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Case Study

ANALYTICAL PIPELINE SOLUTIONS

Industry

Midstream; Pipeline Integrity

Scope of work

Increase production, minimize paraffin, and prevent corrosion in pipelines.

PROJECT VISION:

Echo Canyon Pipeline wanted a chemical injection program in place that allowed the stakeholders to be proactive in maintaining the integrity of their pipelines. Therefore, a detailed chemical injection spreadsheet was formed. The spreadsheet showed the chemical activity in the lines, the date to fill up the injection tanks, and detailed data analysis to justify the chemical's cost and usage. Keeping track of the program is a proactive approach to prevent corrosion damage and paraffin blockage. This would help decrease the Firm's cost and increase revenue.

CHALLENGES:

The firm experienced a lack of proper pipeline integrity, which caused an unexpected major increase in repair costs. Echo Canyon needed a proper chemical injection plan for quality assurance to help make sure the quality requirements will be fulfilled. The program was important to prevent pipeline integrity issues. It was necessary to have various quarterly sample product tests and weekly updated reports dispersed for quality control to confirm the chemical and the program were fulfilling the quality requirements. This was to ensure that the quality is being gauged and monitored, which prevents any type of pipeline integrity risk before it becomes a costly issue.

APPLICATION:

It was decided to use Waterfall Agile Project Management. Hybrid employs thoroughness of Work Breakdown Structure (WBS) with speed and lean benefits of Agile for a project management method, which is both detailed and fast. The company had well-defined deliverables; however, some constraints were not well understood. To be successful, it was important to manage the project through sprints and allow changes throughout the project. Echo Canyon needed an adaptive method that was uniform to coincide with the requirements.

The hybrid methodology allows the team to analyze the project's life cycle, data, and complexity to develop a plan. It doesn't require each task to be defined and makes space for flexibility. The concept combines the planning strategies from traditional project management with Agile methodology's flexible approach, which are the ingredients needed to ensure the success of the chemical injection program.

SOLUTION:

Collect Data Signals- During the initiation of implementing a new chemical injection program into the Firm. It was important to meet with the stakeholders to understand their requirements and their problems to develop a project vision. Next, samples were analyzed, and data was gathered to be able to develop a procedure/plan that aligned with the stakeholder's interest. Once, the Firm agreed with the procedure and costs, an environmentally chemical formula was created to prevent corrosion and paraffin blockage. Throughout the program, there was a monthly update of Barrels per oil received in a month, this was important information to ensure the proper amount of chemical was injected into the line. If there was too much chemical being

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injected, it would increase the cost if there was too little chemical being injected, paraffin blockage and corrosion could begin to occur.

Bring key members together in a working function- One of the bigger challenges was to increase communication between the vendor and the stakeholder. To do this Echo Canyon emailed a weekly pig report with pictures at the end of the week and a monthly throughput volume report was also emailed. The newly acquired data were analyzed and compared to the chemical injection plan to see if there were any impediments or variances. The comparison assisted to maintain quality control and thus a weekly report was developed from this information and emailed to the Firm. The weekly report included the issues (if any) and solutions/changes; also, to justify the report, updated spreadsheets were distributed. These spreadsheets included the evolution of the pictures of pigs at different dates and different locations, which shows the effectiveness of the program against paraffin. Another spreadsheet included the planned volume report of the chemical remaining in each tank at each site. If the bi-monthly volume report and the planned volume report revealed a variance, the matter was discussed and resolved either before sending the report or shortly after sending the report. These smaller spreadsheets helped to maintain the chemical injection spreadsheet.

After a sprint, which was once a month, the weekly report also included the monthly chemical injection spreadsheet. This was updated and distributed when the tanks were filled with a new chemical order. The chemical injection spreadsheet included the volumes of the chemical injected into each tank as well into the pipeline, the expected refill date, chemical cost at each site, PPM recommended, proposed and current chemical injection of gallons per day, updated comments on each site, etc. The comment column was concerning variances from the previous month. It explained the planned chemical injection versus the actual chemical injection and what was done to remove the impediment causing a negative variance if any. The chemical injection spreadsheet was a part of quality assurance, it documented agreed-upon guidelines that were necessary to ensure quality. It revealed what was done the previous month and what was planned for the following month. Also, a part of the chemical injection spreadsheet included various tests that were run on the oil at different sites and an analysis of the corrosion coupons. All this data was a major key to justify the effectiveness and ensure the quality of the chemical injection program.

OUTCOMES:

The monthly cost prior to implementing the new improved injection program was lower. However, the chemical that was used prior was only a water-based corrosion inhibitor and did not contain ingredients for paraffin control. Which ended up being the major cause of unexpected major repair expenses. The reason is when there is a layer of paraffin along the pipe that has not been removed it creates the perfect environment for corrosion to occur. This is because of the reaction of hydrogen sulfide and iron sulfide; these two compounds are perfectly fine if they do not react. Therefore, to prevent corrosion it is important to have a chemical that prevents the paraffin from sticking to the pipe wall as well as inhibits corrosion.

Where the cost comes into play is the leaks due to the poor chemical treatment and loose pigging program that was in place prior. The poor chemical treatment may have been cheaper; however, the company ended up with a significant repair expense and long-term remediation cost. Therefore, by having a better-quality product and stringent pigging program, Echo Canyon is saving money because of the reduction in corrosion, pipe failure issues, blockage, and remediation clean-up; therefore, this chemical injection program is a major success.