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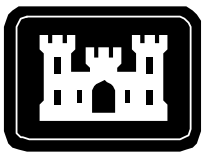
ORLEANS PARISH
DRAINAGE PUMPING STATIONS

KATRINA DAMAGE REPAIR



U. S. ARMY CORPS OF ENGINEERS
NEW ORLEANS DISTRICT

February 15, 2006

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SUMMARY
OPINION OF ESTIMATED COST

Eastbank Orleans	**TOTALS**
Drainage Pump Station #1-Broad Street	$ 2,078,000
Drainage Pump Station #2	$ 2,884,000
Drainage Pump Station #3	$ 2,440,000
Drainage Pump Station #4-London Avenue	$ 468,000
Drainage Pump Station #5-E. of Indust. Canal	$ 1,720,000
Drainage Pump Station #6-17th Street	$ 2,590,000
Drainage Pump Station #7-Orleans Avenue	$ 1,080,000
Drainage Pump Station #12	$ 128,000
Drainage Pump Station #17-Station D	$ 6,800,000
Monticello Drainage Pump Station	$ 3,000
Prictchard Place Drainage Pump Station.	$ 16,000
I-10 Underpass Drainage Pump Station.	$ 298,000
Carrolton Frequency Changer	$ 2,582,000
Westbank Orleans	
Drainage Pump Station #11	$ 2,820,000
Drainage Pump Station #13	$ 2,990,000
New Orleans East	
Drainage Pump Station #10-Citrus	$ 3,851,000
Drainage Pump Station #14-Jahncke	$ 1,210,000
Drainage Pump Station #15-Michoud	$ 756,000
Drainage Pump Station #16-St. Charles	$ 976,000
Drainage Pump Station #18-Maxent	$ 1,000
Drainage Pump Station #19-W. of Indust. Canal	$ 737,000
Drainage Pump Station #20-Amid	$ 2,058,000
Elaine Drainage Pump Station	$ 573,000
Grant Drainage Pump Station	$ 274,000
TOTAL:	**$ 39,333,000**

NOTE: All totals include 25% contingency, 10% E & D, 12% S & A.

DRAINAGE PUMPING STATION NO. 1

Observations, Conclusions and Recommendations

Electrical:

1. Pump motors for drainage pumps A, B, C, D and E were cleaned and baked. Because the motors sustained damage from being submerged in the hurricane, this procedure doesn't guarantee they will continue to work when needed. In fact, the motor for Pump A had been baked and had selected poles repaired, but it failed the first time it was energized and loaded. Therefore, it is recommended that the stators and poles for the rotors be rewound for the motors for Pumps B, C, D, and E. (The S&WB is currently rewinding the stators and rotors for Pump A motor.)

Mechanical:

1. Inspect and replace the inboard bearings for Pumps G and F.

Structural:

1. The flood water level in the station was 11 inches above the operating floor, and 5 inches above the control room floor.

2. Replace roof ridge line flashing missing on SE and SW end of building (about 10' each). There is evidence of roof leaks on the west end of the building. Repair roof as necessary.

3. The 7' X 14' wooden roll-up door on the north end of the building is broken off the rail. Recommend repair of the wooden doors.

4. Replace control room vinyl floor tiles and wood paneling (15' X 15' X 8'). Replace wood paneling on the outside of the control room.

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Photo 1 – Roof ridge flashing missing; west end of bldg.

Photo 2 – Pump G

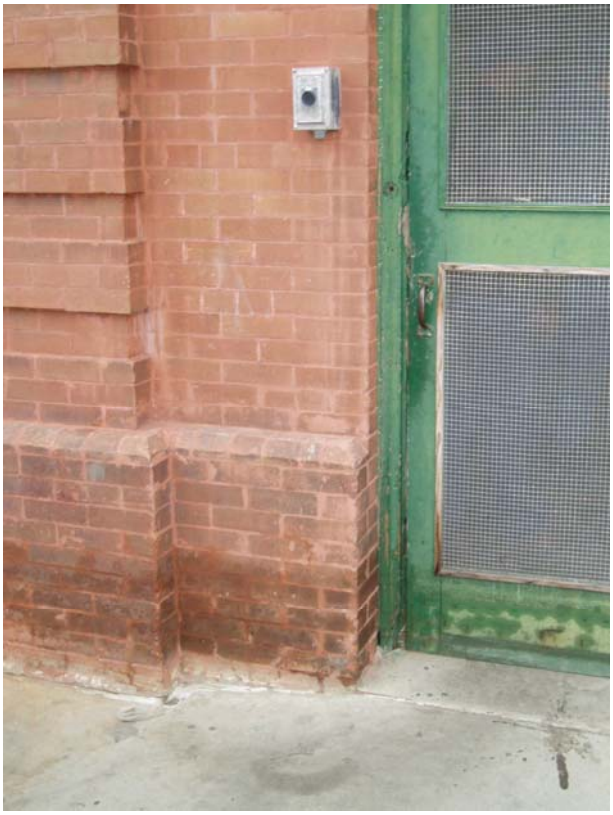

Photo 3 – Water mark on station bldg.

