



February 1, 2017
Questar Gas
IRP Workshop

IRP 2017 Schedule

- February 1, 2017 – Workshop
- February 28, 2017 – Workshop
- April 20, 2017 – Workshop
- June 27, 2017 – Technical Conference

Agenda

- Merger Integration Update
- Review of the 2016 Commission IRP Order
- IRP Standards and Guidelines
- 2016 Appliance Survey
- January 6, 2017 Weather Event

Review of the 2016 Commission IRP Order

- “We encourage Questar to continue to monitor and report on the heat pump trends in its jurisdiction and their impacts on peak demand and cost recovery.”
- “We direct the Natural Gas DSM Advisory Group to collaborate with Questar to explore whether opportunities exist for one or more DSM pilot programs that might alleviate peak demand.”

IRP Standards and Guidelines (2009)

Guideline	Update
Review latest quarterly variance report	April meeting
Changes to customer growth models	No significant changes
Changes to linear programming optimization (LPO) model (SENDOUT)	No significant changes
Changes to DSM models	No significant changes
Supply/demand forecasts, SENDOUT and DSM results	IRP Report
Gas quality and gas storage issues	1. Appliance Survey 2. February 28 th meeting
Changes to Gas Network Analysis (GNA) models	No significant changes
GNA model results	IRP Report
Integrity management issues	IRP Report – Timing of Mega Rule???
Other issues	Scheduled as needed

Appliance Survey Update

2006-2007 Recommendations

- Continue operating within specified Wobbe ranges
- Continue the Green Sticker Program
- Conduct additional residential appliance surveys

Objectives of 2016 Survey

- Survey current appliances and compare results to 2006 survey
- Validate or refine current and future gas quality management strategies

2016 Field Testing

- Service area divided into zones
 1. Utah (consistent with 2006-2007 survey)
 2. Eagle Mountain
 3. Idaho
- Target sample sizes established for each zone
- Customers chosen randomly
- Workshop for technicians to provide guidance on measurement techniques and protocol

Data Collected

■ Appliance information

- Type, manufacturer, model, serial no.
- Installation date
- Date of last service
- Green Sticker (Y/N)
- Nameplate rating (BTU/hr.)
- Air shutter position (if present)

■ Performance data

- Gas flow rate (clock meter)
- Gas manifold pressure
- Flue gas O₂ and CO concentrations
- AGA flame code (flame characteristics)
- Gas composition

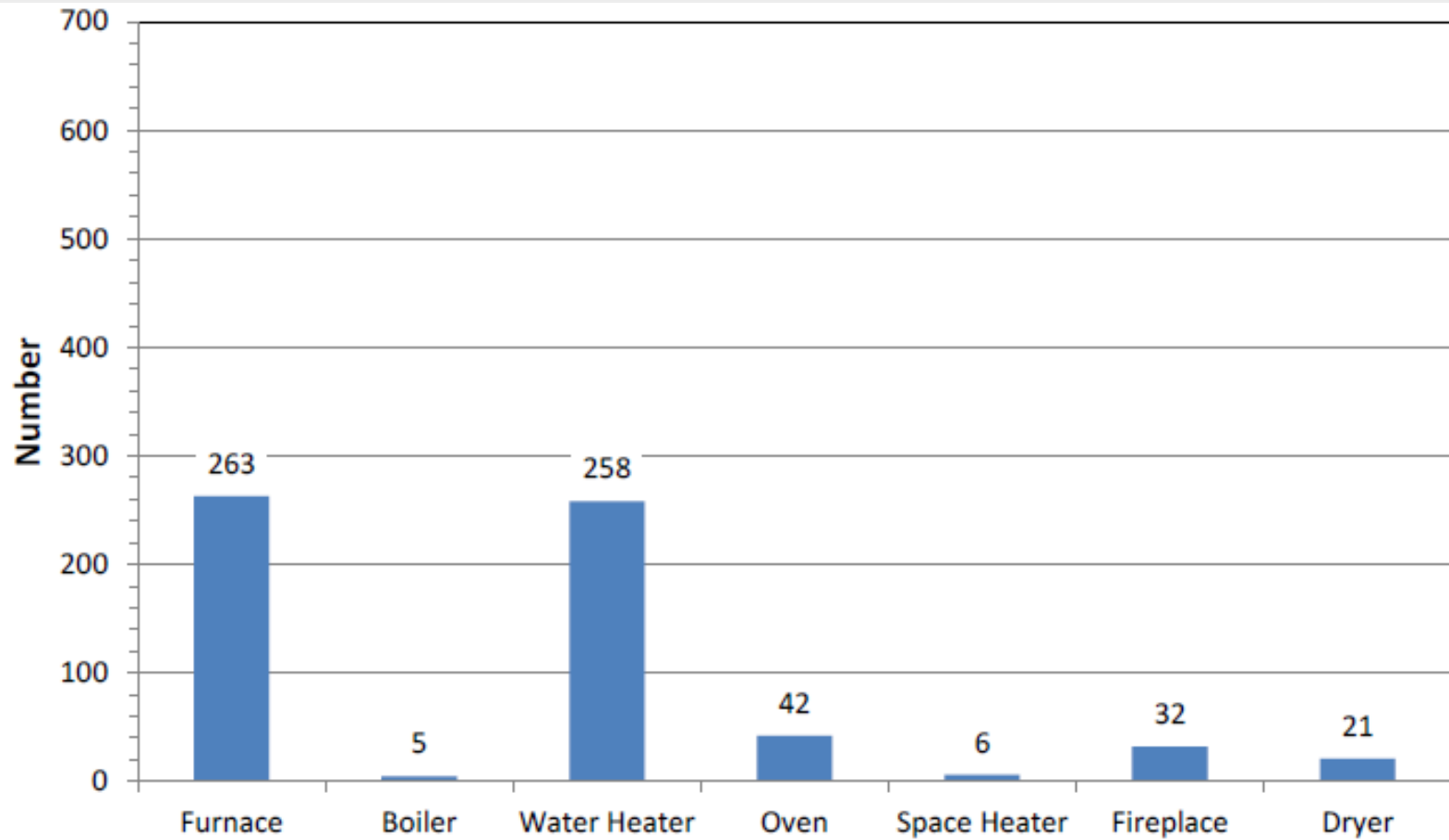


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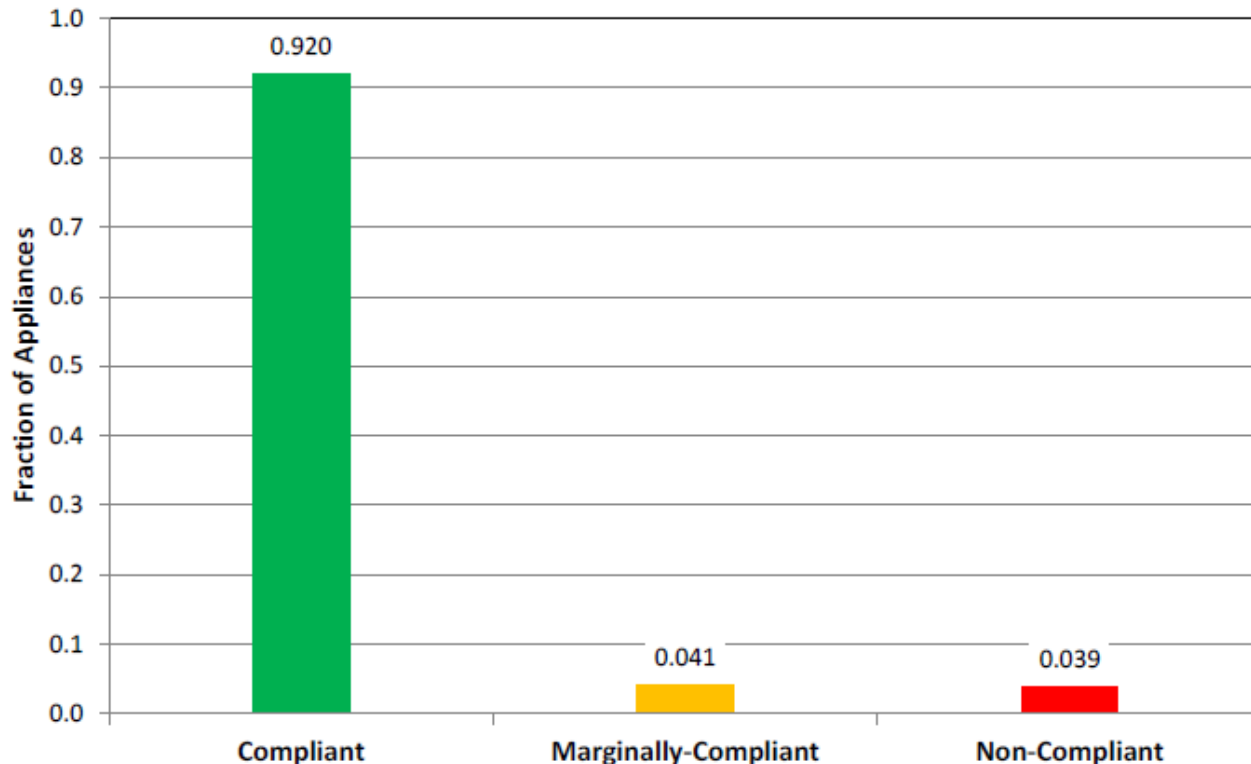
Analysis

