SHOULD IT BE WELL WEIGHING OR WELL ANALYSIS?

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"In the beginning we had an *oil well!* It was away out in the country where, at that time, there was no paved road — only muddy roads and muddy locations or hot dusty roads and hot dusty locations. To a city dude, either was repulsive.

"At that time most thought that after a well was drilled and production hit the tank, that was the important thing and the only thing to do now was to sell the oil. The only trouble was that all wells were not that good and some had to be pumped. Then they found that even though the oil was there in the ground it was difficult to produce enough to pay all the debts.

"Therefore, it became necessary to find some way to take a look at the problems. There have always been some technical people around and they were enlisted to try to find out some of the answers. It happened that they called these people Engineers.

"These dirty, nasty ole wells were usually on ranches and it was difficult to hire people to take care of the wells. It was natural then to have the cowboys take care of the wells between riding fence or checking the herd. Now these men were thrown in with a bunch of other people who were having new experiences and there was no established dictionary to refer to for the nomenclature and experiences with the oil well and its equipment. Then it was natural for the cowboys to give names to equipment and experiences in the field.

"Some of these cowboys soon realized that pumping an oil well was complex because there were many things that were complex within the overall complex, which was more than the majority of the people involved had found out or would accept. So many cowboys found it much more soothing to punch cattle than worry about an oil well. Other cowboys deserted the ponies and cows and went into the exciting and complex business regardless of problems—and tried to ignore the problems.

"When the engineers came out with little boxes or slide rules to try to find out something about an oil well that was making money, that seemed to the cowboy to be a stupid waste of time.

"The engineer usually thought the pumpers and foremen were stupid because they would not believe every word the engineer was saying. Now we have two stupid people talking together—and many of you know the disastrous results the oil industry has experienced.

"The pumper, who later might become a foreman or superintendent or manager of a company, worked by himself most of his working hours. How is he going to learn to communicate with an educated scientist? Then the engineer was too impatient, usually very young, and was not prone to being a good salesman of his ideas, and if the stupid pumper or superintendent did not want to listen — O.K., he would just go on and do the work by himself.

"Working by oneself is not a good way to get the others to accept new ideas and up until recently there has not been much exchange of ideas.

"The way it should be observed is that these men who have a lot of experience and little education may have the equivalent of a Masters or Doctors Degree in experience. The engineer may have only a Bachelor Degree in engineering.

"The man with experience should be proud of his accomplishments and also recognize his shortcomings of technical training, but not be ashamed; but willing and hopeful that the others will be patient until he catches up with enough for him to make better use of his experiences.

"The engineer should be proud of his schooling. He should also recognize the education is of little

value without being able to apply the learning to an advantage.

"Many experienced engineers can look back and see how really "dumb" they were in the beginning, in relation to the experienced pumpers and foremen.

"So it is necessary for these men to get together and try to help each other. In helping the others they will really gain more for themselves, also to their general well being, such as job security and more material wealth, in the end.

"The Dynamometer was an instrument that was first used to try to do well analysis. It has been used since the early 1930s. In the beginning there was limited information that could be used, but that same information today has a wide range of benefit in well analysis. For a few examples:

1. The percentage of possible fluid fill of the pump on the upstroke.
2. Analysis of reasons for insufficient fill.
3. If pounding on downstroke, reason could be due to insufficient fluid or excess gas, etc.
4. Determine stress level on rods to determine if overloaded.
5. Determine torque on pumping unit.
6. Determine load on structure.
7. Need of bottomhole pump repairs.
8. Advantages between prime movers.
9. Difference between anchored and unanchored tubing related to pump production.
10. Results of improper arrangement of downhole equipment.

"The next tool applied was the Sonic Test to explode a quantity of powder in a wellhead attachment and record the echoes of the explosion from below the wellhead to determine the distance to fluid levels, change of weight of pipe, holes in casing, perforations, swedge in tubing, top of liner, casing shoe in open hole, tubing anchors or other varying diameters that may be in the casing above the fluid level. Under certain conditions it is possible to find the level of leaks in tubing. The two-pen recording instrument will usually reflect more information that can be used, successfully.

"Tachometers can aid in a study of prime movers as well as damage being done to gears and rods.

"Hydrometers, RPM counters, Bottomhole Pressure Recorders, recording RPM instruments Ammeters, Voltmeters and Electrical Meters, Tape Measures, Hand-held Calculators, all are some of the many "tools" that can be used to aid in a complete well analysis.

"In the beginning no one would bother to accept the information from the Well Analyst, who in early days was called a "well weigher" or the user of the dynamometer. Therefore, he was only listened to when no one else could guess the trouble. If this man quit or was transferred, the field men were relieved. Unfortunately, he took much valuable information with him in his head and in two months it was lost forever.