Photo 4 – Burned motor for Pump A.

DRAINAGE PUMPING STATION NO. 2

Observations, Conclusions and Recommendations

Electrical:

1. Pump motors for drainage pumps A,B,C and D were cleaned and baked. It is recommended that the motors for these 4 pumps have the stators and coils rewound due to having been submerged. (See Electrical description for Station No. 1)

Mechanical:

1. Replace the bearings and seals for the 2 constant duty pumps.

Structural:

1. The water level in the building was approximately 15 inches above the operating floor and 5 inches above the floor in the control room.

2. The roof sustained damage as follows:
   a. Approximately 160' of copper gutter along the center gable on the east side was damaged or missing,
   b. Approximately 170' of copper fascia on the east side was missing,
   c. The entire shingle roof is in poor condition and should be replaced with a metal roof.

3. The storage building, measuring 25' x 25', was flooded 11" above the floor and needs cleaning out. About 50' of the clay ridge tiles on the roof were blown off. The entire building should be replaced or demolished. (Recommend demolition of the building; S&WB does not need building.)

4. The vinyl tile flooring, and the wood sub-floor, in the control room was damaged. The estimated area is 550 square feet. Recommend replacement.

5. The lag bolts, which attach the roof to the steel purlins, are missing in the NE area of the roof, directly over Constant Duty Pumps Nos. 2 and 3. These should be replaced.

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Photo 1 – Roof damage to station bldg.

Photo 2 – Damage to control room floor.

Photo 3 – Storage bldg. to be demolished.

DRAINAGE PUMPING STATION NO. 3

Observations, Conclusions and Recommendations

Electrical:

1. Pump motors for drainage pumps A,B,C, D, and E were cleaned and baked. It is recommended that the motors for these 5 pumps have the stators and coils rewound due to having been submerged. (See Electrical description for Station No. 1)

2. Re-support cable trays.

Mechanical:

1. Remove protective shroud and inspect Pump D; match and mark all pieces and fasteners and place shroud back together as waterproof. Repair or replace defective pump components as required.

Structural:

1. The water level in the building was approximately 24 inches above the lower operating level and 6 inches above the upper operating level. The control room was flooded 12 inches above the floor level. The basement was completely submerged.

2. The roof, consisting of copper standing seam panels, leaks. Extent of repairs include four locations, measuring approximately 6’ X 20’.

3. The storage building, measuring 25’ x 25’, was flooded 11” above the floor and needs cleaning out. About 50’ of the clay ridge tiles on the roof were blown off. Recommend replacement.

4. The vinyl tile flooring and the wood paneling in the control room should be replaced.

5. Replace about 100’ chain link fence along Broad St. Fence is 6’ with 3 strands of barbed wire on top.

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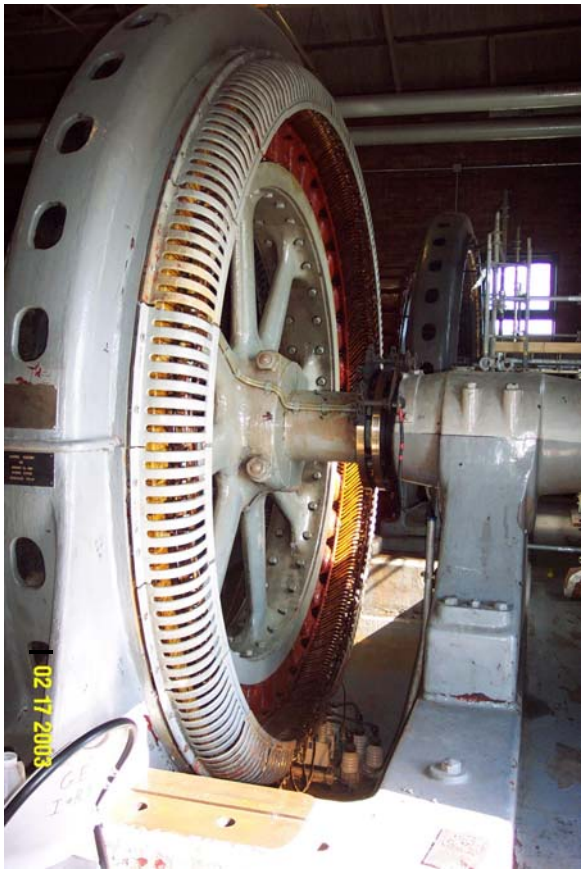

Photo 1 – Motor to be rewound.

