United States Environmental Protection Agency

Region 6 Compliance Assurance and Enforcement Division

INSPECTION REPORT

Inspection Date(s):	07/24/2018		
Media:	Water		
Regulatory Program(s)	CWA – NPDES		
Company Name:	**City of Socorro**		
Facility Name:	**Socorro Wastewater Treatment Facility**		
Facility Physical Location:	301 Main Street		
(city, state, zip code)	Socorro, NM 87801		
Mailing address:	P.O. Drawer K		
(city, state, zip code)	Socorro, NM 87801		
County/Parish:	Socorro County		
Facility Contact:	Jordan Lloyd Martinez	Water/Wastewater Department Supervisor	
	lmartinez@socorronm.gov		
FRS Number:	110000734590		
Identification/Permit Number:	NM0028835		
Media Number:			
NAICS:	221320		
SIC:	4952		

Personnel participating in inspection:			
Amy Andrews, P.E.	USEPA/6EN-WMH	Environmental Engineer	214-907-0638
Jordan Lloyd Martinez	City of Socorro	Utility Director	575-838-1606
Cody Polston	City of Socorro	Wastewater Treatment Plant Chief Operator	575-838-1606
Joe Melendrez	City of Socorro	Water/Wastewater Superintendent	575-838-1606
Pauline Taylor	City of Socorro	Contract Superintendent	575-838-1606
Jenelle Partridge	City of Socorro	Administrative Assistant	575-838-1606

EPA Lead Inspector Signature/Date	AMY ANDREWS Digitally signed by AMY ANDREWS DN: c=US, o=U.S. Government, ou=USEPA, ou=Staff, cn=AMY ANDREWS, dnQualifier=0000131170 Date: 2018.08.17 11:39:40 -06'00'	
	Amy Andrews	Date
Supervisor Signature/Date	CAROL PETERS-WAGNON Digitally signed by CAROL PETERS-WAGNON DN: c=US, o=U.S. Government, ou=USEPA, ou=Staff, cn=CAROL PETERS-WAGNON, dnQualifier=0000009981 Date: 2018.08.17 13:44:27 -05'00'	
	Carol Peters	Date

Section I – INTRODUCTION

PURPOSE OF THE INSPECTION

Environmental Protection Agency (EPA) Region 6 inspector, Amy Andrews, arrived at the City of Socorro Wastewater Treatment Plant at approximately 10:00 am on July 24, 2018 for an unannounced Compliance Evaluation Inspection (CEI). I met with Jordan Lloyd Martinez, Utility Director, Cody Polston, Wastewater Treatment Plant Chief Operator, Joe Melendrez, Water/Wastewater Department Superintendent, and Jenelle Partridge, Administrative Assistant, for the Opening Conference. I presented my credentials to Mr. Martinez and explained that this was an EPA inspection to determine compliance with the facility's National Pollutant Discharge Elimination System (NPDES) permit and the Clean Water Act (CWA). The inspection was conducted under the authority of the NPDES permit program, in accordance with the Federal CWA.

This report is based on information supplied by representatives of the City of Socorro (the permittee), observations made by the EPA inspector, and records and reports maintained by the permittee and/or the EPA.

FACILITY DESCRIPTION

The City of Socorro WWTP is located on Main Street in Socorro, Socorro County, New Mexico. The facility is a Sequencing Batch Reactor (SBR) with an intermittent cycle extended aeration system (ICEAS) and aerobic sludge digestion classified as a major municipal discharger, permitted for 1.3 million gallons per day (MGD) of discharge, with an average actual flow of around 0.7 MGD. Discharge is into receiving waters named Luis Lopez Drain, thence to Socorro Riverside Drain, thence to the Rio Grande River.

