

TURNAROUND DESIGN, ENGINEERING, PLANNING AND EXECUTION

REDUCING CONSTRUCTION COSTS AND FACILITY DOWN TIME
THROUGH DESIGN AND PLANNING

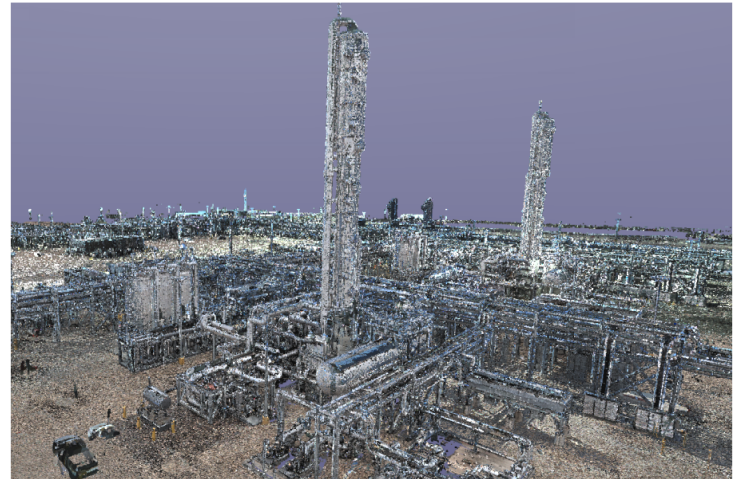
ADVANTAGES

A successful turnaround takes proper design and engineering, planning and execution. ZAP takes each step seriously to ensure that costs are minimized and the desired turnaround, or work outage, duration is achieved.

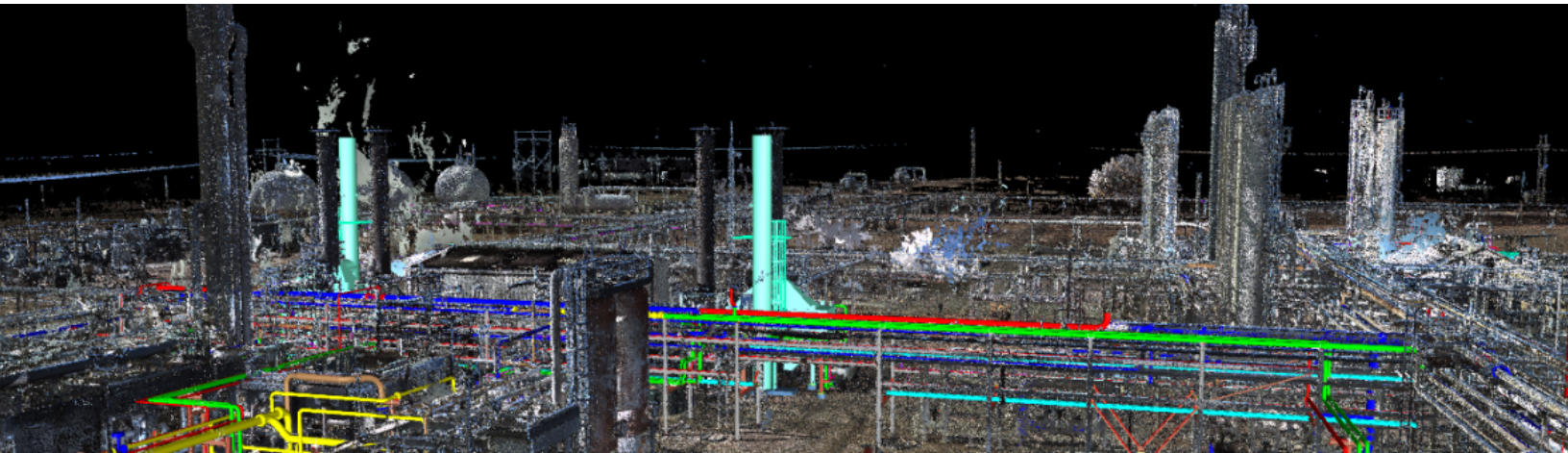
- Reduction in turnaround duration
- Identify and manage shutdown risks through detailed execution planning
- Ability to determine cost vs. schedule benefit

DESIGN AND ENGINEERING

ZAP utilizes our 3D scanning software to survey the entire facility. This establishes that all turnaround tie points are located and the appropriate plan can be designed. ZAP's design takes turnaround duration and costs into account to ensure the client is satisfied with the overall design and plan.

