ZAP ENGINEERING AND QUALIFICATIONS AND CAPABILITIES

PSV MITIGATION

EXCELLENCE IN EXECUTION

August 6, 2020
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SUMMARY OF QUALIFICATIONS

CAPABILITIES

ZAP Engineering & Construction Services, Inc. (ZAP) was established in 2001 and brings decades of expertise to the oil & gas, specialty chemical, and material handling industries. The diverse backgrounds of our project team members allow ZAP to bring focused knowledge to unique challenges and projects. In-house engineering services include: Process, Mechanical, Electrical, Instrumentation & Controls, and Civil/Structural.

ZAP is a full-service engineering and construction management firm. Our team provides process expertise with design and construction follow-through to provide our clients with the capabilities necessary to execute on-schedule, quality projects.

ZAP specializes in:

- ✓ Conceptual Engineering,
- ✓ Detailed Engineering and Design,
- ✓ Project and Construction Management,
- ✓ Controls and Automation,
- ✓ Procurement Services,
- ✓ Safety Management,
- ✓ Project Controls,
- ✓ Feasibility Studies,
- ✓ Due Diligence Analysis, and
- ✓ Permitting Support.

ZAP executes a variety of projects ranging from small process studies to full EPC installations including but not limited to:

- ✓ Well Pad Production Facilities
- ✓ Gathering Pipelines (Gas, Oil, Saltwater, Fresh Water),
- ✓ Compressor Stations,
- ✓ Gas Processing Plants,
- ✓ Oil Stabilization, and
- ✓ Terminals.

Our company size allows us to execute a wide range of projects and prioritize work to meet your company's needs. ZAP has the manpower to tackle large capital projects while efficiently executing smaller projects. We are able to meet deadlines, identify alternate solutions, and change direction quickly when necessary.

LEADERSHIP

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Efficiency and quality are emphasized on every project, and the ZAP team is continually looking for ways to improve in these categories. ZAP takes pride in producing high quality designs at a lower cost. The ZAP culture embraces a collaborative design process with cooperative design reviews. These design reviews involve all project stakeholders to ensure a successful project.

The foundation of our company is process engineering. Our in-depth understanding of processes allows us to provide a holistic approach to any engineering challenge.

PROJECT EXECUTION STRATEGY

ZAP has executed projects with a variety of contracting strategies to best fit our clients' goals and desired outcomes. Below are our most successful strategies.

DESIGN BUILD (EPC)

ZAP has completed engineering, procurement, and construction services on relevant projects ranging from compressor stations and cryogenic gas plants to brownfield processing facility retrofits. Utilizing an engineering, procurement, and construction (EPC) vehicle allows ZAP to offer a turnkey approach. ZAP's responsibility for all project-related activities allows for more streamlined communication between the disciplines. With better communication, mistakes are avoided, the schedule can be compressed, and the project has a higher likelihood of success. ZAP's EPC experience has allowed for the development of simplified project management practices, comprehensive lessons learned program, and robust cost estimating tools. This methodology minimizes client risk but also represents the highest cost.

OWNERS' AGENT ENGINEERING & CONSTRUCTION MANAGEMENT

ZAP is able to provide an open book approach where ZAP is reimbursed for a management fee to execute the project. In this scenario, ZAP provides project management, engineering and design, procurement services, and construction management. ZAP's management fee is subject to the risk of budget or schedule exceedances. The project is initiated with an engineering phase where project documents and drawings are generated, the overall schedule is defined, and a total installed cost estimate is developed. This estimate serves as the basis for the fee and the cost target.

DESIGN-BID-BUILD (T&M OR FIXED PRICE ENGINEERING)

ZAP also offers a more traditional approach to contracting. In this approach, ZAP coordinates with you to establish the design, assist in the bidding process, and support the final build out. ZAP is able to provide project management, engineering and design, procurement services, and construction management. Generally, ZAP expects the engineering and design services to constitute approximately 5% to 10% of the total project cost. The construction management support can vary greatly depending on construction duration and level of field services desired. Typically, construction management support is approximately 7% to 10% (when trade inspection is included) of the total project budget depending on the desired scope. Both of these metrics will depend on the contract structure between ZAP and your company.