Photo 2 – Pump D protective shroud to be removed.

Photo 3 – Damaged floor and wall in control room.

Photo 4 – Damaged fence.

DRAINAGE PUMPING STATION NO. 4

Observations, Conclusions and Recommendations

Electrical:

1. Flood waters flooded the basement. All basement lighting and power should be rewired.

Mechanical:

1. The inboard bearings on Pumps C, D, and E should be replaced.

2. The motors for the trash racks should be rewound and the gear boxes replaced (25 cyle).

3. Minor repairs are required to the piping and valves for the cooling water system.

Structural:

1. The water level in the building was approximately 12 inches above the floor level inside the building, approximately 20 inches above the exterior concrete slab, 9 inches above the control room floor, and 12 inches above the 25-cycle building floor.

2. The vinyl floor tiles in the control room were damaged and should be replaced. The approximate area is 250 sf.

3. Replace about 40’ of 8’ chain link fence along north side of property, and a 15’ gate located at the north end of the east side fence shall be replaced. The fence along the south side should be realigned.

4. About 40’ of the metal roof along the north edge was peeled back, and should be repaired.

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Photo 1 – Trash Racks.

Photo 2 – Damaged roof.

Photo 3 – Damaged tiles in control room.

DRAINAGE PUMPING STATION NO. 5

Observations, Conclusions and Recommendations

Electrical:

1. Pump motors for drainage Pumps A and B were cleaned and baked. It is recommended that the motors for these 2 pumps and Pump D have the stators and coils rewound due to having been submerged. (See Electrical description for Station No. 1)

2. It is recommended that all lighting and low voltage wiring below the main floor area and equipment pits be replaced since all was submerged by floodwaters

Mechanical:

1. Replace entire fuel system due to being completely flooded.

2. Replace inboard bearings for Pump D.

3. Rewind motor and replace gear box for the trash racks on the Jordan Ave. side of the station.

4. Miscellaneous cabinets, water cooler, refrigerator, etc., need to be replaced due to being submerged.

Structural:

1. Drainage Pump Station No. 5 consists of the main pump building and two smaller buildings: the oil storage building and the "D" pump control room. The main building has two sections: the pump room and the electrical equipment room. The pump room was flooded to 9 ft above the operating level. The electrical equipment room was flooded to 4'-3" above the operating level.

2. The pump room building roof, consisting of asphalt shingles, had considerable damage in the form of missing and broken shingles. It is recommended that the entire pump room roof be replaced. The electrical equipment room roof, a copper standing seam, was undamaged.

3. In the interior, (2) 3'x7' aluminum doors and (2) 6' x 10' aluminum double doors were corroded and stained. These should be replaced.

4. The vinyl tiles in the break room, measuring 20' x 40', are peeling and many have broken up or have come loose. The floor should be replaced with new vinyl tiles.

5. The oil storage building was completely submerged. The interior of the building is full of spilled oil, and should be completely cleaned out. The wood frame roof was damaged, and should be reconstructed. This includes the roof shingles, fascia, plywood soffits, and (2) exterior light fixtures. The windows were broken, and should be replaced.

6. The "D" pump room building was undamaged.

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Photo 1 – Pump D.

Photo 2 – Roof, soffit, and window damage.

Photo 3 – Damaged oil storage bldg.

DRAINAGE PUMPING STATION NO. 6

Observations, Conclusions and Recommendations

Electrical:

1. Pump motors for Pumps C, D, E and F were cleaned and baked. It is recommended that the motors for these 4 pumps have the stators and coils rewound due to having been submerged. (See Electrical description for Station No. 1) Motors for Pumps A and B are currently being rewound by the S&WB.

Mechanical:

1. Replace inboard bearings for Pumps G, H, and I.

2. Remove debris from trash screens.

3. Replace one exhaust fan.

Structural:

1. The building structure frame generally was not damaged. Replacement of approximately six feet of missing copper down-spout on the southwest corner of the building is recommended.

2. On the Maryland side of the station, a 36' X 10' wood gate with a metal frame was damaged, and 18' X 10' high wood fence was missing. On the Orpheum Street side of the station, a gate was missing and approximately 60' of 10' high wood fence was damaged or missing, and 60' of 10' high chain link fence was down. Eight 6"X6" wood bollards were sheared off. On the east side of the station approximately 150 LF of 10' high wood fence was damaged. Replacement is hereby recommended.

