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- Currently writing The Final Mile, Natural Gas Distribution Pipelines in NonTechnical Language

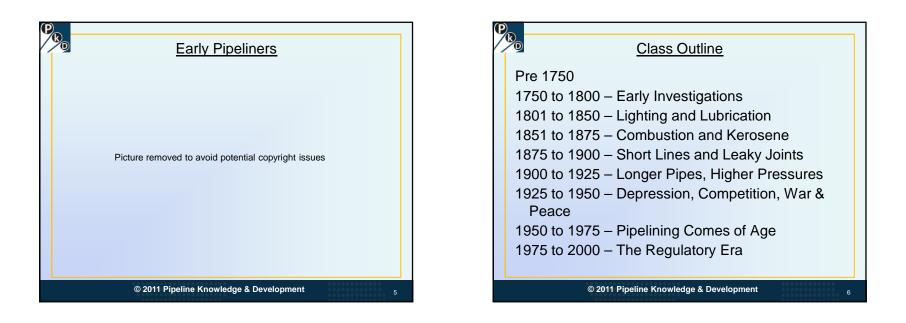
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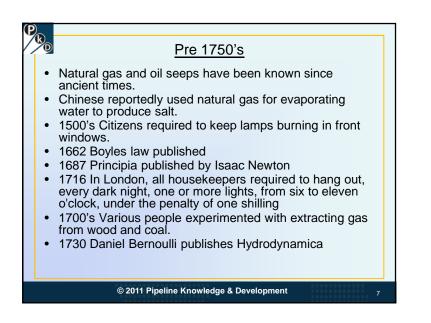


PkD Knowledge Transfer Module Offering

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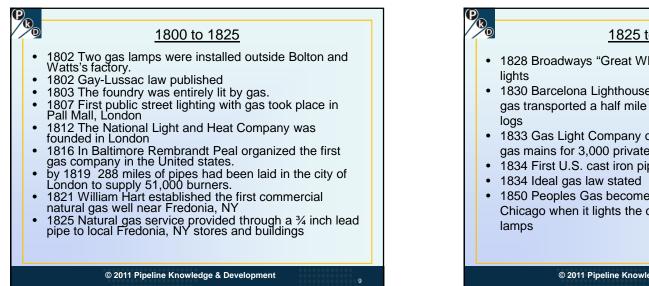


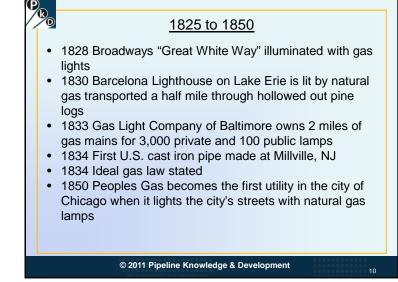


<u>1750 to 1800</u>

- 1760 New York City installed whale oil street lamps.
- 1780 Charles Law discovered
- 1785 Jean Pierre Minckelen lit his classroom with gas
- Late 1790's French inventor Philippe Lebon discovered how to derive gas from wood.
- 1792 William Murdoch achieved a gas flame in his living room at the end of a metal tube attached to an iron retort in his backyard
- 1798 Murdoch lighted a Bolton and Watts foundry in Soho with gas.