- Studied the population of appliances for each zone
- Examined how many exhibited low CO emissions
- Looked at distribution of AGA flame codes
- The results were compared to the limits determined by the NYSEARCH Interchangeability Project Team
 - *This team proposed limits for key appliance population performance parameters. These were based on the experience of local distribution companies and on the interim guidelines established by the Natural Gas Council's Interchangeability Work Group*
- Charts and analysis presented today were prepared by Energy Technology Advancements (ETA) Partners

Utah Appliance Types

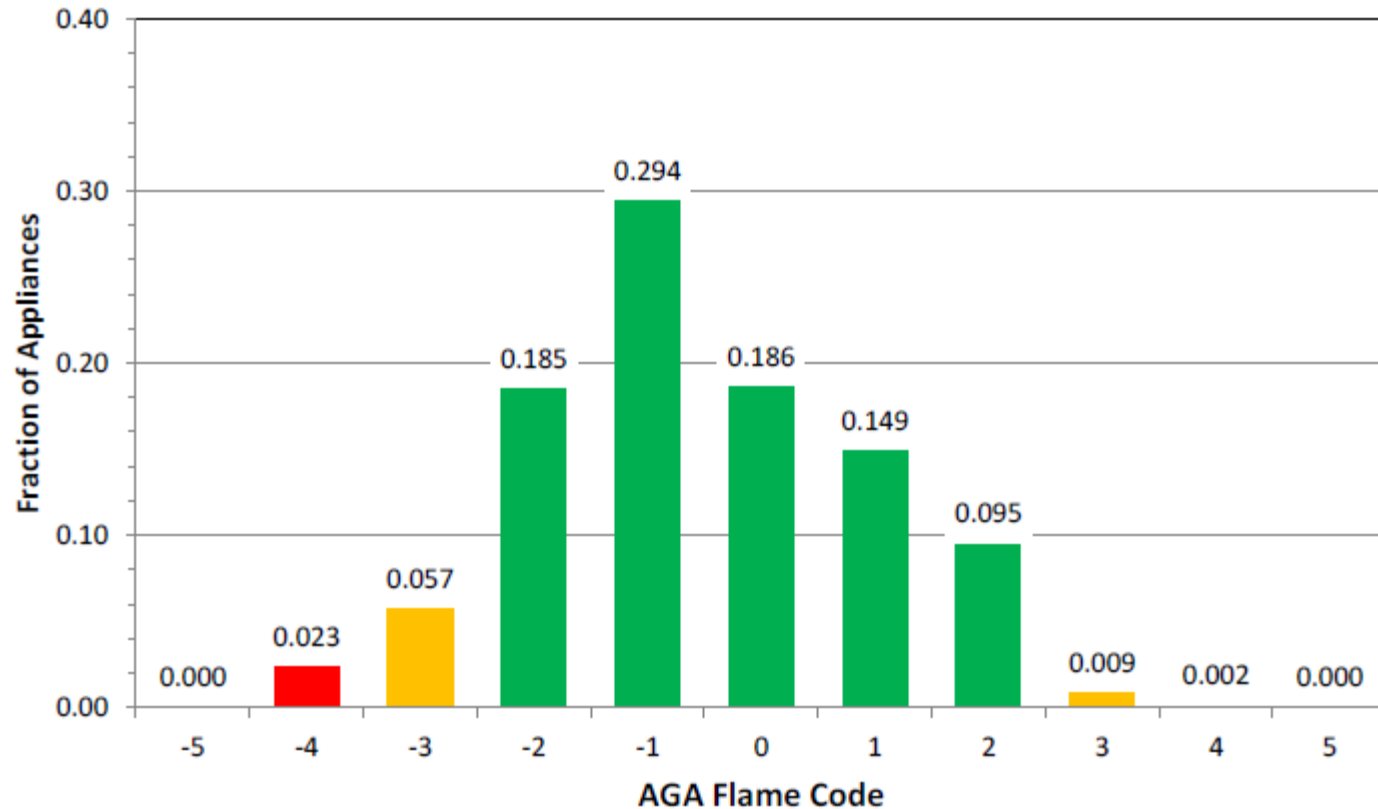


Utah Compliance with CO Limits



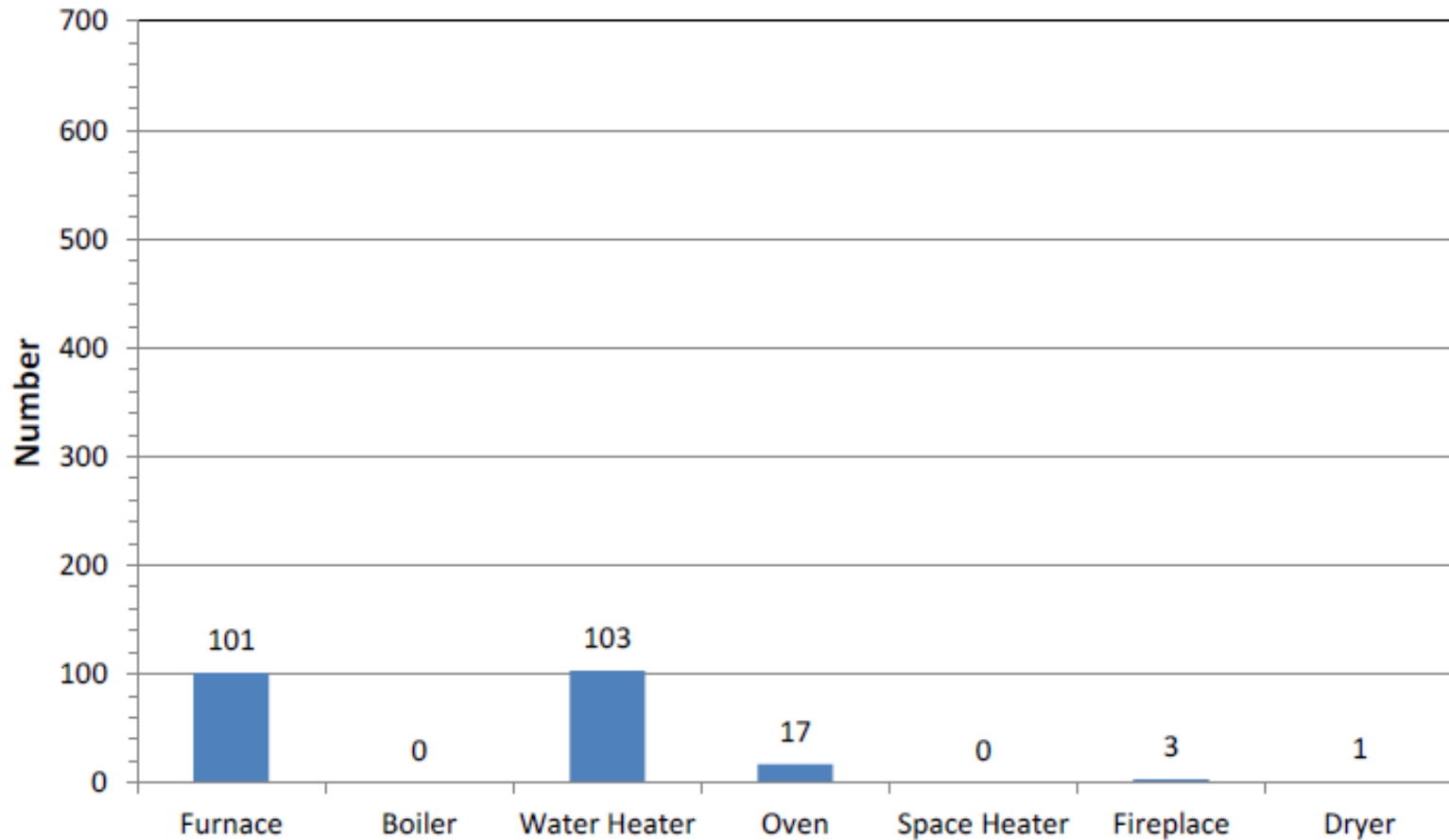
A high percentage of appliances exhibited low CO emissions. Only 3.9% had non-compliant CO emissions. This level is well below the limit (6%) established by the NYSEARCH interchangeability project team

