

Water Sector Measures Analysis

Prepared for
The Water Sector Coordinating Council & WaterISAC

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Water Sector Measures Analysis

Introduction

Drinking water and wastewater systems are critical to the security of the United States, delivering needed drinking water supplies and wastewater collection and treatment services to millions of Americans. They support the many vital services, such as fire suppression, that rely on a stable supply of water. An attack or even a credible threat of an attack on water infrastructure could seriously jeopardize the public health and economic vitality of a community.

The U.S. Department of Homeland Security (DHS) has asked the nation's 18 key sectors of infrastructure to develop measures of sector security progress. The water sector began working on this effort in 2005 and was the first sector to develop and roll out reporting on measures. The water sector developed the measures in this report over a period of several years. The measures are intended to indicate the sector's progress in protecting this vital infrastructure.

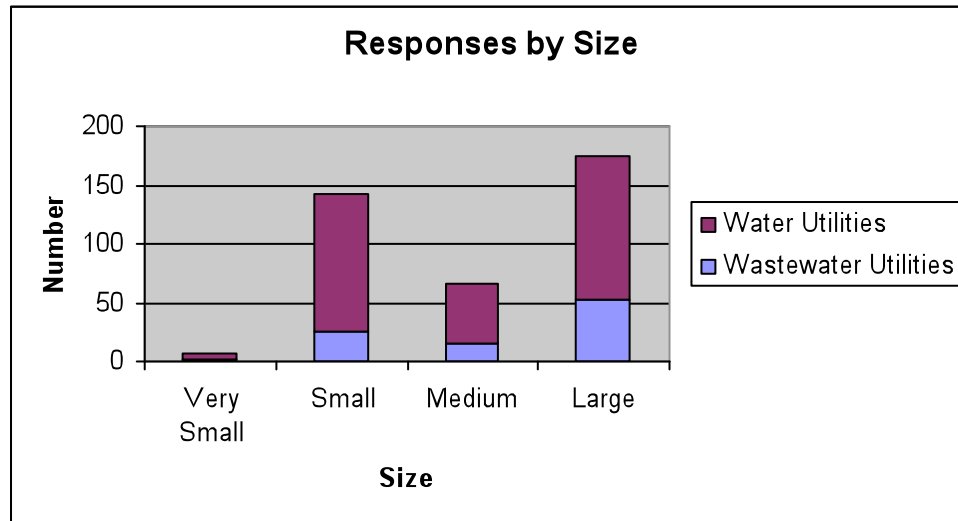
There were a total of 297 responses from drinking water utilities and 94 responses from wastewater utilities. Users must have answered all questions to be counted as a respondent. Combined utilities responded separately for water and wastewater operations. One hundred twenty-nine of the drinking water utility responses were from combined utilities, and 59 of the wastewater utility responses were from combined utilities.

There were responses from drinking water utilities in 46 states and wastewater utilities in 31 states. Twenty-two states had at least five responses from drinking water utilities, and five states had at least five wastewater utility responses.

One hundred twenty-two large, 51 medium, 118 small, and six very small drinking water utilities responded. Fifty-three large, 15 medium, 25 small, and one very small wastewater



utilities responded. These numbers are in ranges reflecting the size categories used in reporting – i.e., very small = less than 3,300 customers, small = 3,300 to 49,999, medium = 50,000 to 99,999, and large = 100,000 or more. The following chart displays the number of responses by size.



These responses were gathered through a voluntary reporting process administered by the WaterISAC. Attachment A contains a complete list of the 22 measures including results by measure, responses, and graphs. Attachment B provides a complete list of the measures and the associated reporting questions, and Attachment C provides background on the measures and reporting methodology.

Analysis

Trends and Findings

Overall, responses from the drinking water utilities were similar to those from the wastewater utilities (i.e., a similar percent of “yes” and “no” responses were seen for most of the questions). Respondents, as a whole, exhibit substantial attentiveness to preparedness, awareness, and resiliency from potential security threats and natural disasters. The data collected show respondents are meeting target objectives and making good progress implementing voluntary security and resiliency practices. The responses across all utility sizes show over 80 percent of both water and wastewater utilities indicated “yes” for the following measures.



- Ninety percent of responding water and 90 percent of responding wastewater utilities have integrated security and preparedness into budgeting, training, and manpower responsibilities (measure 1).
- Ninety-two percent of responding water and 88 percent of responding wastewater utilities receive screened, validated, and timely security threat information from one or more sources (measure 8).
- Ninety-eight percent of responding water and 95 percent of responding wastewater utilities have physical or procedural controls in place to safeguard hazardous chemicals (measure 11).
- Ninety-two percent of responding water and 97 percent of responding wastewater utilities secure and monitor the perimeter of areas containing hazardous materials (measure 11a).
- Eighty-one percent of responding water and 82 percent of wastewater utilities control access to restricted areas within the facility by screening and/or inspecting individuals and vehicles as they enter (measure 11b).
- Ninety-seven percent of responding water and 96 percent of responding wastewater utilities secure and monitor the shipping, receipt, and storage of hazardous materials for the facility (measure 11c).
- Eighty-eight percent of responding water and 93 percent of responding wastewater utilities have evaluated their disinfection methods considering water quality, public health, and security issues (measure 13).

- Ninety-seven percent of responding water and 92 percent of responding wastewater utilities have an emergency response plan (ERP) (measure 15).
- Ninety percent of responding water and 93 percent of responding wastewater utilities review and update their ERP (measure 15c).
- Eighty percent of responding water and 84 percent of responding wastewater utilities engage in networking activities regarding emergency preparedness and collaborative response to be used in the event of an incident (measure 22).

Reducing Vulnerabilities and Securing Hazardous Chemicals

Respondents have been highly attentive to reducing vulnerabilities, as well as securing hazardous chemicals.

- More than three-quarters of all respondents said they had incorporated security into planning and design programs applying to all assets and facilities (measure 2).
- Over 90 percent of all respondents indicated that they secure and monitor perimeters and have physical and procedural controls in place to safeguard chemicals (measures 11 and 11a).
- Over 80 percent control access to restricted areas within the facility by screening and/or inspecting individuals and vehicles as they enter (measure 11b).
- Over 95 percent secure and monitor the shipping, receipt, and storage of hazardous chemicals (measure 11c).



Preparedness & Responsiveness

Respondents have been highly attentive to preparing for potential security threats and natural disasters.

- Over 90 percent of responding utilities have integrated security and preparedness into budgeting, training, and manpower responsibilities (measure 1).

- Over 90 percent have developed emergency response plans (measure 15).
- A majority of respondents are training, exercising, reviewing, and updating their emergency response plans (measures 15a, 15b, and 15c).
- Over 80 percent of both water and wastewater respondents have done networking for collaborative response to be used in the event of an incident (measure 22).

Demonstrating progress on several voluntary fronts, over three-quarters of the respondents (75 percent water, 80 percent wastewater) have adopted the National Incident Management System (measure 16). Almost three quarters of respondents are signatories, or are in the process of becoming signatories, to written agreements for requesting aid or assistance, such as mutual aid or assistance agreements or Water/Wastewater Agency Response Network (WARN) membership (measures 17 and 17a). Preparedness of this type has been an area of substantial sector focus. These responses indicate important progress has been made, while a need still exists to expand the reach of these efforts.

Responses point to two areas for future improvement. Just over half of the respondents said they have a business continuity plan (measure 14). Forty-two percent of responding water and 34 percent of responding wastewater utilities do not have crisis communication plans (measure 21).



Resiliency

Respondents have been highly attentive to building resiliency into their systems.

- Roughly 85 percent of the responding utilities have backup power capabilities for at least 24 hours. More than half of the responding water and wastewater utilities can provide backup power for 96 hours (4 days) or more (measure 19).
- Two thirds of responding water utilities can provide 91–100 percent of minimum daily demand for water for up to 24 hours (measure 20).
- Almost a third of responding water utilities can provide 91–100 percent of minimum daily demand for 72 hours (measure 20).

Risk Understanding and Threat Awareness

Over 90 percent of water utilities and 88 percent of wastewater utilities indicate they are receiving screened, validated, and timely security threat information from one or more sources. Almost 80 percent of respondents are getting information from WaterISAC (measure 8).

The majority of responding utilities are reviewing and updating their Vulnerability Assessments on a regular basis.

- Half of water and wastewater utilities responded that they are reviewing their vulnerability assessments (VA) annually (measure 7).
- Roughly 60 percent of respondents indicated that they update their VA every 1-to-3 years (measure 7a).

Water Contamination Detection

Responses on various aspects of water contamination detection reflect that the sector has made progress but is still developing technology, protocols, and partnerships in this area.

- Eighty-seven percent of water and 73 percent of wastewater utilities responded that they monitor and evaluate customer complaints for indications of water quality or other security threats (measure 5).
- Seventy-two percent of all respondents have established protocols for interpreting and responding to indications of water quality anomalies (measure 6).
- Approximately 60 percent have established relationships with public health networks to interpret public health anomalies for the purpose of identifying waterborne public health impacts (measure 4).
- Roughly half of respondents indicated that they are conducting supplemental water quality monitoring (measure 3).

Attachment A: Results by Measure

The following section presents the raw statistics used in the analysis above. For each measure, the data have been broken out by utility type and size and presented in terms of percentages for easy comparison.

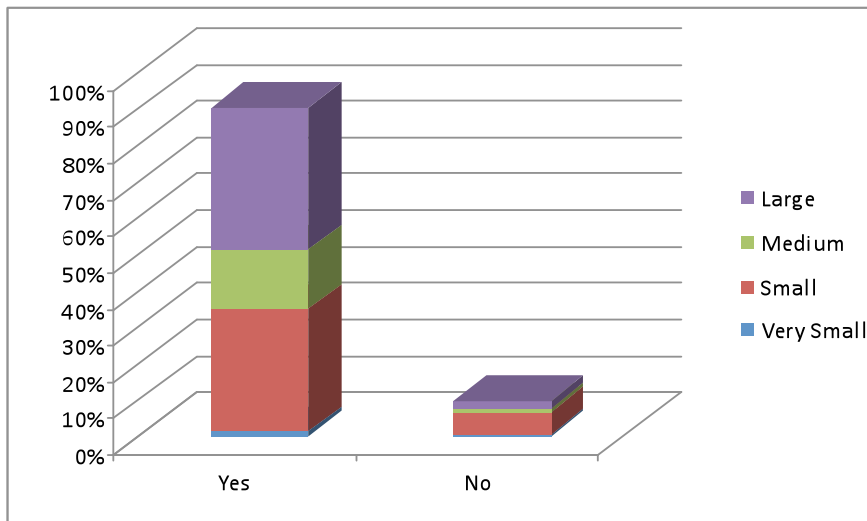
Please Note: The response totals are presented in terms of all utilities that responded a particular way, regardless of size. For convenience, the data tables identify the percentage of utilities in each size category that chose a particular answer relative to the total number of utilities that chose the particular answer. To illustrate this distinction, the table immediately below (for Measure 1) indicates that 39.1% of respondents who selected ‘Yes’ were large utilities. *This does not indicate that 39.1% of large utilities selected ‘Yes’.*

Measure 1: Number and percentage of utilities that have integrated security and preparedness into budgeting, training, and manpower responsibilities.

Question 1: Have you integrated security and preparedness into budgeting, training, and manpower responsibilities?

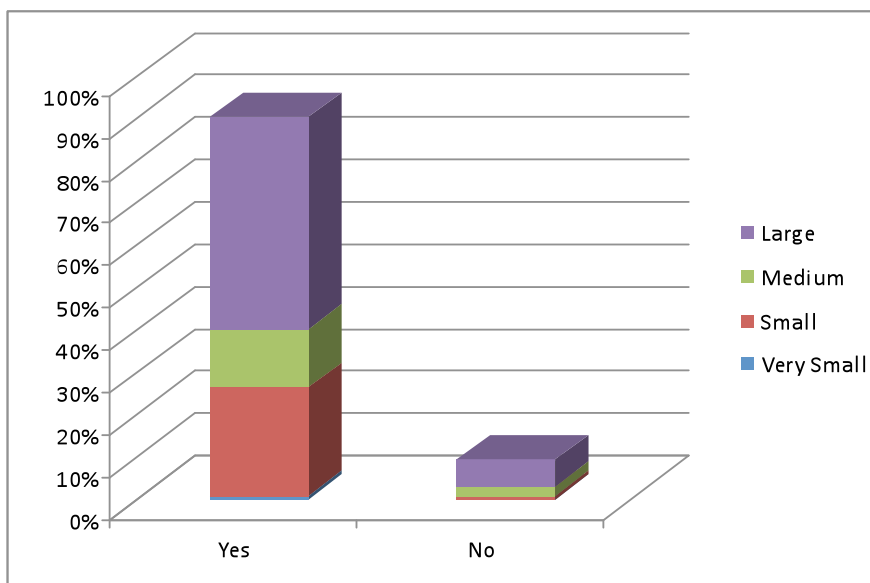
Drinking Water Utility Responses

	Very Small	Small	Medium	Large	Total
Yes	1.3%	33.7%	16.2%	39.1%	90.2%
No	0.7%	6.1%	1.0%	2.0%	9.8%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.1%	25.5%	13.8%	50.0%	90.4%
No	0.0%	1.1%	2.1%	6.4%	9.6%

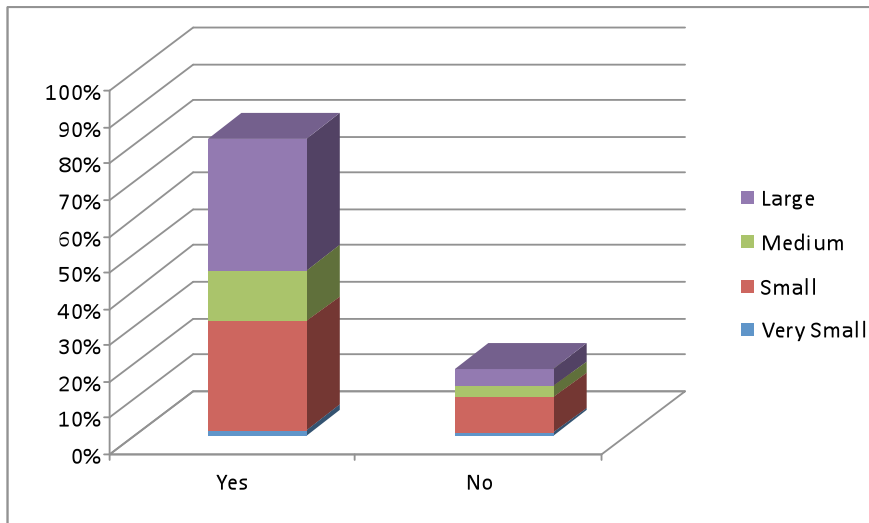


Measure 2: Number and percentage of utilities that incorporate security into planning and design protocols applying to all assets and facilities.

Question 2: Have you incorporated security into planning and design protocols applying to all assets and facilities?