3. Pump Station Building Roof: Copper roof damage was evident from the east end of the building to Pump G, with two other isolated leaks near Pumps CD1 and V3. Approximately 200' X 48' of roof replacement is recommended.
4. The suction bay has a significant build-up of silt and trash that should be removed in order to function adequately.

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Photo 1 – Damage to roof.

Photo 2 – 25 cycle pump motors to be rewound.

Photo 3 – Damaged fence on Maryland side.

DRAINAGE PUMPING STATION NO. 7

Observations, Conclusions and Recommendations

Electrical:

1. Pump motors for Pumps A and C were cleaned and baked. It is recommended that the motors for these 2 pumps have the stators and coils rewound due to having been submerged. (See Electrical description for Station No. 1)

Mechanical:

1. All required mechanical work has been completed by the S&WB

Structural:

1. Water level in the building was approximately 28 inches above the operating floor, and according to the operator, most of the flooding entered through the doors and roll-up doors and the brick wall on the north (lake side) of the station. There was evidence of water washing over the levee and some scour at the northwest corner of the pumping station.

2. There is a crack line in the brick column near the center of the station and seepage lines in the pump pits below the operating floor. Sealing and repair of the existing brick walls are recommended.

3. The 23'X24' control room wall paneling (inside and out), and vinyl floor tile and sub-floor were damaged and replacement is recommended.

4. A 10' X 10' chain link fence gate at the NW corner of the building was destroyed, as well a 30' section of 10' high chain link fence at the SW corner of the pumping station. Replacement is recommended.

5. The suction bay has a significant build-up of silt and trash that should be removed in order to function adequately.

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Photo 1 – Missing tiles and damaged floor in room.

Photo 2 – Damage to walls in control control room

DRAINAGE PUMPING STATION NO. 12

Observations, Conclusions and Recommendations

Electrical:

1. Replace battery drip pan.

Mechanical:

1. Open and inspect Pump D and repair or replace defective components.

Structural:

1. Standing floodwater reached 25 inches above the slab-on-grade and peak levels were significantly higher. The floor level inside the building is about 15 inches higher than the exterior slab-on-grade.

2. The floor tile in the office requires replacement and one door and one window need replacement.

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Photo 1 – Pump D

Photo 2 – Damaged tiles in control room.

DRAINAGE PUMPING STATION NO. 17 (D)

Observations, Conclusions and Recommendations

Electrical:

1. The motor for drainage Pumps A & D and the 4 motors for Frequency Changers #3 & 4 should be totally rewound due to having been submerged.

2. Replace all medium voltage switchgear (60 Hz) due to it being either submerged or flooded by rainwater.

3. Repair recorder that was flooded.

Mechanical:

1. Replace vacuum pump by office.

2. Replace ventilation fan unit.

Structural:

1. Flood water inside the building reached a height of about 2 feet inside the building.

2. Three rollup steel doors were damaged. Replace doors in kind.

3. Replace the tile floor and the paneling in the office and the bathroom due to these areas being submerged.

4. Repair leaking 48” St. Ferdinand discharge line at Claiborne Ave.

5. Repair damage to discharge end of 48” St. Ferdinand line at river due to wharf damage.

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Photo 1 – Damaged roll-up door.

Photo 2 – Motor for drainage pumps A & D.

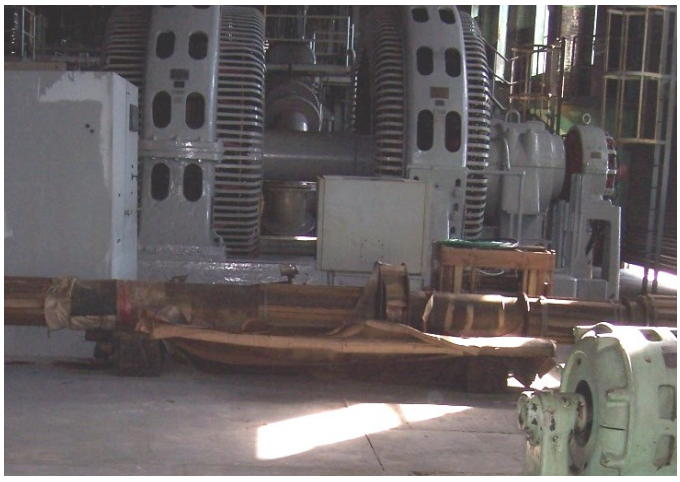

Photo 3 – Frequency changer motors.

