KENTUCKY WATER WORKFORCE SURVEY 2022

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

With the influx of significant federal funds being invested into water infrastructure, it is important to have qualified staff to operate, repair, and maintain Kentucky's assets. This is an essential key to protecting the public health of Kentuckians and the natural resources of the Commonwealth. For many years, Kentucky regulators have heard that drinking water and wastewater utilities have an operator recruitment and retention problem. As a result, the Kentucky Water Workforce Survey (KWWS) was developed to gather the data needed to ascertain if there is an actual problem. The survey was designed to determine what barriers exist in order to recommend possible solutions to the problems identified in the data.

The KWWS builds on a national report by the Brookings Institute that documents national employment concerns. The Kentucky Water Resources Research Institute at the University of Kentucky (KWRRI) designed and deployed two distinct surveys for the KWWS project in collaboration with industry and regulatory stakeholders. The KWWS targeted drinking water and wastewater operators and managers with experience at Kentucky utilities. The anonymous, online surveys generated a total of 635 responses, 415 from the operator survey and 220 from the manager survey. The KWWS included a strong, representative pool of responses that reflected diversity in terms of age, experience, utility size and type, and geographical areas.

Upon analysis of the responses, several questions in both surveys supported the conclusion that there is an operator retention and recruitment problem in Kentucky. A resounding 55% of operator and 56% of manager respondents stated that their utilities did not have enough operators. Additionally, 28% of operators and 40% of managers are planning to retire within the next six years. Another sobering response indicated that 55% of managers had experienced an increase in job vacancies over the last two years.

Several potential barriers to these issues were apparent from the responses. First, the median hourly wage for operators was $25/hour, $6/hour less than the median expected hourly wage. Additionally, 39% of operators were either extremely dissatisfied or somewhat dissatisfied with their current pay and only 49% of the operators felt that they were being paid a fair amount for the work they perform. Current operators may seek employment in another utility or industry that offers higher wages. A further indication of the possible impact of low pay rates for existing operators can be inferred from an examination of the range of pay for utilities as distributed across the 15 different Area Development Districts. These results reveal a range of median salaries between $15/hour in rural Appalachia within the Kentucky River ADD to $35/hour in the KIPDA.

Another retention barrier indicated by the survey results was a lack of appreciation of employees by utility decision-makers. Both the operator and manager surveys included questions that attempted to judge the degree to which operators felt appreciated by the utility leadership and decision makers. Nearly 40% of the operators indicated that they did not feel appreciated by their utility. This response may be influenced by two other

issues. Approximately half of the operators felt that their utility's decision makers did not understand what they did in their job, while 55% of the operators indicated that the utility's decision makers rarely or never communicate with the operators. As a result, additional or perhaps annual board training about basic utility operations would likely be beneficial. In some cases, utility boards or city councils have participated in tours of their utility facilities or invited utility management or operators to make presentations at their regular meetings. Both actions represent some tangible ways that decision makers could help to overcome these perceptions and thus help improve operator retention.

On a positive note, the KWWS found that 65% of responding operators are somewhat happy or extremely happy with their jobs. Only 14% indicated that they were somewhat unhappy or extremely unhappy with their jobs. Further, 70% of the operators surveyed indicated that they are given the equipment and tools they need to do their jobs effectively and 76% of the operators indicated that they liked doing their assigned tasks. This is an essential finding that should inform both retention and recruitment strategies.

The KWWS identified the following problems associated with retaining existing operators:

- A lack of adequate pay
- A lack of consistent benefits
- Better pay elsewhere
- A lack of appreciation of employees by utility decision-makers
- A lack of succession planning
- A lack of appreciation of the retention problem by management
- Impacts from COVID

The KWWS identified the following problems associated with recruiting new operators:

- A lack of qualified applicants
- A lack of adequate pay
- A lack of consistent benefits
- A lack of a trainee or apprentice program
- A lack of effective recruitment strategies including advertisement
- A lack of appreciation of the recruitment problem by management

Based on the results from both the operator and the manager surveys, the following recommendations should be considered to assist utility management and decision makers in the retention of operators in the water workforce:

- Educate utility decision makers about the magnitude and nature of the problem.
- Increase pay.
- Increase benefits.
- Demonstrate a greater appreciation of employees.
- Develop succession plans for both operators and managers.
- Provide tools and support to management to help address retention issues.

Based on the results from both the operator and the manager surveys, the following recommendations should be considered to assist utility management and decision makers in the recruitment of operators into the water workforce:

- Evaluate utility financials and explore avenues to increase operator salary scales.
- Develop and implement an effective trainee internship and/or apprentice program.
- Develop more effective marketing strategies and techniques to advertise new positions.
- Evaluate utility benefit packages to ensure they are commensurate or competitive with other industries or even other utilities.
- Improve communication and interaction with staff.

1.0 INTRODUCTION

In November 2021, the U.S. Infrastructure Investment and Jobs Act was signed into law delivering the single largest federal investment in water infrastructure in history. This law provides for crucial investments to renew and replace aging infrastructure. It reauthorizes many existing water programs and includes an additional $55 billion to improve drinking water and wastewater infrastructure.

These historical increases in funding will undoubtedly create opportunities for Kentucky to improve its water infrastructure. The most recent report by the Kentucky Section of the American Society of Civil Engineers (ASCE) graded Kentucky's drinking water infrastructure as a C+ and its wastewater infrastructure as a C- (ASCE, 2019). These ratings indicate that the infrastructure is in fair condition and will require focused attention to continue reliable and sustainable services to the citizens of the Commonwealth. The additional federal funds are a welcomed investment in public infrastructure, especially considering that state and local governments cover an estimated 77% of public spending on water resources (Tomer et. al., 2021). The infrastructure assets Kentuckians rely on to provide safe, clean water warrant this kind of investment to enable utilities to comply with current and future regulations, to protect health within their communities, and to stimulate economic viability in the Commonwealth. However, investments in the people who maintain Kentucky's water infrastructure must also be made. The key to strong, sustainable, and reliable drinking water and wastewater infrastructure is the people who make up the water workforce.

Recruiting and retaining personnel needed to design, plan, build, operate, and maintain our water infrastructure is critical. In its most recent national infrastructure report, ASCE recommended an "increase in federal and local support to find, train, and retrain the next generation of drinking water and wastewater sector workforce to offset the large number of expected retirements" (ASCE, 2021). Further, the American Water Works Association (AWWA) State of the Water Industry Report has listed "Aging workforce/anticipated retirement" as one of the top 10 concerns for water professionals over the last several years. In fact, the 2022 report listed it as the fourth most prominent concern (AWWA, 2022). The water sector is aging, and utilities are struggling to recruit and retain younger skilled workers. Currently, less than 10% of the workforce is younger than 24 years old. While the national median age for all occupations is 42.2 years old, the national median age for water and wastewater treatment operators is 46.5 years old (Kane & Tomer, 2018).

State and local governments are also contending with a COVID spurred hiring crisis exacerbated by the fact that many operators are nearing retirement. It is estimated that nearly a third of all water workers will retire within the next decade (Monks, 2021). As the water utility industry workforce continues to age, there is a national concern about the problem of recruiting and retaining workers to support the workforce needs of the industry.

In response to such concerns, the Brooking Institution identified several specific needs in water workforce development (Kane & Tomer, 2018). These included:

- Acknowledge the varying scale and capacity of different communities and utilities across urban and rural areas in particular in order to expand the water workforce opportunity.
- Emphasize that the water workforce needs greater public visibility, especially when trying to reach younger workers and other prospective job candidates.
- Consider barriers to support a more diverse water workforce, including the importance of looking for talent in places that may not traditionally have attracted as much attention.
- Investigate why identifying and hiring skilled workers remains a struggle for many utilities and other water employers, including the lack of proactive recruitment strategies.
- Note the need for more extensive work experience and on-the-job training in the water sector, including the frequent difficulty to equip workers with hard and soft skills.
- Examine the ongoing need to retain and grow talent within the water sector, including the development of new competencies and adapting skills to new demands and technologies.

The first of its kind, the Kentucky Water Workforce Survey (KWWS) was designed to provide valuable insight into the current water workforce in the Commonwealth and serve as a valuable roadmap for planning for the future. The results of the KWWS will build on the previously cited 2018 Brookings Institute report that benchmarked the nation’s 1.7 million water workers and recommended changes for employment strategies in hiring, training, and retaining efforts of utilities (Kane & Tomer, 2018). Distributed to operators and utility managers across the Commonwealth, with an emphasis on drinking water and wastewater operators and managers, the KWWS provides a comprehensive study of Kentucky's water workforce.

2.0 METHODS

In 2021, the Kentucky Department for Environmental Protection (KDEP) identified a need to survey drinking water and wastewater utility operators to document and identify possible barriers to operator recruitment and retention in Kentucky. In partnership with KDEP leadership and the Operator Recruitment and Development Committee (ORDC) of the Drinking Water and Clean Water Advisory Councils of the Kentucky Division of Water, the Kentucky Water Resources Research Institute (KWRRI) developed two surveys to address this need. The target audience for the two surveys was: (1) Operators: Certified and non-certified utility staff that have worked as a drinking water and/or wastewater operator in Kentucky, and (2) Managers: individuals with management experience at a Kentucky drinking water or a wastewater utility that could provide responses from the perspective of the overall utility.

The operator survey questions were designed to gather demographic information and solicit individual experiences related to recruitment and retention from operators working in the field. A copy of the survey questions for operators is included in Appendix A. The manager survey questions were designed to identify the challenges and barriers that utilities face in recruiting and retaining drinking water and wastewater operators. A copy of the survey questions for managers in included in Appendix B.

The surveys were developed by KWRRI and the questions contained in the survey were reviewed and revised by ORDC. Both surveys were pilot tested by a group of operators and managers in December 2021. The purpose of the pilot was to solicit feedback about the formatting of the survey, ease of use, and understandability of the questions. The final surveys were reviewed and approved by the University of Kentucky Institutional Review Board in March 2022.

Both surveys were conducted electronically via Qualtrics. Qualtrics is a cloud-based platform for creating and distributing web-based surveys. The survey was anonymous; no identifiable information was collected.

The surveys opened on May 3, 2022. Operators and managers at water utilities across the Commonwealth were invited to participate in the study. A variety of recruitment strategies were used to ensure that we reached as many operators and managers as possible to be equitable and include appropriate racial, ethnic, educational, socioeconomic, and gender diversity.

The KDEP, the funding agency for this study, provided the KWRRI research team with a database of contacts from the Kentucky Operator Certification Program, the Drinking Water Branch, and the Kentucky Pollutant Discharge Elimination System Branch. This database included operators that had applied to take a certification examination, and utility managers representing the permitted water utilities in Kentucky. Approximately 4,200 individual contacts were reached via email using this database. We monitored our response rate and sent two email reminders requesting participation in the survey.

The following organizations shared the survey advertisements through their distribution channels: Clean Water Professionals of Kentucky & Tennessee, Kentucky/Tennessee Section of American Water Works Association, Kentucky Water and Wastewater Operator's Association, Kentucky Municipal Utilities Association, Kentucky Rural Water Association, and the 15 Kentucky Area Development Districts. These organizations shared the invitation to participate in a variety of ways such as by emailing the advertisements to their listservs, posting on social media, including the invitation in their newsletters, and sharing the flyer at conferences and training events.

An informed consent form was presented to participants at the beginning of the online survey. The format resembled that of a cover letter and it was presented to the participant as the first screen they saw when they opened the survey link. After reading the informed consent form letter, participants were asked, "Do you consent to participate in this survey?" They were given the option to select "yes" or "no". If they agreed to participate by selecting "yes," they proceeded to the survey. If they answered "no," indicating they did not consent, they were not able to proceed to the survey.

At the end of the survey, participants were offered an opportunity to visit a separate website to enter a drawing to win a gift card. There were two gift card drawings at the end of each week for the five-week duration of the survey - one drawing was for the operator survey respondents and one drawing was for the manager survey respondents. A random number generator was used to select the winners. Each winner received a $100 Amazon gift card. In total, between the two surveys, ten $100 gift cards were awarded. The following organizations provided funds for the purchase of the gift cards: Clean Water Professionals of Kentucky & Tennessee, Kentucky/Tennessee Section of the American Water Works Association, Kentucky Rural Water Association, Kentucky Municipal Utilities Association, and Kentucky Water and Wastewater Operators Association.

The surveys closed on June 7, 2022. We received a total of 635 surveys, 415 responses to the operator survey and 220 responses to the manager survey.

3.0 RESULTS

The first objective of the KWWS was to try to answer two fundamental questions:

1. Is there a problem retaining existing drinking water and wastewater operators in Kentucky and if so, what are some of the reasons?
2. Is there a problem with recruiting qualified drinking water and wastewater operators in Kentucky and if so, what are some of the reasons?

The second objective of the KWWS was to identify specific steps that could be considered by Kentucky's water industry to improve operator recruitment and retention.

Data for use in addressing these two objectives were obtained using two different online surveys: one for operators (see Appendix A) and one for managers (see Appendix B). An analysis of the results from each survey is provided in the sections below.

3.1 Operator Survey Results

Responses to all questions on the operator survey are provided in Appendix C. The survey questions can be grouped in five major categories:

1. General demographic questions about the respondent: O.1, O.2, O.3, O.4, O.8, O.9, O.10, O.11, O.12, O.13, O.14, O.15, O.16, O.17, O.18. O.19.
2. Questions related to operator recruitment: O.5, O.6, O.21, O.24, O.25, O.27.
3. Questions related to operator retention: O.9, O.10, O.11, O.12, O.20, O.21, O.22, O.23, O.25, O.26, O.27, O.28, O.29. O.30, O.31, O.32, O.33, O.34, O.35, O.36, O.37.
4. Questions related to the operator certification process: O.7, O.35.
5. Questions related to broader utility issues and communication with decision-makers: O.26, O.27, O.28, O.29.

3.2 Manager Survey Results

Responses to all questions on the manager survey are provided in Appendix D. The survey questions can be grouped in five major categories:

1. General demographic questions about the respondent and the utility: M.1, M. 2, M.3, M.4, M.5, M.6, M.7, M.8, M.9.
2. Questions related to operator recruitment: M.11, M.12, M.13, M.25, M.26.
3. Questions related to operator retention: M.14, M.15, M.16, M.17, M.18, M.19, M.20, M.21, M.22, M.23, M.24, M.29, M.30, M.31.
4. Questions related to the operator certification process: M.26, M.29, M.30.

5. Questions related to broader utility issues and communication with decision-makers: M.10, M.27, M.28, M.32.

3.4 Results Analysis

To provide both an operator and utility perspective on the issue of operator recruitment and retention, both operators and utility managers were surveyed. Because of the potential differences in perspectives, each survey was developed separately. While some questions were the same on both surveys, the number and nature of several of the questions was different. In performing the analysis of the overall results, questions from each survey were combined using the categories described above. An analysis of the results associated with each category is provided below:

3.5 Demographic Results

The operator survey contained a wide range of demographic questions to ensure that the survey results were representative of a diversity of respondents. In general, the results reveal a very robust survey with an even distribution of responses based on age [O.1], education [O.4], operator experience [O.19], license certification [O.9], utility type (i.e., water treatment, water distribution, wastewater collection, wastewater treatment) [O.15, M.7], utility size [O.16, M.8], and utility location (i.e., by area development districts) [O.18, M.16].

Survey respondents were primarily white (91%) [O.3] males (85%) [O.2] which is consistent with the water/wastewater utility industry as a whole. Although women make up nearly 47% of employees across all occupations nationally, they make up just 15% of the water workforce (Kane & Tomer, 2018). This was consistent with our survey respondents, of which 13% were female [O.2]. While the highest level of education for 39% of the operator survey respondents was a high school diploma or G.E.D., 28% of respondents had an associate degree or trade school certification, and 30% of respondents had a bachelor’s degree or higher [O.4].

Geographically, the respondents on both surveys were well distributed. All 15 Area Development Districts were represented. A summary of the distribution of all survey respondents (i.e., operators and managers) by Area Development District is provided in Figure 3.1.

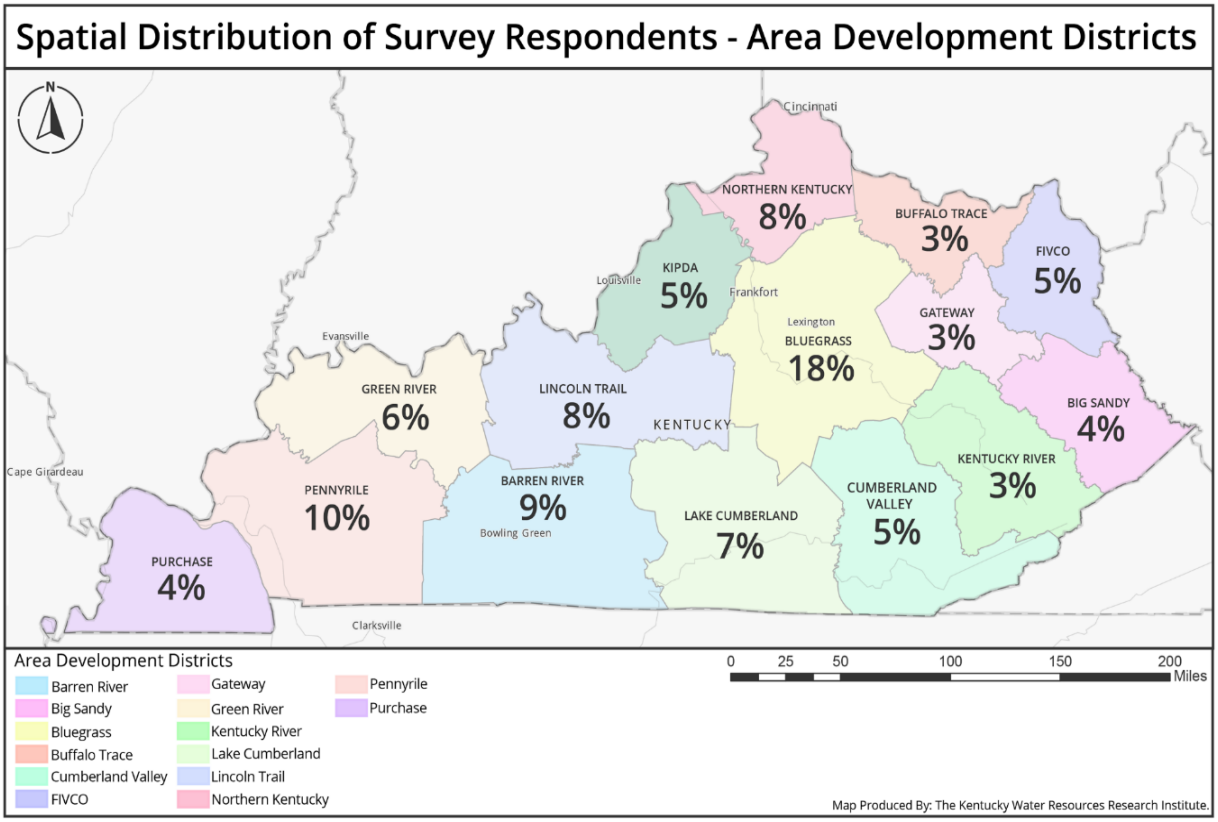

Figure 3.1 Distribution of Respondents by Area Development District

3.6 Operator Retention Results

The first question associated with the first objective of this report was to determine if there is an operator retention problem in Kentucky. This question was addressed by analyzing the results of the individual operator and manager surveys around four sub-questions:

1. Is there a problem?
2. What are the possible causes of the problem?
3. What are not the causes of the problem?
4. What can be done to address the problem?

3.6.1 Is there a problem?

The survey results tend to support the conclusion that there is an operator retention problem in Kentucky. A total of 55% of the operators [O.27] and 56% of the managers [M.18] indicated that their utility does not have enough operators. These responses suggest that utilities are having difficulty retaining qualified operators.

Currently, 23% of the responding operators are eligible to retire [O.11] and nearly 30% of the responding operators are planning to retire in the next six years [O.12]. Similarly, 29% of the responding mangers are eligible to retire [M.4] and over 40% of the

responding mangers are planning to retire in the next six years [M.5]. Based on an assessment of each utility, it was determined that the average number of operators expected to retire from each utility within the next five years was four [M.19, M.20]. Further, over the last two years, 55% of the utilities reported that they had experienced an increase in the number of job vacancies [M.28.3]. These statistics should raise significant concerns within the water industry that there could be an impending crisis of a lack of certified operators, especially considering a similar challenge in recruiting new operators.

3.6.2 What are the possible causes of the problem?

3.6.2.1 Pay expectation gap.

The median of the existing pay of operators was found to be $25/hour [O.20] while the median of the expected pay was found to be $31/hour [O.21]. This indicates that, on average, operators are being paid approximately $6/hour less than they expect. This may put pressure on current operators to seek employment in another industry. This hypothesis is further reinforced by the fact that 39% of operators were either extremely dissatisfied or somewhat dissatisfied with their current pay [O.35] and only 49% of the operators felt that they were being paid a fair amount for the work they do [O.36]. It is important to note that 64% of the managers indicated that their utility had a documented pay scale for certified operators, suggesting that communicating pay expectations for positions is a potential area for improvement [M.21].

A further indication of the possible impact of low pay rates for existing operators can be inferred from an examination of the range of pay for utilities as distributed across the 15 different Area Development Districts (see Figure 1.2). These results reveal a range of median salaries between $15/hour in the Kentucky River ADD and $35/hour in KIPDA.

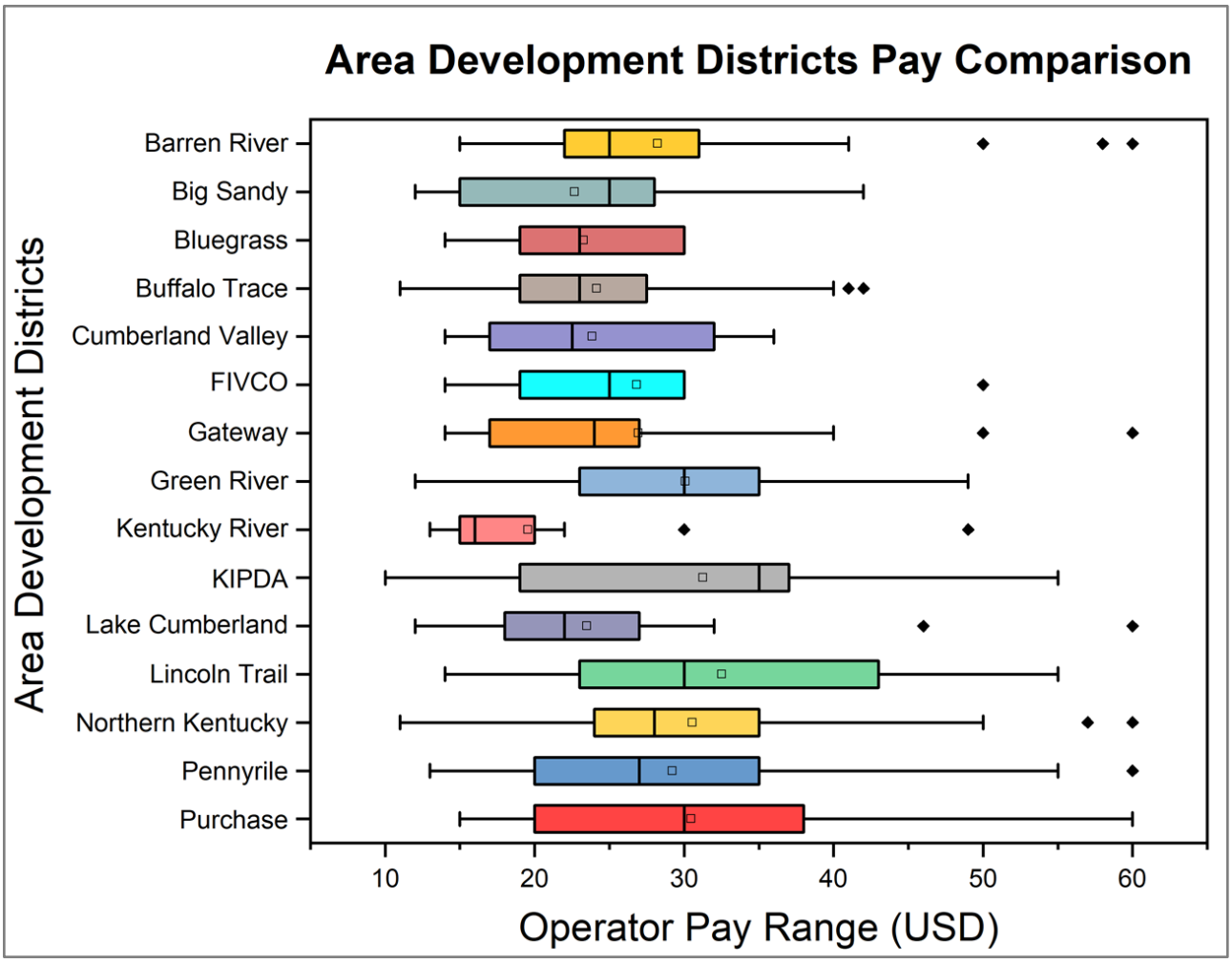

Figure 3.2 Distribution of Pay Rates Across Kentucky's 15 Area Development Districts
Note: The lower and upper marks on each whisker plot reflect the minimum and maximum pay, while the lower and upper bounds of each box represent the 25 and 75 percentiles of pay respectively. The middle line in each box represents the median pay while the small box represents the average pay. The diamonds represent individual outliers.

In the most recently published AWWA Compensation Survey (2021), the average salary for a licensed small water/wastewater system plant operator serving systems with less than 10,000 customers was $27/hour. Since it can be expected that larger utilities may be able to offer their employees higher pay, this number represents a lower floor or threshold for the average expected pay of operators in Kentucky.

In our survey, the median pay rate for operators (which included small, i.e., < 10,000 customers (45%); medium, i.e., between 10,000 and 50,000 customers (36%); and large, i.e., > 50,000 customers (19%)) was $25/hour [O.20] which suggests that utilities in Kentucky are paying less than the national average. In addition, utilities in at least 10 of the 15 Kentucky Area Development Districts have median pay rates less than this average, with some being divergent by over $10/hour (i.e., Kentucky River ADD).

3.6.2.2 Benefits.

With the exception of pay, it appears that most operators seemed to be fairly pleased with the range of benefits offered by their employer. This conclusion is reflected in both the responses of the operators and the perceptions of the managers, although managers felt that 30% of their operators were dissatisfied with their benefits [M.31].

Operators indicated that their utility provided the following benefits [O.22]:

- Paid sick and vacation days (90%)
- Paid holidays (89%)
- Health insurance (86%)
- Retirement benefits (82%)
- Paid time to attend meetings (77%)
- Paid or reimbursed certification fees (76%)
- Overtime (69%)
- Life and disability insurance (64%)
- Annual raises (64%)
- Paid or reimbursed training expenses (63%)

While such benefits seem to be consistent across the industry, it is noteworthy that these benefits are not universal, thus in some cases, a significant percentage (i.e., 10% to 40% in some cases) may not have one or more of these benefits. Further only 34% of the operators reported that their utility paid them to study for their certification exams and only 29% of the utilities provided any mechanism for comp time. Thus, depending on the specific utility and the benefits provided, the absence of some benefits could be a barrier for retaining existing operators for that specific utility.

3.6.2.3 A lack of appreciation of employees by utility decision-makers.

The survey results indicate that a lack of appreciation of employees by utility decision-makers may be a potential cause of retention issues. Both the operator and manager surveys included questions that attempted to judge the degree to which operators felt appreciated by the utility leadership and decision makers. Nearly 40% of the operators indicated that they did not feel appreciated by their utility [O.30]. This response may be influenced by two other issues. Approximately half of the operators felt that their utility's decision makers did not understand what they did in their job [O.28] while 55% of the operators indicated that the utility's decision makers rarely or never communicate with the operators. While the mangers did acknowledge some ways that their utility does try to reward or show their appreciation for its operators, the lack of a universal adoption of such methods across the industry is significant. More specifically, the percentage of utilities that do try to employ such strategies is summarized as follows [M.24].

- Provide pay increases based on certification achievements [76%]
- Provide pay increases based on employee performance [50%]
- Provide longevity awards [32%]

- Offer leadership skills training to employees [27%]
- Recognize employees for their contributions [19%]

A lack of a more universal implementation of such strategies could help explain why the water industry seems to be having a problem retaining qualified operators.

3.6.2.4 Lack of appreciation of the retention problem by management.

According to the manager survey, approximately 40% of the respondents indicated that their utility's leadership did not understand the seriousness of the operator retention problem [M.27]. This reinforces a general finding of the survey that many utility decision makers (i.e., utility boards or city councils) need to improve communication with their utility managers and operators. It is possible that they do not fully understand or appreciate the value and challenges of retaining such important human assets. While this may be due to several factors, it does suggest that steps should be implemented to bridge such gaps where they occur.

In Kentucky, operators must renew their licenses every two years and are required to obtain up to 24 hours of continuing education credits. Board members, regulated by the Kentucky Public Service Commission, are only required to take twelve hours of initial training within one year of taking office. Water district commissioners who desire additional annual compensation are required to obtain six hours of approved training. The remaining utility decision makers are not required to obtain or attend any training related to drinking water or wastewater operations (KRS 74.020). Additional, and perhaps annual, training would be beneficial in addressing the lack of appreciation indicated by the water workforce. In some cases, utility boards or city councils have participated in tours of their utility facilities or invited utility management and/or operators to make presentations at their regular meetings. Both actions represent some tangible ways that decision makers could help to overcome this perception.

3.6.2.5 Lack of a succession plan.

Only 37% of the managers indicated that their utility had a succession plan if an operator leaves or retires and only 35% indicated that their utility had a succession plan if a manager left or retired [M.31]. Such percentages are alarming and indicate that utilities may need additional training and support in this area.

3.6.2.6 Additional reasons for operators leaving the job.

Another indication of why utilities may have trouble retaining operators is reflected in the specific responses by managers to the question: "In your experience, what reasons do operators give for leaving the job?". These are summarized below.

- Better pay in another job opportunity (72%)
- Retiring (62%)
- Undesirable working hours (38%)
- Another job opportunity for career advancement (36%)

- Better benefits in another job opportunity (35%)
- Too much responsibility (22%)
- They no longer want to work in the water sector (17%)
- Certification process is too difficult (16%)
- Too many regulations (13%)

Not surprisingly, the number one identified reason was related to pay, which again reinforces the suggestion that operators in Kentucky are not being paid competitive salaries. The other responses underscore additional areas where employers may need to focus.

3.6.2.7 Potential impacts associated with the COVID crisis.

Although not explicitly asked on the survey, it is possible that part of the operator retention problem may be associated with the residual effects of the COVID crisis. When managers were asked about experiences with the utility over the last two years (i.e., the COVID period), responses including the following [M.28]:

- Increased workloads (64%)
- Increased stress (55%)
- Lower morale (41%)

The surveyed operators provided similar responses [O.34]:

- Increased workloads (66%)
- Increased stress (60%)
- Lower morale (46%)
- Increased work hours (37%)
- Financial hardships (31%)

These results indicate there was a significant amount of stress on the operator community and that utilities should be looking for ways to address these issues going forward. While some of these issues may be transitory, utilities should nevertheless survey their own operators to see if such experiences still exist, and if they do, work to develop specific action plans to address them.

3.6.3 What do not appear to be the causes of the problem?

3.6.3.1 Job satisfaction.

A total of 64% of the operators surveyed indicated that they were somewhat happy or extremely happy with their jobs [O.33]. Only 14% indicated that they were somewhat unhappy or extremely unhappy with their jobs. Further, 70% of the operators surveyed indicated that they are given the equipment and tools they need to do their jobs effectively and 76% of the operators indicated that they liked doing their assigned tasks [O.36]. These responses indicate an industry with fairly good job satisfaction, which also

represents a strong marketing point for the recruitment of new operators. More specific responses to the question of job satisfaction are provided in Figure 3.3.

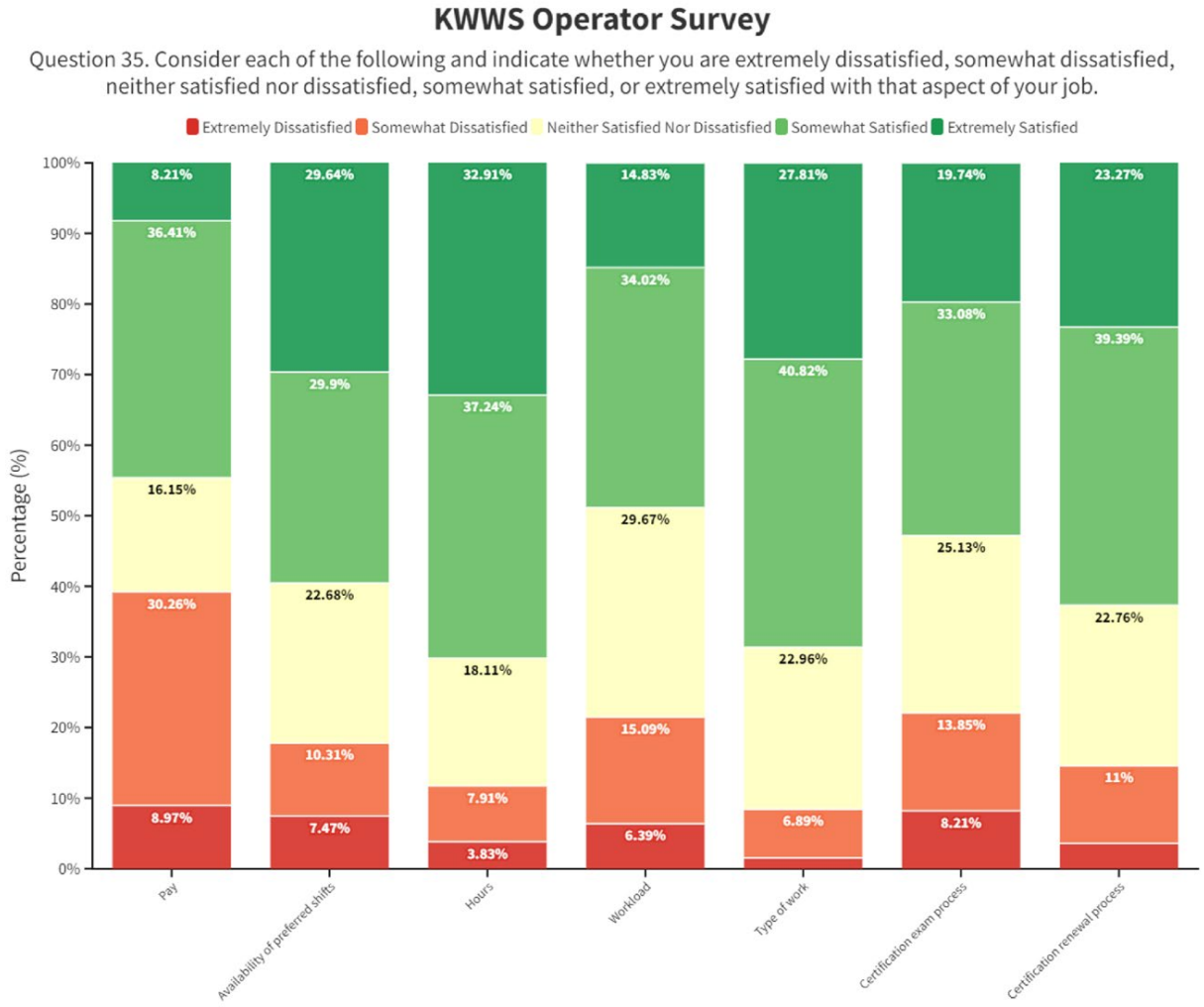

Figure 3.3 Operator Job Satisfaction [O.35]

Despite these results, 39% of the surveyed operators indicated that they were considering leaving the utility where they currently work, and 28% of the operators were considering leaving the water industry itself [O.36]. Additional potential concerns of operators are provided in Figure 3.4. If these reasons are not related to job satisfaction, then they are likely related to pay or the other issues discussed previously.

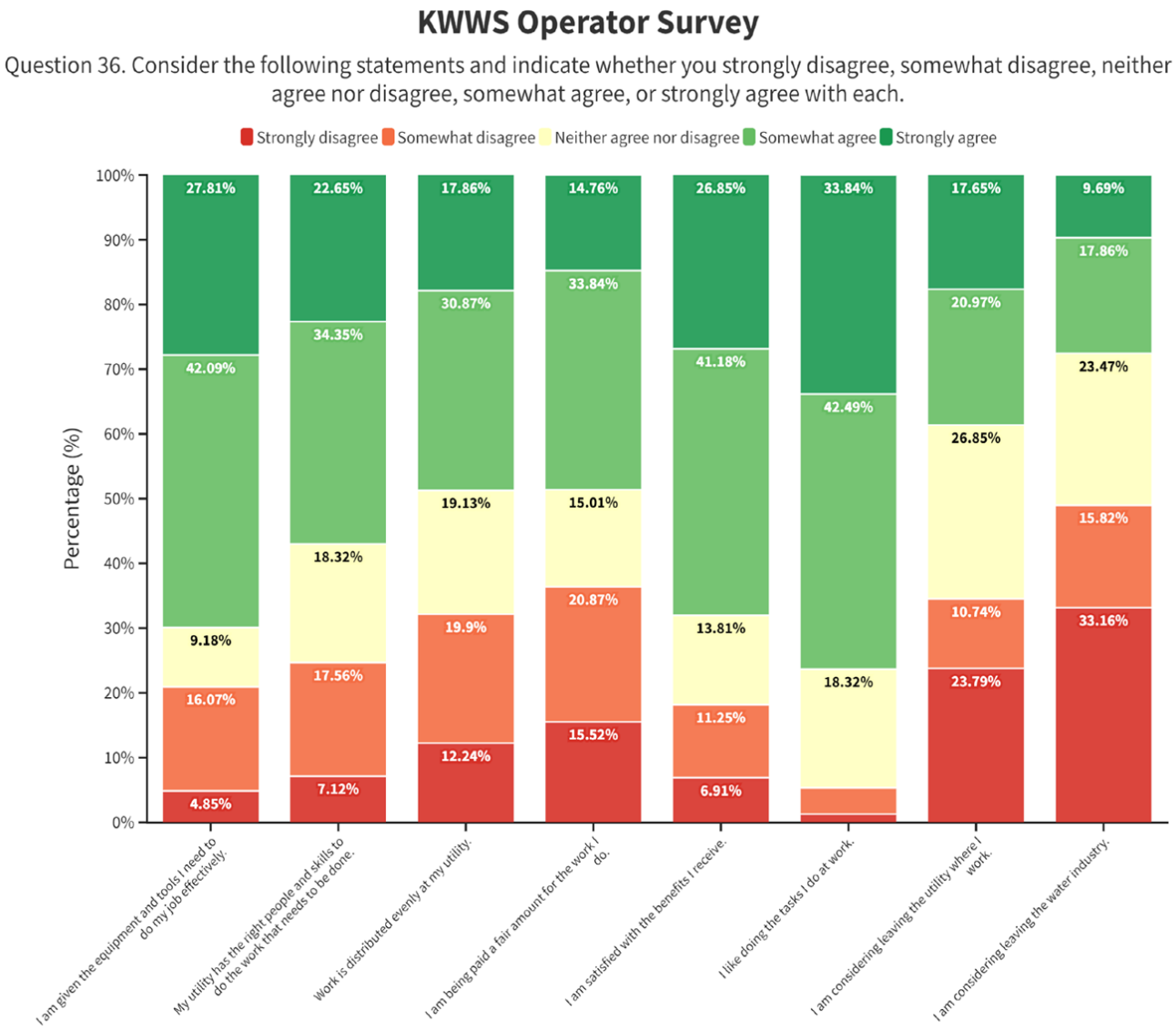

Figure 3.4 Operator Job Satisfaction [O.36]

3.6.3.2 Opportunities for promotions and career advancement.

A total of 74% of the responding operators believe that their utility provides opportunities for promotions and career advancements [O.25]. This is slightly less than 82% of managers who reported that their utility provides such opportunities [M.14]. This minor discrepancy might suggest that some utilities may need to do a better job of educating their employees about such opportunities. Nonetheless, there is still a significant number of utilities (i.e., 18% to 26%) who, according to the survey respondents, do not provide any opportunities for promotion and career advancement, which presents a potential barrier for recruitment and retention.

3.6.4 What can be done to address the problem?

Potential strategies for retaining operators are implicitly identified in the answers to the questions related to potential sources of problems. A summary of strategies is provided below.

3.6.4.1 Educate utility decision makers about the magnitude and nature of the problem.

As a first step, it is important for utility decision makers to first be aware of and then acknowledge the problem. It is hoped that the current survey will help educate such decision makers about the magnitude and nature of the problem as well as suggest some possible strategies for addressing the problem.

3.6.4.2 Increase pay.

As previously demonstrated, there appears to be a noticeable discrepancy between what operators are currently being paid and what is an appropriate rate. This discrepancy varies by Area Development District, with the most significant discrepancy in the Kentucky River ADD. However, across the board, the survey results show that the average gap between current pay and expected pay is approximately $6/hour.

3.6.4.3 Increase benefits.

While the majority of operators indicated that they are pleased with the benefits package offered by their utility, not all utilities provide the range and variety of benefits that may be necessary to retain employees. Thus, at a minimum, a utility should review their current benefits package to see if it is in line with the rest of the industry and consistent with the expectations of their employees.

3.6.4.4 Demonstrate a greater appreciation of employees.

While some utilities do seek to show appreciation to their employees, the survey results indicate that this is not a universal practice. Some tangible ways to demonstrate a greater appreciate of employees are:

- Provide pay increases based on certification achievements.
- Provide pay increases based on employee performance.
- Provide longevity awards.
- Offer leadership skills training to employees.
- Recognize employees for their contributions.

As with benefits, a utility should review their current strategies for demonstrating appreciation to their employees, and where necessary make needed improvements.

