

Headline Drill Interval Smear Index (HDISI): A Simple Mathematical Tool to Quantify & Compare the Degree of Smearing when Juniors Report Drill Intervals

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Reporting a positive drill assay interval in a news release headline is the prominent method whereby junior mineral exploration companies attract investors to buy shares in the secondary market, thereby driving the share price and the company valuation higher. Consequently, there is a strong incentive for junior company insiders (management, the board and large influential investors) to ensure that news release headlines containing drill intervals are as attractive as possible.

There are no stock exchange regulations nor industry guidelines on how drill intervals should be calculated. Drill intervals, typically generated by a senior member of the geological team, are the subjective creations of thickness in metres at the mean mathematical grade, calculated from a database of drill sample assays provided by an independent laboratory. The choice of what to include and what to omit from a drill interval is based on a semi-subjective grade threshold, which in-turn is based on the deposit model, e.g., the drill interval creator for a high-grade gold vein system in an underground setting would typically use 3-4 g/t gold as the threshold for what to include in the thickness and mean grade calculation, whereas if the setting was a low-grade, near-surface, oxide gold system the drill assay cut-off could be as low as 0.2-0.3 g/t gold. There is credibility risk in reporting a drill interval that is unequivocally uneconomic, e.g., 9 m at 0.7 g/t gold for a body of mineralization 500 m below surface. What tends to happen with obviously uneconomic mineralization is that the drill assays are not reported, i.e., there is a strong bias, created and controlled by the junior company insiders, to report only the best and to ignore the rest. Unfortunately, there are also no stock exchange regulations nor industry guidelines requiring the full disclosure of drill assays, only that what is reported is factual.

Drill intervals generated from high-grade and wide thicknesses of mineralization do not require much thought to construct because they are unequivocally appealing to investors, whichever way they are reported. However, by their nature, obvious discovery drill holes are rare, whereas the majority of drill intervals reported by junior exploration companies could be regarded as 'borderline economic'. The word 'reported' was stressed in the last sentence because the majority of drill holes pass through uneconomic rock, but as mentioned above, these tend to be ignored/not reported. Because junior companies gain the maximum share price lift from positive drill assays, which are typically costly to collect and the dream of discovery is the main reason why investors bought the shares, insiders are motivated to portray the all-important headline drill interval in the best possible manner. Both grade and thickness are important components of the headline drill interval, and for the purpose of sticking to the topic there will not be mention of the importance of uncut grade v cut grade, or true thickness v apparent thickness. These are sources of additional contention in how insiders calculate and report drill intervals.

With 'borderline economic' drill intervals insiders want to present the assay data in a format suggesting that their project could be a mine if more of the same is delineated. This is achieved through choices made when generating the headline drill intervals, because many potential investors will not look past the headlines when scanning the dozens of junior exploration company news releases published every business day. What is attention-grabbing for experienced investors are headline drill intervals where there are mineable grades over mineable thicknesses, depending on the perceived deposit style, hence junior company insiders perform their width and grade calculations with the audience in mind. Successful mining projects require a body of mineralization with continuity between drill holes, hence junior company insiders try to upsell the continuity aspect by calculating a mean grade over a drill thickness by mixing the highest-grade drill intervals with less well mineralization wall rock. The degree of grade 'smearing' is important because it may give the perception that the interval is potentially economic, when in reality the probability is lower. This is because as the grade rises in any mineral deposit, the degree of continuity declines. Consequently, if there is a single very high-grade drill gold assay over one metre, there is a strong desire to mathematically 'smear' enough of the grade into adjacent metres so that the calculated mean grade remains above a likely mining cut-off grade, but there are more tonnes (based on the greater drill interval thickness) and there is a greater perception of continuity because the grade is lower. All potential drill interval calculations are mathematically correct, but the greater the smear, the greater the deliberate aim to mislead the news release readers. Consequently, it would be valuable to have a quantifiable method to assess the degree of smearing, especially when comparing the headline drill intervals provided by different junior companies. A logical follow-on conclusion is that the bigger the smear, the greater the desire by insiders to advertise beyond the realms of reality, i.e., higher scores are expected from junior companies with the greatest tendency to try to mislead investors via their news release headlines. There is always a degree of smearing when calculating an aggregated drill interval because it involves generating a mean grade, but only the most shameless promoters will have the gall to report extreme cases of smearing in the headline of their potentially most impactful news releases.