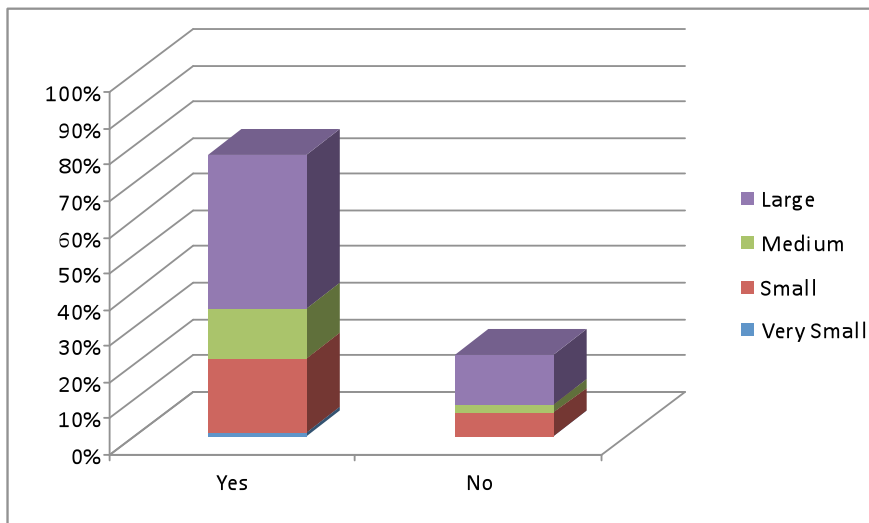
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.4%	29.9%	14.1%	36.4%	81.8%
No	0.7%	9.8%	3.0%	4.7%	18.2%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.1%	20.2%	13.8%	42.6%	77.7%
No	0.0%	6.4%	2.1%	13.8%	22.3%

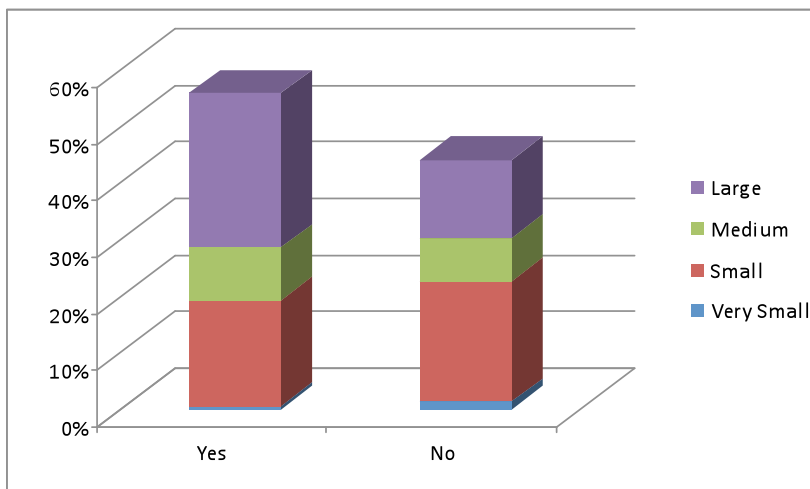


Measure 3: Number and percentage of utilities that routinely conduct supplemental monitoring or more in-depth analysis beyond what is required to identify abnormal water quality conditions.

Question 3: Do you routinely conduct supplemental monitoring or more in-depth analysis beyond what is required to identify abnormal water quality conditions?

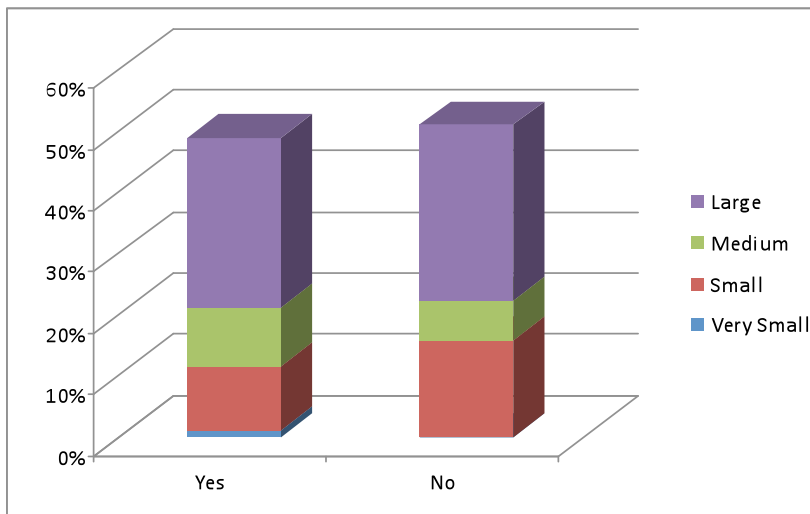
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.7%	18.5%	9.4%	27.3%	55.9%
No	1.4%	21.2%	7.7%	13.8%	44.1%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.1%	10.6%	9.6%	27.7%	48.9%
No	0.0%	16.0%	6.4%	28.7%	51.1%

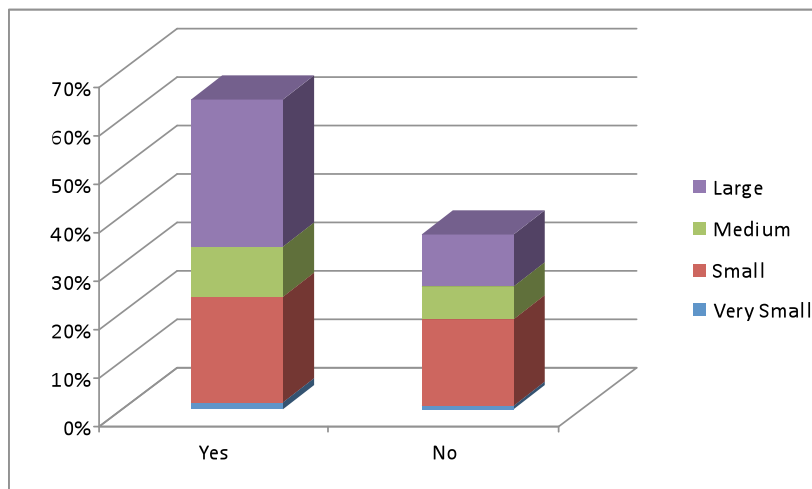


Measure 4: Number and percentage of utilities that have established relationships with public health networks to interpret public health anomalies for the purposes of identifying waterborne public health impacts.

Question 4: Have you formed established relationships with public health networks to interpret public health anomalies for the purposes of identifying waterborne public health impacts?

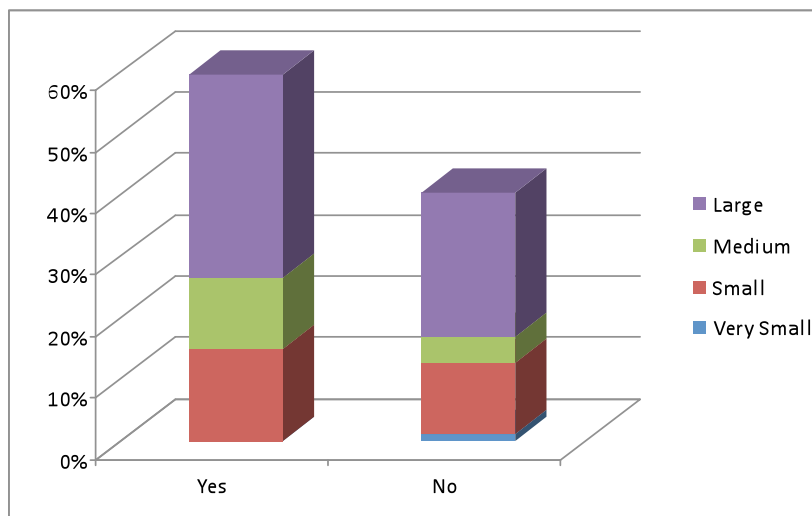
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.4%	21.9%	10.4%	30.3%	64.0%
No	0.7%	17.9%	6.7%	10.8%	36.0%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.0%	14.9%	11.7%	33.0%	59.6%
No	1.1%	11.7%	4.3%	23.4%	40.4%

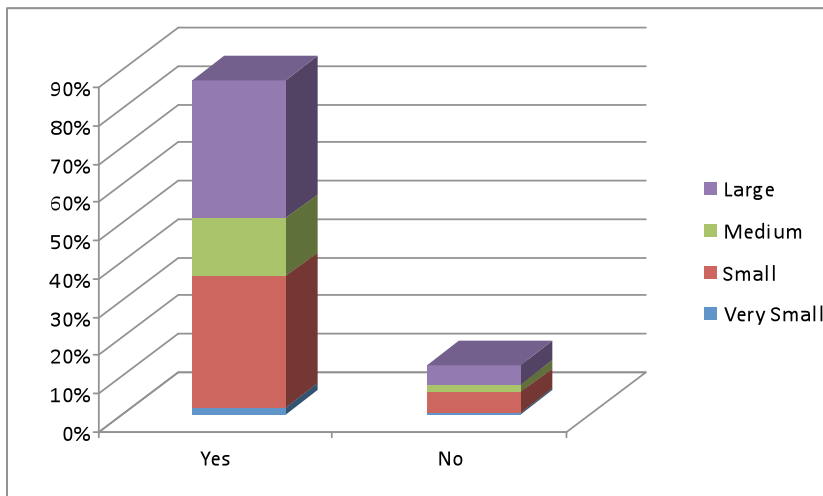


Measure 5: Number and percentage of utilities that monitor and evaluate customer complaints for possible indications of water quality or other security threats.

Question 5: Do you monitor and evaluate customer complaints for possible indications of water quality or other security threats?

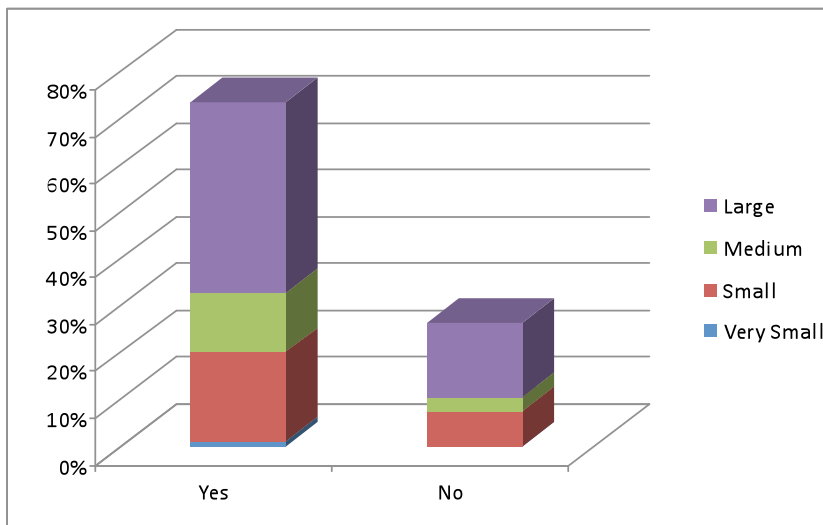
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.7%	34.3%	15.2%	36.0%	87.2%
No	0.3%	5.4%	2.0%	5.1%	12.8%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.1%	19.1%	12.8%	40.4%	73.4%
No	0.0%	7.4%	3.2%	16.0%	26.6%

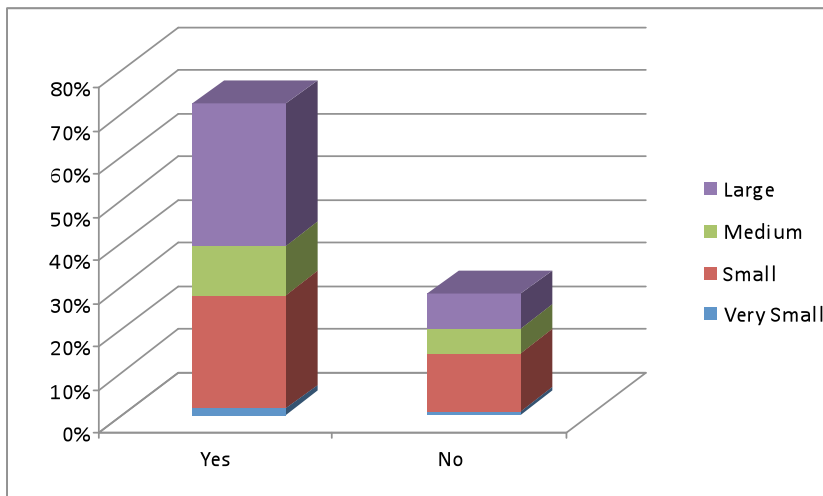


Measure 6: Number and percentage of utilities that have established protocols (e.g., consequence management plans) for interpreting and responding to indications of water quality anomalies.

Question 6: Have you established protocols for interpreting and responding to indications of water quality anomalies?

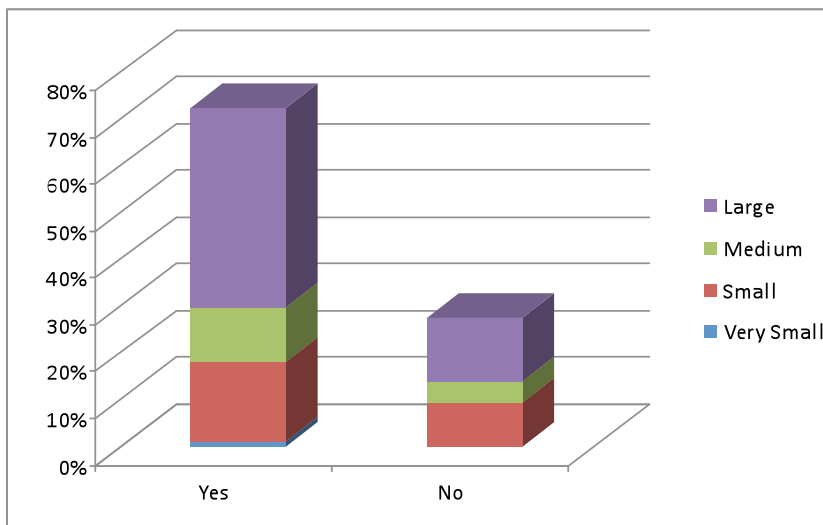
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.4%	26.3%	11.4%	33.0%	72.1%
No	0.7%	13.4%	5.7%	8.1%	27.9%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.1%	17.0%	11.7%	42.5%	72.3%
No	0.0%	9.6%	4.3%	13.8%	27.7%

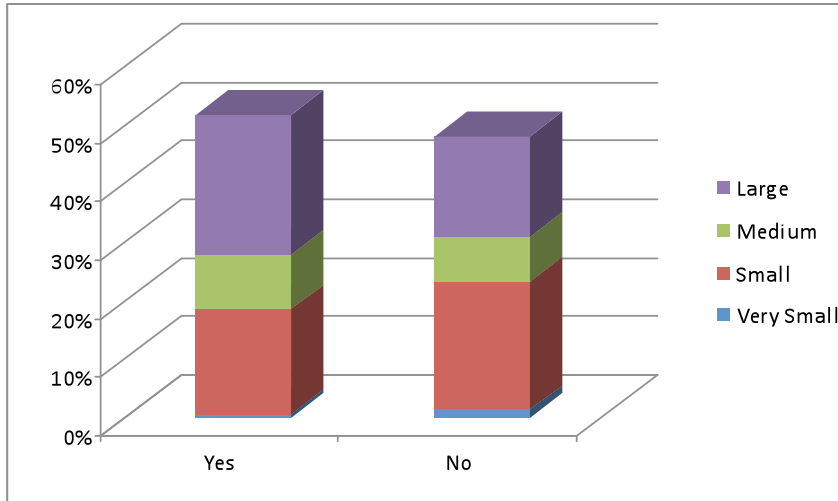


Measure 7: Number and percentage of utilities that annually review and periodically update vulnerability assessments.

Question 7: Do you review your vulnerability assessment (VA) annually?