Utah AGA Flame Code

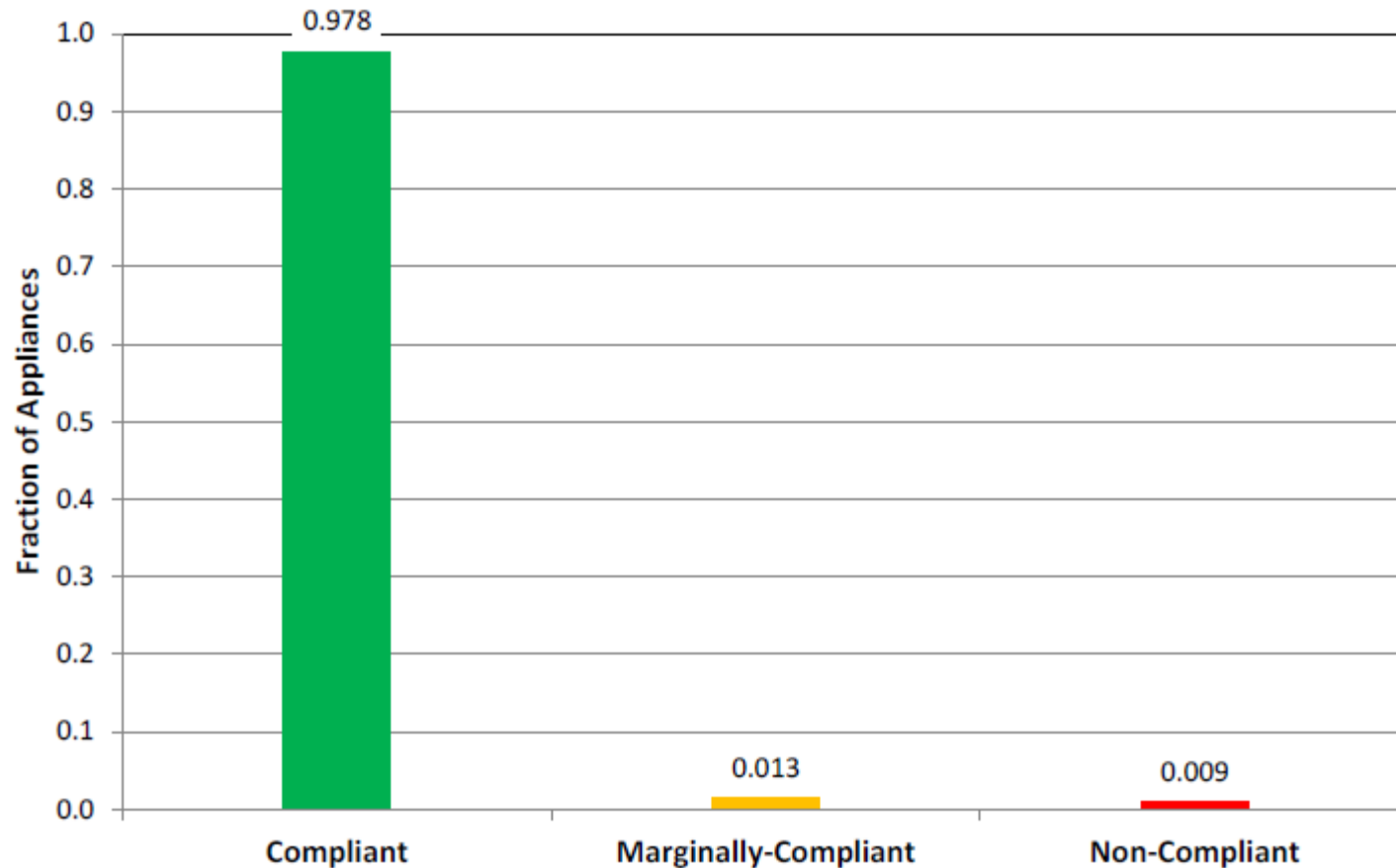


For appliances other than fireplaces, yellow tipping was experienced in 2.3% of the units tested. This level is well below the limit (5%) established by the NYSEARCH team

Eagle Mountain Appliance Types

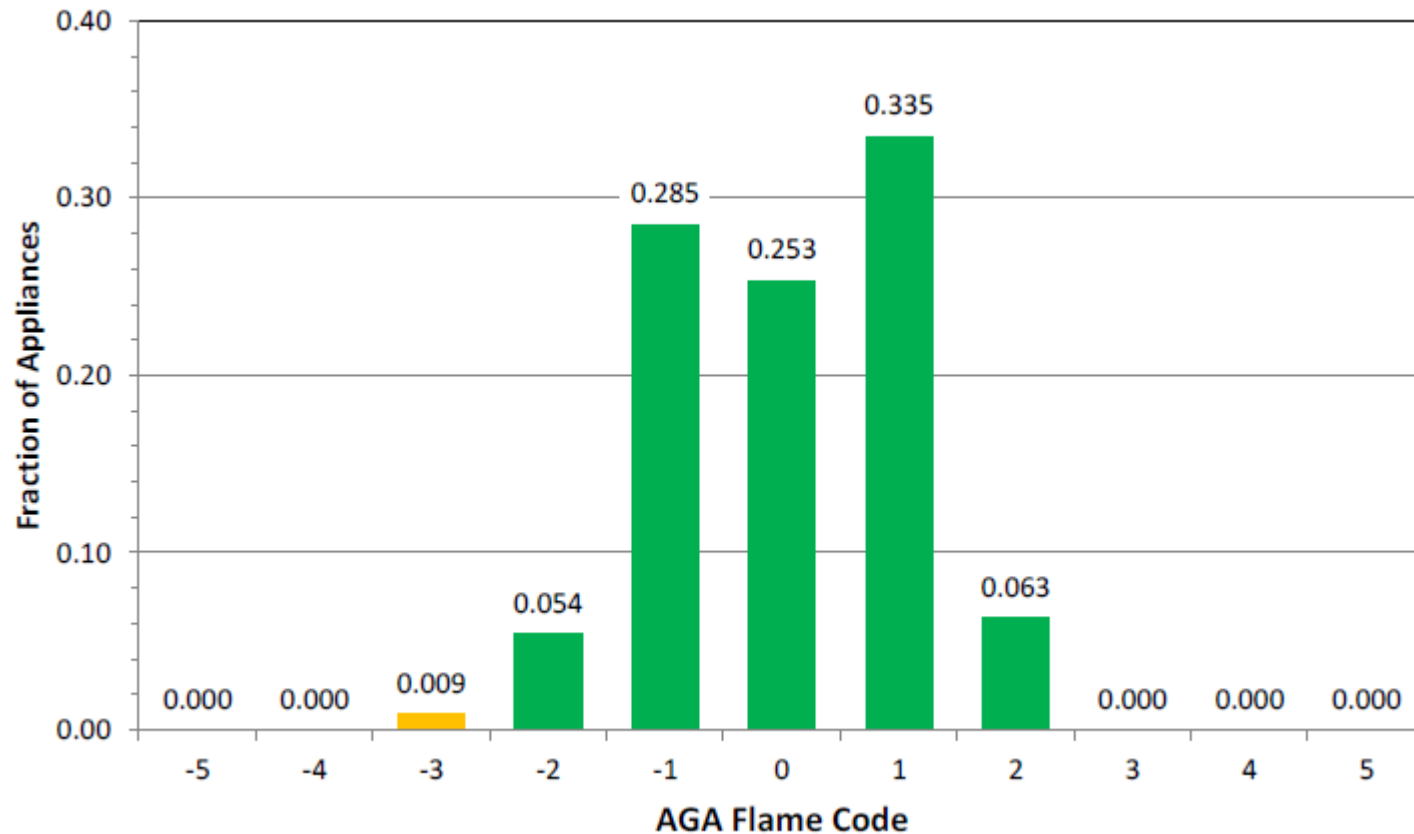


Eagle Mountain Compliance with CO Limits



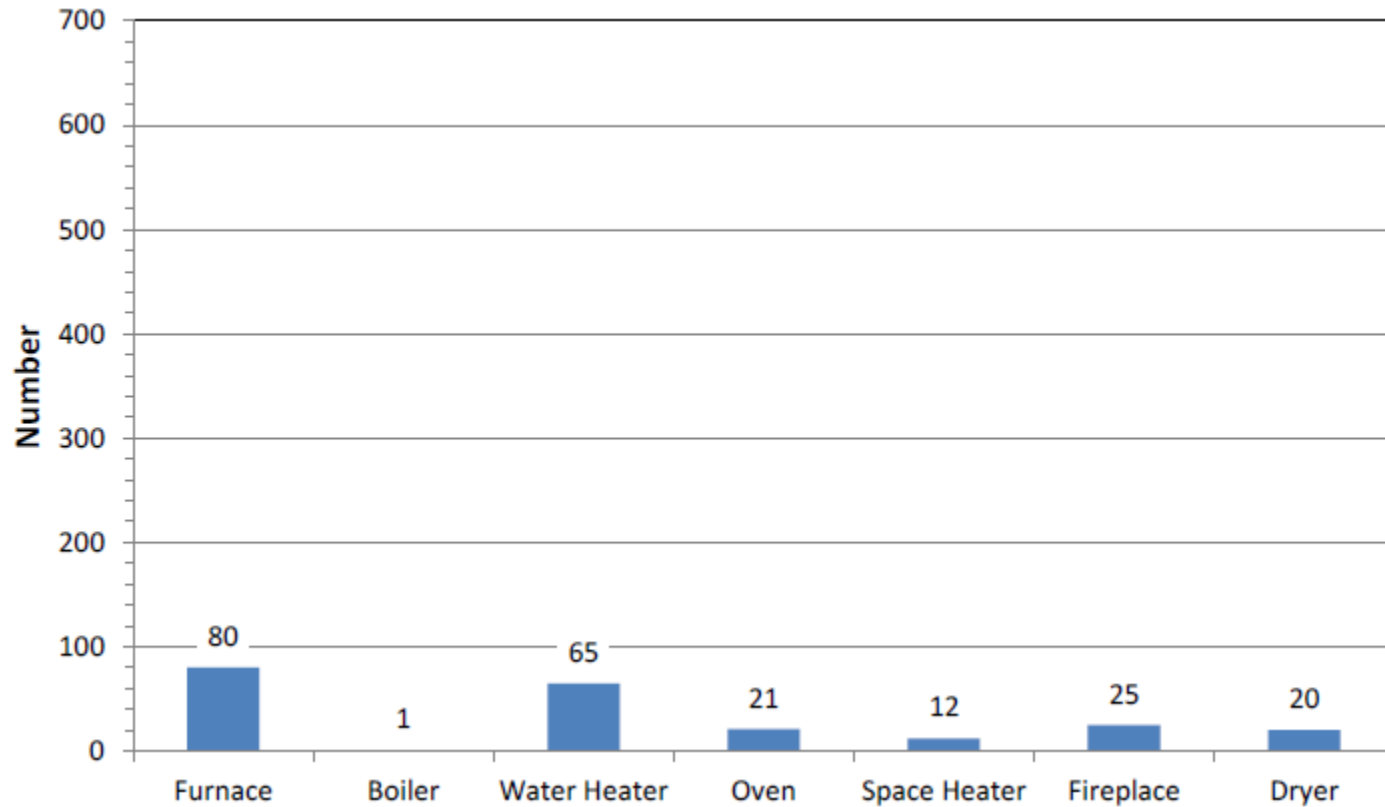
An extraordinarily high percentage of appliances exhibited low CO emissions. Only about 1% had non-compliant CO emissions

