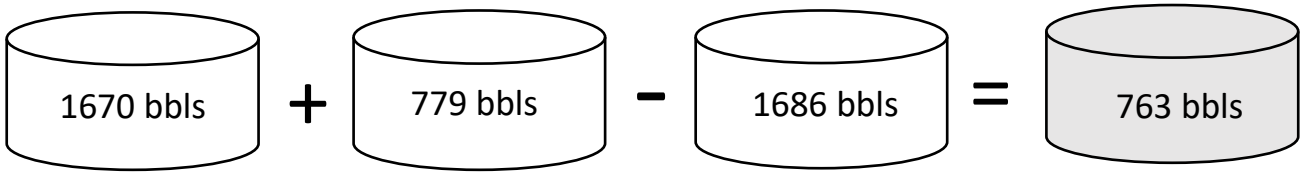
Mud Volume Accounting

Conventional Volume Accounting:



Start Volume Includes Pits, Hole & Reserve

New Volume Built – Product Additions

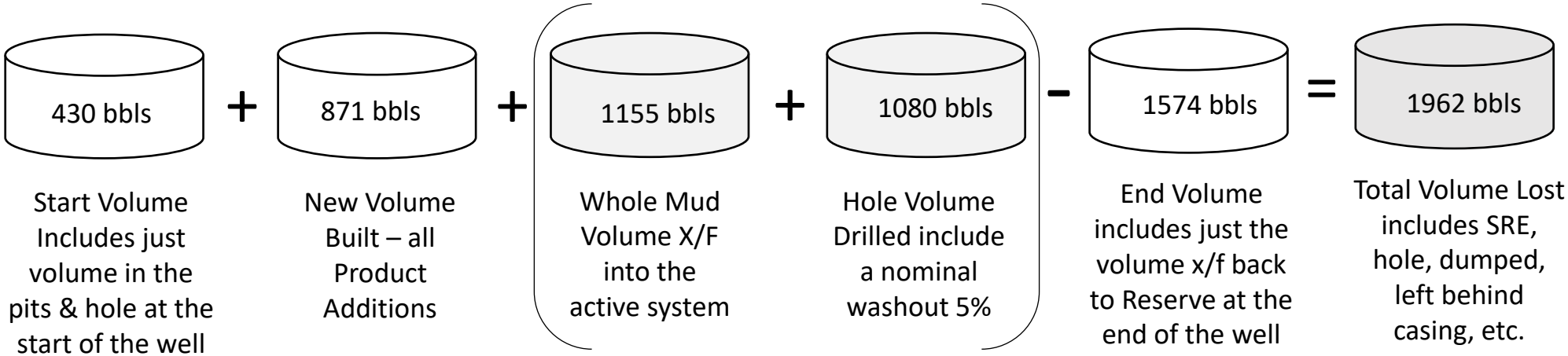
End Volume in Reserve t/f to next well

Total Volume Lost to SCE, hole, dumped

Solids Removal Efficiency calculated at 89.5%, as per conventional API Calculations for SRE
- Typically, the daily volume reconciliation does not include whole mud transfers or hole volume drilled

Let's unpack both methods

Compositional Material Mass Balance:



Start Volume Includes just volume in the pits & hole at the start of the well

New Volume Built – all Product Additions

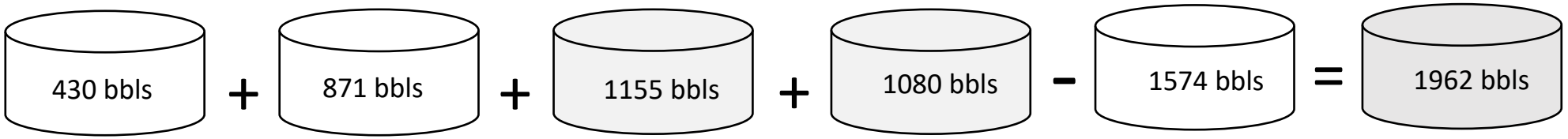
Whole Mud Volume X/F into the active system

Hole Volume Drilled include a nominal washout 5%

End Volume includes just the volume x/f back to Reserve at the end of the well

Total Volume Lost includes SRE, hole, dumped, left behind casing, etc.

Compositional Mass Balance Accounting



Start Volume Includes pit volume & hole volume at the start of the well	New Volume Built – all Product Additions	Whole Mud Volume transferred into the active system	Hole Volume Drilled include a nominal washout 5%	End Volume includes just the volume x/f back to Reserve at the end of the well	Total Volume Lost includes SRE, hole, dumped, left behind casing, etc.
% By Volume:					
Density – 9.5 ppg % Oil – 60.0 % % Water – 10.3 % % Solids – 29.7 %	Density – 9.0 ppg % Oil – 75.1 % % Water – 10.7 % % Solids – 14.2 %	Density – 10.5ppg % Oil – 59.7 % % Water – 10.1 % % Solids – 29.9 %	Density – 21.7 ppg % Oil – 0 % % Water – 0 % % Solids – 100 %	Density – 10.7 ppg % Oil – 58.5 % % Water – 10.5 % % Solids – 31 %	Density – 14.4 ppg % Oil – 36.7 % % Water – 15.3 % % Solids – 47.0 %
% By Mass:					
Density – 9.5 ppg % Oil – 31.3 % % Water – 6.9 % % Solids – 61.8 % Solids – 106,095 lb	Density – 9.0 ppg % Oil – 36.2 % % Water – 6.6 % % Solids – 57.2 % Solids – 188,269 lb	Density – 10.5ppg % Oil – 31.2 % % Water – 6.8 % % Solids – 62.0 % Solids – 315,889 lb	Density – 21.7 ppg % Oil – 0 % % Water – 0 % % Solids – 100 % Solids – 984,312 lb	Density – 10.7 ppg % Oil – 30.7 % % Water – 7.1 % % Solids – 62.2 % Solids – 440,267 lb	Density – 14.4 ppg % Oil – 21.0 % % Water – 11.2 % % Solids –67.8 % Solids – 670,523 lb