"A person who becomes a well analyst can be educated, an engineer, uneducated, no experience, or an experienced oilfield worker and become the best, or the poorest, analyst of all. It takes a special type of person to be the best. First, he must have a certain amount of common sense or "horse sense". He must be compatible and if he has an excellent personality—that much the better. He should be able to read and write and do normal arithmetic. The three most important characteristics for the well analyst must be imagination, curiosity and "love" of the work.

"Sometimes it is difficult to talk to a competent analyst because he realizes that he does not know everything and is interested in learning instead of showing off what he knows. As a result the analyst asks "Why?" to practically every statement a companion makes.

This does not stem from a "smart aleck" attitude but because the analyst recognizes that the well is complex and can have many facets to a problem and he wants to hear and understand as many as possible. He knows that the same information usually gives different answers under different conditions and he is continually seeking more information.

"This has been a big handicap to most field men in that they do not recognize many facts and details about well production and fail to take all of them into consideration when making decisions. As a result, many orders turn out expensively.

"In the past many men have been trained and do an excellent job. Periodically he should have a raise. To get a raise he must be promoted or moved to some other job. So the magic wand of personnel department gives him a raise and away he goes. What about the job?; who gets it? Oh well, it's not important everyone hopes and maybe no one gets the job.

"The other situation is that management recognizes that this individual is super and approaches each task with the attitude that something can be done and does it. The

management really needs a man like that over here in another place, so away he goes. What about his replacement? Well a little later, perhaps, and maybe his former boss doesn't want to let management realize how important well weighing is.

"Now there is one fact that a lot of people who do empire building don't realize; and that is that the ole dirty, nasty oil well, away out in the country, is the most important thing the company owns. In other words,without the oil well there is no "oil business". It is pathetic how many profitable oil wells have been abandoned or sold to others to make a fortune form. It is worse than the geologist who condemned the area from a 3000′ dry hole, while at 4000′ there was a gigantic field.

"The real way to appraise the situation and do something about it is to form a "Well Analysis Department". In this way a search could be made for these special qualities in personnel and see if they are adaptable and would like the work. (If they don't like the work, it would be like having a man beating a good milk cow or frightening the good laying hens—no production to sell. And one can't tolerate that.)

"Have him trained in the use of all the instruments available for this type of work. Let him become proficient, then form a "Well Analysis Department" in the area. Take the lease map and tell him that his responsibility is the area of the circles on the map that indicate locations of an oil well—as soon as the flow line leaves the location it is no longer his responsibility.

"The pumpers would report to him about shortage of production and information regarding the surface equipment.

"This analyst would then take the necessary equipment to the well to make the analysis. If it was necessary to call labor or the well service unit, or change equipment or substitute, this analyst would have the authority to do it, in an effort to reduce lost production and save money.

"If this sounds like too much authority to turn over to a man, it could be handled by having a superintendent who is also qualified in this activity, over several analysts, and then he could ride herd over these lesser experienced men and see that the better job is done.

"If one man quits or a new man comes to work, the trained man in place can train and watch a new man without loss.

"Also, men can climb the ladder and maybe become Vice-President of Well Analysis Department. Why not? There are Vice-Presidents of Geology, Vice-Presidents of the money department, Vice-Presidents of Marketing, Vice-Presidents of Refineries. Yet we have been ignoring the most important part of the oil business — the oil well.

"Don't say it can't work because one company has already started. They realized it was so important they couldn't wait so they gave a man a title of "Rod Pumping Analyst", gave him the instruments, the responsibility, and now he receives pumpers reports of trouble and it is his responsibility to analyze and choose method of correction. He calls proper type help and sees that it is done according to his specifications.

"Another company that forced closer cooperation between well analyst and foremen, in a period of six months raised the daily production 900 barrels a day on old wells, without rejuvenation of formation. This does not take into consideration the reduction of operating expenses which were not statistically recorded.

"Another company increased their net revenue $1/4 million in about 7 months of concentration on well analysis.

"These were done before the increase of oil price, so one can see the advantage if done under new price schedules.

"If this work is not done correctly, by someone who can be trained, it might be disastrous, but with a little care in choosing these men for "Well Analysis" great things can be demanded and expected.

"Well Analysis Department" should be able to handle all phases of lift equipment—Rod Pumping, Hydraulic, Gas Lift and Electrical Submersible, and other types that may be developed.

"So look forward to a better profit picture when you have a Vice-President in charge of "Well Analysis Department" or even one person who concentrates on well analysis alone, (without other duties such as meter repair or treating, etc.).

"Let us make that dirty ole nasty oil well have several more years of economically profitable operation before it is plugged and reduces our job security."