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IDAHO PUBLIC
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BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF DIAMOND BAR ESTATES WATER COMPANY'S APPLICATION FOR AUTHORITY TO INCREASE ITS RATES AND CHARGES FOR WATER SERVICE IN THE STATE OF IDAHO.	**CASE NO. DIA-W-15-01** **ADDENDUM COMMENTS OF THE COMMISSION STAFF**

The Staff of the Idaho Public Utilities Commission, by and through its attorney of record, Daphne Huang, Deputy Attorney General, now submits the following addendum to comments in response to Order No. 33547.

BACKGROUND

In December 2015, Diamond Bar Estates Water Company (Diamond Bar) filed a general rate case Application to increase its rates and charges for water service. The Commission issued a Notice of Application and Notice of Modified Procedure, and suspended the effective date until July 1, 2016. Order No. 33452. Staff conducted a public workshop for customers, performed an investigation and audit, and filed written comments to which Diamond Bar responded with a reply. *Id.* at 1. The Commission received more than 18 written comments and held a public hearing at which six customers testified. *Id.*

In June 2016, the Commission suspended the effective date of the Company's Application an additional 60 days, until August 30, 2016. Order No. 33547. The Commission set a deadline

of July 8, 2016 for Diamond Bar to provide responses to six questions regarding the AEI engineering report, Diamond Bar's pump motor failures, and also contamination at the Company's wells. *Id.* The Commission also directed Staff to file an addendum, if any, by July 22, 2016. *Id.* The Company may file a reply by July 29, 2016. *Id.*

DIAMOND BAR'S RESPONSES

1. KEC's requirement of a soft start on motors larger than 20 hp

The Commission asked if Diamond Bar was made aware of Kootenai Electric Cooperative's (KEC) rule requiring a soft start on motors larger than 20 horsepower (hp), by KEC or any pump contractors working on prior pump motor failures. The Company responded that the rule was brought to its attention through the AEI engineering report. According to the Company, neither Diamond Bar, nor its contractor United Crown Pump and Drilling (UCPD), was contacted by KEC about changing to a soft start. Response to Order No. 33547.

2. Diamond Bar's understanding about need for a soft start

The Commission next asked if Diamond Bar believed that soft start equipment would or would not have prevented motor failure. The Company responded that the AEI report identified a soft start as "recommended action" rather than a requirement. The Company also stated, "The original [full voltage non-reversing starter] was approved and operational and the transformers were sized by KEC for the intended load(s)." The Company noted that KEC's on-site testing "confirmed that the original transformers were able to handle the load of the pumps and motors that were operating at that time." Diamond Bar concluded that, while a soft starter would have changed the power demand, it would not have affected the damage that occurred."

3. Did Diamond Bar inform KEC of its 2004 pump-size increase?

The Commission asked if the Company informed KEC that it increased pump size from 50 hp to 60 hp in 2004. The Company indicated that it did not. However, Diamond Bar noted that KEC's "monitoring report reflects the original transformers were handling the load." Diamond Bar provided an Exhibit 1, in which KEC's Dave Kahly reports, "Our transformer capacity is good."

4. Assessment of electrical equipment at pump by certified electrician before 2015 AEI Report

The Commission also asked if Diamond Bar had hired a certified electrician to assess the electrical equipment at the pump – including grounding, transformer adequacy, surge protection and conductors – prior to the AEI Report in 2015. The Company responded that its contractor, United Crown Pump and Drilling (UCPD), "is a fully licensed and bonded electrical contractor in ID and WA who specializes in pump systems and controls." The Response does not address timing or substance of UCPD's work.

5. Root cause of pump failures between 2002 and 2015

The Commission asked Diamond Bar what it believes was the root cause of the multiple pump motor failures between 2002 and 2015. The Company noted that AEI believes the utility transformers were undersized but "did not pinpoint the failure reason exactly." Diamond Bar believes that installing larger pad transformers has resolved the failures.

6. Contamination at the wells

Finally, the Commission asked for a schedule of dates when either well was contaminated, and the type of notice provided to customers. Diamond Bar indicated there was one contamination issue in August 2012 (coliform was present). The Company stated it notified customers by telephone that the well tested positive for coliform, and that retests were done through August into September 2012, showing the absence of coliform.