3.6.4.5 Develop succession plans for both operators and managers.

One way to address a potential problem is to first anticipate the problem and then develop a contingency plan for action. Almost half of the responding managers reported

that their utility does not have a succession plan for either operator or managerial vacancies. Utility decision makers should develop not only an operator/manager retention plan with tangible action items, but also a formal succession plan that could include cross training in preparation for the scheduled retirement of either an operator or a manager.

3.6.4.6 Provide for additional board training.

Several survey questions revealed an apparent disconnect between utility decision makers and operators. In the Commonwealth of Kentucky, certified drinking water and wastewater operators must renew their licenses every two years and are required to obtain up to 24 hours of continuing education credits. In comparison, the water district commissioners regulated by the Kentucky Public Service Commission (KPSC) are required to receive twelve hours of initial training within one year of taking office (KRS 74.020). KPSC regulates approximately 17% of all drinking water and wastewater utilities in Kentucky. The remaining utility decision makers are not required to obtain or attend training related to drinking water or wastewater operations. Additional, and perhaps annual, training would be beneficial in addressing the lack of appreciation indicated by the water workforce. In some cases, utility boards or city councils have participated in tours of their utility's facilities or invited utility management or operators to make presentations at their regular meetings. Both actions represent tangible ways that decision makers could help to overcome this perception.

3.6.4.7 Additional steps.

Additional steps that could be implemented to help retain a utility's best workers can be inferred from the answers provided to the question in the manager survey related to reasons that operators give for leaving the job [M.30]. To summarize, these included:

- Better pay in another job opportunity (72%)
- Undesirable working hours (38%)
- Too much responsibility (22%)
- Certification process is too difficult (16%)
- Too many regulations (13%)

Some more specific actions that could be undertaken by the utility in order to retain its operators were explicitly identified and ranked by the operators themselves [O.37]. Ranked in order of importance, these included:

1. Increase pay.
2. Provide comp time.
3. Offer more training opportunities.
4. Provide better benefits.
5. Create incentive programs.
6. Provide new equipment and supplies.
7. Have more certified operators on staff.
8. Provide overtime pay.

3.7 Operator Recruitment Results

The second question associated with the first objective of this report was to determine if there is an operator recruitment problem in Kentucky. As with the retention problem, this question was addressed by analyzing the results of the individual operator and manager surveys around four sub-questions:

1) Is there a problem?
2) What are the possible causes of the problem?
3) What are not the causes of the problem?
4) What can be done to address the problem?

3.7.1 Is there a problem?

Survey question results that support the conclusion that there is an operator recruitment problem in Kentucky are summarized below.

3.7.1.1 Does your utility have enough operators?

A total of 55% of the operators [O.27] and 56% of the managers [M.18] indicated their utility does not have enough operators. This implies that the utility may be having a problem recruiting operators.

3.7.1.2 Age of operators.

A total of 80% of the operator survey respondents [O.1] were at least 35 years of age. Only 20% of the respondents were less than 35; 2% of those were less than 25 years of age. If this percentage is reflective of the total industry in Kentucky, then it would indicate that water and wastewater utilities in Kentucky are facing challenges in recruiting younger operators. The 2018 national water workforce study by the Brooking Institution found that approximately 10% of operators were less than 24 years of age (Kate & Tomer 2018). If the KWWS survey data is reflective of the industry as a whole in Kentucky, this indicates that the recruitment problem in Kentucky might be worse than other parts of the country.

3.7.2 What are the possible causes of the problem?

Both the operator and the manager survey revealed several possible causes of the difficulties in recruiting new operators. These are summarized below.

3.7.2.1 Lack of qualified applicants.

A total of 68% of surveyed managers indicated that hiring new operators was hampered by a lack of qualified applicants [M.26]. Over the last two years, 55% of the utilities reported that they had experienced an increase in the number of job vacancies, while 53% reported that they were receiving less job applicants for open positions [M.28]. The reasons for this problem likely vary (e.g., COVID), however, the results support the need for a more proactive statewide strategy to better prepare high school students and

recent graduates for jobs in the water industry. One example of such a program is the employee apprenticeship program currently offered by the Kentucky Rural Water Association. Additional steps, programs, and funding are needed.

3.7.2.2 General barriers to recruitment.

A total of 64% of the respondents to the manager survey indicated that they were having difficulty hiring and retaining skilled staff [M.10]. Managers were also explicitly asked to identify barriers to hiring operators [M.26]. The top answers are provided below.

- Rate of pay: 74%
- Lack of qualified applicants: 68%
- Available shifts are not desirable: 34%
- Type of work: 32%
- Financial limitations at the utility: 30%
- Certification process: 28%
- Certification requirements: 25%
- Applicants unwilling to become certified: 22%
- Lack of benefits: 15%

While the lack of benefits did not appear to be a major barrier to recruitment, the current rate of pay is. This issue was addressed more specifically in section 3.6.2.2. The lack of qualified applicants was also identified as a major barrier. While somewhat speculative, it is possible this problem may be related to a lack of trainee or apprentice programs (see section 3.7.2.5) or the lack of an effective advertisement or recruitment program (see section 3.7.2.6). This could also be related to the possible lack of appreciation by the utility decision-makers of the severity of the current problem (see section 3.7.2.7). While not a major barrier to recruitment, the operator certification process was identified as a potential problem in recruiting some operators. This issue is examined in more detail in section 3.8. It is suspected that some of this concern may be related to anxieties related to the math portions of such exams. If this is the case, then perhaps the different service providers may develop and provide remedial training in this area. One such course has already been developed and implemented by the KWRRI.

3.7.2.3 Pay expectation gap.

The median of the existing pay of operators was found to be $25/hour [O.20] while the mean of the expected pay was found to be $31/hour [O.21]. This indicates that the responding operators are being paid approximately $6/hour less than they expect, and if applicable across all levels of employment, could represent a reason why utilities may be having a problem recruiting new operators. This conclusion is further reinforced by the fact that only 49% of the operators felt that they were being paid a fair amount for the work they perform [O.36].

A further indication of the possible impact of low pay rates for new operators can be inferred from an examination of the range of pay for utilities as distributed across the 15 different Area Development Districts (see Figure 1.2).

If one assumes that the lower end of each distribution represents the minimum pay for a new operator, then this would suggest that the beginning salaries vary between $10/hour and $15/hour, which is less than currently offered by some fast-food restaurants. An alternative indication of the entry-level pay is provided by results from the manager survey which found that the median entry-level pay for certified drinking water operator was approximately $16/hour [M.22a] and the median entry-level pay for a certified wastewater operator was approximately $16/hour [M.22c].

In the most recently published AWWA Compensation Survey (2021), the minimum average salary for a licensed small system plant operator (serving systems with less than 10,000 customers) was $20/hour. This suggests that operators in Kentucky are not being paid at a rate commensurate with the national average. This seems especially egregious since such individuals represent the first line of defense and protection for both the public health of its citizens and the water resources of our Commonwealth.

3.7.2.4 Benefits.

Apart from pay, most responding operators report satisfaction with the range of benefits offered by their employer. This conclusion is reflected in both the responses of the operators and the perceptions of the managers, although managers felt that 30% of their operators were dissatisfied with their benefits [M.31]. Operators indicated that their utility provided the following benefits [O.22]:

- Paid sick and vacation days (90%)
- Paid holidays (89%)
- Health insurance (86%)
- Retirement benefits (82%)
- Paid time to attend meetings (77%)
- Paid or reimbursed certification fees (76%)
- Overtime (69%)
- Life and disability insurance (64%)
- Annual raises (64%)
- Paid or reimbursed training expenses (63%)

While such benefits seem to be fairly consistent across the industry, it is noteworthy that these benefits are not universal, thus in some cases, a significant percentage (i.e., 10% to 40% in some cases) may not have one or more of these benefits. Further, only 34% of the operators reported that their utility paid them to study for their certification exams, and only 29% of the utilities provided any mechanism for comp time. Thus, depending on the specific utility and the benefits provided, the absence of some benefits could be a barrier for recruiting new operators for that specific utility.

3.7.2.5 Lack of a trainee or apprentice program.

A total of 45% of the operator respondents indicated that their utility did not have a trainee or apprentice program [O.24]. This was somewhat in contrast with the results of the manager survey, where 80% of the respondents indicated their utility hires trainees and/or apprentices [M.11]. Approximately 59% of the managers indicated that their utility did have a formal trainee program that allows on-site supervision and hands-on training to be provided to operators in training [M.12]. These results may indicate two things: 1) there is a need for a trainee or apprentice program in some utilities, and 2) operators in some utilities may not be aware that such opportunities exist. Regardless, it is hypothesized that the lack of any such programs may contribute to the problem of recruiting new operators.

When managers were asked how many apprentices would be requested if provided the opportunity [M.13], the median response for water systems was 2 apprentices and for wastewater systems was 1 apprentice. Once again, these results indicate a perceived shortage and need for additional operators in both areas and may suggest that additional trainee or apprentice programs could help recruit additional workers to the industry.

3.7.2.6 Lack of effective recruitment tools and resources.

A comparison between the resources used by utilities to recruit new operators [M.25] and the resources used by operators to find jobs [O.5] revealed some interesting disparities. A list of the top resources used by utilities and managers is provided below along with the percentage of operators who used this same resource.

Job Resources	Resource Used by Utility	Resource Used by Operator
Newspapers	61%	18%
Online job posts	61%	32%
Social media	49%	15%
Industry-specific website	41%	18%
Local government site	29%	14%
Job fair	14%	8%
Unemployment office	12%	4%
Friend or family	N/A	57%

In most cases, less than one-half to one-third of the operators used the same recruitment tool employed by the utility. These results may provide some useful insights for use by utilities in being more strategic in their recruitment strategies.

Of greatest importance from the operator-related question was the fact that 57% of operators indicated that their primary source of finding a job in the water sector was from friends or family. While this does not rule out the possibility that the operators also used other resources, or the fact that friends and family members did not also use the

same resources, it does appear that personal networking remains the primary way in which operators discover new jobs in the water industry.

3.7.2.7 Lack of appreciation of the recruitment problem by management.

The survey results indicate that another potential problem in the recruitment of new operators is that utility decision makers are not recognizing the challenges associated with recruiting operators. According to the manager survey, approximately 40% of the respondents [M.27] indicated that their utility leadership did not understand the seriousness of the recruitment problem. This reinforces a general finding of the survey that many utility decision makers (i.e., utility boards or city councils) may not fully understand or appreciate the challenges their utility is facing.

3.7.3 What do not appear to be the causes of the problem?

While both the operator and manager surveys revealed several possible causes for problems in recruiting new operators, several metrics were identified that did not seem to be current barriers to such recruitment. These include benefits, opportunities for promotions and career advancement, and overall job satisfaction. The latter two are briefly examined below.

3.7.3.1 Opportunities for promotions and career advancement.

The majority of operators (74%) believe that their utility provides opportunities for promotions and career advancements [O.25]. This is slightly less than the manager's response to the same question (82%) [M.14]. This minor discrepancy might suggest that some utilities may need to do a better job in educating potential recruits about such opportunities. Nonetheless, there is still a significant number of utilities (18% to 26%) who do not appear to provide any opportunities for promotion and career advancement indicating a potential barrier for future recruits.

3.7.3.2 Job satisfaction.

A total of 64% of the operators surveyed indicated that they were somewhat happy or extremely happy with their jobs [O.33]. Only 14% indicated that they were somewhat unhappy or extremely unhappy with their jobs. Further, 70% of the operators surveyed indicated that they are given the equipment and tools they need to do their jobs effectively, and 76% of the operators indicated that they liked doing their assigned tasks [O.36]. This indicates good job satisfaction which therefore may represent a strong marketing point for the recruitment of new operators. More specific responses to the question of job satisfaction were provided previously in Figure 3.3 (see Section 3.6.3).

Despite the more positive results provided in Figure 3.3, 39% of the surveyed operators indicated that they were considering leaving the utility where they currently work, and 28% of the operators were considering leaving the water industry itself [O.36]. Such trends are unlikely to help support the recruitment of new operators.

Additional potential concerns of operators were provided in Figure 3.4 (see Section 3.6.3). If these reasons are not related to job satisfaction, then they are likely related to pay [O.35, O.36, O.37] or the other issues discussed previously. If utilities hope to recruit new operators into an evolving industry, it is important that such issues are addressed. A few suggestions are provided below.

3.7.4 What can be done to address the problem?

Based on the results from both the operator and the manager surveys, the following recommendations could aid utility management and decision makers in the recruitment of operators into the water workforce:

- Evaluate utility financials and explore avenues to increase operator salary scales [O.35, O.36, O.37].
- Develop and implement an effective trainee internship and/or apprentice program [O.24, M.11, M.12, M.13].
- Develop more effective marketing strategies and techniques to advertise new positions [M.25, O.5].
- Evaluate utility benefit packages to ensure they are commensurate or competitive with other industries or even other utilities.
- Develop a template for an effective utility communication plan to improve employee, stakeholder, and public interaction during normal operating and emergency situations.
- Consider development of a decision maker training program for all utilities.

Regardless, for each of these strategies to be effective, it will be important for utility decision-makers to first recognize the importance and gravity of the operator recruitment problem and then take steps to address the problem. As previously mentioned, this will require improving communication and interaction between the utility's decision makers, the managers, the supervisors, and the operators [M.27].

At a minimum, such strategies will require additional financial resources. Depending upon the primary source of funds for each utility, it is important for decision makers to become better educated and motivated to take a more active role in promoting such necessary funding. Where such an approach is limited due to local political constraints, it may be necessary for state government and/or the service provider community to look for ways to help bridge this gap. Most assuredly, if such steps are not taken, then it is unlikely that the additional resources for water infrastructure that are expected to be distributed in the near future will see their best and most optimal use.

3.8 Is the certification process a potential barrier to recruitment or retention?

In examining the various reasons why a water/wastewater utility operator retention and recruitment problem exists in Kentucky, the ORDC decided to separate out one issue for a more detailed evaluation. That issue was the current operator certification process.

The survey examined whether the process is a potential barrier and if so, what can be done to improve that process.

Utility managers reported that approximately 30% of operators were either somewhat dissatisfied (21%) or extremely dissatisfied (8%) with the certification exam process [M.29]. Operators were asked the same question and 22% reported that they were somewhat dissatisfied (14%) or extremely dissatisfied (8%) with the certification exam process. Additionally, approximately 15% of the operators were dissatisfied with the certification renewal process.

Potential insights into reasons for such dissatisfaction might be gained by determining how long it typically took an operator to become certified [O.7] and by identifying reasons why it took some operators (i.e., 25%) more than 3 years to complete their first certification. Responses to why it took more than 3 years to complete the first certification included [O.7a]:

- My utility didn't support it (26%)
- I was concerned that I could not pass the exam (16%)
- Personal reasons (13%)
- The certification process was overwhelming (11)
- Too expensive (7%)

Specific reasons listed under the other category varied but are individually recorded in question O.7a in Appendix C.

The findings indicate a possible disconnect between the Kentucky Operator Certification Program (KOCP) and the individual operator. Many utilities submit operator examination and renewal information on behalf of their staff. In doing so, the individual operator may not be aware of KOCP's policies and procedures. For example, an operator with a high school education and one year of appropriate experience may take a Class I certification exam regardless of the utility's classification. In other words, operators at a Class III facility do not have to wait three years to take an exam but may take a lower class of examination based on their experience. As noted by 26% of the operators, some utilities do not support operators progressively obtaining lower certifications. Another example is that individual operators may not be aware that the license belongs to the individual and not the utility. Other than the limited certification classification, the license goes with the individual operator, allowing the operator to be in responsible charge at utilities classified at the same level.

Despite these findings, it should be noted that the KOCP is currently revamping its certification process, including the development of new training and testing materials. The KOCP has also hired new instructors for their training program. Additional training resources are provided by a litany of service providers, including but not limited to, the Kentucky Rural Water Association, the Kentucky Water and Wastewater Operators Association, the Kentucky Rural Community Assistance Program, and the University of

Kentucky (i.e., the KWRRI and the UK Department of Civil Engineering). It is hoped that these many ongoing efforts will help address this issue for most utilities.

3.9 What issues were identified as a potential concern for overall utility management?

In addition to addressing the basic question of whether there was an operator retention and recruitment problem in Kentucky, the survey also contained questions that sought to document some of the general challenges faced by the water and wastewater utility industry. The challenges identified by the operators included [O.26]:

- Aging infrastructure (77%)
- Difficulty in hiring and retaining skilled staff (65%)
- Excessive inflow and infiltration (29%)
- Lack of support from leadership (29%)
- Excessive water loss (25%)
- Inadequate utility rates (23%)

The same question was also asked of the managers [M.10]. The percentages associated with their responses were very similar to the operators. The challenges identified by the managers included:

- Aging infrastructure (73%)
- Difficulty in hiring and retaining skilled staff (64%)
- Excessive inflow and infiltration (35%)
- Lack of support from leadership (15%)
- Excessive water loss (36%)
- Inadequate utility rates (26%)

A second question [O.34, M.28] was asked of both the operators and the managers in order to identify any specific challenges that occurred over the last two years. This question was used to gain some insights into the potential impact of the COVID crisis on the water and wastewater utility. In response to the question, “Over the last two years, which of the following have you experienced?”, the operator responses included:

- Increased workload (66%)
- Increased stress (60%)
- Lower morale (46%)
- Increased work hours (37%)
- Financial hardships (31%)

In response to the question, “Over the last two years, which of the following has your utility experienced?”, the manager responses included:

- Delays in receiving chemicals, parts, etc. (72%)
- Increased workloads (64%)
- Increased number of job openings (55%)

- Increased stress (55%)
- Decreased number of applicants for jobs (53%)
- Low morale (41%)
- Decreased funds (23%)

4.0 CONCLUSIONS

Based on an analysis of the results of both the operator and manager surveys, the data supports the conclusion that there is in fact an ongoing problem in recruiting and retaining qualified operators in Kentucky's water and wastewater industry. Some of the potential reasons for this problem are summarized below:

4.1 Problems associated with recruiting new operators.

- A lack of qualified applicants.
- A lack of adequate pay.
- A lack of consistent benefits.
- A lack of a trainee or apprentice program.
- A lack of effective recruitment strategies including advertisement.
- A lack of appreciation of the recruitment problem by management.

4.2 Problems associated with retaining existing operators.

- A lack of adequate pay.
- A lack of consistent benefits.
- Better pay elsewhere.
- A lack of appreciation of employees by utility decision-makers.
- A lack of succession planning.
- A lack of appreciation of the retention problem by management.
- Impacts from COVID.

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Appendix A: KWWS Operator Survey

Kentucky Water Workforce Survey- Utility Operators

Start of Block: Consent

Kentucky Water Workforce Survey: Utility Operators

Researchers at the University of Kentucky invite you to take part in a survey about your experiences as an operator in the water workforce. The purpose of the Kentucky Water Workforce Survey is to learn more about operator recruitment and retention. We are asking you to participate because you have experience as an operator at a utility in Kentucky which qualifies you to take the survey. The survey will help us gather information about Kentucky's water workforce in order to gain a better understanding of the challenges, barriers, and opportunities in hiring and retaining operators. Although you may not get personal benefit from taking part in this research study, your participation may help improve operator recruitment and retention in Kentucky. You may experience satisfaction from knowing you have contributed to research that may possibly benefit other operators in the future.

The brief survey will take about 10-15 minutes to complete. There are no known risks to participating in this study. Your response to the survey is anonymous which means no names, IP addresses, email addresses, or any other identifiable information will be collected with the survey responses. We will not know which responses are yours if you choose to participate.

We hope to receive completed surveys from about 500 operators. Your participation is very important to us, however, you have a choice about whether or not to complete the survey. If you do participate, you may choose to skip or refuse to answer questions. There is no penalty for skipping questions or discontinuing the survey.

At the end of the survey, your responses will be submitted and you will have the opportunity to visit a separate website to enter a drawing for a chance to win a gift card. You will be asked to provide your name, email address, and phone number so that you can be reached if you win one of the gift cards. There will be no way to tie the contact information you provide on that website back to this survey. Your survey results are anonymous. Participating in the gift card drawing is completely optional. The following organizations provided the funds to make the gift card drawings possible: Clean Water Professionals of KY & TN, KY/TN Section of the American Water Works Association, Kentucky Rural Water Association, Kentucky Municipal Utilities Association, and the Kentucky Water and Wastewater Operators Association. A gift card drawing will be held once a week for the five weeks the survey is open. A total of $500 in Amazon gift cards will be given away. Your odds of winning are dependent on when you respond to the survey and the number of people who respond to the survey. For example, if 500 people respond, you have a 1 in 125 chance of winning.

This study is funded by the Kentucky Division of Compliance Assistance (DCA). DCA will be provided with a summary of results from this survey. If you have questions about the study, please feel free to ask at any time. The Principal Investigator for this study is Dr. Lindell Ormsbee, P.E., P.H., Ph.D., D.WRE, F.ASCE, F.EWRI. He can be reached by email, lindell.ormsbee@uky.edu or by phone at 859-257-6329. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428. Thank you in advance for your assistance with this important project.

Sincerely,
Emily Koyagi
Kentucky Water Resources Research Institute
233 Mining & Minerals Building
Lexington, KY 40506-0107
Phone: (859)312-7321
Email: emily.koyagi@uky.edu

Do you consent to participate in this survey?

- ○ Yes
- ○ No

Skip To: End of Survey If Do you consent to participate in this survey? = No

End of Block: Consent

Start of Block: Demographic Questions about Operator

Kentucky Water Workforce Survey: Utility Operators The following questions ask about you and your career as an operator.

Please use the blue arrows at the bottom of the screen to move through the survey.

O.1. What is your age?

- ○ 18 - 24
- ○ 25 - 34
- ○ 35 - 44
- ○ 45 - 54
- ○ 55 - 64
- ○ 65 - 74
- ○ 75 +

O.2. What is your gender?

- ○ Female
- ○ Male
- ○ Non-binary
- ○ Not listed: _____
- ○ Prefer not to say

O.3. What is your ethnicity? (Select all that apply)

- ☐ Latino or Hispanic or Spanish origin of any race
- ☐ American Indian or Alaskan Native
- ☐ Asian
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Black or African-American
- ☐ White
- ☐ Other/Unknown _____
- ☐ Prefer not to say

O.4. What is the highest degree or level of education you have completed?

- ○ Some high school
- ○ High School or G.E.D.
- ○ Trade School
- ○ Associate Degree
- ○ Bachelor's Degree
- ○ Master's Degree
- ○ Ph.D. or higher
- ○ Prefer not to say

O.5. What resources have you used in the past to find jobs in the water sector? (Select all that apply)

- ☐ Newspaper
- ☐ Online job post (e.g., Indeed, ZipRecruiter, CareerBuilder, LinkedIn, etc.)
- ☐ Job fair
- ☐ School guidance counselor
- ☐ Unemployment office
- ☐ Industry-specific website (e.g., KWWOA, KRWA, WEF Career Center, AWWA, KMUA)
- ☐ Social media
- ☐ Local government website
- ☐ Temp agency
- ☐ Friend or family
- ☐ Other (please specify): _____

O.6. How old were you when you started working as an operator?

_____

O.7. How long were you in that job before you tested for your first certification?

- ○ Less than 1 year
- ○ 1 year
- ○ 2 years
- ○ 3 years
- ○ 4 years
- ○ 5+ years
- ○ Not applicable

Display This Question:

If 7. How long were you in that job before you tested for your first certification? = 3 years

Or 7. How long were you in that job before you tested for your first certification? = 4 years

Or 7. How long were you in that job before you tested for your first certification? = 5+ years

O.7a. Why did it take 3 or more years to test for your first certification? (Select all that apply)

- ☐ My utility didn't support it
- ☐ Too expensive
- ☐ The certification process was overwhelming
- ☐ I was concerned that I could not pass the exam
- ☐ Personal reasons
- ☐ Other (please specify): _____

O.8. Are you currently working as an operator?

- ○ Yes
- ○ No

Display This Question:

If 8. Are you currently working as an operator? = Yes

O.8a. How many utility systems do you work for?

_____

O.9. What level of license(s) do you hold? (Select all that apply)

- [ ] I don't have a license
- [ ] Wastewater Class I
- [ ] Wastewater Class II
- [ ] Wastewater Class III
- [ ] Wastewater Class IV
- [ ] Wastewater OIT
- [ ] Wastewater Limited
- [ ] Drinking Water Class I A-D
- [ ] Drinking Water Class II A
- [ ] Drinking Water Class III A
- [ ] Drinking Water Class IV A
- [ ] Drinking Water Limited
- [ ] Bottled Water
- [ ] Drinking Water Class I B-D
- [ ] Drinking Water Class II B-D
- [ ] Drinking Water Class III B
- [ ] Drinking Water Class IV B
- [ ] Drinking Water Class I D

- [ ] Drinking Water Class II D
- [ ] Drinking Water Class III D
- [ ] Drinking Water Class IV D
- [ ] Drinking Water OIT

Display This Question:

If 9. What level of license(s) do you hold? (Select all that apply) != I don't have a license

O.9a. Is your license active?

- ○ Yes, one or more of my licenses is active
- ○ No

Display This Question:

If 9a. Is your license active? = No

O.9b. Why is your license inactive? (Select all that apply)

- ☐ Renewal fees are too expensive
- ☐ I am retired
- ☐ I no longer work in this industry
- ☐ Jobs in this industry don't provide adequate pay and/or benefits
- ☐ Too many regulations
- ☐ Too much responsibility
- ☐ Certification exam and process is too difficult
- ☐ Unable to find a job
- ☐ Other (please specify): _____

O.10. Are you currently eligible to retire?

- ○ Yes
- ○ No
- ○ I'm not sure

O.11. When do you plan to retire?

- ○ Within the next 12 months
- ○ In 1 - 3 years
- ○ In 4 - 6 years
- ○ In 7 - 9 years
- ○ In 10+ years
- ○ I am retired.

End of Block: Demographic Questions about Operator

Start of Block: Questions about Utility

The following questions ask about the utility where you currently work. If you work at multiple utilities, please answer the questions for the utility where you work the greatest number of hours per week. If you are not currently working as an operator, answer the questions about your most recent job as an operator.

O.12. Which of the following best describes your role at the utility?

- ○ Certified operator
- ○ Operator trainee
- ○ Contract operator
- ○ Other (please specify): _____

O.13. Are you a supervisor or manager at the utility?

- ○ Yes
- ○ No

O.14. On average, how many hours do you work per week?

_____

O.15. Which of the following describe your utility? (Select all that apply)

- ☐ Drinking water treatment
- ☐ Drinking water distribution
- ☐ Wastewater treatment
- ☐ Wastewater collection

Display This Question:

If 15. Which of the following describe your utility? (Select all that apply) = Drinking water treatment

O.15a. What class is your drinking water treatment utility?

- ☐ Class I A-D
- ☐ Class I B-D
- ☐ Class II A
- ☐ Class II B-D
- ☐ Class III A
- ☐ Class III B
- ☐ Class IV A
- ☐ Class IV B

Display This Question:

If 15. Which of the following describe your utility? (Select all that apply) = Drinking water distribution

O.15b. What class is your drinking water distribution utility?

- ☐ Class I A-D
- ☐ Class I B-D
- ☐ Class I D
- ☐ Class II B-D
- ☐ Class II D
- ☐ Class III D
- ☐ Class IV D

Display This Question:

If 15. Which of the following describe your utility? (Select all that apply) = Wastewater treatment

O.15c. What class is your wastewater treatment utility?

- ○ Class I
- ○ Class II
- ○ Class III
- ○ Class IV

Display This Question:

If 15. Which of the following describe your utility? (Select all that apply) = Wastewater collection

O.15d. What class is your wastewater collection utility?

- ○ Class I
- ○ Class II
- ○ Class III
- ○ Class IV

O.16. How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.

- ○ 1 - 1,500
- ○ 1,501 - 10,000
- ○ 10,001 - 15,000
- ○ 15,001 - 30,000
- ○ 30,001 - 50,000
- ○ 50,001 +

O.17. Is your utility regulated by Kentucky's Public Service Commission (PSC)?

- ○ Yes
- ○ No
- ○ I'm not sure

O.18. What Area Development District (ADD) is your utility in? If your utility is in more than one ADD, please choose the one where your main office is located.

○ Purchase ADD (Ballard, Calloway, Carlisle, Fulton, Graves, Hickman, Marshall, McCracken)

○ Pennyrile ADD (Caldwell, Christian, Crittenden, Hopkins, Livingston, Lyon, Muhlenburg, Todd, Trigg)

○ Green River ADD (Daviess, Hancock, Henderson, McLean, Ohio, Union, Webster)

○ Lincoln Trail ADD (Breckinridge, Grayson, Hardin, LaRue, Marion, Meade, Nelson, Washington)

○ Barren River ADD (Allen, Barren, Butler, Edmonson, Hart, Logan, Metcalfe, Monroe, Simpson, Warren)

○ KIPDA ADD (Bullitt, Henry, Jefferson, Oldham, Shelby, Spencer, Trimble)

○ Northern Kentucky ADD (Boone, Campbell, Carroll, Gallatin, Grant, Kenton, Owen, Pendleton)

○ Bluegrass ADD (Anderson, Bourbon, Boyle, Clark, Estill, Fayette, Franklin, Garrard, Harrison, Jessamine, Lincoln, Madison, Mercer, Nicholas, Powell, Scott, Woodford)

○ Lake Cumberland ADD (Adair, Casey, Clinton, Cumberland, Green, McCreary, Pulaski, Russell, Taylor, Wayne)

○ Buffalo Trace ADD (Bracken, Fleming, Lewis, Mason, Robertson)

- ○ Gateway ADD (Bath, Menifee, Montgomery, Morgan, Rowan)
- ○ Kentucky River ADD (Breathitt, Knott, Lee, Leslie, Letcher, Owsley, Perry, Wolfe)
- ○ Cumberland Valley ADD (Bell, Clay, Harlan, Jackson, Knox, Laurel, Rockcastle, Whitley)
- ○ FIVCO ADD (Boyd, Carter, Elliott, Greenup, Lawrence)
- ○ Big Sandy ADD (Floyd, Johnson, Magoffin, Martin, Pike)

O.19. How many years have you worked at the utility?

- ○ Less than 1 year
- ○ 1 - 3 years
- ○ 4 - 6 years
- ○ 7 - 9 years
- ○ 10 - 15 years
- ○ 16 - 20 years
- ○ 21 - 25 years
- ○ 26 - 30 years
- ○ 30+ years

O.20. Using the slider below, move the bar to the number that corresponds with your hourly wage.

0 5 10 15 20 25 30 35 40 45 50 55 60

Hourly Wage	

O.21. Using the slider below, move the bar to the number that corresponds with what you think your hourly wage should be.

0 5 10 15 20 25 30 35 40 45 50 55 60

Hourly Wage	

O.22. What benefits does your utility provide? (Select all that apply)

- ☐ Health insurance
- ☐ Retirement benefits
- ☐ Life and disability insurance
- ☐ Paid sick and vacation days
- ☐ Paid holidays
- ☐ Annual raises
- ☐ Overtime
- ☐ Comp time
- ☐ Paid time and travel to attend trainings
- ☐ Paid or reimbursed tuition or training expenses
- ☐ Paid or reimbursed certification fees
- ☐ Paid or reimbursed certification renewal fees
- ☐ Paid time to study for exams
- ☐ Other (please specify): _____

O.23. What job duties are you responsible for at your utility, other than basic system/treatment works? (Select all that apply)

- [ ] Office work
- [ ] Collecting payments
- [ ] Equipment maintenance
- [ ] Trash services
- [ ] Natural gas services
- [ ] Electrical utility services
- [ ] City maintenance (e.g., mowing)
- [ ] Other (please specify): _____
- [ ] I am not responsible for any other job duties

O.24. Does your utility have a trainee or apprentice program?

- ○ Yes
- ○ No
- ○ I'm not sure

O.25. Does your utility offer opportunities for promotions and career advancement?

- ○ Yes
- ○ No

O.26. What type of operations challenges does your utility face? (Select all that apply)

- ☐ Excessive water loss
- ☐ Excessive inflow and infiltration
- ☐ Declining customer population
- ☐ Aging infrastructure
- ☐ Difficulty hiring and retaining skilled staff
- ☐ Inadequate utility rates
- ☐ Inadequate source of water
- ☐ Inadequate receiving water
- ☐ Non-compliance with permit and regulatory requirements.
- ☐ Lack of trust from customers regarding water quality, service, rates, etc.
- ☐ Lack of community and economic development planning
- ☐ Lack of support from leadership (e.g., city council or utility board)
- ☐ Other (please specify): _____

End of Block: Questions about Utility

Start of Block: Job Satisfaction

The following questions ask about your thoughts and opinions on your current job as well as the water industry as a whole.

O.27. In your opinion, does your utility have enough operators?

- ○ Yes
- ○ No

O.28. How well do your utility's decision makers (e.g., city council or utility board) understand what you do in your job?

- ○ Extremely well
- ○ Very well
- ○ Moderately well
- ○ Slightly well
- ○ Not well at all

O.29. How often do your utility's decision makers (e.g., city council or utility board) communicate with the operators?

- ○ Very frequently
- ○ Frequently
- ○ Occasionally
- ○ Rarely
- ○ Never

O.30. Do you feel appreciated by your utility?

- ○ A great deal
- ○ A lot
- ○ A moderate amount
- ○ A little
- ○ Not at all

O.31. Do your managers listen to your opinions on matters that you deal with on a daily basis?

- ○ Always
- ○ Most of the time
- ○ About half the time
- ○ Sometimes
- ○ Never

O.32. The services provided by drinking water and wastewater utility operators protect public health, the environment, and water quality. Consider each of the following groups of people and tell us, in your opinion, do they think the work you do is not at all important, slightly important, moderately important, very important, or extremely important?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
City council or utility board	○	○	○	○	○
Community	○	○	○	○	○
Friends and family	○	○	○	○	○
Coworkers	○	○	○	○	○
Supervisors	○	○	○	○	○

O.33. How happy are you at work?

- ○ Extremely happy
- ○ Somewhat happy
- ○ Neither happy nor unhappy
- ○ Somewhat unhappy
- ○ Extremely unhappy

O.34. Over the last two years, which of the following have you experienced? (Select all that apply)

- ☐ Increased workload
- ☐ Decreased workload
- ☐ Increased work hours
- ☐ Decreased work hours
- ☐ Lower morale
- ☐ Financial hardships
- ☐ Increased stress
- ☐ Other (please specify): _____
- ☐ None of these apply

O.35. Consider each of the following and indicate whether you are extremely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, or extremely satisfied with that aspect of your job.

	Extremely dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Extremely satisfied
Pay	○	○	○	○	○
Availability of preferred shifts	○	○	○	○	○
Hours	○	○	○	○	○
Workload	○	○	○	○	○
Type of work	○	○	○	○	○
Certification exam process	○	○	○	○	○
Certification renewal process	○	○	○	○	○

O.36. Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I am given the equipment and tools I need to do my job effectively.	○	○	○	○	○
My utility has the right people and skills to do the work that needs to be done.	○	○	○	○	○
Work is distributed evenly at my utility.	○	○	○	○	○
I am being paid a fair amount for the work I do.	○	○	○	○	○
I am satisfied with the benefits I receive.	○	○	○	○	○
I like doing the tasks I do at work.	○	○	○	○	○
I am considering leaving the utility where I work.	○	○	○	○	○
I am considering leaving the water industry.	○	○	○	○	○

O.37. The following is a list of things that utilities can do to encourage operators to stay in the water industry. In your opinion, which are the most effective? Rank them from most effective to least effective by dragging and dropping the statements to reorder them. When you click on a statement to move it, you will see the rank you are giving it.

For example, if you think that increasing pay is the most effective way utilities can encourage operators to stay in the water industry, you will drag that statement to the top, giving it a rank of 1. Continue ranking the options from the most effective (rank of 1) to the least effective (rank of 8).

_____ Create incentive programs
_____ Have more certified operators on staff
_____ Increase pay
_____ Offer more training opportunities
_____ Provide better benefits
_____ Provide comp time
_____ Provide new equipment and supplies
_____ Provide overtime pay

Thank you for completing the survey. Please click the blue arrow on the right below to submit your responses.

End of Block: Job Satisfaction

Appendix B: KWWS Manager Survey

Kentucky Water Workforce Survey- Utility Managers

Start of Block: Consent

Researchers at the University of Kentucky invite you to take part in a survey about your experiences as a water utility manager. The purpose of the Kentucky Water Workforce Survey is to learn more about operator recruitment and retention. We are asking you to participate because you have experience as a manager at a utility in Kentucky which qualifies you to take the survey. The survey will help us gather information about Kentucky's water workforce in order to gain a better understanding of the challenges, barriers, and opportunities in hiring and retaining operators. Although you may not get personal benefit from taking part in this research study, your participation may help improve operator recruitment and retention in Kentucky. You may experience satisfaction from knowing you have contributed to research that may possibly benefit the water workforce in the future.

The brief survey will take about 10-15 minutes to complete. There are no known risks to participating in this study. Your response to the survey is anonymous which means no names, IP addresses, email addresses, or any other identifiable information will be collected with the survey responses. We will not know which responses are yours if you choose to participate.

We hope to receive completed surveys from about 175 utility managers. Your participation is very important to us, however, you have a choice about whether or not to complete the survey. If you do participate, you may choose to skip or refuse to answer questions. There is no penalty for skipping questions or discontinuing the survey.

At the end of the survey, your responses will be submitted and you will have the opportunity to visit a separate website to enter a drawing for a chance to win a gift card. You will be asked to provide your name, email address, and phone number so that you can be reached if you win one of the gift cards. There will be no way to tie the contact information you provide on that website back to this survey. Your survey results are anonymous. Participating in the gift card drawing is completely optional. The following organizations provided the funds to make the gift card drawings possible: Clean Water Professionals of KY & TN, KY/TN Section of the American Water Works Association, Kentucky Rural Water Association, Kentucky Municipal Utilities Association, and the Kentucky Water and Wastewater Operators Association. A $100 gift card drawing will be held once a week for the five weeks the survey is open. A total of $500 in Amazon gift cards will be given away. Your odds of winning are dependent on when you respond to the survey and the number of people who respond to the survey. For example, if 175 people respond, you have a 1 in 175 chance of winning.

This study is funded by the Kentucky Division of Compliance Assistance (DCA). DCA will be

provided with a summary of results from this survey. If you have questions about the study, please feel free to ask at any time. The Principal Investigator for this study is Dr. Lindell Ormsbee, P.E., P.H., Ph.D., D.WRE, F.ASCE, F.EWRI. He can be reached by email, lindell.ormsbee@uky.edu or by phone at 859-257-6329. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428. Thank you in advance for your assistance with this important project.

Sincerely,
Emily Koyagi
Kentucky Water Resources Research Institute
233 Mining & Minerals Building
Lexington, KY 40506-0107
Phone: (859)312-7321
Email: emily.koyagi@uky.edu

Do you consent to participate in this survey?

- ○ Yes
- ○ No

Skip To: End of Survey If Do you consent to participate in this survey? = No

End of Block: Consent

Start of Block: General Questions about Manager & Utility

Kentucky Water Workforce Survey: Utility Managers

The following questions ask about the utility where you work and your role there as the utility contact person. If you are the contact person for more than one utility, please complete separate surveys for each individual utility.

Please use the blue arrows at the bottom of the screen to move through the survey.

M.1. Which of the following best describes your current position at the utility?

- ○ Administrator
- ○ Manager
- ○ Administrative Assistant
- ○ Superintendent
- ○ Elected Official
- ○ Owner
- ○ Other (please specify): _____

M.2. Do you work part-time or full-time?

- ○ Part-time
- ○ Full-time

M.3. How many years have you worked at the utility?

- ○ Less than 1 year
- ○ 1 - 3 years
- ○ 4 - 6 years
- ○ 7 - 9 years
- ○ 10 - 15 years
- ○ 16 - 20 years
- ○ 21 - 25 years
- ○ 26 - 30 years
- ○ 30+ years

M.4. Are you currently eligible to retire?

- ○ Yes
- ○ No
- ○ I'm not sure

M.5. When do you plan to retire?

- ○ Within the next 12 months
- ○ In 1 - 3 years
- ○ In 4 - 6 years
- ○ In 7 - 9 years
- ○ In 10+ years
- ○ I am retired.

M.6. What Area Development District (ADD) is your utility in? If your utility is in more than one ADD, please choose the one where your main office is located.

○ Purchase ADD (Ballard, Calloway, Carlisle, Fulton, Graves, Hickman, Marshall, McCracken)

○ Pennyrile ADD (Caldwell, Christian, Crittenden, Hopkins, Livingston, Lyon, Muhlenburg, Todd, Trigg)

○ Green River ADD (Daviess, Hancock, Henderson, McLean, Ohio, Union, Webster)

○ Lincoln Trail ADD (Breckinridge, Grayson, Hardin, LaRue, Marion, Meade, Nelson, Washington)

○ Barren River ADD (Allen, Barren, Butler, Edmonson, Hart, Logan, Metcalfe, Monroe, Simpson, Warren)

○ KIPDA ADD (Bullitt, Henry, Jefferson, Oldham, Shelby, Spencer, Trimble)

○ Northern Kentucky ADD (Boone, Campbell, Carroll, Gallatin, Grant, Kenton, Owen, Pendleton)

○ Bluegrass ADD (Anderson, Bourbon, Boyle, Clark, Estill, Fayette, Franklin, Garrard, Harrison, Jessamine, Lincoln, Madison, Mercer, Nicholas, Powell, Scott, Woodford)

○ Lake Cumberland ADD (Adair, Casey, Clinton, Cumberland, Green, McCreary, Pulaski, Russell, Taylor, Wayne)

○ Buffalo Trace ADD (Bracken, Fleming, Lewis, Mason, Robertson)

- ○ Gateway ADD (Bath, Menifee, Montgomery, Morgan, Rowan)
- ○ Kentucky River ADD (Breathitt, Knott, Lee, Leslie, Letcher, Owsley, Perry, Wolfe)
- ○ Cumberland Valley ADD (Bell, Clay, Harlan, Jackson, Knox, Laurel, Rockcastle, Whitley)
- ○ FIVCO ADD (Boyd, Carter, Elliott, Greenup, Lawrence)
- ○ Big Sandy ADD (Floyd, Johnson, Magoffin, Martin, Pike)

M.7. Which of the following describe your utility? (Select all that apply)

- ☐ Drinking water treatment
- ☐ Drinking water distribution
- ☐ Wastewater treatment
- ☐ Wastewater collection

Display This Question:

If 7. Which of the following describe your utility? (Select all that apply) = Drinking water treatment

M.7a. What class is your drinking water treatment utility?

