

The background is a solid blue color with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The text is centered in the middle of the page.

**RESPONDING TO WATER
EMERGENCIES DURING
INCLEMENT WEATHER**

BEFORE THE EMERGENCY

- RISK AND RESILIENCE ASSESSMENT
- EMERGENCY RESPONSE PLAN
- EMERGENCY EXERCISES
- FEMA INCIDENT COMMAND TRAINING
- ASSET MANAGEMENT
- BEST MANAGEMENT PRACTICES
- LEARNING FROM EACH “EMERGENCY”
- LEARNING FROM OTHERS

RISK & RESILIENCE ASSESSMENTS

- AMERICA'S WATER INFRASTRUCTURE ACT OF 2018
- ASSESSMENT OF MALEVOLENT & NATURAL ACTS THAT WILL SUBSTANTIALLY DISRUPT THE SYSTEM'S ABILITY TO PROVIDE SAFE AND RELIABLE DRINKING WATER
 - INFRASTRUCTURE
 - MONITORING
 - FINANCIAL
 - CHEMICAL STORAGE
 - O&M
- BASELINE FROM EPA EXPECTED AUGUST 1, 2019
- PLAN DUE MARCH 31, 2020 (>100,000 PEOPLE)
- PLAN DUE DECEMBER 31, 2020 (> 50,000 PEOPLE)
- PLAN DUE JUNE 30, 2021 (>3,301 PEOPLE)

EMERGENCY RESPONSE PLAN

- INCORPORATE THE FINDINGS OF THE RISK & RESILIENCE ASSESSMENT
- ERP DUE 6 MONTHS AFTER RISK & RESILIENCE ASSESSMENT
- STRATEGIES & RESOURCES TO IMPROVE RESILIENCE TO SECURITY & CYBERSECURITY THREATS
- PLANS & PROCEDURES IN THE EVENT OF A MALEVOLENT ACT OR NATURAL HAZARD
- ACTIONS, PROCEDURES, AND EQUIPMENT THAT CAN LESSEN IMPACTS
- IDENTIFY STRATEGIES TO AID IN THE DETECTION OF MALEVOLENT ACTS OR NATURAL HAZARDS
- REVISE EVERY 5 YEARS AT MINIMUM

EMERGENCY EXERCISES

- 2010 - WIND EVENT & DROUGHT
- 2011 - FLOOD
- 2012 - CYBER ATTACK
- 2013 - TORNADO
- 2014 - TRAIN DERAILMENT
- 2015 - CHEMICAL EVENT
- 2016 - ACTIVE SHOOTER
- 2017 - SOLAR STORM (3 MONTH LONG TERM POWER OUTAGE)
- 2018 - SOURCE WATER CONTAMINATION

FEMA INCIDENT COMMAND TRAINING

- HOW TO SET UP AN EMERGENCY OPERATIONS CENTER (EOC)
- ALL SPEAKING THE SAME LANGUAGE
- STAFF KNOWS THEIR ROLE
- DIVISION OF TASKS
- REPORTING

ASSET MANAGEMENT

- IDENTIFY CRITICAL ASSETS
- UNDERSTAND RISK ASSOCIATED WITH SPECIFIC ASSETS
- EVALUATE THE POTENTIAL WAYS OF FAILURE
- IDENTIFY POTENTIAL WAYS TO MITIGATE RISK
- COST VS. VALUE

BEST MANAGEMENT PRACTICES

- REDUNDANT ELECTRICAL FEEDS
- REDUNDANT PLANTS/SYSTEM
 - TWO 96 MGD PLANTS
 - PUMPING CAPABILITIES TO ENTIRE SYSTEM FROM EACH PLANT
- REDUNDANT WELL FIELDS
- ACTIVE MEMBERS OF OHWARN

