Petitioner's Exhibit No. 3

INDIANA-AMERICAN WATER COMPANY, INC.

CAUSE NO. 45609

DIRECT TESTIMONY

OF

EZAT NAYERI

ON

PROPOSED SERVICE ENHANCEMENT IMPROVEMENTS

SPONSORING ATTACHMENTS EON-1 AND EON-2

INDIANA-AMERICAN WATER COMPANY, INC.

Direct Testimony of Ezat Nayeri

BACKGROUND

1 2	Q.	Please state your name and business address.				
3	A.	My name is Ezat Nayeri. My business address is 153 N. Emerson Ave.,				
4		Greenwood, Indiana 46143.				
5	Q.	By whom are you employed?				
6	A.	I am employed by Indiana-American Water Company, Inc. ("Indiana American",				
7		or "Company").				
8	Q.	What is your position with Indiana-American?				
9	А.	I am an Engineering Manager with the Company.				
10	Q.	How long have you held that position?				
11	A.	I have held that position since July 2017.				
12	Q.	What do your job responsibilities include?				
13	A.	My job responsibilities are to lead the asset planning, new business development,				
14		and Geographic Information System (GIS) personnel at Indiana American to				
15		provide facility assessments and capital improvement recommendations, review				
16		developer's new business development plans, and manage the GIS system for				
10		developer's new business development plans, and manage the O15 system for				

1	Q.	What is your educational background?
2	А.	I received a Bachelor of Science Degree in Civil Engineering from Purdue
3		University in 2008.
4	Q.	Are you a Registered Professional Engineer?
5	A.	Yes, and I currently maintain an active Registered Professional Engineer status in
6		Indiana.
7	Q.	Please describe your business experience prior to joining Indiana American.
8	А.	From January 2009 to June 2010, I was employed by Chicago Bridge & Iron
9		(CB&I) as an Engineer in their Engineer Training Program. Through the Engineer
10		Training Program I gained experience in construction management, steel
11		fabrication, and steel design. From June 2010 to August 2013, I was employed by
12		Encore Construction Company as an Estimator. My job responsibilities as
13		Estimator included preparing quantity and cost estimates of mechanical piping and
14		structural concrete on water and wastewater treatment projects, and providing
15		support with the bidding process.
16	Q.	Please describe your business experience with Indiana American.

A. From August 2013 to April 2015, I was employed by Indiana American as Staff
 Engineer. From April 2015 to July 2017, I was employed by Indiana American as
 Engineering Project Manager. My job responsibilities as Staff Engineer and
 Engineering Project Manager included designing and managing water main

1		replacement and relocation projects. From July 2017 to present, I have been
2		employed by Indiana American as Engineering Manager as described earlier in this
3		testimony.
4	Q.	What is the purpose of your direct testimony?
5	A.	The purpose of my direct testimony is to describe the Mecca east pressure zone
6		replacements.
7		SERVICE ENHANCEMENT IMPROVEMENTS
8		MECCA EAST PRESSURE ZONE REPLACEMENTS
9	Q.	Please describe the Mecca east pressure zone replacements.
10	A.	The replacements include construction of a replacement booster station and
11		approximately 8,450 feet of water main replacement to improve pressure to
12		Mecca's east pressure zone. The existing booster station is situated at an elevation
13		where the suction side static pressure is less than 20 psi, and the existing water
14		mains are small in diameter leading to system pressures below 35 psi. The new
15		booster station will be situated at a lower elevation where it will be able to provide
16		more flow to the east pressure zone while maintaining a suction side static pressure
17		of about 51 psi. Approximately 3,150 feet of 3-inch water main and 5,300 feet of
18		2-inch water main will be replaced with 8-inch water main. The larger diameter
19		water main reduces the head loss by at least 30 psi during peak hours, enabling the
20		water system to maintain pressures greater than 35 psi during peak hours. The

existing booster station will be retired. A hydraulic model evaluation of the low
 pressure concern and proposed replacements is described in Attachment EON-1

Q. Will the Mecca East Pressure Zone Replacements increase revenues by connecting the system to new customers?

5 A. No, this is not a main extension to reach and to connect new customers. Rather 6 than an improvement "to connect new customers," this is a replacement of existing 7 plant with plant of greater capacity that will allow connection of new customers. By addressing the low pressure concern, the system's capacity will increase, which 8 9 will allow for the connections of new customers. The Company has received 10 complaints from residents who have requested service and were not permitted to 11 connect to Mecca's east pressure zone due to its lack of capacity. The replacements, 12 as described in Attachment EON-1, will allow for new connections along the 13 replaced water main and a limited number of new connections along some of the 14 small diameter water main which will not be replaced at this time in the East 15 Pressure Zone.