Eagle Mountain AGA Flame Code

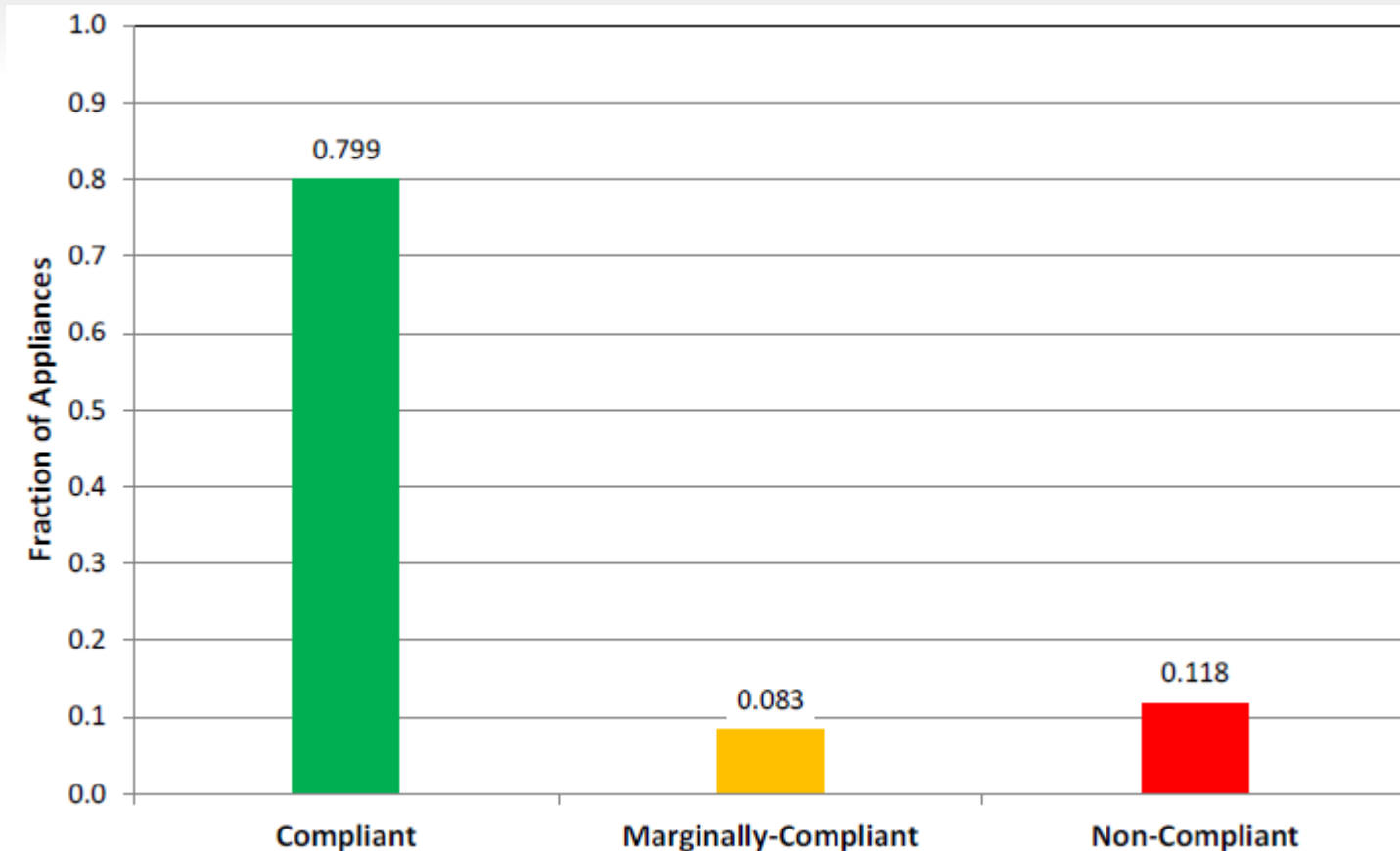


In the Eagle Mountain zone, none of the appliances tested exhibited either lifting or yellow tipping

