

# How to Achieve an Effective Chemical Management Program

Oil and gas producers can increase revenue and efficiency using an out-of-the-box tank monitoring system for chemical management.

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Oil and gas producers complain that chemical management adds up to a large unmanaged cost in terms of managing a lease. While regular chemical treatments are vital to the operation of an oil or gas well, the management of the chemical program often falls short of optimal. Yet without the vital chemical treatments corrosion, scale, paraffin, and bacteria will begin to impede production and/or destroy the well and pumping equipment, eventually leading to an expensive workover.

Here's a question that you should be asking yourself:

"Is there a way to make chemical management more predictable, more efficient and less costly—without endangering your operations?" Let's discuss ways in which producers can optimize their chemical management process, which include:

- Preventing overdosing or unnecessary chemical usage
- Preventing underdosing and assuring production flow and protecting equipment
- Gaining a transparent window into costs and the operations of the vendor

All producers are finding that by [digitizing](#) their resource extraction infrastructure, they are able to increase efficiency and better manage costs. Digitizing chemical management is a prime example of the improvements that can be achieved. This might involve everything from adding IoT tank sensors to modernizing your billing software, but the technology is available today to enable you to create a chemical management system that both controls costs and maintains your revenue while helping you stay profitable even when prices fluctuate.

02

## Managing by Exception: The Good and the Ugly



Many operators in the oil and gas industry are trying to move towards management by exception. To manage by exception requires you to set up monitoring infrastructure, create a cadence for routine tasks, and then forget them until or unless a problem arises.

Oil and gas producers need to be constantly taking advantage of efficiency improvements to [survive](#). Experience has shown that even incremental improvements to operations can add up to large savings over time. Improvements over the recent years have focused on automating mundane tasks to gain the advantage of speed and innovation, and avoid labor being consumed with non-productive work. How does management by exception apply to the chemical management processes? Today, the oil and gas industry already utilizes a management by exception philosophy when it comes to chemical management. However, it is often lacking the necessary systems and processes to be considered a full implementation of management by

exception—specifically when it comes to chemical management. Management by exception requires data, and timely data, to operate. Without the required data, surprises continue to happen and go undetected for long periods of time causing further problems that can be very costly. All operators seek reliable and repeatable processes, but many lack the technologies and methodologies that can surface exceptions in a timely and accurate manner. Let's start with a brief overview of the chemical management process as it currently exists. Oil and gas wells require constant maintenance via the injection of chemicals, without which they will cease operation due to a variety of ailments including bacteria, corrosion, scale and paraffin and asphaltene.

03

## Chemical Management: Who gets to decide and on what basis?



**Oil and gas producers** are naturally focused on maintaining production, often relegating the task of chemical management to an outsourced specialty chemical management company who will provide the services necessary and labor to manage the chemical program, including supply of the chemicals, adjusting and maintaining the chemical dosing equipment, field monitoring and reporting.

While this arrangement often works well, there can be a delay in the operator receiving the information that is being used to manage the chemical program. "Lack of transparency" is often cited by oil and gas producers as one of their main complaints about their chemical vendors. Transparency might not always be the vendors fault if the systems are not in place to provide the primary data used to run the chemical management program.

Oil and gas producers who have dedicated staff to oversee the vendors, often complain that the Chemical Lead does not see that same data that the vendor is seeing in real-time. Because of



this, decisions, based upon exceptions, are not acted upon quickly. Simply, the vendor and the Chemical Lead are not fully aligned due to incomplete or untimely data.

In summary, for by-exception management to work, you need the following foundations:

1. Adequate data in near real-time
2. Processes that can monitor the exceptions and notify the right people
3. People who can respond quickly and take remedial action.

Without these foundations, chemical management by exception cannot be fully realized, and delays will be introduced into the process (sometimes in weeks) that not only cost production but in the long run, incur costly remediation.



