



The

PIPELINE

2007 | VOLUME TWO

California Energy Commission – Delegate Chief Building Official Oversight



- Pico Power Plant Project
- Malburg Generating Station Project
- TID Walnut Energy Center Project
- Metcalf Energy Center Project
- Palomar Power Plant Project
- Mountainview Power Plant Project
- SMUD – Consumnes Power Plant Project
- Magnolia Power Plant Project
- Inland Empire Energy Center Project
- Roseville Power Plant Project

In mid-2004, the California Energy Commission (CEC) engaged EDM Services, Inc. to perform a number of audits of their Delegate Chief Building Officials (DCBO) performing plan reviews and inspections for select power plants under construction throughout the State. The intent of this effort was to insure that the actions of their delegates were acting in a manner which was:

- Consistent with the expectations of the CEC and the Conditions of Certification for each power plant
- Resulting in compliance with the California Building Codes and other applicable laws, regulations and standards
- Fair and consistent regarding the interpretations of the codes and industry standards

This consistency provides an added benefit to any power plant developer within the State, since they know and understand the plan review and construction inspection process and expectations of the CEC.

Over the past twelve months, EDM Services, Inc. has completed 10 audits of DCBO operations at 10 different power plant projects. These plants have ranged in size from 520 to 1,200 megawatts. Audits were conducted at the following power plants:

Once the audits were fully underway, it became evident that not all DCBO operations dealt consistently with many subjects. Inconsistencies were found in a variety of the assigned DCBO duties, from administrative issues to code interpretations. EDM Services, Inc. was subsequently asked to help ensure that all DCBO's executed their duties in a consistent manner. In some cases, the firm mediated disputes between applicants and other project representatives. The firm also authored Guidance Documents to address a number of issues where problems had arisen.

Issues, such as:

- Pre-Fabricated Assemblies (PFA's)
- Professional Engineer (PE) Stamping Requirements
- Use of Recommended Practices

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Pipeline Hydraulic and Surge Analysis Which Tool To Use?

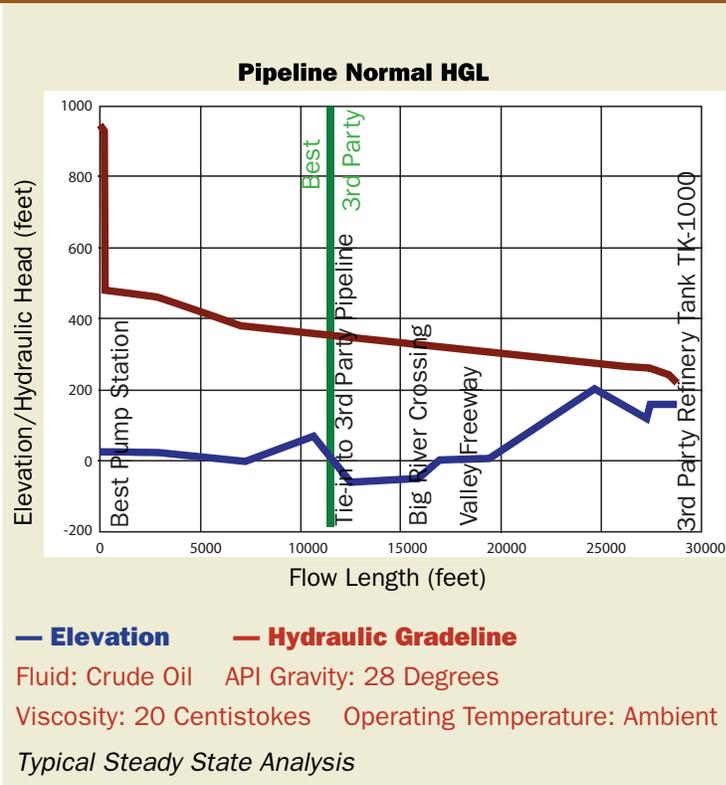
Whether the design subject is a gravity flow HDPE water pipeline; a high pressure, high volume, high temperature crude oil pipeline; or a gas transmission pipeline – a hydraulic design study is necessary to determine the correct line size for the job. However, this common need does not demand a common solution. Today's pipeline engineer is equipped with many tools to assist with the hydraulic design effort. These tools can be as simple as an Excel® spreadsheet or as complex as the Stoner Pipeline Simulator® transient condition modeling software. Using the wrong tool can be like trying to drive a nail with a sledgehammer.

At EDM Services, Inc., we have a variety of engineering tools available to properly design the wide range of pipelines our customers operate or plan to construct.

As projects gain in complexity, so should the design and analysis tools. Basic Excel® spreadsheets are great for calculating head loss, hoop stress due to internal pressure, and stresses caused by external loading, such as railroad track crossings and construction loads. However, as project needs become more complex, with requirements to run multiple load cases, the use of more sophisticated numerical models is likely to necessitate the use of more complicated software.

MathSoft's MathCAD® is such a software program. Like Excel®, MathCAD® allows a user to develop special use mathematical templates for repetitive uses. For example – MathCAD® is most appropriate for complex calculations, such as matrix calculations with multiple variables. When design needs involve the dynamic modeling of pressure surges or temperature loss, these tools are no longer appropriate.