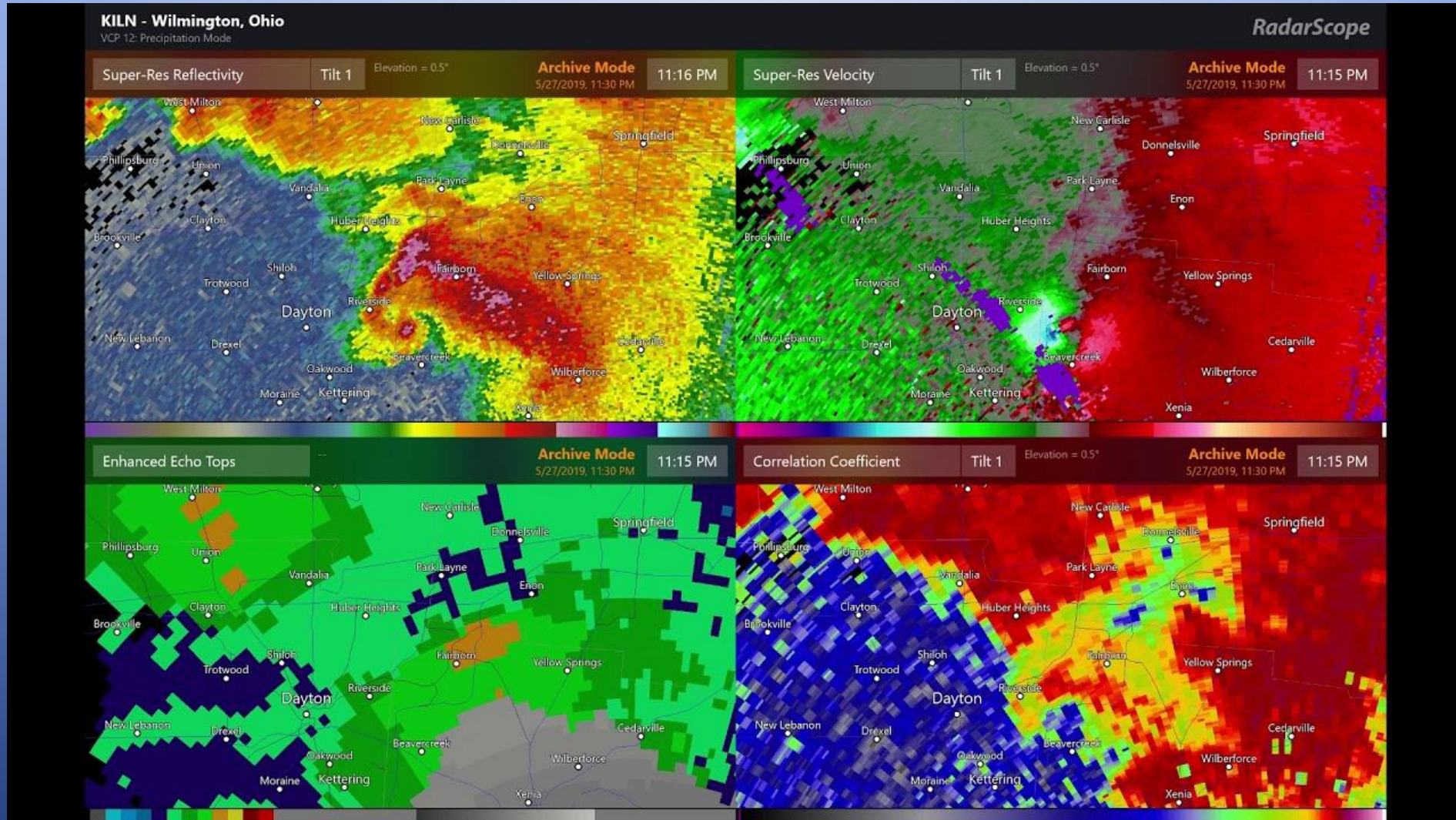
LEARNING FROM EACH “EMERGENCY”

- 3+ HOUR POWER OUTAGES
- HURRICANE IKE 2008
- 24” WATER MAIN BREAK
- 36” WATER MAIN BREAK

LEARNING FROM OTHERS

- TRAINING
- SPEAKING TO OTHER SYSTEMS
- CONFERENCES WITH OTHER FACILITIES OUTSIDE OHIO
- GET NEW IDEAS
- LEARN FROM OTHERS MISTAKES

EMERGENCY





TORNADO DESTRUCTION

- 11:00 PM MEMORIAL DAY NWS ISSUES TORNADO WARNING
- LARGE AND DESTRUCTIVE TORNADO HEADED OUR WAY AT 35 MPH
- 11:09 PM NO POWER AT MIAMI TREATMENT PLANT
- 11:09 PM NO POWER AT MIAMI WELL FIELD
- 11:13 PM NO POWER AT MAD RIVER WELL FIELD
- 11:15 PM NO POWER OTTAWA TREATMENT PLANT
- ALL EMPLOYEES AT THE PLANTS AND WELL FIELDS SAFE (AND AT HOME TOO)

CITYWIDE RESPONSE & FEMA TRAINING

- OPEN UP ERP AND START CONTACTING STAKEHOLDERS
- CITY OF DAYTON SETS UP EMERGENCY OPERATION CENTER 12:30 – 1:00 AM
 - WATER
 - PUBLIC WORKS
 - POLICE
 - FIRE
 - PURCHASING