Q. Do you consider the Mecca East Pressure Zone Replacements to be replacement infrastructure or to be new infrastructure that is not replacement infrastructure?

1	A.	The Mecca east pressure zone replacements are replacement plant and equipment
2		that maintains health and safety of the Company's customers. These replacements
3		will replace an existing booster station and water main.
4	Q.	Why are you replacing the existing booster station?
5	A.	Indiana American acquired the Mecca system as a result of the Commission's 2012
6		Order in Cause No. 44222. Much of the design of the existing system predates the
7		Company's ownership of the system. As described in Attachment EON-1 the
8		current booster station was constructed in 1982 and sits at an elevation where its
9		suction side pressure is below 20 psi. In addition, customers in the southern portion
10		of the east pressure zone experience pressure below 35 psi during peak demand
11		periods. 327 Ind. Admin. Code 8-3.2-11(b) states:
12		"[T]he normal operating pressure in the water main shall not be less than twenty
13		(20) pounds per square inch (psi) under all conditions of flow at the ground level
14		at all points in the water main"
15		Furthermore, section 8.2.1 of the "Recommended Standards for Water Works" as
16		established by the Great Lakes - Upper Mississippi River Board of State and
17		Provincial Public Health and Environmental Managers, which is also known as
18		the "Ten State Standards," states:

1	"The system shall be designed to maintain a minimum pressure of 20 psi (140 kPa)
2	at ground level at all points in the distribution system under all conditions of flow.
3	The normal working pressure in the distribution system should be approximately
4	60 to 80 psi (410 – 550 kPa) and shall not be less than 35 psi (240 kPa) unless
5	otherwise approved by the reviewing authority." (emphasis added)
6	Additionally, 327 Ind. Admin. Code 8-3-4(2) states:
7	"Sec. 4. The commissioner may deny the application for any permit required by
8	this rule unless the applicant submits evidence that the following issuance
9	requirements are met:
10	
11	(2) The facility conforms to the design criteria in the "Recommended Standards
12	for Water Works" established by the Great Lakes—Upper Mississippi River Board
13	of State Public Health and Environmental Managers, the American Water Works
14	Association (AWWA) standards, or is based on such criteria acceptable to the
15	commissioner which the applicant shows will produce drinking water of
16	satisfactory quality and normal operating pressure at the peak operating flowrate
17	in accordance with this article."

Indiana American's standard practice is to maintain a normal working minimum
pressure of 35 psi and a minimum of 20 psi during a fire flow event in compliance

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1 with Indiana Administrative Code and Ten States Standards. Maintaining a 2 minimum pressure of 20 psi is important in protecting the health and safety of 3 customers as this mitigates against infiltration of groundwater or backsiphonage 4 of non-potable water from customer connections. During normal operations, it is 5 important to maintain a minimum of 35 psi at the water main so that there is 6 adequate water pressure available at the customer's location, considering pressure 7 losses through the meter and the Company and customer services lines, and 8 considering potential elevation differences between the main and the customer's 9 facilities.

Q. Given that this is replacement infrastructure, why has the Company included the plan for expenditures to replace this booster station with the Mecca East Pressure Zone Replacements in this case?

13 As I understand it, Ind. Code §8-1-31.7-12 provides the Commission one hundred A. 14 twenty (120) days to review the recovery of service enhancement improvement 15 costs associated with eligible additions that are replacement infrastructure, whereas 16 the Commission is provided two hundred ten (210) days to review Petitioner's plan 17 for service enhancement improvements per Ind. Code §8-1-31.7-9. Given the 18 magnitude of the Mecca East Pressure Zone Replacements in relationship to the size of the Mecca System and given that we already have the plan for the Mecca 19 20 service enhancement replacements ready, we determined that it would be 21 appropriate to provide the longer time period for review.

1Q.Is the technical standard you referenced earlier (327 IAC 8-3.2-11) applicable2to existing low pressure concern in Mecca's east pressure zone since it isn't3related to the design and construction of new or modified water main4extensions as described in 327 IAC 8-3.2-3?

5 A. Yes, though the referenced technical standard is intended for new or modified water 6 main extensions, the principle of the minimum pressure requirement is to minimize 7 the risk to the health and safety of the customers. This principle applies to all parts 8 of a water system, whether they are new mains or existing mains. The Indiana 9 Administrative Code at 327 IAC 8-3-4(2) also references the Ten States Standards 10 with respect to permit application requirements. The applicability of the pressure 11 requirement to existing systems is also exemplified by Indiana Department of 12 Environmental Management's (IDEM) Boil Water Procedure which references 327 13 IAC 8-3.2-11 and 20 psi minimum pressure.