DRAINAGE PUMPING STATION: Oleander (Monticello)

Observations, Conclusions and Recommendations

Electrical:

1. No electrical repairs are required.

Mechanical:

1. Replace one ventilation fan in the operating room.

Structural:

1. Standing floodwater reached 80 inches above grade and peak levels were significantly higher. The operating floor level is about 88 inches above grade.

2. About 15 lf of ceramic ridge tiles were missing from the roof. Acoustic ceiling tiles were missing inside the operating room. Replacement is recommended.

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Photo 1 – Roof damage.

Photo 2 – Damaged ceiling tiles.

DRAINAGE PUMPING STATION: Pritchard

Observations, Conclusions and Recommendations

Electrical:

1. Repair generator muffler insulation.

Mechanical:

1. Repair fuel leak and hydrotest.

Structural:

1. Standing floodwater reached 58 inches above grade and peak levels were significantly higher. The operating floor level is about 61 inches above grade.

2. Copper roof line ridge repair was observed – 20 LF.

3. Repair scour hole near discharge pipe outfall (30’X10’X3’).

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Photo 1 – Damaged generator muffler insulation.

Photo 2 – Roof damage.

Photo 3 – Scour at discharge pipes.

DRAINAGE PUMPING STATION: I-10 Underpass

Observations, Conclusions and Recommendations

Electrical:

1. Inspect all gear that was exposed to rainwater and covered by tarps due to roof leakage. Replace damaged components.

Mechanical:

1. Replace the bearings on Pumps P-1, P-2, P-3. These pumps were operated with "dirty water." Pump P-4 was not run.

2. Repair leaking expansion joint on 12 inch discharge line.

3. The control panel for the sump pumps requires replacement.

4. There was heavy damage to the waste oil system. Overhaul waste oil system.

Structural:

1. The floodwater reached a level of 7'-2" above the first floor. The operating level is on the second floor.

2. The roof leaks. It is apparent that the joint sealant between the pre-cast panels had blown out; therefore, all the joints should be resealed.

3. Ceiling tiles in the control room were missing or damaged; these should be replaced.

4. Replace (2) 3' x 7' metal doors, which were corroded and warped.

5. About 175 lf of 12' vinyl fence, with a 15 ft gate, along the Academy Dr. side was destroyed; this should be replaced in kind.

6. A 6' x 8' noise reduction panel was missing. This should be replaced.

7. Reinstall one light pole at the suction basin, next to the crane mounted on the basin wall.

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Photo 1 – Damaged ceiling tiles

Photo 2 – Damaged noise reduction panel.

Photo 3 – Damaged vinyl fence.

DRAINAGE PUMPING STATION: Carrollton Frequency Changer

Observations, Conclusions and Recommendations

Electrical:

1. Recommend that all 4 frequency changer motors be fully rewound due to having been submerged.

2. Rewire conductors in pits that were fully submerged.

3. Inspect, clean and repair damaged components of outdoor electrical equipment.

4. Replace battery rack and drip pan that are corroded due to salt water flooding

Mechanical:

1. No mechanical repairs are required.

Structural:

1. No structural repairs are required.

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Photo 1 – Outdoor electrical equipment

Photo 2 – Motor pit equipment

DRAINAGE PUMPING STATION NO. 11

Observations, Conclusions and Recommendations

Electrical:

1. Inspect switchgear and motor control centers' internal components and replace damaged components as required.

Mechanical:

1. No mechanical repairs are required.

Structural:

1. The flood water level in the station was confined to the basement area open to the intake side of the station. The operating floor was not flooded.

2. Approximately 4000 square feet of metal roofing was damaged. Repair is recommended

3. In the control room area approximately 10' X10' acoustical ceiling tile showed stains as a result of the station roof leaking. Replacement is recommended.

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Photo 1 – Damaged roof

Photo 2 – Inspect switchgear

DRAINAGE PUMPING STATION NO. 13

Observations, Conclusions and Recommendations

Electrical:

1. Inspect switchgear and MCC to determine damage due to water entry from roof leakage near north end of building. Replace damaged components as required.

2. Replace low voltage wiring, switches, and lighting fixtures in pump and equipment pits that were submerged; located below the main floor area in the east of the control house.

3. Repair exterior switches for raw water intake diesel engines 4 & 5.

4. Repair wiring to low voltage pump on exterior platform next to the discharge pump #4

Mechanical:

1. Replace sump pumps.

2. Replace blown away roof ventilators.

3. Replace damaged air conditioner (AC) condensing unit.

Structural:

1. The flood water level rose approximately to the top of the access road. The operating floor is approximately 7’ above the road elevation.