## Typical Field Scenarios



### The Slow rate of change and reporting

The producer's Chemical Lead notices a variety of wells have experienced increased downtime and decreased production. The Chemical Lead asks the vendors to change the dosing rate of chemicals in these selected wells. It takes a few weeks for the vendors to visit the wells and make changes, and another few months for them to receive new chemical monitoring data with which to assess the effects of the change that is then prepared in a PDF report. The result is that it might take a number of months before the Chemical Lead knows if the changes are in place and several more months before they know if the changes made a positive effect.

#### Data and Data ownership

It's uncommon for vendors to share their information in the sort of real-time, up-to-the-second dashboard that a Chemical Lead might want. Instead, the producer's Chemical Lead might get a

spreadsheet once a month with attached comments. This is typical cadence for most chemical management programs today. It is then the Chemical Lead's job to review and understand the data that has been presented and look at the big picture for ongoing trends and be up to the minute with the vendors understanding. The immediate problem is that the data is locked into spreadsheets, one sheet per month. Additionally, the producer does not have transparency into the underlying data that was used to perform that calculation. For example: what are the before and after chemical tank level readings? When was the data collected? Was it collected or just estimated? What were the raw before and after readings before the calculations were applied? At what time of the day were the readings taken? Etc.

### **Multiple vendors**

If there are two or more vendors onsite, it is up to the Oil and Gas producer to enforce reporting consistency from each vendor. This is often more difficult than would be expected because each vendor will have their own methods within their company that their people are trained to use. Moving away from the "standard" often requires additional manual manipulation, especially when additional fields are requested or the data formats are requested in a different format than the vendor is used to using. For the oil and gas producer, this makes using multiple chemical vendors a challenge.

### **Over-dosing or under-dosing**

Due to the immediate outages that are caused by paraffin wax or asphaltene, chemical programs that control these problems often get a high focus. With the potential to cause immediate production losses, control programs for these problems are very rarely underdosed.

However, corrosion and scale forms over a longer period of time. For this reason, there often does not appear to be any immediate feedback on the success or otherwise of these programs. Due to the expense, it is not possible to analyze water samples or corrosion coupons from every well, every month, so assumptions are made. In these circumstances, it is easy to see how underdosing or overdosing might go un-noticed for many months, before a problem is revealed.

The problem of wells that are being batch dosed (treater truck) and not dosing chemicals continuously is also a real problem. Not knowing if the well was dosed and by how much means that troubleshooting root causes by looking at the water cut, temperature, pressure, H<sub>2</sub>S levels etc. are useless unless you have a baseline chemical dose to compare the performance against.

To summarize, oil and gas producers can't manage their wells by exception unless they have the feedback mechanisms in place to understand exceptions when they occur. How can operators create these feedback mechanisms and put them in place?

## Ways to Reduce Trips to the Field



It might seem obvious that the best way to gain more insight on how chemical management operations are performing is to perform more tests. For example, performing chemical tests on the treated water provides insights into how the chemical balance is being adjusted in the produced fluid. Exposing and analyzing corrosion coupons allows operators a window into how successful the corrosion inhibitor program is working and if the chemical dosing needs to be adjusted up or down or even substituted for another chemical.

However, in practice, it is cost prohibitive to perform all of the chemical monitoring tests needed on each well, each month. Not only does it cost hundreds of dollars to run the tests through a laboratory, but it would require significant labor to collect the samples each month – beyond even the cost of the monthly consumption of chemicals in many cases.

There is an old saying in process control that rings true in chemical management, "at least measure what can be measured!"

The technology exists today to at least passively monitor your chemical management system using tank level sensors that can help you calculate both how much material you have left in your tanks and how much material your chemical pumps are using. This, combined with real-time production data, will give you a sense of how your chemical management implementation impacts production and operations on a real-time basis. Using this information, you can then automate your chemical management, immediately responding to changes in temperature, pressure and shifting production volumes with an optimized chemical dose.

More automated data gathering decreases your reliance on vendors, reduces the cost of maintenance and total travel and maintains production and therefore revenue and profit.

