FLOOD RECOVERY (WITHOUT an ARK)
DERRY TOWNSHIP MUNICIPAL AUTHORITY
CLEARWATER ROAD WWTP, Hershey, PA

PRESENTED TO THE 98th ANNUAL NJWEA
CONFERENCE – AAEES WORKSHOP

Wayne A. Schutz
Derry Township Municipal Authority
May 13, 2013
PRESENTATION OVERVIEW

- INTRODUCTION
- PLANNING FOR THE “FLOOD”
- THE FLOOD
- CLEAN-UP & DEWATERING
- RESTORATION [SHORT TERM]
  - ADMIN
  - PROCESS
- RECOVERY [LONG TERM]
  - EQUIPMENT
  - BUILDINGS & MISC
- PAYING THE BILL & FUN WITH FEMA
Slow moving thunderstorm storm tracks the Swatara Creek from the Susquehanna River thru the watershed to the headwaters.

- Predicted crest ~ 12-13’
- Actual Crest ~ 16.1’ (Should’ve been a “NOTE TO SELF” moment!)
- Set Flood Preparedness Planning in Motion
Flood Preparedness Plan

For
Derry Township Municipal Authority

October 21, 2010

The purpose of the Flood Preparedness Plan is to provide guidelines that support an orderly and effective response to flood conditions at Derry Township Municipal Authority Wastewater Treatment Facility located at 670 Clearwater Road, Hershey, Pa. The Plan provides direction for responding to and mitigating flooding hazards that may occur at various stages of the Swatara Creek. The Plan includes:

- Notification of personnel of potential flooding,
- Action Items designed to secure structures at given water elevations,
- Historic and other information helpful to the situation,
- A list of supplies and equipment to ensure adequate response time,
- A list of service providers that may be called upon for assistance during mitigation efforts, and
- Maps which show areas affected by flooding based on topography and river level.

DTMA has enrolled in the USGS Real-Time Hydrologic Notification System subscription program to receive email and telephone notifications of potential flooding of the Swatara Creek. The Operations & Maintenance Supervisor is responsible to activate the Flood Preparedness Plan upon notification and will monitor response and mitigation efforts utilizing Operation and Maintenance staff to carry out the action items. The degree of response will be determined by the forecast flow level of the Swatara Creek near Hershey as predicted by the National Weather Service.

Information Sources

U.S. Geological Survey
Sign up for email and/or mobile phone notifications: http://water.usgs.gov/wateralert
Swatara Creek water level: http://waterdata.usgs.gov/nwis/uv?site_no=07527900
Rain gages: http://waterdata.usgs.gov/nwis/uv?site_no=017701076410001

National Weather Service Advanced Hydrologic Prediction Service:
http://water.weather.gov/ahps2/hydrograph.php?wfo=ste&gage=herp1&view=1.1.1.1.1.1.1.1&topegas=107.6.1.15.186

© Flood Preparedness Plan

October 21, 2010
## DTMA - FLOOD PREPAREDNESS ACTION ITEMS

<table>
<thead>
<tr>
<th>ELEV, FT</th>
<th>IMPACTS &amp; PREPARATORY ACTIONS</th>
<th>CREEK LEVEL, FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>332</td>
<td>Notify Management, Operation, Maintenance and Collection personnel of potential flooding. Plug lower trench drain at Storage Pad.</td>
<td>9</td>
</tr>
<tr>
<td>333</td>
<td>Storage Pad trench is flooded</td>
<td>10</td>
</tr>
<tr>
<td>334</td>
<td>Plug RAS Building drain. Plug Blending Tank driveway drain. Close Chlorine Contact Tank mud valve and fill the tanks. Move boards, totes, equipment, floatables, etc, from potential flood areas. Remove chemicals from Alka Pro Building and turn Alka Pro off. Remove equipment from Filter Building.</td>
<td>11</td>
</tr>
<tr>
<td>335</td>
<td>Check for proper operation of backflow flap gate in the Filter Building Distribution Chamber. Remove Filter Building Sump Pump cover. Close manual gate valve at Equalization Basins.</td>
<td>12</td>
</tr>
<tr>
<td>336</td>
<td>Ivan flood level was 336.76 on 9/18/2004 (See mark on Chlorine Tank wall.) RAS Building and Blending Tank driveway drains are flooded. Average water level in Chlorine Contact Tank is 336.95. Install curb barrier in Filter Building to keep water out of lower level. Install curb barrier at UV Influent Sump. Plug Secondary Digester drain and both Mix Pump containment drains. Board stairwell to Blending Tank room.</td>
<td>13</td>
</tr>
</tbody>
</table>
# Flood Recovery

