MEMORANDUM

TO:	**UTILITIES ADVISORY COMMISSION**
FROM:	**UTILITIES DEPARTMENT**
DATE:	**August 1, 2018**
SUBJECT:	**Natural Gas Capital Improvement Plan (CIP)**

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The purpose of this report is to provide information of City of Palo Alto Utilities' natural gas capital improvement plan (CIP), specifically the gas main replacement program, and to solicit feedback from the Utilities Advisory Commission (UAC) regarding future planning for gas CIPs.

The Gas Utility's five-year CIP program consists of the following:

- The Gas Main Replacement Program, under which the Gas Utility replaces aging gas mains ranked to have the highest threat scores within the system.
- Customer Connections, which covers the cost when the Gas Utility installs new services or upgrades existing services at a customer's request in response to development or redevelopment. The Gas Utility charges a fee to these customers to cover the cost of these projects.
- Ongoing Projects, which covers the cost of routine meter, regulator, and service replacement, minor projects to improve reliability or increase capacity, and other general improvements.
- Tools and Equipment, which covers the cost of capitalized equipment, such as directional boring, gas pipeline maintenance and emergency equipment.
- One-time Projects, which represents occasional large projects that do not fall into any other category.

Attachment A: Natural Gas CIP Planning presentation

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Utilities General Manager

NATURAL GAS CIP PLANNING

August 1, 2018

CITY OF PALO ALTO

CPAU NATURAL GAS SYSTEM

- Four PG&E/City of Palo Alto (CPAU) city gate stations
  - 3 distribute gas to the City at a delivery pressure of 25
  - 1 dedicated to VA Hospital at a delivery pressure of 40
- 386 miles of natural gas pipeline
  - 210 miles of distribution main
  - 176 miles of service pipe
- 17,500 natural gas service pipelines
- 24,000 natural gas meters

MATERIAL	MILES OF MAINS IN SYSTEM	NUMBER OF SERVICES IN SYSTEM	MILES OF SERVICES IN SYSTEM (AVG 53'/SERVICE)
STEEL	63.231	1820	18.269
COPPER	0	1	0.010
PLASTIC PVC	36.110	716	7.187
PLASTIC PE	110.380	13988	140.410
PLASTIC ABS	0.380	102	1.024
PLASTIC OTHER	0.017	65	0.652
OTHER	0	851	8.542
TOTAL	210.118	17,543	176.095

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REGULATORY OVERSIGHT

- Federal Department of Transportation
  - PHMSA – Pipeline and Hazardous Materials Safety Administration
  - Five regions that cover the United States: Western, Central, Eastern, Southern and Southwest
  - Responsible for regulating and ensuring the safe and secure movement of hazardous materials
  - Establish national policy, set and enforce standards, educate and conduct research to prevent incidents
  - 151 inspection and enforcement employees; 90 of which are pipeline inspectors

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PIPELINE INTEGRITY PLAN

- In August 2011 distribution operators were required to develop and implement a Gas Distribution Integrity Management Plan (DIMP)
- Distribution Integrity Management Plan elements:
  - Knowledge of the system
  - Identifying threats of the system
  - Evaluate and rank risks
  - Implement measures to reduce risks
  - Measure performance

PHMSA
U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

- CPAU uses American Public Gas Association's tool, "SHRIMP", to create the City's custom DIMP plan
  - SHRIMP: Simple, Handy, Risk-Based, Integrity Management Plan