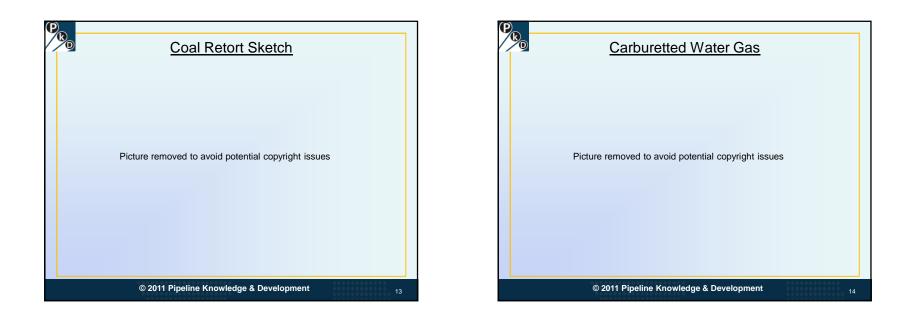
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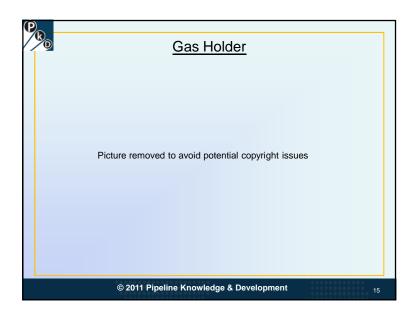


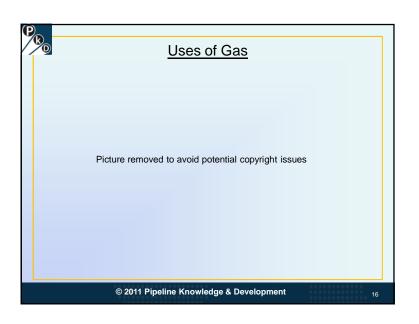


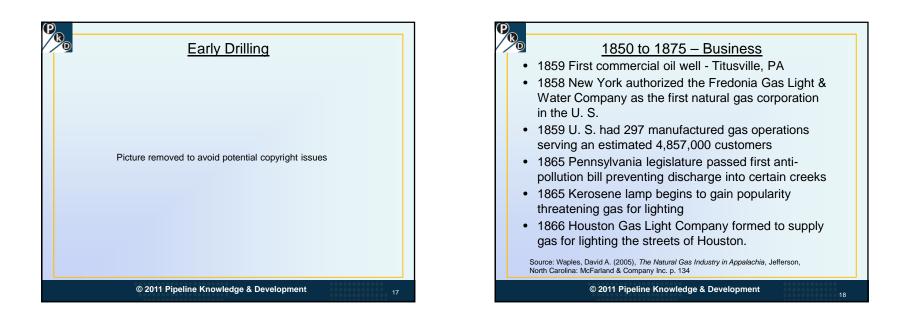


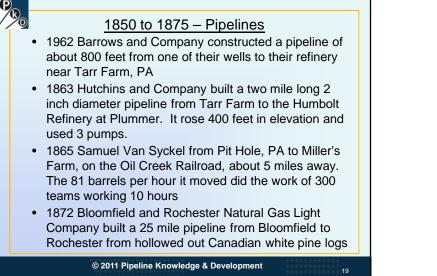
P Ko	Manufacturing Coal Gas
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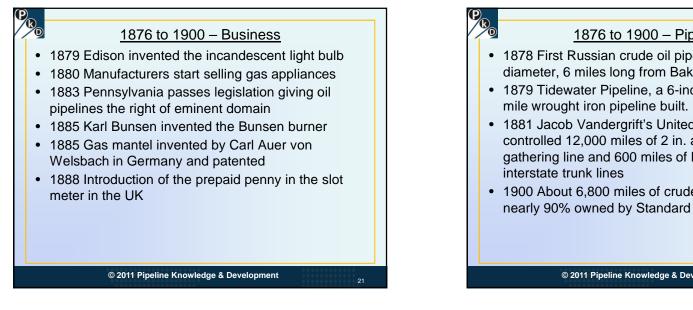