STORM OVER, WORK BEGINS

- 3:37 AM TUESDAY CONTACTED OHWARN FOR GENERATORS
 - 350 KW REQUIRED TO RUN ONE WELL
 - 1.2 MW TO RUN DISTRIBUTION PUMPS
- CONCENTRATE ON GETTING MIAMI TREATMENT PLANT UP FIRST
 - QUICKEST TO RESPOND AND...
- OTTAWA WATER TREATMENT PLANT IS FLOODING
 - BIG PROBLEM
 - ONCE THE RAW WATER HAS LEFT THE WELL PUMPS, IT FLOWS BY GRAVITY 2.5 MILES THROUGH 72"/84" PIPES – NO STOPPING IT

MIAMI WATER TREATMENT PLANT

BEFORE SUNRISE

- GET MIAMI WELL FIELDS PUMPING
 - SMALLER GENERATORS START ARRIVING VERY EARLY MORNING
 - WELLS CAN BE RUN ON 350 KW, SMALLER GENERATORS
- MIAMI TREATMENT PLANT
 - CAN RUN AT A THIRD CAPACITY BY GENERATOR POWER
- MIAMI DISTRIBUTION PUMPS
 - NEED VERY LARGE 1.2 MW GENERATOR

OTTAWA WATER TREATMENT PLANT

BEFORE SUNRISE

- OLDER DESIGN, PLACED IN SERVICE IN 1953
- WATER PUMPED OUT OF THE WELLS AND FLOWS BY GRAVITY TO THE PLANT
- THE WATER IS COMING FOR HOURS ONCE ITS PUMPED
- BASEMENT FLOODED
- ALL ELECTRICAL COMPONENTS LOST (TRANSFORMERS, VFD'S, TURBIDIMETERS, FLUORIDE PUMP, SAMPLE PUMPS)
- STARTED DEWATERING BY GENERATOR POWER SHORTLY AFTER MIDNIGHT TUESDAY

DISTRIBUTION SYSTEM

BEFORE SUNRISE

- LOSING PRESSURE IMMEDIATELY, BUT SLOWLY
- SOME PUMP STATIONS OUT IN THE SYSTEM HAVE POWER
- NO DISTRIBUTION PUMPS AT THE PLANTS HAVE POWER

TORNADOES

National Weather Service Wilmington OH

... EF4 FOR MONTGOMERY COUNTY...