STAFF ANALYSIS

Staff reviewed the Company's response to the Commission's requests for information in Order No. 33547. To develop meaningful conclusions about the Company's information and to provide additional context, Staff performed further review of technical reports and Company responses already in the record. Based on its review, and mindful of the Commission's concerns in Order No. 33547, Staff makes four determinations, discussed in more detail below:

1. Root Cause of Pump Motor Failure - Staff concurs with the Company that the 75 kVA transformer supplying power to the well house was undersized and was a major contributing factor of well pump motor failures. However, Staff also believes that phase configuration incompatibility between the transformer and the service entry was also a

contributing factor. Staff believes these two items were the primary root cause of well pump motor failures, and resolution of these items are critical for the simultaneous operation and starting of the water system's four pumps.

2. Failure Mode Prevention - To reduce the possibility of future pump motor failures, Staff believes the Company should install a circuit breaker designed to simultaneously disconnect all three phases in the event that any one phase is disconnected.
3. Soft Start – Although a soft start might have prevented some of the conditions causing well pump motor failure, Staff agrees with the Company that a soft start alone would not have prevented all failure modes.
4. Contamination – Based on information provided by the Company and the Idaho Department of Environmental Quality (IDEQ), the Company has complied with IDEQ's customer notice and additional water sampling requirements. There have been no contamination problems detected since November 2012.

Root Cause of Pump Motor Failure

Staff believes that the 75 kVA transformer (provided by KEC, not Diamond Bar) supplying power to the well house was grossly undersized for the simultaneous operation and starting of the water system's four pumps. This problem is made worse by incompatible phase configurations between the pump house service entry (Delta configuration) and KEC transformer (Wye configuration). Staff has determined that the 75 kVA transformer was barely adequate to supply the power needed for all pumps to operate simultaneously, and that the additional load required to start either the 60 hp well pump or the 20 hp fire pump would be sufficient to blow a transformer circuit breaker or pump house fuse. Using Article 430 of the National Electric Code, Staff has calculated that the transformer should be sized to supply at least 109 kVA.

To determine the root cause of the repeated pump failures between 2002 and 2015, and to understand the Company's responses to those failures, Staff again reviewed the Company's records. Staff notes that the Company does not possess the in-house expertise necessary to diagnose the problem without relying on advice from outside experts. Prior to consulting with Engineering Company, AEI, in 2015, Staff believes the advice Diamond Bar received from some of these experts may have been inadequate or incomplete.

When it was constructed in 1995, the Company's water system used a 50 hp well pump and was provided a 75 kVA transformer by KEC. Using National Electric Code Article 430, Staff

calculated that the water system required a transformer of no less than 96 kVA. Then in 2004, the Company decided to install a 60 hp pump making the problem worse. It is Staff's opinion that an engineer or journeyman electrician familiar with the National Electric Code should have determined that the transformer was grossly undersized for simultaneous start-up loads required of the water system's four pumps. Staff was unable to determine either why the transformer was not originally sized correctly, or why this issue was not identified in 2004 when the pump was upsized.

Staff notes that several parties expressed concerns about system and transformer sizing throughout the record period. However, as late as August 2015, KEC advised the Company's contractor, UCPD, that the transformer was adequately sized. Staff notes that KEC's analysis was based on hourly average load data, and does not appear to have considered the brief, but large surges needed for pump starts.

Between 2011 and 2015, there were five pump failures. The notes supplied by the Company indicate that all failures occurred during time periods when all four of the Company's pumps were making frequent starts. Staff compared Company records to KEC's transformer maintenance records. Staff observed a correlation between the Company's record of pump failures and dates on which KEC noted that its substation breakers had been tripped. On at least one occasion, KEC staff noted that this failure occurred concurrently with a pump failure, but appears to have concluded that the pump failure caused the blown circuit breaker and not vice versa. It was not until after the August 2015 pump failure that the Company contacted an engineering firm, AEI, to help determine how to reduce the incidence of pump failures. In its report, AEI implied that the service drop and the transformer have incompatible phase configurations and concluded that the current utility transformers are undersized. As a result and as indicated in the Company's response to Commission Order No. 33547, a new pad transformer was installed which Staff verified was completed in late 2015, but Staff could not verify that it is large enough to meet pump house power requirements.