Idaho Appliance Types

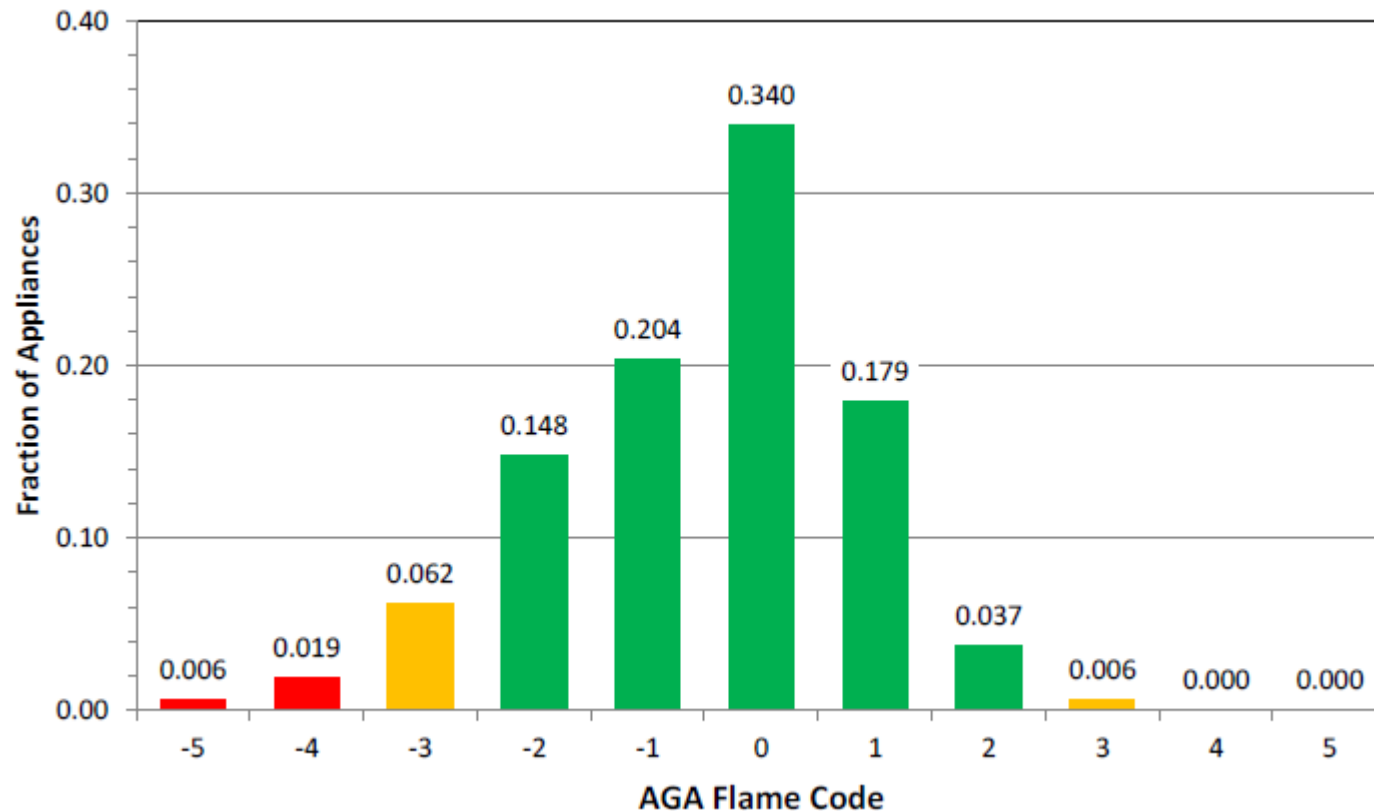


Idaho Compliance with CO Limits



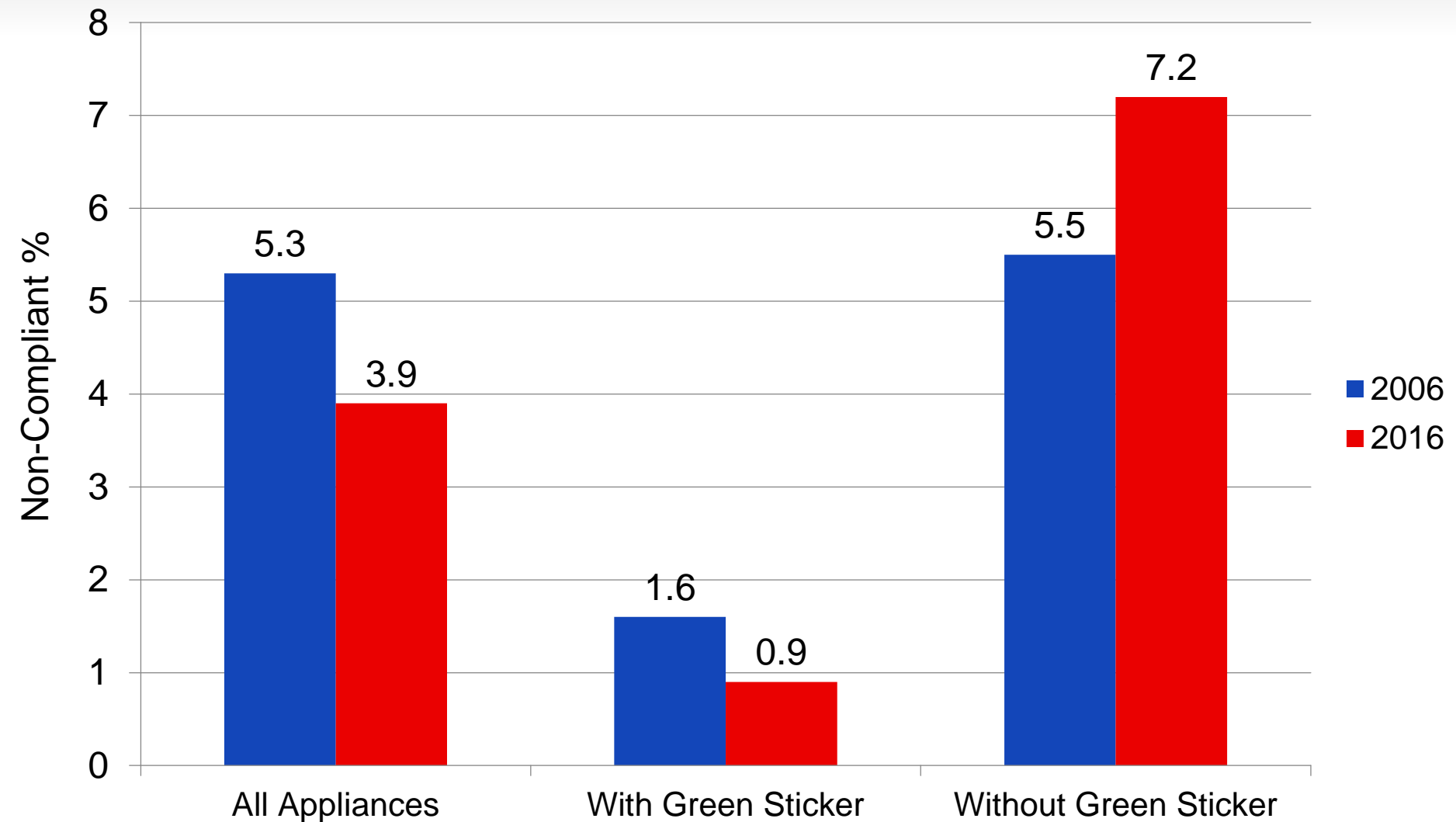
About 12% of the appliances tested had non-compliant CO emissions. This level exceeds the limit established by the NYSEARCH Team

Idaho AGA Flame Code

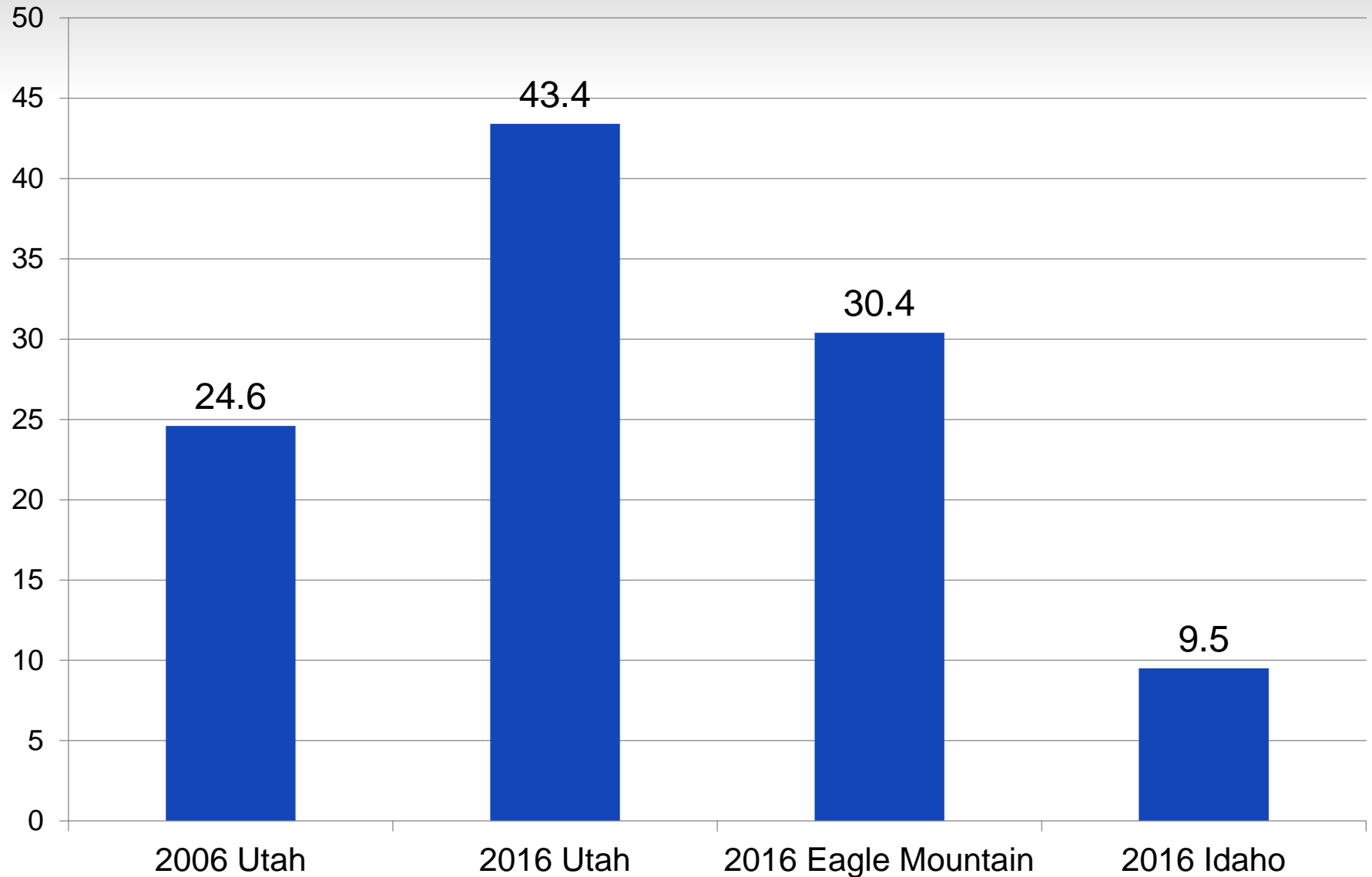


Without fireplaces the percentage experiencing yellow tipping is 3.4%, well below the 5% limit established by the NYSEARCH Team

Comparison of Appliances with Non-Compliant CO Emissions 2006 vs 2016



Percentage of Appliances with Green Sticker



- Nearly 12% of appliances were non-compliant
- Service technician notes indicate that overfiring is the primary cause of elevated CO emissions
- Overfiring is often caused by improper adjustment
 - Incorrect orifice size
 - High gas manifold pressure

Conclusions

- Utah continues to improve
- The Green Sticker program is effective in reducing the percentage of appliances having elevated CO emissions
- Idaho has a higher rate of non-compliant appliances

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Recommendations

- Continue to manage gas supplies within current Wobbe ranges
- Notify commercial, industrial, and power generation customers of any pending, significant gas quality changes
- Continue emphasizing importance of annual inspections
- Initiate proactive measures in Idaho to reduce the percentage of non-compliant appliances.
 - Share the defined “best practice” for appliance installation and inspection with all independent service contractors
 - Consider providing incentives for homeowners to have annual appliance check-ups performed

January 6, 2017 Weather Event

January 6, 2017

Weather Event – Timeline

- Approximately 6:40 AM
 - Received first no-gas call from Coalville
- 7:30 AM
 - Top management notification
- 8:00 AM
 - Activate the Emergency Operating Center
- 8:15 AM
 - Sent out the call for help to Salt Lake, Western, Ogden, Springville, Eastern and Wyoming Regions. Over 100 techs respond over the entire day.