## Preparedness Planning

### DTMA - Flood Preparedness Action Items

<table>
<thead>
<tr>
<th>ELEV, FT</th>
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</thead>
<tbody>
<tr>
<td>337</td>
<td>Average water level of Filter Building Distribution Chamber is 337.33</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Chlorine Contact Tank sidewall height is 337.84 on June 2006</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remove Sludge Building and Pump Station (3) sump pump covers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plug Sludge building trench drain and Loading Area drains</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Board stairwell to Sludge Building Heating Boiler Room, tape door, seal louvers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Board Waste Sludge stairwell, tape door</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Board tunnel to Primary Pump Station</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seal Sludge Building doors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Open Filter Building doors and remove grating from UV Effluent Pit, Rope for safety barrier</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Move Control Building, Administration, and Maintenance assets to higher elevation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seal Secondary Digester Room doors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seal Control Building and Atrium Doors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consider removing pump motors and panel control modules</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Notify DEP of potential process failure</td>
<td></td>
</tr>
</tbody>
</table>

| 338      | Water enters Garage | 15              |
|          | Water enters Atrium |                 |
|          | Water backs up through effluent line causing effluent flow to surcharge out of UV Effluent Pit |                 |
|          | Water enters Sludge Building stairwell and Secondary Digester drains |                 |
|          | Top of Power Center No. 2 concrete pad is 338.5 |                 |
|          | Storm event level was at 338.84 or 3' up on Power Center No. 2 on 06/29/2006 |                 |
|          | Shut down power to Power Station No. 2 |                 |
|          | Notify DEP of process failure |                 |
|          | Seal Control Building doors |                 |
## DTMA - FLOOD PREPAREDNESS ACTION ITEMS

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<thead>
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<tbody>
<tr>
<td>339</td>
<td>Secondary Clarifier 1 &amp; 2 average water level is 339.20</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Waste Sludge Pump Station Stairwell top is 339.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control Building Ground is 339.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maintenance Garage Floor is 339.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sludge Building Ground Floor is 339.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Filter Building Ground Floor is 339.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Filter Building Distribution Chamber Wall top is 339.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitor Sludge Building Basement for flooding level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shut down power to Transfer Pump and Primary Pump Stations and rest of the buildings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitor Control Building for Dry Well flooding and need to shut down power</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seal Dry Well door</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prepare for having PPL shutdown power to both power sources</td>
<td></td>
</tr>
<tr>
<td>340</td>
<td>Diluent Water Pit top is 340.33</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Secondary 1 &amp; 2 Tank Wall tops are 340.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transfer Pump Station Stairwell top is 340.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitor flood water levels at Switch Gear Power Station</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lift Rotomats from channel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fill Equalization Basins</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Divert flow from Grit Units</td>
<td></td>
</tr>
<tr>
<td>341</td>
<td>Primary Sludge Pump Station Stairwell top is 341.37</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>PPL power shut down</td>
<td></td>
</tr>
<tr>
<td>342</td>
<td>Influent flow may overcome the four Raw Pumps’ capacity and the Wet Well will flood</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Monitor the Emergency Generator as they continue to power the Raw Pumps</td>
<td></td>
</tr>
<tr>
<td>343</td>
<td>Administration Floor is 343.25</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Thickener and DAF Tanks Walls tops are 343.50</td>
<td></td>
</tr>
<tr>
<td>344</td>
<td>The 100-year flood elevation</td>
<td>21</td>
</tr>
</tbody>
</table>
# FLOOD RECOVERY
Preparedness Planning