- ☐ Class I A-D
- ☐ Class I B-D
- ☐ Class II A
- ☐ Class II B-D
- ☐ Class III A
- ☐ Class III B
- ☐ Class IV A
- ☐ Class IV B

Display This Question:

If 7. Which of the following describe your utility? (Select all that apply) = Drinking water distribution

M.7b. What class is your drinking water distribution utility?

- ☐ Class I A-D
- ☐ Class I B-D
- ☐ Class I D
- ☐ Class II B-D
- ☐ Class II D
- ☐ Class III D
- ☐ Class IV D

Page Break

Display This Question:

If 7. Which of the following describe your utility? (Select all that apply) = Wastewater treatment

M.7c. What class is your wastewater treatment utility?

- ☐ Class I
- ☐ Class II
- ☐ Class III
- ☐ Class IV

Display This Question:

If 7. Which of the following describe your utility? (Select all that apply) = Wastewater collection

M.7d. What class is your wastewater collection utility?

- ☐ Class I
- ☐ Class II
- ☐ Class III
- ☐ Class IV

M.8. How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.

- ○ 1 - 1,500
- ○ 1,501 - 10,000
- ○ 10,001 - 15,000
- ○ 15,001 - 30,000
- ○ 30,001 - 50,000
- ○ 50,001 +

M.9. Is your utility regulated by Kentucky's Public Service Commission (PSC)?

- ○ Yes
- ○ No

M.10. Which of the following operations challenges does your utility face? (Select all that apply)

- ☐ Excessive water loss
- ☐ Excessive inflow and infiltration
- ☐ Declining customer population
- ☐ Aging infrastructure
- ☐ Difficulty hiring and retaining skilled staff
- ☐ Inadequate utility rates
- ☐ Inadequate source of water
- ☐ Inadequate receiving water
- ☐ Non-compliance with permit and regulatory requirements
- ☐ Lack of trust from customers regarding water quality, service, rates, etc.
- ☐ Lack of community and economic development planning
- ☐ Lack of support from leadership (e.g., city council or utility board)
- ☐ Other (please specify): _____

End of Block: General Questions about Manager & Utility

Start of Block: Questions about operators

The following questions ask about operator positions at your utility.

M.11. Does your utility hire trainees or apprentices?

- ○ Yes
- ○ No

M.12. Does your utility have a formal trainee program that allows on-site supervision and hands-on training to be provided to operators in training?

- ○ Yes, on a full-time basis
- ○ Yes, on a part-time basis
- ○ No

M.13. If your utility was offered a paid apprentice, how many would you request?

- ○ Drinking Water System Apprentice _____
- ○ Wastewater System Apprentice _____

M.14. Does your utility offer opportunities for promotions and career advancement?

- ○ Yes
- ○ No

M.15. What benefits does your utility provide for operators? (Select all that apply)

- ☐ Health insurance
- ☐ Retirement benefits
- ☐ Life and disability insurance
- ☐ Paid sick and vacation days
- ☐ Paid holidays
- ☐ Annual raises
- ☐ Overtime
- ☐ Comp time
- ☐ Paid time and travel to attend trainings
- ☐ Paid or reimbursed tuition or training expenses
- ☐ Paid or reimbursed certification fees
- ☐ Paid or reimbursed certification renewal fees
- ☐ Paid time to study for exams
- ☐ Other (please specify): _____

M.16. How many operator positions has your utility budgeted for?

- ○ Drinking Water Treatment Operators _____
- ○ Drinking Water Distribution Operators _____
- ○ Wastewater Treatment Operators _____
- ○ Wastewater Collection Operators _____

M.17. How many operator positions at your utility are filled?

- ○ Drinking Water Treatment Operators _____
- ○ Drinking Water Distribution Operators _____
- ○ Wastewater Treatment Operators _____
- ○ Wastewater Collection Operators _____

M.18. In your opinion, does your utility have enough operators?

- ○ Yes
- ○ No

M.19. How many operators are eligible to retire **now** at your utility? _____

M.20. How many operators are eligible to retire **within the next 2-5 years** at your utility? _____

M.21. Does your utility have a formal documented pay scale for certified operators?

- ○ Yes
- ○ No

Display This Question:

If 7. Which of the following describe your utility? (Select all that apply) = Drinking water treatment

Or 7. Which of the following describe your utility? (Select all that apply) = Drinking water distribution

M.22a. Using the slider below, please move the bar to the number that corresponds with the **starting wage** for an entry-level certified drinking water operator at your utility.

Not Applicable

0 5 10 15 20 25 30 35 40 45 50 55 60

Hourly Wage

Display This Question:

If 7. Which of the following describe your utility? (Select all that apply) = Drinking water treatment

Or 7. Which of the following describe your utility? (Select all that apply) = Drinking water distribution

M.22b. Using the slider below, please move the bar to the number that corresponds with the **highest** hourly wage a certified drinking water operator working at your utility is paid.

Not Applicable

0 5 10 15 20 25 30 35 40 45 50 55 60

Hourly Wage

Display This Question:

If 7. Which of the following describe your utility? (Select all that apply) = Wastewater treatment

Or 7. Which of the following describe your utility? (Select all that apply) = Wastewater collection

M.22c. Using the slider below, please move the bar to the number that corresponds with the **starting wage** for an entry-level certified wastewater operator at your utility.

Not Applicable

0 5 10 15 20 25 30 35 40 45 50 55 60

Hourly Wage	

Display This Question:

If 7. Which of the following describe your utility? (Select all that apply) = Wastewater treatment

Or 7. Which of the following describe your utility? (Select all that apply) = Wastewater collection

M.22d. Using the slider below, please move the bar to the number that corresponds with the **highest** hourly wage a certified wastewater operator working at your utility is paid.

Not Applicable

0 5 10 15 20 25 30 35 40 45 50 55 60

Hourly Wage	

M.23. What job duties are operators responsible for at your utility, other than basic system/treatment works? (Select all that apply)

- ☐ Office work
- ☐ Collecting payments
- ☐ Equipment maintenance
- ☐ Trash services
- ☐ Natural gas services
- ☐ Electrical utility services
- ☐ City maintenance (e.g., mowing)
- ☐ Other (please specify): _____
- ☐ They are not responsible for any other tasks

M.24. How does the utility reward and/or show appreciation for its operators?

- ☐ Provide pay increases based on employee performance
- ☐ Provide pay increases based on certification achievements
- ☐ Provide longevity awards
- ☐ Recognize employees for their contributions (e.g., suggesting cost saving measures)
- ☐ Offer leadership skills training to employees
- ☐ Other (please specify): _____

End of Block: Questions about operators

Start of Block: Recruitment and Retention

The following questions ask for your thoughts and opinions about recruiting and retaining operators.

M.25. When you have an open position for an operator at your utility, where do you advertise the position? (Select all that apply)

- ☐ Newspaper
- ☐ Online job post (e.g., Indeed, ZipRecruiter, CareerBuilder, LinkedIn, etc.)
- ☐ Job fair
- ☐ Unemployment office
- ☐ Industry-specific website (e.g., KWWOA, KRWA, WEF Career Center, AWWA, KMUA)
- ☐ Social Media
- ☐ Local government website
- ☐ Temp agency
- ☐ Trade school
- ☐ Other (please specify): _____

M.26. In your opinion, which of the following are barriers to hiring operators? (Select all that apply)

- [ ] Rate of pay
- [ ] Financial limitations at the utility
- [ ] City Council or Utility Board
- [ ] Lack of qualified applicants
- [ ] Applicants are unwilling to become certified
- [ ] Certification requirements
- [ ] Certification process
- [ ] Lack of benefits
- [ ] Type of work
- [ ] Available shifts are not desirable
- [ ] Other (Please specify): _____

M.27. How well do your utility's decision makers (e.g., city council or utility board) understand the challenge of recruiting and retaining operators?

- ○ Not well at all
- ○ Slightly well
- ○ Moderately well
- ○ Very well
- ○ Extremely well

M.28. Over the last two years, which of the following has your utility experienced? (Select all that apply)

- ☐ Increased number of job openings
- ☐ Decreased number of job openings
- ☐ Increased number of applicants for jobs
- ☐ Decreased number of applicants for jobs
- ☐ Increased workloads
- ☐ Decreased workloads
- ☐ Lowered morale
- ☐ Decreased funds coming in
- ☐ Increased stress
- ☐ Delays in receiving chemicals, parts, etc.
- ☐ Other (please specify): _____
- ☐ None of these have affected my utility

M.29. As the manager of the utility, you have firsthand knowledge about your operators' job satisfaction. Consider each of the following and indicate whether your operators are extremely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, or extremely satisfied with that aspect of their job. If you aren't sure, you can mark the answer "I don't know."

	Extremely dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Extremely satisfied	I don't know
Pay	○	○	○	○	○	○
Availability of preferred shifts	○	○	○	○	○	○
Hours	○	○	○	○	○	○
Workload	○	○	○	○	○	○
Type of work	○	○	○	○	○	○
Certification exam process	○	○	○	○	○	○
Certification renewal process	○	○	○	○	○	○

M.30. In your experience, what reasons do operators give for leaving the job? (Select all that apply)

- [ ] Retiring
- [ ] They no longer want to work in the water sector
- [ ] Renewal fees are too expensive
- [ ] Better pay in another job opportunity
- [ ] Better benefits in another job opportunity
- [ ] Another job opportunity allows for career advancement
- [ ] Too many regulations
- [ ] Too much responsibility
- [ ] Undesirable working hours (e.g., being on-call, working on holidays, shifts)
- [ ] Certification exam and process is too difficult
- [ ] Other (please specify): _____

M.31. Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each.

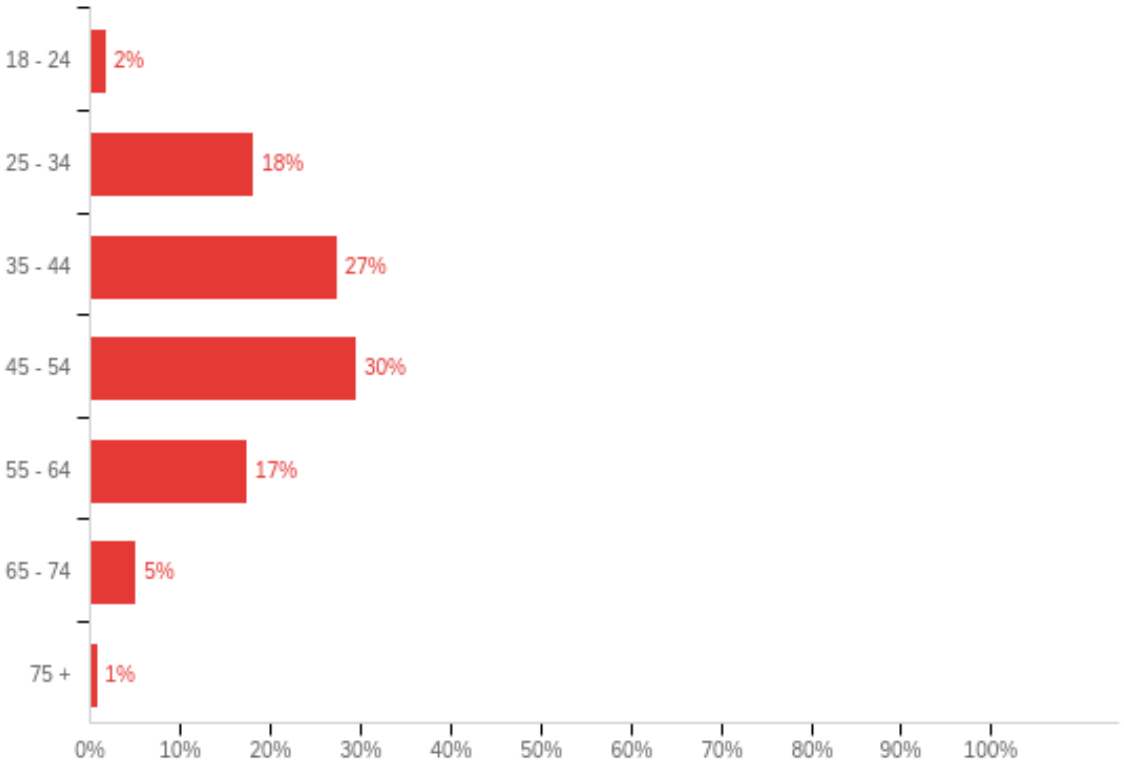
	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Operators at my utility are given the equipment and tools needed to do their jobs effectively.	○	○	○	○	○
My utility has the right people and skills to do the work that needs to be done.	○	○	○	○	○
Work is distributed evenly among operators at my utility.	○	○	○	○	○
Operators are being paid a fair amount for the work they do.	○	○	○	○	○
My employees are satisfied with the benefits they receive.	○	○	○	○	○
My utility has a succession plan in place if a manager leaves or retires.	○	○	○	○	○
My utility has a succession plan in place if an operator leaves or retires.	○	○	○	○	○

Thank you for completing the survey. Please click the blue arrow on the right below to submit your responses.

End of Block: Recruitment and Retention

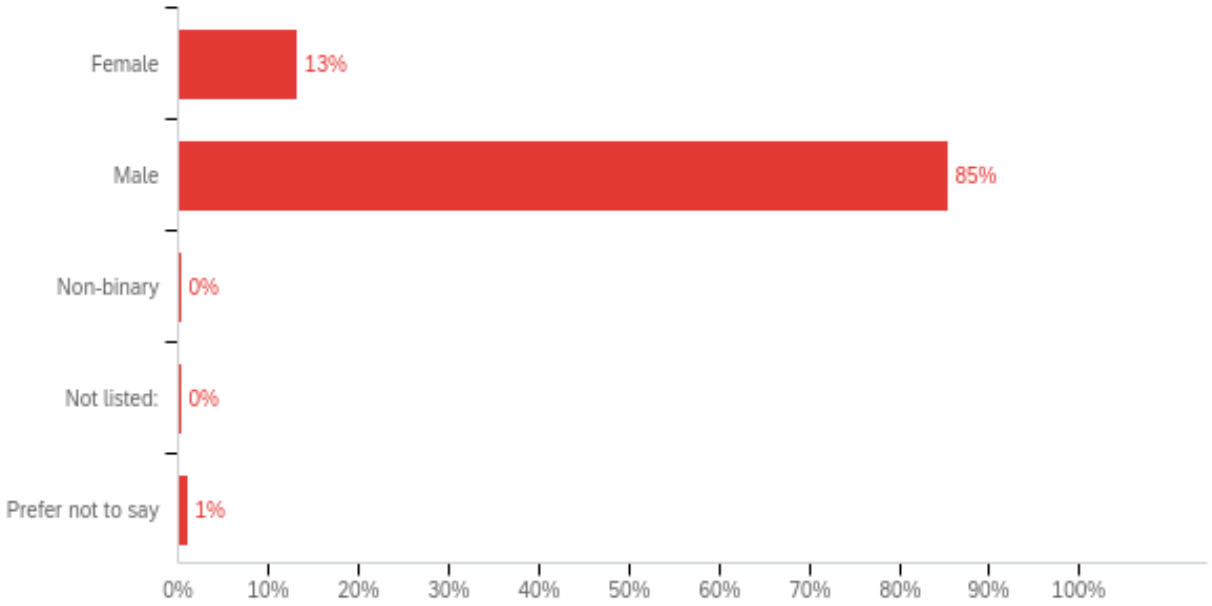
Appendix C: KWWS Operator Survey Results

O.1. What is your age?



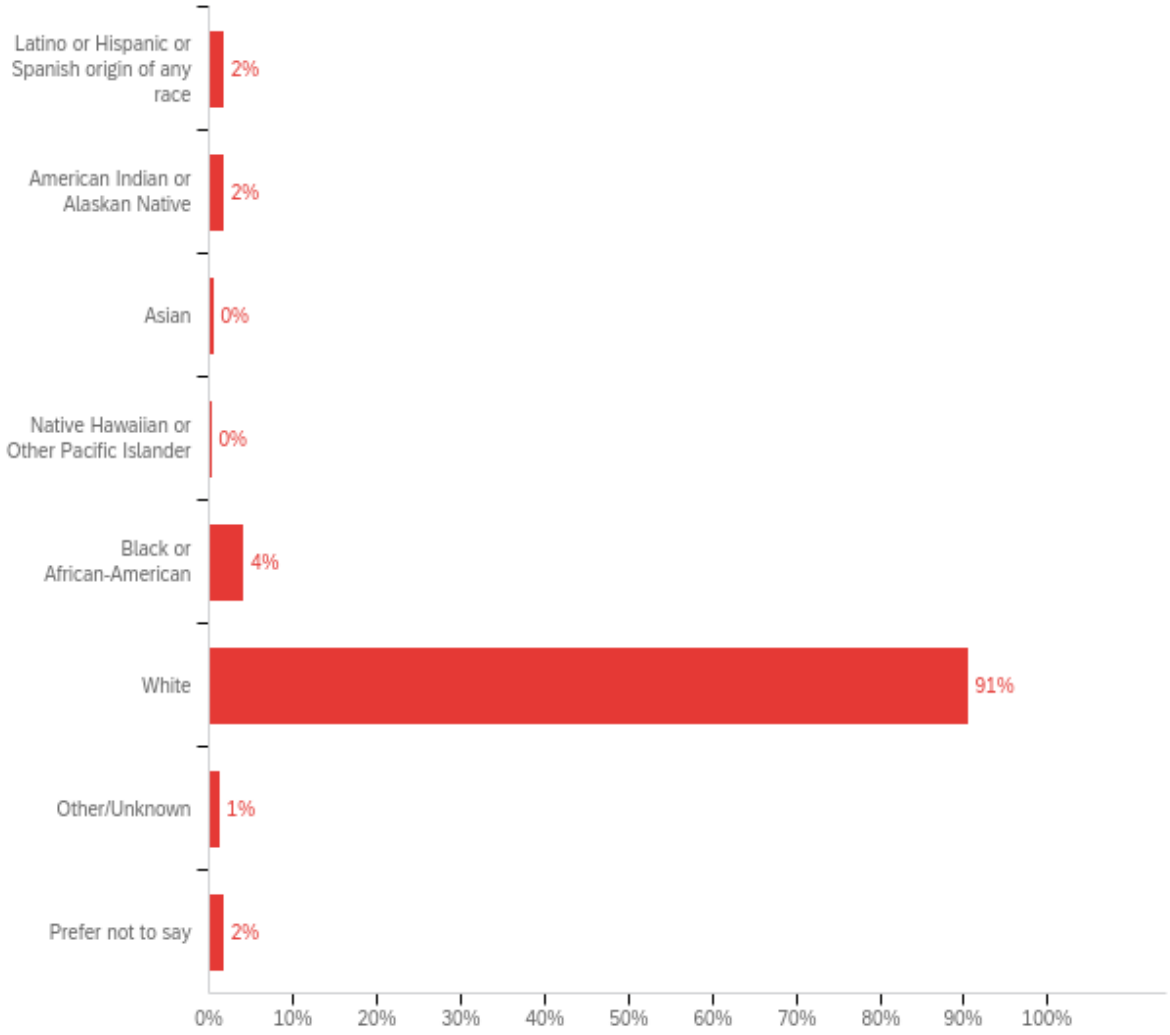
Answer	%	Count
18 - 24	2%	7
25 - 34	18%	75
35 - 44	27%	113
45 - 54	30%	122
55 - 64	17%	72
65 - 74	5%	21
75 +	1%	3
Total	**100%**	**413**

O.2. What is your gender?



Answer	%	Count
Female	13%	54
Male	85%	350
Non-binary	0%	1
Not listed	0%	1
Prefer not to say	1%	4
Total	**100%**	**410**

O.3. What is your ethnicity? (Select all that apply)

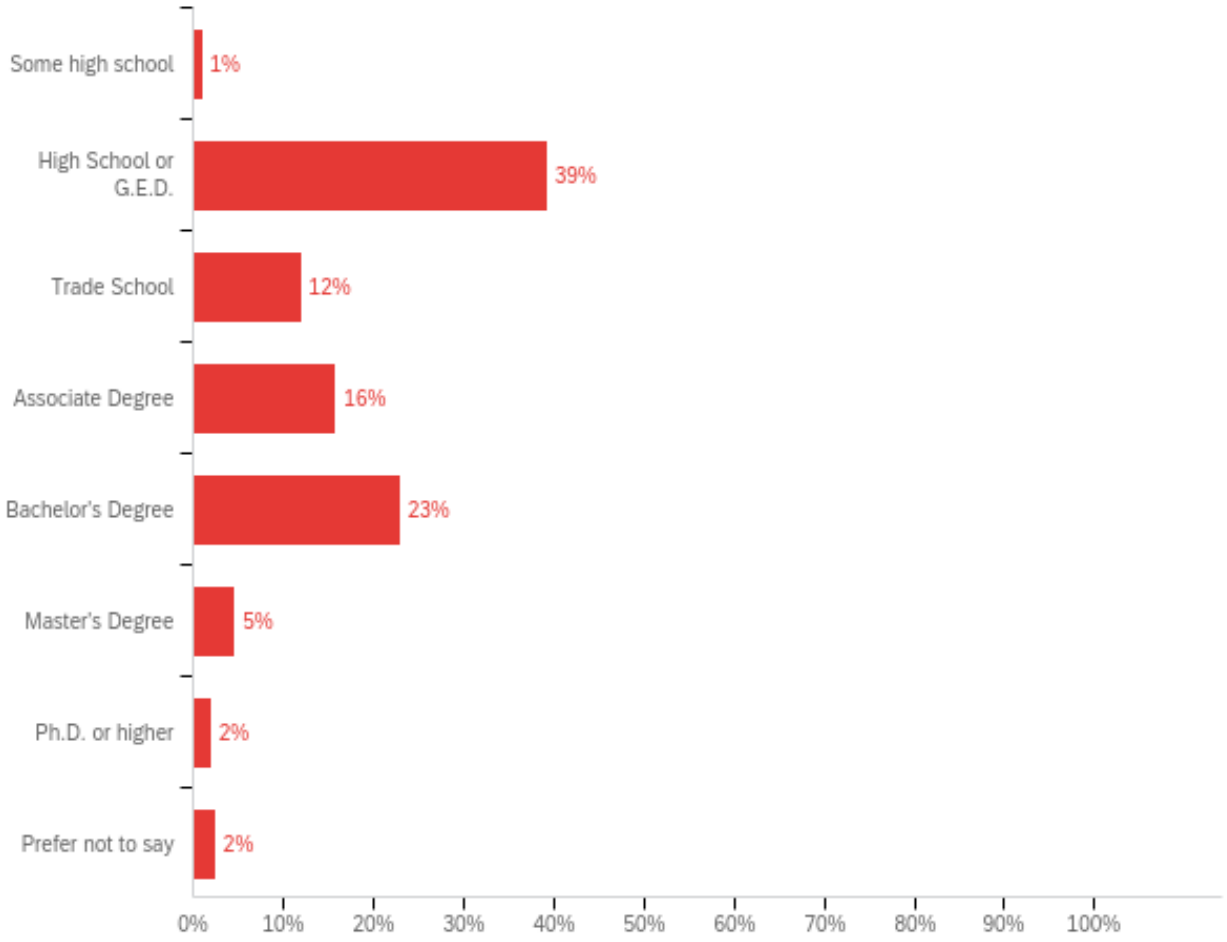


Answer	%	Count
Latino or Hispanic or Spanish origin of any race	2%	7
American Indian or Alaskan Native	2%	7
Asian	0%	2
Native Hawaiian or Other Pacific Islander	0%	1
Black or African-American	4%	17
White	91%	373
Other/Unknown	1%	5
Prefer not to say	2%	7
Total	**100%**	**412**

O.3- Other/Unknown:

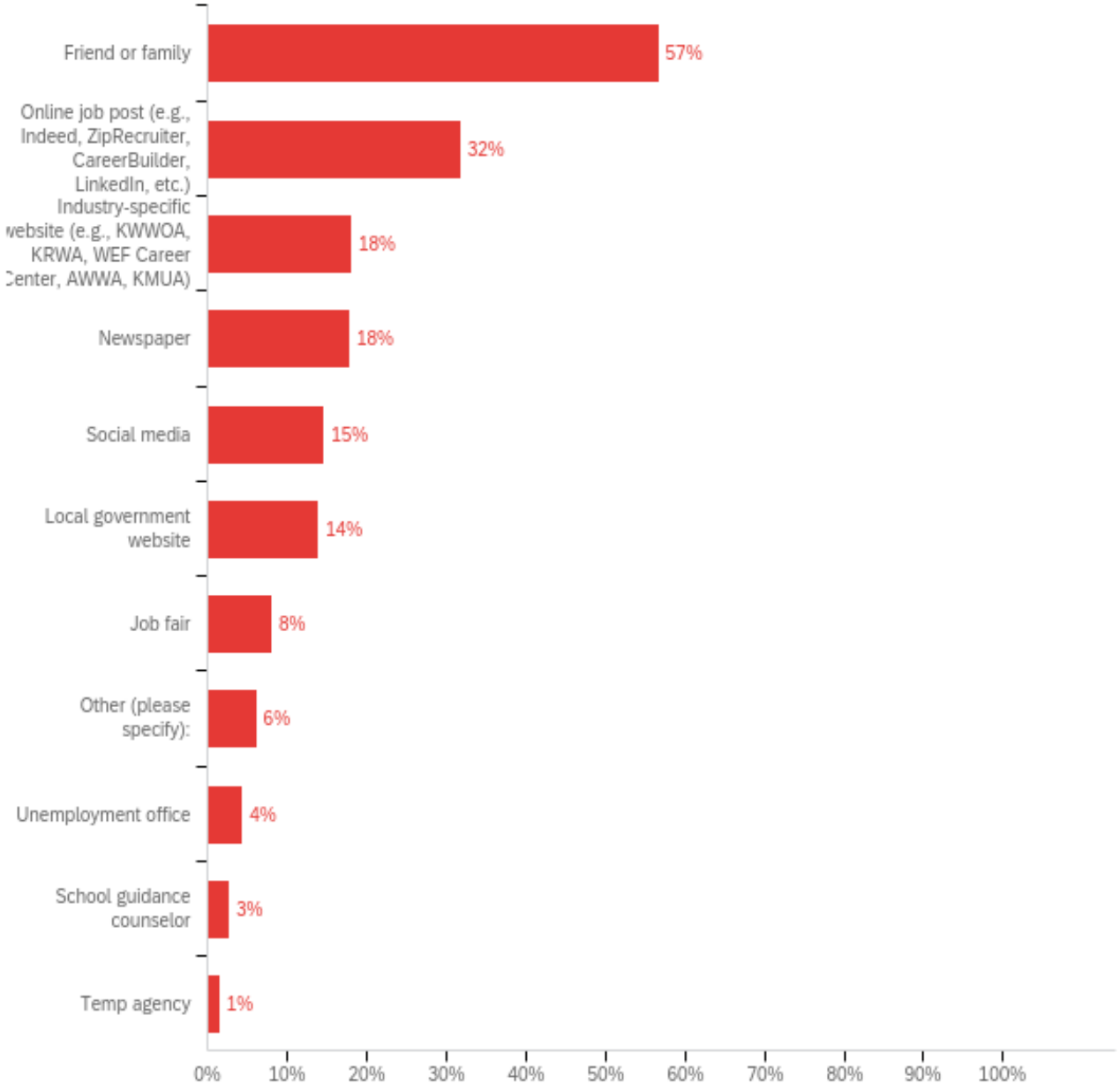
Other (text entry):
mixed
European American

O.4. What is the highest degree or level of education you have completed?



Answer	%	Count
Some high school	1%	4
High School or G.E.D.	39%	161
Trade School	12%	49
Associate Degree	16%	65
Bachelor's Degree	23%	94
Master's Degree	5%	19
Ph.D. or higher	2%	8
Prefer not to say	2%	10
Total	**100%**	**410**

O.5. What resources have you used in the past to find jobs in the water sector? (Select all that apply)



Answer	%	Count
Friend or family	57%	232
Online job post (e.g., Indeed, ZipRecruiter, CareerBuilder, LinkedIn, etc.)	32%	130
Industry-specific website (e.g., KWWOA, KRWA, WEF Career Center, AWWA, KMUA)	18%	74
Newspaper	18%	73
Social media	15%	60
Local government website	14%	57
Job fair	8%	33
Other (please specify):	6%	25
Unemployment office	4%	18
School guidance counselor	3%	11
Temp agency	1%	6
Total	**100%**	**409**

O.5 Other (please specify):

Other (text entry):
I was recruited from one system to another. I was not satisfied with the opportunities in the first system.
Nowhere
Walk Ins
Operator making known
none
water dist. person
client from environmental lab
city hall
I retired in 2008
USA jobs
Contact by interested facilities
They called me. Inspected for them several years

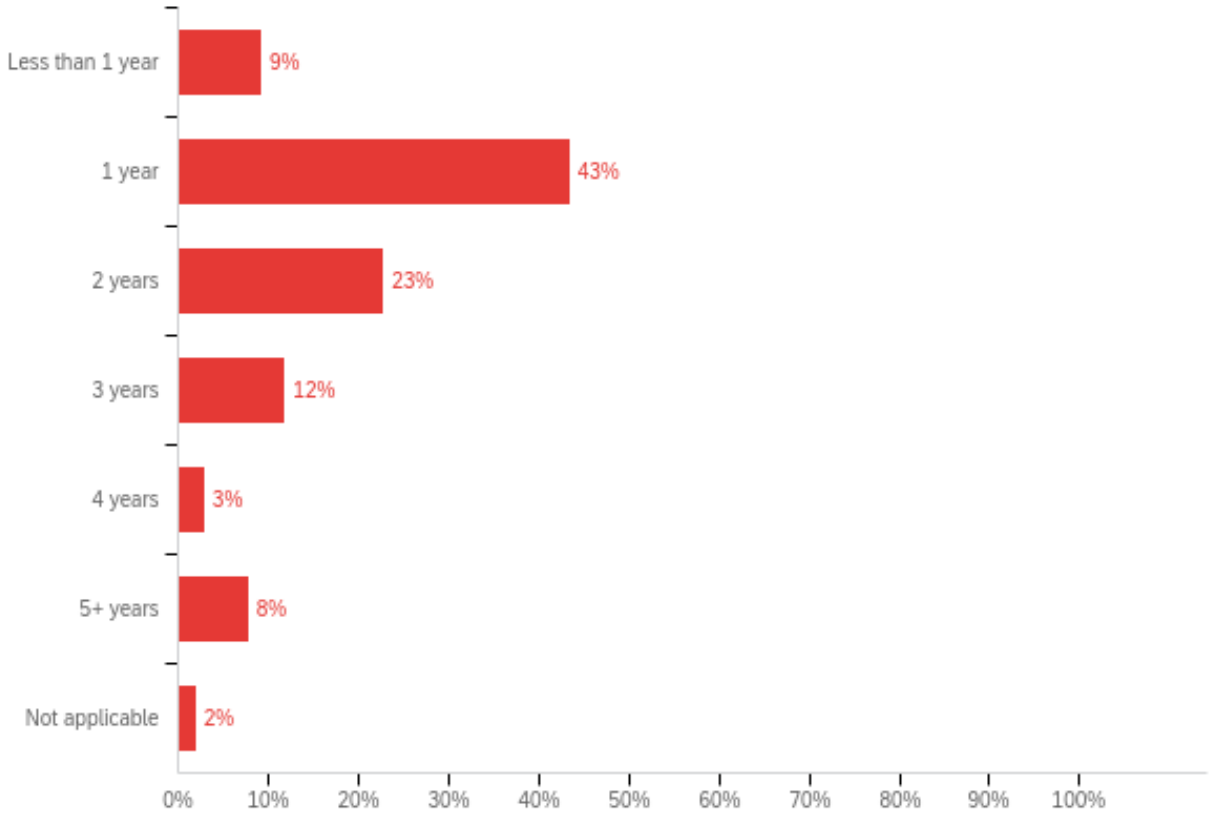
Added to position description
Business co-op in high school
I took my resume and applied multiple times until an opening was available
Networking
Utility employee
I posted my resume on Indeed. My potential employer (now employer) contacted me.
KRWA
Became an operator for current employer's needs
Kwwoa and krw websites

O.6. How old were you when you started working as an operator?

N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
403	30.00	9.40	1.03	0.46	24.00	17.00	27.00	65.00

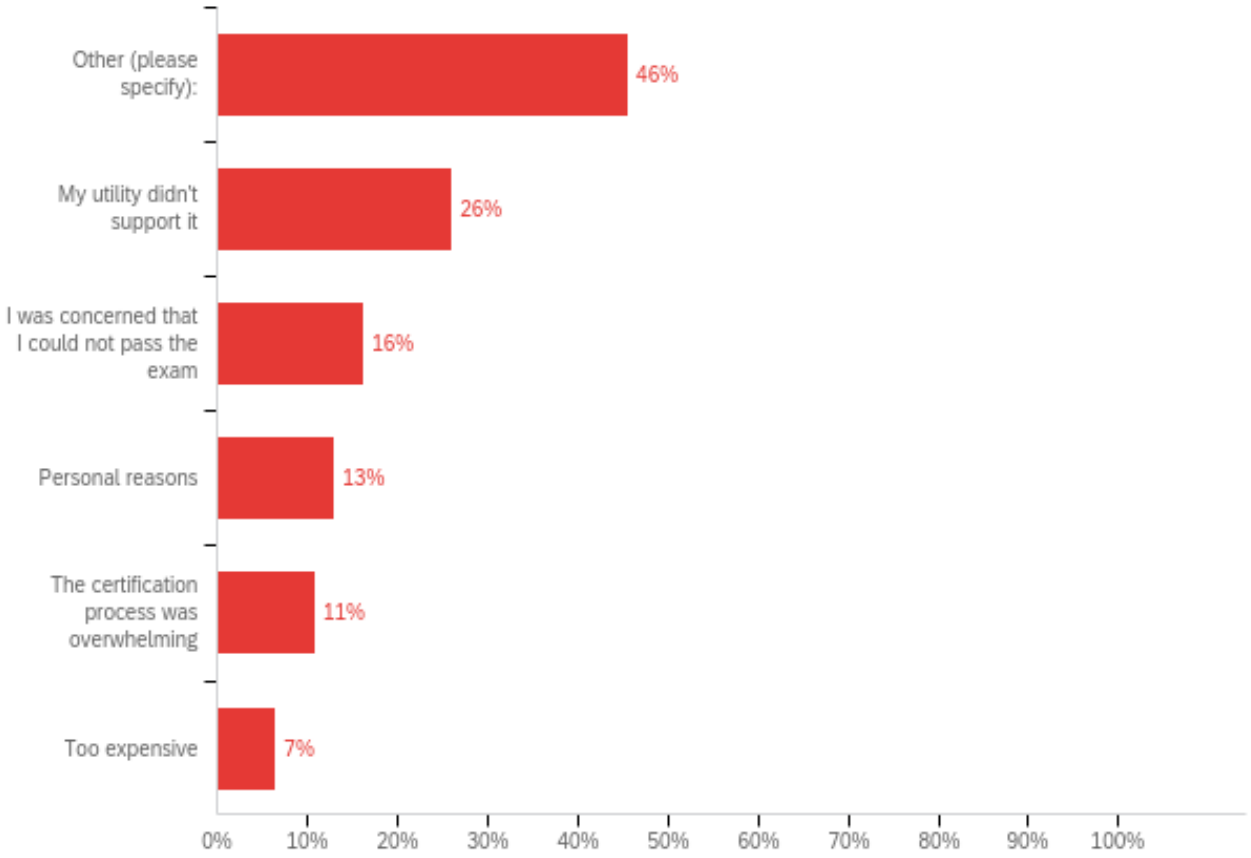
SD – Standard Deviation, SK – Skewness, K– Kurtosis

O.7. How long were you in that job before you tested for your first certification?



Answer	%	Count
Less than 1 year	9%	38
1 year	43%	179
2 years	23%	94
3 years	12%	49
4 years	3%	12
5+ years	8%	32
Not applicable	2%	8
Total	**100%**	**412**

O.7a. Why did it take 3 or more years to test for your first certification? (Select all that apply)



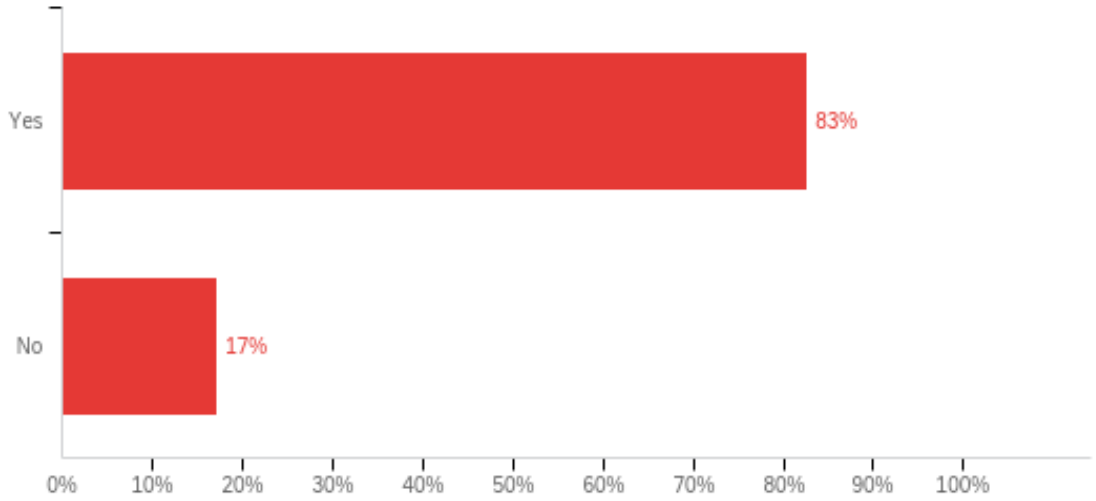
Answer	%	Count
Other (please specify):	46%	42
My utility didn't support it	26%	24
I was concerned that I could not pass the exam	16%	15
Personal reasons	13%	12
The certification process was overwhelming	11%	10
Too expensive	7%	6
Total	**100%**	**92**

O.7a- Other (please specify):

Other (text entry):
Split certification time between DW and sewer
Waited until qualified to take the 4 class.
2 years water and 2 years wastewater
Have to have 3 years experience before you can take it
Worked in maintenance
Have to have 3 years experience before state will let you take the test
Had to have on the job training for two years.
that was the rule back then you had to wait 3 years to get a class III license
had to have enough hours
Needed at least 7 Years experience
state regulations
that was the rule back then you had to wait 3 years to get a class III license
they wouldn't take my school credits
did not need at time
First three positions didn't require it.
COVID
I needed 3 years experience to take the class 3 test.
required for testing qualifications
didn’t really need it back when i started
I was told that I had to wait due to not having any college
I had to obtain enough time to take a Class III DW Dist. License
I was told I had to wait 3 years because I didn't have any college
took cert when I was told I could
experience requirements
Not required at time
It was a part time job.

Have to have 3 years of experience to test for an operator 3 license.
Began working in labor pool, moved to Operations after gaining some seniority.
Class III Exam required 3 years
wasn't necessary
Had to wait for the experience and time needed. experience in the plant.
It wasn't required for my position.
My utility only tested for class 3 and 4 certifications. with no prior experience, I had to wait until I qualified
needed 3 years experience to get class 3
No college degree. Had to wait 3 years to take class III exam.
Company over site/covid
Employer had not asked me to try yet
With my education I could go straight for the 4 so I did, also COVID-19 made it take a year longer than it should have.
Had to work three years before I took my class 3s. Our treatment plant was a class 3 and we weren’t given the option to take the class 1 or 2. People hired after I got my class 3s were offered to get class 1 and 2 license.
I moved out of state working in Industrial WW treatment
My company did not support licensure/training, so I waited until I could take the WWT IV test (based on education and experience) to minimize personal costs.

O.8. Are you currently working as an operator?