Weather Event – Timeline Continued

- 9:00 AM
 - Contacted County to activate reverse 911 call asking the residents of Coalville to reduce their thermostats by 5 degrees
- 9:44 AM
 - Shut down order for the town of Coalville

Questar Pipeline Meter



Questar Pipeline Meter



Weather Event – Timeline Continued

- 9:00 AM
 - Contacted County to activate reverse 911 call asking the residents of Coalville to reduce their thermostats by 5 degrees
- 9:44 AM
 - Shut down order for the town of Coalville
- 9:58 AM
 - Command center established at Flair Constructions yard
- 10:02 AM
 - North Summit High School selected as location for customers to stay warm; Questar to keep school heated with CNG trailer

Coalville Command Center



Weather Event – Timeline Continued

- 11:00 AM
 - Job Safety Analysis meeting held
- 11:25 AM
 - Started Shut-offs
- 2:06 PM
 - Contacted religious leaders for help finding those that are not home
- 2:30 PM
 - Shut-off of 629 customers completed
- 2:45 PM
 - Gas is turned on at Coalville #1

Weather Event – Timeline Continued

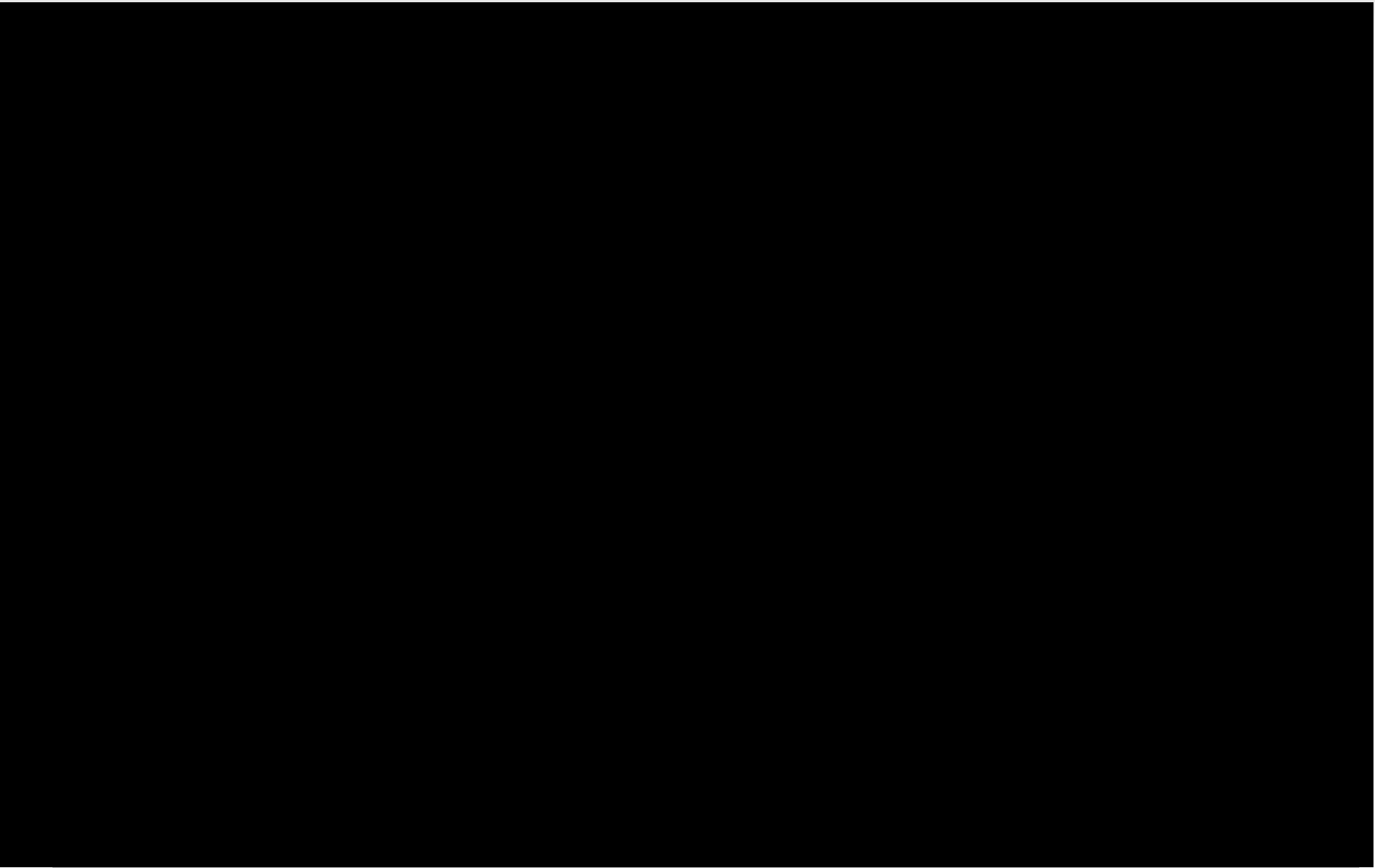
- 2:55 PM
 - Job Safety Analysis meeting held prior to re-light
- 3:10 PM
 - Re-light starts
- 10:00 PM
 - 95% of customers are back in service
- 2:00 AM January 7
 - All customers have gas restored

