THE PROBLEMS

POOR EFFLUENT QUALITY

- BOD 5 – 87 MG/L
- TSS – 105 MG/L
- E.COLI - > 2420 MPN
- TOTAL P - 10 MG/L
- AMMONIA – 108 MG/L
- OIL AND GREASE – 8.6 MG/L
- ALUMINUM – 0.44 MG/L

SEVERE ODOR COMPLAINTS

PLANT IS LOCATED IN A RESIDENTIAL NEIGHBORHOOD – SEVERE ODORS RESULTING IN NUMEROUS COMPLAINTS TO LOCAL, REGIONAL AND STATE REGULATORS

ENFORCEMENT

FACILITY AND CITY FACING THIRD EPA ENFORCEMENT ACTION IN TEN YEARS

- $186,000 FINE
- AGGRESSIVE SCHEDULE FOR IMPROVEMENTS IN PLANT PERFORMANCE
THE CAUSES

• DEFERRED MAINTENANCE AND REPAIRS
• LACK OF ADHERENCE TO PROPER OPERATIONAL PROCEDURES
• EXCESSIVE SOLIDS INVENTORY
• INSUFFICIENT BLOWER CAPACITY
• POOR SAMPLING AND RECORD KEEPING PROCEDURES
SOUTH OXIDATION DITCH 4/28/2016
ANOTHER SHOT OF THE SOUTH OXIDATION DITCH ON 4/28/2016
CLARIFIER ON 4/28/16
EFFLUENT ON 4/28/2016
THE EFFECT
SPECIFIC PROBLEMS AND HOW THEY WERE RESOLVED

• INOPERATIVE MOTIVE PUMP, SOUTH TREATMENT TRAIN
  • REPLACED FAILED MOTOR STARTER CONTACTOR
SPECIFIC PROBLEMS AND HOW THEY WERE RESOLVED

• EXCESSIVE DRY SOLIDS AND WEEDS IN NORTH TREATMENT TRAIN AERATION BASIN.
  • RETAIN VACTOR CONTRACTOR TO ENTER BASIN AND REMOVE SOLIDS AND WEEDS
SPECIFIC PROBLEMS AND HOW THEY WERE RESOLVED

• CLOGS IN AIR AND LIQUID MIXING PIPING OF JET AERATION SYSTEM, NORTH BASIN
  • ENTER BASIN, REMOVE SOLIDS FROM LIQUID MIXING PIPING, DISASSEMBLE CLOGGED SECTIONS OF AIR PIPING, REMOVE SOLIDS
  • TEST AIR PIPING
  • TEST LIQUID PIPING
SPECIFIC PROBLEMS AND HOW THEY WERE RESOLVED

• AERATION BASIN DISSOLVED OXYGEN < 0.2 MG/L
  • INSTALL THIRD BLOWER THAT WAS ON-SITE SITTING NEW IN BOX
  • CHANGE PULLEY SIZE TO SPEED BLOWERS UP TO MAXIMUM DESIGN SPEED
SPECIFIC PROBLEMS AND HOW THEY WERE RESOLVED

• INOPERATIVE MOTIVE PUMP, NORTH TREATMENT TRAIN
  • PULL MOTIVE PUMP, MANUALLY FREE IMPELLER
  • TEST MOTIVE PUMP
MOTIVE PUMP
SPECIFIC PROBLEMS AND HOW THEY WERE RESOLVED

• TWO INOPERATIVE MIXERS IN ANOXIC SELECTOR BASINS
  • REPAIR ONE MOTOR STARTER COIL
  • REPLACE ONE MOTOR STARTER
SPECIFIC PROBLEMS AND HOW THEY WERE RESOLVED

• FAILED SELF CLEANING BAR SCREEN
  • REPLACE CONTROL FLOAT
  • REPLACE FAILED HAND/OFF/AUTO SELECTOR
NORTH TREATMENT TRAIN NOW OPERABLE

- Divert all influent flow to North Treatment Train
- Seed North Treatment Train with Fresh Waste Activated Sludge
- Immediate improvement in aeration basin dissolved oxygen levels
- Immediate improvement in sludge settling characteristics
- Immediate improvements in effluent quality
- Immediate drastic reduction in odors from the facility
ANOTHER PROBLEM AND HOW IT IS BEING RESOLVED

- POOR PHOSPHORUS REMOVAL – 10 MG/L EFFLUENT TOTAL P ON 4/28/2016
  - MODIFY ALUM FEED POINT TO NEAR SUCTION OF MOTIVE PUMP
  - 0.6 MG/L EFFLUENT TOTAL P ON 6/2/2016 WITHOUT TERTIARY FILTRATION
  - INCREASE ALUM FEED RATE
  - RETURN TERTIARY FILTERS TO OPERATION – MORE ON THAT ONE TO COME
OTHER WORK, DEFERRED AND OTHERWISE