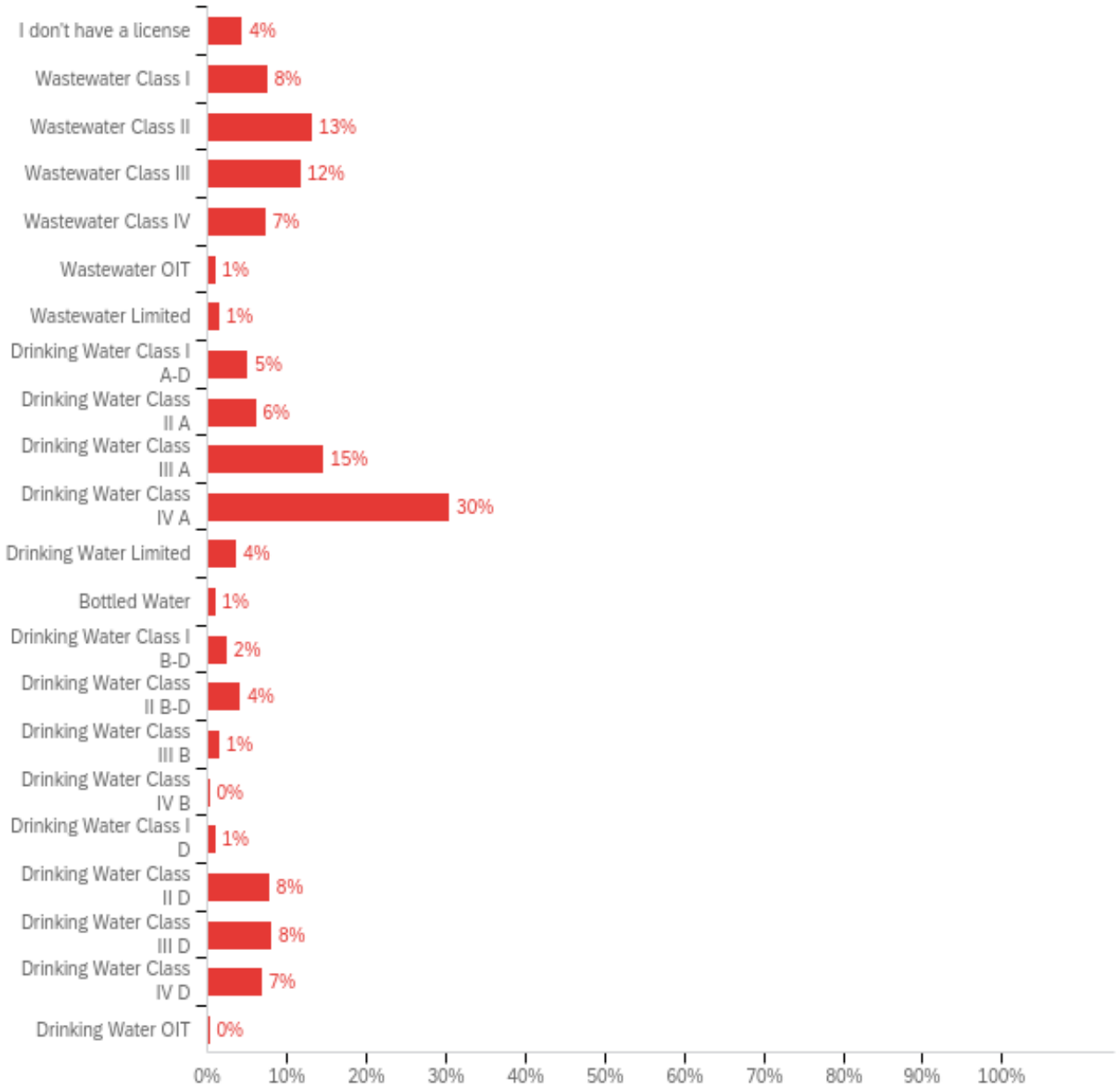
Answer	%	Count
Yes	83%	341
No	17%	71
Total	**100%**	**412**

O.8a. How many utility systems do you work for?

N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
333	2.29	3.54	4.09	19.64	1.00	1.00	1.00	28.00

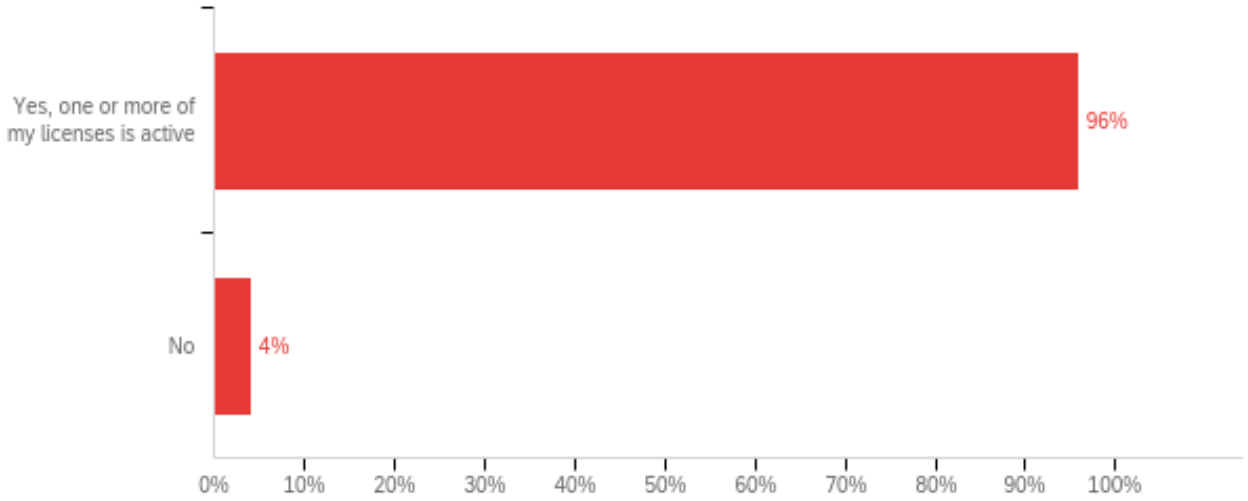
SD – Standard Deviation, SK – Skewness, K– Kurtosis

O.9. What level of license(s) do you hold? (Select all that apply)



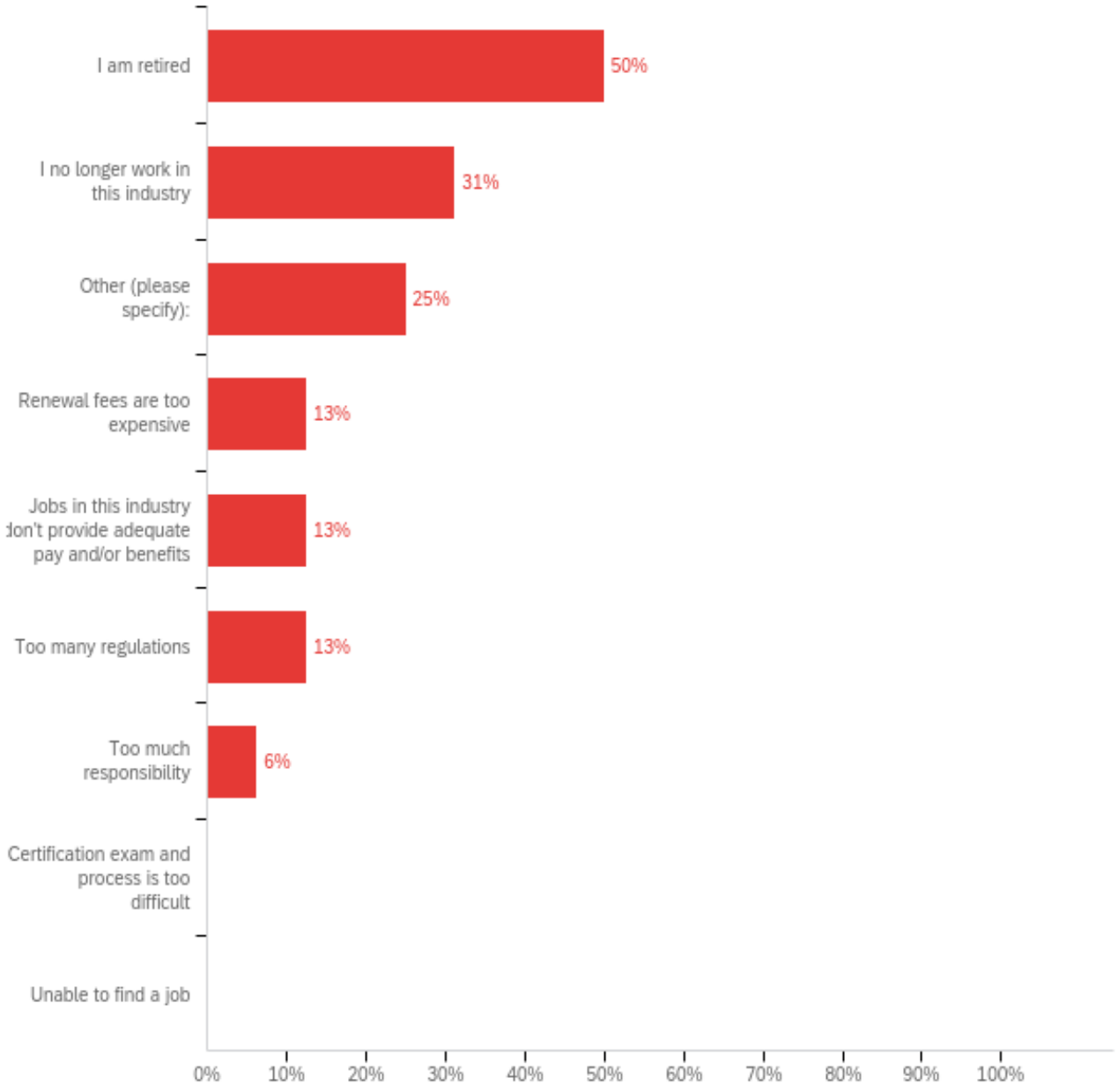
Answer	%	Count
I don't have a license	4%	18
Wastewater Class I	8%	31
Wastewater Class II	13%	54
Wastewater Class III	12%	48
Wastewater Class IV	7%	30
Wastewater OIT	1%	4
Wastewater Limited	1%	6
Drinking Water Class I A-D	5%	21
Drinking Water Class II A	6%	25
Drinking Water Class III A	15%	60
Drinking Water Class IV A	30%	125
Drinking Water Limited	4%	15
Bottled Water	1%	4
Drinking Water Class I B-D	2%	10
Drinking Water Class II B-D	4%	17
Drinking Water Class III B	1%	6
Drinking Water Class IV B	0%	1
Drinking Water Class I D	1%	4
Drinking Water Class II D	8%	32
Drinking Water Class III D	8%	33
Drinking Water Class IV D	7%	28
Drinking Water OIT	0%	1
Total	**100%**	**410**

O.9a. Is your license active?



Answer	%	Count
Yes, one or more of my licenses is active	96%	377
No	4%	16
Total	**100%**	**393**

O.9b. Why is your license inactive? (Select all that apply)

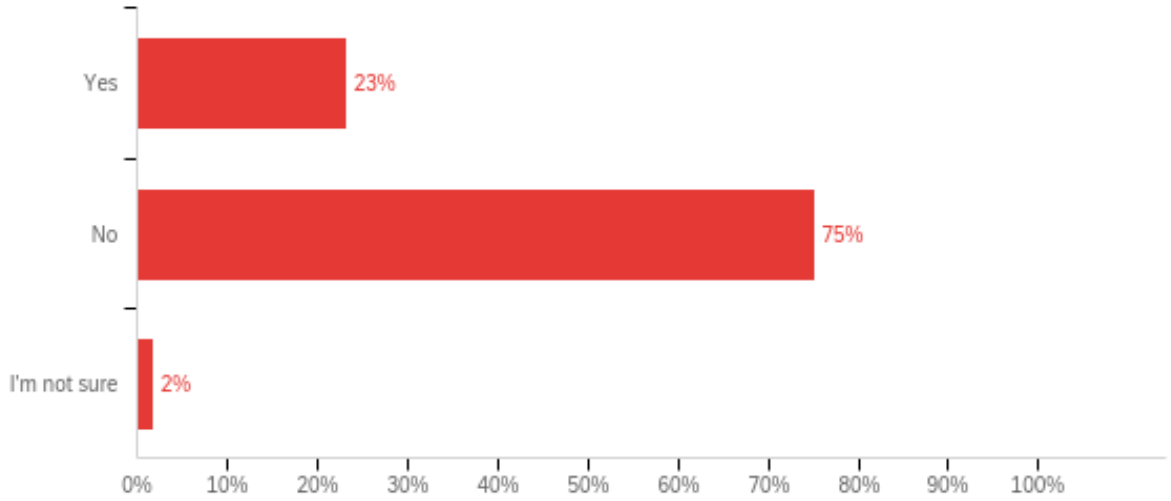


Answer	%	Count
I am retired	50%	8
I no longer work in this industry	31%	5
Other (please specify):	25%	4
Renewal fees are too expensive	13%	2
Jobs in this industry don't provide adequate pay and/or benefits	13%	2
Too many regulations	13%	2
Too much responsibility	6%	1
Certification exam and process is too difficult	0%	0
Unable to find a job	0%	0
Total	**100%**	**16**

O.9b- Other (please specify):

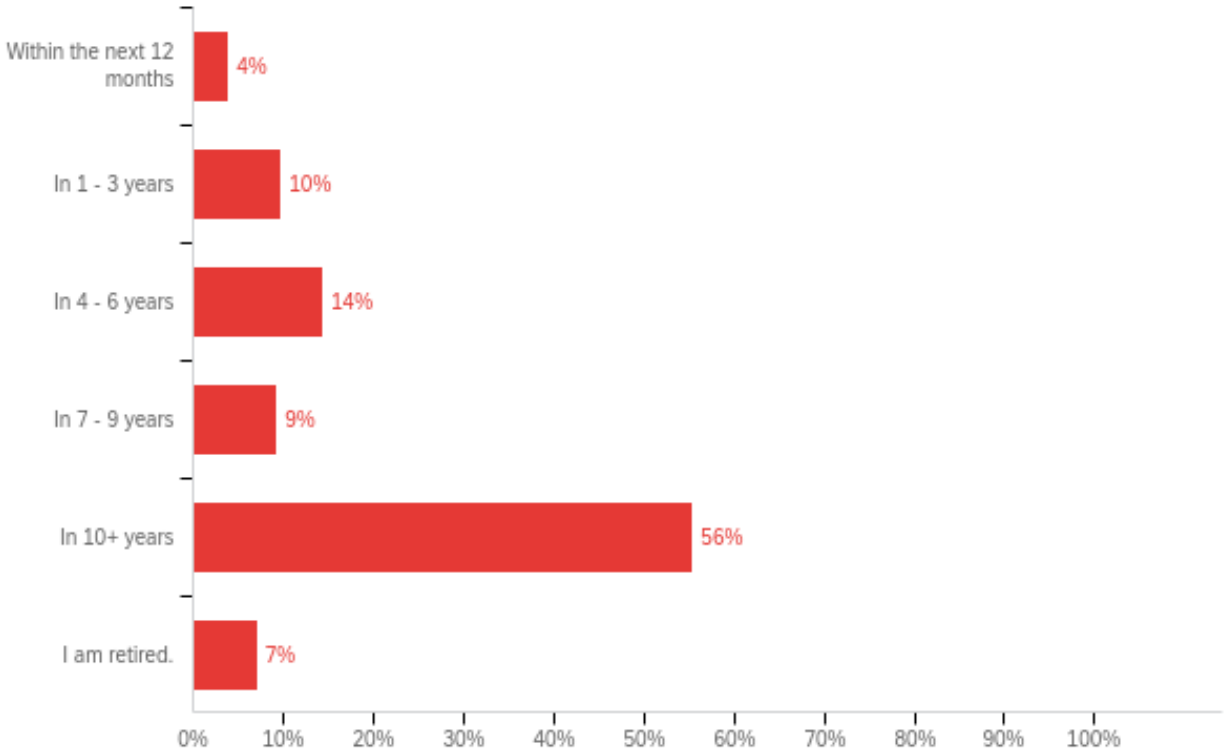
Other (text entry):
continuing ed was a pain
I accidentally let time go to the 1 year and the young lady I spoke to inform me that the DOW to 6 months so I said if it ever came a time that I needed it I would come and retake my test
My license are inactive at this time
They are renewed as inactive through DCA

O.10. Are you currently eligible to retire?



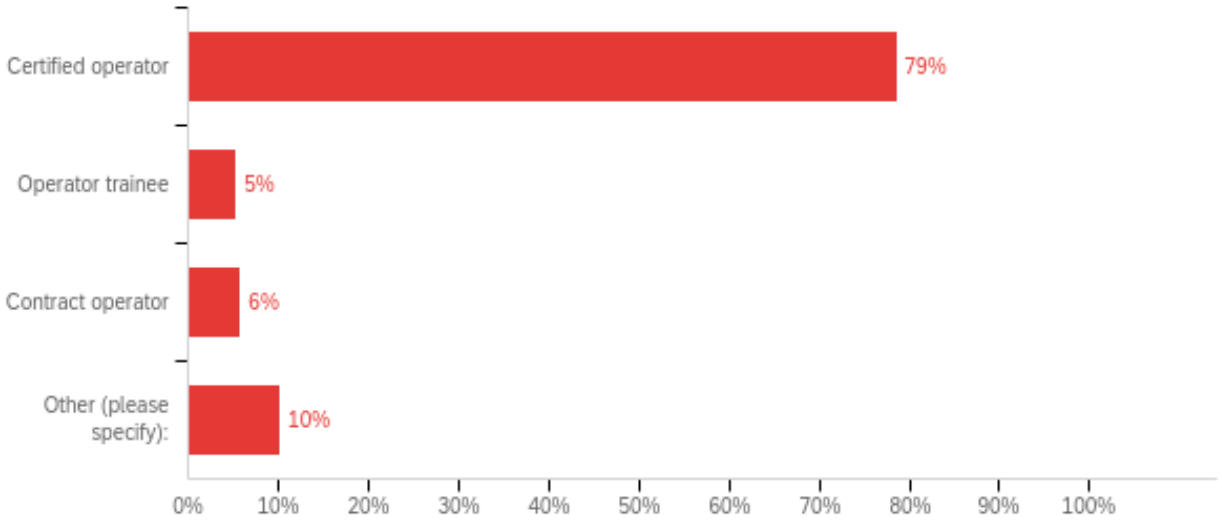
Answer	%	Count
Yes	23%	95
No	75%	308
I'm not sure	2%	7
Total	**100%**	**410**

O.11. When do you plan to retire?



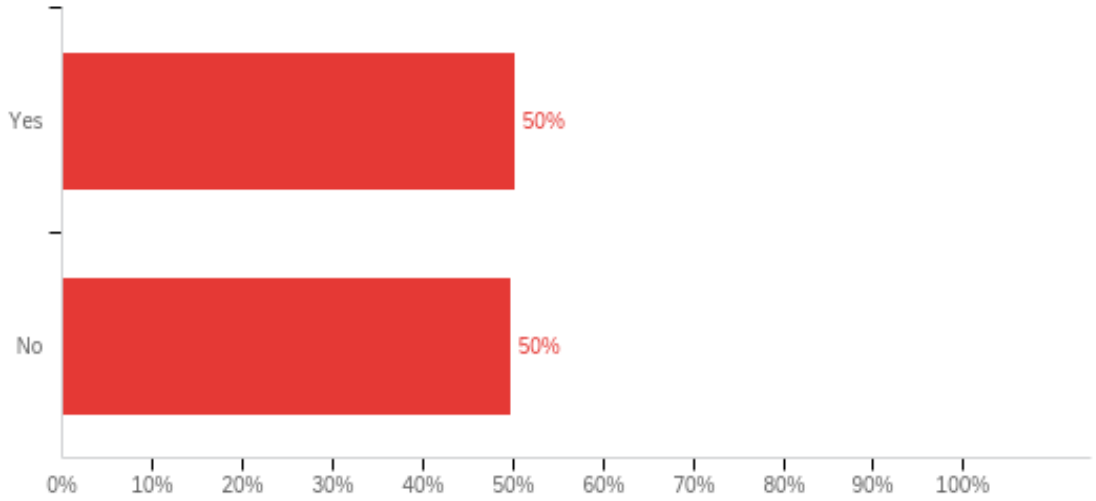
Answer	%	Count
Within the next 12 months	4%	16
In 1 - 3 years	10%	40
In 4 - 6 years	14%	59
In 7 - 9 years	9%	38
In 10+ years	56%	227
I am retired.	7%	29
Total	**100%**	**409**

O.12. Which of the following best describes your role at the utility?



Answer	%	Count
Certified operator	79%	324
Operator trainee	5%	22
Contract operator	6%	24
Other	10%	42
Total	**100%**	**412**

O.13. Are you a supervisor or manager at the utility?



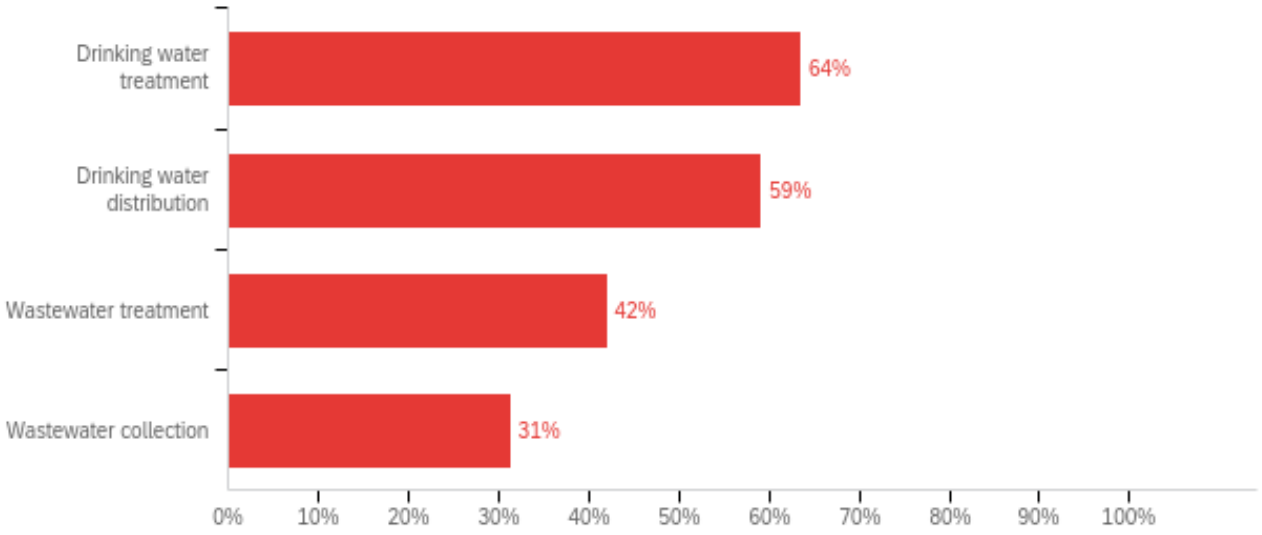
Answer	%	Count
Yes	50%	207
No	50%	205
Total	**100%**	**412**

O.14. On average, how many hours do you work per week?

N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
390	42.73	7.79	0.69	10.51	40.00	1.00	40.00	90.00

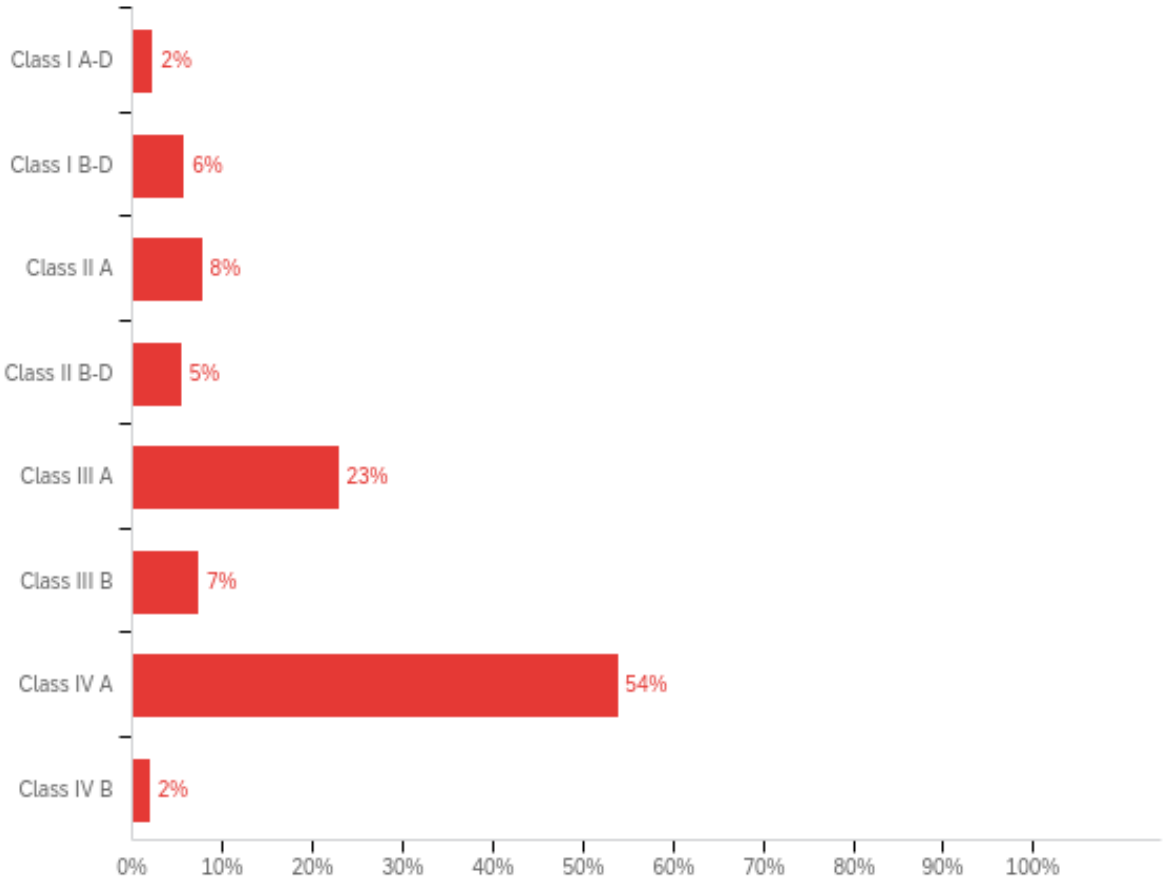
SD – Standard Deviation, SK – Skewness, K– Kurtosis

O.15. Which of the following describe your utility? (Select all that apply)



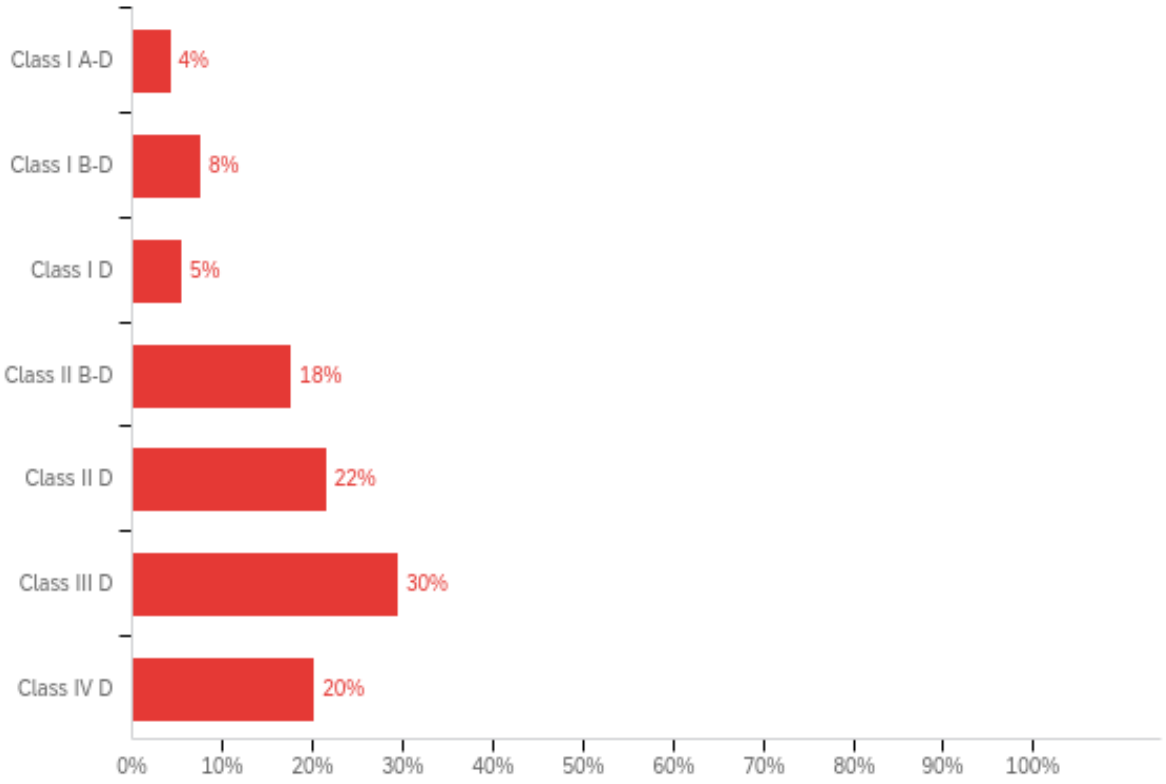
Answer	%	Count
Drinking water treatment	64%	262
Drinking water distribution	59%	244
Wastewater treatment	42%	173
Wastewater collection	31%	129
Total	**100%**	**412**

O.15a. What class is your drinking water treatment utility?



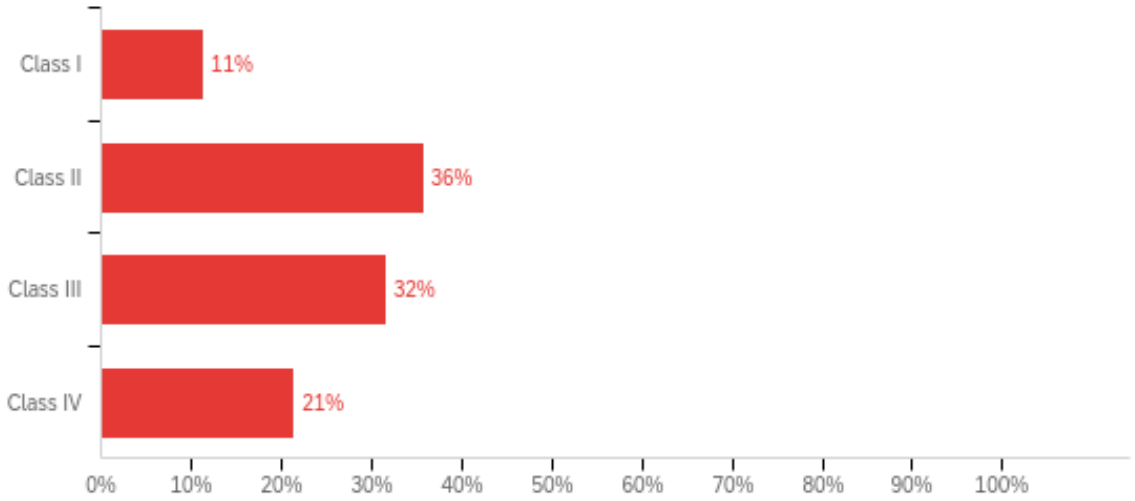
Answer	%	Count
Class I A-D	2%	6
Class I B-D	6%	15
Class II A	8%	20
Class II B-D	5%	14
Class III A	23%	59
Class III B	7%	19
Class IV A	54%	139
Class IV B	2%	5
Total	**100%**	**258**

O.15b. What class is your drinking water distribution utility?



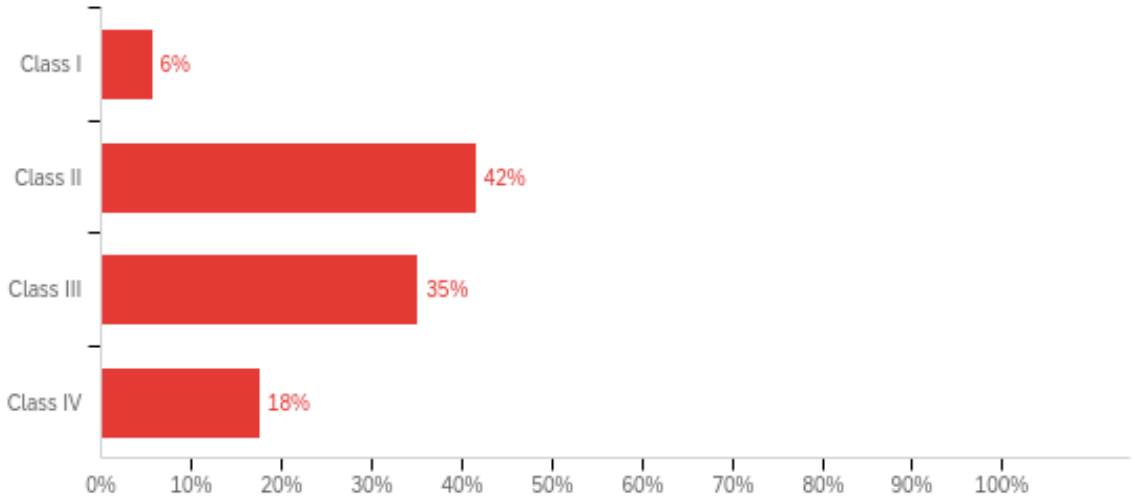
Answer	%	Count
Class I A-D	4%	10
Class I B-D	8%	18
Class I D	5%	13
Class II B-D	18%	42
Class II D	22%	51
Class III D	30%	70
Class IV D	20%	48
Total	**100%**	**237**

O.15c. What class is your wastewater treatment utility?



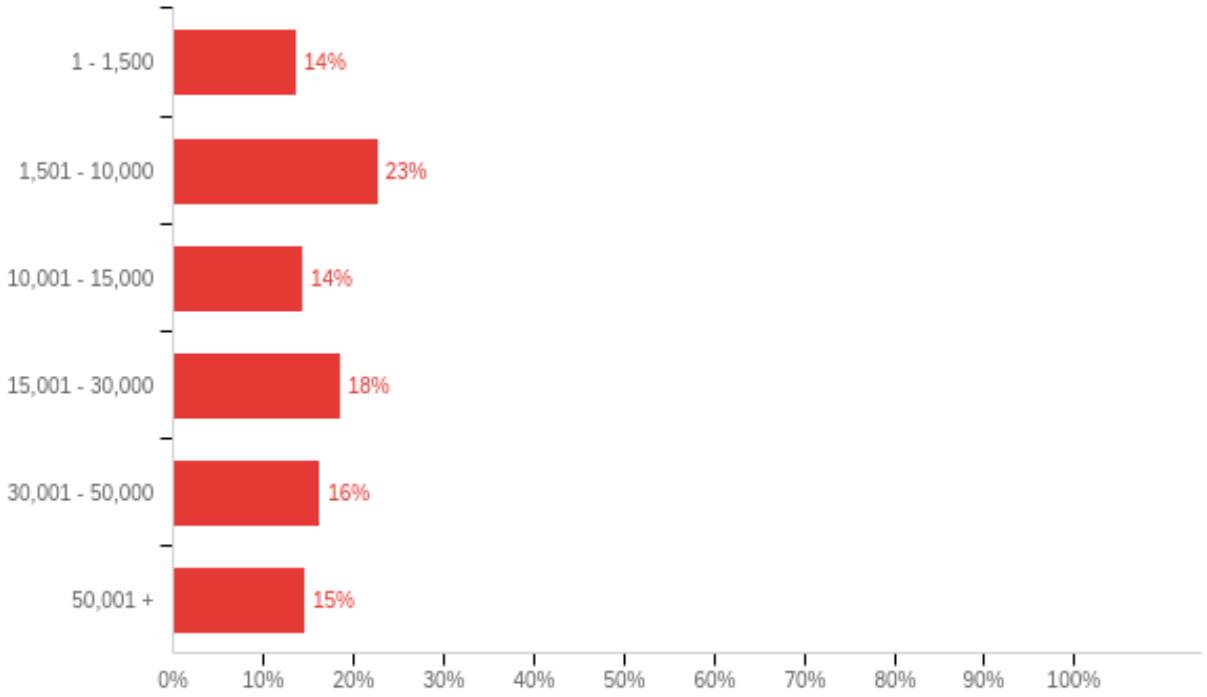
Answer	%	Count
Class I	11%	19
Class II	36%	60
Class III	32%	53
Class IV	21%	36
Total	**100%**	**168**

O.15d. What class is your wastewater collection utility?



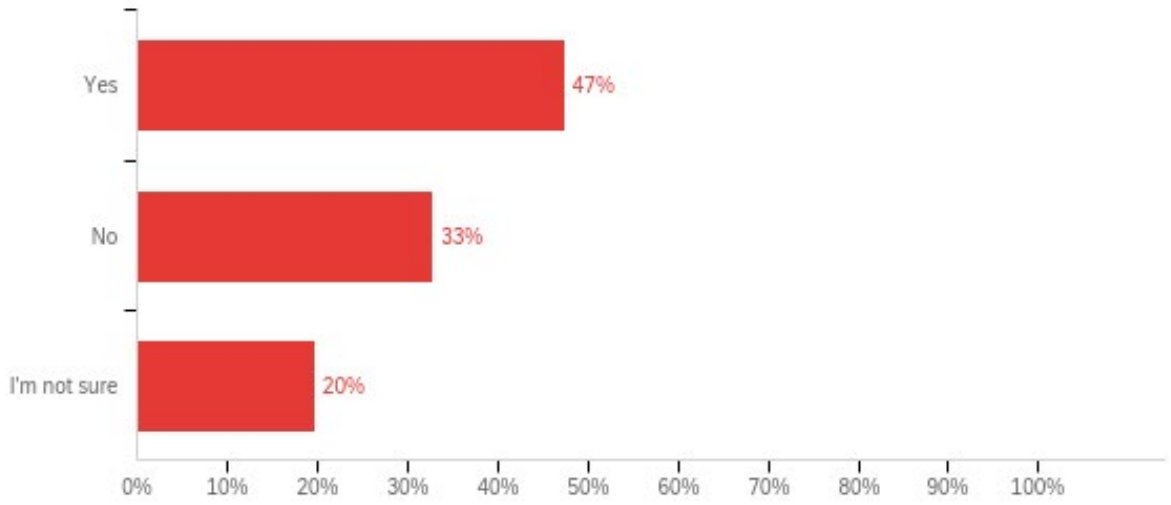
Answer	%	Count
Class I	6%	7
Class II	42%	52
Class III	35%	44
Class IV	18%	22
Total	**100%**	**125**

16. How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.



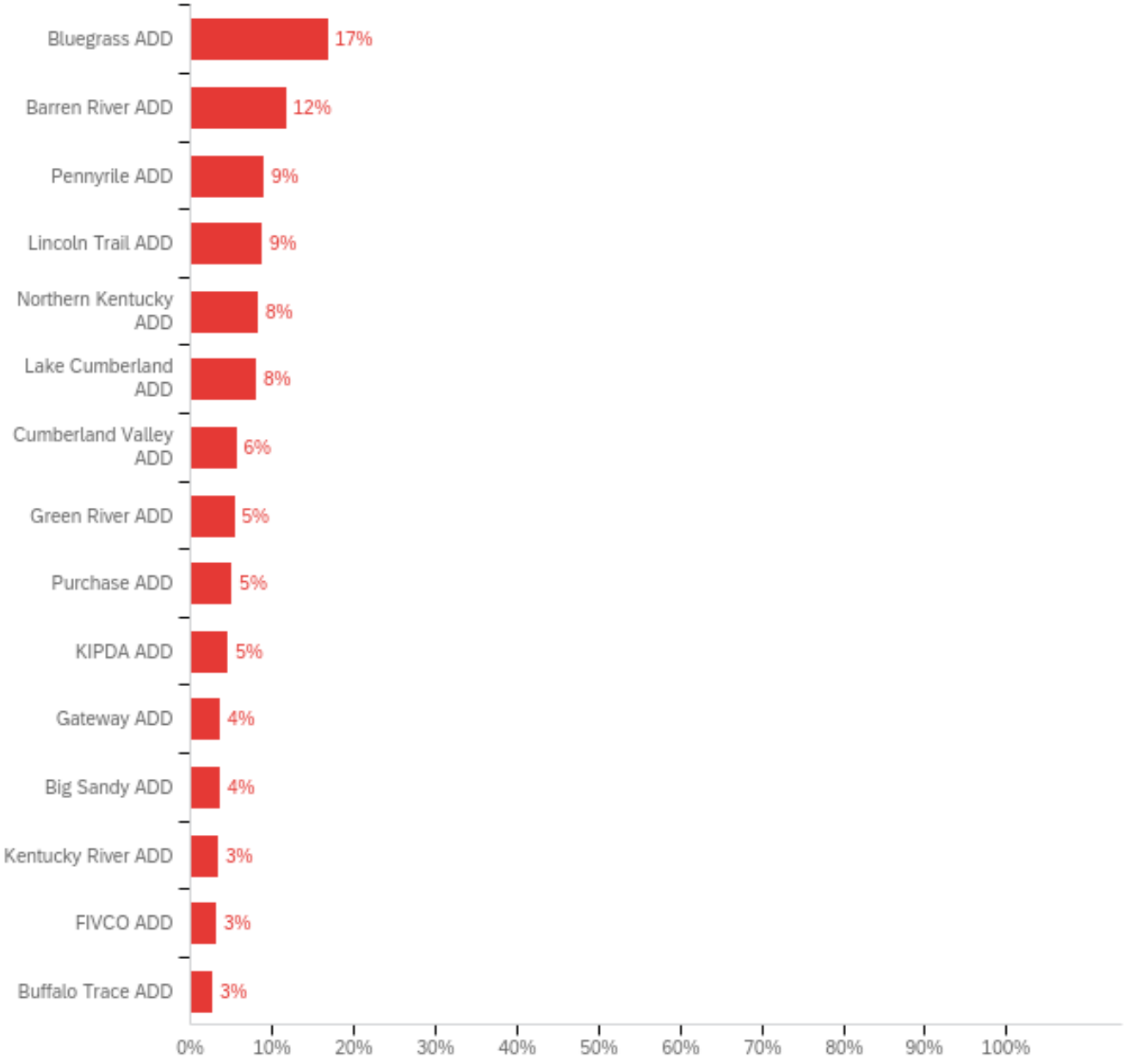
Answer	%	Count
1 - 1,500	14%	56
1,501 - 10,000	23%	93
10,001 - 15,000	14%	59
15,001 - 30,000	18%	76
30,001 - 50,000	16%	67
50,001 +	15%	60
Total	**100%**	**411**

O.17. Is your utility regulated by Kentucky's Public Service Commission (PSC)?