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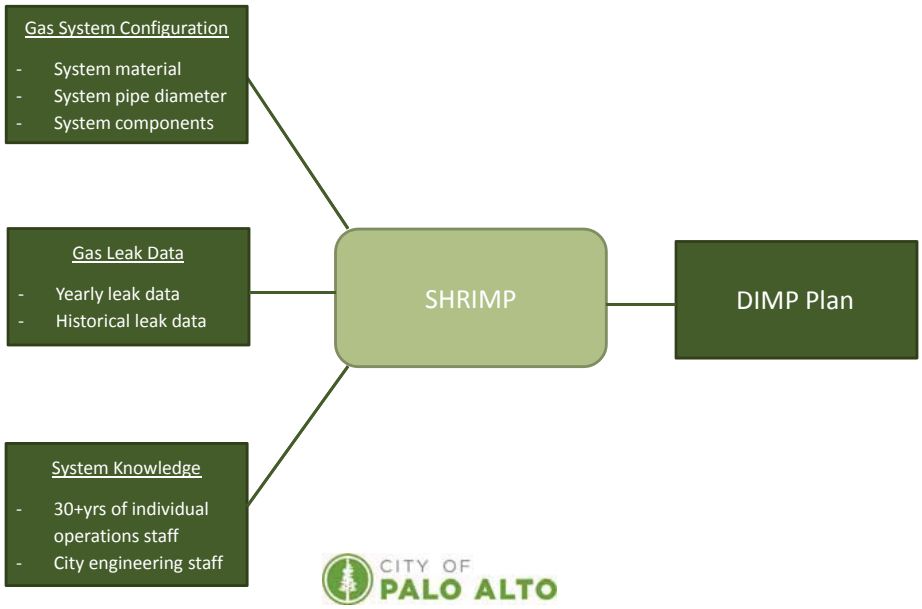
CPAU INTEGRITY MANAGEMENT PLAN



CPAU INTEGRITY MANAGEMENT PLAN

- DIMP – Distribution Integrity Management Plan risk assessment
  - #1 – Material, Weld or Joint Failure; PVC
  - #2 – Excavation Damage; by Third Party
  - #3 – Excavation Damage; by Crew or Contractors
  - #4 – Material, Weld or Joint Failure; ABS/Tenite
  - #5 – Corrosion, External Corrosion
  - #6 – Other Threats, Legacy Crossbores
  - #7 – Natural Forces

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NATIONWIDE PVC FAILURES SINCE 1970

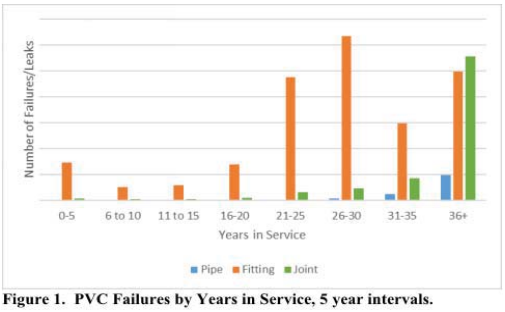

Figure 1. PVC Failures by Years in Service, 5 year intervals.

Report: April 27, 2017

- Plastic Pipe Database Committee, with 119 operators
- PVC failure/leaks increase after 20+ years of service life
- CPAU has prioritized the replacement of PVC pipes in its system based on this industry data and experience

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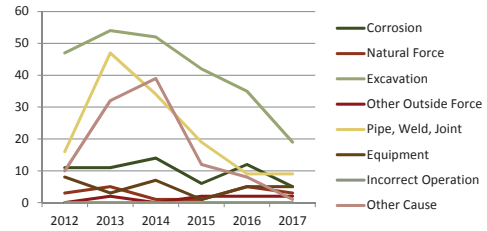
CPAU REPORTED LEAKS

Total Reported Leaks by Category (6 year)						
	2012	2013	2014	2015	2016	2017
Corrosion	11	11	14	6	12	5
Natural Force	3	5	1	1	5	3
Excavation	47	54	52	42	35	19
Other Outside Force	0	2	0	2	2	2
Pipe, Weld, Joint	16	47	34	19	9	9
Equipment	8	3	7	1	5	5
Incorrect Operation	0	0	0	0	0	0
Other Cause	10	32	39	12	8	1



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CPAU PVC RISK ASSESSMENT

- In 2015 CPAU commissioned a PVC and PE gas piping study.
- Assessed risk of vintage PVC, vintage PE and modern PE by analyzing extracted segments of pipe from the system.
- Concluded PVC material presented a greater risk to the system than PE material.
- Compared to PE pipe, PVC has a 4 times greater risk of failure when used on distribution mains and a 3 times greater risk of failure on services.
- Three scenarios: 5-, 10-, and 15-year replacement programs, indicating a small benefit to accelerating from the 15-year program.