When a project demands the calculation of pressure surges or other transients, such as heat loss, Applied Flow Technology's Impluse® or Avantica's Stoner Pipeline Simulator® become the appropriate engineering tools. Both of these software packages allow EDM Services, Inc. to build exact replicas of a customer's pipeline system. This includes pump performance curves, valve head loss curves based on valve position, valve closure speeds, and many other factors that make each pipeline unique. When isothermal conditions exist, Impluse® is usually the most cost effective software because of its simplified input configuration.



When transient thermal and pressure analyses are needed, the more powerful Avantica Stone Pipeline Simulator® may be warranted. This package has the capability to simulate the true operation of a complex pipeline system. It is only used for projects that warrant this level of complexity, where less expensive and less powerful tools simply cannot provide the analysis and results desired. The EDM Services, Inc. engineering staff makes every effort to utilize the correct tools for our design efforts and provide the lowest overall project cost to our clients.

No discussion of pipeline design tools would be complete without the mention of the pipe stress modeling. The programs mentioned above do a lot to support the pipeline engineer, but they do not provide design guidance in regards to pipe stresses. Coade's CAESAR II® pipe stress modeling software has been the pipe stress analysis standard for many years. This software provides a means for the engineer to analyze the stresses induced in piping systems caused by a wide variety of forces:

- Internal pressure,
- External loads (buried pipe),
- Process temperatures,
- Unsupported lengths of pipe, and
- Dynamic forces (rotating equipment, earthquakes, etc.).

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Survey SAYS

EDM Services, Inc. recently conducted a client survey.

We asked – **“What are your initial thoughts when you consider our firm for engineering projects?”**

Below are a sampling of responses we’ve received from our clients:

“Dedicated, trustworthy, thorough, easy to work with.”

“EDM Services provide sound engineering from a team of knowledgeable professionals.”

“Highly qualified, experienced specialists that provide excellent service and high quality product.”

“Very knowledgeable in pipeline engineering, particularly California; good understanding of permit requirements, both environmental and county throughout most of California; very good quality of work, thorough and complete work products; and reliable and timely completion of assigned work.”

We would like to thank everyone who took the time to complete our survey. Your feedback is valued and much appreciated. It also helps us to better serve our clients.

Congratulations to Randy Siegel of URS Corporation, winner of our iPod drawing, in response to our Client Survey E-mail.

California Energy Commission

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- Use and applicability of California Plumbing Code/California Mechanical Code versus ASME Piping Codes (ASME B31.1, B31.3, B31.8)
- Limits and Application of the Process Piping Codes (ASME B31.8, 31.1, 31.3) and Delegate CBO Review
- Process Piping Hydrostatic Testing
- Consistent Oversight of Piping Systems – Design and Construction
- Labeling and Listing – Material Approvals versus Inspection for Compliance
- Construction Oversight – Means and Methods versus Code Compliance
- Plant Start-Up Responsibilities of the Delegate CBO
- Fire Suppression California Fire Code Compliance – Special Equipment Protection
- PE Requirements for Plan Reviewers and Delegate CBO
- Approval of Structural Steel Fabricators
- CBO limits of Responsibilities (Plan Reviewer versus Project Engineer)
- Chemical Spacing and Setbacks
- Safety Responsibilities
- CBO and Local Fire Marshal Interaction
- ADA versus OSHA Requirements for Handrails/Platforms
- Consistent Application of Importance Factors for Seismic Design, etc.

We anticipate renewed power plant design and construction activity in California over the next few years. We look forward to continuing our role and being a part of California’s energy solution.

Pipeline Hydraulic and Surge Analysis

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Typical Transient Analysis

For complex situations, where pipe strain will be experienced (e.g., fault crossings, landslides, pipe bridges, etc.) EDM Services’ engineers use more complex software to provide pipe modeling beyond the elastic limit.

The variety of design and analysis tools available allows EDM Services to provide the

most appropriate solutions for our clients, avoiding situations where we may otherwise be driving a nail with a sledgehammer.

In The Spotlight

Francis Wilson is the epitome of the “can do” spirit. And, his spirit was put to the test at the young age of 17, when he fell while riding a motor bike and broke his back. His prognosis was dismal and he was told he might never walk again. Francis endured two surgeries to repair the damage, spent a week in ICU, months in the hospital and three months in a full body cast.

The odds were definitely stacked against Francis, but through it all, he remembered what his father taught him – “never give up and keep a good work ethic.” Shortly after being released from the hospital, Francis went to work (not even a full body cast could keep him down). He worked on his car, and began rebuilding his body. His accident made him realize the importance of “living life to the fullest.” He eventually became a personal trainer. Bikes were still his passion and he turned that passion into a talent for designing bikes.



His pride and joy is his Chopper Bike, which he designed and built from top to bottom. His Chopper serves as testament to his tenacity and zest for living.

Francis Wilson beat the odds and is a shining example that “anything is possible.” He has been part of the EDM Services family for the last 7½ years and was recently promoted to CAD Manager.



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