Location...across central Montgomery County, Ohio

Date.....May 27 2019

Start Time.....1041 PM EDT

End Time.....1113 PM EDT

Maximum EF-Scale Rating.....EF4

Estimated Maximum Wind Speed...170 MPH

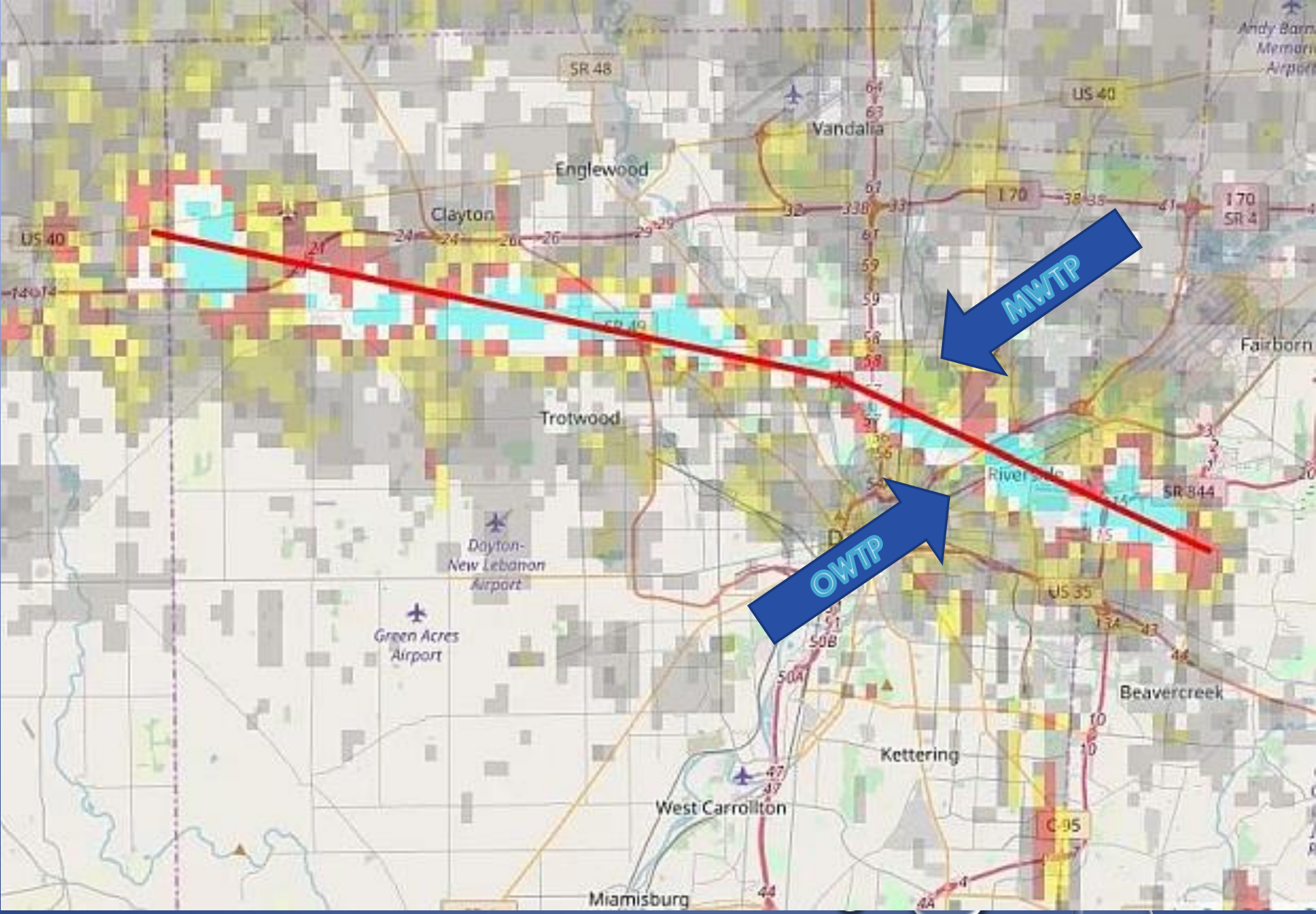
Maximum Path Width.....0.60 mile

Path Length.....20 miles

Beginning Lat/Lon...39.8243N / 84.4632W

Ending Lat/Lon.....39.7580N / 84.1121W











Chris Gibson / Facebook

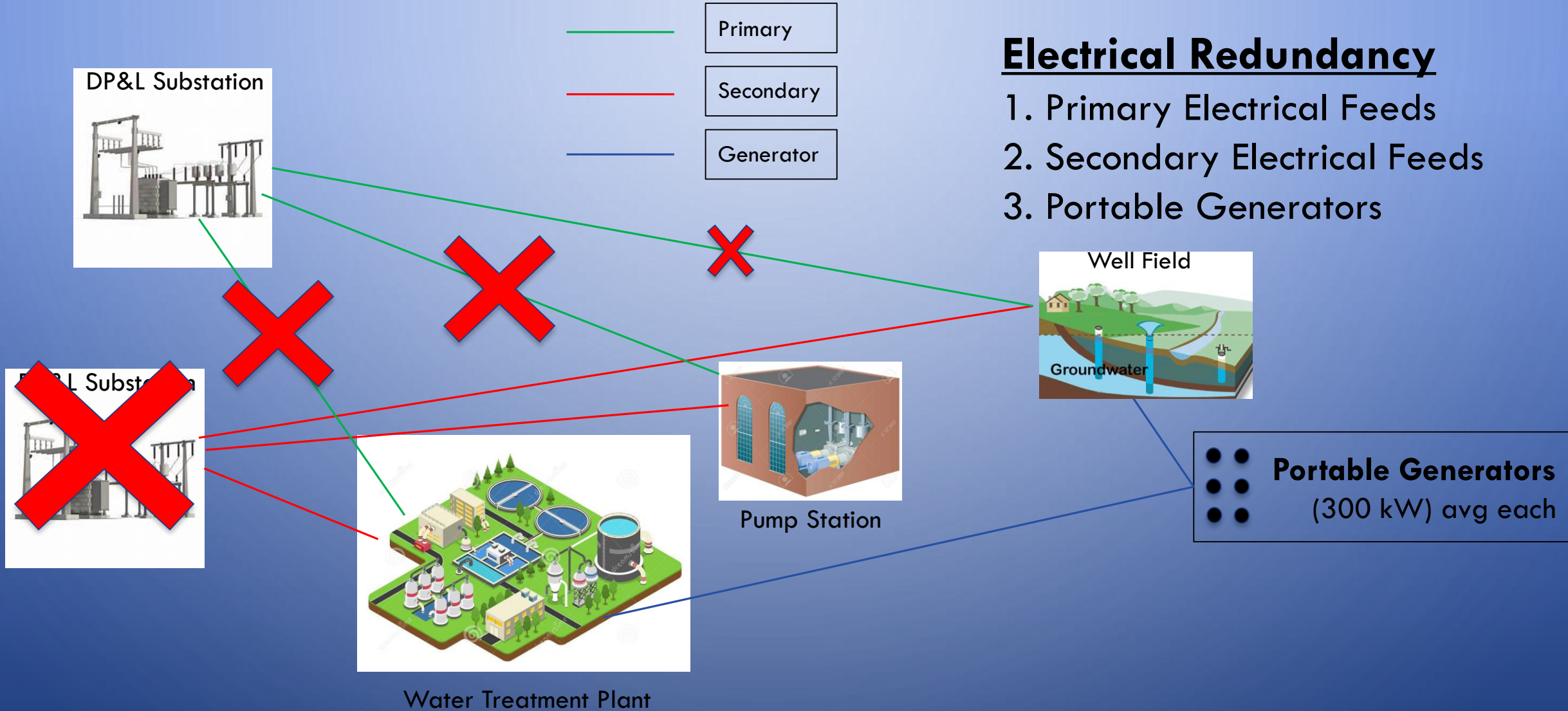




POWER

- DAYTON POWER & LIGHT IN CONTACT
- WEBSTER STATION IS BADLY DAMAGED AND MANY POWER LINES ARE DOWN
- DOWNED LINES SHOULD BACK TUESDAY NIGHT OR WEDNESDAY
- DP&L DISCONNECTS US TO ALLOW FOR GENERATOR POWER

WATER PLANT ELECTRICAL OVERVIEW



DISTRIBUTION SYSTEM

TUESDAY EARLY

- LOSING PRESSURE IMMEDIATELY, BUT SLOWLY
- BOIL ADVISORY ISSUED 8:00 AM TUESDAY
 - CITY OF DAYTON AND MONTGOMERY COUNTY

MIAMI WATER TREATMENT PLANT

TUESDAY EARLY

- GET MIAMI WELL FIELDS PUMPING
 - AS GENERATORS ARRIVE THEY ARE PLACED IN THE WELL FIELDS
 - GENERATORS ARRIVE FROM COLUMBUS, CINCINNATI, FAIRBORN, TROY, UNION COUNTY EMA, NEORS AND MONTGOMERY COUNTY