PSV STUDIES AND MITIGATION CAPABILITIES

ZAP has evaluated PSVs, flare networks, and vent stacks for compliance with API STD 520, API STD 521, API 2000, NFPA 59A, ANSI/ISA-84.01, and client standards. ZAP has demonstrated quality, efficiency, low cost, and adaptability to client practices to establish a large basis of return customers.

PSV STUDY

Each relief valve shall be evaluated based on the following scenarios:

- Blocked flow
- Cooling medium loss
- Column reflux failure
- Non-condensable accumulation
- External fire exposure
- Overfilling of vessel/container
- Control device failure
- Abnormal heat input
- Power failure
- Thermal expansion
- Exchanger tube rupture
- External fire on a double-walled vessel
- Any other scenario identified in API 521
- Any other scenario identified through NFPA 59A and subsequently CGA S-1.3
- Any other scenario identified through PHAs, etc. and communicated to ZAP.

Calculations are performed using proprietary spreadsheets, with calculations derived from API 520/521 and CGA S-1.3 (as referenced by NFPA 59A), in conjunction with HYSYS, Unisim, or Promax modeling software to provide fluid properties. A study will include the following deliverables for each valve:

- Relieving scenario and relief device summary sheet
- Calculation results for each valid relief scenario
- Fluid properties and conditions used for each calculation
- Identification of sizing scenario and basis for controlling scenario selection
- Actual relieving capacity
- Inlet piping pressure loss
- Outlet piping pressure loss
- Calculations including discrete list of all equation inputs
- Supporting documentation for selected inputs (e.g. pump curve)

- Identification of Codes, Standards and Guidelines applied

ZAP will transmit completed PSV deliverables at an interval agreed upon during the project kick-off meeting. For example, PSV deliverables may be sent on a weekly basis, once all first revisions have been completed, or at any interval in between. ZAP will compile PSV calculations into transmittals at whatever interval suits the client's preference for deliverable review.

After all PSVs discharging to flare or other collection headers have been preliminarily sized, ZAP will use Aspen Flare Analyzer or an equivalent software package to evaluate relief networks.

FLARE HEADERS AND OTHER RELIEF NETWORKS

Collection header capacities are calculated based on the simultaneous activation of multiple devices. Both relief devices and blowdowns will be considered when sizing the collection header. Common-mode events will be identified and the collection header will be examined for worst case scenarios. Common-mode events that are considered will include but are not limited to:

- Utility failure (power, instrument air, fuel, etc.)
- Simultaneous reliefs within fire circles
- Loss of cooling
- ESD blowdown

Vent stack and/or flare capacities will be evaluated. Per industry and client standards, radiation calculations will be performed for flare stacks.

KNOCKOUT DRUMS

Knockout drums will be sized based on API 521, GPSA, and client standards. All assumptions and calculations will be documented.

EXISTING RELIEF SYSTEM MODIFICATION

If the study indicates the system requires modification or redesign to ensure adequate protection, including modification of existing piping or addition of new relief valves or equipment, both the system as it currently exists and the proposed system will be documented as described in the above sections.

DISPERSION ANALYSIS

If dispersion modeling is performed, the vent stack or flare will be screened for all combinations of flow, atmospheric conditions, and wind directions identified by the client using the ALOHA software package. Other software packages (such as PHAST) may be available upon client request.

MITIGATION

Upon completion of a PSV Study, ZAP can develop mitigation recommendations with a turnkey IFC package for implementation. The mitigation package is comprised of the following:

P&ID REVISIONS

P&ID revisions and updates are the first step in the mitigation process. Revisions to the facility P&ID set will be done with the latest AutoCAD software. ZAP will setup reviews of the P&ID's for client approval. ZAP follows industry standard revision control. All natives will be returned to the client in .DWG format and PDF.

3D LASER SCAN

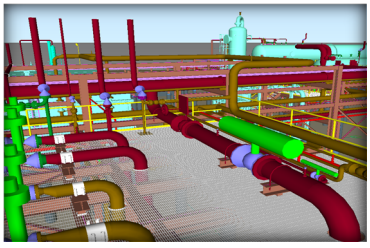
ZAP will go to site and perform a 3D Laser Scan only scanning PSV's that are identified in need of piping changes. The purpose of 3D Laser Scan is to accurately map out the existing PSV piping and immediate environment. This will allow the "new" 3D model PSV piping to be modeled in the exact location within the facility accurately.