## DTMA - FLOOD PREPAREDNESS ACTION ITEMS

<table>
<thead>
<tr>
<th>SUPPLIES &amp; EQUIPMENT</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe plugs, rags, duct tape, plastic sheeting, sandbags</td>
<td>Filter Building - Janitorial Supply Area</td>
</tr>
<tr>
<td>Wood</td>
<td>Filter Building - Janitorial Supply Area</td>
</tr>
<tr>
<td>Pusher Trailers (Qty 2)</td>
<td>Filter Building</td>
</tr>
<tr>
<td>Pumps (4” / 1 ½ - 2”)</td>
<td>Filter Building / Garage - Collection Bay</td>
</tr>
</tbody>
</table>

## SERVICE CONTACTS

<table>
<thead>
<tr>
<th>Service</th>
<th>Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning Services</td>
<td>Belfor USA Group, Inc. (939-9090)</td>
</tr>
<tr>
<td></td>
<td>Mark 1 Restoration (561-1255)</td>
</tr>
<tr>
<td></td>
<td>Mellon Certified Restoration (232-1551)</td>
</tr>
<tr>
<td>Electrical Utility</td>
<td>PP&amp;L (888-220-9991) (Acct. No. 64950-78009)</td>
</tr>
<tr>
<td>Electrical Service</td>
<td>Bitner Electric (564-5070)</td>
</tr>
<tr>
<td></td>
<td>Garden Spot Electric (626-2360)</td>
</tr>
<tr>
<td>Movers</td>
<td>Penn Hershey Transfer (533-2000)</td>
</tr>
<tr>
<td></td>
<td>United Van Lines (232-2100)</td>
</tr>
<tr>
<td>Moving Truck Rentals</td>
<td>Budget Truck Rental (561-8925)</td>
</tr>
<tr>
<td></td>
<td>U - Haul (545-8124)</td>
</tr>
<tr>
<td>Pumps</td>
<td>Godwin Pumps (724-266-6936)</td>
</tr>
<tr>
<td></td>
<td>Keystone Pump &amp; Power (502-8500)</td>
</tr>
<tr>
<td>Vactor</td>
<td>Kline’s Services (1-866-455-4637)</td>
</tr>
</tbody>
</table>
Fully saturated, “brim” full Swatara Creek receives 16” – 18” of rainfall from TS Lee from the Susquehanna River thru the watershed to the headwaters.

- Predicted crest ~ 20’
- Actual Crest ~26.1’ *(Note to Self)*
Forecasts for the Swatara Creek near Hershey are issued as needed during times of high water, but are not routinely available.
Latest observed value: 26.79 ft at 8:14 PM EDT 8-Sep-2011. Flood Stage is 7 ft

Record Stage: 16.1'

Major Stage: 14.0'
Moderate Stage: 10.0'
Flood Stage: 7.0'
Action Stage: 6.0'

Graph Created (8:45PM Sep 8, 2011)  - Observed  - Forecast (issued 2:46PM Sep 8)
SWATARA CREEK LEVELS - SEPTEMBER 7th, 8th, & 9th, 2011

- **FLOOD RECOVERY**
- Creek Level - The Facts

**SWATARA CREEK LEVELS - SEPTEMBER 7th, 8th, & 9th, 2011**

- **ALL POWER OFF**
- **LEVEL, FEET**
  - 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0

- **HOUR**

---

- **WED, SEP 7**
- **THURSDAY, SEPTEMBER 8**
- **FRIDAY, SEPTEMBER 9**

- **SWATARA CREEK LEVEL**
- **POWER SHUT OFF**
FLOOD RECOVERY
Views from the Flood

- VIEWS FROM THE FLOOD
FLOOD RECOVERY
Views from the Ark
FLOOD RECOVERY
Views from the Ark
FLOOD RECOVERY
Views from the Ark
FLOOD RECOVERY