 - NORTHEAST OHIO REGIONAL SEWER DISTRICT & COLUMBUS SENT ELECTRICIANS AS WELL
- MIAMI TREATMENT PLANT
 - CAN RUN AT A THIRD OF CAPACITY BY GENERATOR POWER
- MIAMI DISTRIBUTION PUMPS
 - NEED VERY LARGE 1.2 MW GENERATOR (~ 30 MGD)



BORROWED 29 GENERATORS



MIAMI WATER TREATMENT PLANT

TUESDAY MIDDAY

- DP&L POWER RESTORED TO PLANT
- DP&L RESTORED POWER TO DISTRIBUTION PUMPS AT MIAMI
- STILL NO POWER AT THE WELL FIELDS
- MIAMI WATER TREATMENT PLANT PUMPING TO THE SYSTEM BY 12:30 PM TUESDAY

OTTAWA WATER TREATMENT PLANT

TUESDAY

- STARTED PUMPING OUT THE BASEMENT BY GENERATOR POWER SHORTLY AFTER MIDNIGHT TUESDAY
- STARTED ASSESSMENT OF DAMAGE MIDDAY TUESDAY
- EPA AT OWTP TO PROVIDE GUIDANCE UNTIL THE BOIL HAS LIFTED

DISTRIBUTION SYSTEM

TUESDAY AFTERNOON

- SYSTEM HAS LOST PRESSURE
 - HIGH SERVICE
 - LOW SERVICE
 - SUPER-HIGH SWITCHED TO VANDALIA WATER
- CITY OF DAYTON & MONTGOMERY COUNTY BOIL CONTINUES
- MUCH OF CITY & MONTGOMERY COUNTY HAVE NO WATER TO BOIL
- BY LATE AFTERNOON LAB STAFF WAS COLLECTING BACTERIA SAMPLES IN LOW SERVICE AREAS
- BY EARLY EVENING LOW SERVICE AREA BACTERIA SAMPLES WERE INCUBATING