• INSTALL THREE NEW ULTRASONIC FLOW METERS – SITTING NEW IN BOX AT FACILITY
• INSTALL SIX NEW ULTRAVIOLET LAMP RACKS – SITTING NEW IN BOX AT FACILITY
• INSTALL TEMPORARY WASTE ACTIVATED SLUDGE PUMPING SYSTEM
• START THE PROCESS OF REMOVING EXCESS SOLIDS INVENTORY – TRI LAKES BIOSOLIDS COALITION
• OVER 375,000 GALLONS OF SLUDGE REMOVED
• OVER 30 DRY TONS OF SOLIDS REMOVED
UV LAMP RACKS IN OPERATION
OLD OXIDATION DITCH FULL OF WASTE SOLIDS
WORKING TOWARDS A FULLY OPERABLE TREATMENT FACILITY

• TOTH AND ASSOCIATES IN CONCERT WITH ALGIER MARTIN AND ASSOCIATES PREPARE ENGINEERING EVALUATION OF THE FACILITY – FIELD WORK COMPLETED EARLY IN 2016

• PRIMARY FINDING – INSUFFICIENT AERATION CAPACITY – UNDERSIZED BLOWERS

• INVENTORY OTHER ISSUES AT THE FACILITY REQUIRING REPAIR OR REHABILITATION

• PREPARE COST ESTIMATES FOR THE EMERGENCY WORK NEEDED

• SEEK EMERGENCY FUNDING FROM TANEY COUNTY SEWER SALES TAX FUNDS

• APPROXIMATELY $140,000 IN EMERGENCY FUNDING APPROVED BY TANEY COUNTY COMMISSION AND TANEY COUNTY REGIONAL SEWER DISTRICT
THE EMERGENCY WORK

- REPAIR FAILED GORMAN RUPP SELF PRIMING INFLUENT PUMP
  - INSTALL NEW IMPELLER AND WET END, GORMAN RUPP SELF PRIMING PUMP
INFLUENT PUMP WET END REPLACEMENT
REPAIR RUSTED GRATES AND BROKEN VALVE OPERATOR EXTENSIONS ON FIVE VALVES IN RAS/WAS BASIN

- NEW STAINLESS STEEL BAR STOCK
- NEW HANDBHEW OPERATORS
- INSTALLATION IN CONFINED SPACE – PERFORMED BY SUBCONTRACTOR
- INSTALL NEW FIBERGLASS GRATING
NEW VALVE OPERATORS AND GRATE
THE EMERGENCY WORK - CONTINUED

• PURCHASE THREE NEW COMPOSITE SAMPLERS
  • UTILIZE INDEPENDENT THIRD PARTY LABORATORY FOR REPORTABLE MONITORING

• PURCHASE AND INSTALL THREE NEW BLOWER PACKAGES
  • REMOVE EXISTING 15 HP BLOWERS
  • INSTALL NEW 40 HP BLOWERS

• UPGRADE ELECTRICAL COMPONENTS FOR NEW HIGHER HP BLOWERS
  • NEW SWITCHGEAR – TIGHT FIT!
  • LARGER WIRE SIZE - OLD #8 TO NEW #6 – EXISTING CONDUIT ADEQUATELY Sized – WHEW!
REMOVING OLD BLOWERS
ELECTRICAL SWITCH GEAR
INSTALLING NEW BLOWERS
RETURNING SOUTH TREATMENT TRAIN TO OPERATING CONDITION

• The South Treatment Train exhibited significant problems with the aeration system. The decision was taken to fully drain the Treatment Train, enter the basin and perform essentially the same tasks that were undertaken to successfully return the North Treatment Train to operating condition.

• Step One, Drain Clarifier – accomplished by gravity and returning sludge to North Treatment Train

• Step Two, Drain Aeration Basin – plant piping only allows gravity flow to head of plant – not acceptable as this would cause major upset to North Treatment Train – excess solids that were inadequately treated

• The only available option is then to utilize the temporary sludge wasting pump to transfer mixed liquor to sludge holding basin(s)

• This was an extensive process – and took nearly 45 days to complete
RETURNING SOUTH TREATMENT TRAIN TO OPERATING CONDITION - CONTINUED

• STEP THREE IN THE PROCESS WAS TO ENTER BASIN AND REMOVE SOLIDS FROM LIQUID PIPING
• STEP FOUR IN THE PROCESS WAS TO REPAIR AND REHAB AIR PIPING.
• A FAILED BUTTERFLY AIR CONTROL VALVE WAS REMOVED AND REPLACED.
• AIR PIPING WAS TESTED
• LIQUID PIPING WAS TESTED
SOUTH TREATMENT TRAIN WORK
The South treatment train was placed on line on August 12, 2016, further improving facility performance and enhancing ability to deal with peak flows (surprise – there is an I&I issue here).
THE EMERGENCY WORK – LAST ITEM