Wastewater from the 23 lift stations in the City of Socorro is conveyed to a manhole on Main Street near the treatment facility and flows by gravity to the entrance works of the plant. The entrance works consist of a 5,000 gallon, below-grade septage receiving tank, where the influent wastewater from the last manhole was previously mixed with septage received by the facility (currently received septage goes directly to the digester); mechanical bar screen with bypass channel equipped with a manual bar screen. A lift station with three 20 horsepower submersible pumps then pumps the wastewater past a grit removal unit that has been out of service for a number of years to a splitter box which sends the wastewater to the three ICEAS SBR basins. In the ICEAS process, the wastewater flows continuously into a pre-react zone in the SBR which is separated from the main react zone by a non-hydrostatic baffle wall. The pre-react zone acts as a biological selector to minimize filamentous growth. Wastewater then flows through openings at the bottom of the baffle wall and into the main react zone where treatment occurs by aeration and mixing. At the end of the aeration stage, aeration and mixing are stopped to allow solids separation, at which time the sludge settles to the bottom of the basin, leaving a layer of clear water at the top of the basin. At the end of the settling stage, the clear water is removed from each basin by an automated, time controlled decant mechanism and sludge is wasted using submersible pumps. Chlorine gas is injected into the effluent for disinfection, and then it travels through two baffled

chlorine contact chambers that operate in parallel before being dechlorinated using sulfur dioxide. The effluent then flows through a flow meter before it is discharged over the cascade aeration unit, through an underground pipe, and out of Outfall 001 into the Luis Lopez Drain. The waste biosolids generated at the facility is first sent to a gravity thickener unit. The thickened sludge is then transported to two aerobic digesters that are operated in series. The supernatant from the thickener and the aerobic digesters are sent back to the plant headworks. The digested sludge is sent to the belt filter press to be dewatered. The final dried biosolids are disposed of at the City of Socorro Landfill.

Section II - OBSERVATIONS

During the opening meeting, I was informed that the Socorro WWTP is due for a major overhaul and they are currently working out the financial details. Prior to the upcoming overhaul, the facility has been actively replacing smaller components, including sludge pumps, chemical induction pumps for chlorine and sulfur dioxide, as well as electrical panels for these pumps. The City of Socorro has been connecting properties near the river over the shallow water table onto the WWTP, but the facility still accepts around 4000 gallons of septage each month. The WWTP has switched from putting the septage into the headworks to putting the septage directly into the digester. The City of Socorro does not have much problem with inflow/infiltration during rain storms except that after especially large rainstorms some of the citizens will pop open the manholes to drain flooding from the streets or their own property. The WWTP alarm system is audio/visual and if the alarm goes off at night, plant personnel get a call from the Socorro police. Standby phone doesn't get called unless there is a power failure.

After the opening meeting, we began the inspection with a tour of the laboratory. Samples run by the facility include pH, biochemical oxygen demand (BOD), total suspended solids (TSS), E. coli bacteria, and total residual chlorine. Total and dissolved aluminum is sent to Hall Environmental Laboratory in Albuquerque, NM, and whole effluent toxicity testing is done by Bio Aquatics Laboratory in Carrollton, TX. The laboratory appeared clean and well-maintained. All laboratory procedures were well documented in Standard Operating Procedure (SOP) notebooks with pictures (see Photo 1 of the Photo Log in Appendix 1), and most laboratory data is recorded directly into Excel bench sheets to prevent transcription errors.

After the tour of the laboratory was completed, a tour of the WWTP was done. No evidence of operational issues was observed, however due to the ICEAS process, the facility was not actively discharging at the time of the tour, so the clarity of the effluent was not observed. One of the two chlorine contact chambers was in the process of being cleaned for algae, and the other chlorine contact chamber had a visible short circuit at a break in the wall of the contact chamber (see Photo 2 of the Photo Log in Appendix 1). The exterior wall of the SBR basin has a visible deflection, as seen from the walkway around the perimeter of the basin (see Photo 3 of the Photo Log in Appendix 1), as well as significant diagonal cracking that can be seen from the ground looking up at the north wall of the SBR basin (see Photo 4 of the Photo Log in Appendix 1). The SBR basin has not yet been reported to leak any liquid.

A records review, including checking of Excel formulas was completed after leaving the facility. Monthly flow records are missing the reading from the morning of the first day of the following month, thereby missing the flow rate from the last day of the month. Several small typographic errors were noted in the Excel bench sheets, but no errors were found in other mathematical formulas.