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GAS CIP BUDGETING

- Natural gas CIP master plan FY2019-FY2023
- Average about 18,000 linear feet of main replacement per year
- Locate replacement economically
- Replacement includes distribution main and services
- Estimating a total of $6.5M in pipeline main and service replacement per year

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GAS CIP BUDGETING

- Estimated $325 per linear foot in FY20
- Annual labor and material cost increase of 3%
- Replacement cost varies due to replacement size and project site conditions.
- 13 year replacement strategy for PVC main

Total PVC Footage Remaining	Main Replacement Footage	$/ft of Replacement + 3% Annual Increase	Total-13 years
190,872	18,250	$ 325.00	$ 5,931,250.00
172,622	17,703	$ 334.75	$ 5,925,911.88
154,920	17,171	$ 344.79	$ 5,920,578.55
137,748	16,656	$ 355.14	$ 5,915,250.03
121,092	16,157	$ 365.79	$ 5,909,926.31
104,935	15,672	$ 376.76	$ 5,904,607.37
89,263	15,202	$ 388.07	$ 5,899,293.23
74,062	14,746	$ 399.71	$ 5,893,983.86
59,316	14,303	$ 411.70	$ 5,888,679.28
45,013	13,874	$ 424.05	$ 5,883,379.47
31,138	13,458	$ 436.77	$ 5,878,084.43
17,680	13,054	$ 449.88	$ 5,872,794.15
4,626	12,663	$ 463.37	$ 5,867,508.64

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GAS CIP FY 2019 - 2023

CIP Project Title		FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Gas Main Replacement Projects:	22	$ 800,000	$ -	$ -	$ -	$ -
	23	$ 550,000	$ 6,500,000	$ -	$ -	$ -
	24	$ -	$ 804,525	$ 6,500,000	$ -	$ -
	25	$ -	$ -	$ 650,000	$ 6,500,000	$ -
	26	$ -	$ -	$ -	$ 650,000	$ 6,500,000
	27	$ -	$ -	$ -	$ -	$ 856,180
System Extensions - Unreimbursed		$ 210,590	$ 216,908	$ 223,415	$ 230,117	$ 237,021
Gas ABS/Tenite Replacement Project		$ 1,500,000	$ -	$ -	$ -	$ -
Gas Distribution System Model		$ 20,000	$ 20,000	$ 20,000	$ -	$ -
Gas Distribution System Improvements		$ 246,036	$ 253,417	$ 261,020	$ 268,851	$ 276,916
Gas Equipment and Tools		$ 350,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000
Gas Meters and Regulators		$ 376,652	$ 387,952	$ 399,591	$ 411,579	$ 423,926
Gas System, Customer Connections		$ 1,303,315	$ 1,342,415	$ 1,382,688	$ 1,424,169	$ 1,466,894
Total Expenses		**$ 5,356,593**	**$ 9,625,217**	**$ 9,536,714**	**$ 9,584,716**	**$ 9,860,937**
Gas System, Customer Connections		$ (1,078,935)	$ (1,111,303)	$ (1,144,642)	$ (1,178,981)	$ (1,200,000)
Total Revenues		**$ (1,078,935)**	**$ (1,111,303)**	**$ (1,144,642)**	**$ (1,178,981)**	**$ (1,200,000)**
Grand Total		**$ 4,277,658**	**$ 8,513,914**	**$ 8,392,072**	**$ 8,405,735**	**$ 8,660,937**

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