:1500
Distribution: Uniform between 10 and 10 m AGL
Dry Deposition Rate:0.0 m/s Wet Removal (below/in-cloud):0.0/0.0
Meteorology: NAM
Note: Contour values may change from chart to chart
Response: As Requested

Web HAZ Grid Output – Hysplit Image (Future?)

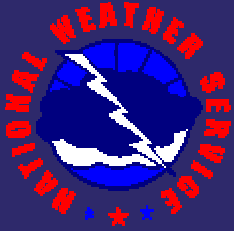
A STRONG COLD FRONT WILL MOVE THROUGH HAZMAT SITE BETWEEN 1 PM - 1:30 PM.

IMPACTS:

- * SOUTH WINDS 15-20 MPH W/ GUSTS TO 30 MPH
- * STRONG THUNDERSTORMS THROUGH 1:30 PM W/ UP TO DIME SIZE HAIL & 50 MPH WIND GUSTS
- * HEAVY RAINFALL WITH THUNDERSTORMS
- * WIND SHIFT TO NORTHWEST 15-25MPH GUSTS 35 MPH BETWEEN 1:30 PM - 3:30 PM
- * NORTHWEST WINDS DIMINISH TO < 15 MPH AFTER 3:30 PM

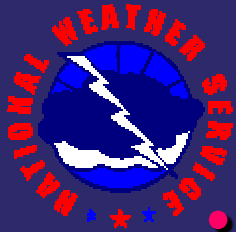


Web HAZ Grid Output – FXC Weather Image (Future ?)



Summary

- **Overall Goal is to Provide Accurate & Reliable Weather Support to Emergency Management / Incident Commanders during Natural & Manmade Disaster Situations**
 - *HAZ Grid Hopefully Improves Services Provided*
- **WFO Memphis has the Capability & Expertise to Provide this Type of Support**
- **Fits into Service Evolution & Allows WFO Memphis to Provide the Necessary Tailored Weather Support to our Customers**
- **Continues to Allow WFO Memphis to Fulfill our Commitment of Protecting Life & Property in the Mid-South**



EMA Discussion Period

- What can we do to Improve HAZ Grid Outputs ?
- Will You Utilize This Product and Our Services ? Why or Why Not.
- How Can We Evolve Further to Best Meet Your Needs ?

– *Email Answers to:*

jonathan.howell@noaa.gov

michael.scotten@noaa.gov

Thank You