MIAMI WATER TREATMENT PLANT

WEDNESDAY

- STILL NO POWER AT THE WELL FIELDS
 - MAINTAINING GENERATORS IN THE WELL FIELDS
 - REFUELING
- NO SCADA
- DP&L RESTORED POWER TO DISTRIBUTION PUMPS AT MWTP
- PUMPING TO THE SYSTEM NEARLY 60 MGD BY END OF THE DAY

OTTAWA WATER TREATMENT PLANT

WEDNESDAY

- RENTAL DEHUMIDIFIERS REQUESTED FOR THE BASEMENT - 2 AM WEDNESDAY
 - ARRIVE BY AFTERNOON
- DP&L RESTORED POWER TO MAD RIVER WELL FIELDS - 5 AM WEDNESDAY
 - OWTP NOT READY TO TREAT WATER
- DEVELOPED A STRATEGY TO TREAT WATER - 6 AM WEDNESDAY
 - LIMITED CAPACITY
 - BRING WATER IN SLOWLY
- LATER MORNING POWER RESTORED TO OWTP
- MIDDAY CALLING FOR WATER FROM MRWF TO OWTP

DISTRIBUTION SYSTEM

WEDNESDAY

- BACTERIA SAMPLES FOR LOW SERVICE AREA ABSENT FOR TOTAL COLIFORM BY LATE AFTERNOON
- CITY OF DAYTON & MONTGOMERY COUNTY BOIL CONTINUES
- STARTING TO FILL HIGH SERVICE AREA BY AFTERNOON
- BY LATE EVENING HIGH SERVICE AREA REGAINED PRESSURE



MIAMI WATER TREATMENT PLANT

THURSDAY

- MAINTAINING GENERATORS
 - REFUELING
- NO SCADA
- CONTINUE PUMPING TO THE SYSTEM 60+ MGD
- LIME DELIVERIES 4 TRUCKS/DAY
 - NOT MAKING OUR OWN LIME