2. A 6’ x 8’ air-conditioned metal guard station building was destroyed. Replacement is recommended.

3. According to the operator, approximately 90% of the copper metal roof blew off. The estimated leaking part of the roof dimensions is approximately 200’ X 50’. Repair with a new metal roof is recommended.

4. Recommend replacement of approximately 110 LF of copper gutter, which is missing.

5. Recommend replacement of eleven 5’ x 5’ skylights, which are missing. Replace with same material as new metal roof.

6. Ten feet of copper down spout on the southwest side of the building is missing, and a 4” vent pipe is leaning away from the building. Recommend replacement and repairs.

7. Recommend repair of a 12’ X 19’ steel roll-up door at the north end of the building, which blew out.

8. Eight 44” X 48” screen openings in the wall of the building were damaged. Recommend replacement.

9. Two sixty-inch air intake pipes blew off on the discharge side of the station. Recommend replacement.

10. Four 6” insulated meter vent stacks were blown off. Recommend replacement.

11. Both the inside and outside gantry cranes cable units were damaged. Recommend repairs.

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Photo 1 – Missing roll-up door

Photo 2 – Damaged downspout

DRAINAGE PUMPING STATION NO. 10 - Citrus

Observations, Conclusions and Recommendations

Electrical:

1. Inspect switchgear and MCC to determine damage due to water entry from roof leakage. Replace damaged components as required.

Mechanical:

1. Replace the bearings for Pumps 1, 2, 3, and 4.

2. Replace the trash screen cleaner motors.

Structural:

1. The flood water level was approximately 2” above the operating floor level.

2. Seventy five percent of the roof (64’ X 140’) was damaged. Repair with a new metal roof is recommended.

3. Replacement of approximately 175 LF missing copper gutters is recommended.

4. Eight copper downspouts are broken (40 LF). Replacement is recommended.

5. Approximately 14’ X 20’ of the 18”X18” acoustical roof panels are damaged in the control room. Recommend replacement.

6. Seventy-five feet of 6’ high chain link fence topped with barbed wire was damaged. Replacement is recommended

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Photo 1 – Screen cleaner motors require replacement.

Photo 2 – Damaged ceiling tiles.

Photo 3 – Damaged gutter and downspout.

DRAINAGE PUMPING STATION NO. 14 - Jahncke

Observations, Conclusions and Recommendations

Electrical:

1. Replace screen motors, starters, and wiring

2. Replace low voltage wiring, switches, and lighting fixtures in basement of float house.

2. Repair west door on motor control center

3. Replace auto/manual controls in pump house

4. Replace sump pump in float house

Mechanical:

1. Vacuum system needs repairs on vacuum breaker for Pumps #2 and #4. Repair leaks on hydraulic system for siphon breaks valve and pressure test.

2. Replace bearings for Pumps 1, 2, 3, and 4. All pump bearings need to be replaced because dirty water was used during operation.

3. Open Pump 3 gear and repair/replace as required.

4. Rebuild or replace sump pumps.

Structural:

1. The flood water level at the station was approximately 2.5' above ground level. Wash over the Lake Pontchartrain levee was reported to be approximately 4'.

2. The entire flat built-up roof and copper flashing were damaged. Approximate dimensions are 28.5' X 37'.

3. A crack line on the concrete block walls located approximately 18" below the roof suggests that the 5' roof overhang , which extends on all sides of the building, may have contributed to a "wing effect," causing uplift on the roof during the storm.

4. Rain water seeped through the roof and cracks in the walls damaging the vinyl tile floor (18' X 26'). Replacement of the control room roof and walls is recommended.
5. Approximately 250 LF of chain link fence 12' high was damaged. Two chain link gates on the levee (4' X 8') were damaged, and approximately 26' of 8' high chain link fence destroyed. Replacement id recommended.

6. On the levee there is scour approximately 4’ deep around the concrete base supporting the valve actuators, and the wood cross beams between piles supporting the out-fall pipes are missing or damaged. Repairs are recommended.

7. The float house asphalt built-up roof was damaged, and there was a crack similar to that described in Item 3 above on this structure (22’ X 26’ roof area). The building floor area is approximately 16’ X 20’. The 4’ X 8’ steel door does not close. Replacement of these elements is recommended.

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Photo 1 – Wall crack below roof overhang.

Photo 2 – Roof damage.

Photo 3 – Screen cleaner motors require replacement.

Photo 4 – Roof overhang.

