



Drilling Waste Compliance Checklist

Oct 9th, 2018

Data Collection Results

- 207 remote sump phase IIs submitted for analysis
- Almost 1/2 the sites triggered for a phase II passed investigation
- Trend is that pass and fail are almost even for major categories
- Salt Calc w/o DST is largest component of triggered Phase IIs

Total Pass vs. Fail		
Row Labels	Count of Fail/Pass	
Fail	112	54%
Pass	95	46%
Grand Total	207	

Missing Drilling Records/incomplete tours		
Fail	13	57%
Pass	10	43%
Grand Total	23	

Salt Calc w DST Default Chloride Value		
Fail	9	56%
Pass	7	44%
Grand Total	16	

Salt Calc w/o DST		
Fail	38	62%
Pass	23	38%
Grand Total	61	

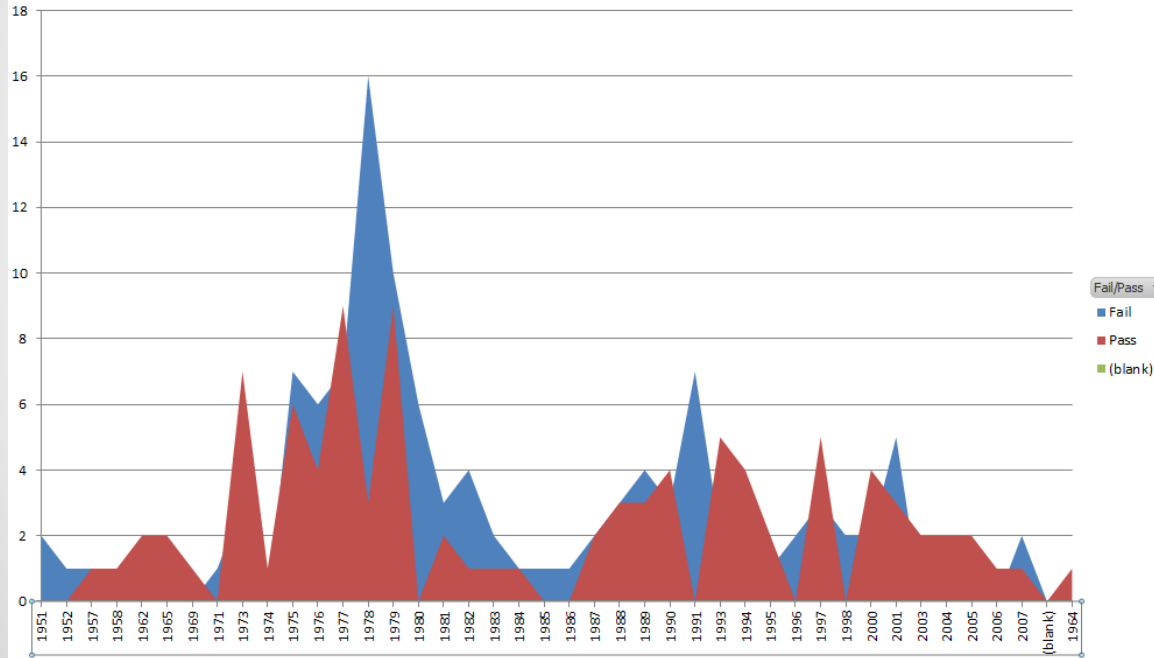
Unknown Mud Additive or quantity or drilling fluid system		
Fail	14	56%
Pass	11	44%
Grand Total	25	

PHCS added or Horizontal Oil Well or evidence of kick or flow		
Fail	9	53%
Pass	8	47%
Grand Total	17	

PHCS added or Horizontal Oil Well or evidence of kick or flow		
Fail	9	53%
Pass	8	47%
Grand Total	17	

Effect of Spud Date

Spud Date Effect on Pass Vs Fail



- Less sites failed after 1996 (updated D-50 came into effect)
- After 1996 improved records retention by Industry
- Spike in fails in 1970s

Potential Improvements:

1. Unknown Additives

- Automatically flags a Phase II if all of the additives cannot be identified and described.
- Tour reports commonly have shorthand, faded printing, or mud additives from small mud companies that have gone out of business.
- Nothing wrong with the additive, just not identifiable by the name given.
- **Solution:**
 - Should be able to evaluate the amount of the additive used in relation to total amount of all additives used and estimated waste volume.
 - If the percentage is under a threshold (<10%) a Phase II should not be flagged. This can also fit in with Professional Justification (see below).

2. DSTs

- If no value for Chloride is given (and in old reports it rarely is) then a default value of 215,000 mg/l is used,
- This value artificially inflates salinity calculations.
- **Solution:**
 - A value that more accurately reflects CL values in produced water should be used.
 - Could revisit using a regional/formation based DST if available.

3. Salinity Threshold Values

- The 0.02 and 0.03 values in the salinity threshold calcs are too conservative resulting in unnecessary Phase II work.
- For LWD and the 50m³ cuttings left on site, the calcs, especially NaOH, are overly conservative and assume all the salinity is contained in the cuttings.
- In reality, the majority of the salinity would be in solution and disposed (properly) with the LWD fluids.
- Industry needs to remember that the salt calcs need to be done on the entire volume of drilling waste, not just the cuttings left onsite. (common mistake)
- **Solution:**
 - The 0.02 and 0.03 value should be increased as calcs that slightly exceed these values usually come back clean.
 - There should be an allowance for Professional Justification.
 - Develop a method of attributing only a portion of the total salinity from the mud additives to the cuttings.
 - An ability to justify and carry out an EM survey to show no anomalies on site instead of requiring a phase II. Avoids unnecessary phase IIs (i.e. sites where there is no indication that waste was hauled to landfill or where every indication is that total waste was disposed via LWD but there are no records to indicate it).

4. Hydrocarbons

- When hydrocarbons are added to drilling fluid there is no option to allow calcs to determine if the amount used poses a risk, (i.e. hydrocarbon calcs in the DST section).
- For disposals pre-Nov 2012, if the volume of hydrocarbon is known allow an option to utilize the hydrocarbon DST calculation and add the volume as 100% oil and then calculate the Post Disposal Oil concentration.
- **Solution:**
 - Use calculations for oil based additives in a method similar to DST hydrocarbons. Some operators / vendors are already using this approach and it used to be a on a case-by-case approval basis in the past.

5. Professional Justification

- Prof. justification should be allowed / considered before a phase II is automatically triggered.
- A well drilled November 1995 must meet the 0.02-- salinity value while a well drilled a few months later in 1996 can meet the 0.03—value.
- Prof. justification for sites with $>50\text{m}^3$ of drill cuttings were disposed on-site, and not trigger an automatic phase II if analytical information is not available for the cuttings.
- **Solution:**
 - Prof. justification should be a separate box to further explain if something should or should not be investigated further.
 - Most locations where $>50\text{ m}^3$ of cuttings disposed via MBC on-site still pass based on benign gel-chemical mud system being used. There should be an ability to provide prof. justification and not result in an automatically Phase II.