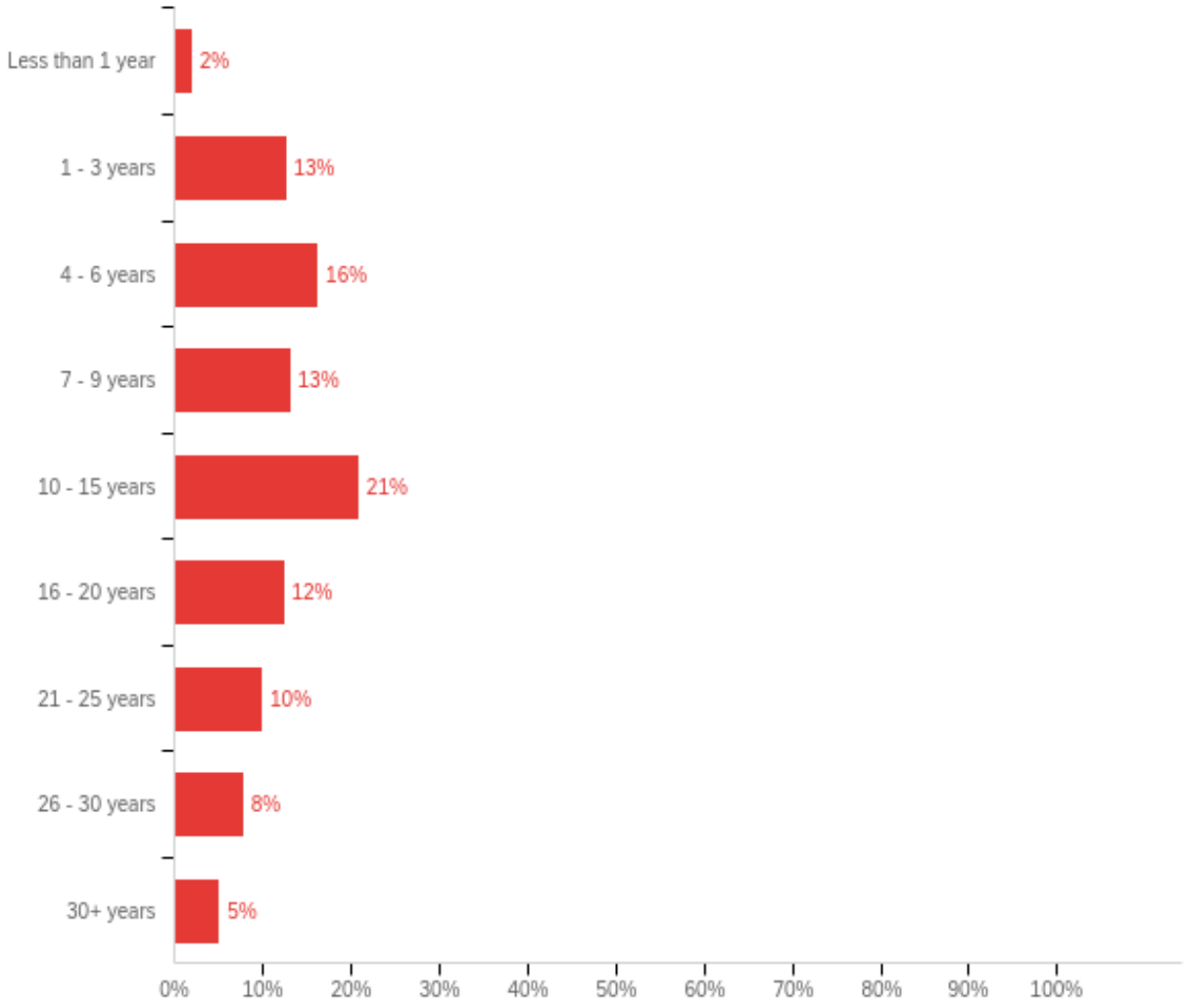
Answer	%	Count
Yes	47%	195
No	33%	135
I'm not sure	20%	81
Total	**100%**	**411**

O.18. What Area Development District (ADD) is your utility in? If your utility is in more than one ADD, please choose the one where your main office is located.



Answer	%	Count
Bluegrass ADD (Anderson, Bourbon, Boyle, Clark, Estill, Fayette, Franklin, Garrard, Harrison, Jessamine, Lincoln, Madison, Mercer, Nicholas, Powell, Scott, Woodford)	17%	69
Barren River ADD (Allen, Barren, Butler, Edmonson, Hart, Logan, Metcalfe, Monroe, Simpson, Warren)	12%	48
Pennyrile ADD (Caldwell, Christian, Crittenden, Hopkins, Livingston, Lyon, Muhlenburg, Todd, Trigg)	9%	37
Lincoln Trail ADD (Breckinridge, Grayson, Hardin, LaRue, Marion, Meade, Nelson, Washington)	9%	36
Northern Kentucky ADD (Boone, Campbell, Carroll, Gallatin, Grant, Kenton, Owen, Pendleton)	8%	34
Lake Cumberland ADD (Adair, Casey, Clinton, Cumberland, Green, McCreary, Pulaski, Russell, Taylor, Wayne)	8%	33
Cumberland Valley ADD (Bell, Clay, Harlan, Jackson, Knox, Laurel, Rockcastle, Whitley)	6%	23
Green River ADD (Daviess, Hancock, Henderson, McLean, Ohio, Union, Webster)	5%	22
Purchase ADD (Ballard, Calloway, Carlisle, Fulton, Graves, Hickman, Marshall, McCracken)	5%	21
KIPDA ADD (Bullitt, Henry, Jefferson, Oldham, Shelby, Spencer, Trimble)	5%	19
Gateway ADD (Bath, Menifee, Montgomery, Morgan, Rowan)	4%	15
Big Sandy ADD (Floyd, Johnson, Magoffin, Martin, Pike)	4%	15
Kentucky River ADD (Breathitt, Knott, Lee, Leslie, Letcher, Owsley, Perry, Wolfe)	3%	14
FIVCO ADD (Boyd, Carter, Elliott, Greenup, Lawrence)	3%	13
Buffalo Trace ADD (Bracken, Fleming, Lewis, Mason, Robertson)	3%	11
Total	**100%**	**410**

O.19. How many years have you worked at the utility?



Answer	%	Count
Less than 1 year	2%	8
1 - 3 years	13%	52
4 - 6 years	16%	67
7 - 9 years	13%	54
10 - 15 years	21%	86
16 - 20 years	12%	51
21 - 25 years	10%	41
26 - 30 years	8%	32
30+ years	5%	21

Total	**100%**	**412**

O.20. Using the slider below, move the bar to the number that corresponds with your hourly wage.

	N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
Hourly Wage	**404**	27.17	10.57	0.99	0.68	20.00	10.00	25.00	60.00

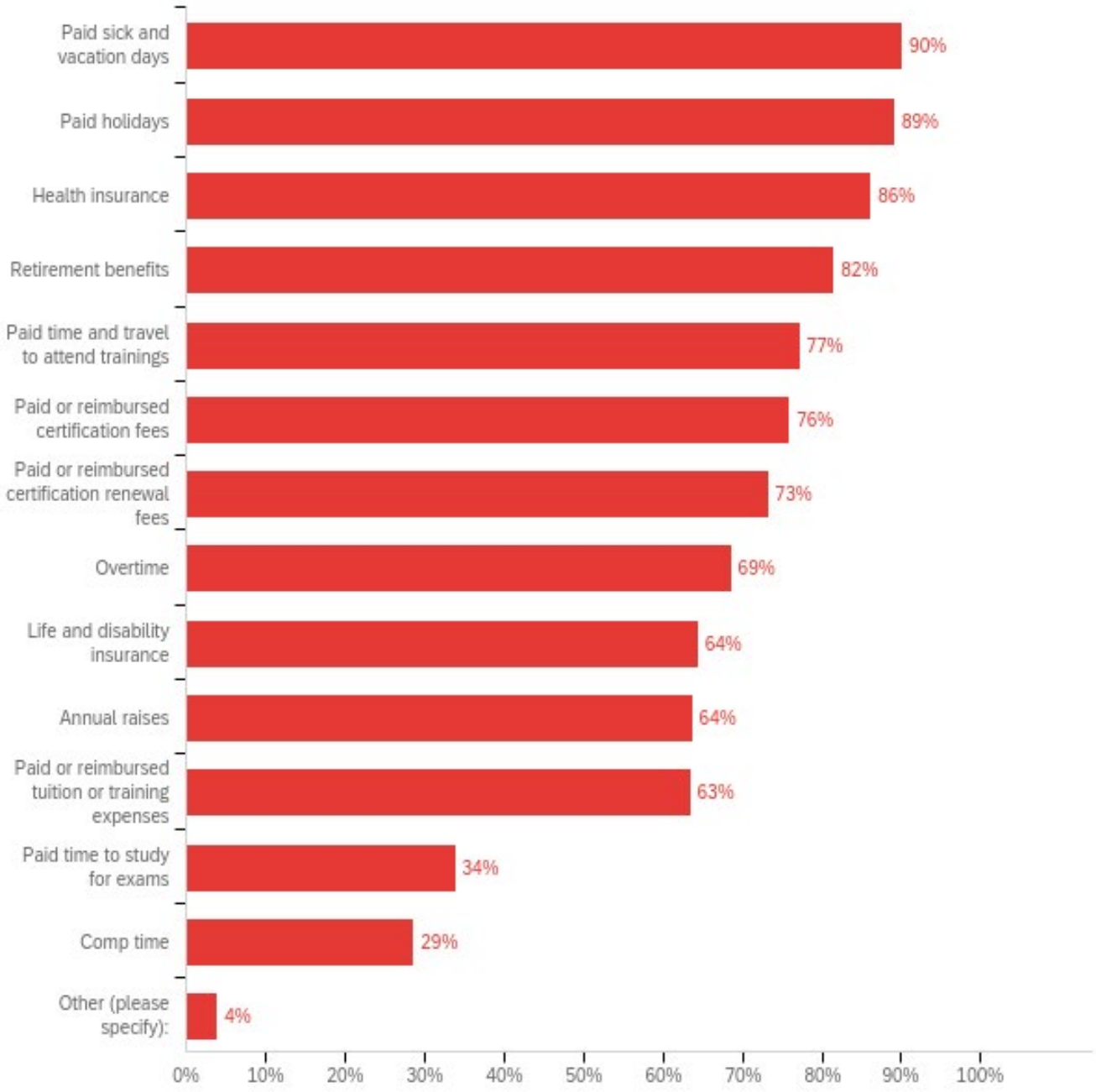
SD – Standard Deviation, SK – Skewness, K– Kurtosis

O.21. Using the slider below, move the bar to the number that corresponds with what you think your hourly wage should be.

	N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
Expected Hourly Wage	**402**	33.41	10.36	0.65	-0.06	30.00	11.00	31.00	60.00

SD – Standard Deviation, SK – Skewness, K– Kurtosis

22. What benefits does your utility provide? (Select all that apply)

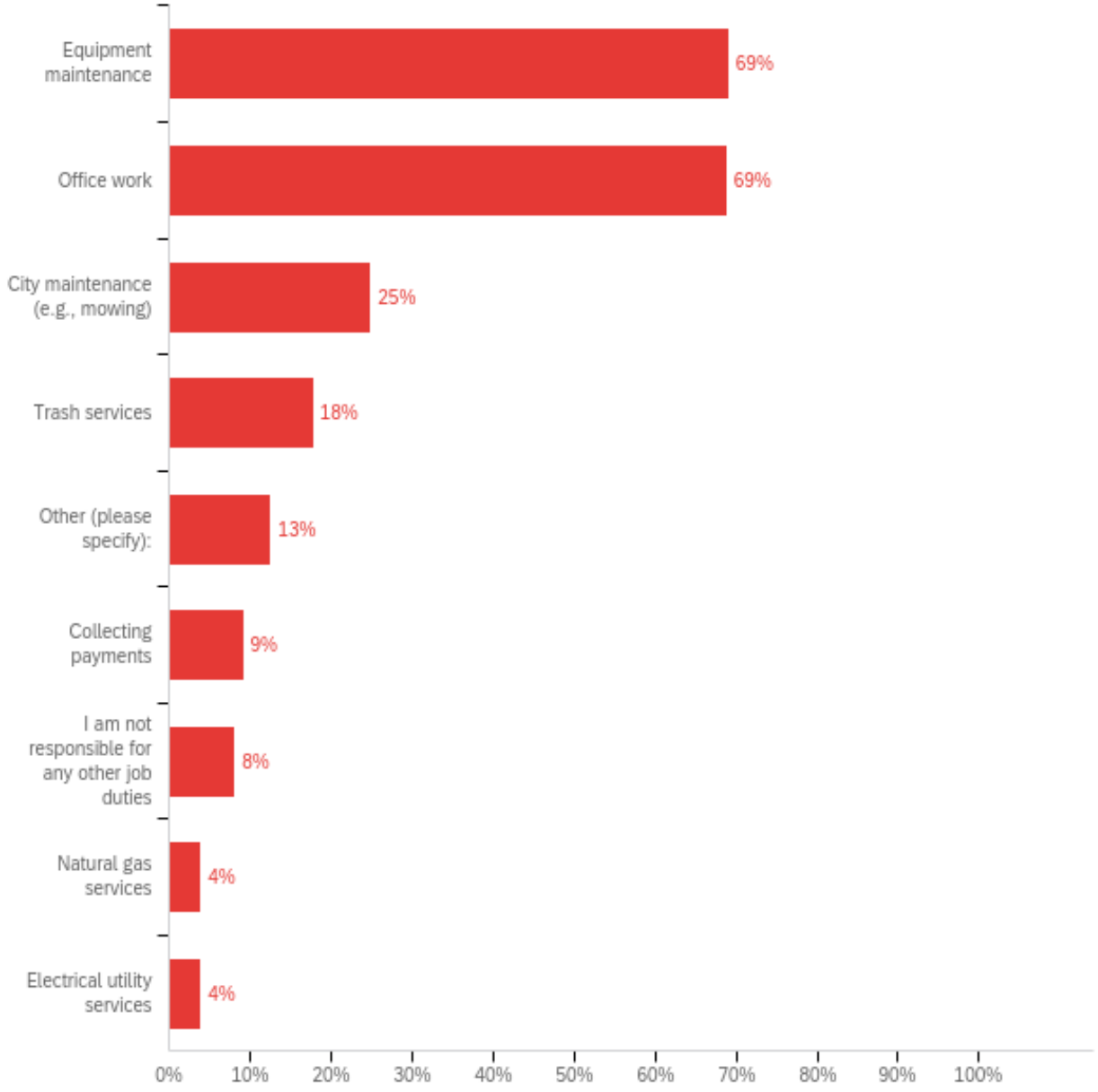


Answer	%	Count
Paid sick and vacation days	90%	368
Paid holidays	89%	364
Health insurance	86%	352
Retirement benefits	82%	333
Paid time and travel to attend trainings	77%	315
Paid or reimbursed certification fees	76%	310
Paid or reimbursed certification renewal fees	73%	299
Overtime	69%	280
Life and disability insurance	64%	263
Annual raises	64%	260
Paid or reimbursed tuition or training expenses	63%	259
Paid time to study for exams	34%	138
Comp time	29%	117
Other (please specify):	4%	16
Total	**100%**	**408**

Other (text entry):
NONE
Tuition reimbursement
Clothing allowance
Everything
none
Pride; Confidence; Health; Dental
TRUCK TO DRIVE AND CELL PHONE
No OT for salary employees
money for steel toe boots and uniforms are supplied
Cell Phone Reimbursement
I'm not paid I am a volunteer

My utility provides housing for two employees.
NONE
Housing
vacations

O.23. What job duties are you responsible for at your utility, other than basic system/treatment works? (Select all that apply)

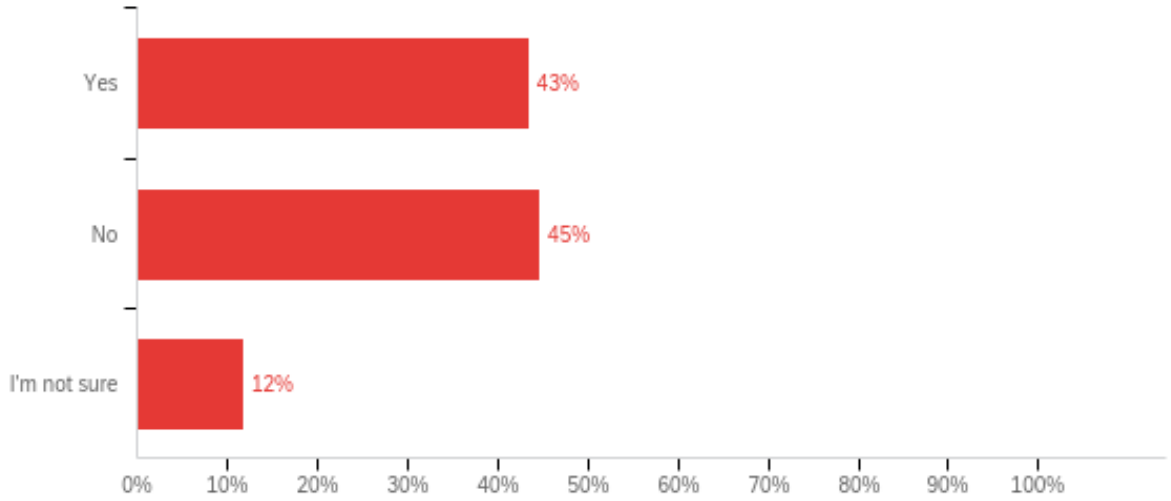


Answer	%	Count
Equipment maintenance	69%	280
Office work	69%	279
City maintenance (e.g., mowing)	25%	101
Trash services	18%	72
Other (please specify):	13%	51
Collecting payments	9%	37
I am not responsible for any other job duties	8%	33
Natural gas services	4%	16
Electrical utility services	4%	16
Total	**100%**	**405**

Other (please specify):
Water quality and compliance samples
I manage water/street/sewer/garbage and city cemetery
Employee supervision and training, scheduling, certified bacti lab supervision
data logs
lab tech/analyst
WATER
Laboratory
sample collecting and public relations
ALL PROCESS OPERATIONS
Scheduling Inspectors, performance reviews
Equipment operator.
G.I.S.
SEWER LIFT STATIONS
pumps, waterlines, telementry, valves, hydrants, power outages ,water leaks new meter taps
distribution water leaks
Training new hires. Creating standard operating procedures

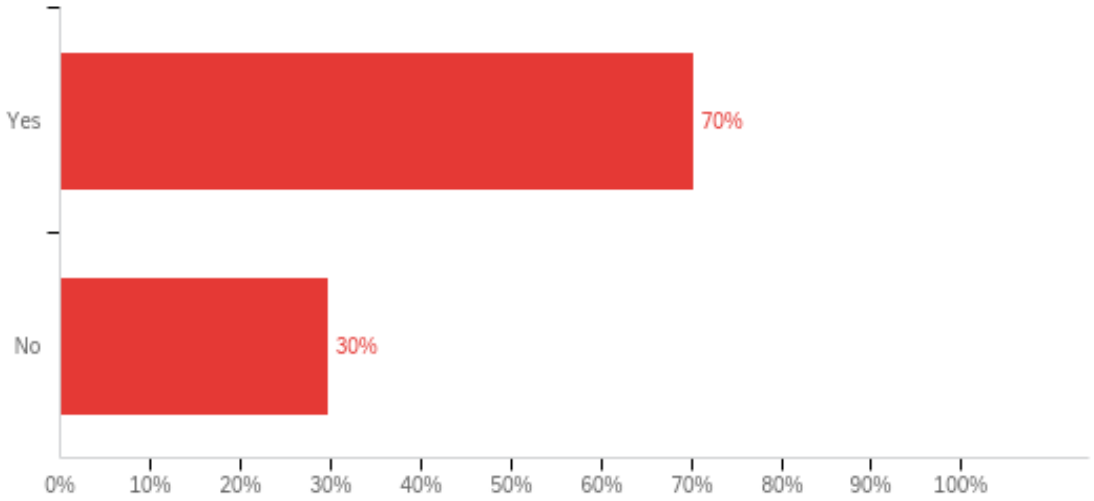
Laboratory and pretreatment
leak hunting
Sludge removal
Laboratory analysis
The plants
Samples. Fixing leaks. Finding leaks. Making schedules
Engineering
repair and fix water main breaks meter repair
Cheerleader; Financial; EE benefits; HR
Anything where help is needed
I do all locates, schedule work for the maintenance department, help with Gis. I work in the distribution department not water treatment.
cleaning, taking out trash
Bookkeeping
Cleaning
Reading meters. Responding to leaks. Keeping inventory on chemicals, tools and equipment.
Water treatment
Gotta love working outside
maintaining trails, law enforcement, firefighting
Supervision of WTP
Treating waste water
microbiology lab, toc lab, landscaping, painting, keeping up with grounds,
record keeping
Samples and hydrant maintenance
Collection system rehabilitation
Surface Cleaning, Prep, Painting
Facilities Director
Supervising other physical plant employees
lab manager

O.24. Does your utility have a trainee or apprentice program?



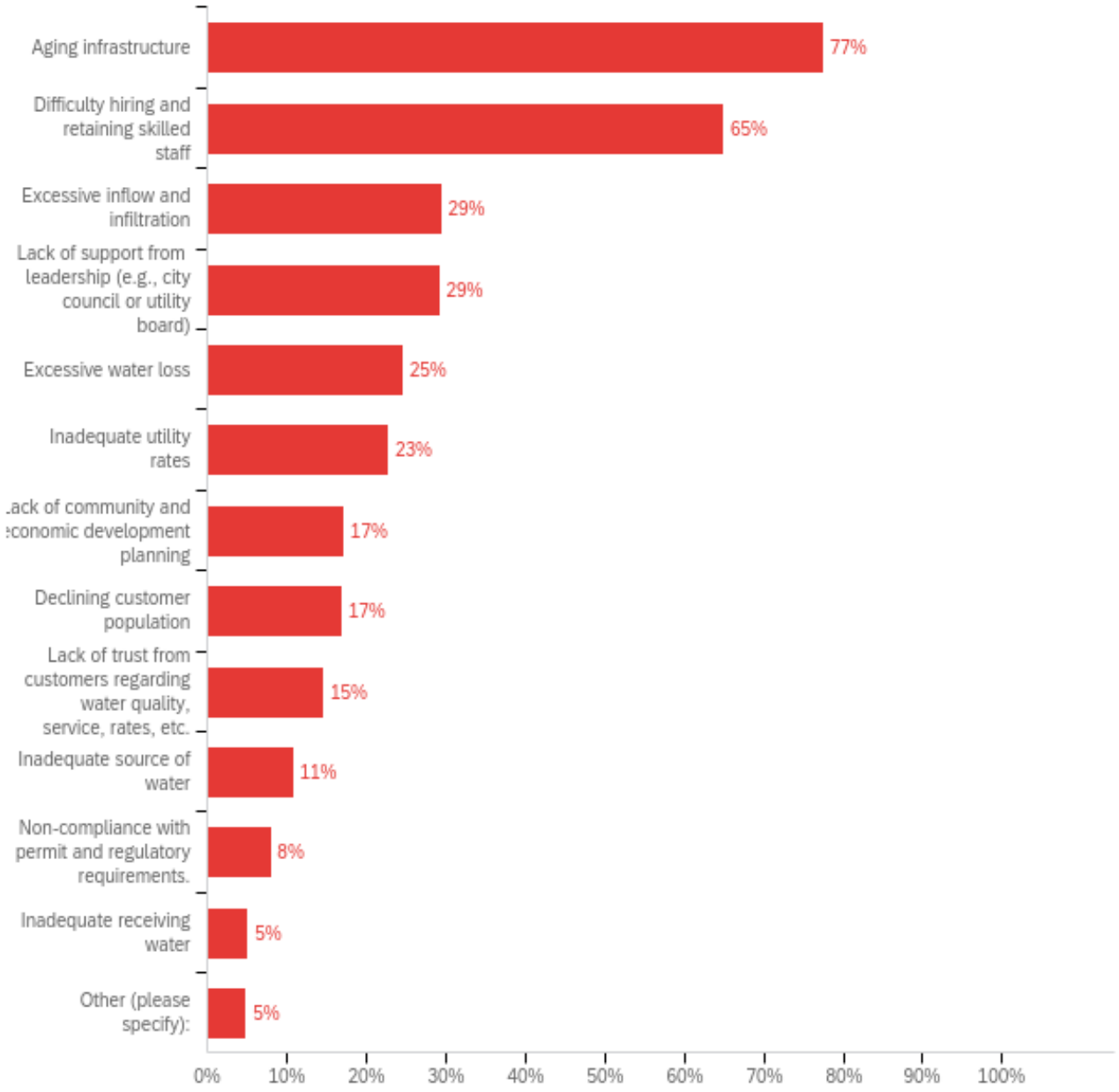
Answer	%	Count
Yes	43%	177
No	45%	182
I'm not sure	12%	48
Total	**100%**	**407**

O.25. Does your utility offer opportunities for promotions and career advancement?



Answer	%	Count
Yes	70%	284
No	30%	120
Total	**100%**	**404**

O.26. What type of operations challenges does your utility face? (Select all that apply)

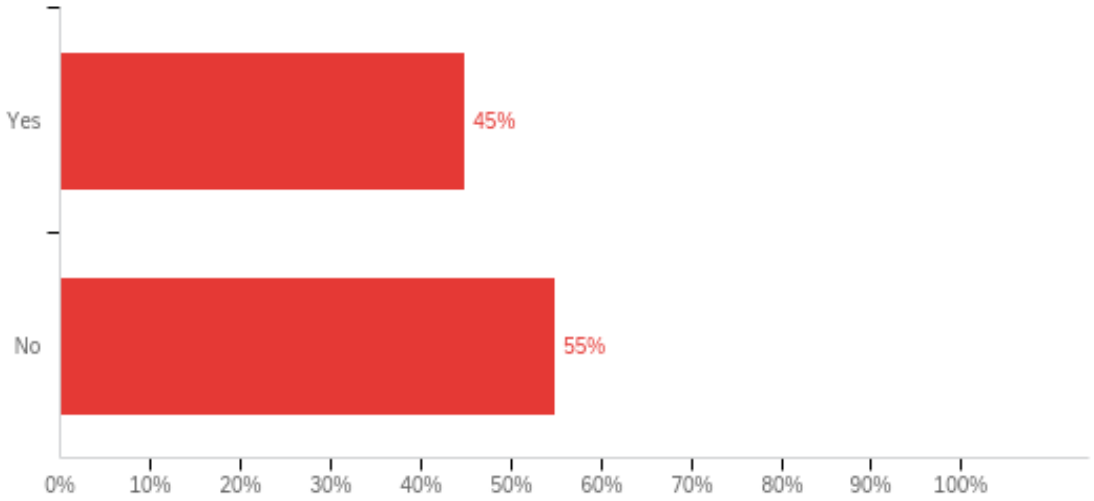


Answer	%	Count
Aging infrastructure	77%	303
Difficulty hiring and retaining skilled staff	65%	254
Excessive inflow and infiltration	29%	115
Lack of support from leadership (e.g., city council or utility board)	29%	114
Excessive water loss	25%	96
Inadequate utility rates	23%	89
Lack of community and economic development planning	17%	67
Declining customer population	17%	66
Lack of trust from customers regarding water quality, service, rates, etc.	15%	57
Inadequate source of water	11%	42
Non-compliance with permit and regulatory requirements.	8%	31
Inadequate receiving water	5%	20
Other (please specify):	5%	19
Total	**100%**	**391**

Other (please specify):
Aging staff that will not retire
Pay isn’t adequate for job
willingly lets an employee write false test results and bully others until several of us quit.
need for plant updates and more employees
Stringent EPA & State regulations
wasteful spending by board members
none
I'm retired
lack of supervisor not being able to supervise the right way without getting mad or upset if something doesn’t go his way
Not having enough staff
Fewer customers per mile of distribution system. Reduced water use by industry

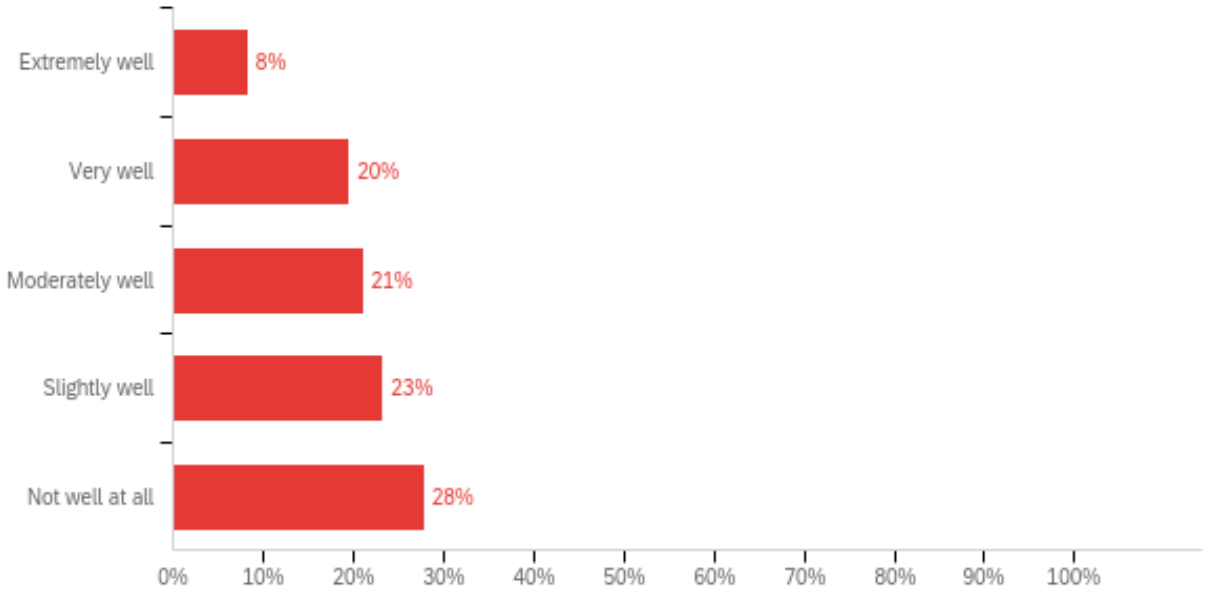
Bad Wholesale Contracts with 42 years of length
Workplace discrimination
Need a help desk for when you have high e. Coli for example
Poor management, active discrimination and devaluation of employees.
Lack of respect of operators as a Profession
Source water redundancy.

O.27. In your opinion, does your utility have enough operators?



Answer	%	Count
Yes	45%	180
No	55%	220
Total	**100%**	**400**

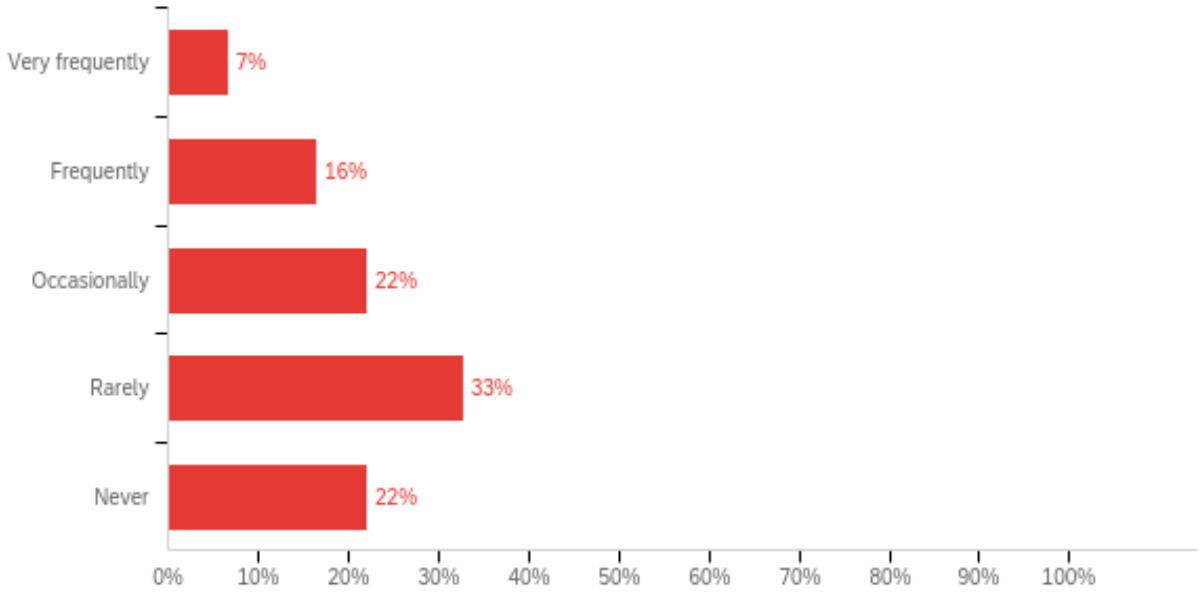
O.28. How well do your utility's decision makers (e.g., city council or utility board) understand what you do in your job?



Answer	%	Count
Extremely well (1)	8%	33
Very well (2)	20%	78
Moderately well (3)	21%	84
Slightly well (4)	23%	93
Not well at all (5)	28%	111
Total	**100%**	**399**

	Minimum	Maximum	Mean	Std Deviation	Variance	Count
28. How well do your utility's decision makers (e.g., city council or utility board) understand what you do in your job?	1.00	5.00	3.43	1.30	1.69	399

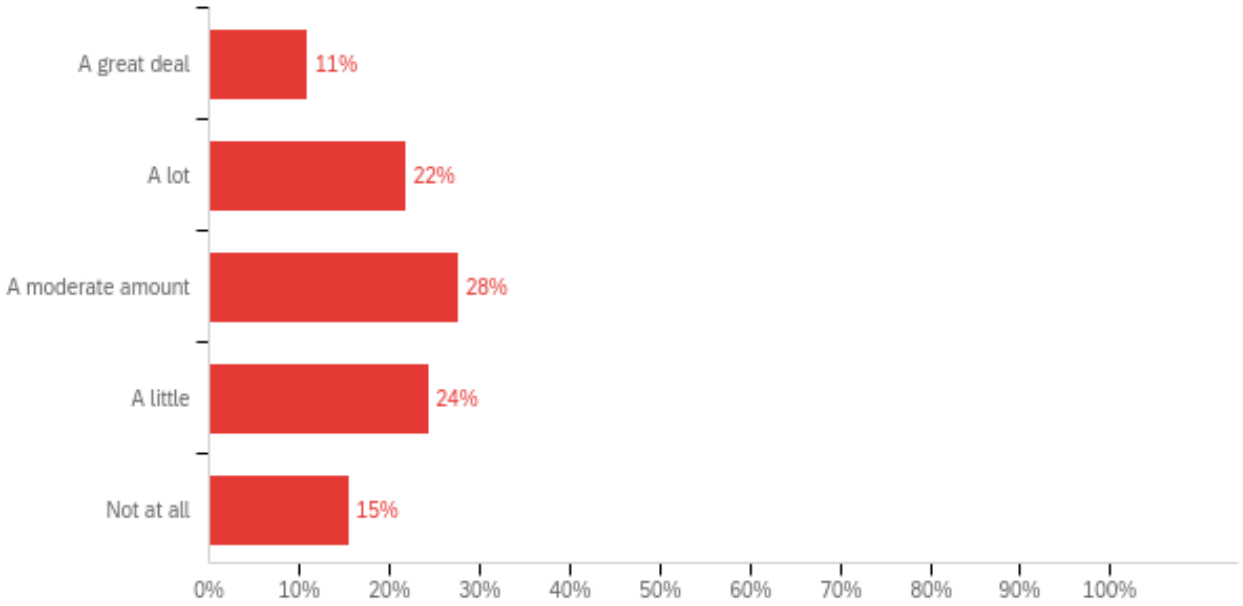
O.29. How often do your utility's decision makers (e.g., city council or utility board) communicate with the operators?



Answer	%	Count
Very frequently (1)	7%	26
Frequently (2)	16%	65
Occasionally (3)	22%	87
Rarely (4)	33%	129
Never (5)	22%	87
Total	**100%**	**394**

	Minimum	Maximum	Mean	Std Deviation	Variance	Count
29. How often do your utility's decision makers (e.g., city council or utility board) communicate with the operators?	1.00	5.00	3.47	1.19	1.42	394

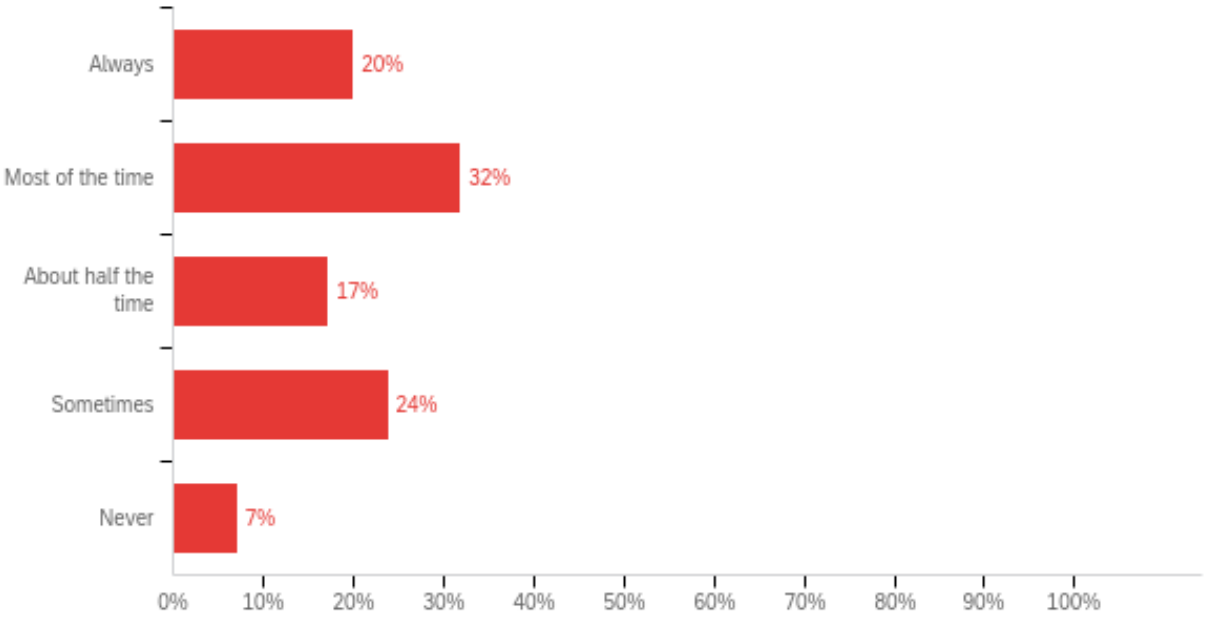
O.30. Do you feel appreciated by your utility?



Answer	%	Count
A great deal (1)	11%	43
A lot (2)	22%	86
A moderate amount (3)	28%	109
A little (4)	24%	96
Not at all (5)	15%	61
Total	**100%**	**395**

	Minimum	Maximum	Mean	Std Deviation	Variance	Count
30. Do you feel appreciated by your utility?	1.00	5.00	3.12	1.22	1.50	395

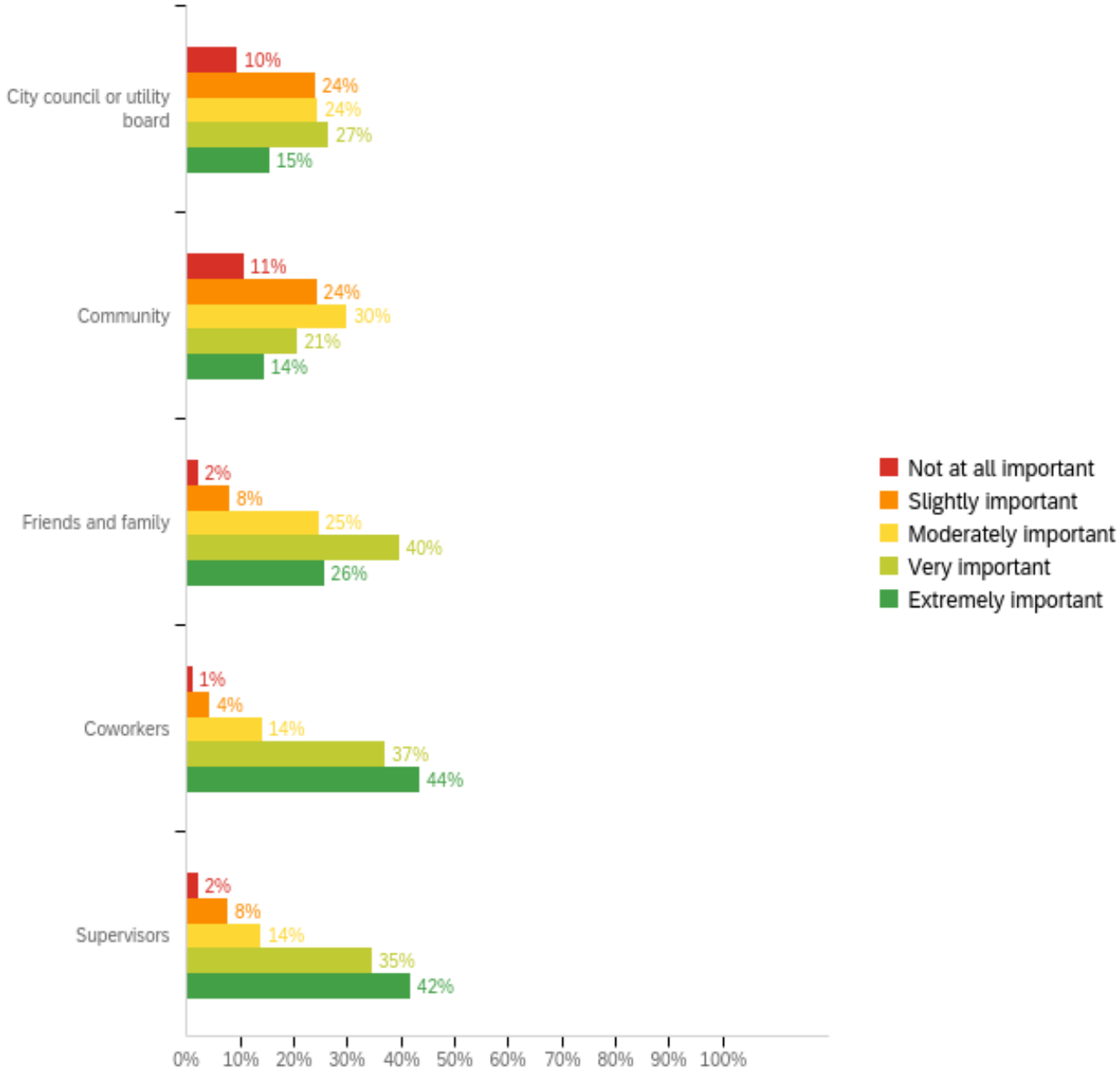
O.31. Do your managers listen to your opinions on matters that you deal with on a daily basis?



