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ENERGY: OIL & GAS



Albert Swalha

Western Midstream



SWD Injection - Robust Reporting Solutions with Seeq

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Introduction & Bio



- University of Michigan ChemE
- 15+ Years in Process Data space
- Industry Experience:
 - Industrial Gas
 - Chemical Monitoring
 - Pharmaceutical
 - Petrochemicals
 - Oil & Gas
- Career Focus: Facilitate Actionable Data!

Problem Statement

- Railroad Commission of Texas requires monthly reporting of daily Saltwater Disposal (SWD) well data – Pressures & Volumes
- Existing process for collecting, analyzing, and submitting daily injection data too cumbersome
- Excel Workbook with 34 tabs pulling sampling arrays of 15-minute data and ~160,000 cells with data call formulas.

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- Data prone to outliers - requiring manual checking and review
- New SWD additions involve sizable spreadsheet re-work
- Involved process that required 22-24 work-hours of preparation & review every month

Solution Requirements

- Streamlined process for 60+ SWD locations in West Texas
- New path forward should result in increased confidence in report data with reduced overhead
- Solution must be scalable to new SWDs coming online



Solution Implementation in Seeq

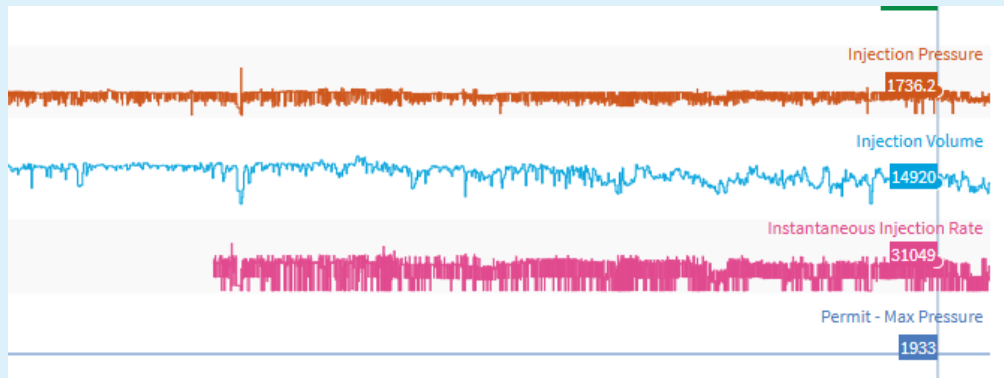
Used a Combination of Seeq Apps in tandem to craft streamlined reporting solution:



Solution: Seeq Workbench

	Daily Avera...essure	Daily Insta...x Rate	Daily Maxim...essure	Daily Total...Volume	Injection day	Injection Pressure
APC 2-21 1D ... 2 #1)	fx	fx	fx	fx	fx	☑
APC 2-28 1D ... 2 #2)	fx	fx	fx	fx	fx	☑
APC 28-17 1D...er 1)	fx	fx	fx	fx	fx	☑
APC 28-20 1D...wer 2)	fx	fx	fx	fx	fx	☑
APC 29-29 1D...ey 29)	fx	fx	fx	fx	fx	☑
APC 29-29 2D (Yeti 2)	fx	fx	fx	fx	fx	☑
APC 29-29 3D (Yeti 1)	fx	fx	fx	fx	fx	☑
APC 3-8 1D (Pluto)	fx	fx	fx	fx	fx	☑
APC 34-179 1...ger 1)	fx	fx	fx	fx	fx	☑
APC 34-197 1...ger 2)	fx	fx	fx	fx	fx	☑
APC 54-1-18 ... 5 #1)	fx	fx	fx	fx	fx	☑
APC 54-1-18 ... 5 #3)	fx	fx	fx	fx	fx	☑
APC 54-2-15 ...awk 1)	fx	fx	fx	fx	fx	☑
APC 54-2-15 ...awk 2)	fx	fx	fx	fx	fx	☑
APC 54-5-1 2...ro 3)	fx	fx	fx	fx	fx	☑
APC 54-5-5 1...tro 4)	fx	fx	fx	fx	fx	☑