"HQ"
FLOOD RECOVERY
"HQ Lunchroom"
Clean-up Challenges
  • Power
  • Water
Debris
Stuff
FLOOD RECOVERY
Tanker Recovery
But the biggest Clean-up Challenge...
FLOOD RECOVERY
Fence Clean-Up - Mulch

MULCH,
FLOOD RECOVERY
Fence Clean-Up - Mulch

MULCH,
FLOOD RECOVERY
Reality Sets In
FLOOD RECOVERY
Reality Sets In
FLOOD RECOVERY
Clean-Up
FLOOD RECOVERY
Clean-Up
Clean-up Challenge

.....BASEMENT DEWATERING
FLOOD RECOVERY
Dewatering Challenges
ADMINISTRATIVE FUNCTIONS
RESTORATION
FLOOD RECOVERY

Admin Restoration – “Temporary” Office Trailers
TREATMENT PROCESS
RESTORATION
FLOOD RECOVERY
Process & Equipment Restoration

• MOTORS
  – Bake, Dip, & RTS

• DRIVERS
  – Pumps & Gearboxes
    • Drain, Flush, Refill (grease/lubricant) & RTS

• FLYING BLIND
  – CONTROLS & INSTRUMENTATION
  – SCADA System

• MAINTENANCE
  – No Tools
POWER RESTORATION
FLOOD RECOVERY
MCC “Buckets”
COLLECTION SYSTEM RESTORATION
TREATMENT PROCESS & EQUIPMENT RECOVERY
• MOTORS

• DRIVERS
  – Pumps & Gearboxes
  – Remove from Service One at a Time
  – Contract Repair
    • Open, Clean, Rebuild, Repair, RTS

• CONTROLS & INSTRUMENTATION
  – VFDs
  – Flow Meters
  – Actuators ("Note to Self")
• SCADA System
  – Rebuild (we can make it better)
• CLARIFIER & THICKENER DRIVES
  – Remove from Service One at a Time
  – Contract Repair
    • Open, Clean, Rebuild, Repair, RTS
• CoGENERATION
  – DTMA gets Lucky
• BIOSOLIDS DRYER
  – Bid Awarded for Repair
• MISCELLANEOUS
  – Heating System
    • Boiler
    • Circ Pumps
    • Unit Heaters
  – Pipe Insulation
  – Doors & Windows

• ADMIN BUILDING RENOVATION
  – Slowed by Hurdles
COSTS & OTHER MINOR STUFF
• No Flood Insurance
• $500,000 Flood Reserve Fund
• $1 - $2 Million in “Other” Reserve Funds
• $6 Million Line of Credit
FLOOD RECOVERY
Fun with FEMA/PEMA

• FEMA
  – Reimburse 100% of "ELIGIBLE" Costs
  – Project Worksheets (paper & forms)
    • 55, 3” binders submitted
  – Bureaucratic Process, slow reimbursement
• NO SEWER FLOW
  – Approximately 96 Hours
• EXTENDED PRIMARY TREATMENT
  – Approximately 21 days
• NPDES PERMIT Compliance
  – October 1st
  – WY 2010 - 2011
  • LOST ~50,000 Lbs “N” Credits
• FLOOD RECOVERY ASSISTANCE
• TECHNICAL, CONTRACT, & ADMINISTRATIVE SUPPORT
  – ENGINEERS
  – CONTRACTORS

–STAFF!!!!!!!!!!
• **FINAL COSTS:**
  – Approximately $12 - $13 Million

• **COMPLETE RECOVERY:**
  – WWTP ~ 18-24 Months
  – Office Building ~36 Months
QUESTIONS?

JOE CONTRACTOR
OUR PARKING LOT FLOODED AFTER THE BIG STORM.

I NEED YOU TO WADE OUT THERE AND FIND OUR DOWnd POWER CABLES.

WE NEED MORE CONTRACTORS LIKE THAT!