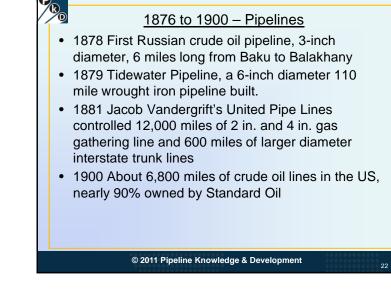


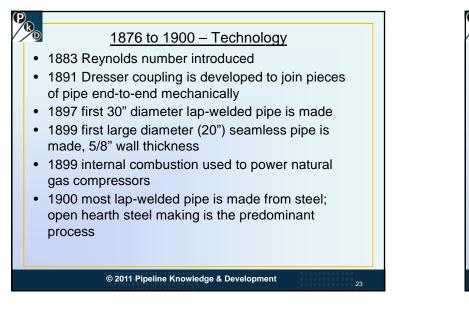


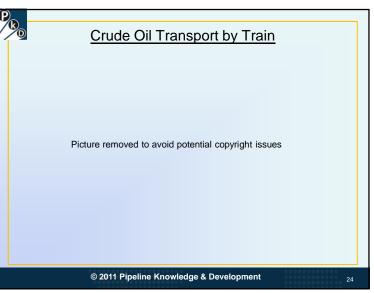


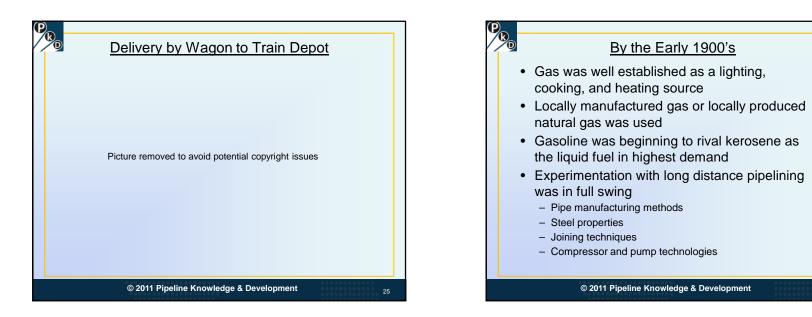
1850 to 1875 – Technology 1855 Darcy's law published 1856 Bessemer steel is developed 1863 Pipelines joined by screwed couplings 1863 Standardize metering for gas started with the formation of the American Metering Company 1869 Hydraulic testing of pipe begins as a quality assurance test 1871 Bessemer steel begins to displace wrought iron

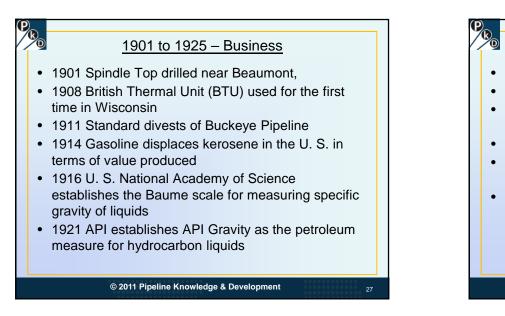












1901 to 1925 – Regulations

- 1903 Elkins Act passed by Congress
- 1903 Bureau of Commerce established by Congress
- 1905 The Garfield Investigation looks into pipeline practices in Kansas
- 1906 Hepburn Act passed by Congress
- 1906 Ten states required oil pipelines to be common carrier
- 1921 Iroquois Natural Gas ordered by the NY Public Service Commission to augment its supply of natural gas with manufactured gas

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<u> 1901 to 1925 – Pipelines</u>

- 1904 Pure Oil built a 300 mile 5-inch kerosene line from Western PA to Marcus Hook
- 1904 first major gas transmission pipeline, 16" diameter
- 1904 The state of Texas had 513.5 miles of crude pipelines
- 1907 Transcaucasus Railroad put into operation a 550
 mile long kerosene pipeline between Baku and Batum
- 1907 Gulf Pipeline built a 6-inch line 480 mile line from Glennpool, OK to Port Arthur, TX
- 1925 The first long distance all welded pipeline is laid by Magnolia Gas from North LA to Beaumont, Texas. It is 217 miles long and consisted of 14, 16, and 18 inch diameter pipe