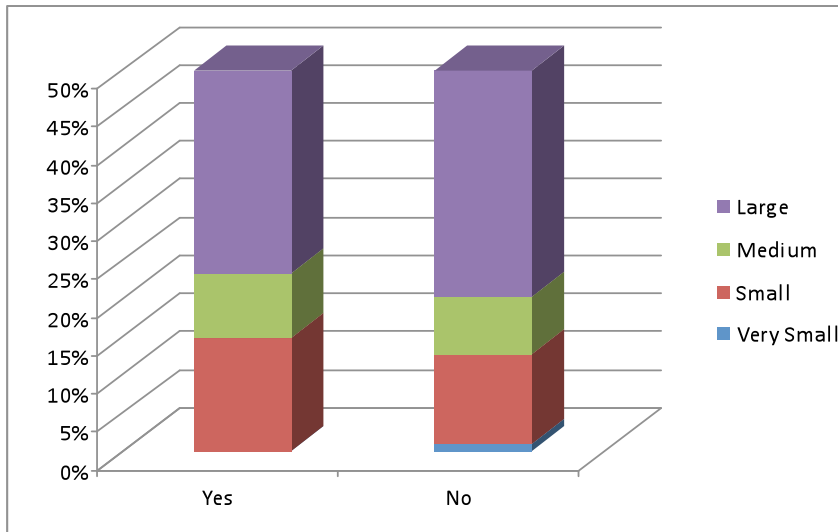
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.7%	17.9%	9.4%	23.9%	51.9%
No	1.4%	21.8%	7.7%	17.2%	48.1%



Wastewater Utility Responses:

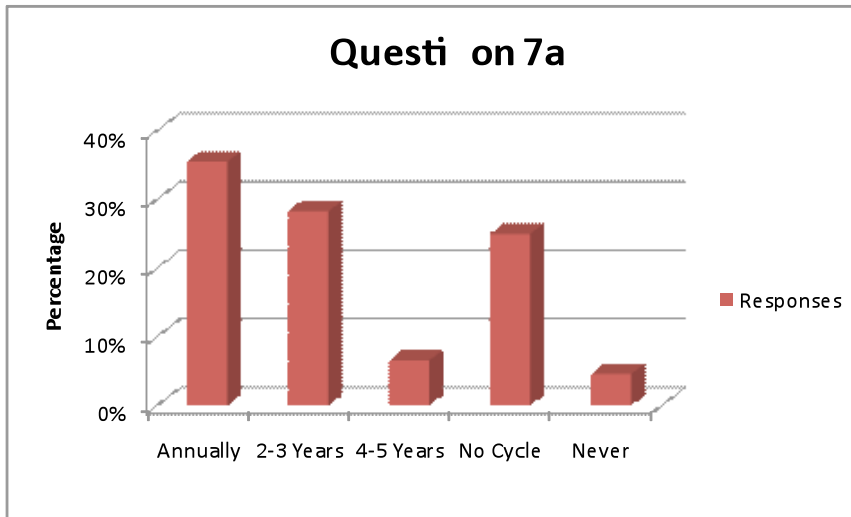
	Very Small	Small	Medium	Large	Total
Yes	0.0%	14.9%	8.5%	26.6%	50.0%
No	1.1%	11.7%	7.4%	29.8%	50.0%



Question 7a: How frequently do you update your VA to adjust for changes in your system that may alter the risk profile of your utility?

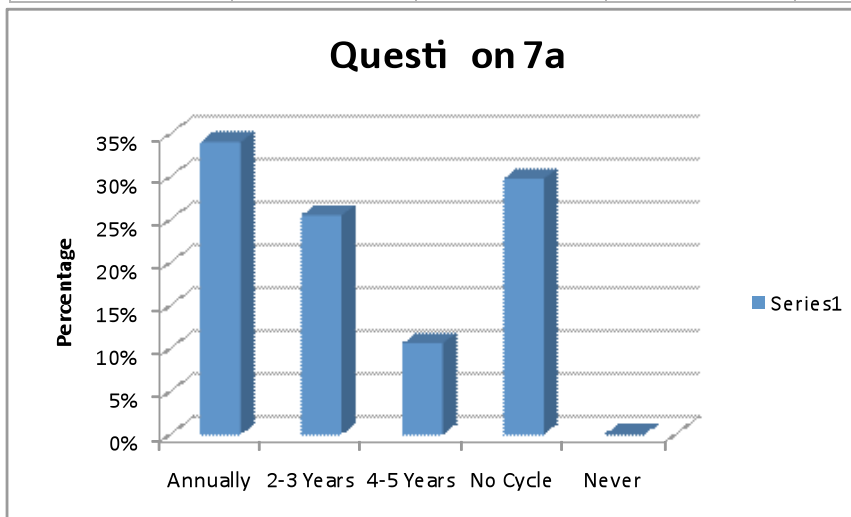
Drinking Water Utility Responses:

	Annually	2-3 Years	4-5 Years	No Cycle	Never
Responses	35.5%	28.3%	6.6%	25.0%	4.6%



Wastewater Utility Responses:

	Annually	2-3 Years	4-5 Years	No Cycle	Never
Percentage	34.0%	25.6%	10.6%	29.8%	0.00%

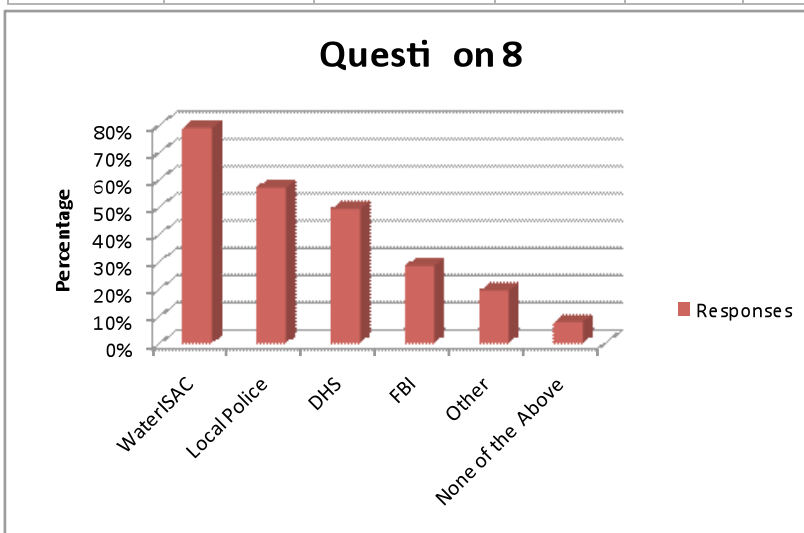


Measure 8: Number and percentage of utilities that receive screened, validated, and timely (e.g., in time to inform decisions or take action) threat information from one or more trusted sources such as WaterISAC, the FBI, local police, or DHS.

Question 8: Does your utility receive screened, validated, and timely (e.g., in time to inform decisions or take action) security threat information from one or more of the following sources?

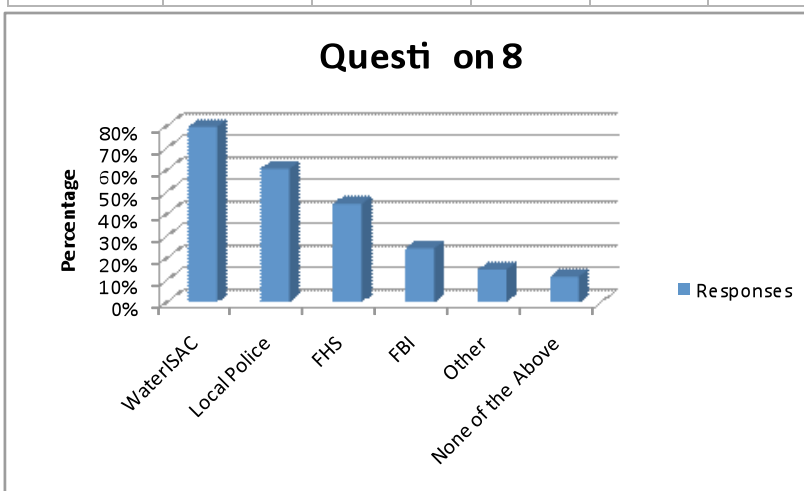
Drinking Water Utility Responses:

	WaterISAC	Local Police	DHS	FBI	Other	None of the Above
Percentage	78.8%	56.9%	49.2%	28.9%	19.2%	7.7%



Wastewater Utility Responses:

	WaterISAC	Local Police	FHS	FBI	Other	None of the Above
Percentage	79.8%	60.6%	44.7%	24.5%	14.9%	11.7%

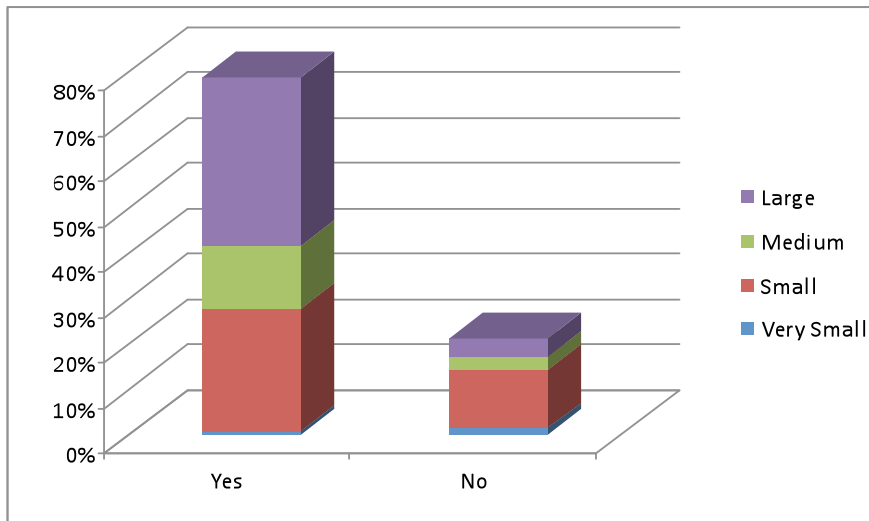


Measure 9: Number and percentage of utilities that have a plan in place to increase utility security in response to a threat.

Question 9: Do you have a plan in place to increase utility security in response to a threat?

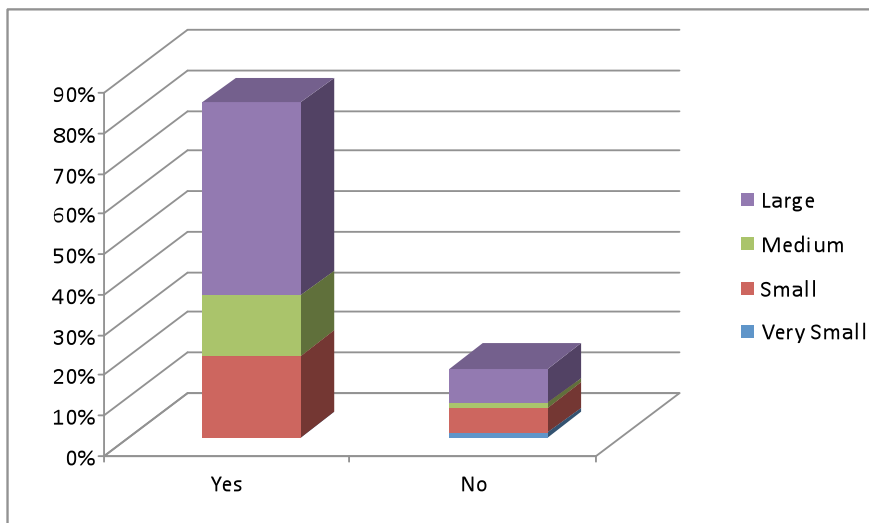
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.7%	26.9%	14.2%	37.0%	78.8%
No	1.4%	12.8%	3.0%	4.0%	21.2%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.0%	20.2%	14.9%	47.9%	83.0%
No	1.1%	6.3%	1.1%	8.5%	17.0%

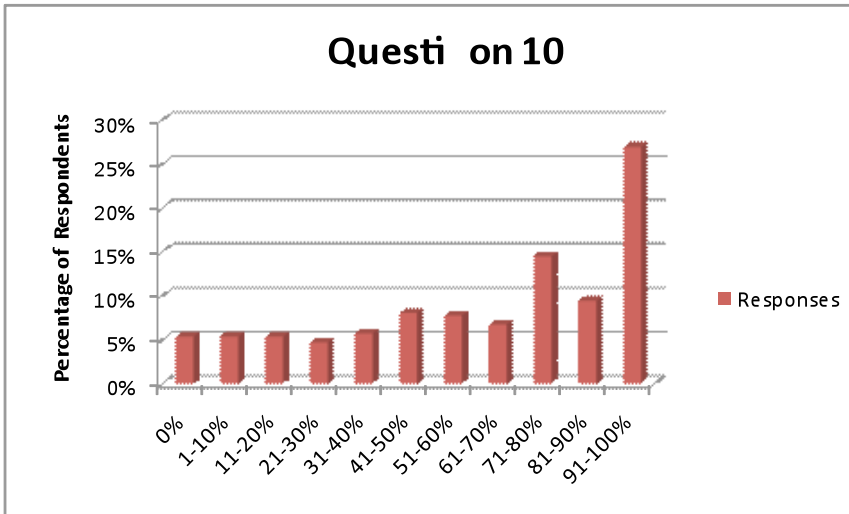


Measure 10: Percent of critical assets with enhanced capability to detect intruders.

Question 10: What percent of your critical assets are protected by enhanced detection capability?

Drinking Water Utility Responses:

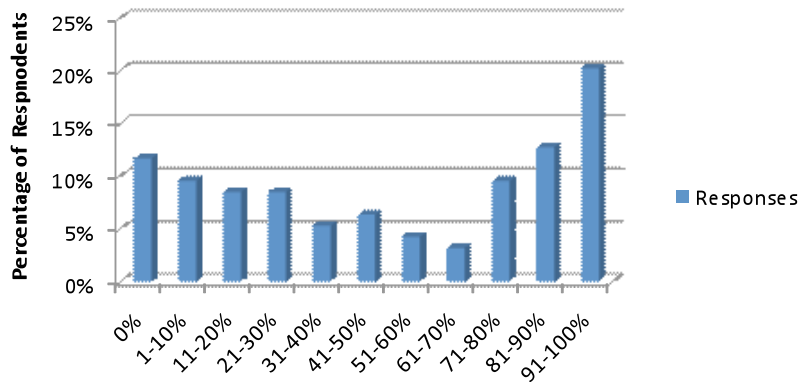
	0%	1-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%	Total:
Responses	16	16	16	14	17	24	23	20	43	28	80	297
Very Small	1.0%	0.0%	0.0%	0.0%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	2.0%
Small	3.7%	4.0%	2.4%	2.0%	1.7%	3.0%	2.7%	3.0%	5.7%	2.7%	8.8%	39.7%
Medium	0.0%	0.3%	1.4%	1.7%	1.7%	1.3%	1.0%	0.7%	2.7%	1.3%	5.1%	17.2%
Large	0.7%	1.0%	1.7%	1.0%	2.0%	3.4%	4.0%	3.0%	6.1%	5.4%	12.8%	41.1%
Total	5.4%	5.4%	5.4%	4.7%	5.7%	8.1%	7.7%	6.7%	14.5%	9.4%	26.9%	



Wastewater Utility Responses:

	0%	1-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%	Total:
Responses	11	9	8	8	5	6	4	3	9	12	19	94
Very Small	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%
Small	6.4%	4.3%	2.1%	3.2%	1.1%	1.1%	3.2%	2.1%	0.0%	2.1%	1.1%	26.6%
Medium	0.0%	1.1%	4.3%	2.1%	1.1%	2.1%	0.0%	0.0%	1.1%	0.0%	4.3%	16.0%
Large	4.3%	4.3%	2.1%	3.2%	3.2%	3.2%	1.1%	1.1%	8.5%	10.6%	14.9%	56.4%
Total	11.7%	9.6%	8.5%	8.5%	5.3%	6.4%	4.3%	3.2%	9.6%	12.8%	20.2%	

Question 10

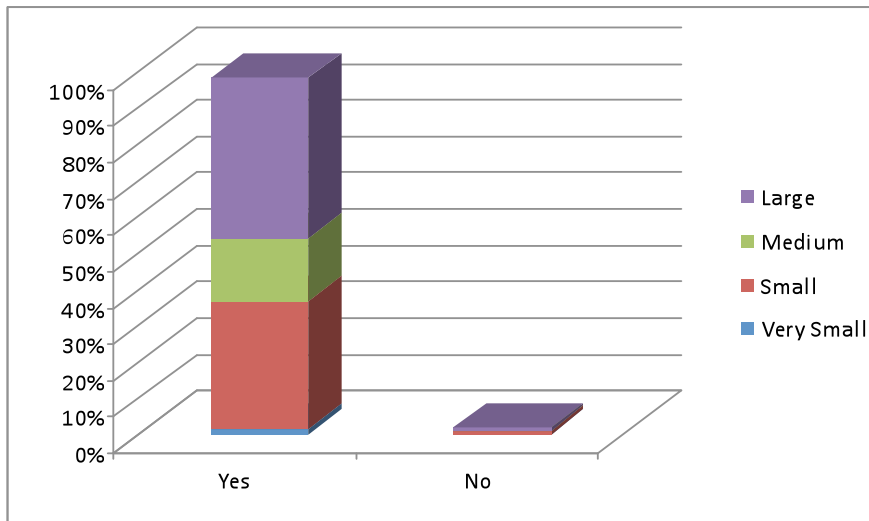


Measure 11: Number and percent of utilities with physical and/or procedural controls in place to safeguard hazardous chemicals.

Question11: If you use hazardous chemicals, do you have physical or procedural controls in place to safeguard them?