DRAINAGE PUMPING STATION NO. 15

Observations, Conclusions and Recommendations

Electrical:

1. No electrical repairs are required.

Mechanical:

1. Inspect gear boxes for Pumps 1, 2, and 3, and repair/replace defective components.

2. Drain fuel tank and piping, flush, hydrotest, repair, and refill.

3. Replace stainless steel cable trays on trash rakes in Bays #1 and #2.

4. Replace bearings in Pumps 1, 2, and 3.

Structural:

1. The flood water level was approximately 2 feet below the operating floor level.

2. Three 4’ X 7’ steel doors on the basement level are corroded through. Replacement is recommended.

3. Replacement of 100 LF of 6’ high, barbed wire topped fence and gates, which are missing on the east side of the station is recommended.

4. Replacement of 80 LF of galvanized steel hand railing, which is damaged along the cat walk at the trash rack is recommended.

5. The ladder leading to the roof is bent out of shape. Repair is recommended.

6. Replacement of two 12” diameter roof vents, which blew off, is recommended.

8. Replace two damaged trash rake support struts, approximately 40 LF each.

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Photo 1 – Damaged trash rake cable tray

Photo 2 – Damaged steel doors

DRAINAGE PUMPING STATION NO. 16 – St. Charles

Observations, Conclusions and Recommendations

Electrical:

1. Replace screen motors, starters, and wiring

2. Replace low voltage wiring, switches, and lighting fixtures in basement of float house.

3. Replace auto/manual controls in pump house

Mechanical:

1. Replace sump pump in float house.

2. Trash rakes were underwater. Open motors and gearboxes to determine extent of necessary repairs. Replace motors if required.

3. Replace bearings on 3 pumps because of using dirty water for lubrication during operation.

4. Replace damaged air conditioner condensing unit.

Structural:

1. The flood water level at the station was approximately 4’ above round level.

2. The entire flat built-up roof was damaged. Approximate dimensions are 28.5’ X 37’.

3. A crack line on the concrete block walls located approximately 18” below the roof suggests that the 5’ roof overhang, which extends on all sides of the building, may have contributed to a “wing effect,” causing uplift on the roof during the storm.

4. Rain water seeped through the roof and cracks in the walls damaging the vinyl tile floor (18’ X 26’). Replacement of the walls, roof and vinyl floor are recommended.

5. Approximately 120 LF of 12’ high chain link fence was destroyed. Replacement is recommended.

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Photo 1 – Crack in bldg. wall

Photo 2 – Damaged air conditioner

Photo 3 – Damaged trash rakes.

DRAINAGE PUMPING STATION NO. 18 - Maxent

Observations, Conclusions and Recommendations

Electrical:

1. No electrical repairs required.

Mechanical:

1. No mechanical repairs required.

Structural:

1. The flood water level was below the operating floor level.

2. 30 LF of 6’ chain link fence on the outlet structure is damaged. Repairs are recommended.

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Photo 1 – Pump Station 18

DRAINAGE PUMPING STATION NO. 19

Observations, Conclusions and Recommendations

Electrical:

1. Replace all lighting/power wiring and devices below operating floor.

2. Inspect electrical gear on the third level.

3. Inspect/test emergency duct bank running from generator to station.

Mechanical:

1. The first level was completely flooded. The sewer grinder pump and the sump pump require inspection to determine condition and required repairs or replacement. Inspect pumps and meg motors and repair or replace as required.

2. Drain hydraulic oil system for Pumps V1, V2. Repair leaks, hydro-test, refill and run test.

3. Replace pump bearings on Pumps V1, V2, and H2. Inspect gearboxes on all pumps and repair as required.

4. Replace one ventilation fan.

Structural:

1. Flood water just reached the height of the second operating level, which is 10'-2" higher than the lower operating level (at grade). At the generator building, located to the west of the main building, the flood water reached a height of 36" above grade around the building.

2. The roof is leaking along the valley running lengthwise along the center of the building, as well as over the electrical panels on the south side of the building. Repair of copper standing seam roof is recommended.

3. Rebuild 150 lf of 10 ft. high chain link fence w/ 3 strand barbed wire on top, located on top of wall on west side and 100 lf of 6 ft. high chain link fence on south wall w/ 3 strand barbed wire on top.

4. Repair about 50 lf pipe rail along suction basin.

5. Rebuild 600 lf of 6 ft. high chain link fence w/ 3 strand barbed wire on top, and a 30 ft rolling gate, around generator building.

6. Replace about 30 lf concrete sidewalk between main and generator buildings, with about 20 cy of soil material, which was washed out during the storm. Also, replace about 140 lf

of concrete curb and gutter, and about ½ of 26 ft. wide paved surface with about 50 cy of soil material, which was washed away.