OTTAWA WATER TREATMENT PLANT

THURSDAY

- RUNNING AT LIMITED CAPACITY (~20 MGD)
- RUNNING MANUALLY
 - TURBIDITY READINGS
 - WASHING FILTERS
 - OPERATING VALVES

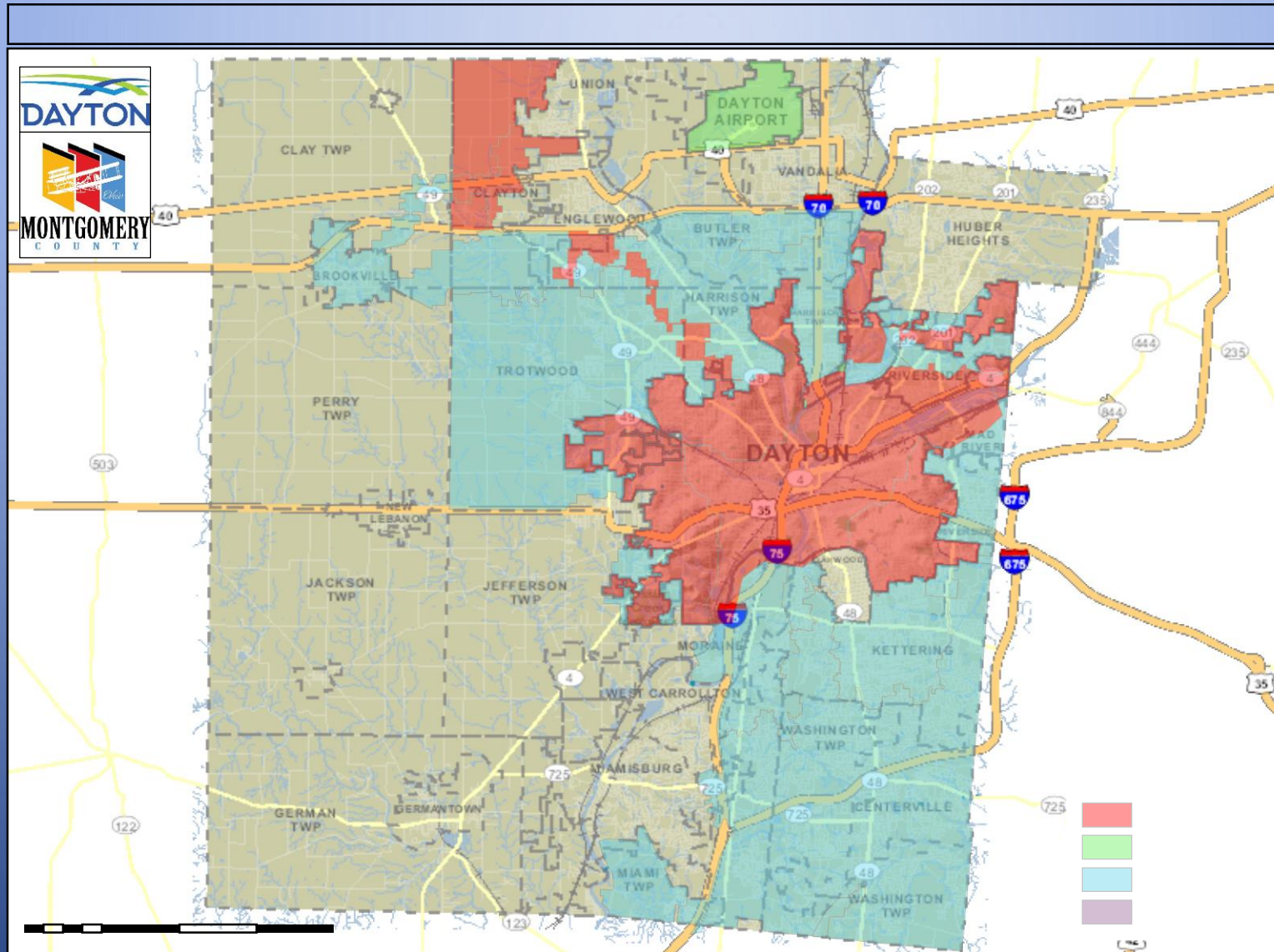


DISTRIBUTION SYSTEM

THURSDAY

- EARLY MORNING LAB STAFF IS OUT COLLECTING BACTERIA SAMPLES IN HIGH SERVICE AREA
- HIGH SERVICE BACTERIA SAMPLES INCUBATING BY LATE MORNING
- LOW SERVICE AREA BOIL ADVISORY LIFTED AT NOON
- HIGH SERVICE AREA BOIL ADVISORY CONTINUES

BOIL ADVISORY TUESDAY – THURSDAY NOON



MIAMI WATER TREATMENT PLANT

FRIDAY

- MAINTAINING GENERATORS
 - REFUELING
 - NO SCADA
- CONTINUE PUMPING TO THE SYSTEM 60+ MGD
- LIME DELIVERIES - 4 TRUCKS/DAY
- POWER RESTORED TO MIAMI WELL FIELD AT 5:30 AM
- WORKING ON DEMOBILIZATION PLAN FOR GENERATORS BY 6 AM