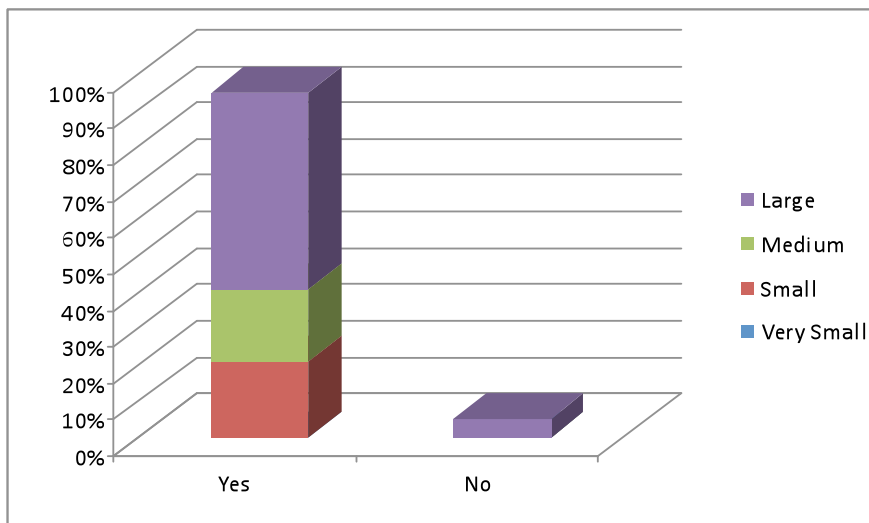
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.5%	35.4%	17.1%	44.1%	98.1%
No	0.0%	1.1%	0.0%	0.8%	1.9%



Wastewater Utility Responses:

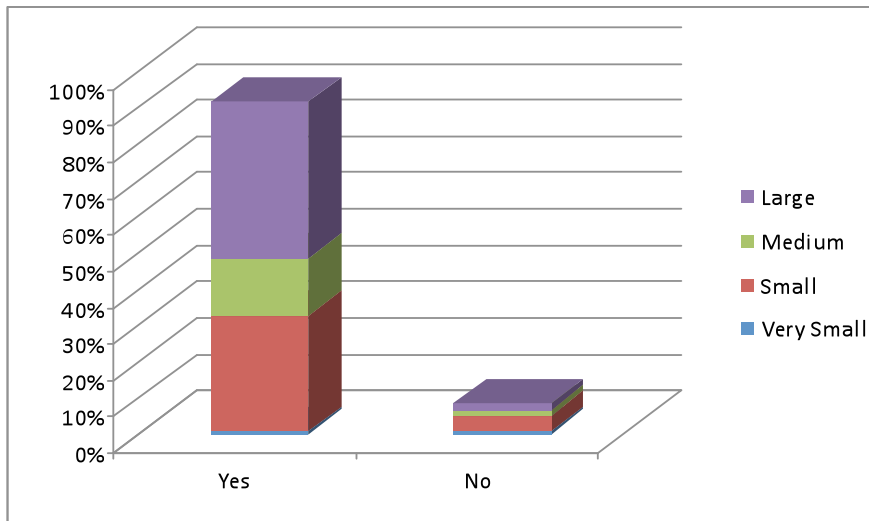
	Very Small	Small	Medium	Large	Total
Yes	0.0%	21.1%	19.7%	53.9%	94.7%
No	0.0%	0.0%	0.0%	5.3%	5.3%



Question 11a: Have you secured and do you monitor the perimeter of areas containing hazardous chemicals?

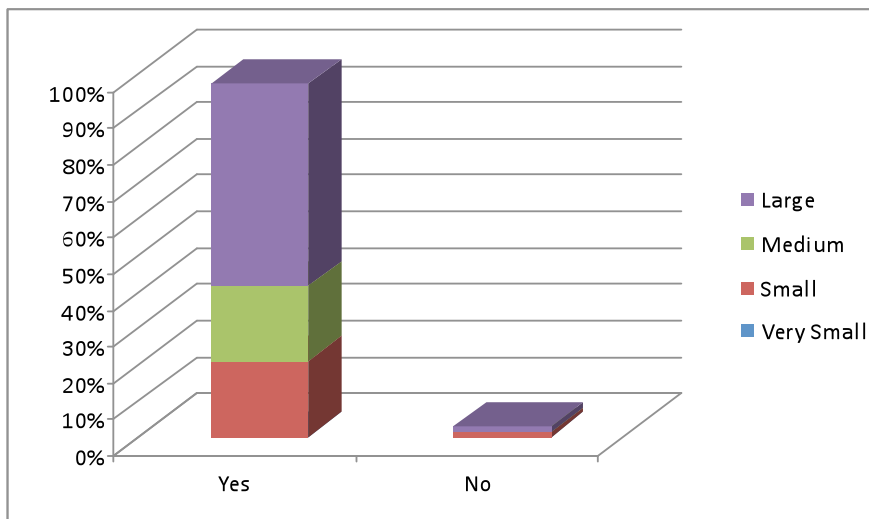
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.8%	31.8%	15.9%	43.0%	91.5%
No	0.8%	4.3%	1.5%	1.9%	8.5%



Wastewater Utility Responses:

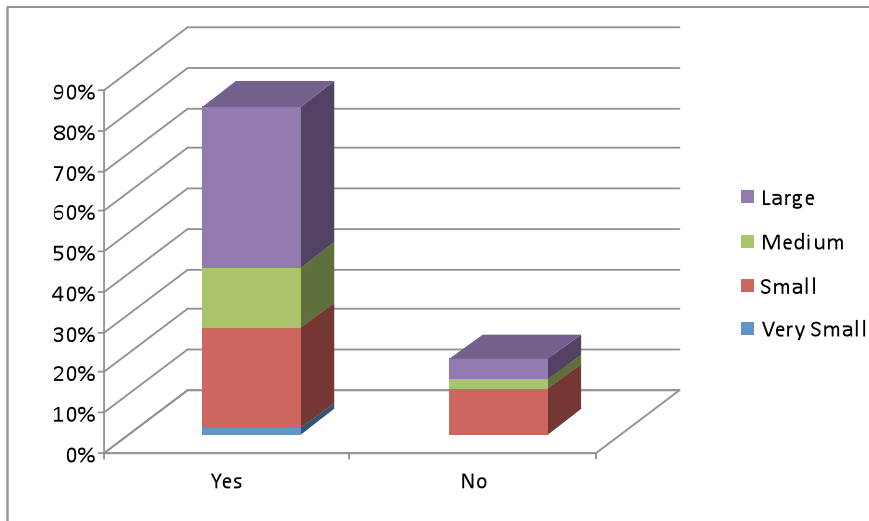
	Very Small	Small	Medium	Large	Total
Yes	0.0%	20.8%	20.8%	55.6%	97.2%
No	0.0%	1.4%	0.0%	1.4%	2.8%



Question 11b: Have you controlled access to restricted areas within the facility by screening and/or inspecting individuals and vehicles as they enter?

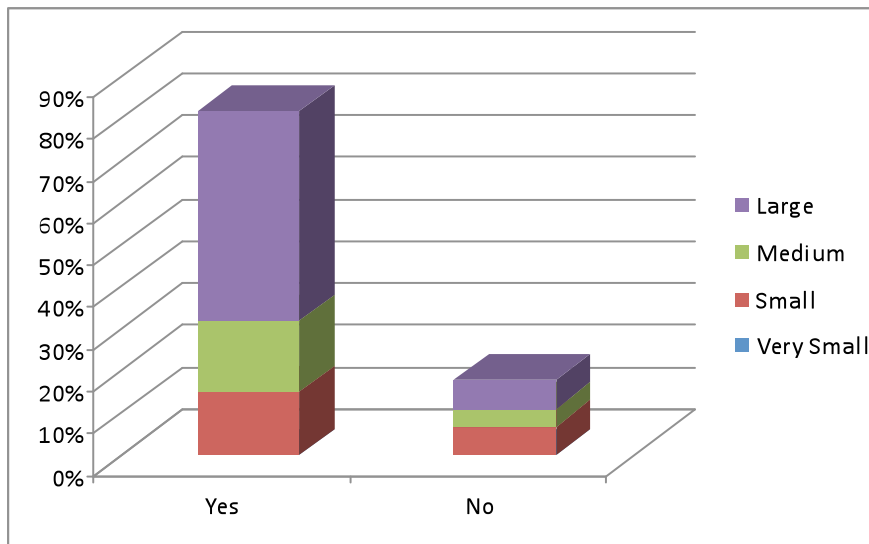
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.6%	24.8%	15.1%	39.9%	81.4%
No	0.0%	11.3%	2.3%	5.0%	18.6%



Wastewater Utility Responses:

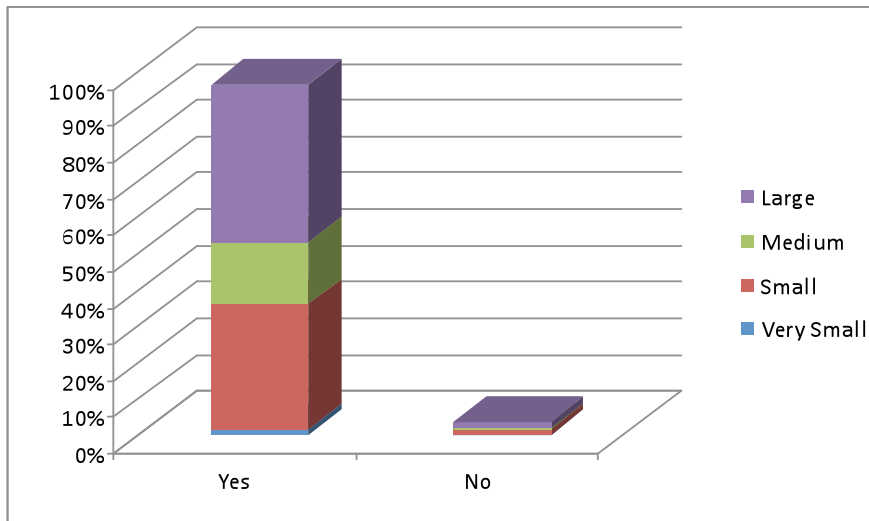
	Very Small	Small	Medium	Large	Total
Yes	0.0%	15.2%	16.7%	50.0%	81.9%
No	0.0%	6.9%	4.1%	6.9%	18.1%



Question 11c: Do you secure and monitor the shipping, receipt, and storage of hazardous materials for the facility?

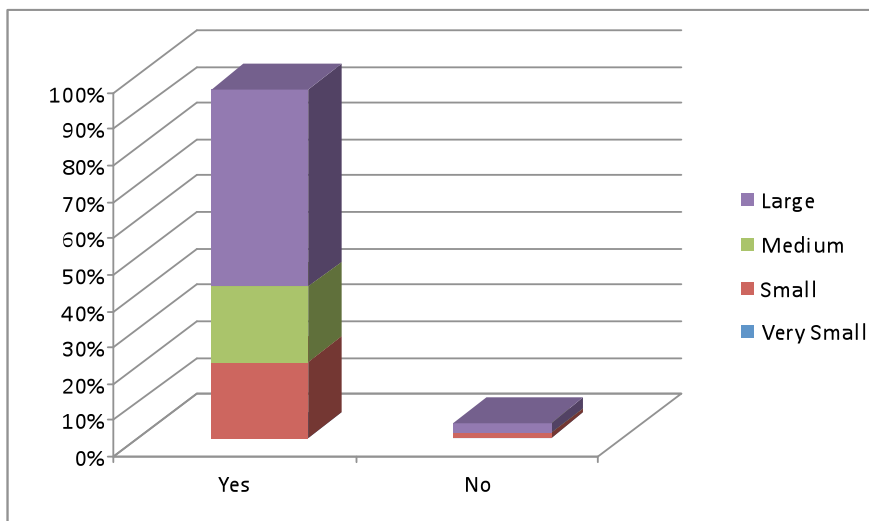
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.6%	34.5%	17.0%	43.4%	96.5%
No	0.0%	1.6%	0.4%	1.6%	3.5%



Wastewater Utility Responses:

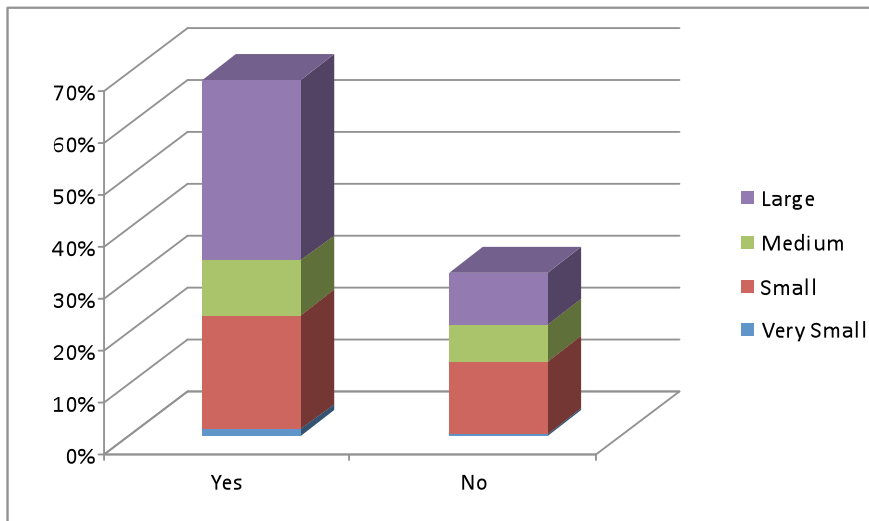
	Very Small	Small	Medium	Large	Total
Yes	0.0%	20.8%	20.8%	54.2%	95.8%
No	0.0%	1.4%	0.0%	2.8%	4.2%



Question 11d: Do you escalate the level of protective measures for periods of elevated threat?

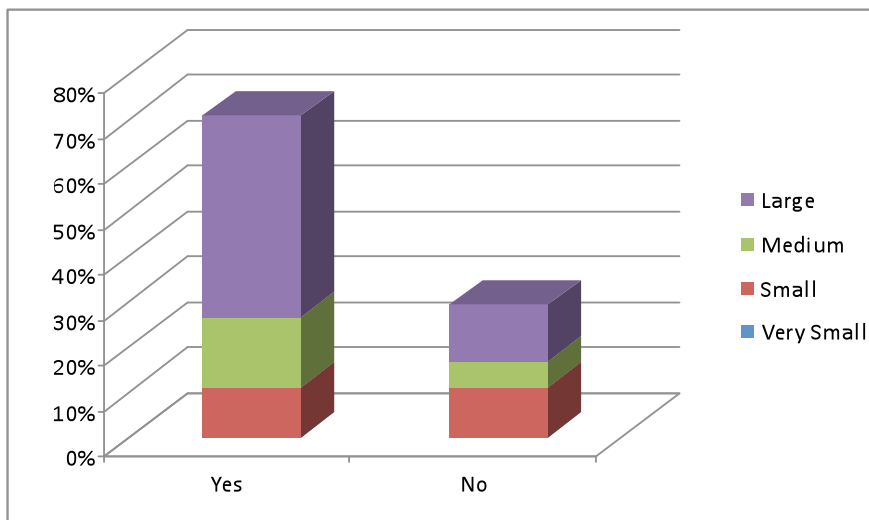
Drinking Water Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.2%	22.1%	10.5%	34.9%	68.6%
No	0.4%	13.9%	67.0%	10.1%	31.4%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.0%	11.1%	15.3%	44.4%	70.8%
No	0.0%	11.1%	5.6%	12.5%	29.2%



Question 11e: Do your physical and/or procedural controls include other physical or procedural controls not identified in the previous questions?

Utilities that responded with addition physical or procedural controls not identified in the previous questions included the following.

Wastewater additional responses, Question 11e:

- Response procedures for leaks, spills, and releases.
- Routine update of security force post orders.
- Provide sufficient lighting in the areas and annual staff training of written procedures in place followed up with quarterly awareness training.
- Access controls.
- Procedural training controls.
- We have a Hazardous Chemical Security Plan that includes employee checks and key access distribution measures.
- Operator Certification Program, scrubber systems, auto shut-off valves for tanks in use, leak and smoke detection.
- Entire facility is fenced in, access is controlled, and access and other key areas are constantly monitored with cameras.