Failure Mode Prevention

Staff believes there are two improvements that should prevent most pump motor failures like the ones seen by the Company. First, is to employ a circuit breaker designed to simultaneously disconnect all three phases in the event that any one phase is disconnected. Each phase of KEC's 75 kVA transformer is protected by a single circuit breaker. Additionally, each of

the 60 hp well pump's three phases is protected by a single fuse. The well motor will be protected from damage when any two of these fuses blow. However, when only a single fuse blows, the load on the remaining phases will increase by approximately 73%. This condition is called single phasing, and is a leading cause of three phase motor failure. When three fuses are used to protect a motor, they must be properly sized so that in the event that a single fuse blows, one of the remaining fuses blows before the pump is damaged. This arrangement, using a separate fuse for each phase, has been permitted by the National Electric Code for many years but will not prevent all failure modes, and is not considered a best-practice.

Second, the service entrance and the transformer should use compatible three phase configurations – either the Wye or the Delta. Both methods work well, and have long been used throughout the United States. However, the two methods are not completely compatible. In particular, when a Wye transformer is connected to a Delta service entry (or vice versa), failure of a single phase will cause the load on the remaining two phases to increase by 130% making it possible that the pump will be damaged before the remaining fuses blow. During the 1990s, when the well's electrical system was installed, this problem was not fully appreciated, and the National Electric Code permitted the Company's use of a Delta service entry with KEC's Wye transformer. This arrangement has since been prohibited in later editions of the code. According to KEC's engineering manager, this change was also incorporated into the KEC handbook sometime between the years 2000 and 2002. However, KEC does not require existing Delta connected service entries to be re-wired and it is unlikely that this change was communicated to the Company.

Soft Start

Staff does not believe that the installation of a soft start would have prevented every pump motor failure experienced by the Company. Staff believes the majority of failures were caused by single phase conditions. Although using a soft start could reduce the 60 hp well pump motor starting load, it would not reduce the starting load of the other three pumps, making it possible for any of these pumps to overtax the 75 kVA transformer sufficiently to blow a circuit breaker. Additionally, Staff believes that a soft start would not mitigate other potential causes resulting in a single phase condition, such as lightning.

The pump manufacturer recommends a soft start if during start-up, the torque induced by a submersible pump on the well casing causes the pump to slip or vibrate. This can lead to pump

bearing or other mechanical component failures. The Company did not report any failure mode of this kind.

According to the KEC engineering manager, the KEC handbook was updated to include a soft start requirement for motors larger than 20 hp sometime between the years 2000 and 2002. This is primarily a benefit to the electric company – not Diamond Bar – by reducing surge-induced electrical harmonics that can result from rapid starting motors. It is unlikely that this requirement was communicated to Diamond Bar prior to 2015.

Contamination

The Company provided four Analysis Reports of water samples taken in August and September, 2012. The first two reports indicated the presence of coliform bacteria on the distribution system (sample taken on August 6) and at Well No. 1 (sample taken on August 8). The Company also provided a letter it received from the Idaho Department of Environmental Quality (IDEQ) regarding the August 6, 2012, sample, which directed the Company to provide additional water samples for testing. IDEQ did not detect contamination at the well or at the sampling locations on the distribution system in subsequent water samples submitted by the Company.

Staff contacted IDEQ and obtained additional information. IDEQ sent a letter to the Company on August 14, 2012, that confirmed the presence of coliform bacteria in the system and required that users be notified of the issue. In response, the Company provided a notice to customers on August 20, 2014. *See* Attachment A.

Staff reviewed IDEQ data files for the Company's Coliform Sample Summary Results covering the period January 1, 2006 to June 24, 2016. Staff discovered that coliform bacteria was detected in the distribution system again in October and November, 2012. In DEQ's November 6, 2016 letter, the Company was again directed to notify its customers. The letter mentions that the agency agreed with the Company's proposed solution to the contamination problem, which was "to chlorinate and flush the reservoir and distribution system." *See* Attachment B.

Staff verified that the Company complied with IDEQ's customer notification and additional sampling requirements as provided under the Idaho Rules for Public Drinking Water Systems. IDAPA 58.01.08. Based on Staff's review of IDEQ's records, there have been no contamination problems detected since November 2012.