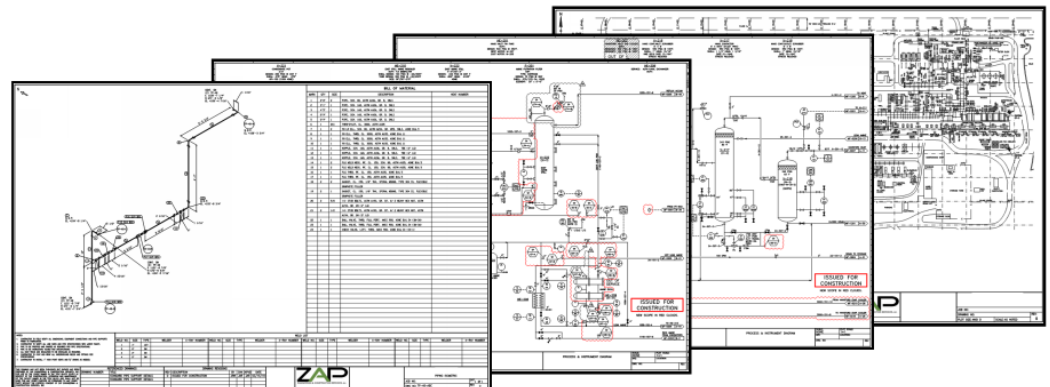


3D Scan Pictured Above



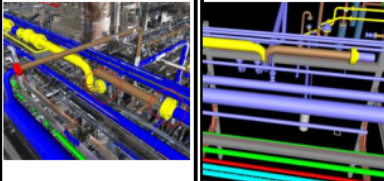
Piping Design Utilizing 3D Scan Pictured Above

Detailed construction packages are tailored to clients' turnaround requirements.



PLANNING

A bottom up approach is used when planning a turnaround. Each tie point is scheduled individually in a "Ribbon Schedule", which is then imported into ZAP's proprietary turnaround scheduling software; allowing the project team to level the available personnel and equipment to the desired shutdown duration

23(A, B)		DESCRIPTION	P&ID NUMBER	LINE NUMBER	SIZE	SCH.	CONN. TYPE	CONN. FACING	CONN. RATING	THIS OCCUR?	REF. DWG	TASK	FITTINGS
		DISCONNECT PIPING BETWEEN ETHANE II DEHY TO GAS	MF-0306	3040-601-10	8"	80	WELDED	RFWN	CL 600	SHUT-DOWN	ISO	Add new pipe after TT-16 connecting to line number 20-601-8 on MF-0904. TP-23-B (a flange and blind connection) needs to be cut back near the support. Add flange pair at TP-23-A for weld bag.	(2) 8" 600# RF flanges (1) 8" 600# blind flanges (2) 8" 600# Gasket (24) 1 1/8" x 7 3/4" bolts.
		Activity	Duration										
			1HR	2HRS	3HRS	4HRS	5HRS	6HRS	8HRS	9HRS			
		1. Cut and remove spool	[Gantt bar from 1HR to 2HRS]										
		2. 2 (8") weld	[Gantt bar from 2HRS to 4HRS]										
		3. X-ray/NDT	[Gantt bar from 4HRS to 5HRS]										
		4. Bolt up 1 blind flanges	[Gantt bar from 5HRS to 6HRS]										
		5. Electrical - Terminate valve	[Gantt bar from 6HRS to 8HRS]										
		Crew	Equipment										
		1 Welder	30 Ton crane										
		3 man crew	Scaffolding										

"ZAP's planning empowers shutdown teams to respond quickly when things change, keeping critical work on track."