• PREPARE TERTIARY FILTRATION SYSTEM FOR RETURN TO OPERABLE STATUS
  • CLEAN AND FLUSH BACKWASH WATER STORAGE – A LOT OF SOLIDS PRESENT THERE
  • REPAIR AND REHAB CONTROL SYSTEM TO INCLUDE FUNCTION TESTING ALL COMPONENTS
  • REPLACE CONTROL SYSTEM INTERFACE
  • PURCHASE AND INSTALL FILTER MEDIA – FILTERS DESIGNED FOR 30” MEDIA DEPTH – LESS THAN 6” MEDIA PRESENT AT THE TIME OES BECAME INVOLVED WITH THE FACILITY
  • 950 BAGS OF ANTHRACITE WEIGHING 50 POUNDS EACH WERE HAND PLACED ON SATURDAY, AUGUST 27
FINALLY, A FULLY OPERABLE FACILITY

• AS OF 4/28/2016 WE HAD:
  • A TREATMENT PLANT THAT HAD ONE OF TWO TREATMENT TRAINS ON LINE AND BARELY FUNCTIONING
  • TWO INOPERABLE MIXERS IN SELECTOR BASINS
  • INOPERABLE SELF CLEANING BAR SCREEN
  • INOPERABLE VALVES IN WAS/RAS BASIN
  • ONE INOPERABLE INFLUENT PUMP
  • INOPERABLE TERTIARY FILTRATION SYSTEM
FINALLY, A FULLY OPERABLE FACILITY, CONTINUED

- AS OF 4/28/2016 WE HAD:
  - NO FUNCTIONING COMPOSITE SAMPLERS
  - INSUFFICIENT AERATION CAPACITY
  - ONE OF TWO REQUIRED BANKS OF ULTRAVIOLET DISINFECTION LAMPS
  - UNINSTALLED FLOW MEASUREMENT EQUIPMENT
  - EVERY BASIN IN THE FACILITY 100% FILLED WITH WASTE ACTIVATED SLUDGE
  - EVERY SPACE IN EVERY BUILDING NEEDED CLEANING
As of August 28, 2016, the facility was fully functioning with all components and processes available and on line. And neat clean buildings and grounds.

An accomplishment we are all proud to have played a part in bringing to pass.
EFFLUENT ON 4/28/2016
"THERE WAS A LOT OF MURK AND ALGAE GROWING IN THE WATER," SAID RESIDENT DANIEL HUGH. "I WAS LOOKING AT IT WHEN I FIRST MOVED HERE BEFORE WHEN I FIRST MOVED HERE, AND YOU COULD NOT SEE BUT MAYBE TWO FEET OUT."

YOU NOW CAN SEE AND SMELL THE DIFFERENCE.

"I JUST SAW ONE OF THE GUYS THAT WORKED THERE AND I TOLD HIM THEY WERE DOING A GREAT JOB AND I AM REALLY IMPRESSED BY IT." HE ADDED, "THE FISH ARE AROUND MORE. IT IS CLEARER. IT IS GETTING BETTER AND BETTER BY THE DAYS," SAID DANIEL HUGH, ROCKAWAY BEACH RESIDENT.
EFFLUENT QUALITY

4/28/2016
- BOD: 87 MG/L
- TSS: 105 MG/L
- E. COLI: >2420 MPN/100 ML
- AMMONIA: 108 MG/L
- TOTAL P: 10 MG/L
- O&G: 8.6 MG/L
- ALUMINUM: 0.44 MG/L

AVERAGE SINCE 6/1/2016
- BOD: 7.1 MG/L
- TSS: 3.3 MG/L
- E. COLI: <10 MPN/100 ML
- AMMONIA: 1.6 MG/L
- TOTAL P: 1.8 MG/L
- O&G: <5.1 MG/L
- ALUMINUM: 0.10 MG/L
ACKNOWLEDGEMENTS

• CITY COUNCIL OF THE CITY OF ROCKAWAY BEACH MISSOURI, CITY STAFF AND CITIZENS
• TANEY COUNTY COMMISSION AND ENVIRONMENTAL DEPARTMENT
• TANEY COUNTY REGIONAL SEWER DISTRICT BOARD OF DIRECTORS AND STAFF
• THE CITIZENS AND TAXPAYERS OF TANEY COUNTY MISSOURI
• TRI LAKES BIOSOLIDS COALITION
• TOTH AND ASSOCIATES
• ALGIER MARTIN AND ASSOCIATES
• THE BOARD OF DIRECTORS, MANAGEMENT AND STAFF OF OZARKS ENVIRONMENTAL SERVICES