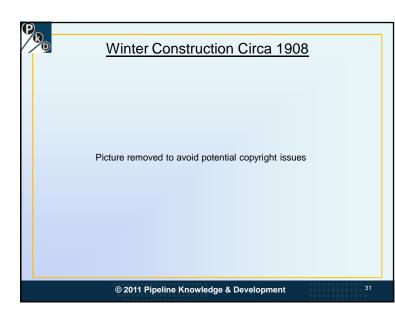
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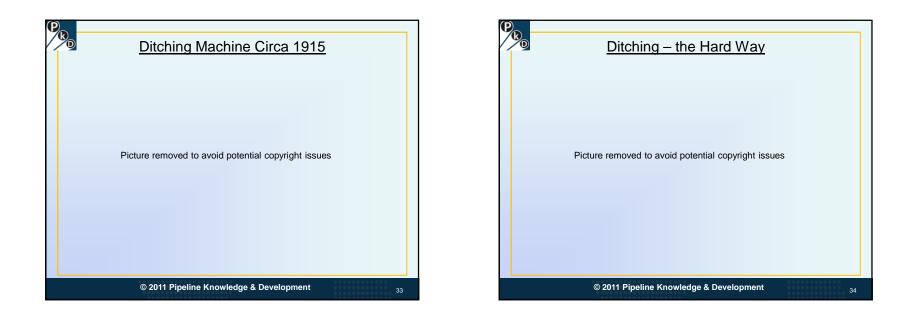
1901 to 1925 - Technology

- 1900 most lap-welded pipe is made from steel
- 1911 one mile pipeline constructed with oxy-acetylene girth welds
- 1915 Depleted reservoirs used to store gas
- 1917 11 mile pipeline is welded with electric metal arc welding
- 1924 a process for making line pipe by electric resistance welding with direct or low frequency current is invented
- 1925 large diameter seamless pipe (made by the plug mill process) becomes available (24" diameter)

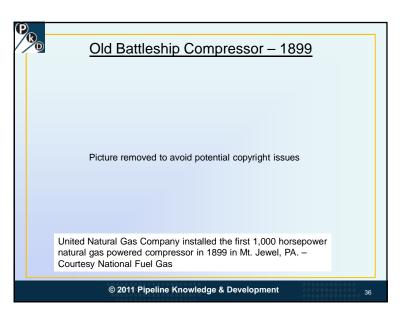
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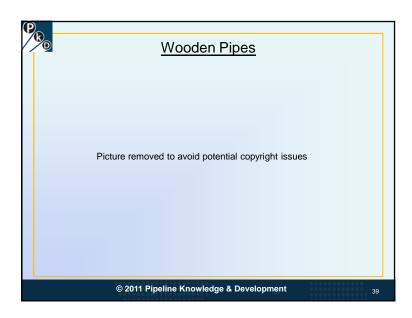
P k D	Gathering Station Circa 1900
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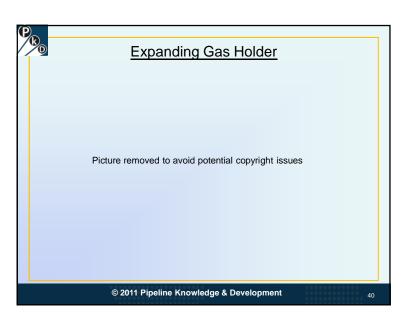


