Flood Preparedness Planning
& Construction

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AQUA ℠

Aqua Pennsylvania, Inc.

➢ Serves 430,000 customers (~1.3 million people) in Pennsylvania

➢ Southeastern Pennsylvania Division

       5 county area surrounding Philadelphia

       8 surface water treatment plants

       85 groundwater well stations

       Sendout 100 - 150 MGD

➢ Shenango Valley Division (Western PA)

       2 surface water plants

       12 groundwater well stations

       Sendout ~10 MGD

Aqua Pennsylvania, Inc.

➢ Roaring Creek Division (North Central PA)

    1 surface water treatment plant

    2 groundwater well stations

    Sendout ~8 MGD

➢ Northeast PA Division

    170 groundwater well stations

    Sendout ~9 MGD

Storm Facts

➢ **Hurricane Irene, August 26 – 28, 2011**

August 14, Philadelphia had 3rd highest precipitation on record

August 28, Wilkes-Barre/Scranton had 3.23 inches of rain

This was Pennsylvania's 5th wettest August since 1895

For Allentown & Philadelphia, August wettest month on record

Philadelphia Airport recorded 19.31 inches of rain in August

Storm Facts

➢ **Tropical Storm Lee, September 7 – 9, 2011**

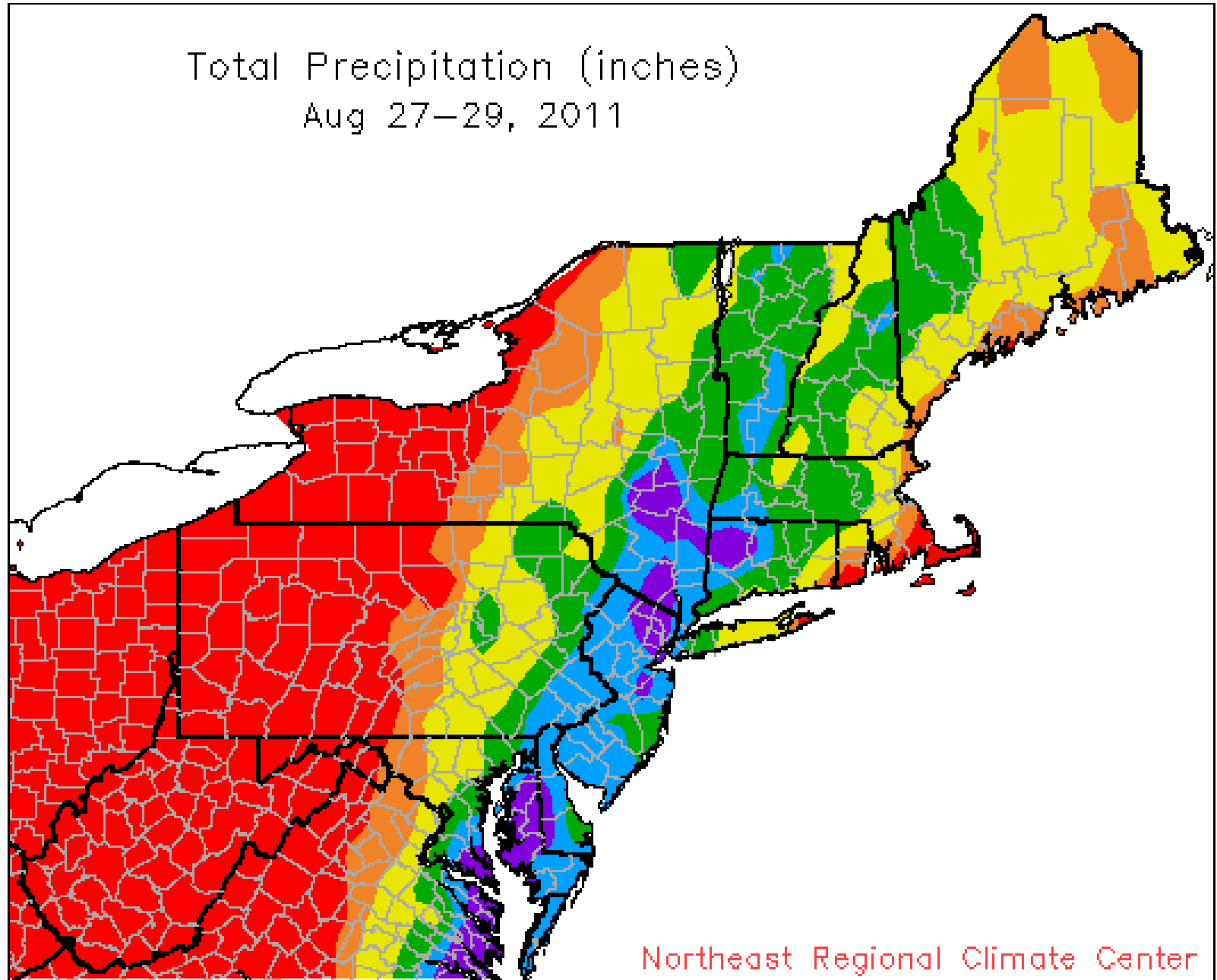Flooding in Wilkes-Barre/Scranton resulted in mandatory evacuations