RECOMMENDATIONS

Staff believes that the Company's corrective actions should stay consistent with recommendations by the Company's engineering company, AEI, and be directed toward decreasing the likelihood of a single phase condition. This includes that:

1. The Company ensure that KEC replaced the 75 kVA transformer with a properly-sized transformer.
2. The Company install a device that disconnects all phases simultaneously when an overcurrent condition occurs in any phase to protect against loss of phase.
3. The Company replace the Delta type service drop with a Wye type service entry that complies with KEC's current engineering guidelines.

Respectfully submitted this 22nd day of July 2016.

Daphne Huang
Deputy Attorney General

Technical Staff: Michael Morrison
Chris Hecht

i:umisc:comments/diaw15.1djhmmcwh addendum comments

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2110 Ironwood Parkway, Coeur d'Alene, ID 83814 (208) 769-1422

C. L. "Butch" Otter, Governor
Curt A. Fransen, Director

August 14, 2012

Rob Turnipseed
Diamond Bar Water, ID1280268
PO Box 1870
Hayden, ID 83835

Subject: Bacteriological Contamination MCL, Diamond Bar, ID1280268

The purpose of this letter is to notify you that confirmation results for total coliform bacteria indicate the presence of bacteria in the Diamond Bar water supply. The confirmed presence of total coliform bacteria during the month of August 2012 is a maximum contaminant level (MCL) violation. This MCL violation will require public notification to all users as specified in IDAPA Section 58.01.08.150.02 of the Idaho Rules for Public Drinking Water Systems.

A public notice template that you may use to distribute this notification to your users is enclosed herein; and it is also available online at:
http://www.deq.idaho.gov/Applications/SDWISReports/pws_pub_notify_index.cfm
At this site, please click on the box for Tier 2. Therein, the templates to be used are identified as Template 2-1 for unresolved coliform contamination or Template 2-2 for resolved coliform contamination.

This notice may be modified by adding detailed information and clarifying facts. However, the public notification issued must contain the mandatory language for health effects as marked in italics. A copy of the public notice needs to be kept on record with the water system and with your records. Also, a copy of the notice must be submitted to our office within ten days of posting or delivery.

Since your bacteriological samples had only total coliform (TC) bacteria present and E coli (EC) absent, the public notice must be issued as soon as possible, at least within 30 days. The notice should be issued by mail or hand delivery, in addition to another method, as necessary to reach other water users. If you do not notify your users, we may issue notice ourselves and bill you for associated expenses.

It is the responsibility of the water system owner/operator that adequate public notification is issued to all affected parties. Our experience has been that there is more criticism when the public has not been properly notified than due to the notice itself. Once the problem has been corrected and you have re-sampled the water system with results of two consecutive series of uncontaminated samples, it is acceptable to discontinue notification. Please contact DEQ before removing public notice.

During the month following this contaminated bacteria sample (September 2012) you are *required* to submit **five (5) routine** bacteria samples.

Sincerely,

Erik Ketner, R.E.H.S.
Drinking Water Analyst
erik.ketner@deq.idaho.gov

File in TRIM: Diamond Bar, ID1280268

Resolved Total Coliform Notice – Template 2-2

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

Tests Showed Coliform Bacteria in Diamond Bar Estates Water Co

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we did to correct this situation.

We routinely monitor for drinking water contaminants. We took one sample to test for the presence of coliform bacteria during August 2012. One of our samples showed the presence of total coliform bacteria. The standard is that no more than 1 sample per month may do so.

What should I do?

- You do not need to boil your water or take other corrective actions. However, if you have specific health concerns, consult your doctor.
- If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at 1-800-426-4791.

What does this mean?

This is not an emergency. If it had been you would have been notified within 24 hours. Total coliform bacteria are generally not harmful themselves. **Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.**

Usually, coliforms are a sign that there could be a problem with the system's treatment or distribution system (pipes). Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or *E. coli*, are present. **We did not find any of these bacteria in our subsequent testing.**

What is being done?

Diamond Bar Estates Water proceeded to take 5 additional samples within the distribution system as required by IDEQ. Further testing showed that this problem has been resolved.

For more information, please contact Office at 208-665-9200 or PO Box 1870 Hayden ID 83835.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by Diamond Bar Estates Water Co.
Water System ID#: 1280268.
Date distributed: 8/20/12.

