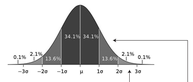
Drilling Permit
New drill, deepen, plugback, re-enter

- Exploratory Well Spike — *Geography, Operator, Formation*
- Permit Spike — *Geography, Operator, Formation*
- Rare Permit — *Geography, Operator, Formation*
- Sidetrack Spike — *Large number on one vertical*
- H_2S Spike — *Geography, Operator*
- Amended Permits — *Geography, Operator*
- Well Type — *Rarely used well type code*
- 1st Directional — *Geography, Operator*
- New Operator — *Never filed permit before now*
- Denied Permit Spike — *Geography, Operator, Formation*
- Nearest Well — *Long distance to nearest well*
- Can start email delivery with only one set of data (then add wellbore+)
- Dismissed Permits — *Geography, Operator*
- Total Depth — *Unusual depth in area*
- Withdrawn Permits — *Geography, Operator*
- Permit to Spud Time — *Long time to spud after permit*
- Dry Hole Spike — *Geography, Operator, Formation*

Operator
Drilling, Operation, Production, etc.

- New Gatherer — *Oil, Gas, Casinghead, Condensate*
- New Purchaser — *Oil, Gas, Casinghead, Condensate*
- New Service Company — *Survey, Processing, Reclaiming, etc.*
- Officer Changes — *All Operator Types*
- Unusual Operator Location — *No other operators nearby*
- Operator Status — *Large Operators Up/Downsizing*



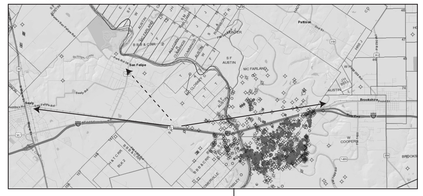
CSuite Version
CEO+ only interested in the "big events"
Can be statewide, operator centric
Easy to understand, shows data value

Engineering Version
Can send below 2a, but they need to be technical
Will want anomalies that draw interest to new AOIs
Will also be interested in competitor anomalies

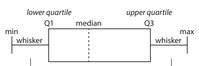
Regulatory Version
Will use to double check regulatory filing accuracy
Will want to use even before data gets to regulators

Area of Interest (AOI) Version
We may have 100+ anomalies per day
CSuite interested in the dramatic events
We filter by metadata for specialized teams
All new events, but only in this geography

Defining a Geography



1. Define Texas anchor cities by population
   Is San Felipe too small to be considered?
2. Find centerpoint of each anchor city
3. Calculate the distance of each well
   Is wellbore closer to Brookshire or Sealy?
4. Associate every well to an anchor city
5. Use cities as metadata and for AOI creation
   AOI is Brookshire and Sealy - give me all wells in area
6. Assign a vector (direction + distance)
   Well is associated with Sealy, X miles, Y degrees SE

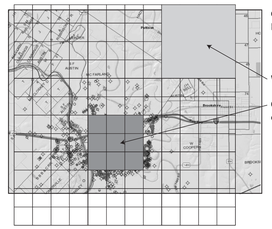


+ Client Data
+ Subscription Data

What about missing data?
Many fields filled in < 50%

We hunt where there is data
Data in X geo = anomalies
No data in Y geo? No hunting

Geohashes



Geohashes are hidden to users
But used for "neighborhood" analysis

We can use fixed squares (like township+)

Or we can make each wellbore centerpoint of it's own neighborhood for analysis

Wellbore
Drilling and Completion

- Unusual Length — *Horizontal, Perfs, Casing, Liner, Squeeze*
- Unusual Limits — *Oil, Gas, Casinghead, Condensate*
- New Entity — *Operator, Plugging, Permit*
- Rare Well Type — *Unusual Type of Wellbore*
- Unusual Amounts — *Cement, Mud*
- Unusual Pressure — *BHL*
- Unusual Depth — *Wellbore, Plug, Fresh Water,*
- Rare Removal — *From Oil Schedule*
- Shut-in Spike — *Geography or Operator*
- Rare Violations — *UIC, 14B2, H15, Equipment, W3*
- Plugging Spike — *Geography, Operator, Formation*
- Long Timespan — *Spud to Compl., Compl. to Recompl.*
- Unusual Size — *Tubing, Casing, Packer, Plug Hole*
- Formation Spike — *Geography*
- Unusual Allowables — *Oil/Gas, Prorated, Discovery, Transfer*
- Rare Producing Method — *Lift, Swab, Injection, etc.*

Other Possible Datasets

- Survey Map Data — *Changes/Additions to map*
- Gas Disposition — *PR(P1/P2)*
- Pending Leases — *Analyze applications*
- Gas Processing Plants — *R3*
- University Lands — *Detailed public production data*
- Environmental Data — *U.S. EPA datasets*
- Infrastructure — *Field Services/Transportation, etc.*
- SEC Filings — *10K, Proxies, News, Officers, etc.*