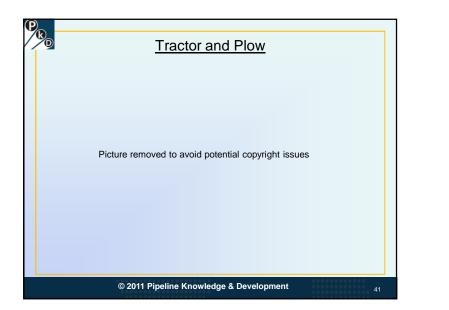


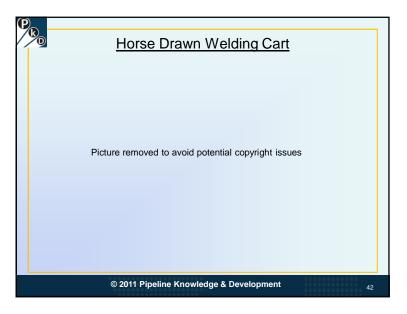




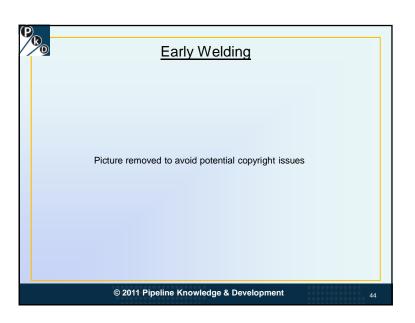












<u>1926 to 1950 – Business</u>

- 1927 Missouri-Kansas Pipe Line Corporation formed by a group of entrepreneurs. It later became Mo-Kan and then Panhandle Eastern
- 1930 Four natural gas companies controlled almost 60% of U. S. gas transmission pipeline mileage
- 1931 People's Gas Light Company (Chicago) began the first major marketing of natural gas for home heating.
- 1932 More than 80 percent of U. S. gas sales by volume are natural gas versus manufactured gas
- 1947 Minneapolis Gas Light Co. switched entirely from manufactured gas to natural gas

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1926 to 1950 - Gas Regulations

- 1928 U. S. Senate directs the Federal Trade Commission to investigate utility holding companies
- 1935 Public Utility Holding Act Passed
- 1935 Federal Power Act Passed
- 1935 Federal Trade Commission's investigation of utility holding companies, comprised of ninety six volumes, published
- 1938 Natural Gas Policy Act passed
- 1948 UK passes The Gas Act of 1948 nationalizing the gas industry in the UK

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1926 to 1950 - Oil Regulations

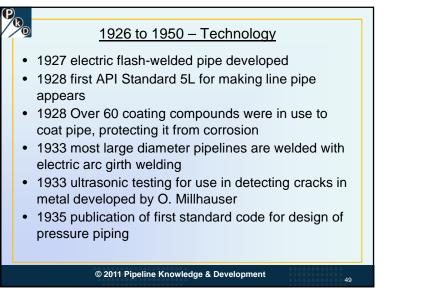
- 1940 ICC established a standard for assessing the reasonableness of oil pipeline
- 1941 Federal legislation passed giving oil pipelines the right of eminent domain with the President of the US decided it was in the interest of national defense
- 1941 Consent Decree signed by Justice Department and 20 major oil companies, 52 oil pipeline companies, and 7 affiliates or subsidiaries

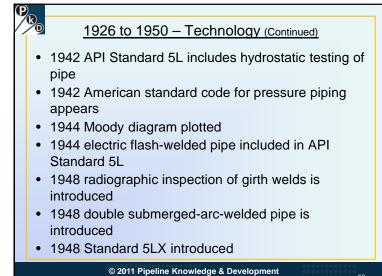
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<u> 1926 to 1950 – Pipelines</u>

- 1942 Plantation Pipeline completed from Gulf Coast to Northeast
- 1942 German submarines began sinking crude oil tankers destined for refineries in the North East
- 1942-1943 War emergency pipelines built
 Big inch
 - Little inch
- 1947 Big Inch and Little Inch are sold to Texas Eastern Transmission and converted to gas
- Multiple oil and gas pipelines constructed post WW II

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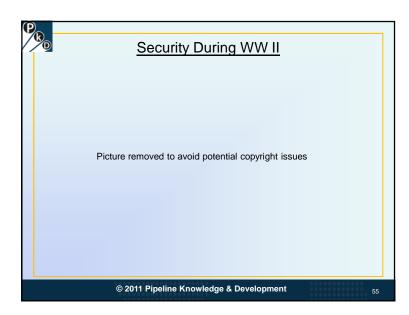