Answer	%	Count
Always (1)	20%	79
Most of the time (2)	32%	126
About half the time (3)	17%	68
Sometimes (4)	23%	94
Never (5)	7%	28
Total	**100%**	**395**

	Minimum	Maximum	Mean	Std Deviation	Variance	Count
31. Do your managers listen to your opinions on matters that you deal with on a daily basis?	1.00	5.00	2.66	1.24	1.53	395

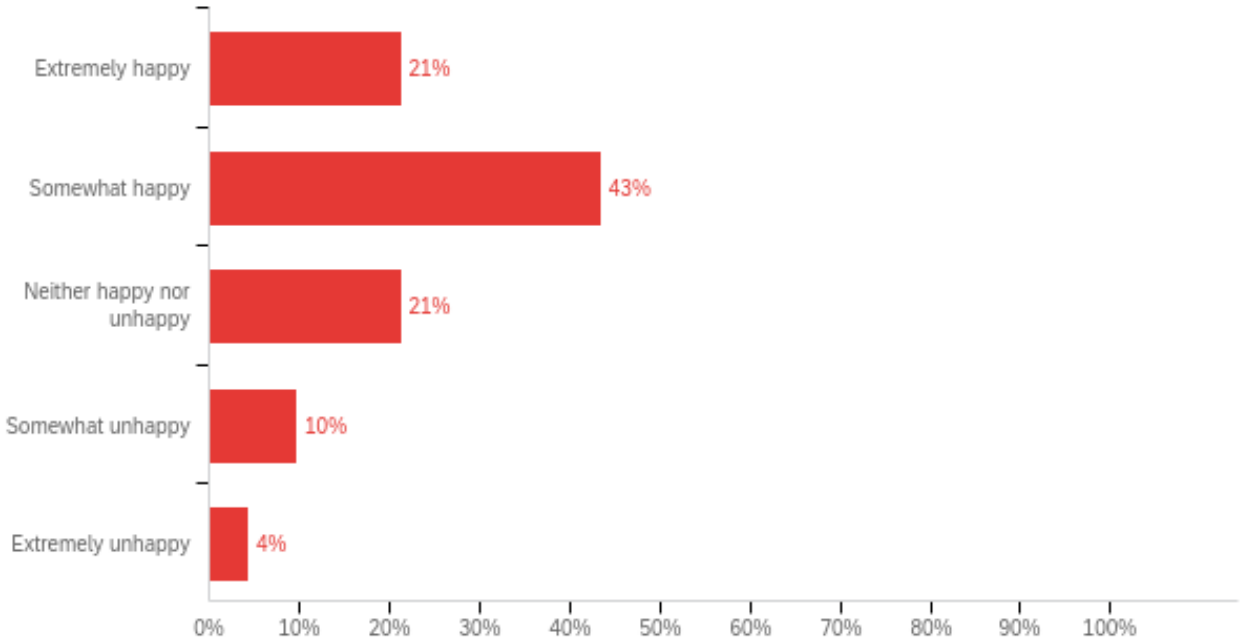
32. The services provided by drinking water and wastewater utility operators protect public health, the environment, and water quality. Consider each of the following groups of people and tell us, in your opinion, do they think the work you do is not at all important, slightly important, moderately important, very important, or extremely important?



	Minimum	Maximum	Mean	Std Deviation	Variance	Count
City council or utility board	1.00	5.00	3.14	1.22	1.48	388
Community	1.00	5.00	3.04	1.20	1.45	387
Friends and family	1.00	5.00	3.79	0.98	0.97	386
Coworkers	1.00	5.00	4.18	0.90	0.81	386
Supervisors	1.00	5.00	4.06	1.02	1.05	388

	Not at all important		Slightly important		Moderately important		Very important		Extremely important		Total
City council or utility board	10%	37	24%	93	24%	95	27%	103	15%	60	388
Community	11%	41	24%	94	30%	116	21%	80	14%	56	387
Friends and family	2%	8	8%	31	25%	95	40%	153	26%	99	386
Coworkers	1%	4	4%	17	14%	54	37%	143	44%	168	386
Supervisors	2%	8	8%	30	14%	54	35%	134	42%	162	388

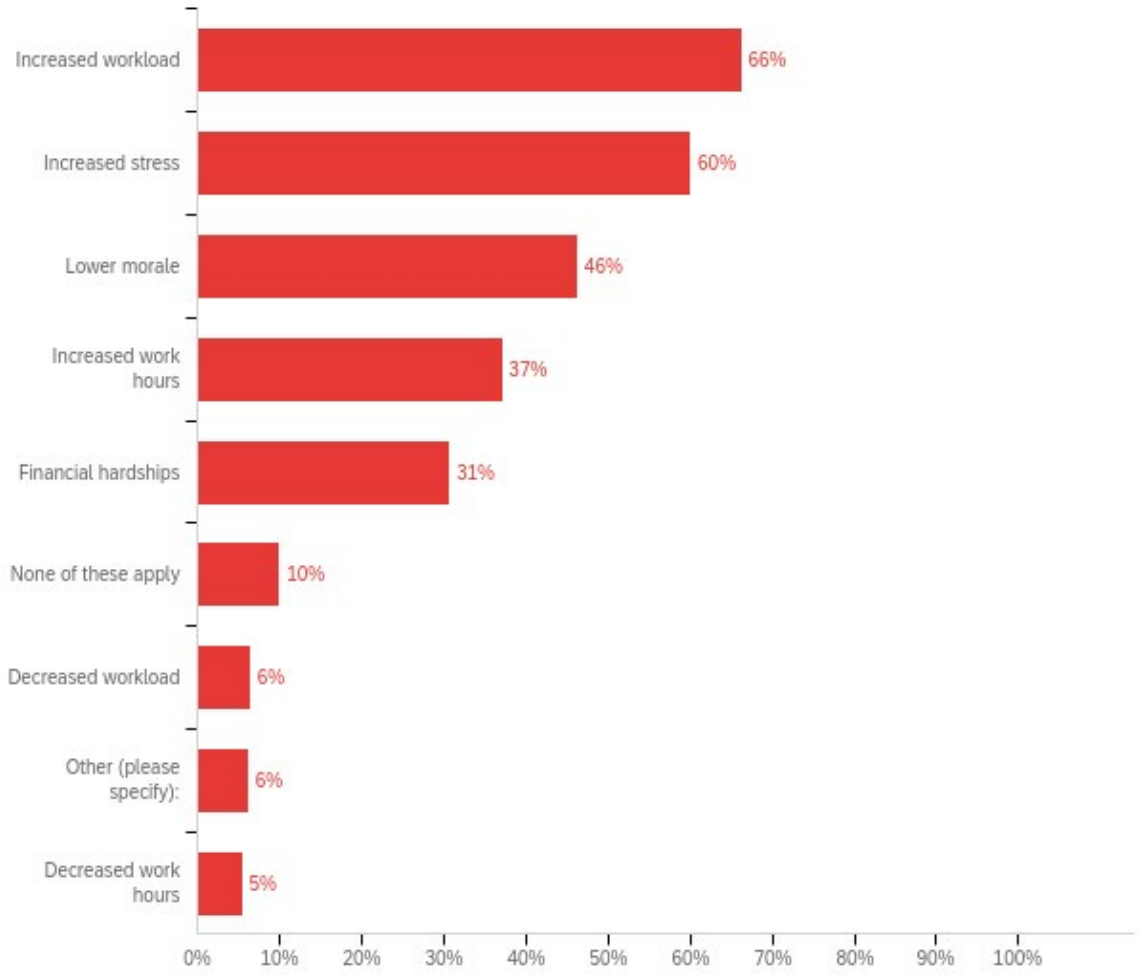
O.33. How happy are you at work?



Answer	%	Count
Extremely happy (1)	21%	83
Somewhat happy (2)	43%	170
Neither happy nor unhappy (3)	21%	83
Somewhat unhappy (4)	10%	38
Extremely unhappy (5)	4%	17
Total	**100%**	**391**

	Minimum	Maximum	Mean	Std Deviation	Variance	Count
33. How happy are you at work?	1.00	5.00	2.32	1.05	1.10	391

O.34. Over the last two years, which of the following have you experienced? (Select all that apply)

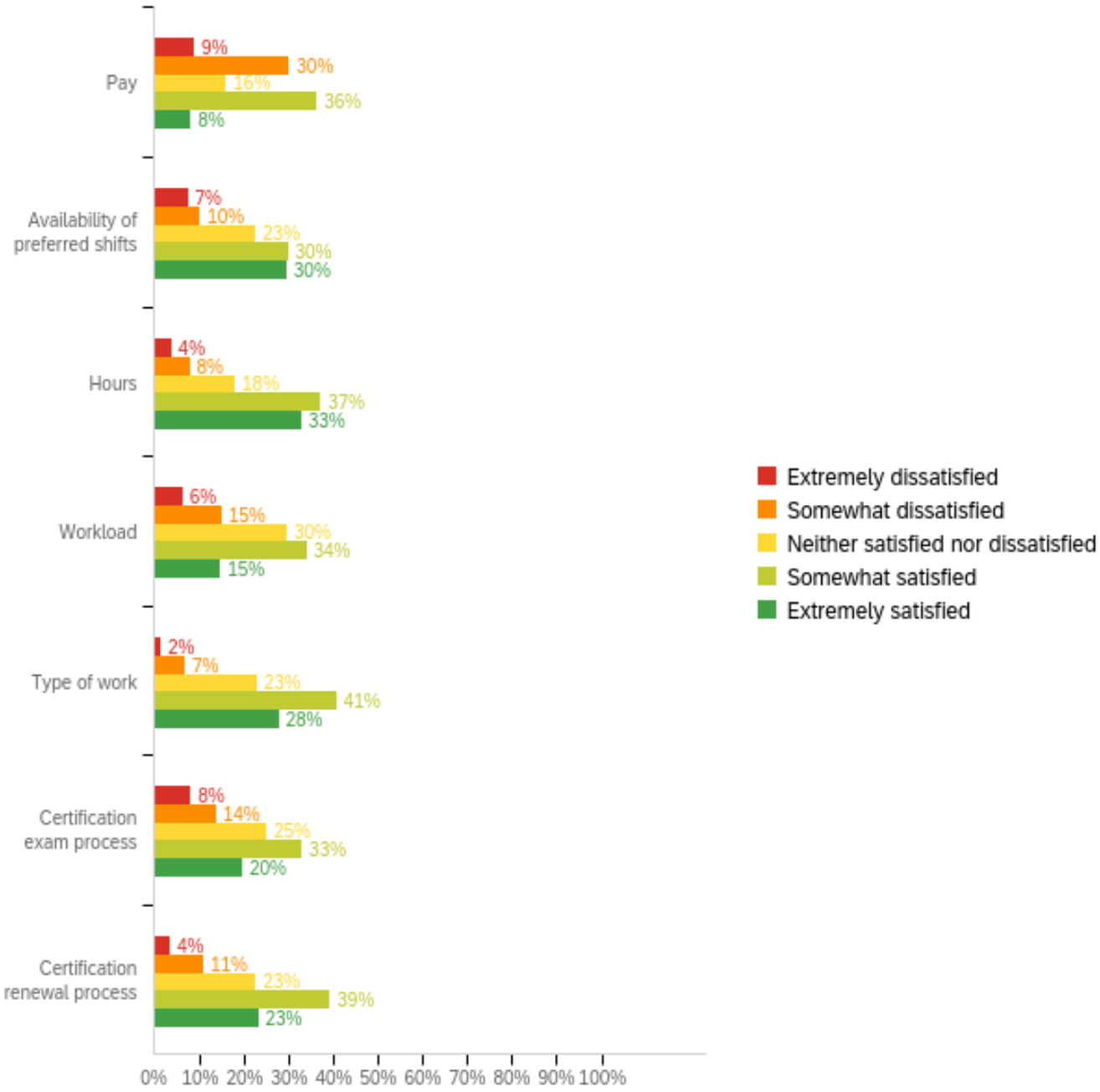


Answer	%	Count
Increased workload	66%	259
Increased stress	60%	235
Lower morale	46%	181
Increased work hours	37%	145
Financial hardships	31%	120
None of these apply	10%	39
Decreased workload	6%	25
Other (please specify):	6%	24
Decreased work hours	5%	21

Total	**100%**	**391**

Other (please specify):
promotion
get upset when people do not do their job and i have to do it for them
gas prices are really hard especially living away from work
Workplace discrimination
Workplace discrimination
Thoughts of suicide
They been pretty good to me
Shift work has taken its toll on many of us. Rotating shifts are terrible.
Retired for 6 years
Rapid turn around at our formally poor work place
Politics(which doesn't mix with water)
Not keeping on with inflation or cost of living raises where the 2 percent raises they give every year don't cover the cost of just getting to the plant to do your job. Unfair policies and practices for management vs operators during covid.
Not being listened to, not being valued. Being discriminated against as a female.
No longer employed
Inflation. Cost of living raises don’t match inflation. So our salary used to be decent now it’s mediocre at best
Increased political influence by upper echelon on utility operations...politics or media relations driving decisions and budgets vs science and maintenance needs
Increased anxiety and frequent unprofessional behaviors from another employee.
Increase in pay.
Hostile work environment. questionable decisions by management
Horrible hazing of women. Unfit work environment. No appreciation for operators
Engineering took the department over.
Company refusal to certify its operators
Chemical supply issues
Change of shift that makes it impossible to see my children, I am the only employee with school aged children at my plant.

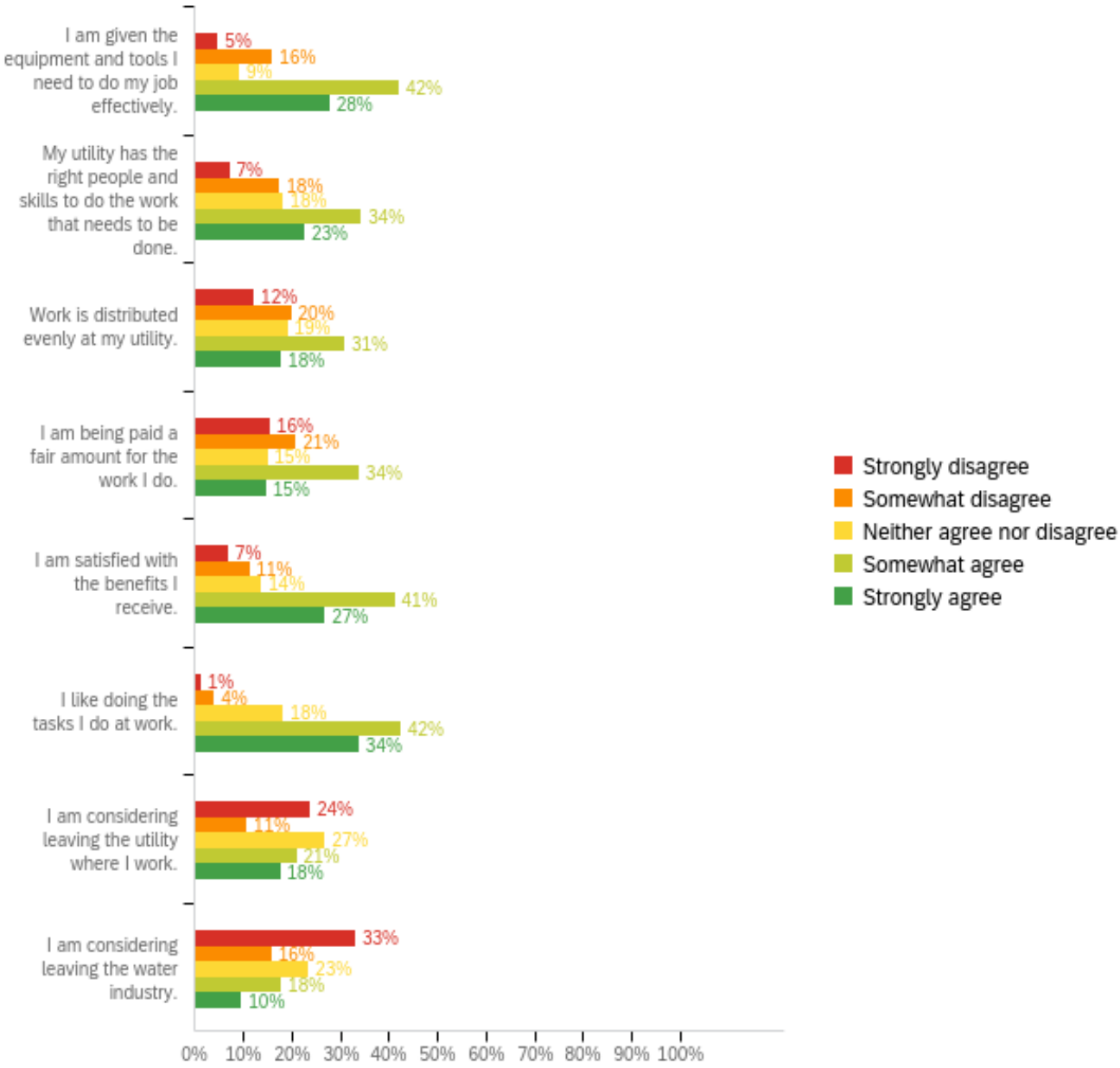
O.35. Consider each of the following and indicate whether you are extremely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, or extremely satisfied with that aspect of your job.



	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Pay	1.00	5.00	3.05	1.16	1.35	390
Availability of preferred shifts	1.00	5.00	3.64	1.22	1.48	388
Hours	1.00	5.00	3.88	1.07	1.16	392
Workload	1.00	5.00	3.36	1.10	1.21	391
Type of work	1.00	5.00	3.86	0.95	0.90	392
Certification exam process	1.00	5.00	3.42	1.19	1.41	390
Certification renewal process	1.00	5.00	3.68	1.06	1.12	391

	Extremely dissatisfied		Somewhat dissatisfied		Neither satisfied nor dissatisfied		Somewhat satisfied		Extremely satisfied		Total
Pay	9%	35	30%	118	16%	63	36%	142	8%	32	390
Availability of preferred shifts	7%	29	10%	40	23%	88	30%	116	30%	115	388
Hours	4%	15	8%	31	18%	71	37%	146	33%	129	392
Workload	6%	25	15%	59	30%	116	34%	133	15%	58	391
Type of work	2%	6	7%	27	23%	90	41%	160	28%	109	392
Certification exam process	8%	32	14%	54	25%	98	33%	129	20%	77	390
Certification renewal process	4%	14	11%	43	23%	89	39%	154	23%	91	391

O.36. Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each.



	Minimum	Maximum	Mean	Std Deviation	Variance	Count
I am given the equipment and tools I need to do my job effectively.	1.00	5.00	3.72	1.17	1.37	392
My utility has the right people and skills to do the work that needs to be done.	1.00	5.00	3.48	1.22	1.48	393
Work is distributed evenly at my utility.	1.00	5.00	3.22	1.29	1.66	392
I am being paid a fair amount for the work I do.	1.00	5.00	3.11	1.32	1.75	393
I am satisfied with the benefits I receive.	1.00	5.00	3.70	1.18	1.39	391
I like doing the tasks I do at work.	1.00	5.00	4.04	0.89	0.80	393
I am considering leaving the utility where I work.	1.00	5.00	2.98	1.40	1.97	391
I am considering leaving the water industry.	1.00	5.00	2.55	1.36	1.85	392

	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agree		Total
I am given the equipment and tools I need to do my job effectively.	5%	19	16%	63	9%	36	42%	165	28%	109	392
My utility has the right people and skills to do the work that needs to be done.	7%	28	18%	69	18%	72	34%	135	23%	89	393
Work is distributed evenly at my utility.	12%	48	20%	78	19%	75	31%	121	18%	70	392
I am being paid a fair amount for the work I do.	16%	61	21%	82	15%	59	34%	133	15%	58	393
I am satisfied with the benefits I receive.	7%	27	11%	44	14%	54	41%	161	27%	105	391
I like doing the tasks I do at work.	1%	5	4%	16	18%	72	42%	167	34%	133	393
I am considering leaving the utility where I work.	24%	93	11%	42	27%	105	21%	82	18%	69	391
I am considering leaving the water industry.	33%	130	16%	62	23%	92	18%	70	10%	38	392

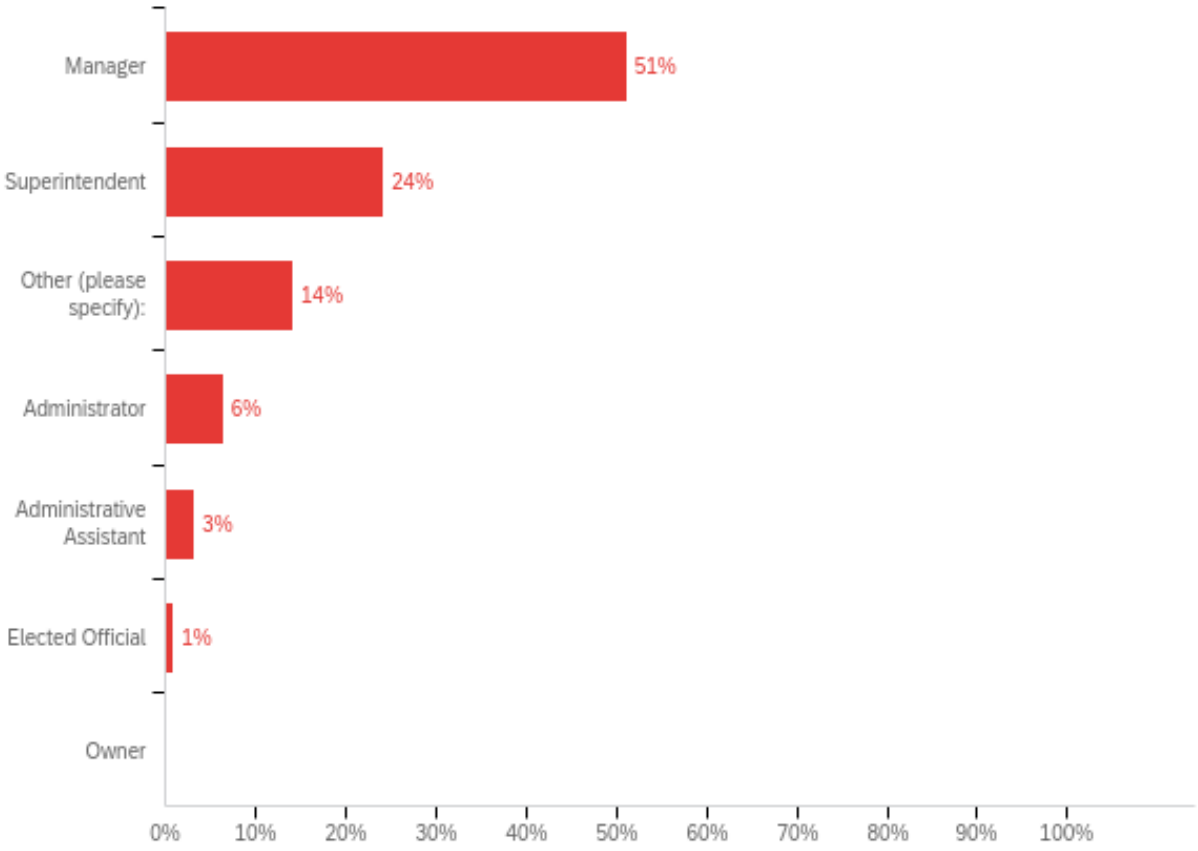
O.37. The following is a list of things that utilities can do to encourage operators to stay in the water industry. In your opinion, which are the most effective? Rank them from most effective to least effective by dragging and dropping the statements to reorder them. When you click on a statement to move it, you will see the rank you are giving it. For example, if you think that increasing pay is the most effective way utilities can encourage operators to stay in the water industry, you will drag that statement to the top, giving it a rank of 1. Continue ranking the options from the most effective (rank of 1) to the least effective (rank of 8).

	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Increase pay	1.00	8.00	1.59	1.18	1.39	377
Create incentive programs	1.00	8.00	3.68	1.93	3.72	377
Provide better benefits	1.00	8.00	3.76	1.76	3.10	377
Have more certified operators on staff	1.00	8.00	4.35	2.03	4.10	377
Provide new equipment and supplies	1.00	8.00	5.27	1.99	3.98	377
Offer more training opportunities	1.00	8.00	5.29	1.75	3.06	377
Provide overtime pay	1.00	8.00	5.65	2.12	4.50	377
Provide comp time	1.00	8.00	6.41	1.51	2.27	377

	1		2		3		4		5		6		7		8		Total
Offer more training opportunities	2%	6	5%	19	9%	35	18%	68	18%	68	19%	73	18%	67	11%	41	377
Have more certified operators on staff	7%	25	16%	61	15%	56	16%	61	17%	64	11%	42	10%	36	8%	32	377
Provide better benefits	5%	17	29%	108	17%	64	15%	55	16%	62	11%	43	5%	20	2%	8	377
Create incentive programs	11%	43	23%	85	18%	68	16%	60	14%	52	7%	28	7%	25	4%	16	377
Provide new equipment and supplies	4%	14	6%	22	15%	56	11%	42	13%	50	15%	56	24%	90	12%	47	377
Provide overtime pay	0%	1	9%	34	12%	46	13%	48	11%	43	10%	37	13%	49	32%	119	377
Provide comp time	1%	2	1%	4	3%	11	9%	35	8%	30	25%	94	24%	90	29%	111	377
Increase pay	71%	269	12%	44	11%	41	2%	8	2%	8	1%	4	0%	0	1%	3	377

Appendix D: KWWS Manager Survey Results

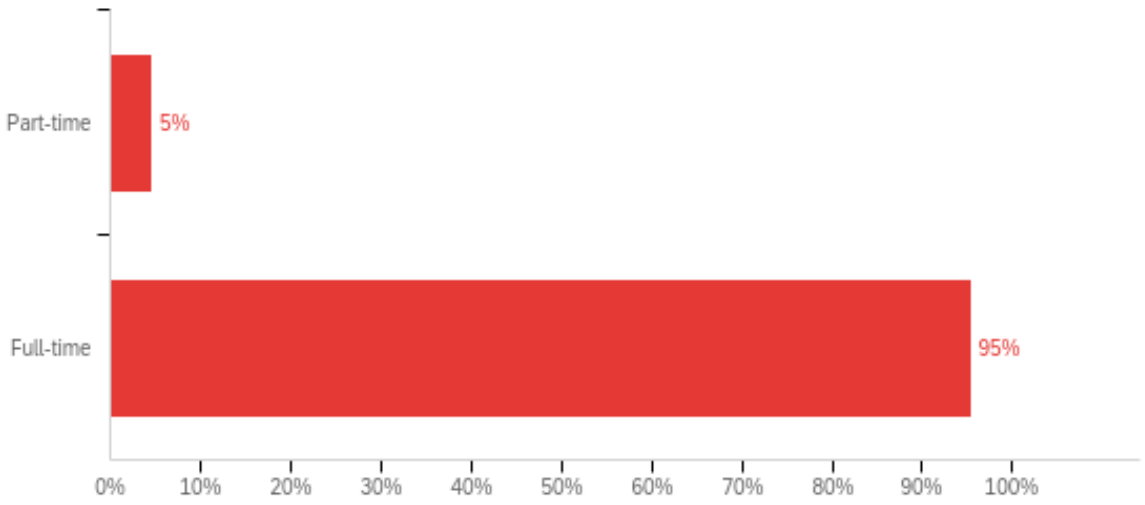
M.1. Which of the following best describes your current position at the utility?



Answer	%	Count
Manager	51%	112
Superintendent	24%	53
Other (please specify):	14%	31
Administrator	6%	14
Administrative Assistant	3%	7
Elected Official	1%	2
Owner	0%	0
Total	**100%**	**219**

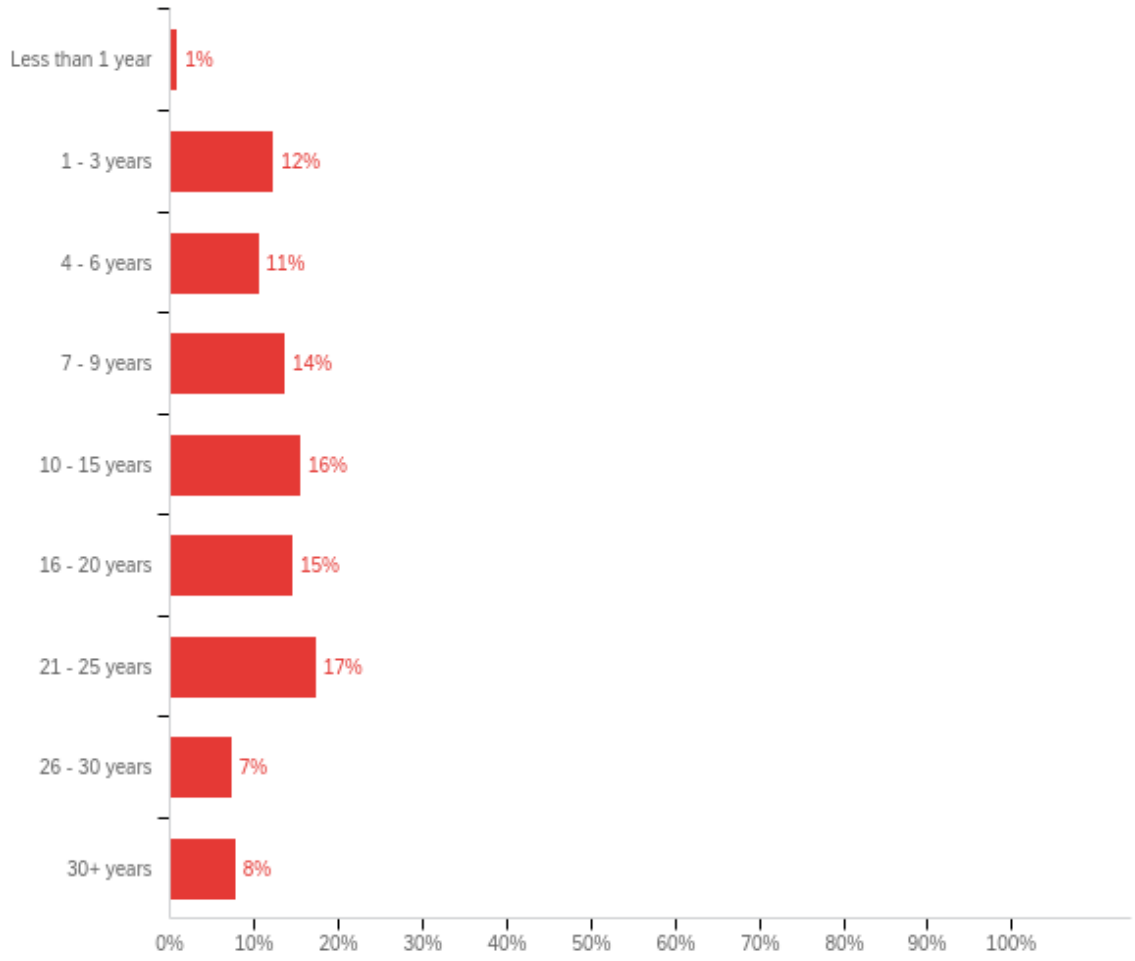
Other (please specify):
supervisor
HR
Chief Plant Operator
General Manager
Chief Operator
operator
Engineer
Lab Supervisor
supervisor
technical expert
Manager and Sole Operator
Supervisor
I am retired (not presently working)
engineer
CEO
Supervisor
Human Resources Officer
General Manager
Retired
Retired manager
Consultant to small utility
Operations Supervisor, operating when needed
Plant Operations Manager
Plant Operations Foreman
Plant Manager
Retired Superintendent, Current owner of a utility business
Field Supervisor
Water Quality Director
Assistant Superintendent
Director of Operations

M.2. Do you work part-time or full-time?



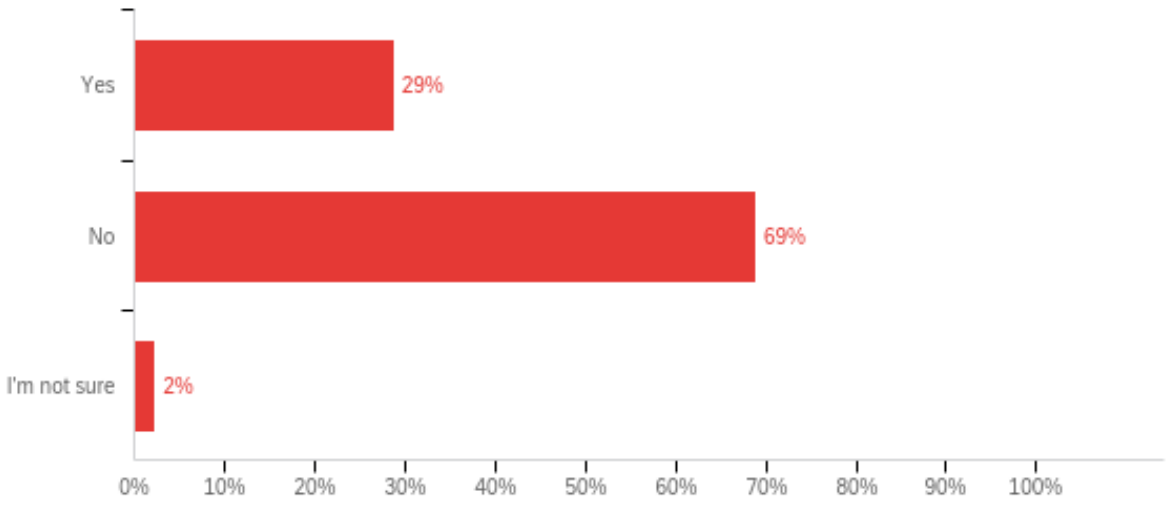
Answer	%	Count
Part-time	5%	10
Full-time	95%	208
Total	**100%**	**218**

M.3. How many years have you worked at the utility?



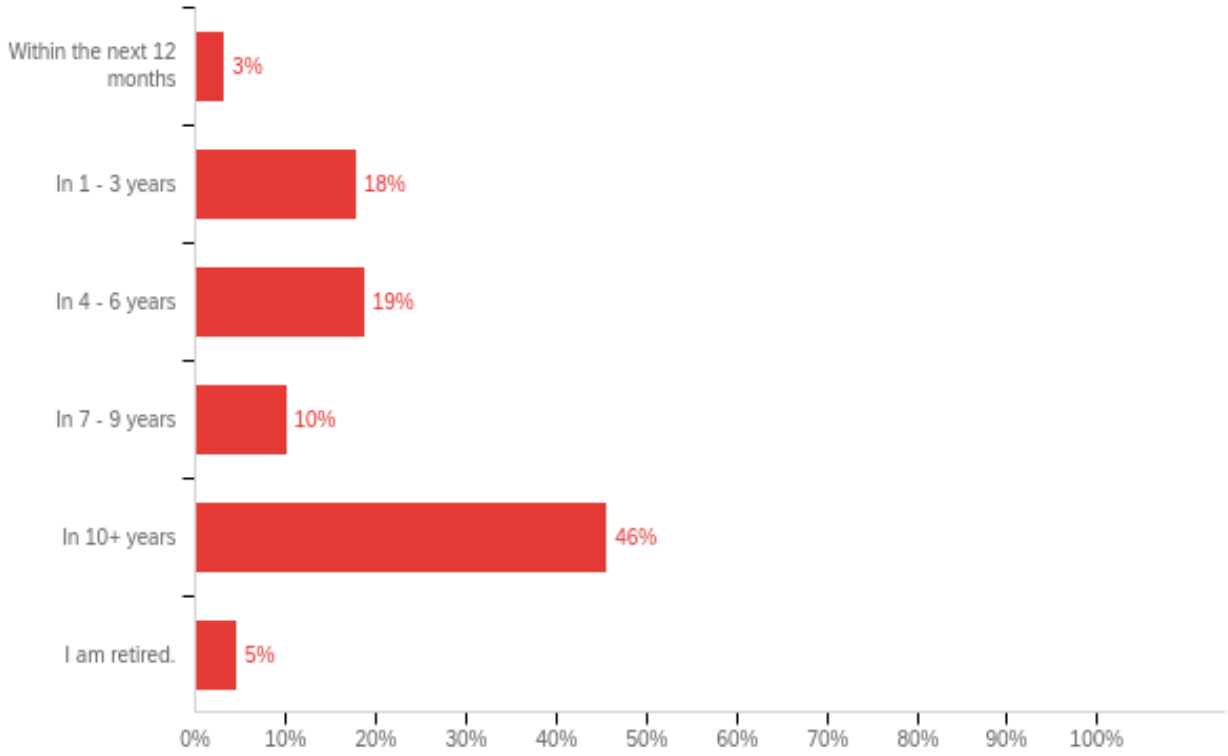
Answer	%	Count
Less than 1 year	1%	2
1 - 3 years	12%	27
30+ years	8%	17
4 - 6 years	11%	23
7 - 9 years	14%	30
10 - 15 years	16%	34
16 - 20 years	15%	32
21 - 25 years	17%	38
26 - 30 years	7%	16
Total	**100%**	**219**

M.4. Are you currently eligible to retire?



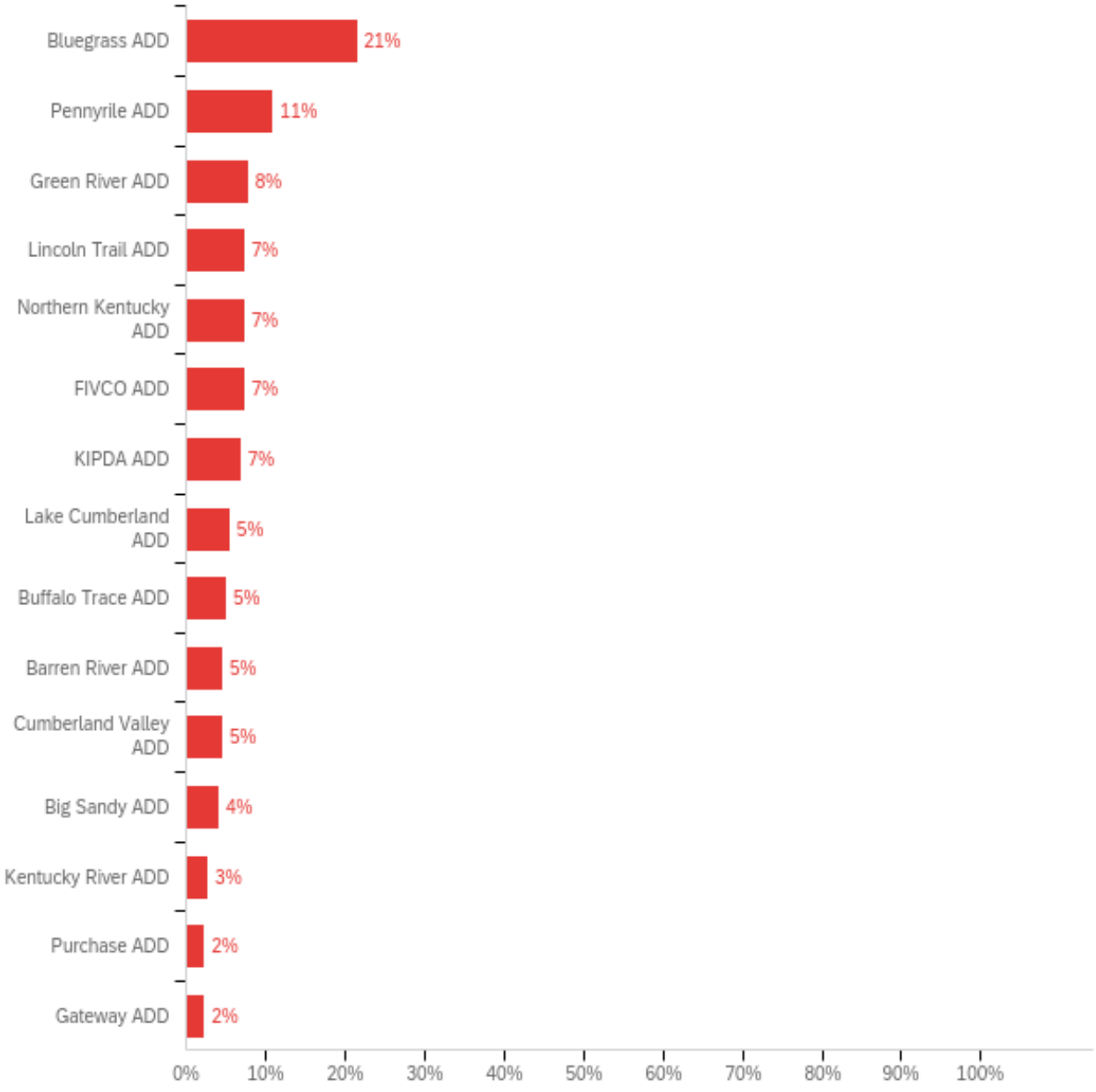
Answer	%	Count
Yes	29%	63
No	69%	151
I'm not sure	2%	5
Total	**100%**	**219**

M.5. When do you plan to retire?