Hydraulic Fracturing
Filtered to Texas

- Unusual Depths — *Deep or shallow frac total depths*
- High Water Volumes — *Large amounts of water used*
- New Operator — *By County and State*
- New Chemicals — *Purpose or Ingredient*
- Rare/Spike Fracs — *By Geography and Operator*
- Delayed Reporting — *Unusual time to file frac*

Special Edition News Briefing
Production is batched processed

All public data
Don't shoot the messenger
We build no user interfaces
We are not responsible for source

Our IP is the machine we use to hunt
Can hunt in any database

Popup Row Data — Client User Interfaces

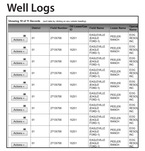
Texas RRC Landing Pages

Map

Permit (W-1)

Production

Well Logs



Imaged Records

Surveys

Operator

Lease

Proration

Completion

Texas RRC only recently made their data free of charge

Leases
Oil or Gas

- Well Count Changes — *Large increases in all wells*
- Rare/Spike Operators — *Operator lease activity*
- Legal Hold — *Type of restriction on lease*
- Severances — *Geography and Operator*
- Violations — *By Geography and Operator*

Imaged Records
Imaged Records

- Surface Commingling Permits — *Form P-17*
- Disposal Permits — *Form W-14*
- Mechanical Integrity Tests — *Form H-5*
- Pipeline Permits — *Form T-4*
- Well Logs — *Oil and Gas*
- Dry Holes — *Oil and Gas*
- Injection Permits — *Forms H-1/H-1A*
- Hydrogen Sulfide — *Form H-9*
- Transportation/Storage — *Form T-1*

Lease Production
Oil and/or Gas

- Large Dispositions — *Pipeline, Truck, Tank, Lost*
- Rare Field Type — *Salvage, Cycling, Capacity, etc.*
- Production Changes — *Oil, Gas, Condensate, Casinghead*
- Unusual Allowables — *Oil, Gas*
- Production Spikes — *Lease, Geography or Operator*
- New Operator — *Oil, Gas*
- High By-product Levels — *Venting, Flaring*
- Onsite Storage Excesses — *Oil, Gas, Condensate, Casinghead*

Well Testing
Gas (G10) and Oil (W10)

- Production Spike — *Oil or Gas or Water*
- Rare Test Type — *Initial, Retest, Survey*
- Rare Well Type — *Non-producing wells*
- Rare Producing Method — *Lift, CO2, Injection, Vacuum, etc.*
- Unusual Pressure — *Wellhead, Flowing, BHL*
- Unusual Ratio — *Gas to Condensate or Gas to Oil*
- High By-product Amounts — *Condensate or Water*
- Lack of Reported Testing — *Geography and Operator*

Field
Oil and/or Gas

- New Reservoir Name — *Oil, Gas*
- First Formation Type — *Sandstone, Conglomerate, etc.*
- Dormant Field — *Oil, Gas Restart*
- Reservoir Demand — *Oil/Gas Field Forecast*
- Unusual Field Type — *Salvage, Capacity, etc.*
- Unusual Allowables — *Oil and/or Gas*
- Unusual Gravity — *Weight of oil or gas*

Pipeline
Oil or Gas

- New Operator — *By County and State*
- Permit Spikes — *New and Cancelled Permits*
- Unusual Transport Types — *Full Well Stream, Condensate, Other*
- Unusual Purpose — *Lift, Plant, Storage, Feed Stock, etc.*
- H_2S Concentration — *High Levels*
- Unusual Length — *Long or short distances*

Hearing Dockets
Oil and/or Gas

- Rare Case Types — *Closures, Exceptions, Rules, etc.*
- High Hearing Counts — *Geography and Operator*
- Unusual Actions — *Denied, Extended, Protested, etc.*
- Civil Penalties — *High Penalty Amounts*
- Large Number Parties — *Number of Parties Involved*
- Disposition Action — *Rules Compliance*

Injection/Disposal
Underground Injection Control

- New Operator — *By County and State*
- Well Spike — *Geography and Operator*
- Rare Injection Types — *Air, Brackish, LPG, H2S, Nitrogen, etc.*
- Violation Types — *Complaint, Pollution, Breakout, etc.*
- Unusual Well Type — *Geothermal, Brine, etc.*
- Unusual Volumes — *Liquid Barrels/MCF per Day*
- Unusual Depth — *Deep/Shallow well depths*
- Unusual Pressure — *Max, Average, Annulus*

Texas Potential Daily Readers:

23,000+ companies pull permits	15,000+ companies produce oil and gas	1,800+ that have fracked a well
28,000+ companies plug wells	10,000+ companies that complete wells	3,000+ chemical suppliers

Many of these companies overlap
But there may be 100 readers per company?

Local mayors, state legislators, even national politicians — 4,200+ towns are mentioned in RRC data + 698 newspapers

The Texas RRC email is free, except for customizations (like AOI or tracking miskeys)
The goal is to use Texas RRC to showcase Anomaly Hunting
What we do for Texas RRC... we can do for IHS£+, your internal data, your financial data, etc.