ZAP uses Leica hardware and software for our 3D Laser Scanning projects. The two 3D Laser Scanners ZAP primarily uses are the Leica P50 and The Leica BLK360. The Leica P50 is a survey grade long-range scanner that has millimeter accuracy and a working range of 1,200m. The P50 3D Laser Scanner is a survey grade 3D Laser scanner that captures 1 million points per second and is our main 3D Laser Scanning Platform. The BLK360 laser scanner is a small form factor 3D Laser scanner that has an accuracy of 6mm accuracy with a working range of 60m. The size of the BLK360 3D Laser Scanner allows it to be deployed in small confined spaces or raised up into congested pipe racks.



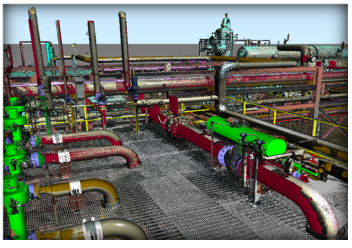
3D MODEL

ZAP will import the register3D laser scan into software's that are sharable between ZAP and the project team. ZAP uses Navisworks as the primary software to incorporate the 3D scan with the AutoCAD 3D models.



3D Model

3D Scan



3D Model & 3D Scan

3D MODEL PSV MODIFICATIONS

ZAP utilizes intelligent 3D modeling software based on Autodesk platforms. All recommended mitigation action items will be 3D modeled and incorporated with the 3D scan. This gives ZAP the ability to make modifications to piping without having interferences with the existing site. The 3D piping model will be developed with ZAP or

client specifications. ZAP will setup model reviews with the project team before any bid or construction documents are developed.

STRUCTURAL SUPPORT

New piping modifications may require structural supports. ZAP can provide full engineering and design as needed per site conditions.

BILL OF MATERIAL

When all 3D model modifications are complete and have been through the client review and QA/QC process, ZAP utilizes the 3D model to export the bill of materials (BOM) for purchase and construction. The BOM is developed per the piping specification for the project.