Section III – AREAS OF CONCERN

Requirement 1

NPDES Permit NM0028835, Part III: Standard Conditions B.2. Duty to Mitigate: *The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.*

Concern 1

The perimeter wall of the SBR basin is showing stress cracking in the concrete as well as significant deflection of the wall (see Photos 3, 4 and 5 of the Photo Log in Appendix 1). An engineering assessment of the wall has been done by a contracted engineering firm, and monitoring of the cracks via strain gauges is ongoing (see Photo 6 of the Photo Log in Appendix 1). The assessment states that reinforcement of the wall is currently not required, however catastrophic failure is possible. Recommendations from the engineering firm indicate that the cracking in the wall should be repaired with epoxy injection and the wall should be monitored monthly for further movement and increased cracking. Should additional movement or cracking of the wall be observed, the basin should be emptied immediately and the wall shored before the basin is refilled.

The Socorro WWTP is located immediately adjacent to a residential area within the city limits of Socorro, and catastrophic failure of the SBR basin would threaten both human health and the environment of the area. Facility personnel stated that they are in the process of attempting to obtain funding for a total overhaul of the facility, but that the funding is not yet available.

Requirement 2

NPDES Permit NM0028835, Part III: B.3.a. Proper Operation and Maintenance: *The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by permittee as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants and will achieve compliance with the conditions of this permit.*

Concern 2

There is a crack in one of the walls of the chlorine contact chamber (see Photo 2 of the Photo Log in Appendix 1) which is causing a short circuit in the chlorine contact chamber and potentially shortening the total duration of chlorination. It is possible that this short circuit was caused by the same structural failure that is causing the cracking and deflection in the SBR basin, as the eastern wall of the chlorine contact chamber is in line with the eastern wall of the SBR basin.

Requirement 3

NPDES Permit NM0028835, Part III: B.3.b. Proper Operation and Maintenance: *The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and testing functions required to insure compliance with the conditions of this permit.*

Concern 3

The facility is in need of two additional qualified operators.

Requirement 4

NPDES Permit NM0028835, Part III: C.5. b. *The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to insure accuracy of measurements and shall maintain appropriate records of such activities.*

Concern 4

pH buffer solutions had a hand-written date on them, however it wasn't clear if this date was the received-on date, the opened-on date, or the expiration date (see Photo 7 of the Photo Log in Appendix 1). Additionally, pH buffer solutions had been transferred from the original bottles (with the hand-written date) into smaller bottles for ease of use. The smaller bottles did not have specific identifying marks on them, including opened-on and expiration dates. It was therefore not possible to confirm proper calibration of the pH instrument.

Section IV – FOLLOW UP

Follow-up correspondence emails received from the facility after the close of the inspection were received on 7/25-27/2018, 8/2/2018, and 8/13/2018 regarding information about equipment upgrades and the engineering assessment of the SBR wall cracking and deflection.

Section V – LIST OF APPENDICES

Appendix 1 – Photo Log: 7 photos taken 7/24/2018

Appendix 2 – Engineering Report: Socorro WWTP; SBR Basin Perimeter Walls, Feb 2, 2018
(report appendices not included – available upon request)

Appendix 1
Photograph Log

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 1

Location: City of Socorro Wastewater Treatment Plant		
City: Socorro	County/Parish: Socorro	State: New Mexico