Susquehanna River reached a record high of 42.6 feet, 3rd highest in history

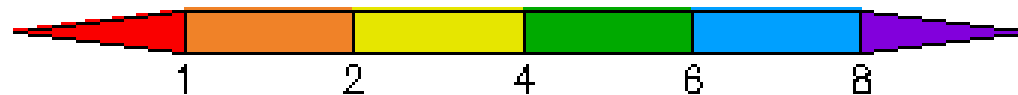Swatara Creek at Hershey reached its highest level ever

7 to 15 inches fell in Northwestern Lancaster County

Lancaster received 7.76 inches of rain
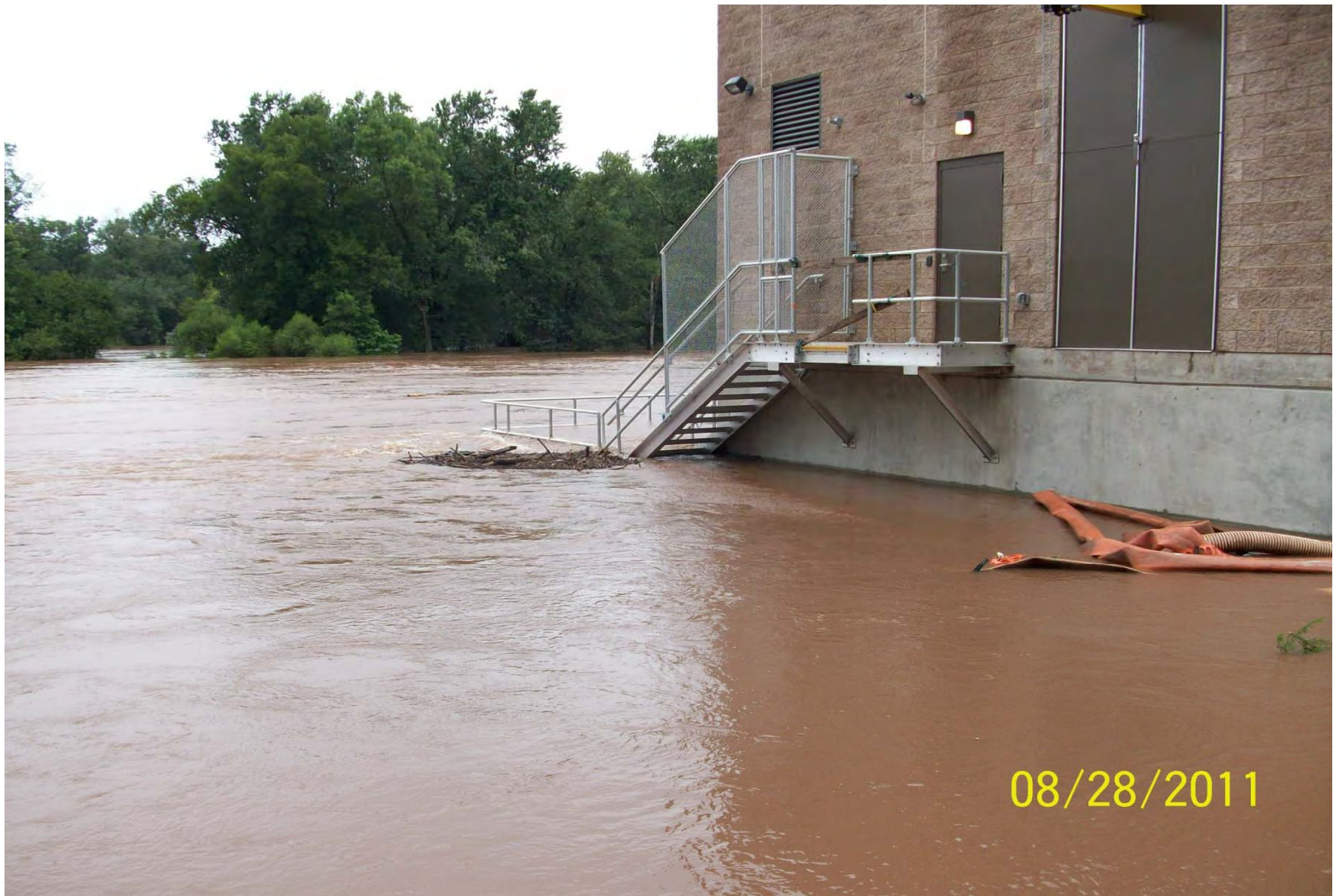
Total Precipitation (inches)
Aug 27-29, 2011