Compositional Mass Balance Calculation:

Total Mass of Solids IN – 1,594,566 lb
Total Mass of Solids OUT– 1,110,789 lb
Solids Removal Efficiency = 69.7 %

Leveraging Real Time Data

The Value in Increasing Solids Removal Efficiency

Continuous improvement plan would be to track intangible cost savings such as:

- number of trips due to downhole tool failures
- number of mud pump consumable swabs, liners, fluid end repairs
- Abrasiveness of high solids concentration on drill pipe, valves, BOP internal components.

DIGITAL FLUIDS MANAGEMENT				
8.5" Hole Section	PACESETTER PAD	PAD # 1 (Averages)	PAD # 2 (Averages)	*STRETCH TARGET*
TOTAL FLUIDS MANAGEMENT $	**$435,525.00**	**$425,555.00**	**$398,502.00**	***$358,651.00***
% Cost Reduction Across Pads		$9970 (2.3%)	$37,023 (8.5%)	*$76,874 (17.7%)*
DRILLING FLUID PRODUCT $	**$361,838**	**$334,982**	**$319,819**	***$287,837***
% Cost Reduction Across Pads		7.4%	11.6%	*20.5%*
TOTAL WASTE MANAGEMENT $	**$63,187**	**$57,028**	**$52,943**	**$47,648**
% Reduction Across Pads		9.7%	16.2%	24.6%
Facility Disposal Costs	$29,397	$26,058	$25,730	*$23,156.64*
Drilled Cuttings Disposed (bbls)	2879	2524	2197	*1977*
Waste Trucking Costs	$33,790	$30,970	$27,213	*$24,492*
Waste Cost/bbl of Hole Drilled	$61.53	$31.44	$53.18	*$47.86*
LGS Removed (bbls)	780	828	892	*803*
Mud on Cuttings Volume (bbls)	2099	1696	1305	*1175*
Solids Removal Efficiency (SRE)	43.7%	51.1%	62.9%	*72.3%*
Centrifuge Run Time (hrs)	14	33	59	*83*
Diesel Usage (bbls)	1459	1073	916	*825*
Diesel/ft (gal/ft)	4.4	3.9	3.2	*2.9*
Cost/bbl of Hole Drilled	$424.07	$371.02	$389.45	*$350.51*
Cost/ft of Hole Drilled	$31.01	$29.65	$22.30	*$20.07*
New Volume Built	2157	1857	1687	*1518*
18 wells / year / rig Savings $				**$1,383,722**
Fleetwide Adoption 5 rig Total Savings				**$6,918,611**

Value Add: As Solids Removal Efficiency increased, costs decreased, dilution volumes decreased & waste volumes decreased.

Environmental Footprint

ESG – GHG Emissions

ESG COMPLIANCE / GHG ENVIRONMENTAL FOOTPRINT							
	Well # 1	Well # 2	Well # 3	Well # 4	Well # 5	Well # 6	Total Pad
Number of Waste Loads (12.25")	54	43	55	48	55	50	305
Estimated CO2 Emissions (tons)	14.8	11.8	15.1	13.2	15.1	13.7	83.8
Number of Waste Loads (8.5")	74	46	38	46	21	53	278
Estimated CO2 Emissions (tons	20.3	12.6	10.4	12.6	5.8	14.6	76.4
Total Loads/well	128	89	93	94	76	103	583
Estimated CO2 Emissions/well (tons)	35.2	24.5	25.6	25.8	20.9	28.3	160.2
Generator Diesel (gallons/well)	36230	34815	35130	33710	31647	33968	205500
Estimated CO2 Emissions (tons)	369	354	358	343	322	346	2092
Trucks hauling diesel for generators (tons)	125	121	122	117	110	118	712
Total CO2 Emissions/well (tons)	404	379	383	369	343	374	2252
Total CO2 Emissions 3 pads per yr/rig (tons)	1212	1137	1150	1107	1029	1122	6757
Total Emissions/yr from 5 rigs (tons)	6060	5683	5748	5535	5146	5612	33784
20% Stretch Target Reduction (tons/yr)							**6757**

A targeted 20% reduction in GHG emissions by applying good drilling fluid practices like reduce the mud on cuttings and remove large volumes of drilled solids to lighten the energy load required by the generators could reduce the GHG emissions by more than 7000 tons/year.

This initiative could qualify as a Carbon Credit Offset Project.