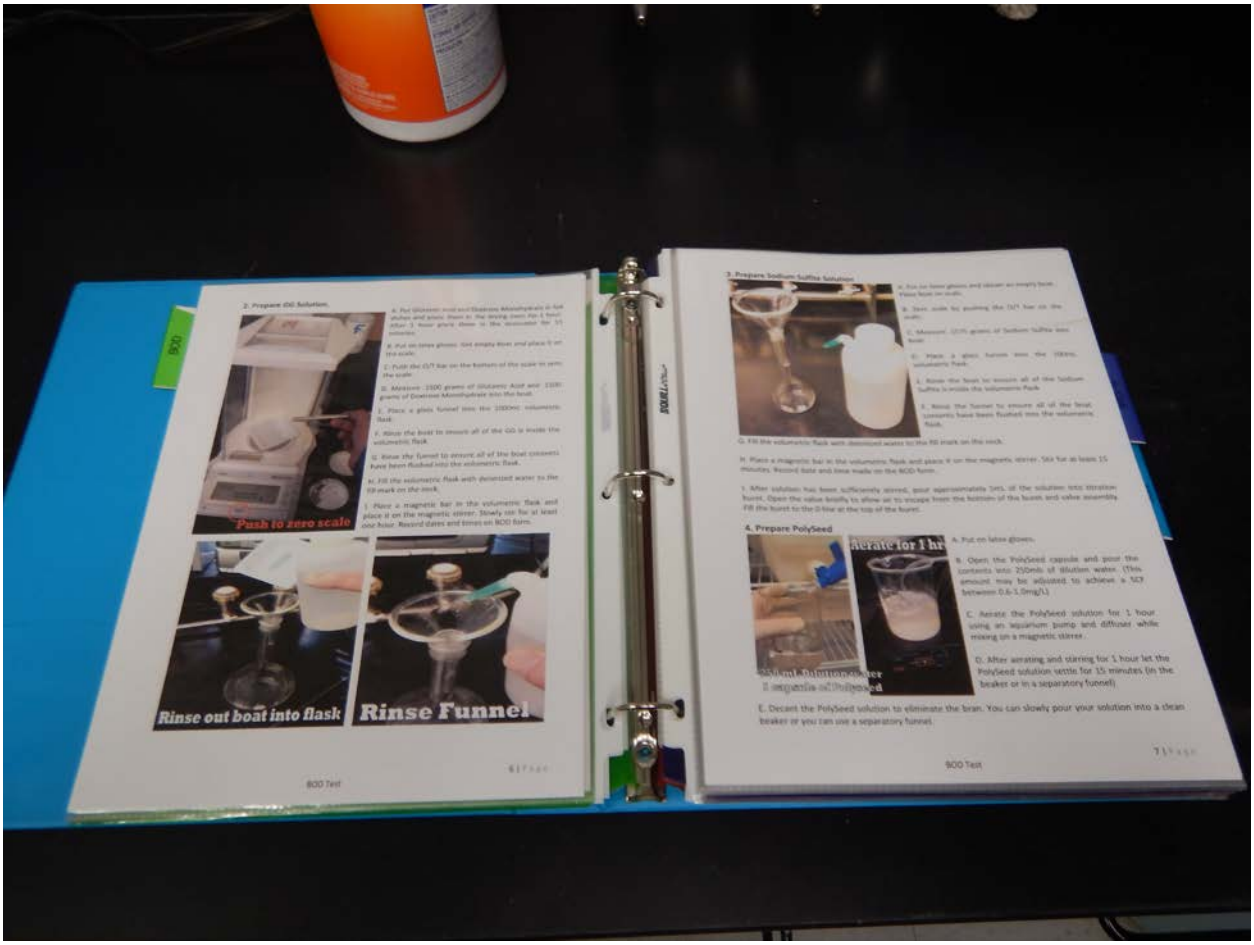

Photo File Name: DSCN0412.JPG
Date of Photo: 7/24/2017
Time of Photo: 10:48 AM
Photographer: Amy Andrews
Description: Well documented Standard Operating Procedure (SOP) notebook with pictures for Laboratory Procedures

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 2

Location: City of Socorro Wastewater Treatment Plant		
City: Socorro	County/Parish: Socorro	State: New Mexico

Photo File Name: DSCN0421.JPG
Date of Photo: 7/24/2017
Time of Photo: 11:24 AM
Photographer: Amy Andrews
Description: Short circuit in chlorine contact chamber (circled)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 3

Location: City of Socorro Wastewater Treatment Plant		
City: Socorro	County/Parish: Socorro	State: New Mexico

