THE KENNECOTT EAGLE MINE PLANNED FOR UPPER MICHIGAN IS PREDICTED TO BE UNSTABLE.

AUGUST 2010

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The Kennecott Eagle Project

UNSTABLE

JP August 2010

FIFTY FEET OF DIAMOND DRILL CORES FROM CROWN PILLAR – HOLE 67

Stability depends more on rock structure than on laboratory measurements of strength of small, select, intact samples. Take a close look.

THE KENNECOTT EAGLE PROJECT APPLICATION FOR PERMITS TO MINE IS REPLETE WITH ERRORS AND OMISSIONS; BUT, MOST SIGNIFICANTLY, WHEN A VERY FEW OF THE ERRORS ARE CORRECTED THE KEMC CONCLUSIONS ARE REVERSED AND THE MINE AND THE CROWN PILLAR ARE PREDICTED TO BE

UNSTABLE.

Jack Parker, August 2010.*

INTRODUCTION. In the past four years I have tried several times to show the many errors and omissions in the application – but have bogged down in details. The reports begin to resemble encyclopedias, full of facts perhaps, but nobody reads encyclopedias from beginning to end.

This time I confine my observations to the most significant errors – those concerning health and safety, primarily the stability of the mine and the crown pillar in particular. The crown pillar is the rock above the mine.

Instead of beginning with the basics, such as the strength of the various rock types, and progressing through all the steps in mine design, I begin with the conclusions, given in red ink above – to get your attention. Then come brief discussions of the factors which Kennecott/Golder (K/G) presented to show how they arrived at their conclusion that the mine would be stable. Then I show how obviously they departed from reality, and how their conclusions must now be reversed.

Discussion of just two of their design approaches should suffice to convince the reader that the K/G conclusions are incorrect and dangerous, but I will include a few others for good measure.

The reader may ask, "If the mine design is so incredibly bad why hasn't it been corrected?" I speculate that no knowledgeable persons have studied it (except Sainsbury) and those who are not conversant with mine design must have thought that mining giants such as Kennecott and Golder Associates and Rio Tinto could be trusted to do good work. If so – they are badly mistaken.

Politics and theoretical considerations can be deferred, but structural stability must be addressed immediately. It is indeed a matter of life and death. To ignore this warning – not emotional and not political but entirely technical – is to share the consequences – the blame.

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* Jack Parker is a semi-retired mining engineer/geologist – BS Mining Engineering, BS Geological Engineering and MS Geology at Michigan Tech in the 1950s. He has worked in and around mines, here and abroad, since 1946. Since 1971 he has been "self employed," helping mine operators to resolve problems in mine design and operation, specializing in practical rock mechanics – which he defines as "an understanding of the properties and behavior of rocks and rock structures – and what to do about it." The knowledge comes from experience in more than 500 underground mines. He has written numerous technical papers concerning the practical approach (First go look at it!) and has presented many seminars to miners and engineers. He dropped the title "consultant" when an early client said that it was condescending. It is.

On this Kennecott project he was originally hired by NWF (National Wildlife Federation) in April 2006, to help with technical evaluation, but the funds ran out and for the last three years he has continued to work on the project unpaid – but also independent.

THE APPROACH TO MINE DESIGN. Kennecott, through their consulting experts Golder Associates, chose to employ a "computer modeling" approach, whereby numbers are plugged into computer programs and formulas to arrive at designs.

Neither of MDEQ's hired experts, David Sainsbury and Wilson Blake, approved the approach. Because the programs and the input to them are based on absolutely invalid assumptions, I too disapprove, vehemently.

UCS – Unconfined Compressive Strength of the rock is a prime example. All of the calculations and the predictions depend on it, yet Kennecott began their program by using an indirect and unacceptable method to measure it – the Point-Load test.

Even when Kennecott, or other operators, use "acceptable" methods to measure UCS I hold their results at arm's length – because they are simply NOT representative of the rock mass or the conditions encountered underground. The rocks don't lie but the numbers do.

A typical 4" length of 2" diameter diamond-drill core is said to represent the properties of the rock mass in which a structure is to be formed – but in all steps of sample selection and testing the results are skewed because one begins by taking the best specimen in sight and by ignoring all the defective pieces and structures on which the real mine is likely to fail. Similarly if a specimen falls apart "prematurely" in a test the result is thrown out.

In theoretical circles that dilemma is handled by applying an arbitrary "safety factor," reducing the measured strength by 50% perhaps, and in so doing reducing the process to guesswork. I would expect those who make a living this way to defend it vigorously, but not to change it.

For some purposes the UCS tests can be useful, as, for example, when comparing wet strength to dry strength – because that particular test should lead you to modify your mining techniques. K/G failed to consider that point.

RQD – Rock Quality Designation. This system was introduced by a Professor Don Deere half a century ago to make numbers somewhat more acceptable in core description.

K/G misapplies the system. Instead of using it to "red flag" sections of poor core which would indicate potential instability – the K/G approach actually hides them.

By definition the RQD is the percentage of a sample of core which arrives at surface in lengths greater than two core diameters. Example: If 10" of a 2" core 4 ft. long arrives in pieces shorter than 4" – then the RQD will be 38/48 = 80%, commonly referred to as 80.