14 Q. Please describe how the installation of a new booster station at a lower 15 elevation improves the pressure.

A. The existing east booster station is situated at an elevation of approximately 592 feet. The water storage tank in the main pressure zone has an overflow elevation of 634 feet. The static pressure within the main pressure zone is dictated by the overflow elevation of the water storage tank. The difference in elevation between the existing booster station and overflow of the storage tank is 42 feet, which equates to a maximum static pressure of 18 psi at the existing booster station, not

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1		accounting for pressure losses in the distribution pipe. Accounting for lower tank
2		operating levels and pressure losses in the distribution piping results in even lower
3		pressures at the existing booster station. The new booster station is proposed to be
4		installed at an elevation that is approximately 75 feet lower than the existing
5		booster station. The static pressure on the suction side of the new booster station
6		will be about 51 psi.
7	Q.	Please describe how the replacement of water main improves pressure.
8	A.	The installation of a new booster station at a lower elevation addresses the low
9		pressure concern at the suction side of the booster station; however, small diameter
10		water mains create high head loss leading to low pressures in the east pressure
11		zone. Replacement of the small diameter water mains identified in Attachment
12		EON-1 with an 8-inch water main reduces the head loss and allows the distribution
13		system to be maintained at a normal operating pressure of above 35 psi.
14	Q.	Please describe the projected Mecca east pressure zone replacements capital
15		cost.
16	А.	The projected total replacements are estimated to be \$3,834,986. Total projected
17		cost of removal and retirements are estimated to be \$65,000 and \$17,021,
18		respectively. A planning level cost estimate is provided in Attachment EON-2.
19	Q.	What is the estimated in-service date for the Mecca east pressure zone
20		replacements?

A. The Mecca east pressure zone replacements are estimated to be placed in service
 by June 30, 2023.

Q. Please describe any alternative plans for compliance with requirements as
defined in Ind. Code § 8-1-31.7-6, or alternative plans for furthering or
maintaining the health, safety, or environmental protection for the Company's
customers, employees, or the public as described in Ind. Code § 8-1-31.7-7, and
why the Company considered the Company's described replacement
infrastructure to be the preferred plan.

9 A. An alternative to the Mecca east pressure zone replacement is to not implement it. 10 This will result in continued low pressures in the east pressure zone and the water 11 system will continue to be at risk of contamination from groundwater infiltration or 12 backsiphonage of non-potable water. Given that the system drops below 20 psi only near the suction side of the existing booster station, the risk remains low, though 13 14 still present. Additionally, normal operating pressures would also remain below 35 15 psi in portions of the east pressure zone during high customer demands. Low 16 pressures would also result in customer complaints and would limit the Company's 17 ability to serve new customers.

- 18 Q. Does this conclude your prepared direct testimony?
- 19 A. Yes.

VERIFICATION

I, Ezat Nayeri, Engineering Manager for Indiana-American Water Co., Inc., affirm under penalties of perjury that the foregoing representations are true and correct to the best of my knowledge, information and belief,

 $\frac{2}{2021}$ Ezat Nayeri Date: $\frac{9}{2}$



MEMORANDUM

Subject: Background of Mecca East Pressure Zone and Summary of Analysis By: Ezat Nayeri, Engineering Manager; Kim Stefanich, Planning Engineer Date: 9/1/2021

Background

Indiana American Water's Mecca Distribution system consists of four pressure zones. Two groundwater wells pump into the Main Zone and three booster stations pump from the Main Zone into three other zones, East Zone, West Zone, and South Zone. The distribution system is shown in Figure 1 below.

The East Booster Station, constructed in 1982 and located at 4450 Parke Street, pumps from the Main Zone into the East Zone. A 1-mile-long single feed, mostly 3-inch diameter water main, supplies water to the suction side of the East Booster Station. The suction side of the East Booster station experiences pressure below 20 psi due to its location at a high elevation point at the top of a hill. The low suction pressure also limits the amount of water that the station can pump into the East Zone. Additionally, pressures below 35 psi exist throughout the East pressure zone during normal operating conditions. The low pressures on the suction side of the East Booster Station and in the East Zone do not comply with system pressure requirements and standards respectively outlined in Indiana Administrative Code, Article 327 IAC 8-3.2-11(b) and in the "Recommended Standards for Water Works" as established by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, which is also known as the "Ten State Standards".

Analyses and Conclusions

Indiana American Water developed a field calibrated hydraulic model of the Mecca system which was used in the evaluation of the east pressure zone. The Mecca system has two wells that pump into a ground storage tank, all of which is located in the Main Zone. The water level in the storage tank sets the hydraulic gradient for the Main Zone. The East Booster Station elevation is at 592 ft and the Main Zone storage tank overflow elevation is 634 ft. The 42 ft elevation difference equates to a maximum static pressure of 18 psi at the East Booster Station when the storage tank is full and not accounting for pressure losses due to flow through the distribution pipes. With flow through the distribution pipes to the East Zone, the pressure head loss in the 3-inch diameter transmission main results in even lower suction pressures at the East Booster Station.