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2110 Ironwood Parkway, Coeur d'Alene, ID 83814 (208) 769-1422

C. L. "Butch" Otter, Governor
Curt A. Fransen, Director

November 6, 2012

Robert Turnipseed, Designated Operator
Diamond Bar Estates, ID1280268
PO Box 1870
Hayden, ID 83835
avondalecon@frontier.com

Subject: Bacteriological Contamination MCL, Diamond Bar Estates, ID1280268

Dear Rob:

The purpose of this letter is to follow-up our conversation this afternoon regarding coliform detections in three (3) of the five (5) routine total coliform bacteria samples required from the Diamond Bar Estates water system for the month of November 2012. These results confirm the presence of total coliform bacteria within the distribution system and constitute a maximum contaminant level (MCL) violation for November 2012.

As discussed, the Idaho Department of Environmental Quality agrees with your approach to chlorinate and flush the reservoir and distribution system as a means of resolving the contamination. Please ensure that after chlorinating the system that no chlorine residual remains in the system prior to collecting future coliform samples.

This MCL violation will also require public notification to all users as specified in IDAPA Section 58.01.08.150.02 of the Idaho Rules for Public Drinking Water Systems. A public notice template that you may use to distribute this notification to your users is enclosed herein; and it is also available online at:
http://www.deq.idaho.gov/Applications/SDWISReports/pws_pub_notify_index.cfm
At this site, please click on the box for Tier 2. Therein, the templates to be used are identified as Template 2-1 for unresolved coliform contamination or Template 2-2 for resolved coliform contamination.

This notice may be modified by adding detailed information and clarifying facts. However, the public notification issued must contain the mandatory language for health effects as marked in italics. A copy of the public notice needs to be kept on record with the water system and with your records. Also, a copy of the notice must be submitted to our office within ten days of posting or delivery.

Since your bacteriological samples had only total coliform (TC) bacteria present and E coli (EC) absent, the public notice must be issued as soon as possible, at least within 30 days. The notice should be issued by mail or hand delivery, in addition to another method, as necessary to reach other water users.

It is the responsibility of the water system owner/operator that adequate public notification is issued to all affected parties. Once the problem has been corrected and you have re-sampled the water system with results of two consecutive series of uncontaminated samples, it is acceptable to discontinue notification. Please contact DEQ before removing public notice.

During the month following this contaminated bacteria sample (**December 2012**) you are *required* to submit **five (5) routine** bacteria samples.

Sincerely,

Erik Ketner
Drinking Water Analyst
Erik.Ketner@deq.idaho.gov

cc: Cristy Turnipseed, Administrative Contact, Diamond Bar Estates avondalecon@frontier.com
File in TRIM: ID1280268 Diamond Bar

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

Tests Showed Coliform Bacteria in Diamond Bar Estates Water Co

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we did to correct this situation.

We routinely monitor for drinking water contaminants. We took 5 samples to test for the presence of coliform bacteria during October 2012. 3 out of 5 of our samples showed the presence of total coliform bacteria. The standard is that no more than 1 sample per month may do so.

What should I do?

- You do not need to boil your water or take other corrective actions. However, if you have specific health concerns, consult your doctor.
- If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at 1-800-426-4791.

What does this mean?

This is not an emergency. If it had been you would have been notified within 24 hours. Total coliform bacteria are generally not harmful themselves. **Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.**

Usually, coliforms are a sign that there could be a problem with the system's treatment or distribution system (pipes). Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or *E. coli*, are present. **We did not find any of these bacteria in our subsequent testing.**

What is being done?

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For more information, please contact the Office at 208-665-9200 or PO Box 1870 Hayden ID 83835.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by Diamond Bar Estates Water Co
State Water System ID#: 1280268.
Date distributed: 11/20/12.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY THAT I HAVE THIS 22ND DAY OF JULY 2016, SERVED THE FOREGOING **ADDENDUM COMMENTS OF THE COMMISSION STAFF,** IN CASE NO. DIA-W-15-01, BY MAILING A COPY THEREOF, POSTAGE PREPAID, TO THE FOLLOWING:

ROBERT TURNIPSEED
DIAMOND BAR ESTATES
WATER CO
PO BOX 1870
HAYDEN ID 83835
E-MAIL: avondalecon@frontier.com

ALDEN HOLM
9446 W FAIRVIEW AVE
BOISE ID 83704
E-MAIL: alden@treasurevalleycpa.com

Jo Nelson
SECRETARY