Photo File Name: DSCN0423.JPG
Date of Photo: 7/24/2017
Time of Photo: 11:28 AM
Photographer: Amy Andrews
Description: Visible deflection of the north wall of the SBR basin, as seen from the walkway around the perimeter of the basin (straight line added for reference).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 4

Location: City of Socorro Wastewater Treatment Plant		
City: Socorro	County/Parish: Socorro	State: New Mexico

Photo File Name: DSCN0427.JPG
Date of Photo: 7/24/2017
Time of Photo: 11:30 AM
Photographer: Amy Andrews
Description: Significant diagonal cracking that can be seen from the ground looking up at the north wall of the SBR basin.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 5

Location: City of Socorro Wastewater Treatment Plant		
City: Socorro	County/Parish: Socorro	State: New Mexico

Photo File Name: DSCN0425.JPG
Date of Photo: 7/24/2017
Time of Photo: 11:29 AM
Photographer: Amy Andrews
Description: Cracking at the exterior corner of the SBR basin as seen from the walkway around the top of the basin.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 6

Location: City of Socorro Wastewater Treatment Plant		
City: Socorro	County/Parish: Socorro	State: New Mexico

Photo File Name: DSCN0428.JPG
Date of Photo: 7/24/2017
Time of Photo: 11:31 AM
Photographer: Amy Andrews
Description: Strain gauge used to monitor changes in cracking.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 7

Location: City of Socorro Wastewater Treatment Plant		
City: Socorro	County/Parish: Socorro	State: New Mexico

Photo File Name: DSCN0414.JPG
Date of Photo: 7/24/2017
Time of Photo: 10:52 AM
Photographer: Amy Andrews
Description: Larger pH buffer bottles have a single hand-written date with no specific identification as to whether that date is the received-on, opened-on, or expiration date. Smaller pH buffer bottles on the right have no identifying labels or dates.

Appendix 2
Engineering Report: Socorro WWTP;
SBR Basin Perimeter Walls, Feb 2, 2018

(report appendices not included – available upon request)

LANDON ENGINEERING LLC

58 Vista Drive

Edgewood, New Mexico 87015

505-331-6133

Tappan J. Mahoney. P.E.

President/Chief Engineer

Dennis ENGINEERING Company

21 Main St, Edgewood, NM 87015

Re: Socorro WWTP

SBR Basins Perimeter Walls

Monitoring Summary March 28, 2017 Thru January 2, 2018

Dear Mr. Mahoney:

As authorized by the City of Socorro, Dennis Engineering Company (DEC) and Landon Engineering LLC (LE) provided services to monitor cracks and deflections of the SBR basin perimeter walls. This letter is a summary of the observation made, and data recorded from March 28, 2017 to January 2, 2018.

BACKGROUND:

The monitoring of the walls was recommended by LE after comparing photos of the north wall which were taken in 2011 to cracking which was observed on a site visit on February 22, 2017. The wall cracking appeared to have progressed over this period of time and the progression was more than what would be expected for normal behavior of a wall system of the type.

As reported by LE in a letter dated March 29, 2018 to DEC, a preliminary analysis performed by LE indicated the wall is experiencing out-of-plane bending with sufficient stresses to crack the concrete and potentially fail the wall reinforcing. The preliminary analysis indicated the wall should experience a deflection of about 1.5 inches at the top near the middle between adjacent perpendicular walls with the basins full. This would be a deflection expected if the wall was not overstressed and behaving normally.

The purpose of the monitoring program was to record any movement that may warrant consideration of removal from service the existing SBR basin and implement repair recommendations.

The monitoring program was for the period from March 28, 2017 to January 2, 2018 and consisted of:

1. Measuring the north wall deflections at the top of the wall near the midpoint between the perpendicular walls at each end. The wall deflection (or bow) at the top was measured with a tape between a string line stretched from each outside corner of the wall and the outside face of wall. The bow at the bottom of the wall was measured in a similar manner. The net bow of the wall was determined from the difference of the top and bottom measurement.

2. Eleven Avongard concrete crack monitor gauges were installed on the exterior face of the walls. Two gauges were installed on each of the east, south, and west walls of the SBR. Five gauges were installed on the north wall. The location of the crack gauges installed are shown in Attachment A.