Line	Unique task ID	Name	Duration	Start	Finish	2019				
						May				
						14	15	16	17	
						Tue	Wed	Thu	Fri	
Mech. Cont.										
Crew A										
TIE-IN POINTS										
Condensate Scrubbers										
TP 01 & 02 - 6" Spool V-9060 Inlet/Outlet (P&ID P04-203) (P&ID P04-203)										
1	147	Permit/Tailgate/LOTO (TP01/TP02)	1h 30min	Thu 05/16 07:00	Thu 05/16 08:30 A					Permit/Tailgate/
2	146	Cold Cut/Demo (TP01/TP02)	2h	Thu 05/16 08:30	Thu 05/16 10:30 A					Cold Cut/Demo
3	0153	Install Stopple Isolation (TP01/TP02)	1h	Thu 05/16 10:30	Thu 05/16 11:30 A					Install Stopple I
4	144	Tie-in Weld/NDT (TP01/TP02)	3h	Thu 05/16 11:30	Thu 05/16 15:30 A					Tie-in Weld/N
5	145	Install New Pipe Spool/Fit-up (TP01/TP02)	2h	Thu 05/16 17:00	Thu 05/16 19:00 A					Install New F
6	143	Final Bolt-up (TP01/TP02)	1h	Sat 05/18 13:00	Sat 05/18 14:00					
TP 03 & 04 - 10" Spool V-9070 Inlet/Outlet (P&ID P04-954)										
7	4160	Permit/Tailgate/LOTO (TP03/TP04)	1h 30min	Fri 05/17 07:00	Fri 05/17 08:30					Permit/
8	0174	Cold Cut/Demo (TP03/TP04)	1h 30min	Fri 05/17 08:30	Fri 05/17 10:00					Cold C
9	0046	Install Stopple Isolation (TP03/TP04)	1h	Fri 05/17 10:00	Fri 05/17 11:00					Install
10	0047	Tie-in Weld/NDT (TP03/TP04)	4h	Sat 05/18 12:00	Sat 05/18 16:00					
11	4800	Change: Install 1 1/2" Plug in place of TT (TP03/04)	1h	Sat 05/18 12:00	Sat 05/18 13:00					
12	4170	Install New Pipe Spool/Fit-up (TP03/TP04)	2h	Sat 05/18 13:00	Sat 05/18 15:00					
13	4180	Final Bolt-up (TP03/TP04)	2h	Sat 05/18 13:00	Sat 05/18 15:00					
TP 20 & 21 - C-9320 Liquid Hydrocarbon Discharge XV (P&ID P04-955)										
14	173	Permit/Tailgate/LOTO (TP20/TP21)	3h	Sat 05/18 13:00	Sat 05/18 16:00					

Detailed CPM Schedule (pictured above) sorted by Contractor, Crew and Tie-Point Location.

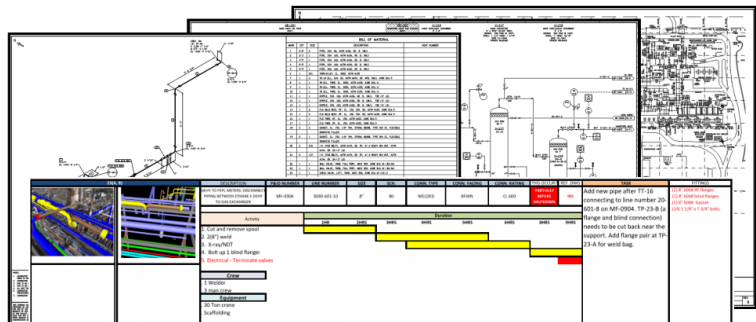
Once the turnaround plan has been created, it is then imported into a detailed CPM project schedule to share with all stakeholders.

All Planning documents are updated throughout the turnaround to ensure the schedule is followed.

EXECUTION

ZAP has the capability to perform work as the EPC contractor or as a client representative. The client can decide which approach fits best.

Work packages are created and distributed to the crew for each tie point outlining the detailed ribbon schedule, any engineering drawings needed to complete work, and any additional information



Tie points are flagged at each specified location, and all necessary materials are staged prior to turnaround. All personnel will complete a pre-turnaround walk through.

SAFETY

Safety is always the most important factor to any turnaround.

ZAP coordinates all pre-shift safety meetings with operations, managers and crew leads prior to remaining personnel arrive to review turnaround shift plan.



TURNAROUND OR WORK OUTAGE?

Whether you are planning a large turnaround project with an extended duration or a small work outage to swap a pump, proper planning and execution are key to success. ZAP has the ability to ensure that the work is completed safely and the facility comes back on-line as planned while limiting the outage time.

"A task specific schedule was developed that allowed good work breakdown structure, supported procurement, inventory control and work planning"

Client PM

"Excellent detail on what was required for the task, materials, manpower, equipment wise."

Client PM

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