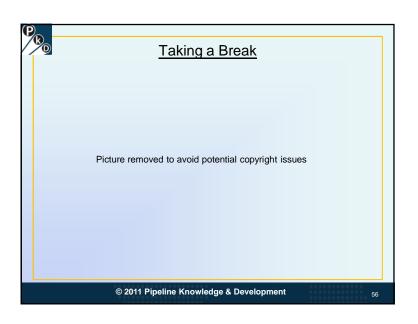


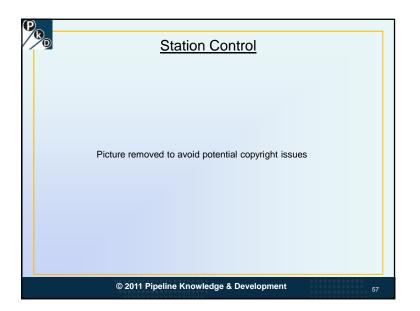


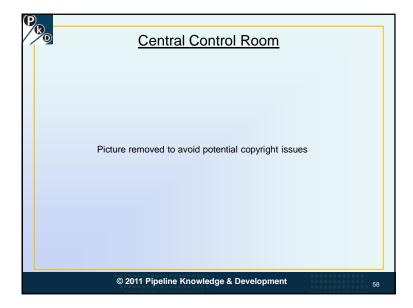
P k 0	Hilly Construction
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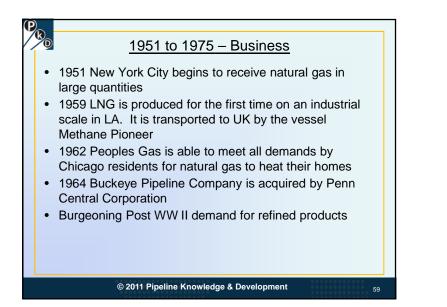










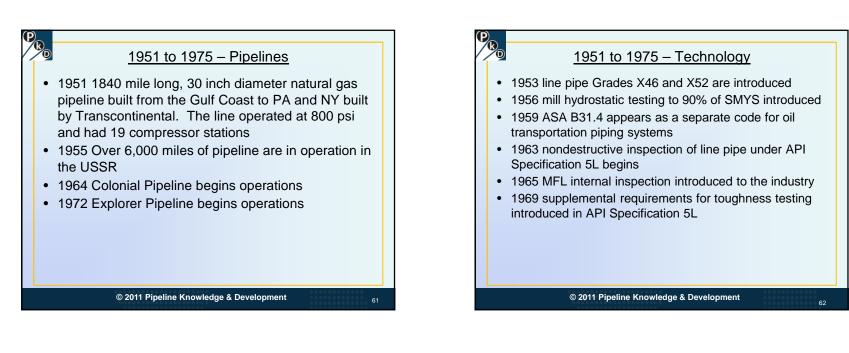


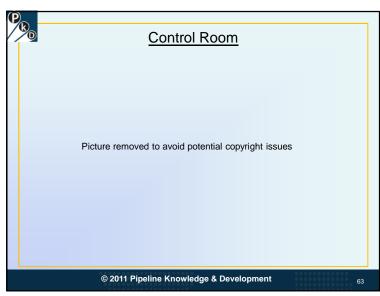
1951 to 1975 – Gas Regulations

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- 1954 Supreme Court's decision in Phillips Petroleum Co.
 v. Wisconsin (347 U.S. 672 (1954) gave FPC right to regulate well head price of natural gas
- 1965 UK passes the Gas Act of 1965 empowered the Gas Council to acquire and supply gas to 12 area boards
- 1968 Federal Natural Gas Pipeline Safety Act of 1968
 passed by Congress
- 1973 UK sets up British Gas, replacing the Gas Councils
- 1974 FPC determined that area wide pricing of well head gas rates was unfeasible

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