- Asset Group Editor allows each SWD to be an “asset”
 - Defines Variables
 - Pulls relevant PI Tags as signal
 - New SWDs are easy to add this way with templated approach
 - Signal cleansing from outliers and noisy data / transmitter faults
- Supports ad-hoc trending / beneficial for troubleshooting



Solution: Seeq Data Lab

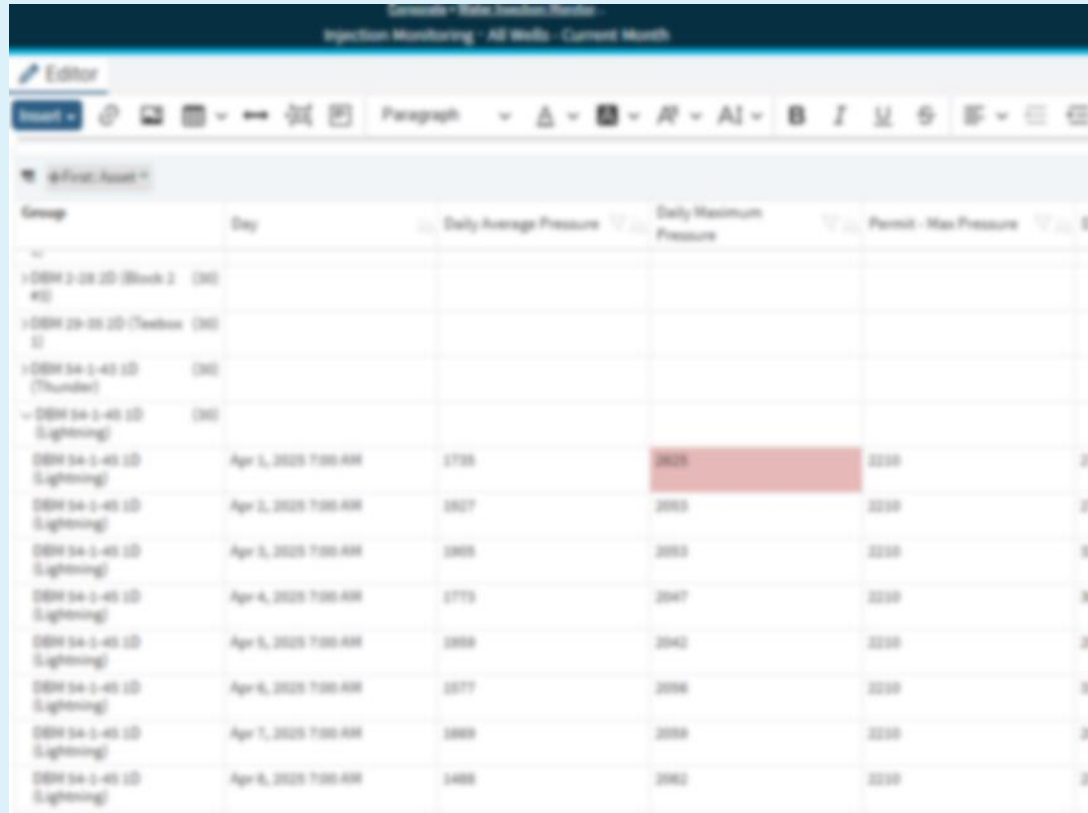
- Seeq Data Lab Scripts in Python
 - Summarizes calculation outputs into Excel format for easy reporting
 - Contains instruction for monthly e-mail distribution
 - BONUS! Formatting arranged identically to RRC to allow “one-copy one-paste” approach
- Seeq Analytics Engineering team provided support
- Highlight: Once and Done Exercise

```
5 now = datetime.now(central)
6
7 # Step 3: Calculate the start of this month in Central Time
8 start_this_month = now.replace(day=1, hour=7, minute=0, second=0, microsecond=0)
9
10 # Step 4: Calculate the start of last month
11 end_of_last_month = start_this_month - timedelta(days=1)
12 start_last_month = end_of_last_month.replace(day=1, hour=7, minute=0, second=0, microsecond=0)
13
[9]: 1 report='last month' #'Last' #'Last month'
2
3 if report=='current':
4     start=start_this_month
5     end=now
6 elif report=='last month':
7     start=start_last_month
8     end=end_of_last_month
9 else:
10    print('Invalid Date Range Selection')