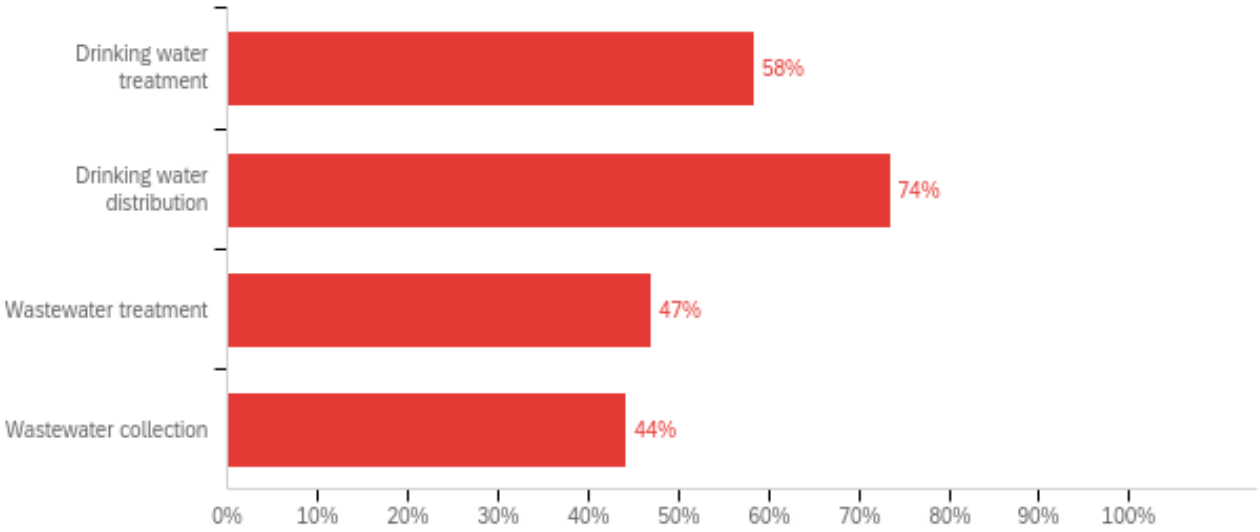
Answer	%	Count
Within the next 12 months	3%	7
In 1 - 3 years	18%	39
In 4 - 6 years	19%	41
In 7 - 9 years	10%	22
In 10+ years	46%	100
I am retired.	5%	10
Total	**100%**	**219**

M.6. What Area Development District (ADD) is your utility in? If your utility is in more than one ADD, please choose the one where your main office is located.



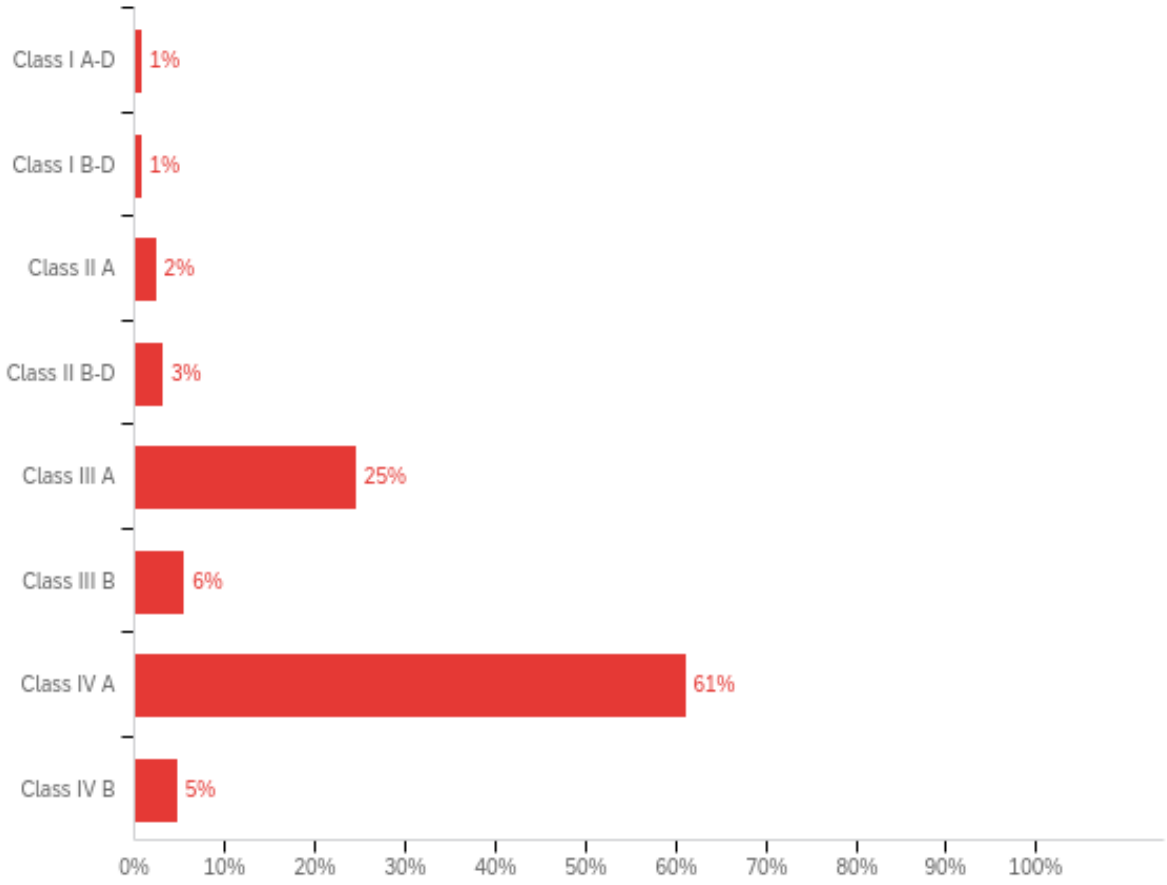
Answer	%	Count
Bluegrass ADD (Anderson, Bourbon, Boyle, Clark, Estill, Fayette, Franklin, Garrard, Harrison, Jessamine, Lincoln, Madison, Mercer, Nicholas, Powell, Scott, Woodford)	21%	47
Pennyrile ADD (Caldwell, Christian, Crittenden, Hopkins, Livingston, Lyon, Muhlenburg, Todd, Trigg)	11%	24
Green River ADD (Daviess, Hancock, Henderson, McLean, Ohio, Union, Webster)	8%	17
Lincoln Trail ADD (Breckinridge, Grayson, Hardin, LaRue, Marion, Meade, Nelson, Washington)	7%	16
FIVCO ADD (Boyd, Carter, Elliott, Greenup, Lawrence)	7%	16
Northern Kentucky ADD (Boone, Campbell, Carroll, Gallatin, Grant, Kenton, Owen, Pendleton)	7%	16
KIPDA ADD (Bullitt, Henry, Jefferson, Oldham, Shelby, Spencer, Trimble)	7%	15
Lake Cumberland ADD (Adair, Casey, Clinton, Cumberland, Green, McCreary, Pulaski, Russell, Taylor, Wayne)	5%	12
Buffalo Trace ADD (Bracken, Fleming, Lewis, Mason, Robertson)	5%	11
Barren River ADD (Allen, Barren, Butler, Edmonson, Hart, Logan, Metcalfe, Monroe, Simpson, Warren)	5%	10
Cumberland Valley ADD (Bell, Clay, Harlan, Jackson, Knox, Laurel, Rockcastle, Whitley)	5%	10
Big Sandy ADD (Floyd, Johnson, Magoffin, Martin, Pike)	4%	9
Kentucky River ADD (Breathitt, Knott, Lee, Leslie, Letcher, Owsley, Perry, Wolfe)	3%	6
Gateway ADD (Bath, Menifee, Montgomery, Morgan, Rowan)	2%	5
Purchase ADD (Ballard, Calloway, Carlisle, Fulton, Graves, Hickman, Marshall, McCracken)	2%	5
Total	**100%**	**219**

M.7. Which of the following describe your utility? (Select all that apply)



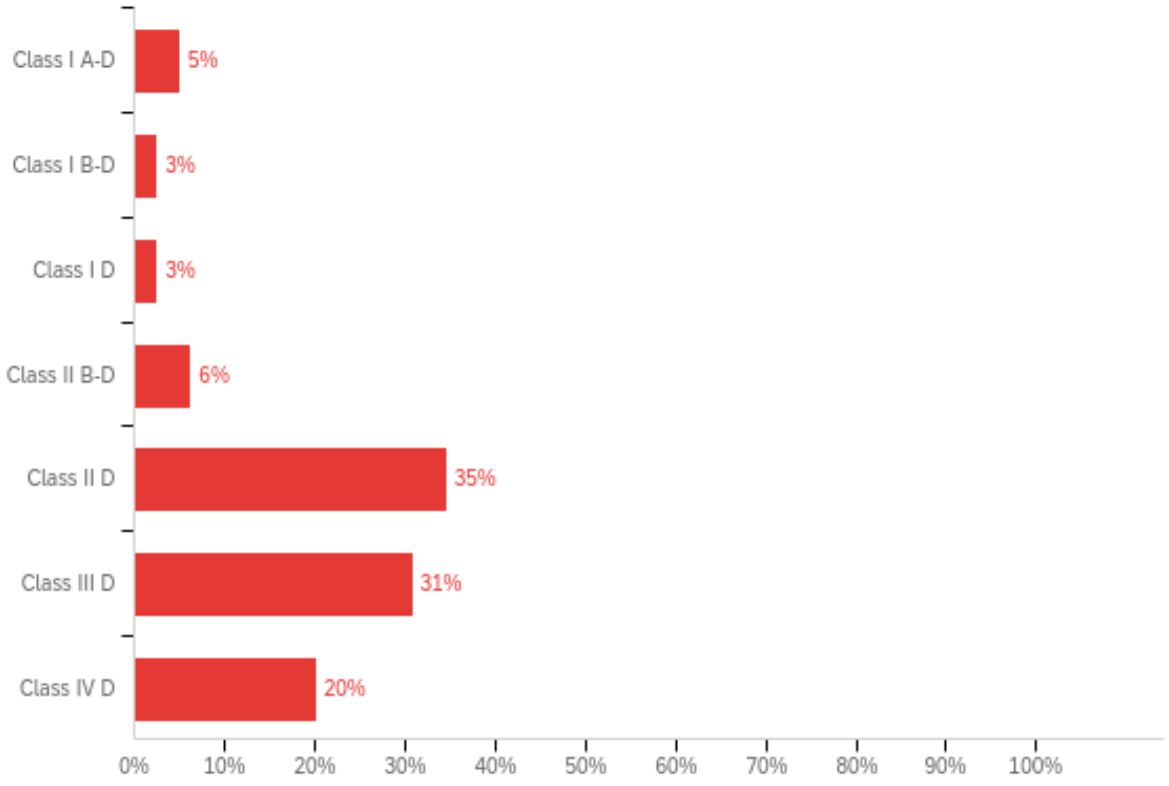
Answer	%	Count
Drinking water treatment	58%	128
Drinking water distribution	74%	161
Wastewater treatment	47%	103
Wastewater collection	44%	97
Total	**100%**	**219**

M.7a. What class is your drinking water treatment utility?



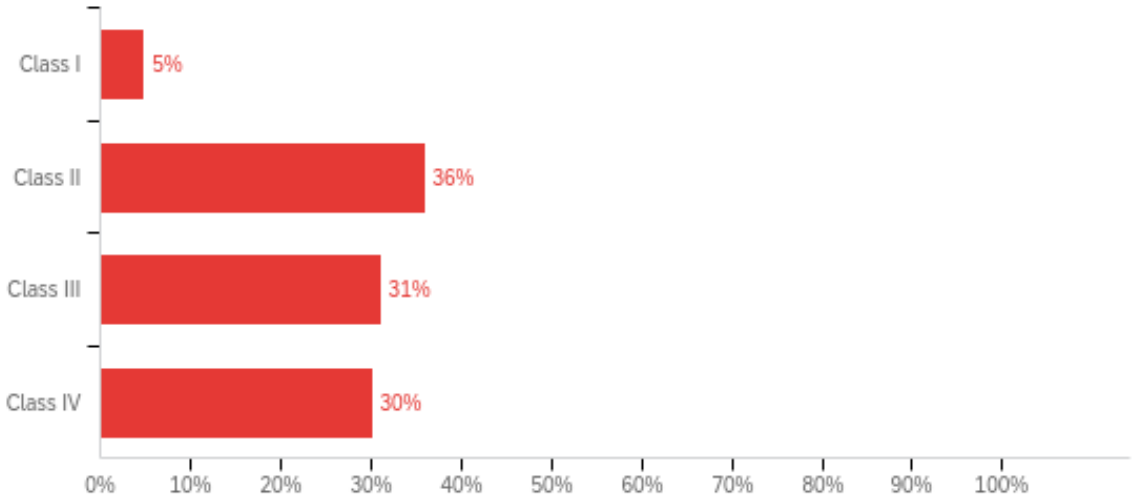
Answer	%	Count
Class I A-D	1%	1
Class I B-D	1%	1
Class II A	2%	3
Class II B-D	3%	4
Class III A	25%	31
Class III B	6%	7
Class IV A	61%	77
Class IV B	5%	6
Total	**100%**	**126**

M.7b. What class is your drinking water distribution utility?



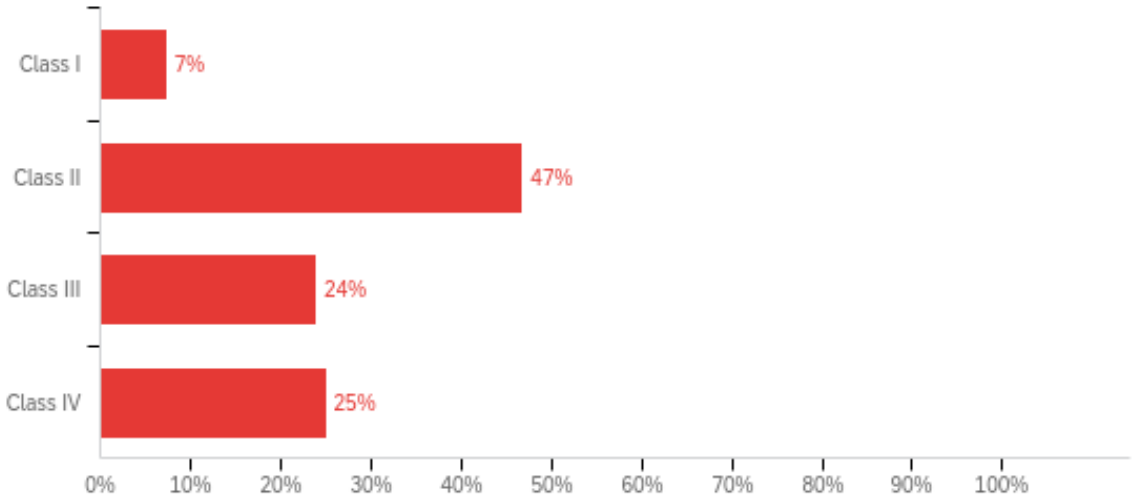
Answer	%	Count
Class I A-D	5%	8
Class I B-D	3%	4
Class I D	3%	4
Class II B-D	6%	10
Class II D	35%	55
Class III D	31%	49
Class IV D	20%	32
Total	**100%**	**159**

M.7c. What class is your wastewater treatment utility?



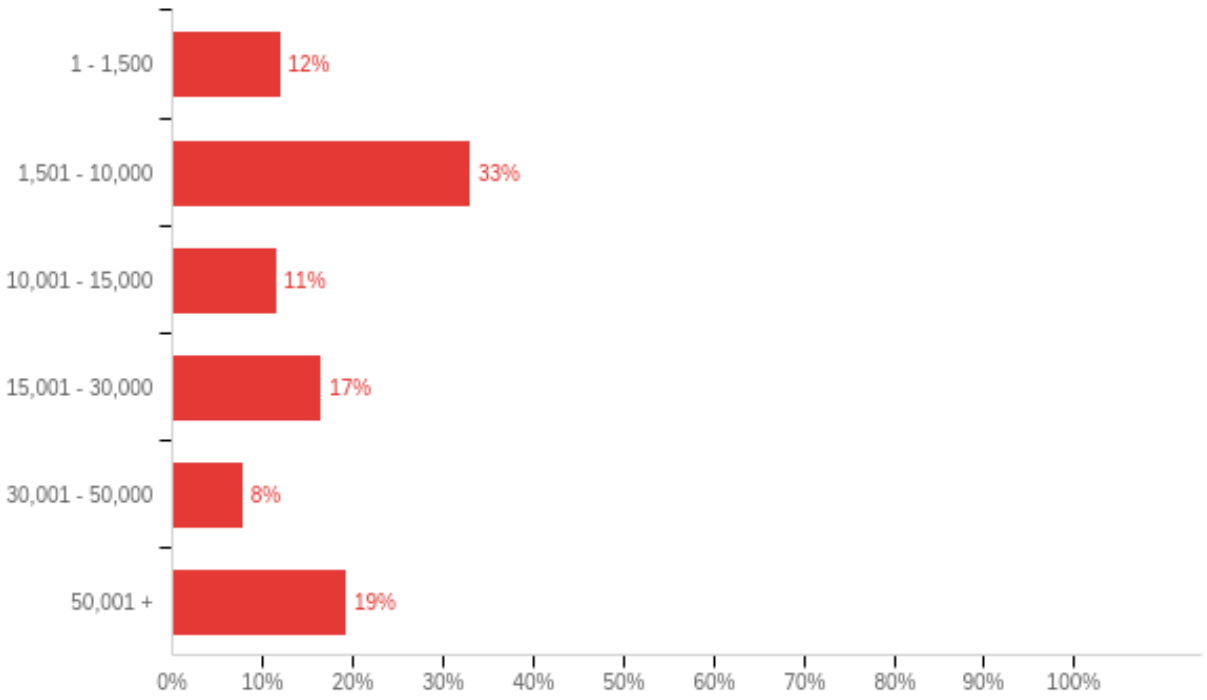
Answer	%	Count
Class I	5%	5
Class II	36%	37
Class III	31%	32
Class IV	30%	31
Total	**100%**	**103**

M.7d. What class is your wastewater collection utility?



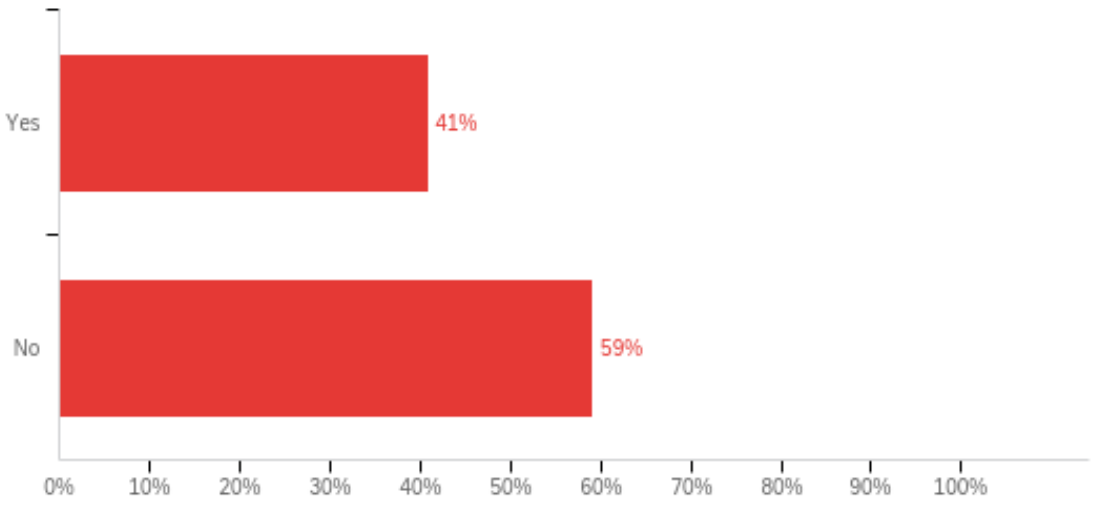
Answer	%	Count
Class I	7%	7
Class II	47%	45
Class III	24%	23
Class IV	25%	24
Total	**100%**	**96**

M.8. How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.



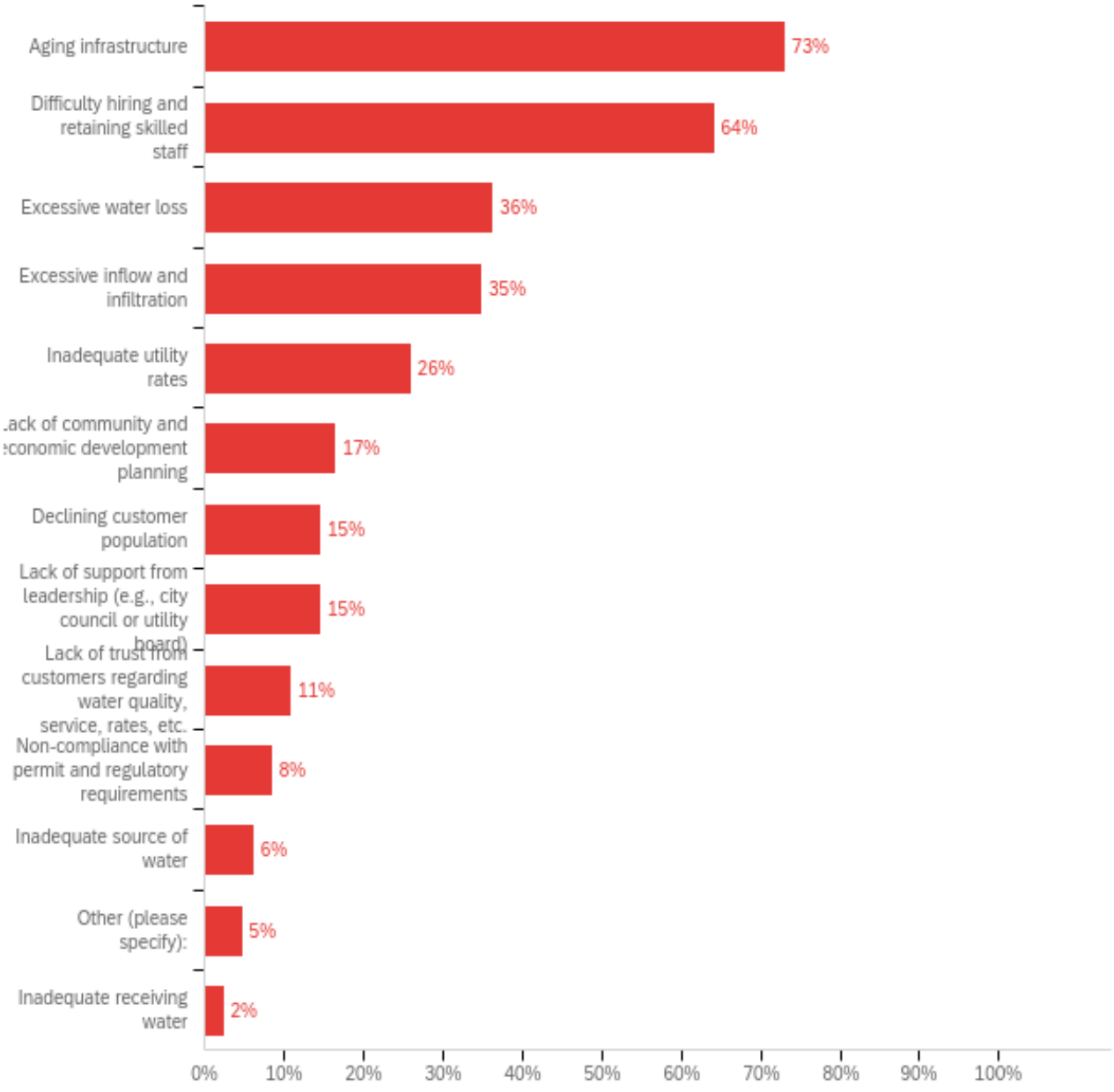
Answer	%	Count
1 - 1,500	12%	26
1,501 - 10,000	33%	72
10,001 - 15,000	11%	25
15,001 - 30,000	17%	36
30,001 - 50,000	8%	17
50,001 +	19%	42
Total	**100%**	**218**

M.9. Is your utility regulated by Kentucky's Public Service Commission (PSC)?



Answer	%	Count
Yes	41%	89
No	59%	129
Total	100%	218

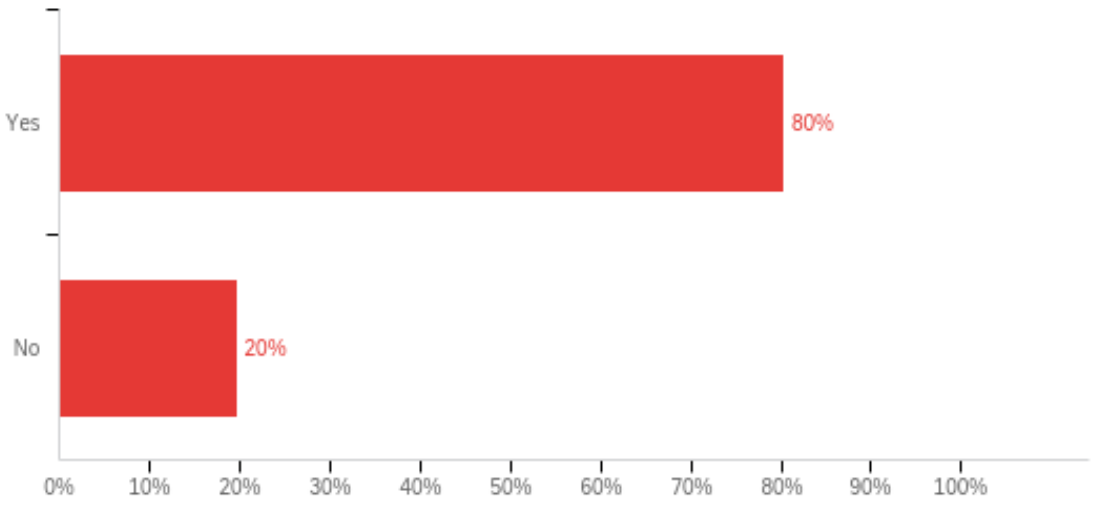
M.10. Which of the following operations challenges does your utility face? (Select all that apply)



Answer	%	Count
Aging infrastructure	73%	155
Difficulty hiring and retaining skilled staff	64%	136
Excessive water loss	36%	77
Excessive inflow and infiltration	35%	74
Inadequate utility rates	26%	55
Lack of community and economic development planning	17%	35
Declining customer population	15%	31
Lack of support from leadership (e.g., city council or utility board)	15%	31
Lack of trust from customers regarding water quality, service, rates, etc.	11%	23
Non-compliance with permit and regulatory requirements	8%	18
Inadequate source of water	6%	13
Other (please specify):	5%	10
Inadequate receiving water	2%	5
Total	**100%**	**212**

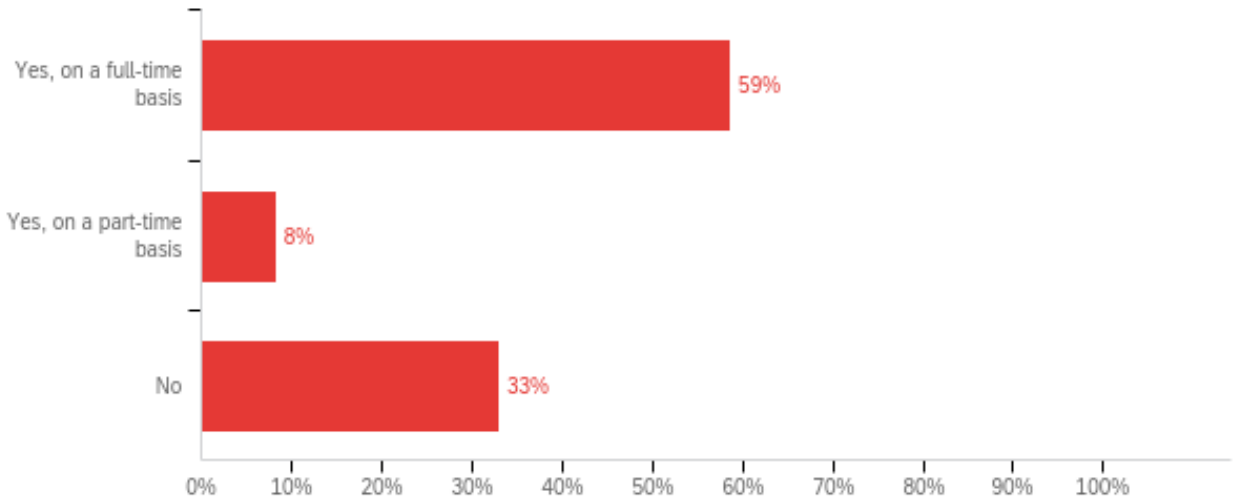
Other (please specify):
Consent Decree
Use reduction due to conservation.
None
i take care of two different plants
Need more women
Continued declining consumption
Water Loss
none
None
Making growth pay for growth instead of existing customers paying for growth.

M.11. Does your utility hire trainees or apprentices?



Answer	%	Count
No	20%	43
Yes	80%	176
Total	**100%**	**219**

M.12. Does your utility have a formal trainee program that allows on-site supervision and hands-on training to be provided to operators in training?



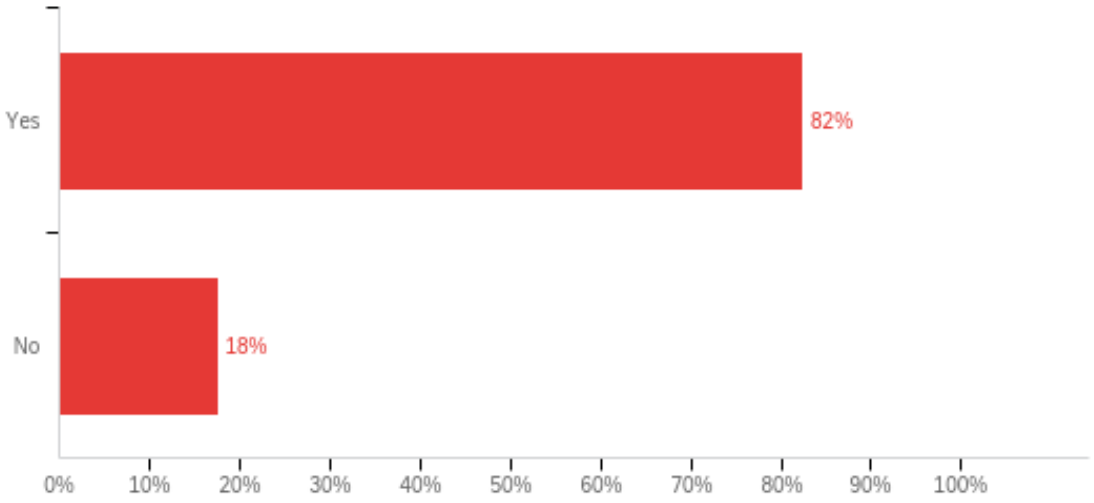
Answer	%	Count
Yes, on a full-time basis	59%	128
Yes, on a part-time basis	8%	18
No	33%	72
Total	**100%**	**218**

M.13. If your utility was offered a paid apprentice, how many would you request?

	N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
Drinking Water	**181**	2.60	5.64	7.01	53.90	2.00	0.00	2.00	50.00
Wastewater	**119**	2.73	6.82	5.94	37.03	1.00	0.00	1.00	50.00

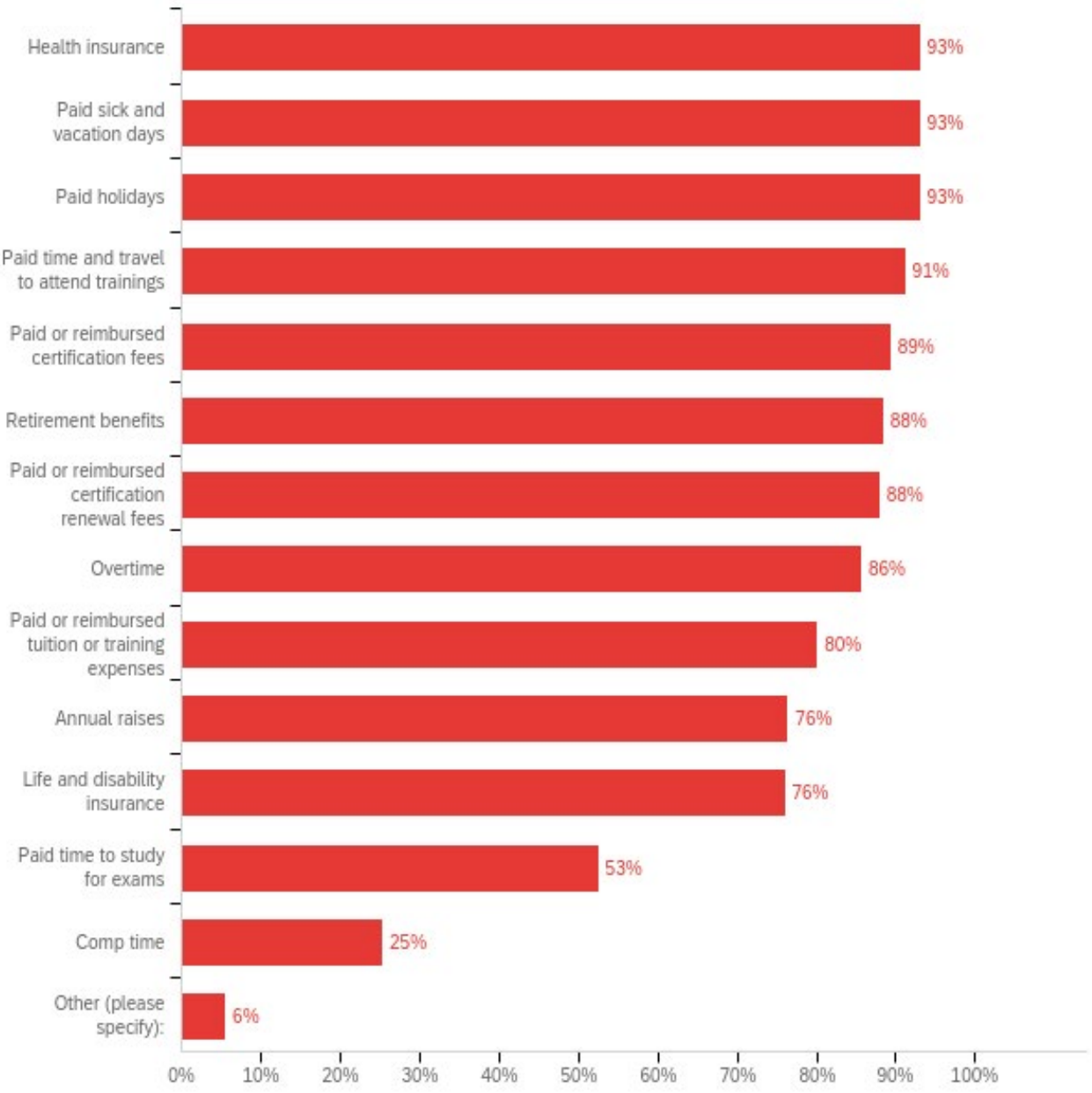
SD – Standard Deviation, SK – Skewness, K– Kurtosis

M.14. Does your utility offer opportunities for promotions and career advancement?



Answer	%	Count
Yes	82%	179
No	18%	38
Total	**100%**	**217**

M.15. What benefits does your utility provide for operators? (Select all that apply)



Answer	%	Count
Health insurance	93%	202
Paid sick and vacation days	93%	202
Paid holidays	93%	202
Paid time and travel to attend trainings	91%	198
Paid or reimbursed certification fees	89%	194
Retirement benefits	88%	192
Paid or reimbursed certification renewal fees	88%	191
Overtime	86%	186
Paid or reimbursed tuition or training expenses	80%	174
Annual raises	76%	166
Life and disability insurance	76%	165
Paid time to study for exams	53%	114
Comp time	25%	55
Other (please specify):	6%	12
Total	**100%**	**217**

Other (please specify):
wellness stipend, milestone anniversary awards
Wellness program, Safety incentives
We hire contractors no benefits given
They get to work for me...
Partial College tuition
Paid family leave
Our facility is managed by an external contractor.
On call pay
Note we use a contract operator
Dental Insurance
A great boss

M.16. How many operator positions has your utility budgeted for?

	N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
Drinking Water Treatment Operators	**150**	5.97	6.99	3.28	14.56	0.00	0.00	4.25	50.00
Drinking Water Distribution Operators	**161**	6.59	7.62	2.87	10.17	2.00	3.00	4.00	50.00
Wastewater Treatment Operators	**117**	5.19	6.56	3.69	19.08	1.00	2.00	4.00	50.00
Wastewater Collection Operators	**103**	4.85	6.79	4.04	21.18	1.00	0	3.00	50.00

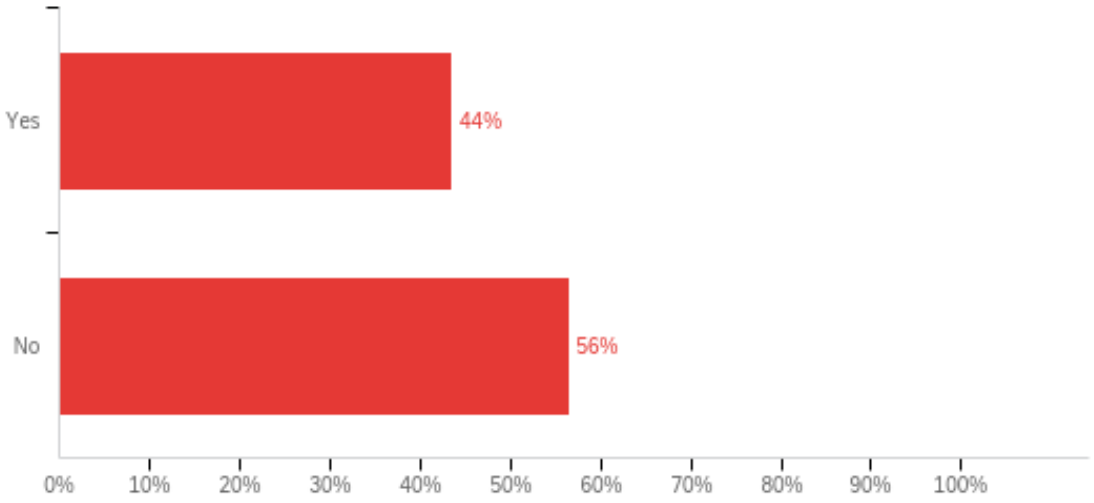
SD – Standard Deviation, SK – Skewness, K– Kurtosis

M.17. How many operator positions at your utility are filled?

	N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
Drinking Water Treatment Operators	**146**	6.02	8.31	5.66	43.48	4.00	0.00	4.00	80.00
Drinking Water Distribution Operators	**157**	6.24	7.28	2.91	10.83	2.00	2.00	4.00	50.00
Wastewater Treatment Operators	**112**	6.44	12.67	5.56	34.59	0.00	2.00	3.5	100.0
Wastewater Collection Operators	**101**	4.62	6.49	4.10	23.05	0.00	0	3.00	50.00

SD – Standard Deviation, SK – Skewness, K– Kurtosis

M.18. In your opinion, does your utility have enough operators?



Answer	%	Count
No	56%	118
Yes	44%	91
Total	**100%**	**209**

M.19. How many operators are eligible to retire now at your utility?

N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
201	1.36	1.98	4.60	37.50	0.00	0.00	1.00	20.00

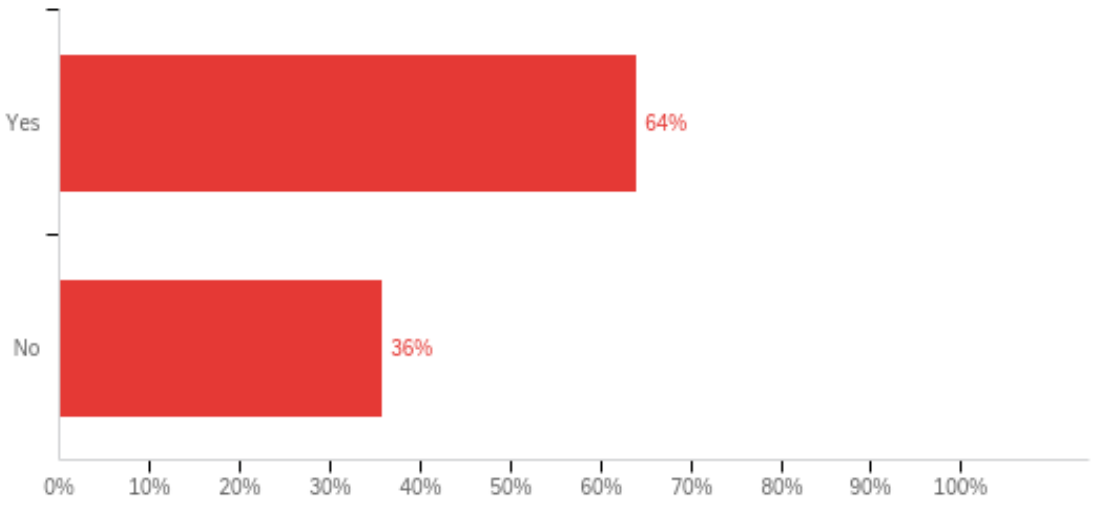
SD – Standard Deviation, SK – Skewness, K– Kurtosis

M.20. How many operators are eligible to retire within the next 2-5 years at your utility?

N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
204	2.67	4.54	10.00	122.86	2.00	0.00	1.00	60.00

SD – Standard Deviation, SK – Skewness, K– Kurtosis

M.21. Does your utility have a formal documented pay scale for certified operators?



Answer	%	Count
Yes	64%	134
No	36%	75
Total	**100%**	**209**

M.22a. Using the slider below, please move the bar to the number that corresponds with the starting wage for an entry-level certified drinking water operator at your utility.

	N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
Entry Level Wage	**171**	17.87	6.47	2.33	6.67	15.00	10.00	16.00	50.00

SD – Standard Deviation, SK – Skewness, K– Kurtosis

M.22b. Using the slider below, please move the bar to the number that corresponds with the highest hourly wage a certified drinking water operator working at your utility is paid.

	N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
Highest Wage	**170**	26.72	7.77	0.99	1.08	25.00	13.00	25.00	52.00

SD – Standard Deviation, SK – Skewness, K– Kurtosis

M.22c. Using the slider below, please move the bar to the number that corresponds with the starting wage for an entry-level certified wastewater operator at your utility.