Water additional responses, Question 11e:

- Security guard, cameras on tanks, employees must meet and watch each load being unloaded. Incoming loads are posted on boards so employees know. Plant manager must ok every load. We have truck driver's name in advance or the truck must wait for the guard to check.
- Routinely Updating Security Force's Post Orders.
- Automatic valve closure, enhanced Leak Detection, HAZMAT certified employee response team.
- Employee training and alerts.
- Conduct background checks on individuals touring or working in the plant.
- Laboratory analysis of chemicals before offloading shipment.
- Chlorine storage facilities are isolated and equipped with scrubbers.
- Increased frequency of guard patrols, increased video patrols, and use of GPS to track shipments of chlorine.
- Access Control card readers for building access, Emergency Response Plan, Risk Management Plan.
- Access Controls.
- Deter, Detect, and Delay; Theft and Diversion; Sabotage; Cyber; Response; Monitoring; Training; Personnel Surety; Elevated Threats; Specific Threats, Vulnerabilities, or Risks; Reporting of Significant Security Incidents.

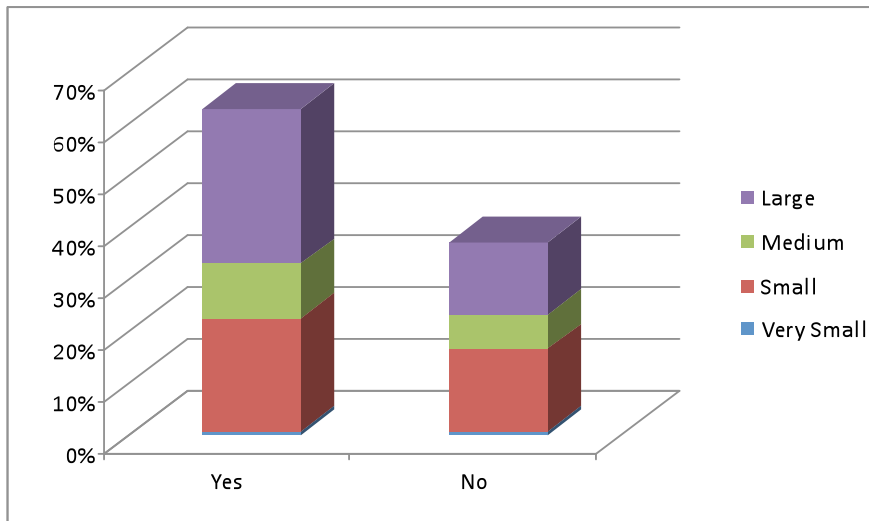
- Basic chemical tests on hydrated lime and aluminum sulfate deliveries to validate chemical identity before unloading.
- Use escorts for chemical deliveries in remote areas. In process of installing perimeter fencing, Access Control, CCTV, motion detection, etc.
- Procedural training controls.
- Hazardous chemical areas have added layers of security sensors present—limited access, surveillance cameras, hoist alarms, motion detectors.
- Alarms, cameras, fence monitoring equipment at plant and remote sites.
- Parameter fence with barb wire, electric security gate, intrusion alarms, cameras, breaking glass sensors, ID drivers, checking truck and chemical company paperwork before delivery, etc.
- Chemical receiving check list from vendor with seal number and driver number and truck number.
- Unmanned facilities such as tank sites, wells, and reservoirs are patrolled on a more frequent basis depending on the threat level.
- In some cases, sample the hazardous material supplied.
- Video.
- Cyber/SCADA; Secure site assets; Deter, Detect, Delay; Theft and Diversion; Emergency Response Plan; Monitoring; Training; Personnel Surety; Specific Threats; Reporting of Incidents; Security Organization; maintain records.
- Extra locks, extra doors, added radio alarms.
- Checking Physical Characteristics of chemicals received (e.g., Specific Gravity, color, pH).
- Testing of delivered product.
- Verification of chemical deliveries through paperwork review and physical analysis (except chlorine gas analysis).
- Chemical storage building is locked and alarmed.
- Leak monitors, Chemical neutralization equipment, tabletop exercises.
- With each level of elevated threat, there are increased levels of on-site restrictions.
- Pictures of drivers of chemical trucks on file. Sampling of chemicals and analysis prior to off-loading.
- Fences, locks, enclosed buildings, general observation of plant and distribution facilities, use of SCADA.
- RMP.
- Special receiving SOPs, Escorts; Validation; Faxed ID prior to shipment, CCDTV, Specific day of week for all shipments, Practice with HAZMAT response team.

Measure 12: Number and percentage of utilities that include gaseous chlorine in their hazardous chemicals use.

Question 12: If you use hazardous chemicals, does your chemical use include gaseous chlorine?

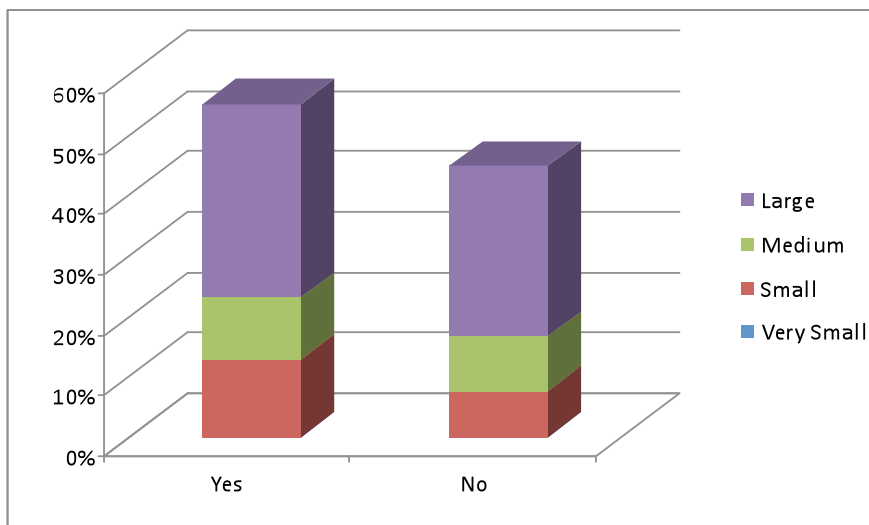
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.7%	21.7%	10.7%	29.8%	62.9%
No	0.7%	15.8%	6.6%	14.0%	37.1%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.0%	12.8%	10.3%	32.1%	55.1%
No	0.0%	7.7%	9.0%	28.2%	44.9%

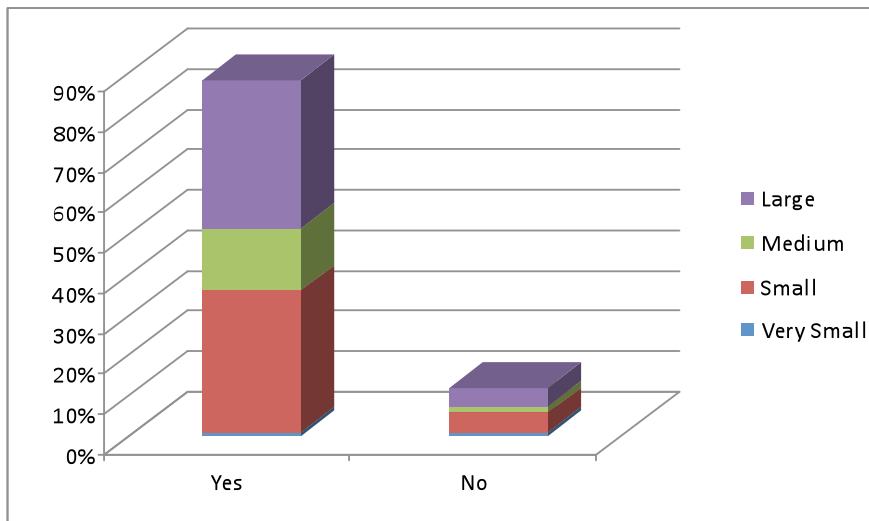


Measure 13: Number and percentage of utilities that have evaluated their disinfection methods considering water quality, public health, and security issues.

Question 13: Have you evaluated your disinfection methods considering water quality, public health, and security issues?

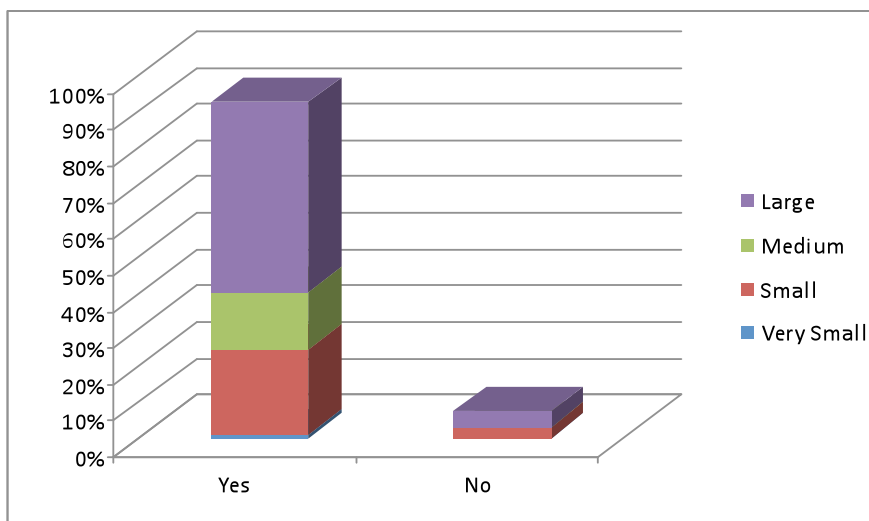
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.0%	35.0%	15.5%	36.7%	88.2%
No	1.0%	4.7%	1.7%	4.4%	11.8%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.1%	23.4%	16.0%	52.1%	92.6%
No	0.0%	3.2%	0.0%	4.3%	7.5%

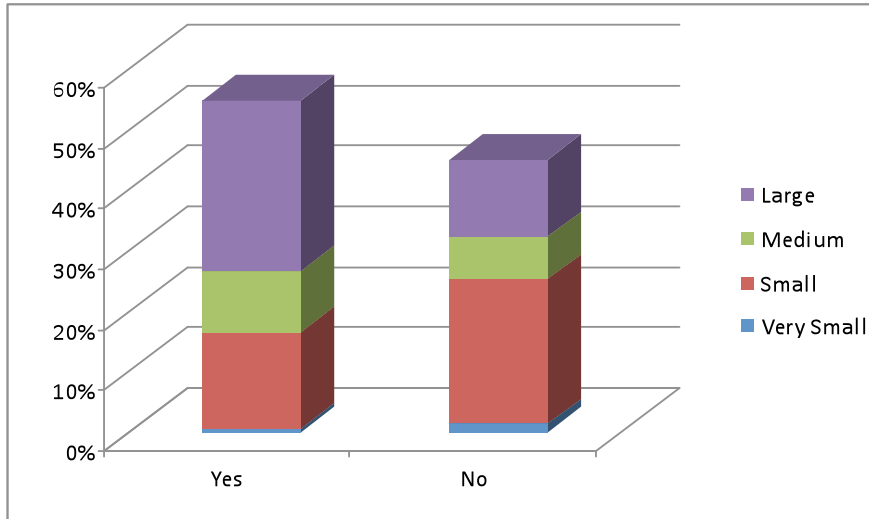


Measure 14: Number and percentage of utilities that have a written business continuity plan.

Question 14: Do you have a written business continuity plan?

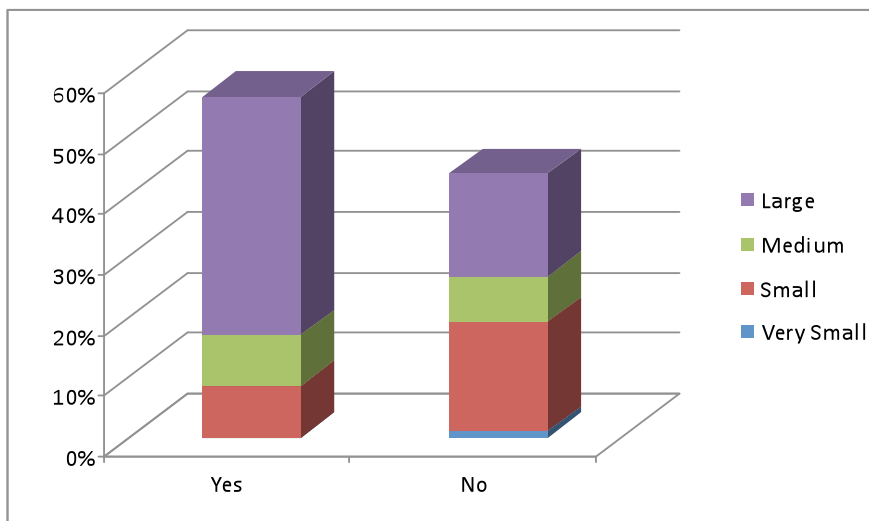
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.7%	15.8%	10.1%	28.3%	54.9%
No	1.6%	23.9%	7.1%	12.8%	45.1%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.0%	8.5%	8.5%	39.4%	56.4%
No	1.1%	18.1%	7.5%	17.0%	43.6%



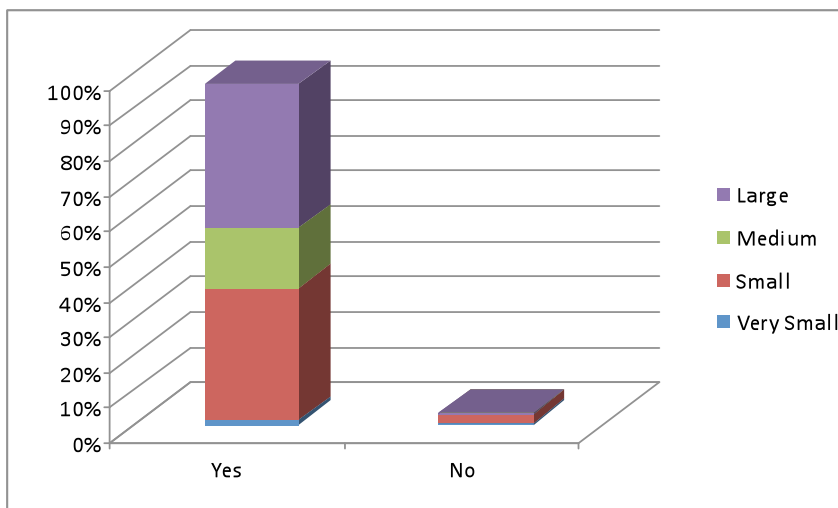
Measure 15: Number and percentage of utilities that:

- Have an emergency response plan (ERP)
- Conduct training on their ERP
- Carry out exercises on their ERP
- Review and update their ERP on a periodic basis

Question 15: Do you have an emergency response plan (ERP)?