Northeast Regional Climate Center

1 2 4 6 8

Tropical Storm Lee Streambank Erosion

Hurricane Irene Flooding at Perkiomen Creek Intake

Hurricane Irene Flooding at Crum Creek Plant

Hurricane Irene Flooding at Crum Creek Plant

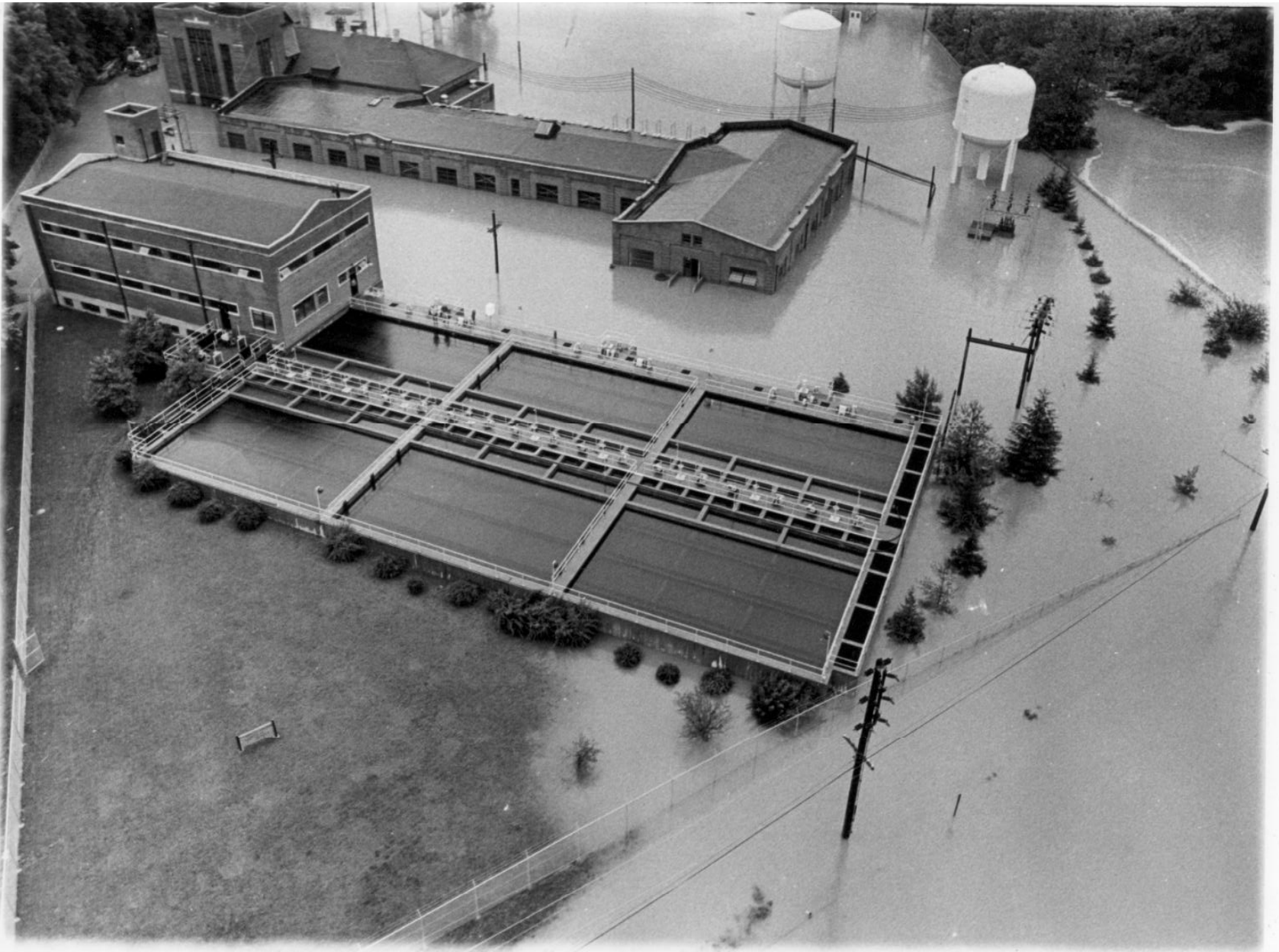Hurricane Irene Flooding at Ingrams Mill Plant