```

```
[10]: 1 #Search for the signals from the Asset Group, limit to the report signals, and then pull the data
2 all_signals=spy.search({'Path':asset_group_name,'Type':'Signal'},workbook=workbook_id,quiet=True)
3
4 #Limit to just the signals of interest
5 report_signals_df=all_signals[all_signals['Name'].isin(report_signals)]
6 data=spy.pull(report_signals_df,start=start,end=end,grid=None,quiet=True)
```

Solution: Seeq Organizer



The screenshot shows the Seeq Organizer interface. At the top, there's a header bar with 'Inspector Monitoring - All Wells - Current Month'. Below it is a toolbar with various icons and a 'Paragraph' dropdown. The main area displays a table with columns: Group, Day, Daily Average Pressure, Daily Maximum Pressure, Permit - Max Pressure, and a final column with values like 27, 27, 30, 30, 28, 30, 28. The table is filtered to show data for 'Lightning' events. The 'Daily Maximum Pressure' column has a red background for the first row, indicating an exceedance. The 'Permit - Max Pressure' column has a value of 22.00 for all rows.

Group	Day	Daily Average Pressure	Daily Maximum Pressure	Permit - Max Pressure	
DBM 2-28-20 (Block 2 #2)					27
DBM 28-01-20 (Twelve 1)					27
DBM 04-1-40 (2) (Thunder)					30
DBM 04-1-40 (2) (Lightning)					30
DBM 04-1-40 (2) (Lightning)	Apr 1, 2025 7:00 AM	2735	2825	22.00	27
DBM 04-1-40 (2) (Lightning)	Apr 2, 2025 7:00 AM	2827	2893	22.00	27
DBM 04-1-40 (2) (Lightning)	Apr 3, 2025 7:00 AM	2895	2953	22.00	30
DBM 04-1-40 (2) (Lightning)	Apr 4, 2025 7:00 AM	2775	2847	22.00	30
DBM 04-1-40 (2) (Lightning)	Apr 5, 2025 7:00 AM	2858	2942	22.00	28
DBM 04-1-40 (2) (Lightning)	Apr 6, 2025 7:00 AM	2877	2998	22.00	30
DBM 04-1-40 (2) (Lightning)	Apr 7, 2025 7:00 AM	2889	2998	22.00	28
DBM 04-1-40 (2) (Lightning)	Apr 8, 2025 7:00 AM	2485	2962	22.00	28

- Arranges ad-hoc end-user facing visualization and reporting
- Allows viewer to change reporting month and toggle by SWD
- Conditional formatting allows visual detection of exceedances
- Produces exception report(s) related to operation outside of permit limits