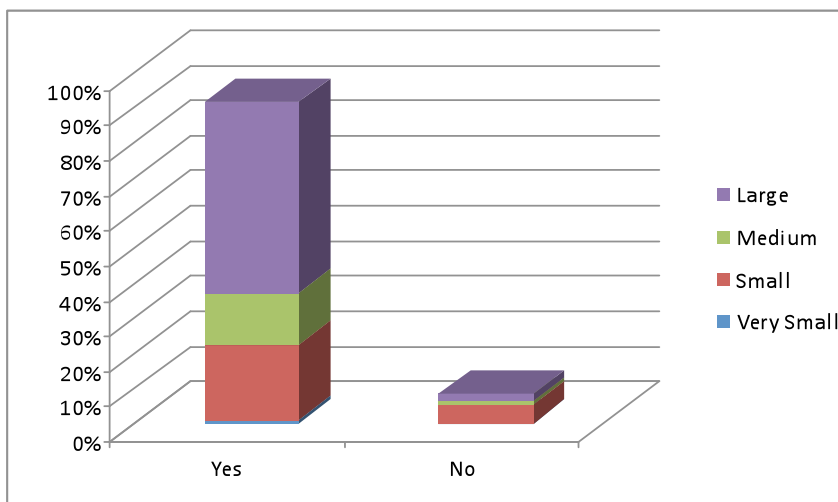
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.4%	37.4%	17.2%	40.7%	96.6%
No	0.7%	2.4%	0.0%	0.3%	3.4%



Wastewater Utility Responses:

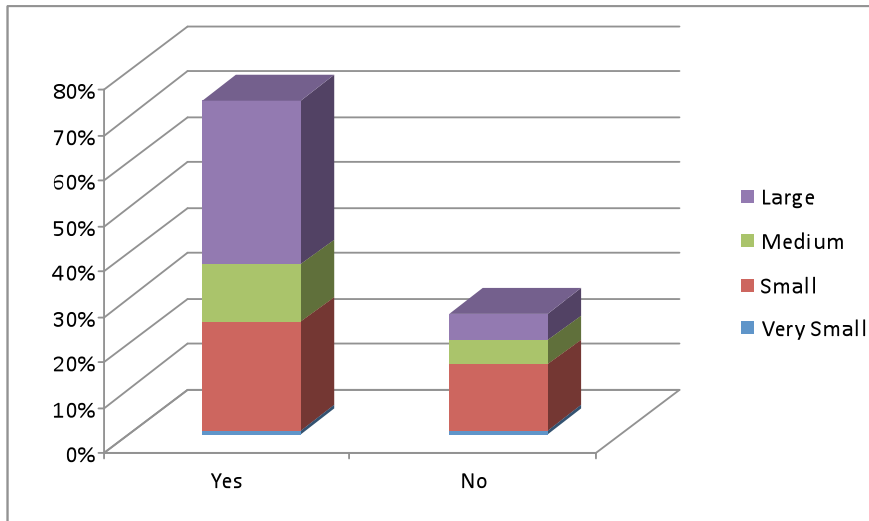
	Very Small	Small	Medium	Large	Total
Yes	1.1%	21.3%	14.9%	54.3%	91.5%
No	0.0%	5.3%	1.1%	2.1%	8.5%



Question 15a: Do you conduct training on the ERP?

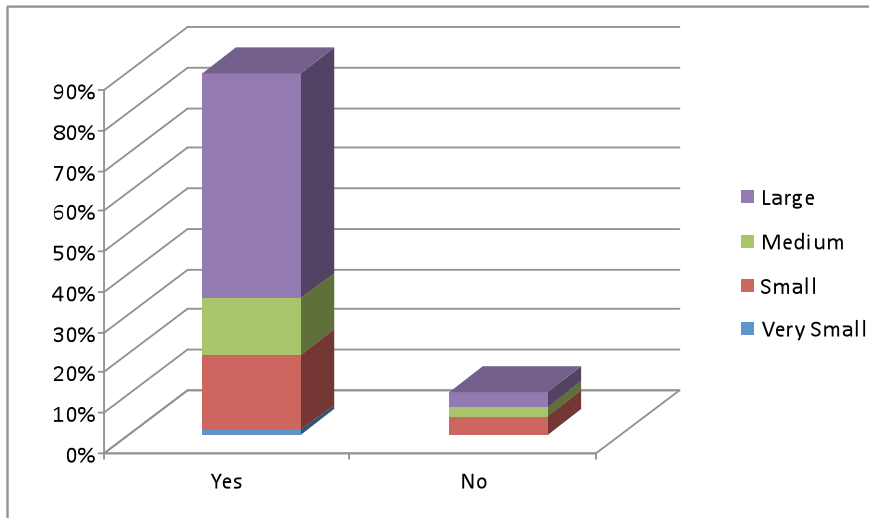
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.7%	24.0%	12.5%	36.2%	73.5%
No	0.7%	14.6%	5.2%	5.9%	26.5%



Wastewater Utility Responses:

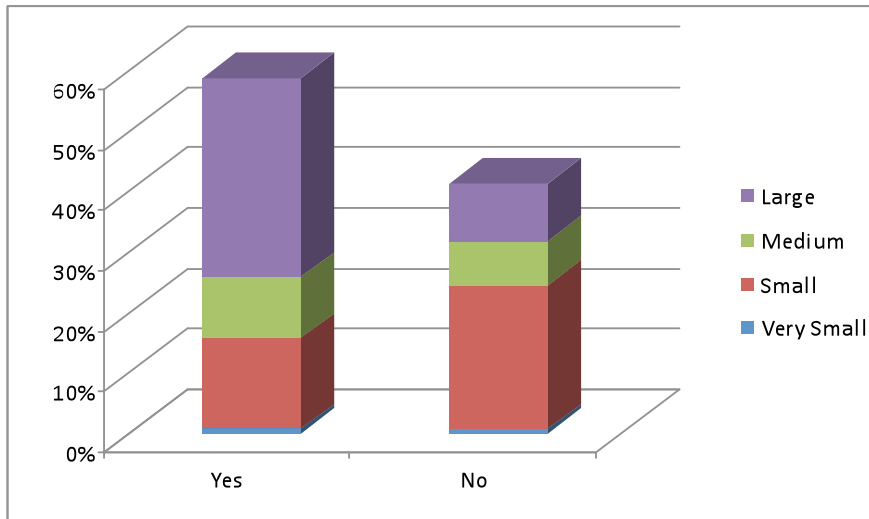
	Very Small	Small	Medium	Large	Total
Yes	1.2%	18.6%	14.0%	55.8%	89.5%
No	0.0%	4.7%	2.3%	3.5%	10.5%



Question 15b: Do you carry out exercises on the ERP?

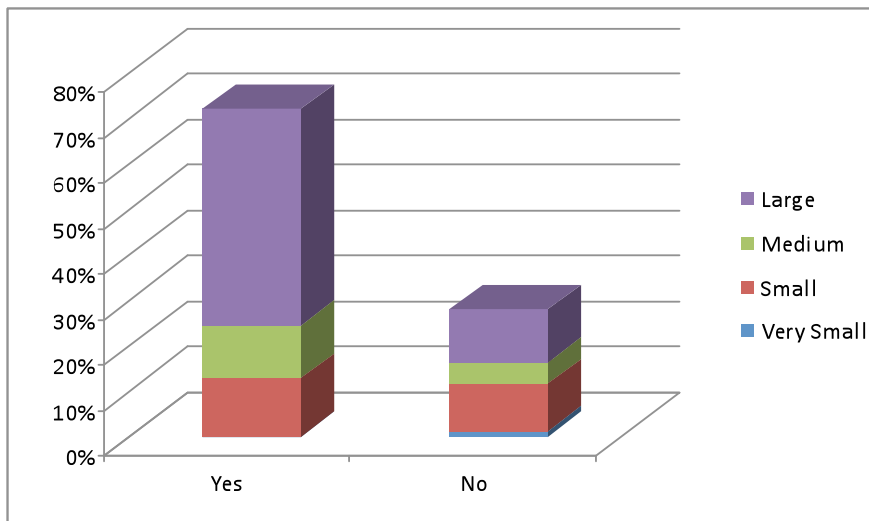
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.7%	15.0%	10.1%	32.9%	58.7%
No	0.7%	23.8%	7.3%	9.4%	41.3%



Wastewater Utility Responses:

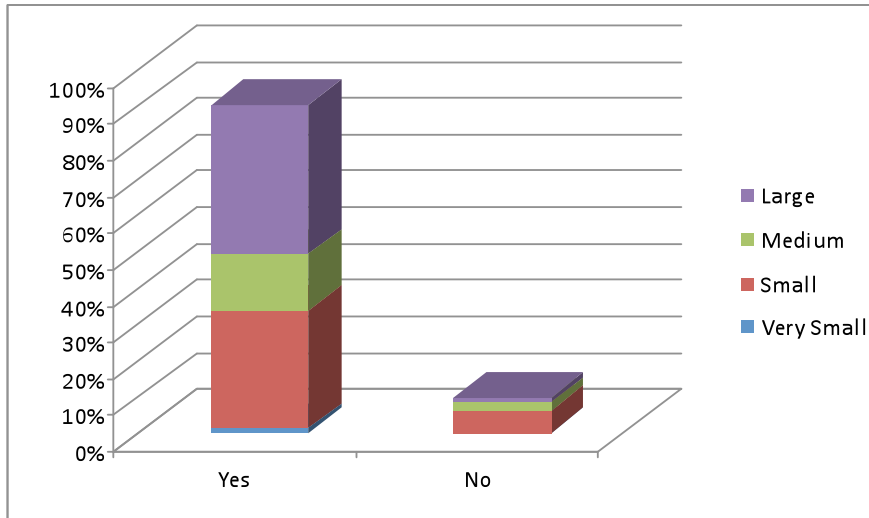
	Very Small	Small	Medium	Large	Total
Yes	0.0%	12.8%	11.6%	47.7%	72.1%
No	1.2%	10.5%	4.7%	11.6%	27.9%



Question 15c: Do you review and update the ERP?

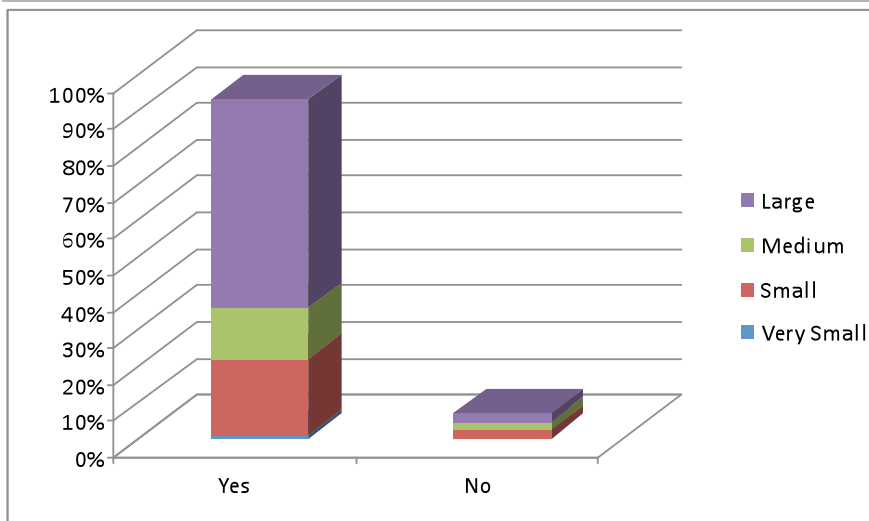
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.4%	32.8%	15.7%	40.9%	90.2%
No	0.0%	6.3%	2.1%	1.4%	9.8%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.2%	20.9%	14.0%	57.0%	93.0%
No	0.0%	2.3%	2.3%	2.3%	7.0%

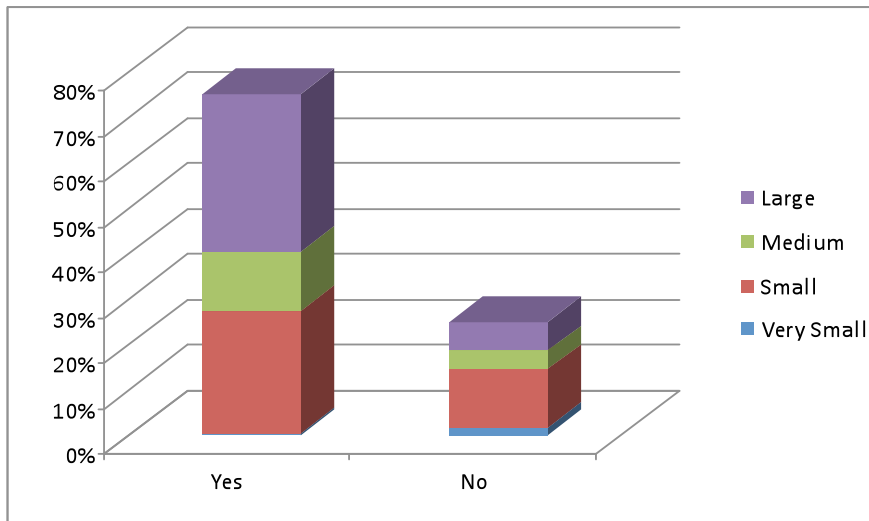


Measure 16: Number and percentage of utilities that have adopted the National Incident Management System (NIMS).

Question 16: Has your utility adopted the National Incident Management System (NIMS)?

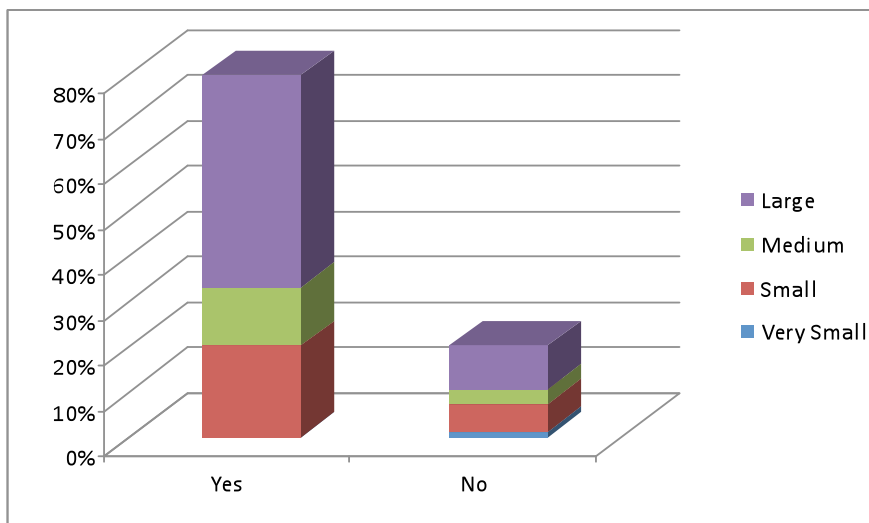
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.3%	26.9%	13.1%	34.7%	75.1%
No	1.7%	12.8%	4.0%	6.4%	24.9%



Wastewater Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.0%	20.2%	12.8%	46.8%	79.8%
No	1.1%	6.4%	3.2%	9.6%	20.2%

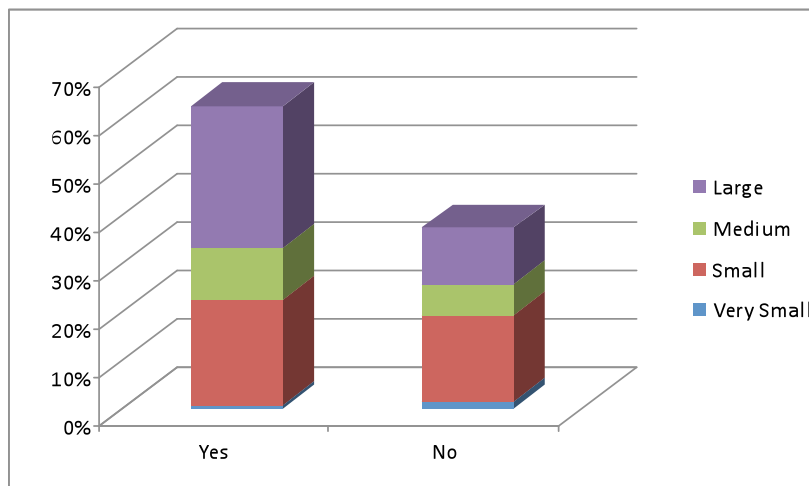


Measure 17: Number and percentage of utilities that are signatories, or are in the process of becoming signatories, to written agreements for requesting aid or assistance, such as a mutual aid or assistance agreement or a Water/Wastewater Agency Response Network (WARN) membership.