The information contained on this page is proprietary to the Government and can not be posted on the public website at this time.

Photo 1 – Damaged fence on west wall

Photo 2 – Damaged pipe rail.

Photo 3 – Damaged low voltage lighting below operating floor.

DRAINAGE PUMPING STATION NO. 20 - Amid

Observations, Conclusions and Recommendations

Electrical:

1. Replace screen motor and starter and wiring.

2. Inspect service entrance junction box for splices and water intrusion. Repair damaged components.

Mechanical:

1. Diesel generator completely flooded and inoperative. Replace generator and diesel engine. New generator and engine should be raised.

2. Pump 2. Open and inspect to determine damage. It is likely that the impeller is off the shaft.

3. Repair trash racks chains, bars, sprockets and replace motor. Remove all debris.

Structural:

1. Seven feet of water was reported over the site. Use of the site for temporary pumps generally damaged the landscape.

2. Repair of site soil scoured areas, and access road grading is recommended, along with replacement of aggregate road and parking areas is recommended.

3. One wall of the generator building will require demolition and replacement to accommodate submerged generator replacement. The roof of the generator building is a flat concrete slab with a built-up roof and 5’ overhang, which may produce a wing effect in high winds.

4. The roof of the office building (41’ X 43’), consisting of a flat concrete slab, topped by built-up roofing, was cracked and leaking. There was evidence that the built-up material had blown off. It is recommended that the existing concrete roof be replaced (without the 5’ overhang), and that the new built-up roofing be installed. The flashing around the perimeter of the roof was for mostly missing. The ceiling tiles should also be replaced.

5. Significant scour occurred under the concrete slab supporting the pipe at the levee crossing. The scoured soil should be replaced with approximately about 50 cy of soil.

6. The 12’ x 14’ steel rollup door in the Generator building was damaged and should be replaced.

7. An enclosed steel ladder was torn off the office building. This should be reinstalled.

8. About 300 lf of 8’ chain link fence with 3 strands of barbed wire along the top is damaged. Replacement in kind is recommended.

9 One light pole at the suction basin was damaged and should be replaced.

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Photo 1 – Damaged control panel for trash screen motor.

Photo 2 – Damaged diesel engine for generator.

Photo 3 – Damaged fence.

DRAINAGE PUMPING STATION: Elaine

Observations, Conclusions and Recommendations

Electrical:

1. Replace electrical and automation systems due to submersion of all electrical equipment.

Mechanical:

1. Replace the entire vacuum system.

2. Inspect and replace the bearings for Pumps 1 and 2.

Structural:

1. It was reported that floodwater reached 8’ over the site, with 2.5 feet standing water over the site. The levee failed on either side of the pump outlet pipes causing considerable scour on the site. A sink hole 10’ X 4’ over the intake drain, behind the sheet pile wall was noted. Fill and grading of these areas are recommended.

2. Debris and fill in the intake channel should be removed. (120’ X 60’ sheetpile, walled intake area).

3. Site grading adjacent to the access road is needed (approximately 130’ X 30’).

4. A 3’ x 8’ steel door on the switch gear building will not open. Recommend replacement.

5. Five 6” steel tie-down straps on the outlet pipes are damaged. A 12’ steel support member supporting one outlet pipe has collapsed near the outlet, and needs replacement. Recommend repair and replacement.

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Photo 1 – Damaged steel support straps for discharge pipe.

Photo 2 – Debris in intake channel.

Photo 3 – Replace pump bearings.

DRAINAGE PUMPING STATION: Grant

Observations, Conclusions and Recommendations

Electrical:

1. Rewind motors for Pumps 1, 2, 3, and 4.

2. All lighting and low voltage power and devices below the platform should be replaced and rewired due to having been submerged

3. Switchgear and MCC should be inspected due to partial submersion in floodwaters. Replace defective components.

Mechanical:

1. Replace pump bearings, Pumps 1, 2, 3, and 4.

Structural:

1. Floodwater reached 15" below the operating floor. The site was flooded over the exterior pumps.

2. Twenty feet of copper roof flashing on the west side of the building is missing.

3. Water washing over the levee generally scoured the site. General site fill and grading are needed to restore the grades. Approximately 200' of access road and a 150' X 30' parking area at the station washed away. Replacement is recommended.

4. 335' of 8 ft. high fence with wire topping, and gates were destroyed. Recommend replacement.

5. Scour under a 20' X 4' sidewalk at the entry-way caused considerable walkway differential settlement. Sidewalk replacement is recommended.

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Photo 1 – Replace pump motors 1, 2, 3, 4.

Photo 2 – Site erosion and required grading.