OTTAWA WATER TREATMENT PLANT

FRIDAY

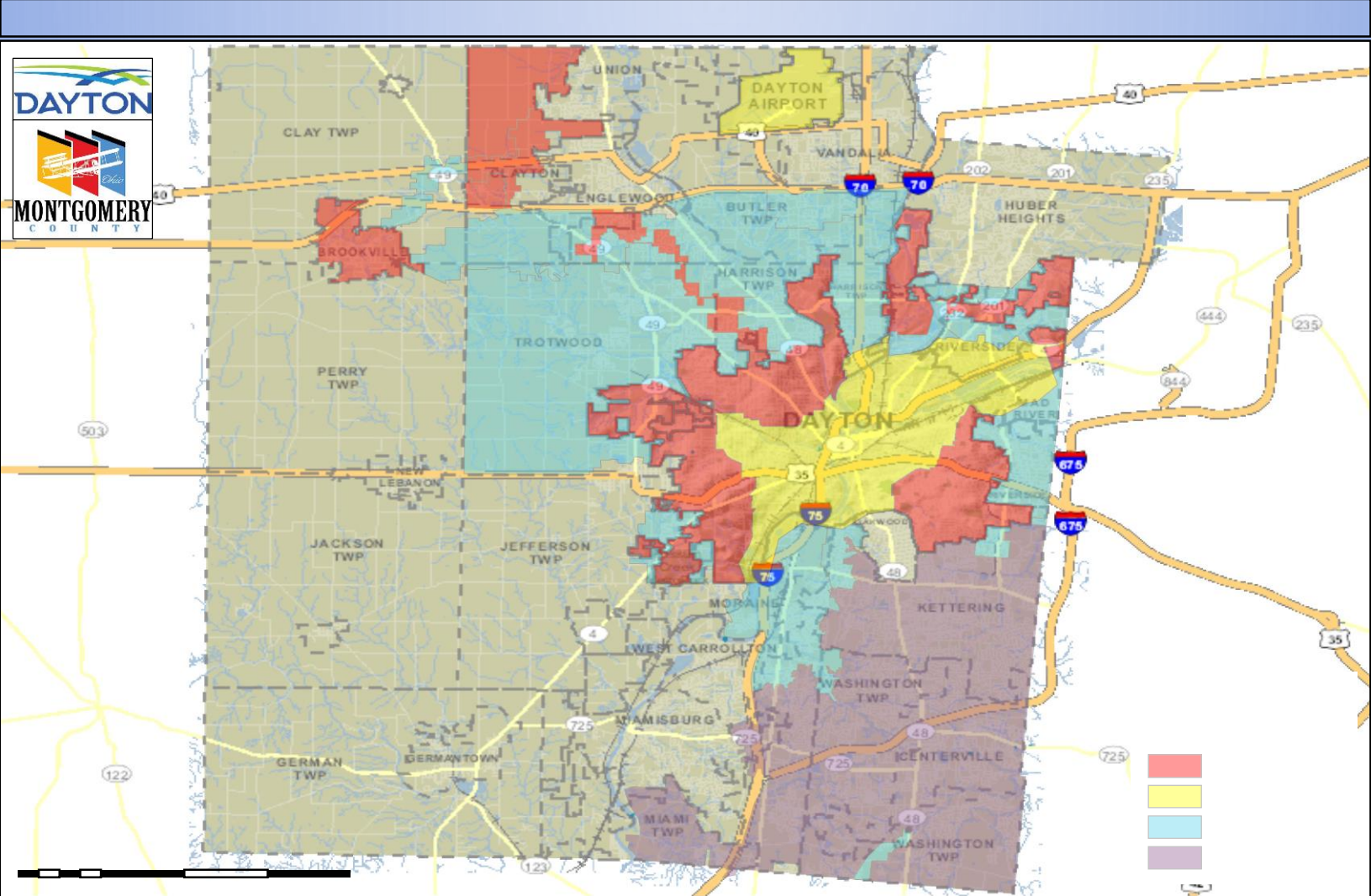
- RUNNING AT LIMITED CAPACITY
- SLOWLY RAMPING UP CAPACITY
- RUNNING MANUALLY
 - TURBIDITY READINGS EVERY 2 HOURS FOR EACH FILTER IN SERVICE
 - WITHOUT SCADA, RECORDS WERE MAINTAINED MANUALLY
 - WASHING FILTERS
 - OPERATING VALVES MANUALLY

DISTRIBUTION SYSTEM

FRIDAY

- HIGH SERVICE AREA BOIL LIFTED AT 12:30 PM
- BROOKVILLE BOIL ADVISORY CONTINUES UNTIL 4:50 PM

BOIL ADVISORY TUESDAY – FRIDAY NOON



ADMINISTRATIVE

- MAINTAIN PAPERWORK ON ALL GENERATORS SENT
 - COSTS FOR FUEL
- MAINTAIN PAPERWORK FOR ALL OVERTIME WORKED
- START PURCHASING TO REPLACE DAMAGED EQUIPMENT
 - MOTORS
 - SCADA
 - PUMPS
 - VFDS
 - TURBIDIMETERS
 - DEHUMIDIFIERS

STILL WORKING

- INVENTORY EVERYTHING LOST OR DAMAGED ATTRIBUTED TO THIS EVENT
- ELECTRICIANS STILL WORKING TO RESTORE FULL FUNCTIONALITY TO EQUIPMENT AT OWTP
- STILL WAITING ON EQUIPMENT WITH LONG LEAD TIMES

LESSONS LEARNED

- PAY ATTENTION TO EMERGENCY PLANNING
- UPDATE EMERGENCY RESPONSE PLAN EVERY YEAR
- PARTICIPATE IN EMERGENCY RESPONSE TRAINING
- AFTER EMERGENCY AFTER ACTION MEETING
- DOCUMENT ALL ACTIVITIES, IN DETAIL, CHRONOLOGICALLY
- EMERGENCY TRAINING FOR OPERATORS
- MAINTAIN COMMUNICATION INTERNAL AND EXTERNAL
 - CLEAR SIMPLE LANGUAGE
- HAVE A PLAN FOR STAFFING FOR A LONGER EMERGENCY
 - WHO IS MY RELIEF?



ANY QUESTIONS?