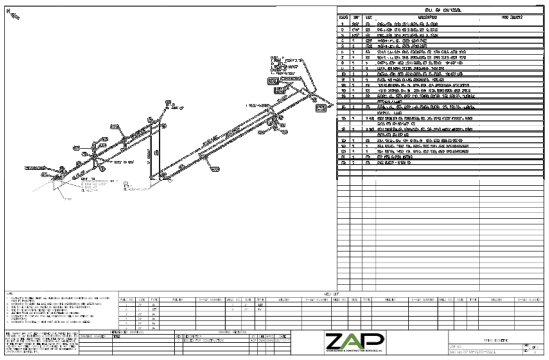
MATERIAL REQUISITION

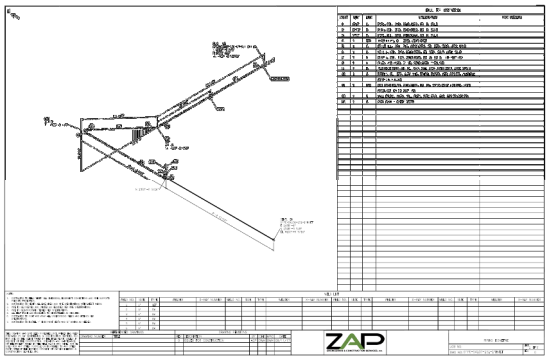
JOB NUMBER:		REQ NUMBER			ADDITIONAL INSTRUCTIONS: * All material is to be manufactured, inspected and tested to the latest requirement of ASME B31.3
DATE ISSUED:		QUOTES DUE	-		
REV		MATERIAL ON SITE DATE			
ISSUED FOR: PURCHASE					DELIVERY ADDRESS / SITE CONTACT
BY: APPROVED:		DATE: DATE:			
ITEM NUMBER	TAG NUMBER	QTY	SIZE	LENGTH	DESCRIPTION
1		1	3"		45 ELL, SCH. STD, ASTM A234, GR. WPB, SMLS, ASME B16.9
5		10	2"		90 LR ELL, SCH. 80, ASTM A234, GR. WPB, SMLS, ASME B16.9
7		12	6"		90 LR ELL, SCH. 80, ASTM A234, GR. WPB, SMLS, ASME B16.9
8		2	12"		90 LR ELL, SCH. STD, ASTM A234, GR. WPB, SMLS, ASME B16.9
9		2	20"		90 LR ELL, SCH. STD, ASTM A234, GR. WPB, SMLS, ASME B16.9
14		4	12"		90 SR ELL, SCH. 80, ASTM A234, GR. WPB, SMLS, ASME B16.9
15		11	2"		FLG WELD NECK, RF, CL. 150, SCH. 80, ASTM A105, ASME B16.5
16		6	12"		FLG WELD NECK, RF, CL. 150, SCH. STD, ASTM A105, ASME B16.5
17		4	20"		FLG WELD NECK, RF, CL. 150, SCH. STD, ASTM A105, ASME B16.5
18		2	12"x6"		RED CONC, SCH. 80 X SCH. 80, ASTM A234, GR. WPB, SMLS, ASME B16.9
19			8"	20'	PIPE, SCH. 80, ASTM A106, GR. B, SMLS
20			12"	100'	PIPE, SCH. STD, ASTM A106, GR. B, SMLS

ISOMETRICS

ZAP's standard practice is to create isometric piping drawings to provide all necessary details. This is one important tool to provide an overall piping design to the contractor. ZAP isometrics will contain the following:

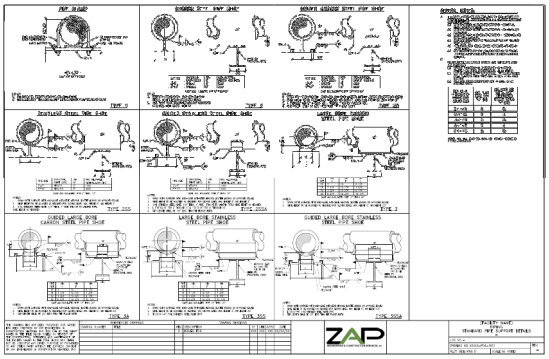
- Straight pipe runs with corresponding lengths
- Indicating line numbers
- Piping class & material
- Miscellaneous components such as flanges, valves, elbows, & other fittings
- Material take-off with each type of fitting and the corresponding quantity

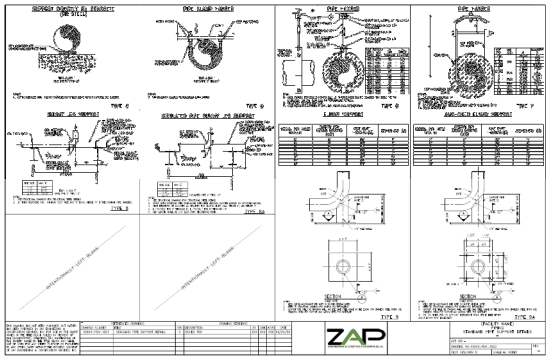




STANDARD PIPING SUPPORTS

ZAP produces a drawing with all pipe support typicals, rather than providing a unique drawing for each individual pipe support. This reduces the overall drafting cost while providing the necessary information to the contractor without unnecessary repetitive drawings.