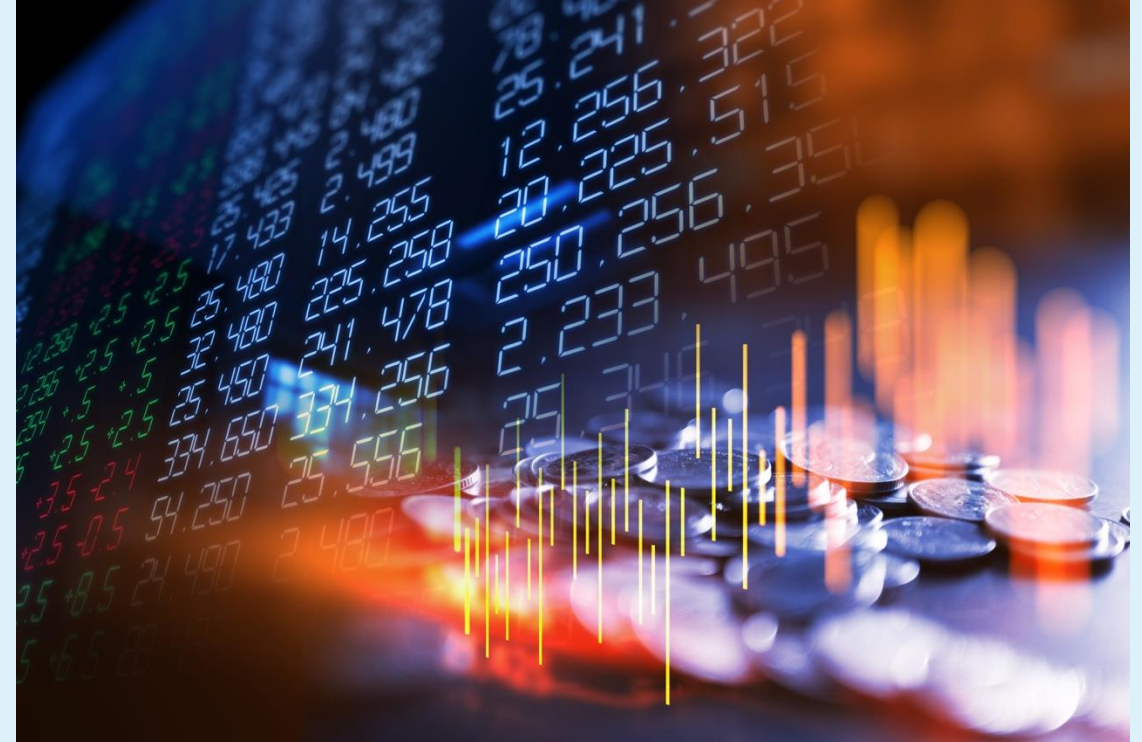
Putting it All Together

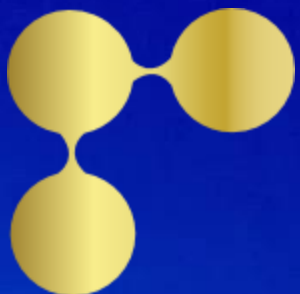
All Unread				
!	📎	📄	📧	
From	Subject	Received ▼	Size	Cate
▼ Three Weeks Ago				
📎 Seeq Alerts	[EXTERNAL]: Monthly Injection Data from 2025-03-01 to 2025-03-31	Wed 4/2/2025 1:02 AM	126 KB	
EXTERNAL EMAIL: PROCEED WITH CAUTION. This e-mail has originated from outside of the organization. Do not respond, click on links or open attachm				
📎 Seeq Alerts	[EXTERNAL]: Monthly Injection Data from 2025-02-01 to 2025-02-28	Mon 3/31/2025 5:46 PM	115 KB	
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EXTERNAL EMAIL: PROCEED WITH CAUTION. This e-mail has originated from outside of the organization. Do not respond, click on links or open attachm				

- New SWD Reporting system allows more “hands-off” approach and frees up Regulatory Analyst for other tasks.
- Monthly reporting cycle burden reduced from 22-24 hours (loading spreadsheets, reviewing uncertainties in polled data or accidentally misconfigured cells, error checking, etc) to 1-2 hours total (Quick review and send)
- New function: Proactively identifies exceptions automatically
- Reduction of 90%+ in administrative burden every month!
- This solution will be used as a springboard for future projects.

Questions to Ask

- Do I have any spreadsheet reports running recurring calculations (especially a large amount of them) on fixed assets?
- Are these Excel reports at risk of being accidentally altered?
- If I only had more assistance with Python code, would I be able to produce a better solution? Seeq Customer Success team is very flexible with training and assistance. There is also an AI assistant to help with common coding questions.

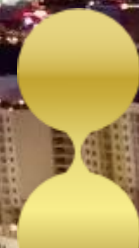


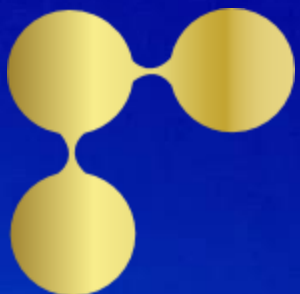


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Questions?





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Thank You