Question 17: Is your utility a signatory to written agreements for requesting aid or assistance, such as a mutual aid or assistance agreement or Water/Wastewater Agency Response Network (WARN) membership

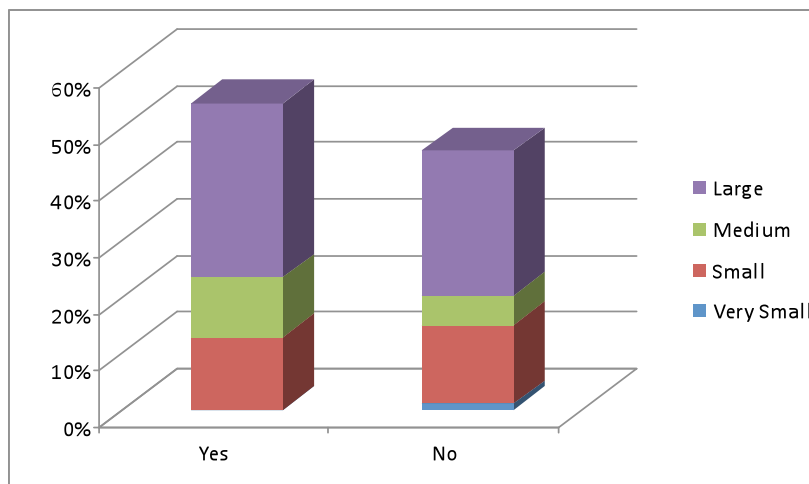
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.7%	21.9%	10.8%	29.3%	62.6%
No	1.4%	17.9%	6.4%	11.8%	37.4%



Wastewater Utility Responses:

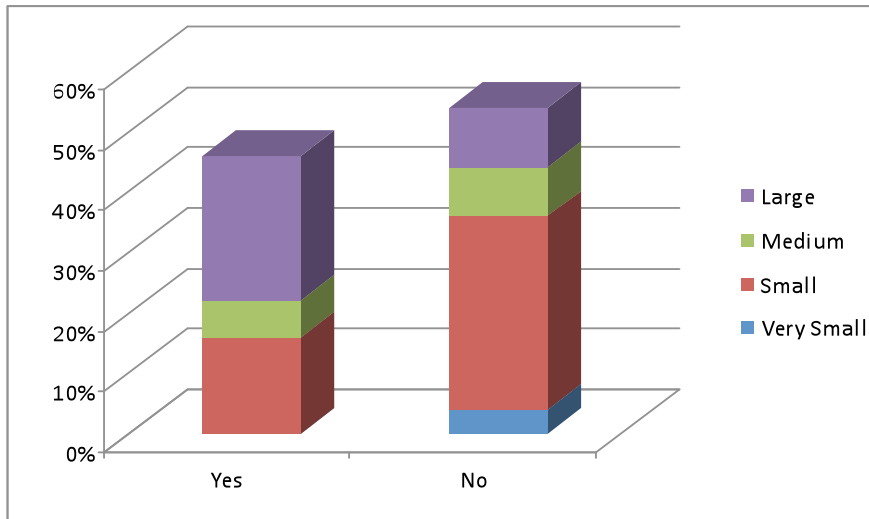
	Very Small	Small	Medium	Large	Total
Yes	0.0%	12.8%	10.6%	30.9%	54.3%
No	1.1%	13.8%	5.3%	25.5%	45.7%



Question 17a: If no, are you in the process of creating an agreement?

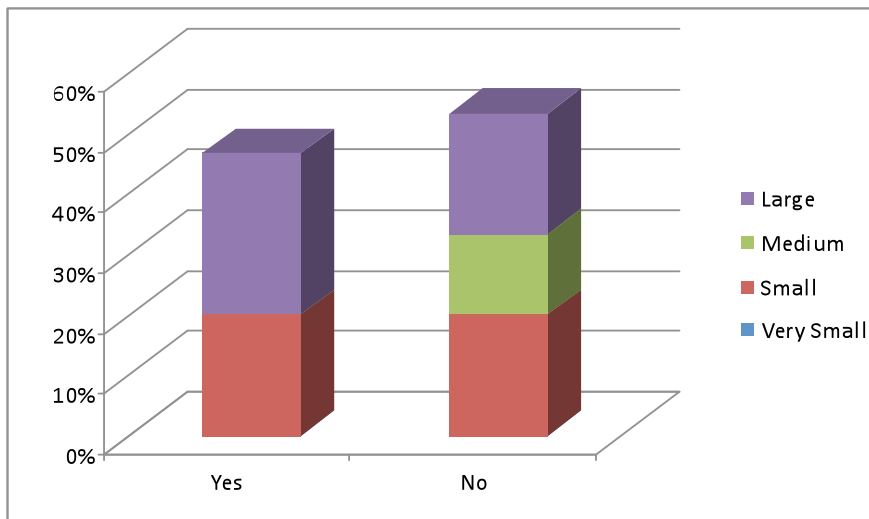
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.00%	16.0%	6.0%	24.0%	46.0%
No	4.0%	32.0%	8.0%	10.0%	54.0%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.0%	20.0%	0.0%	26.7%	46.7%
No	0.0%	20.0%	13.3%	20.0%	53.3%

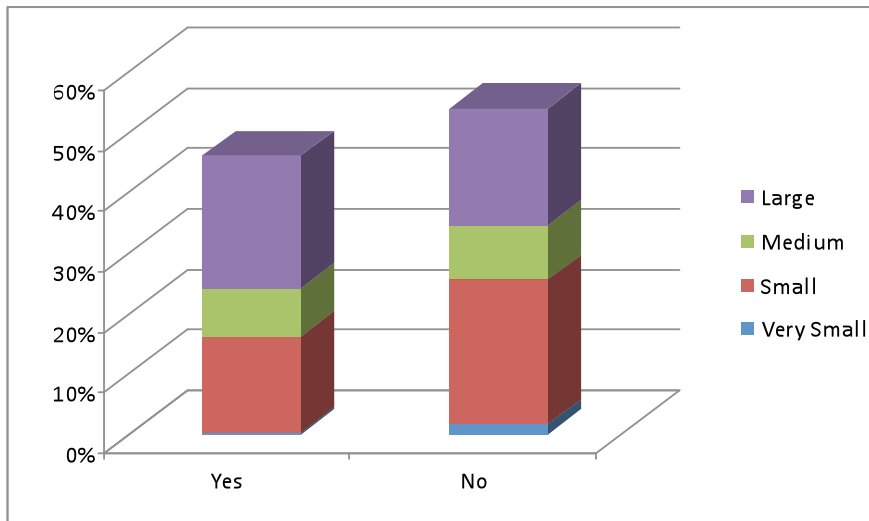


Measure 18: Number and percentage of utilities that have responded to an emergency request to provide mutual aid and assistance.

Question 18: Has your utility responded to an emergency request to provide mutual aid and assistance?

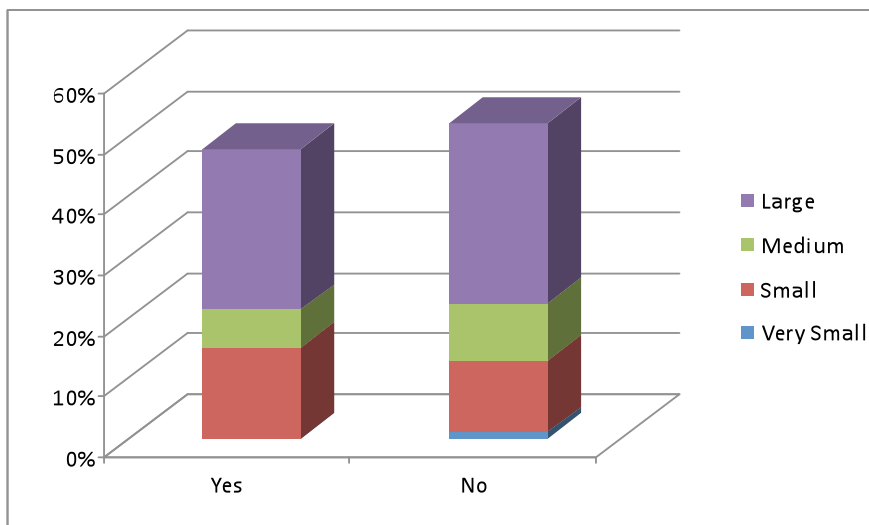
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.3%	15.8%	8.1%	21.9%	46.1%
No	1.7%	23.9%	9.1%	19.2%	53.9%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	0.0%	14.9%	6.4%	26.6%	47.9%
No	1.1%	11.7%	9.6%	29.8%	52.1%

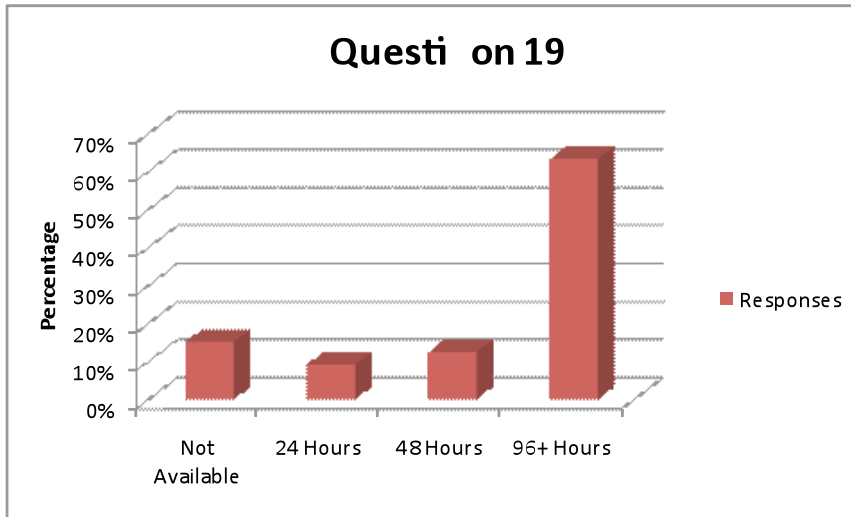


Measure 19: Percent of utilities that have backup power for critical operations.

Question 19: For what period of time does your utility have backup power?

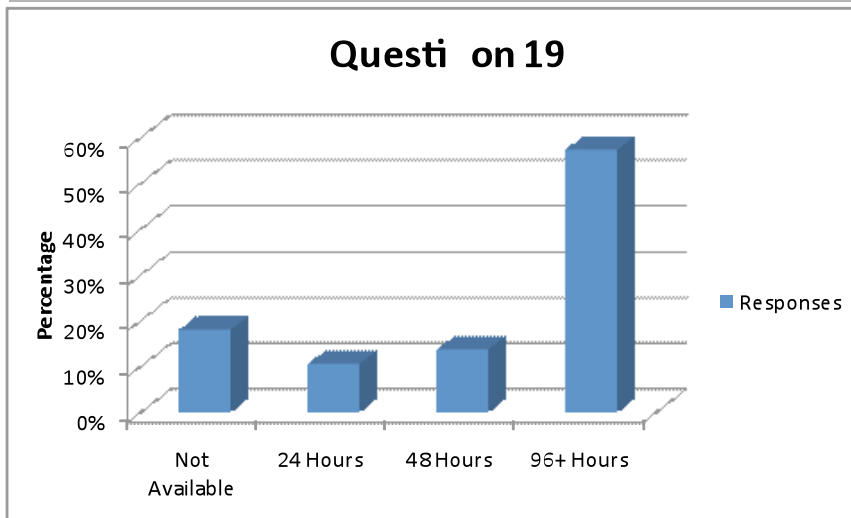
Drinking Water Utility Responses:

	Not Available	24 Hours	48 Hours	96+ Hours
Percentage	15.2%	9.1%	12.5%	63.3%



Wastewater Utility Responses:

	Not Available	24 Hours	48 Hours	96+ Hours
Percentage	18.1%	10.6%	13.8%	57.5%

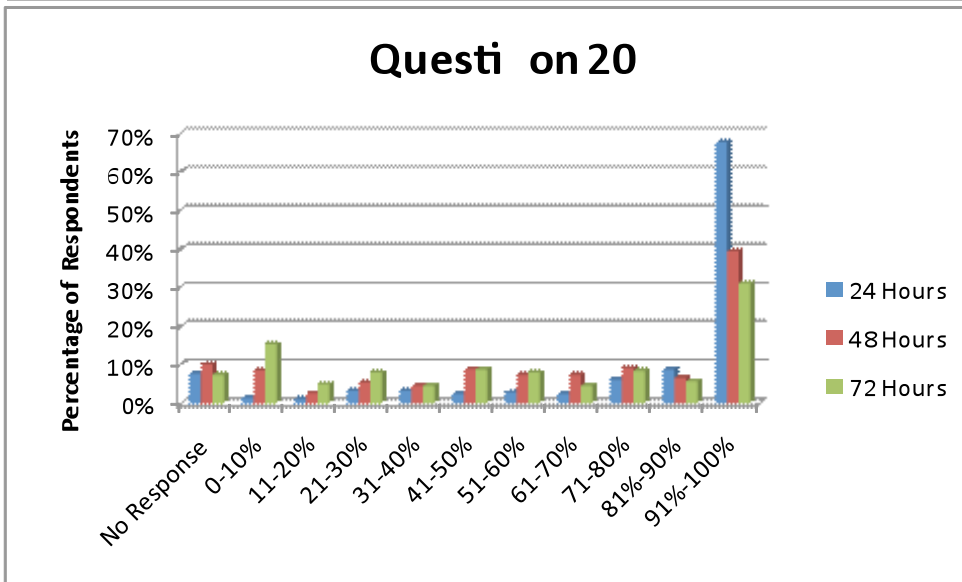


Measure 20: Percent of utilities that can meet minimum daily demand with their primary production/treatment plant non-functional.

Question 20: What percent of minimum daily demand can your utility meet (approaches to meet minimum daily demand could include use of stored finished water, arrangements with alternative finished water supply sources, etc) with your primary production/treatment plant shut down for: 24 hours, 48 hours, 72 hours.

Drinking Water Utility Responses:

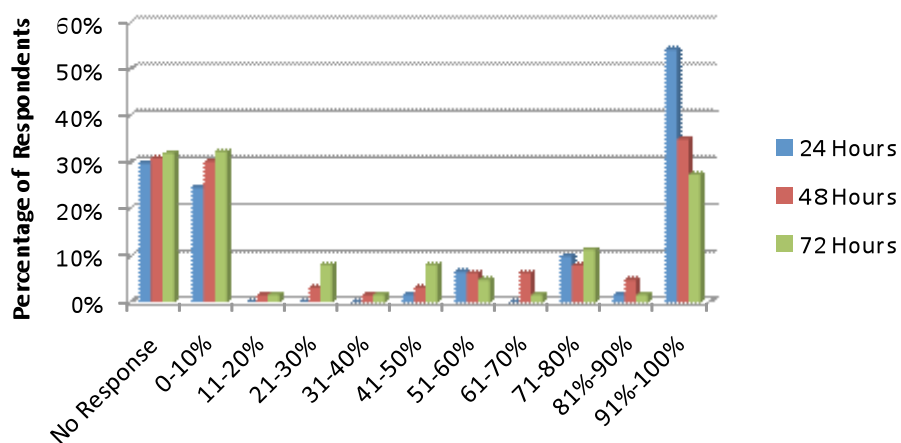
	No Response	0-10%	11-20%	21-30%	31-40%	41-50%
24 Hours	7.7%	1.5%	1.1%	3.3%	3.3%	2.6%
48 Hours	10.1%	8.5%	2.7%	5.4%	4.6%	8.9%
72 Hours	7.4%	15.4%	5.0%	8.1%	4.6%	8.9%
	51-60%	61-70%	71-80%	81%-90%	91%-100%	
24 Hours	2.9%	2.6%	6.3%	8.8%	67.7%	
48 Hours	7.3%	7.3%	9.3%	6.6%	39.4%	
72 Hours	8.1%	4.6%	8.5%	5.8%	31.2%	



Wastewater Utility Responses:

	No Response	0-10%	11-20%	21-30%	31-40%	41-50%
24 Hours	29.8%	24.6%	0.0%	0.0%	0.0%	1.6%
48 Hours	30.9%	30.2%	1.6%	3.2%	1.6%	3.2%
72 Hours	31.9%	32.3%	1.6%	8.1%	1.6%	8.1%
	51-60%	61-70%	71-80%	81%-90%	91%-100%	
24 Hours	6.56%	0.00%	9.84%	1.64%	54.10%	
48 Hours	6.35%	6.35%	7.94%	4.76%	34.92%	
72 Hours	4.84%	1.61%	11.29%	1.61%	27.42%	

Question 20

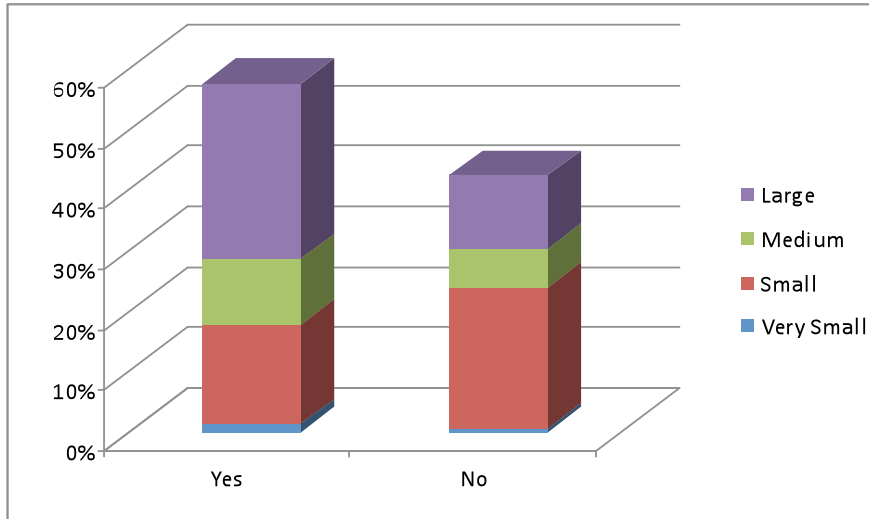


Measure 21: Number and percentage of utilities that have plans to handle communications during a crisis.