	N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
Entry Level Wage	**96**	16.83	3.81	0.46	-0.15	15	10.00	16.00	27.00

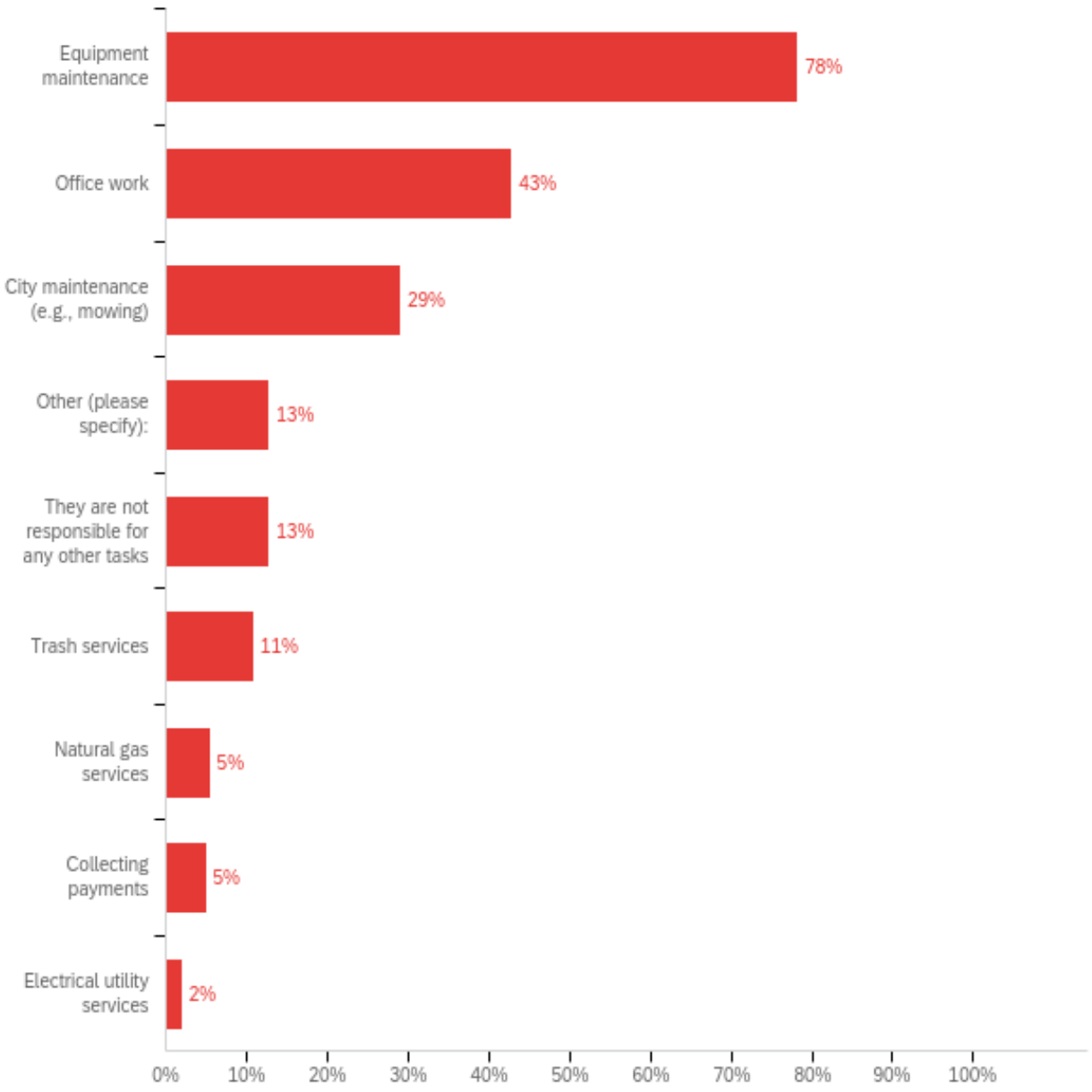
SD – Standard Deviation, SK – Skewness, K– Kurtosis

M.22d. Using the slider below, please move the bar to the number that corresponds with the highest hourly wage a certified wastewater operator working at your utility is paid.

	N	*Mean*	*SD*	*SK*	*K*	*Mode*	*Min*	*Median*	*Max*
Highest Wage	**94**	26.72	7.00	0.44	-0.31	22	11.00	26.00	48.00

SD – Standard Deviation, SK – Skewness, K– Kurtosis

M.23. What job duties are operators responsible for at your utility, other than basic system/treatment works? (Select all that apply)

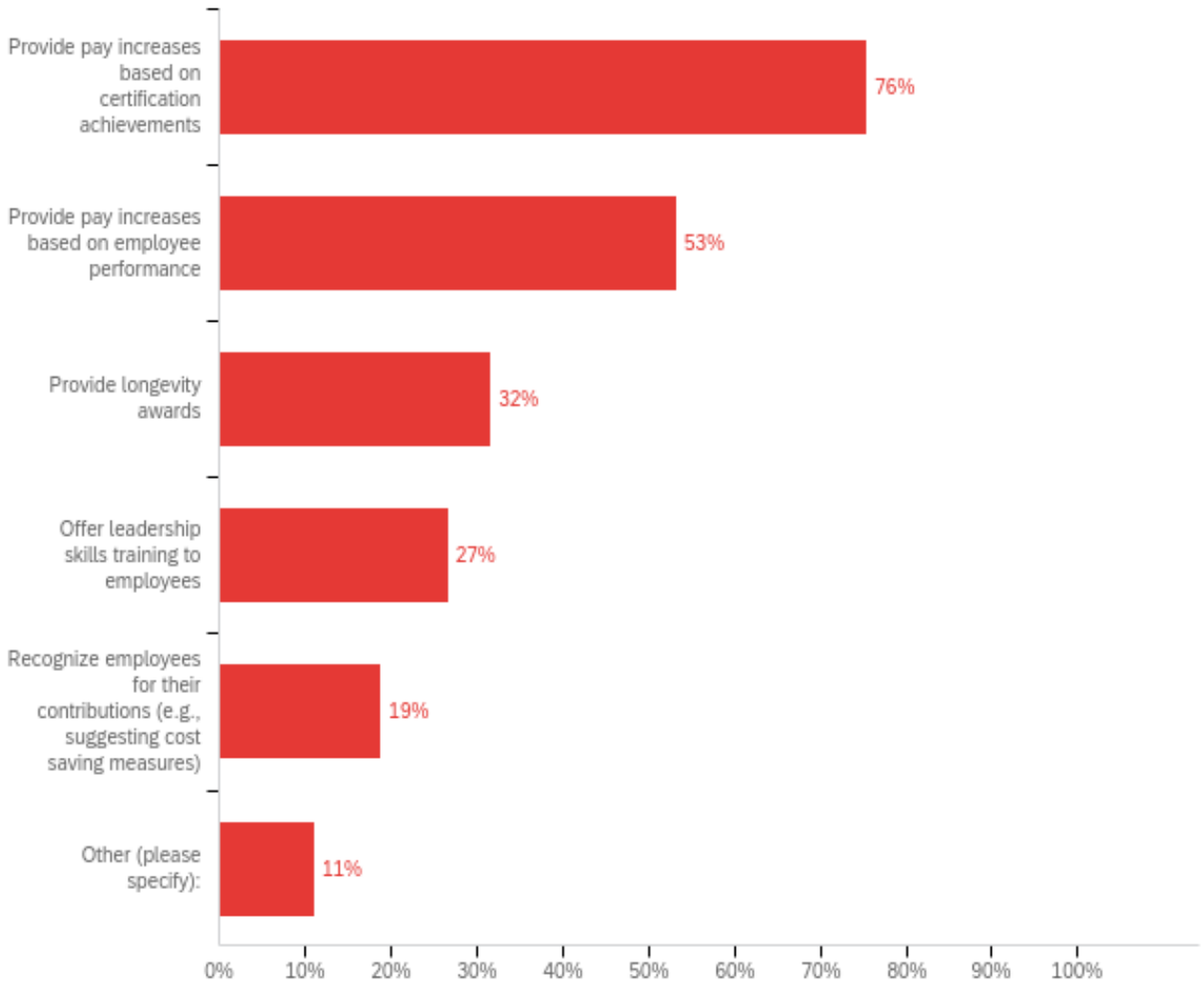


Answer	%	Count
Equipment maintenance	78%	159
Office work	43%	87
City maintenance (e.g., mowing)	29%	59
Other (please specify):	13%	26
They are not responsible for any other tasks	13%	26
Trash services	11%	22
Natural gas services	5%	11
Collecting payments	5%	10
Electrical utility services	2%	4
Total	**100%**	**203**

Other (please specify):
Operate Boilers
Non payment disconnects, inventory control, work order processing and completion (paperwork), assisting with water/electric/wastewater crews as needed due to staffing shortages
Being on call about 1/2 of the week
Testing & Master Meter Reading
Lab testing
Outflow sampling and analysis, consultation on permitting paperwork
Operators split their time between two different jobs
Recreation site maintenance
scraping road in winter, decorating town for Christmas and festivals, plant flowers in spring, cut brush, sweep streets, and anything the mayor thinks we need to do.
Hydrant flushing, dishes, cleaning, painting....
SCADA
Small maintenance on equipment
Anything they are asked to do - building maintenance, community outreach, education, etc.
Compliance Documents and Inspections

Other tasks as needed
Flushing, sampling, preventative maintenance,
Anything needed
We are a small system. We do everything for both water and sewer.
Monitoring tanks on telemetry and answering calls and dispatching after hours workers
extra sampling/maintenance/instrumentation help as needed
Monitoring distribution system via SCADA
If you're an operator then you should operate. Facilities that have operators leaving the grounds for any reason (and there are a lot of plants that do this) are just asking for a disaster. And the DOW knows about this and should be held as being complicit. Same way that they should be held responsible for allowing operators to be underpaid, or allowing facilities to be operated with no certified operators on staff.
streets, sidewalks, snow removal, signage, building maintenance, customer service,
Grounds Maintenance
collection

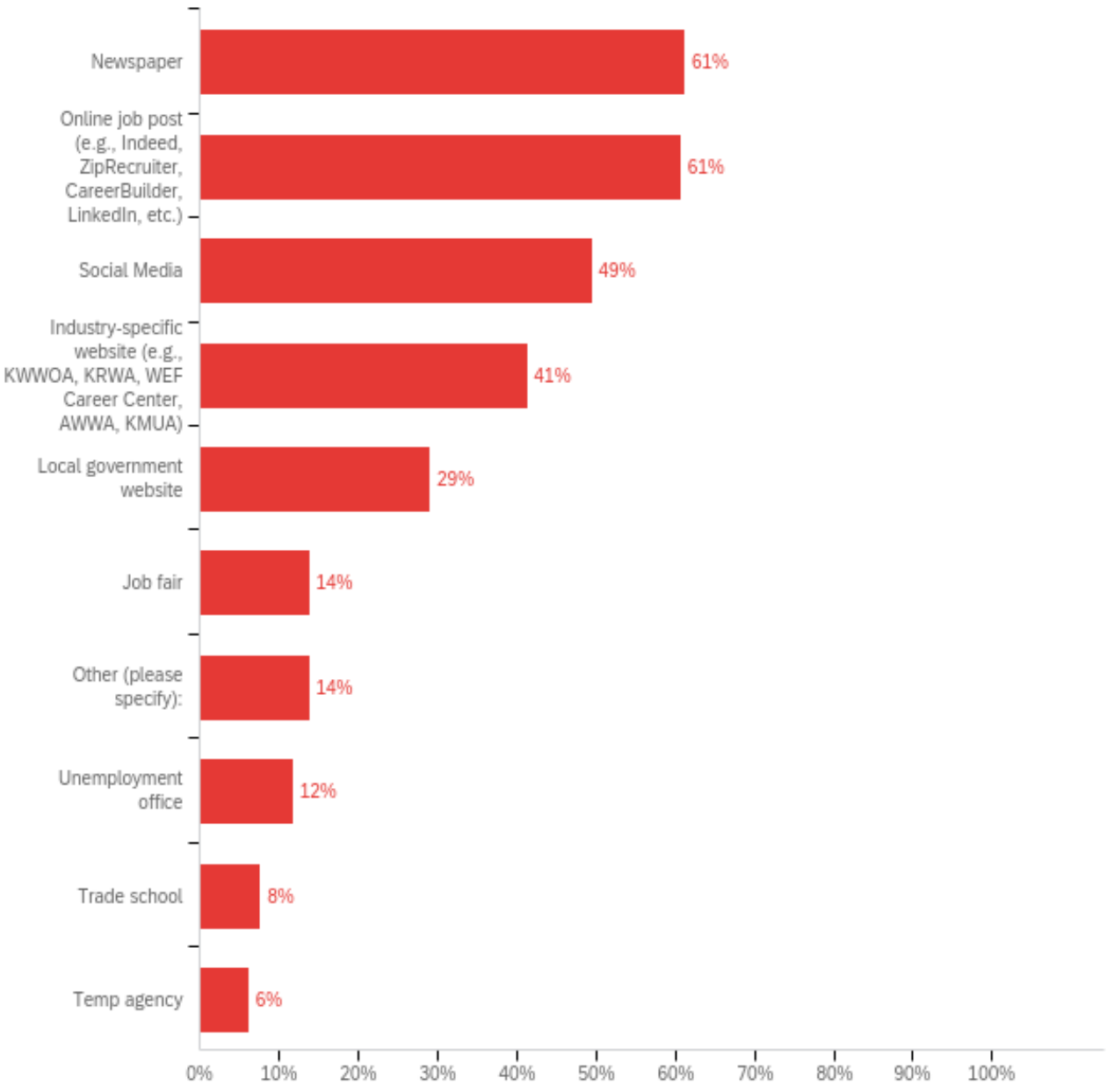
M.24. How does the utility reward and/or show appreciation for its operators?



Answer	%	Count
Provide pay increases based on certification achievements	76%	136
Provide pay increases based on employee performance	53%	96
Provide longevity awards	32%	57
Offer leadership skills training to employees	27%	48
Recognize employees for their contributions (e.g., suggesting cost saving measures)	19%	34
Other (please specify):	11%	20
Total	**100%**	**180**

Other (please specify):
longevity bonus of $500/5-year, $1,000/10 year, $1,500/15 year etc.
End of The Year Bonus
We are Union
none
milestone anniversary awards
provide a raise when we show up at city meetings and ask for a raise, we sometimes get one.
We buy/prepare breakfasts and lunches on occasion. Some managers purchase Christmas gifts. Praises are given weekly for those accomplishing tasks and moving things forward.
Annual Salary Increases
Paid health insurance, safety incentive program, wellness program, etc.
we were turned down for a raise because of water loss that we can't help
None
Water district uses contract operator
Meals and gifts
None
none
Bonus
The utility lacks in rewarding those who perform above and beyond.
Bonus
N/A

M.25. When you have an open position for an operator at your utility, where do you advertise the position? (Select all that apply)

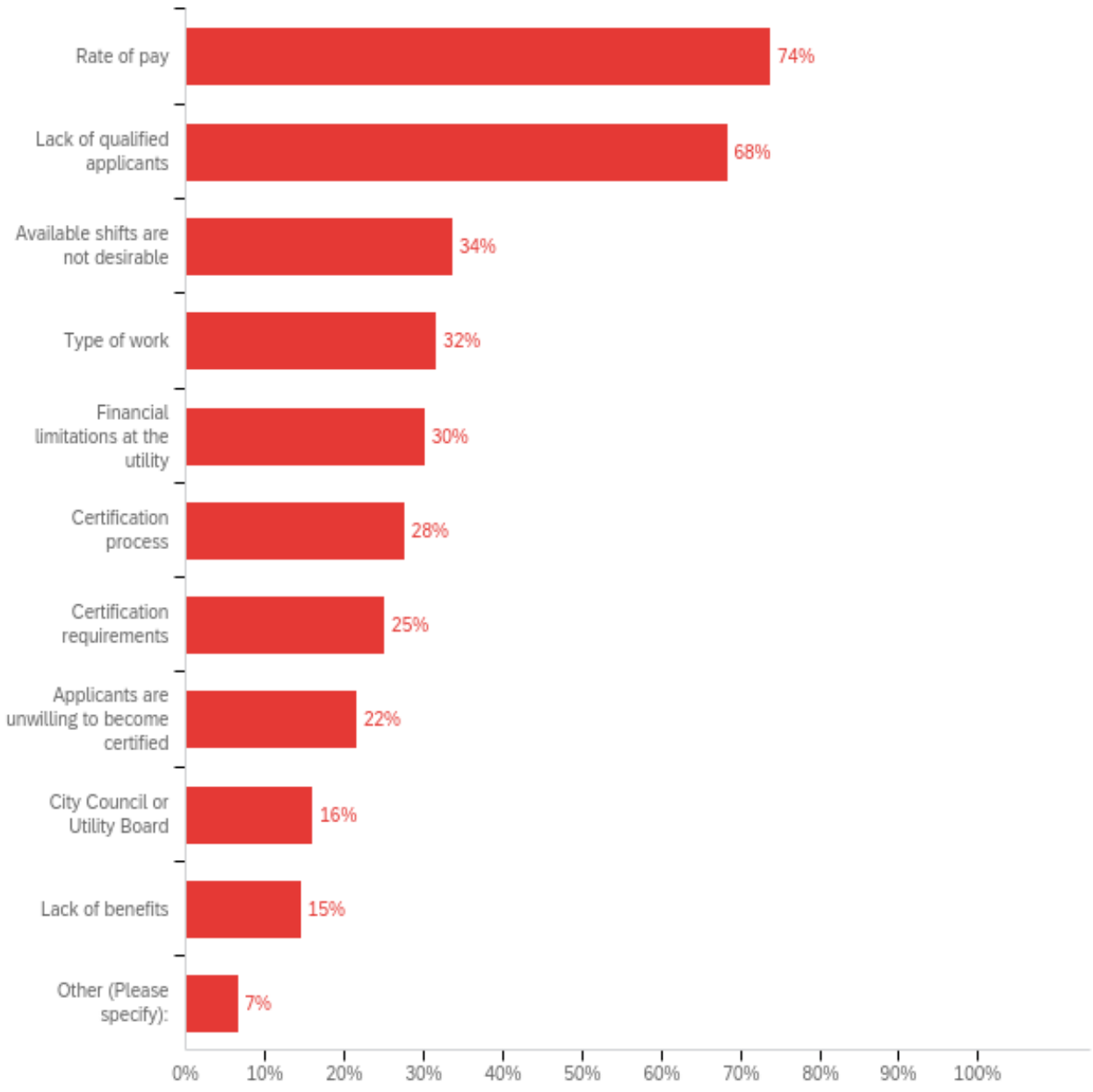


Answer	%	Count
Newspaper	61%	120
Online job post (e.g., Indeed, ZipRecruiter, CareerBuilder, LinkedIn, etc.)	61%	119
Social Media	49%	97
Industry-specific website (e.g., KWWOA, KRWA, WEF Career Center, AWWA, KMUA)	41%	81
Local government website	29%	57
Job fair	14%	27
Other (please specify):	14%	27
Unemployment office	12%	23
Trade school	8%	15
Temp agency	6%	12
Total	**100%**	**196**

Other (please specify):
website
word of mouth
Our utility website
Kentucky Rural Water Association
KRWA
None
Ky. Rural Water
Word of mouth. Is a desired job in our community.
A contractor provides all employees
Signs at the office
speak with local high school guidance counselors
email community groups
word of mouth

local community and technical college
Our own website
Do Not Advertise
Local High Schools and Alternative Schools
word of mouth mostly
plumbing co employees
RFP for contract operator
Friends.
KRWA
our own website
Usually not advertised
magnetic sign on our vehicles
Hand pick

M.26. In your opinion, which of the following are barriers to hiring operators? (Select all that apply)

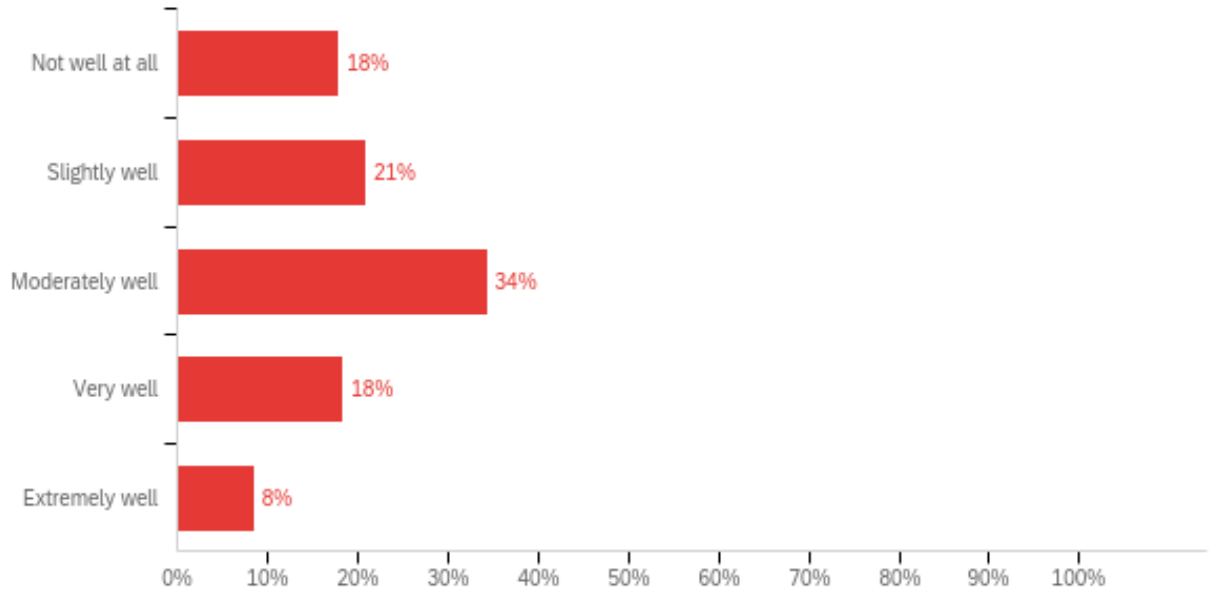


Answer	%	Count
Rate of pay	74%	147
Lack of qualified applicants	68%	136
Available shifts are not desirable	34%	67
Type of work	32%	63
Financial limitations at the utility	30%	60
Certification process	28%	55
Certification requirements	25%	50
Applicants are unwilling to become certified	22%	43
City Council or Utility Board	16%	32
Lack of benefits	15%	29
Other (Please specify):	7%	13
Total	**100%**	**199**

Other (Please specify):
The overtime as required is not an area many new employees seem to tolerate
Passing drug tests
N/a
Municipalities offer better benefits
picking favors
new treatment operators without experience require a bachelors degree +1 year experience. It is very difficult to hire an applicant with a BS degree that wants to work shift work at low end of union seniority
I believe that the pay scale needs to be adjusted though we have not been negatively impacted yet.
Over regulation by the EPA is a huge issue for most. Also when recruits find out they will be on call for emergencies they tend to shy away.
Recruits not willing to perform necessary job requirements.
Loss of Tier I KY retirement
Shortage of operators in area
the pay doesn't match the level of responsibility

Management not understanding requirements of the utility

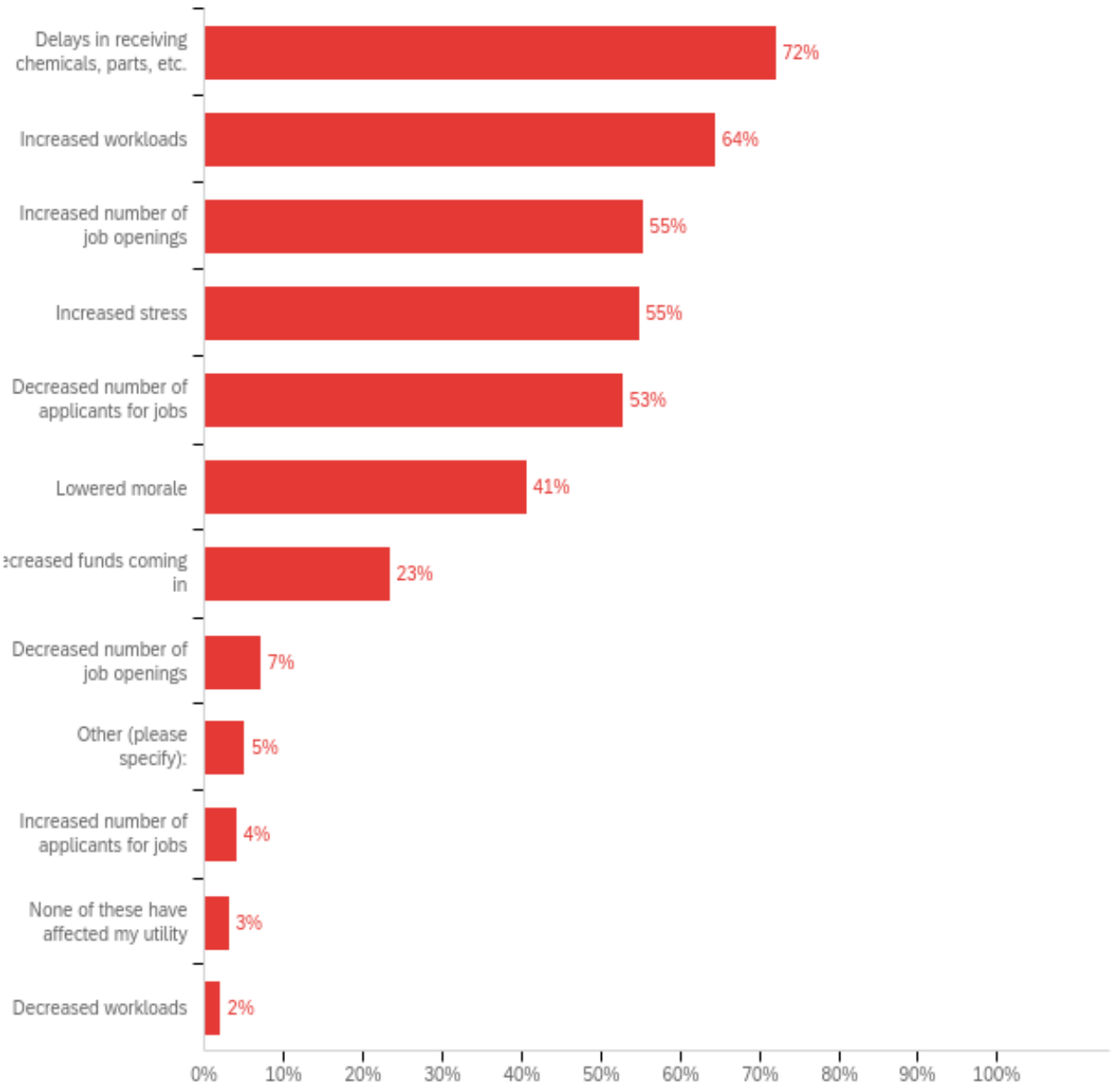
M.27. How well do your utility's decision makers (e.g., city council or utility board) understand the challenge of recruiting and retaining operators?



Answer	%	Count
Not well at all (1)	18%	36
Slightly well (2)	21%	42
Moderately well (3)	34%	69
Very well (4)	18%	37
Extremely well (5)	8%	17
Total	**100%**	**201**

	Minimum	Maximum	Mean	Std Deviation	Variance	Count
27. How well do your utility's decision makers (e.g., city council or utility board) understand the challenge of recruiting and retaining operators?	1.00	5.00	2.79	1.18	1.40	201

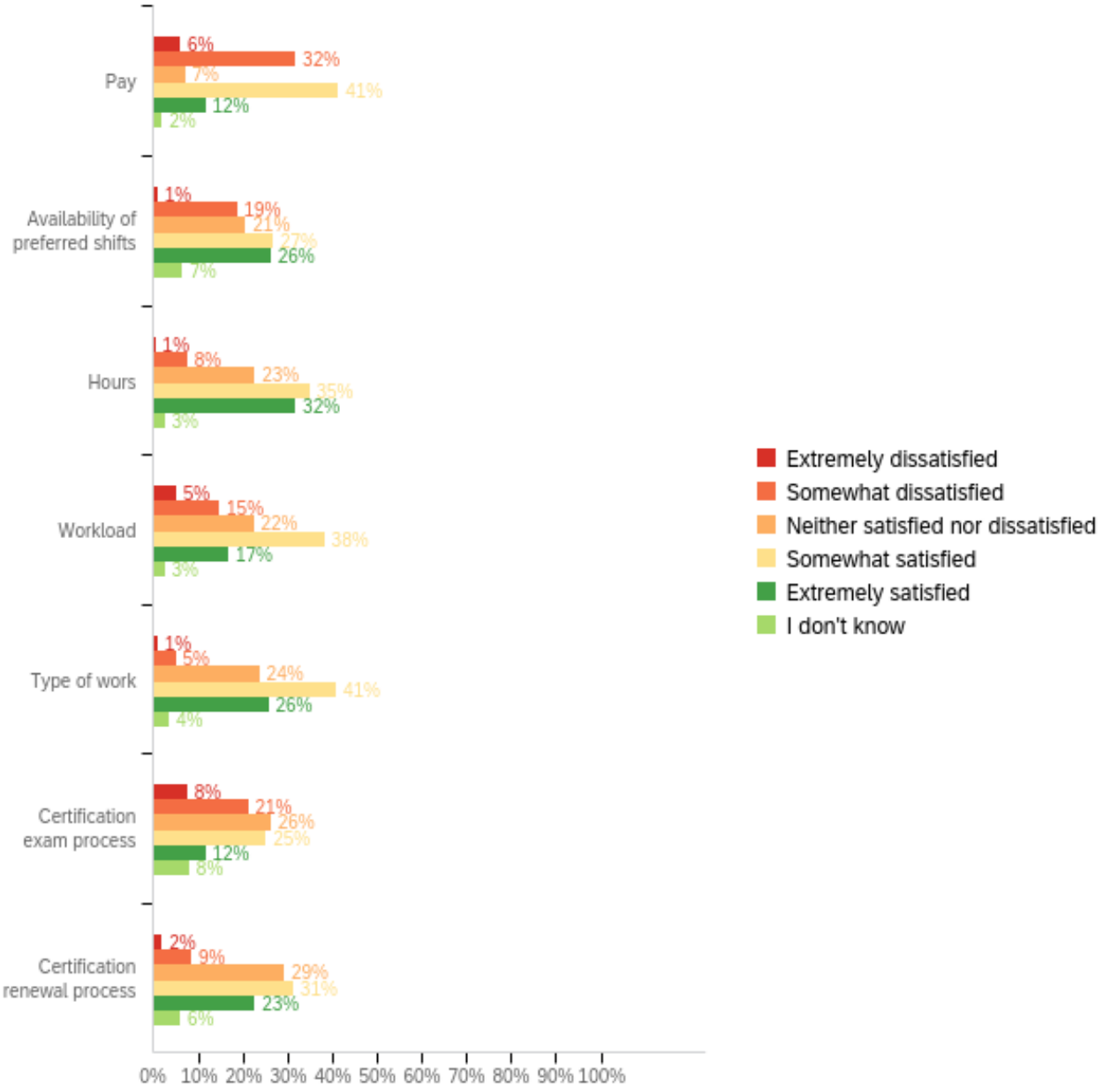
M.28. Over the last two years, which of the following has your utility experienced? (Select all that apply)



Answer	%	Count
Delays in receiving chemicals, parts, etc.	72%	142
Increased workloads	64%	127
Increased number of job openings	55%	109
Increased stress	55%	108
Decreased number of applicants for jobs	53%	104
Lowered morale	41%	80
Decreased funds coming in	23%	46
Decreased number of job openings	7%	14
Other (please specify):	5%	10
Increased number of applicants for jobs	4%	8
None of these have affected my utility	3%	6
Decreased workloads	2%	4
Total	100%	197

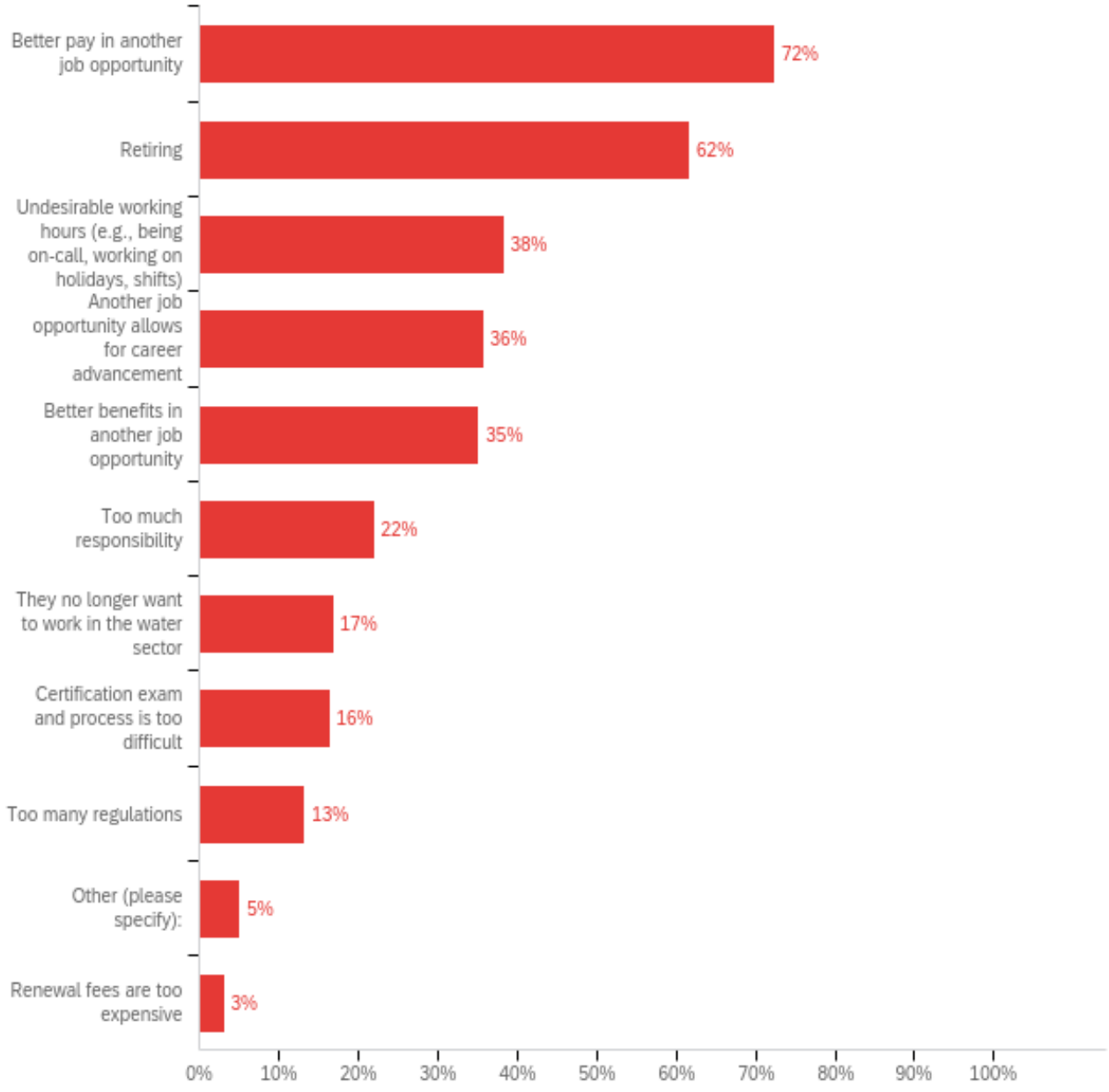
Other (please specify):
Increasing of prices on chemical, parts, etc.
Increased supply price
New regulation that has dramatic effects on all of the above
Lack of coordination with local government
We had 3 qualified applicants for the most recent operator opening. Have also seen 50% turnover in the WTP staff in the last few years.
Constant stress of trying to continue business as usual with chaotic supply chain and extreme work force turnover.
Material and Chemical price escalations
Unable to retain necessary workforce.
Increased regulatory demands
Poor State response

M.29. As the manager of the utility, you have firsthand knowledge about your operators' job satisfaction. Consider each of the following and indicate whether your operators are extremely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, or extremely satisfied with that aspect of their job. If you aren't sure, you can mark the answer "I don't know."



Question	Extremely dissatisfied		Somewhat dissatisfied		Neither satisfied nor dissatisfied		Somewhat satisfied		Extremely satisfied		I don't know		Total
Pay	6%	12	32%	63	7%	14	41%	82	12%	23	2%	4	198
Availability of preferred shifts	1%	2	19%	37	21%	41	27%	53	26%	52	7%	13	198
Hours	1%	1	8%	15	23%	45	35%	69	32%	63	3%	5	198
Workload	5%	10	15%	29	22%	44	38%	75	17%	33	3%	5	196
Type of work	1%	2	5%	10	24%	47	41%	81	26%	51	4%	7	198
Certification exam process	8%	15	21%	42	26%	52	25%	50	12%	23	8%	16	198
Certification renewal process	2%	4	9%	17	29%	58	31%	62	23%	45	6%	12	198

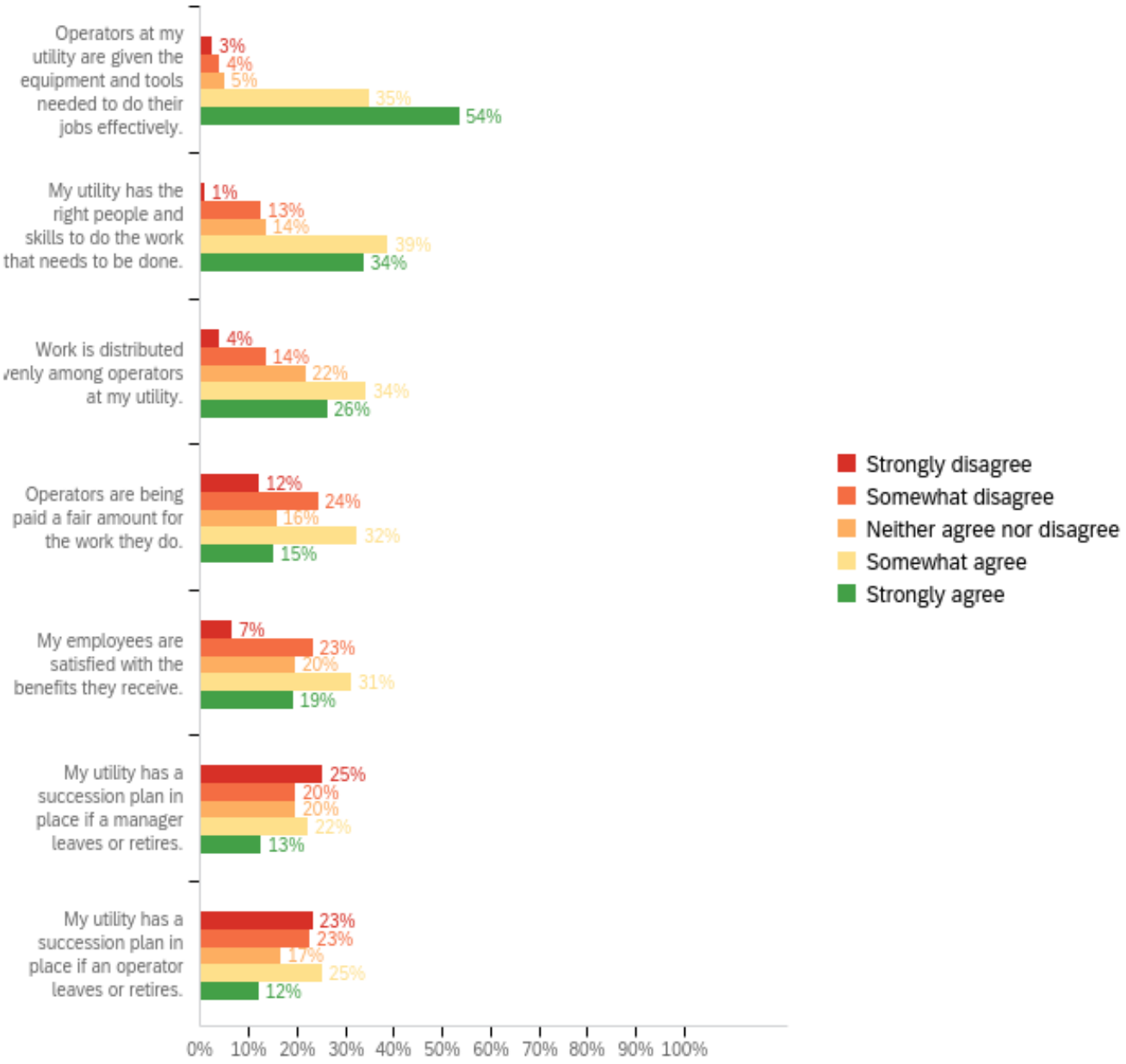
M.30. In your experience, what reasons do operators give for leaving the job? (Select all that apply)



Answer	%	Count
Better pay in another job opportunity	72%	142
Retiring	62%	121
Undesirable working hours (e.g., being on-call, working on holidays, shifts)	38%	75
Another job opportunity allows for career advancement	36%	70
Better benefits in another job opportunity	35%	69
Too much responsibility	22%	43
They no longer want to work in the water sector	17%	33
Certification exam and process is too difficult	16%	32
Too many regulations	13%	26
Other (please specify):	5%	10
Renewal fees are too expensive	3%	6
Total	**100%**	**196**

Other (please specify):
other water plants pay more than we can pay
N/a
they all stay
Better pay at a neighboring utility
Easy to find another job in current environment, including running their own business.
Simply not willing to work.
Being fired
It's not that the exam is too difficult, but that the training they are used to is not available.
Politics and poor leadership
N/A

M.31. Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each.



	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agree		Total
Operators at my utility are given the equipment and tools needed to do their jobs effectively.	3%	5	4%	8	5%	10	35%	69	54%	106	198
My utility has the right people and skills to do the work that needs to be done.	1%	2	13%	25	14%	27	39%	77	34%	67	198
Work is distributed evenly among operators at my utility.	4%	8	14%	27	22%	43	34%	68	26%	52	198
Operators are being paid a fair amount for the work they do.	12%	24	24%	48	16%	31	32%	64	15%	30	197
My employees are satisfied with the benefits they receive.	7%	13	23%	46	20%	39	31%	62	19%	38	198
My utility has a succession plan in place if a manager leaves or retires.	25%	50	20%	39	20%	39	22%	44	13%	25	197
My utility has a succession plan in place if an operator leaves or retires.	23%	46	23%	45	17%	33	25%	50	12%	24	198