The initial north wall deflection measurements were taken on March 28, 2017. The crack gauges were installed on May 4, 2017. The monitoring frequency was approximately:

1. Weekly during the first month.

2. Monthly following the first month.

Additional measurements were taken as the basin was drained at the end of August 2017 and as the basin was refilled around the end of October 2017. A site visit was conducted on September 14, 2017 to observe the visual condition of the interior of the north wall.

OBSERVATIONS:

On March 28, 2017, Steve Williams of DEC and Gary Landon of LE visited the site to measure the approximate wall deflections or bowing of the north wall. The wall was measured to have a net bow at the top middle of approximately 2 ½". The measured bow was more than the expected 1.5-inch deflection calculated from the preliminary analysis. During the monitoring period, the wall deflection remained relatively constant (between 2 and 2 ½") with the basin full, decreased to about 1 ¾" with the basin empty and increased to about 2 ½" when the basin was filled again. The wall deflection data and trends are included in Attachment B. The approximate wall deflection rebound when the basin was empty was measured to be approximately ½" less

than the wall deflection when the basin was filled again. The north wall deflection measurement records and deflection trends are included with Attachment B.

On September 14, 2017, Gary Landon of LE visited the site to observe the interior condition of the north basin wall. Horizontal cracks were observed near the bottom of the wall midway between the adjacent perpendicular walls. Patching of previous horizontal cracks in generally the same location was also observed. Vertical cracking at the corner intersection of the north wall and wall adjacent to the north wall was present. The cracking observed was consistent with cracking that is present on the exterior face of the north wall. The cracks are located in high tensile regions of the wall with the basins full.

With the exception of gauge #7, changes in the crack widths were not observed. Gauge #7 indicated a small increase in crack width with some rotation around May 16, 2017. However, the gauge reading remained constant during the remainder of the monitoring period. The crack gauge reading records and a photo of gauge #7 is included in Attachment C.

CONCLUSIONS:

From the observations made and data collected during the monitoring period, the exterior walls of the SBR basins did not show signs of additional or continuing distress. However, from the north wall deflection measurements taken and the extent of cracking observed, the wall may have experienced some yielding at some time in the past. Evidence of yielding includes:

1. The cracking pattern and locations observed are in areas of high tensile forces. The cracks are consistent with out-of-plane bending creating tensile stress which have exceeded the capacity of the concrete to resist these stresses.

2. The wall deflection at the top was measured to be 2 ½" which is greater than the expected deflection from a preliminary structural analysis. Some of this is may be due to the wall being built out-of-plumb.

3. After the north basin was emptied and then filled again, the measurements taken indicate the wall may have deflected more than it had recovered. This is typical behavior of a structural element that has yielded.

The deflection of the wall after the basin was emptied and then refilled was measured to be approximately 0.7 inches. This is less than the 1.5 inches calculated from the preliminary analysis. It is stipulated that after rotating and yielding (based on cracking observed), distribution of stresses in the wall occurred and vertical and horizontal reinforcing engaged to resist the redistributed forces. This is likely not how the wall was originally designed to behave.

Based on data collected during the monitoring period, the north wall of the SBR appears to have stabilized and reinforcement of the wall is currently not required. However, the extent of the wall cracking is concerning and if it continues to worsen DEC should be contacted immediately for recommended actions. Based on past experience with walls having similar cracking patterns, catastrophic failure is possible.

RECOMMENDATIONS:

1. Repair the wall cracking with epoxy injection as recommended in the PER.
2. Monitor the wall for further movement. This should be done monthly and increased cracking and movement shall be reported to DEC immediately.
3. Should additional movement or cracking of the wall be observed, the basin should be emptied immediately, and the wall shored before the basin is filled.
4. For safety concerns, plan and budget to design and construct a system to reinforce the wall.

If you should have any questions, please contact Gary Landon at 505-331-1600 or Jeremy Nowell at 505-980-2291

Sincerely,

Gary E Landon

Gary Landon, P.E.

Landon Engineering LLC