Telemetry

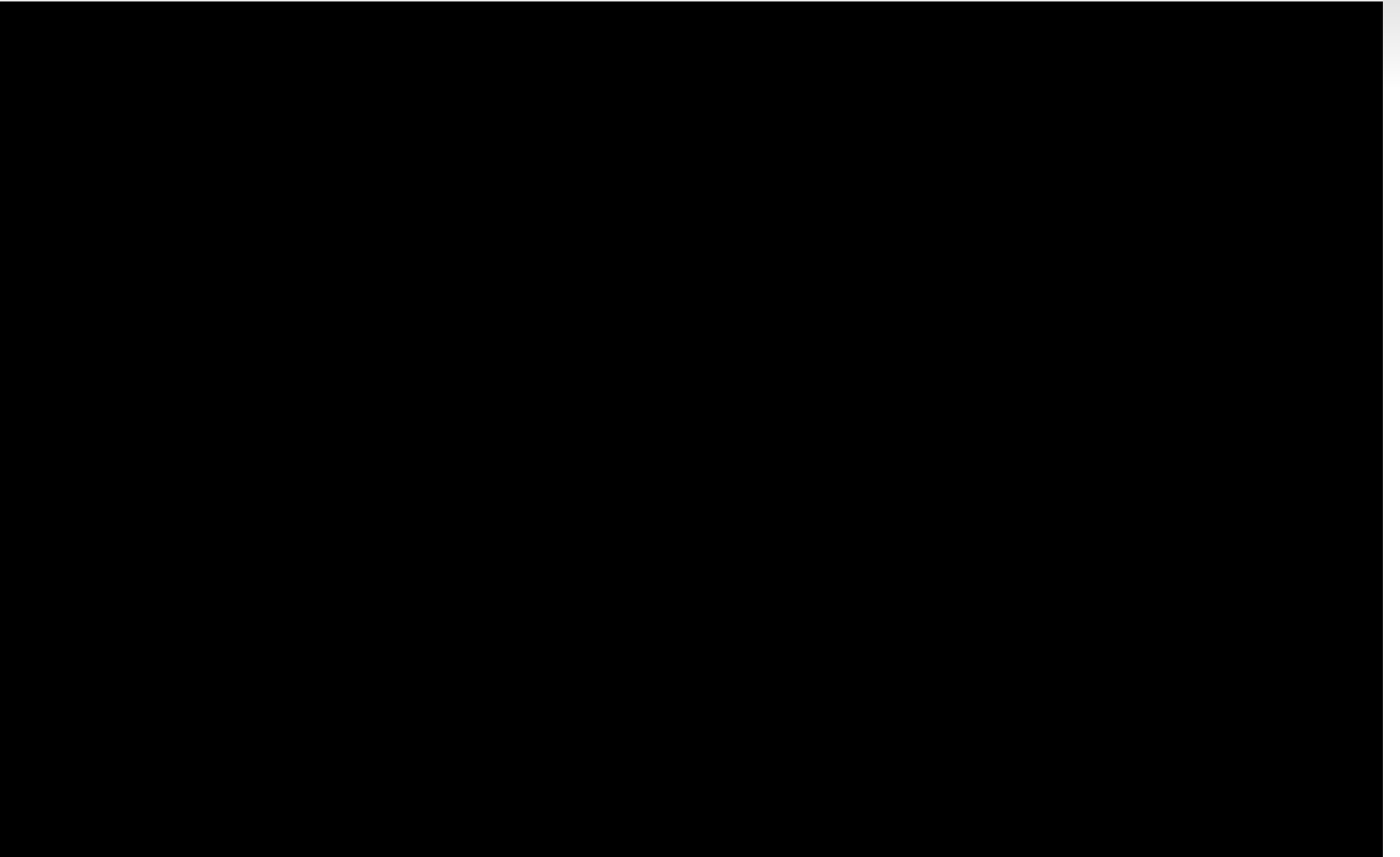


Confidential Information

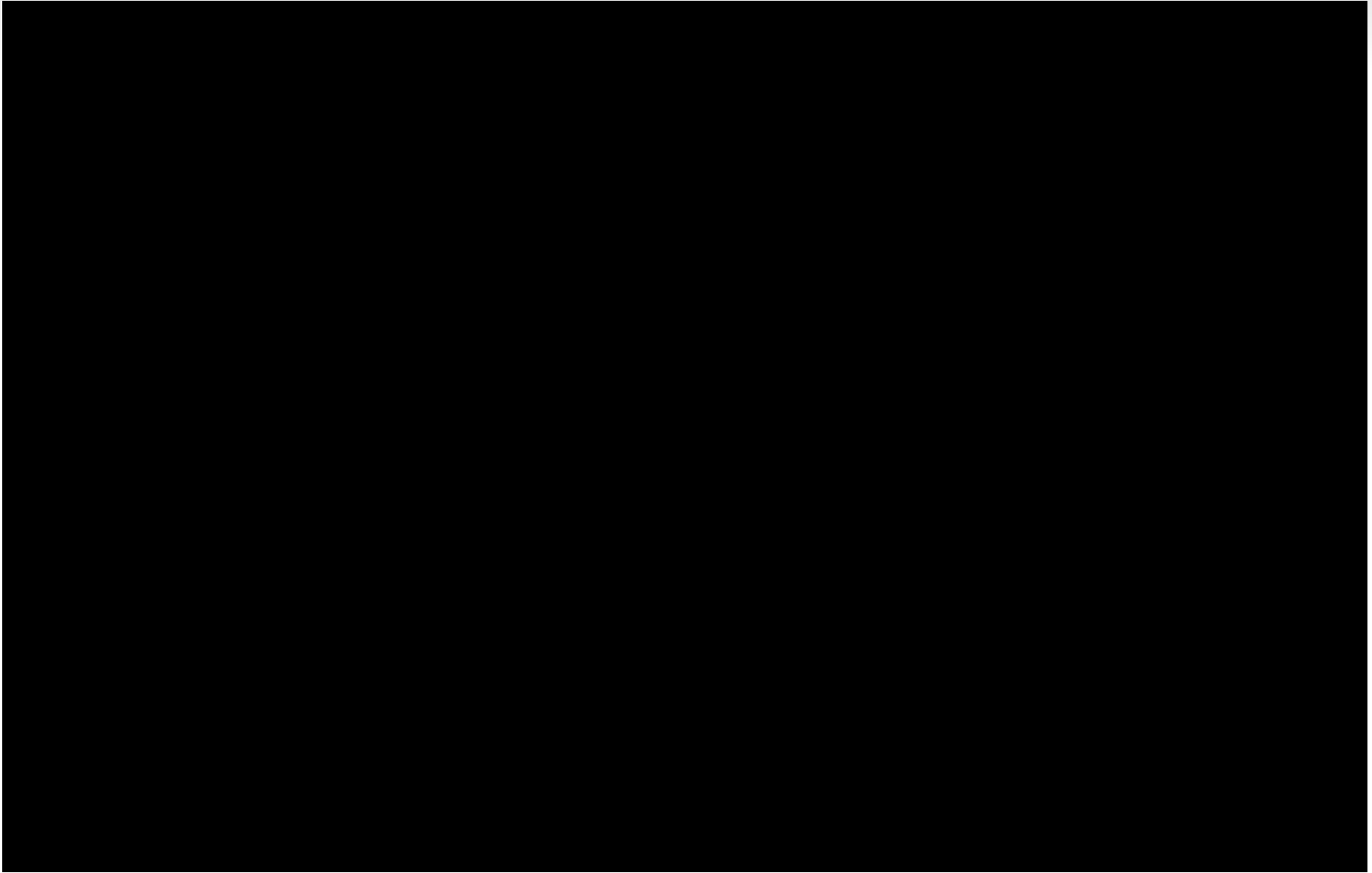
Questar Gas Customer Interruption



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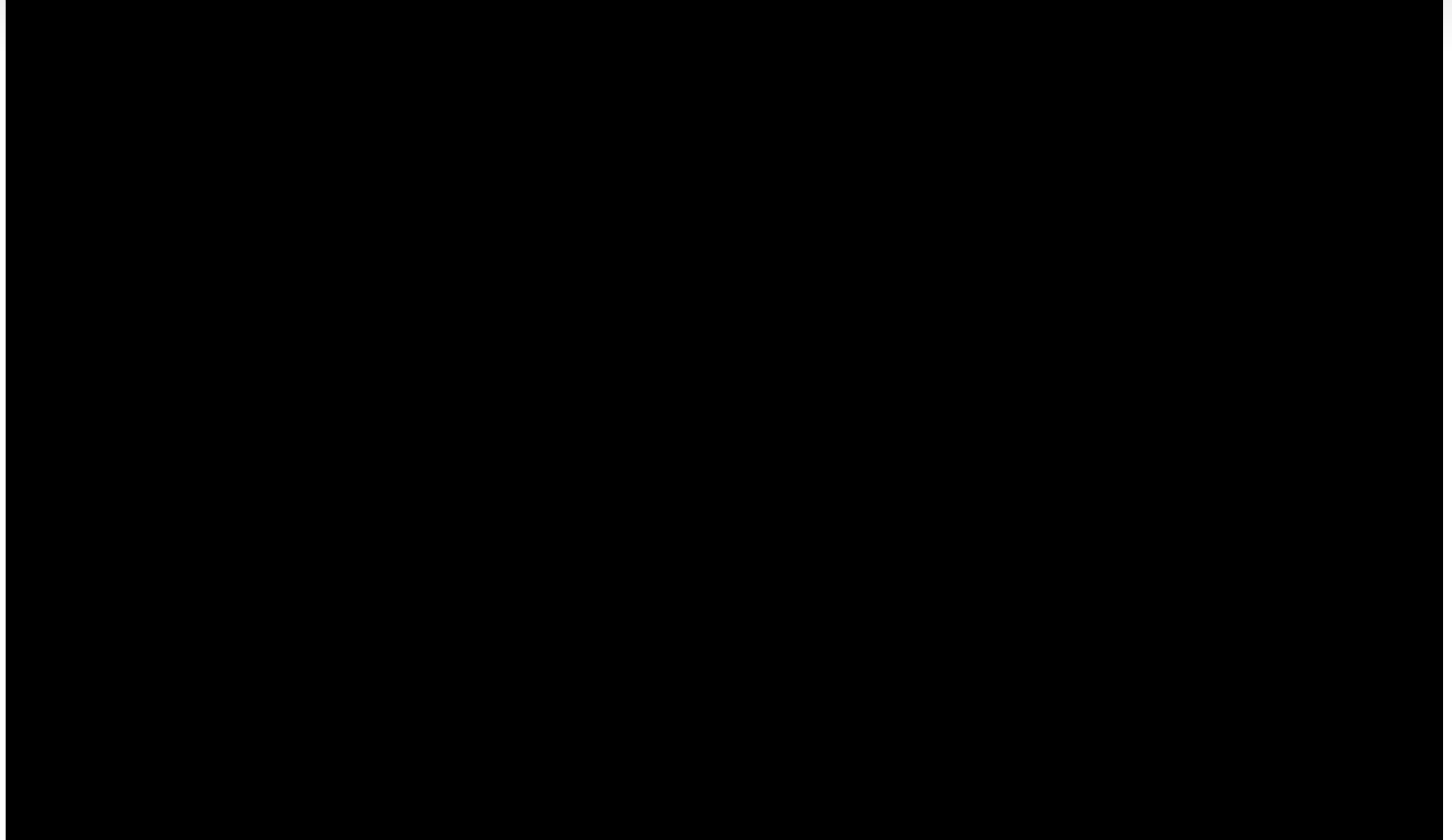