## Measuring the liquid Volumes in Field Chemical Tanks



Just like oil tank level measurements, the apparent volume of material in your chemical tanks can vary widely based on aspects such as temperature, pressure, and the mixture of chemicals in use. In addition, your chosen tank management system needs to work with variables that include:

- Venting: If pressure builds up inside a chemical tank, it can distort readings from hydrostatic and ultrasonic tank level sensors. Not every chemical tank has a good venting solution, which means that inaccurate readings can occur.
- Temperature: The volume of the fluid in the chemical tank will vary throughout the day, expanding and contracting as the temperature changes.
- Pump Stroking: Vibration can be the enemy of accurate measurement. Depending on how noisy the attached pump machinery is, the sensors attached to the chemical tank can produce inconsistent measurements.
- Tank Seating: Sensors placed on a tank that's leaning to one side—as opposed to one that's on a level concrete pad, will skew the strapping-table measurements used to calculate the fluid volume. What's more, a tank that is not on a firm base will can change tilt during the filling process further distorting the readings.
- Chemical Reactions: Some [tank level sensors](#) are placed within the tank itself and are designed to come into direct contact with the chemicals inside. If the sensor is not compatible with the chemical, the instrument may not give an accurate reading—or fail!

## Automated Tank Level Reading Devices – The Choices



There's a large number of technologies that specialize in the measurement of volume remaining in chemical tanks. Each deal with the compensation for the various environmental factors differently. These may include:

- Hydrostatic pressure transducers, which can be placed at the bottom of a tank or installed on the outlet piping, convert the pressure of the remaining liquid into a measurement of the liquid level.
- Ultrasonic sensor that reflects soundwaves off the surface of a liquid and establishes a level by measuring the time it takes for the soundwaves to bound back.
- Radar sensors that perform the same operation as an Ultrasonic sensor but using microwaves. These are generally used on very large tanks.
- Ball Floats that measure the position of a floating ball on the surface of the liquid as it rises and falls on a shaft.

These sensors all have their pros and cons. Ultrasonic, for example, is unaffected by vibration or sediment, but it's confused by foam on the surface of liquid. Hydrostatic pressure transducers are affected by poorly vented tanks, and tanks installed on other-than-level surfaces. Radar isn't affected by pressure or foaming, but it can be too expensive for regular use. Ball Floats have a tendency to stick on the shaft.



Replacing manual processes with the right remote tank level sensor is one of the most important parts of the chemical management program because it is the foundation of the data that is used in the process automation. Adding a remote level sensor not only provides a new level of real-time data that is critical to your Chemical Management program but also, significantly reduces the errors associated with manual level checking and eliminates the labor hours needed to routinely collect the data. Additionally, measuring the drawdown of the chemical through the chemical pump by measuring the changing tank volume over time provides a direct indication of dosing pump health, again without labor being used to physically check the operation of the pump.

Having a reliable measure of chemical volume in chemical tanks also allows you to track and monitor chemical deliveries into the tank and reconcile these with the chemical delivery charges.

Finally, once all the data is available, it is visually displayed on a dashboard and used to provide digital or assisted feedback to automated pump control in response to changing conditions. Logic can also be added to provide alerts and warnings to operators if exceptions are detected like a pump failure or a missed delivery.



## How Detection's Chemical Monitoring System can help you Save Money



Creating a comprehensive chemical management program that avoids the pitfalls is often a difficult challenge. However, building a foundation on an accurate and reliable tank monitoring system is a critical start in reducing costs and increasing efficiency during a time when prudence matters more than ever. It does take time and expertise to go through the process of choosing the right tank level sensor, install it correctly, set up the telemetry and assemble the data onto a dashboard in a usable format.

Fortunately, that's what Detection can provide: a turn-key solution.

Detection's [Enbase® Tank Level System](#) (TLS) is designed to provide a solution specifically targeted towards oil and gas operators. The system uses an ultra-reliable hydrostatic measurement sensor that provides exceptional accuracy and performance at a reasonable cost. The Detection Tank Level Sensor installs in minutes, works anywhere with a clear view of the sky due to its satellite connection, mounts on existing tank plumbing and cancels out vibrations with a proprietary algorithm. Detection's TLS is the only Tank Level Sensor that is installed without making modifications to the chemical tank.