The 'Headline Drill Interval Smear index' (HDISI) is simple to calculate and is best explained via a recent real-world example. On 8 January 2019, Juggernaut Exploration Ltd released news with the following headline: "**JUGGERANUT DRILLS NEW GOLD ZONE GRADING 6.85 G/T AU OVER 9.0 METRES ON MIDAS**". In the table of summary drill results in Juggernaut's news release, which only provided assays for intervals for four of the 16 holes drilled in 2018 (the other 12 must not have intersected anomalous gold mineralization), the interval of 6.85 g/t gold over 9.0 m included a narrower, much higher-grade zone of 60.4 g/t gold over 1.0 m. Multiplying the grade by the thickness of both intervals delivers 61.65 gram-metres ('g-m') for the headline drill interval and 60.4 g-m for the 1 m thick internal high-grade zone. Subtracting the high-grade zone g-m from the headline interval g-m leaves only 1.25 g-m for the 'remainder', i.e., *Headline = Best + Remainder, or Remainder = Headline - Best*. This 1.25 g-m total gold content is the contribution for the remainder of the 9 m headline drill interval not in the 1 m thick high-grade interval, i.e., 8 m. Dividing the 1.25 g-m into the 8 m remainder results in a mean grade per metre of only 0.156 g/t. The HDISI is a simple ratio of the g-m in the headline drill interval (60.4

g-m in this example) and the g-m calculated in the remainder (1.25 g-m), i.e., $HDISI = \text{Headline } g\text{-m} / \text{Remainder } g\text{-m}$. Juggernaut's headline drill interval smearing index of 48.3x is an extreme outlier when compared to other randomly selected headline drill intervals reported in the same week, e.g., 10.85x for Granada Gold on 8 January 2019 at their Granada project in Quebec, 2.0x for SilverCrest Metals on 9 January 2019 on the Babicanora Vein on their Las Chispas project in Mexico, and 3.3x for Benchmark Metals on 11 January 2019 at their Lawyers project in BC. Further HDISI calculations are required to develop statistically sound quantitative thresholds to define the degree of assay smearing in headline drill intervals. Initial thoughts are that low single digit HDISI scores reflect minimal smearing, HDISI scores either side of 10x represent a concerning level of smearing, whereas a HDISI exceeding 15x is derived after insiders made a conscious decision to mislead investors. Preliminary reviews of a random collection of news releases with drill assay headlines noted several where the HDISI could not be calculated because greater granularity on the assays used to calculate the headline interval were not provided. This could either mean that the individual grades within the headline interval are similar to the overall grades, and the detail is not required (this is positive for investors), or the news release writer realizes that they could be criticized by being accused of smearing, therefore they omit to include greater detail (this is negative for investors). This is another criticism of the regulation surrounding the selective disclosure of drill assay data by mineral exploration companies and a loophole that less scrupulous insiders can use to the detriment of investors who only have exposure to the drill assays that a company chooses to publicize, even though investors provided the capital that enabled a junior to drill the holes! Investors should have the right to assess the overall quality of all the drill holes that they funded. There have been previous requests by industry participants for all drill assays to be published, e.g., by Corebox.net, but to date the regulators who set disclosure rules in Canada have decided to allow companies with drill assays to cherry pick the data they report from what investors have paid to obtain. If the HDISI catches on with investors and industry analysts, under current disclosure rules it will be simple for less scrupulous juniors to continue generating misleading news release headlines by reducing their drill assay disclosure so that the HDISI cannot be calculated.

In summary, the higher the HDISI, especially in the teens and above, the more blatant the case of deliberately smearing high-grade drill assays when juniors compose headlines for their most important news releases. It is also likely that there will be a positive correlation between regularly high HDISI scores, and the degree of low value-add promotion practiced by the junior company, because of the deep consideration given when composing the headline for every drill assay news release.