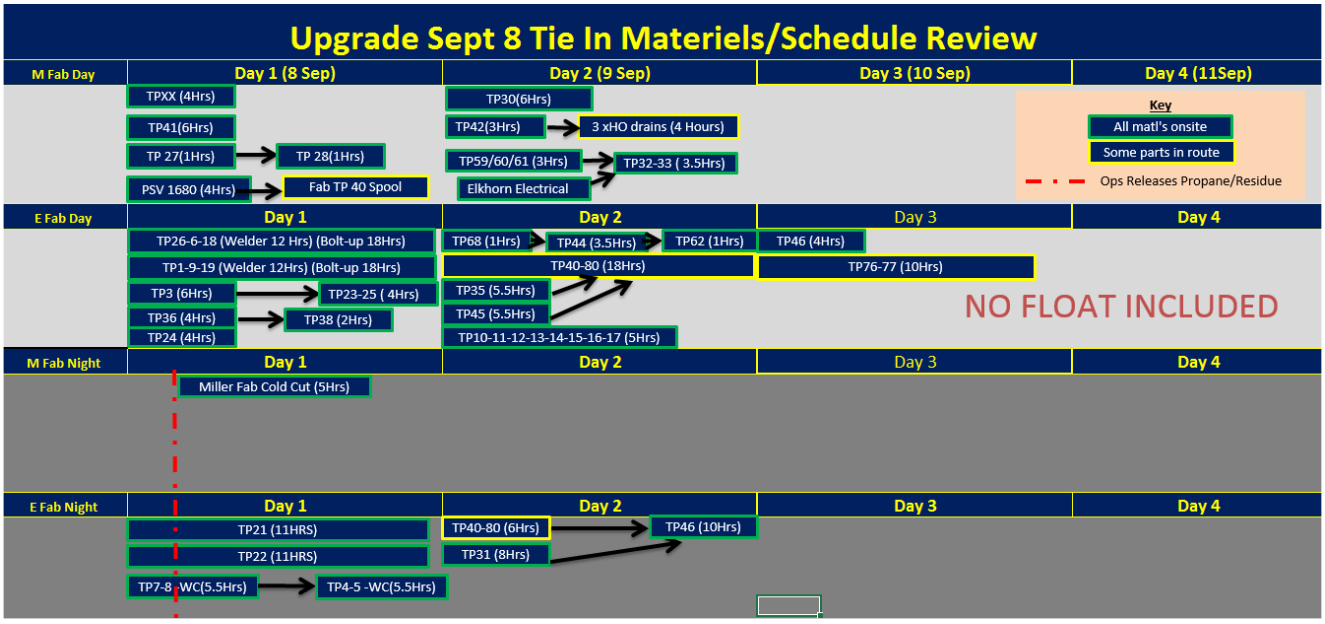


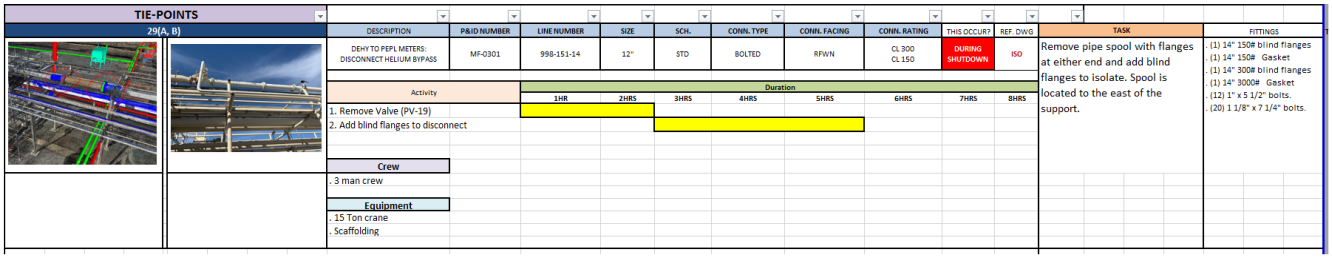
PROCUREMENT

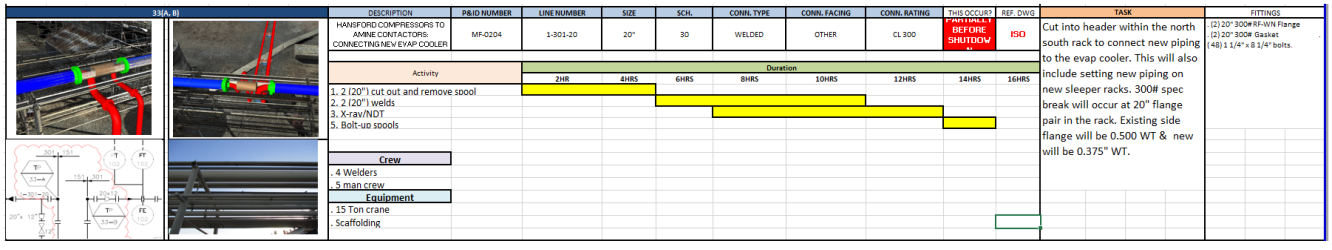
ZAP's procurement team goes beyond the traditional role of procurement, which is supplying goods and services. ZAP works directly with in-office engineering teams as well as field representatives to track materials from initial Purchase Order to Delivery. This helps to ensure schedule compliance and works to streamline the construction process so that the necessary equipment and resources are available to execute the job and remove equipment such as cranes, forklifts and manlifts as soon as the job is complete to keep cost low.