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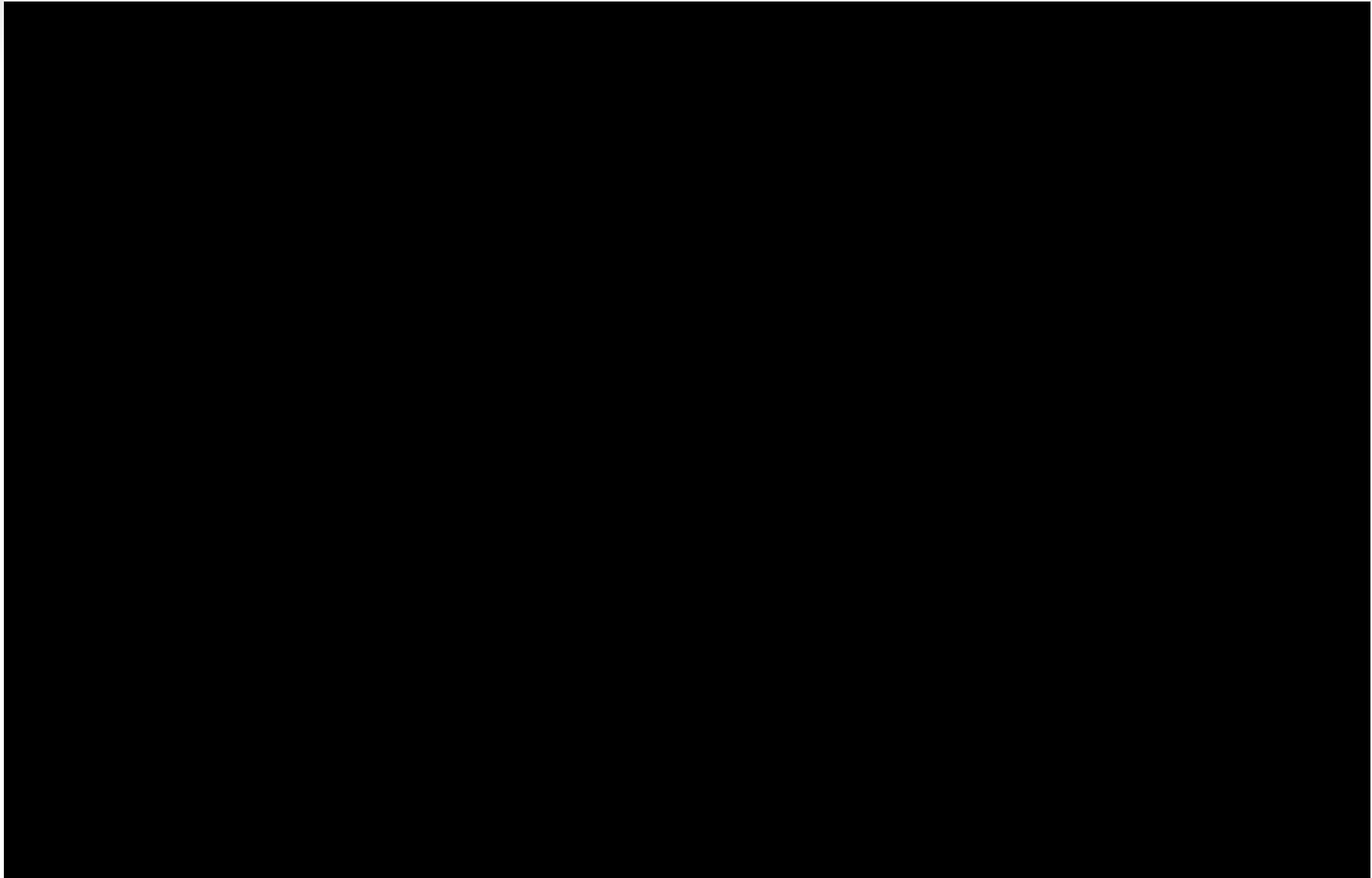
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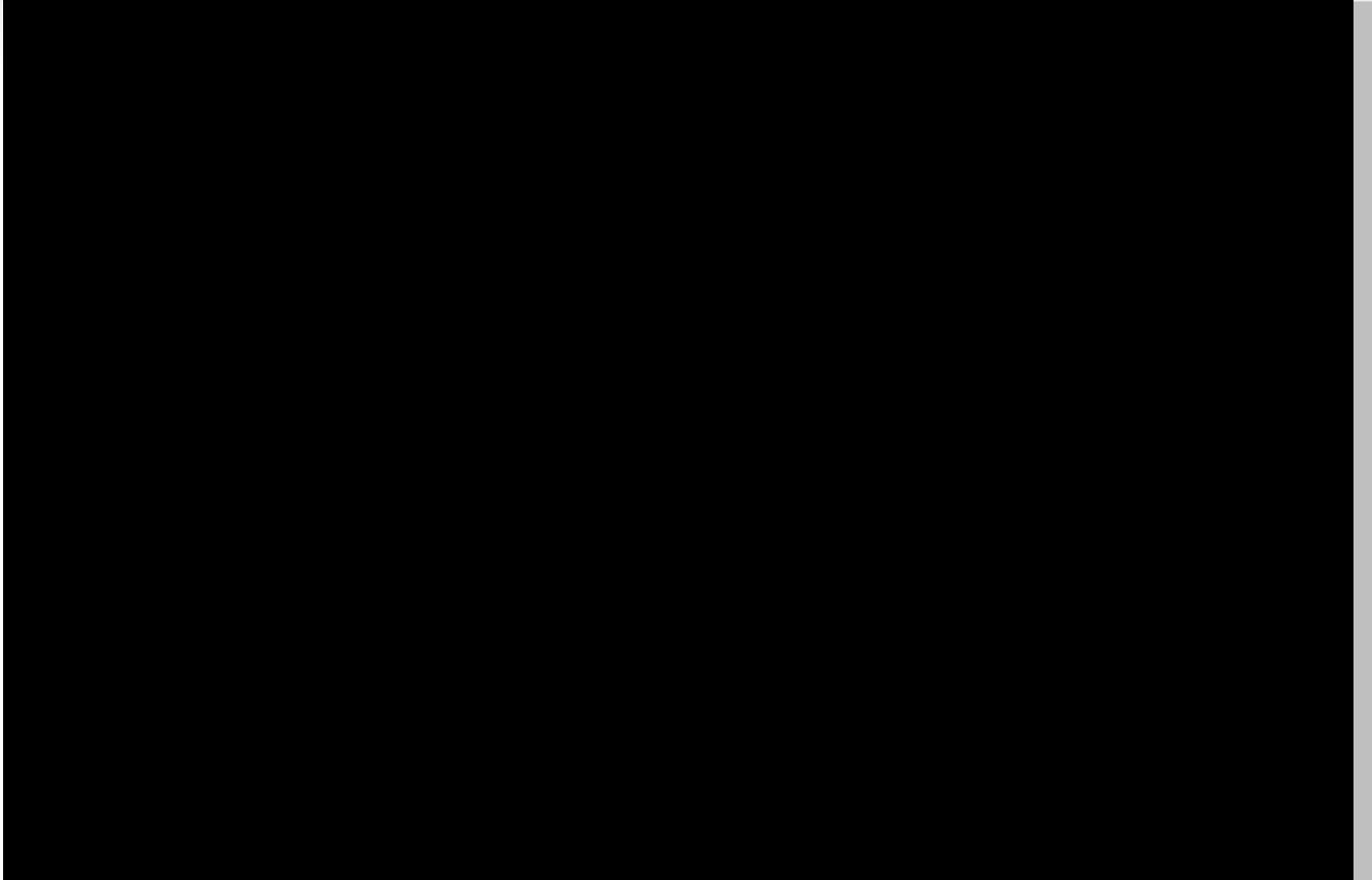
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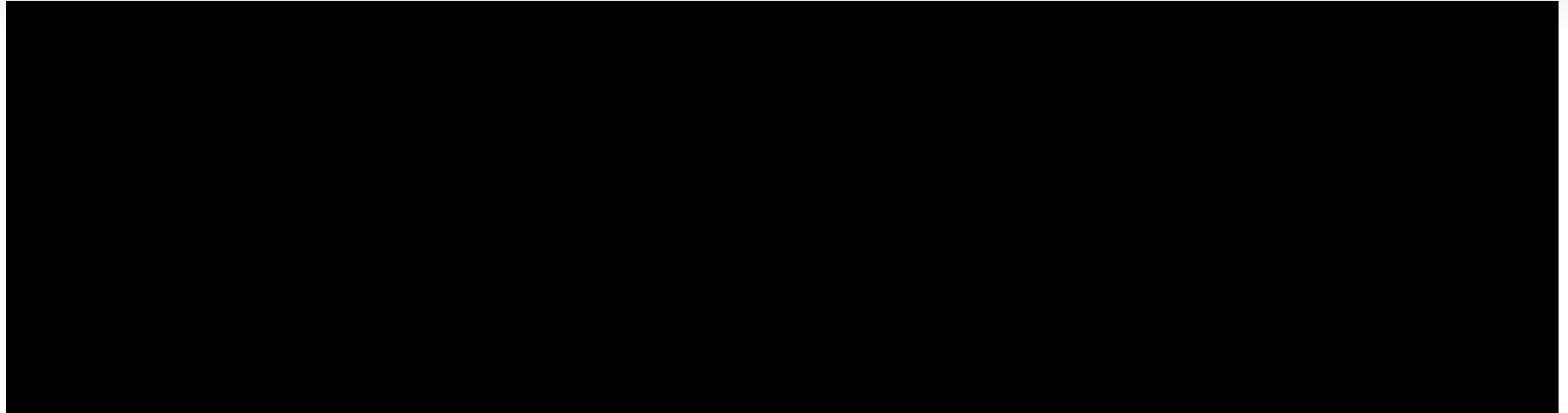
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