Question 21: Do you have a crisis communication plan?

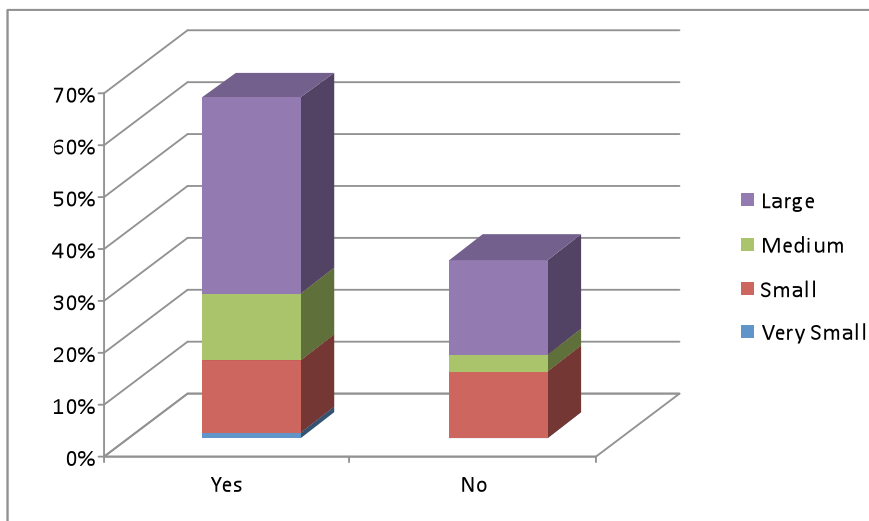
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.4%	16.5%	10.8%	29.0%	57.6%
No	0.7%	23.2%	6.4%	12.1%	42.4%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.1%	14.0%	12.9%	37.6%	65.6%
No	0.0%	12.9%	3.2%	18.3%	34.4%

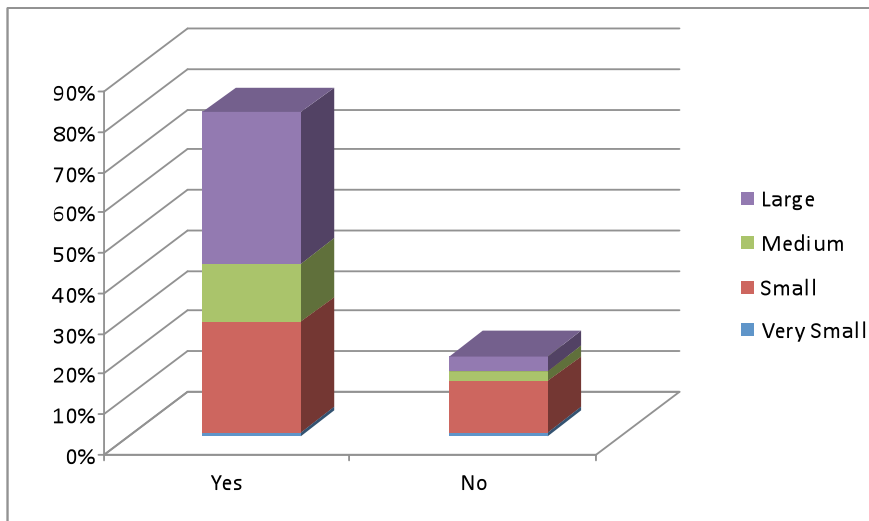


Measure 22: Number and percentage of utilities that engage in networking activities regarding emergency preparedness and collaborative response in the event of an incident.

Question 22: Do you engage in networking activities regarding emergency preparedness and collaborative response to be used in the event of an incident?

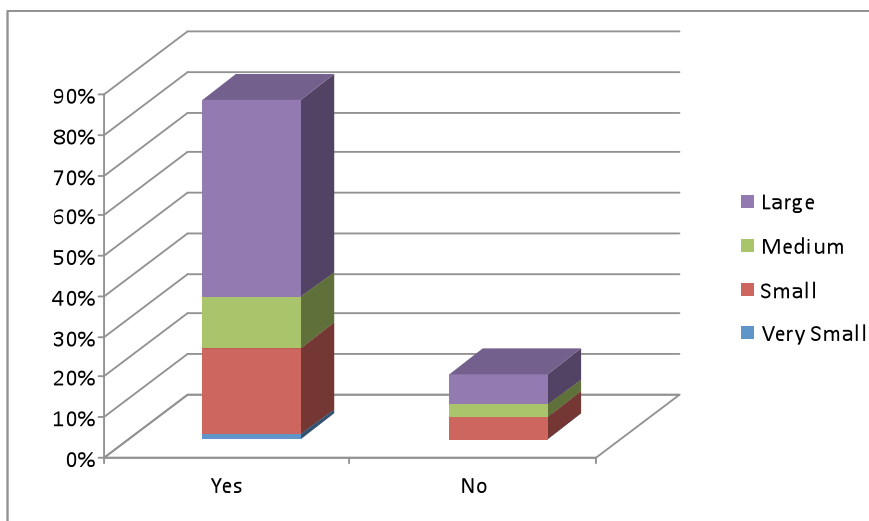
Drinking Water Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.0%	27.3%	14.5%	37.4%	80.1%
No	1.0%	12.5%	2.7%	3.7%	19.9%



Wastewater Utility Responses:

	Very Small	Small	Medium	Large	Total
Yes	1.1%	21.3%	12.8%	48.9%	84.0%
No	0.0%	5.3%	3.2%	7.5%	16.0%



Attachment B: The Measures and Reporting Questions

Measure 1: Number and percentage of utilities that have integrated security and preparedness into budgeting, training, and manpower responsibilities.

Question 1: Have you integrated security and preparedness into budgeting, training, and manpower responsibilities (Y/N)?

Measure 2: Number and percentage of utilities that incorporate security into planning and design protocols applying to all assets and facilities.

Question 2: Have you incorporated security into planning and design protocols applying to all assets and facilities (Y/N)?

Measure 3: Number and percentage of utilities that routinely conduct supplemental monitoring or more in-depth analysis beyond what is required to identify abnormal water quality conditions.

Question 3: Do you routinely conduct supplemental monitoring or more in-depth analysis beyond what is required to identify abnormal water quality conditions (Y/N)?

Measure 4: Number and percentage of utilities that have established relationships with public health networks to interpret public health anomalies for the purposes of identifying waterborne public health impacts.

Question 4: Have you formed established relationships with public health networks to interpret public health anomalies for the purposes of identifying waterborne public health impacts (Y/N)?

Measure 5: Number and percentage of utilities that monitor and evaluate customer complaints for possible indications of water quality or other security threats.

Question 5: Do you monitor and evaluate customer complaints for possible indications of water quality or other security threats (Y/N)?

Measure 6: Number and percentage of utilities that have established protocols (e.g., consequence management plans) for interpreting and responding to indications of water quality anomalies.

Question 6: Have you established protocols for interpreting and responding to indications of water quality anomalies (Y/N)?

Measure 7: Number and percentage of utilities that annually review and periodically update vulnerability assessments.

Question 7: Do you review your vulnerability assessment (VA) annually (Y/N)? How frequently do you update your VA to adjust for changes in your system that may

alter the risk profile of your utility? (Never update; annually; every 2-3 years; every 3-5 years; every 5-10 years; no defined cycle)?

Measure 8: Number and percentage of utilities that receive screened, validated, and timely (e.g., in time to inform decisions or take action) threat information from one or more trusted sources such as WaterISAC, the FBI, local police, or DHS.

Question 8: Does your utility receive screened, validated, and timely (e.g., in time to inform decisions or take action) security threat information from one or more of the following sources (Y/N)?

Please check all that apply.

- WaterISAC
- FBI
- Local police
- DHS

Measure 9: Number and percentage of utilities that have a plan in place to increase utility security in response to a threat.

Question 9: Do you have a plan in place to increase utility security in response to a threat (Y/N)?

Measure 10: Percent of critical assets with enhanced capability to detect intruders.

Question 10: What percent of your critical assets are protected by enhanced detection capability?

Measure 11: Number and percent of utilities with physical and/or procedural controls in place to safeguard hazardous chemicals.

Question 11: If you use hazardous chemicals, do you have physical or procedural controls in place to safeguard them(Y/N)?

If yes, do they include some or all of the following? (Please identify all that apply)

- A. Restrict Area Perimeter. Have you secured and do you monitor the perimeter of areas containing hazardous chemicals (Y/N)?
- B. Screen and Control Access. Have you controlled access to restricted areas within the facility by screening and/or inspecting individuals and vehicles as they enter (Y/N)?
- C. Shipping, Receipt, and Storage. Do you secure and monitor the shipping, receipt, and storage of hazardous materials for the facility (Y/N)?
- D. Elevated Threats. Do you escalate the level of protective measures for periods of elevated threat (Y/N)?
- E. Other physical or procedural controls (Y/N)? (Please specify)

Measure 12: Number and percentage of utilities that include gaseous chlorine in their hazardous chemicals use.

Question 12: If you use hazardous chemicals, does your chemical use include gaseous chlorine (Y/N)?

Measure 13: Number and percentage of utilities that have evaluated their disinfection methods considering water quality, public health, and security issues.

Question 13: Have you evaluated your disinfection methods considering water quality, public health, and security issues (Y/N)?

Measure 14: Number and percentage of utilities that have a written business continuity plan.

Question 14: Do you have a written business continuity plan (Y/N)?

Measure 15: Number and percentage of utilities that:

- **Have an emergency response plan (ERP)**
- **Conduct training on their ERP**
- **Carry out exercises on their ERP**
- **Review and update their ERP on a periodic basis**

Questions 15: Do you have an emergency response plan (ERP) (Y/N)?

If yes, do you:

- Conduct training on the ERP
- Carry out exercises on the ERP
- Review and update the ERP on a periodic basis

Measure 16: Number and percentage of utilities that have adopted the National Incident Management System (NIMS).

Question 16: Has your utility adopted the National Incident Management System (NIMS) (Y/N)?

Measure 17: Number and percentage of utilities that are signatories, or are in the process of becoming signatories, to written agreements for requesting aid or assistance, such as a mutual aid or assistance agreement or a Water/Wastewater Agency Response Network (WARN) membership.

Question 17: Is your utility a signatory to written agreements for requesting aid or assistance, such as a mutual aid or assistance agreement or Water/Wastewater Agency Response Network (WARN) membership (Y/N)?

If no, are you in the process of creating an agreement (Y/N)?

Measure 18: Number and percentage of utilities that have responded to an emergency request to provide mutual aid and assistance.

Question 18: Has your utility responded to an emergency request to provide mutual aid and assistance (Y/N)?

Measure 19: Percent of utilities that have backup power for critical operations.

Question 19: Does your utility have backup power for critical operations for:

- 24 hours?
- 48 hours?
- 96 hours?

Measure 20: Percent of utilities that can meet minimum daily demand with their primary production/treatment plant non-functional.

Question 20: What percent of minimum daily demand can your utility meet with your primary production/treatment plant non-functional for:

- 24 hours?
- 48 hours?
- 96 hours?

Measure 21: Number and percentage of utilities that have plans to handle communications during a crisis.

Question 21: Do you have a crisis communication plan (Y/N)?

Measure 22: Number and percentage of utilities that engage in networking activities regarding emergency preparedness and collaborative response in the event of an incident.

Question 22: Do you engage in networking activities regarding emergency preparedness and collaborative response to be used in the event of an incident (Y/N)?

Attachment C: Measures and Reporting Background, Methodology, and Data Limitations

Background and Purpose

Drinking water and wastewater systems are critical to the security of the United States, delivering needed drinking water supplies and wastewater collection and treatment services to millions of Americans. They support the many vital services, such as fire suppression, that rely on a stable supply of water. An attack or even a credible threat of an attack on water infrastructure could seriously jeopardize the public health and economic vitality of a community.

The water sector developed the measures in this report over a period of several years. The measures are intended to indicate the sector's progress in protecting this vital infrastructure. Representatives of individual utilities, drinking water and wastewater associations, and Federal and State government officials cooperated to develop the 22 utility measures and a reporting approach to gather the data in support of each measure. The sector also created additional measures proposed for utility self-assessment purposes. Self-assessment measures are available for utility internal use; they are not connected to national reporting.

The U.S. Department of Homeland Security (DHS) has asked the nation's 18 key sectors of infrastructure to develop measures of sector security. The water sector began working on this effort in 2005 and was the first sector to develop and roll out reporting on measures, ahead of requests from DHS. DHS is using the water sector's methodology and process for developing a model for other sectors.

Reporting Methodology

The WaterISAC served as the host for the secure, on-line tool for utilities to report on the measures. The reporting tool included questions for utilities on their performance on each of the water sector measures. Respondents provided contact information and received a unique PIN. Respondents used their PIN to access and respond to the on-line questions.

Respondents provided attribute data (state/territory location, population served/size, utility type, and source/receiving water) before providing responses to the 22 utility questions and their sub-questions. Respondents needed to provide an answer to all 22 questions to submit their answers. After respondents completed and submitted their responses, the reporting tool directed them to the optional self-assessment questions.

The reporting tool provided definitions of key terms used in the questions with the goal of clarifying question intent and creating more consistency in utility responses. A group of volunteer utility managers beta tested the definitions, the questions, and the reporting tool prior to reporting tool roll out to the sector. A technical assistance hotline supported the reporting process. The reporting tool administrators received very few (less than 10) calls.

Respondents submitted their data through an online website, and the data were captured in a back end data base. When the reporting period closed, the reporting tool administrators transferred the data to Excel for analysis. An independent contractor conducted the data analysis for the WaterISAC.

Data Limitations

Combined, the respondents serve between 15 and 133 million drinking water customers and between 6 and 55 million wastewater customers in the U.S. As a voluntary reporting effort, all respondents were self-selected.

Strict data management rules, designed to address concerns about potential security sensitive information, guided the data analysis and display of results. The rules, in particular, limit data aggregation by utility attribute to ensure displays with fewer than five respondents were not created. These rules were designed to prevent a data sort from inadvertently revealing the identity of an individual utility. Consistent with these rules, the number of responses per state has prohibited data aggregation by state and size of utility. The sector had anticipated and discussed this potential limitation.

In addition to the specific measures, the sector also developed recommendations for how data on the measures would be reported.

- Reporting of data will be voluntary.
- All water and wastewater utilities (and combined utilities) of all sizes and types will be invited to report.
- Reporting will be at no cost to the utility.
- Data transmission and storage will be secure.
- PIN codes will be kept confidential to protect the identity of reporters.
- Progress data submitted by individual utilities will be protected from public disclosure (i.e., Freedom of Information Act or FOIA requests).
- Data will be released to the public at the national level only in aggregate form.
- Data will be submitted to EPA anonymously through a third party in aggregated form.

- State location, population served (size), utility type (drinking water, wastewater, combined), and utility source/receiving water type should be collected as attribute data.
- Specific requirements for data banding and/or other data management rules will protect inappropriate combinations/reporting of attribute data (to protect the identity of individual utilities).
- The third party will include a non-disclosure agreement in the utility reporting tool, indicating that the identity of participating utilities will not be released or shared with other parties without the express permission of the individual utility.

The reporting tool and all subsequent data management have operated in strict accordance with these requirements.