In addition to its reliability, once it starts communicating to the [Enbase®](#) dashboard, the sensor provides rich and interactive data. It can detect and alert on critical events such as low levels, low/high dosage rates, tank refills, leaks, airlocks and more. Yet, it can create direct integrations with your existing systems. This means that it's easy to see how much of a chemical you're using and then order more if necessary. If you're a chemical vendor, you can put this data in your field management system to automatically trigger the resupply for your clients.

Since the TLS communicates to the dashboard via the cloud, you can manage your chemical tanks by exception and reduce the number of unnecessary trips to the field. Similarly, Detection's TLS reduces chemical spend by alerting you on tank levels and dosing rates, thereby preventing overdosing/underdosing, and milk runs. Most importantly Detection's Chemical Monitoring solution helps to keep the cost of well operation down by maintaining flow assurance and asset integrity through daily readings and alarming.

## Chemical Management Offerings

Ready to discover what solutions we offer for your Chemical Management & Monitoring?  
Check out our package deals below!

### Starter Packages



**DETECHTION**  
Enabling the Digital Oilfield  
CHEMICAL MANAGEMENT SOLUTIONS

### CHEMICAL TANK MONITORING

REMOTE TANK LEVEL MONITORING SOLUTION

- Remote Inventory Monitoring
- Dashboard Reporting
- Alarms and Alerts for:
  - Chemical Recorder Point
  - Low Pump Flow
  - Low Tank Warning

**INCLUDED**

- 4 x Tank Level Sensors (TLS)
- Field Installation
- Cloud and dashboard setup
- 3 months of data uploads

**\$3,900**



**DETECHTION**  
Enabling the Digital Oilfield  
CHEMICAL MANAGEMENT SOLUTIONS

### CONTINUOUS DOSE CHEMICAL MANAGEMENT

MOBILE BASED CHEMICAL MANAGEMENT APPLICATION FOR CONTINUOUSLY DOSED WELLS

- Inventory Reporting
- Chemical Delivery Reporting
- Pump Status Reporting
- Dashboard Reporting including Mapping

**INCLUDED**

- 4 Users: Two Drivers, Admin & Manager
- Training and Documentation
- 3 months of fees for users

**\$2,900**



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CHEMICAL MANAGEMENT SOLUTIONS

### BATCH DOSE CHEMICAL MANAGEMENT

MOBILE BASED CHEMICAL MANAGEMENT APPLICATION FOR BATCHED DOSED WELLS

- Field Injection Reporting
- GPS & Time Stamping
- Stop Changes
- Dashboard Reporting including Mapping

**INCLUDED**

- 4 Users: Two Drivers, Admin & Manager
- Training and Documentation
- 3 months of fees for users

**\$2,900**



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### 3 IN A BOX CHEMICAL MANAGEMENT PACKAGE OFFER

CHEMICAL TANK MONITORING + CONTINUOUS DOSE CHEMICAL MANAGEMENT + BATCH DOSE CHEMICAL MANAGEMENT

**\$8,900**

Installation is free if within the lower 48 United States.  
(All prices are reflected in USD; offer expires 7/30/2021)

[Purchase Now](#)

## Beyond Tank Monitoring



Detection also provides an integrated field management system for a complete Chemical Management Program. Tank level monitoring is the first piece of a Chemical Management Program; this provides the timely and accurate data required for improved decision making. But where does this data go? How are tank fills dispatched? How is maintenance scheduled? Where are maintenance logs and notes saved?

Detection's [Mobile Oilfield Management](#) solution, Fieldlink®, provides one central solution to address all of the above questions, and many more. The Tank Level Sensor seamlessly integrates with Fieldlink® to provide the data necessary for certain workflows. This data can trigger events and jobs in Fieldlink®'s scheduling module as well as log information collected at site visits or maintenance jobs. Any and all tasks and information related to sample collection, tracking through the lab analysis and getting results back can be entered and referenced in Fieldlink®. Continuous treatments are recorded through the integration to the dashboard, but batch treatments can also be tracked and saved in Fieldlink®, painting the complete chemical management picture.