Over 8.5 miles of 3-inch water main and 8 miles of 2-inch water main exist in the East Zone. The long lengths of small diameter main contribute to high head losses. The East Zone has an average day demand of approximately 13.5 gpm. During the average day demand, the East Zone's lowest pressure is approximately 49 psi during normal operating conditions. The East Zone has an estimated maximum day demand of approximately 38 gpm and a peak hour demand of approximately 55 gpm. As demand in the East Zone increases above 40 gpm, many customers in the East Zone experience pressures below 35 psi. This does not comply with the Ten States Standards requirement which states that normal working pressure in the distribution system should be approximately 60 to 80 psi and shall not be less than 35 psi unless otherwise approved by the reviewing authority. Article 327 IAC 8-3-4 cites the Ten State Standard as design criteria for which the utilities must conform to for the issuance of permit from Indiana Department of Environmental Management.

New customer connections cannot be added in the east zone due to the existing substandard low pressures already existing in the East zone.

While commercial and industrial growth is not expected in the East Zone, residents in the East zone who are not already connected to the water system have requested service. There is also available land for residential development along existing water mains in the East Zone.

Recommendations

It is recommended to replace the East Booster Station at a lower elevation to provide adequate system pressures on the suction side of the East Booster station and to enable appropriate flow to be pumped into the East Zone. It is also recommended to replace approximately 8,450 ft. of the 2-inch and 3-inch mains on the suction and discharge sides of the East Booster Station with 8-inch main to reduce system pressure losses and to provide adequate system pressures to customers. These improvements will ensure pressures remain above 20 psi at the booster station and above 35 psi in the East zone. The improvements will also allow for a limited number of other residents requesting service to connect to the system. These Improvements are referred to as Phase 1 Improvements. Additional detail of Phase 1 Improvements is provided in Appendix 1. Potential additional future phases of improvements are also being evaluated and will be discussed in future evaluation memos.



Figure 1: Mecca Distribution System

Appendix 1 - Phase 1

Phase 1 includes replacing the existing East Booster Station with a new booster station at a lower elevation and replacing approximately 1.6 miles of small diameter main with 8-inch main. The improvements are shown in Figure 2.

Constructing a booster station near the intersection of W Wabash St and S Blossom Ln will enable peak hour flows to be pumped into the east zone without the suction pressure dropping below 20 psi. The elevation at this location is approximately 75 feet lower than the elevation at the existing East Booster Station. The suction pressure at the new booster location will remain above 40 psi even at flows greater than 275 gpm. The existing peak hour flow is approximately 55 gpm.

Replacing 1.6 miles of 2-inch and 3-inch water main with 8-inch will significantly reduce head loss. Currently, during peak hours there is 30 psi pressure reduction due to head loss in the 1-mile length of 2-inch discharge pipe that leads to the south portion of the East Zone. With Phase 1 improvements the head loss will be reduced to less than 1 psi in the new 8-inch water main.

Completing phase 1 improvements will significantly decrease head loss and increase the available flow in the East zone. Existing customers will have pressures above 35 psi during peak demand hours and new customers will be able to be added anywhere along the 8-inch without causing the pressure to drop at existing customers. There will be at least 7 gpm available flow along the remaining 2-inch water main in the south portion of the East Zone and at least 2 gpm available flow along the existing 3-inch water main in the north portion of the East Zone. Additional flow may be available beyond those values depending on the connection location of new customers. The available flows listed above were determined by looking at available flow during average hour of max day at the highest elevation locations.

Summary of Phase 1 Benefits

- Pressure will remain above 35 psi at all existing customer locations in the East Zone during normal operating conditions
- The suction pressure at the East Booster Station will remain above 20 psi during normal operating conditions. It will be approximately 49 psi when the ground storage tank in the Main Zone is full
 - Flows up to approximately 275 gpm can be delivered by the East Booster Station without the suction pressure dropping below 40 psi
- New customers can be added along the newly installed 8-inch water main on W Mecca Rd without impacting the pressure or available flow in the East Zone
- A limited number of customers can be added to the remaining 2-inch main on S CR 325 W (the south portion of the East Zone)
 - Approximately 7 gpm available
- A limited number of customers can be added to the existing 3-inch main on S McAdams Rd and W CR 100 S (the north portion of the east zone)
 - Approximately 2 gpm available



Figure 2: Phase 1 Improvements

Phase 1 Improvements		
Construct a new booster station west of the existing East Booster Station and retire the existing East Booster Station		\$1,500,000
Replace 3,150 feet of 3-inch water main with 8-inch water main		\$900,000
Replace 5,300 feet of 2-inch water main with 8-inch water main		\$1,500,000
	Total	\$3,900,000