08/28/2011

Hurricane Irene Flooding at Neshaminy Creek

Hurricane Irene Flooding at Pickering Creek

Hurricane Agnes 1972 Flooding at Pickering Plant

Flood Vulnerability Assessment

➢ Identify the FEMA 100 year flood elevation at your facilities

➢ Confirm elevations of critical facility components – pumps, electrical equipment, chemical tanks, etc.

➢ Investigate location and elevations of facility drains and outfalls

➢ Identify critical facilities and make provisions for portable or permanent Emergency Generators

➢ Prepare a Flood Emergency Response Plan and update regularly

Aqua Storm Preparedness Activities

➢ Over the past four years, Aqua has spent over 10 million dollars on flood protection measures and upgrades to flood prone facilities

➢ Increased height of existing flood wall at Pickering Plant

➢ Replaced 2 raw water intake facilities to get operating floors, pumps, and equipment above the FEMA 100 year flood

➢ Flood proofed well stations prone to flooding

➢ Install emergency generators at all surface water treatment plants

➢ Locate and install backflow prevention devices on plant outfall pipes

➢ Review and update Flood Emergency Response Plans

11/15/2010

Pickering Plant Flood Wall Raising Project

02/04/2010

09/15/2010

Cabot Well Flood Door

Original Perkiomen Creek Intake Building

New Perkiomen Creek Intake Building

Original Schuylkill River Intake Building

New Schuylkill River Intake Building

Pickering Plant Waste Transfer Station

Typical Outfall Pipe Protection

Pickering East & West Plant Emergency Generator Farm

10/03/2011

Typical Portable Emergency Generator

Conclusions

➢ Protect your treatment facilities and finished water quality

➢ Water Utilities are a critical infrastructure that must remain in operation

➢ Flood protection capital investment can be substantial but consider the potential loss of equipment and revenue if the facilities are lost

➢ Motors & MCC's could take several months to receive replacements

➢ Investigate local flood elevations relative to your critical plant operating elevations and equipment elevations

➢ Assume an extended loss of power and make provisions

➢ Develop a plant / system Flood Emergency Response Plan (FERP)

➢ Review the FERP plan with plant operations staff routinely

➢ Update the FERP plan regularly as your facilities are upgraded or personnel changes are made

Questions ??