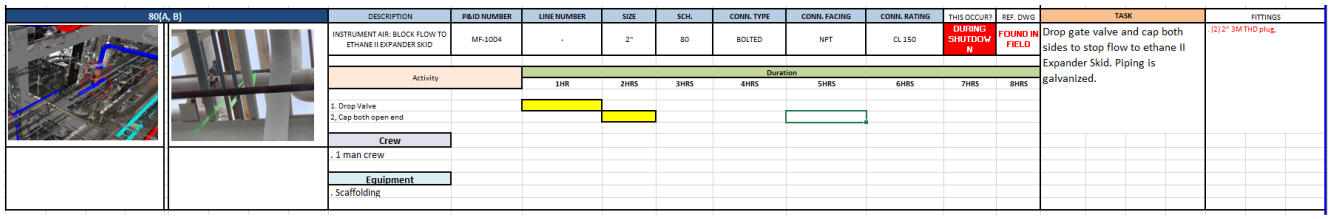
CONSTRUCTION MANAGEMENT

ZAP has the experience to implement and manage large scale construction in both greenfield and brownfield environments for utility (substation & power generation), Oil and Gas facilities, water, and wastewater, agriculture, manufacturing, mineral, and pipeline-based projects. ZAP is committed to building relationships and managing projects to meet customer costs and schedule. Our experience covers construction management, construction development, contract management, safety management, quality assurance, project planning, scheduling, project controls, cost controls, and project commissioning. Other field services ZAP offers are discipline inspection services, material management, testing services, weld and material mapping, startup assistance, shutdown assistance, contractor coordination, document control, estimating, programing and integration services, as well as project turnover and documentation.









SAFETY

ZAP utilizes a Site Specific Safety Plan which outlines the safety and health requirements that apply to all ZAP and subcontractor employees and any site visitors. Per company policy, three types of safety meetings are required.

Daily Safety Meeting with Subcontractors (Tailgate Meetings)

- Facilitated by each Foreman
- 15-20 minutes reviewing possible hazards for the days work (job safety analysis (JSA)).
- Allow site workers to stretch and loosen up.

Weekly Supervisor Meetings

- Facilitated by the Project Manager
- Occur during weekly progress meetings
- Review possible safety concerns.

Tri-monthly Safety Meetings

- Facilitated by the ZAP Safety Director
- 20-30 minutes reviewing the safety performance of the past three months.
- Rewards for a good safety record.

ZAP's Construction Management Team requires, along with the individual daily safety meeting, a joint safety/coordination meeting with all onsite workers. During this meeting, the daily JSA is reviewed and discussed and the activities of the day are reviewed to ensure all parties understand where work is occurring.

SAFETY RECORD

ZAP has logged over 800,000 safety man-hours on EPC project sites demonstrating our understanding of the importance of safety on the job. Our dedication to safety is reflected in our outstanding OSHA ratings. To continue to achieve an exceptional safety record, ZAP has a number of programs and trainings in place for our office and field employees.

To comply with OSHA's process safety management (PSM) regulations, ZAP focuses on employee participation and training, project hazard analysis (PHA) knowledge, effective communication, and performing pre-startup safety reviews (PSSR). A PSSR is always completed as part of our dedication to safety. As part of this review, ZAP's safety director, safety manager, and other onsite personnel will meet with Williams to confirm construction and equipment are in accordance with design specifications; Safety, operating, maintenance, and emergency procedures are in place and are adequate; A process hazard analysis has been performed for new facilities and recommendations have been resolved or implemented before startup, and modified facilities meet the management of change requirements; and training of each employee involved in operating a process has been completed.