Shortcomings are recognized. For example, the core is not truly representative. The cross-sectional area of a 2" core is about 3 sq. in. and it is meant to represent an area say 100 ft. square, i.e 1,440,000 sq. in., that is, 1 in 480,000! Go look at a quarry face to help you understand the insignificance of that little sample.

Another example is that much depends on the orientations of the core and the fractures. If they are

parallel the core may encounter no fractures, for an RQD of 100, but if the core is vertical and bedding planes are horizontal, for example, then the RQD could be much lower – in the same rock mass. Keep that in mind and you'll be a step ahead of most of the experts who just look at the numbers.

In their paper Deere and Deere specified that the RQD should be assessed as soon as the core comes up the hole. Kennecott specifies that the core should be boxed and hauled to a lab for assessment.

Deere and Deere stressed the importance of "red flagging" sections of poor core because they threaten stability of the structure. Kennecott hides the poor core, by diluting it in a long sample.

For example, 18" of poor core in Kennecott's 10 ft. sample would earn an RQD of 102/120 = 85, whereas in Deere's recommended 5 ft. sample the same 18" of poor core would earn an RQD of 42/60 = 70, a much lower value. Kennecott intentionally skews the data in their favor.

RQDs do have some value. An RQD of 95 would be encouraging, for example (but with reservations), and an RQD of, say, 22 would be instantly discouraging, as far as structural stability is concerned.

RMR – Rock Mass Rating – is a system developed by industry and academia to improve on RQD, by applying modifiers observable in real rock masses (as opposed to small, selected intact specimens).

K/G again got it wrong in several ways, intentionally or otherwise, with the end result that plans and predictions of stability are also incorrect. Deplorably so.

This is their formula: RMR = A1 + A2 + A3 + A4 + A5.

A1 is the lab-measured UCS of rock samples. We have already discredited the sampling and testing procedures with their unrealistically high results, which do NOT represent the rock mass. Still, in an exhibition of blind folly, K/G accepts them and points are awarded as follows: 4 points for the lowest strength, 15 for the highest and 7 or 12 for intermediate strengths. I do not consider that procedure scientific.

A2 is based on the RQDs, carrying with them the same limitations. For an RQD of 25 or lower only 3 points are allowed. RQDs between 40 and 100 are divided by 5 – so an RQD of 70 would get 14 points. This procedure too is arbitrary, not scientific.

A3 is based on the spacing of natural discontinuities in the core, so it too is related to RQD. If breaks are 10 ft apart, as in massive rock, 30 points are awarded. (This would be true even if the core had managed to sneak between two major parallel fractures.) If the breaks are close together, say 2" apart, the core still gets 5 points – although to my way of thinking it adds nothing to strength of the structure.

A4 depends on the condition of the breaks – are they filled or open? Altered? Rough? Smooth? Up to 25 points can be assigned – based on some individual's opinion and sense of job security.

A5 is, in the present context, very significant, because all of the RMRs assigned in the project are 10 points too high. A5 relates to the degree of wetness or dryness in the breaks. Elsewhere in the application, notably the Subsidence report, the rocks are considered to be water-saturated, but in the RMR modification they are said to be dry.

Points to be awarded varied initially from 0 to 15, depending on dryness, until Sainsbury pointed out the 15 could bring the total higher than 100 – so K/G reduced the A5 maximum to 10 points.

CONSIDERING THAT THE ROCKS ARE WET, NOT DRY AS ASSUMED, ALL OF THE RMRs ARE TEN POINTS TOO HIGH. Initially, when the maximum was 15 points, the RMRs were 15 points too high. It is not clear whether the correction should therefore be 10 or 15.

EITHER WAY – THE CORRECTED RMRs, APPLIED TO K/G METHODOLOGY, PREDICT THAT THE MINE AND THE CROWN PILLAR WILL BE **UNSTABLE**.

You may need to read that sentence again. You'd better believe it.

MANIPULATING THE RMRs. ALL OF THE DESIGN WORK AND THE PREDICTIONS OF STABILITY, AND THE OUTSIDE REVIEWS, DEPEND ON THE COLORED DRAWINGS, PLANS AND SECTIONS OF RMR FURNISHED BY K/G. ALL ARE DEFECTIVE, SKEWED TO FAVOR THE SUCCESS OF THE APPLICATION.

DRAWINGS COMPARING RQDs AND RMRs. Figure 1 is an example. Tabulated values were transferred to drawings at the location of the drill holes. Contours (lines of equal value) were then interpolated between holes. Then the areas between contours were color-coded, from red to show poorest conditions to green and blue showing the best.

Note immediately that the contours around the red holes are close together – "bull's-eyes" – implying that their influence is local, not widespread. The contours between blue/green holes are far apart, implying that the good conditions *are* widespread. That, of course, skews the information toward favorable conditions.

Apart from drilling additional holes there is no way to predict what lies between holes, whether the change from red to blue is abrupt or gradual, or where the change takes place. K/G opts for optimistic interpolation, more guesswork.

MOST GRIEVOUS IS THE SYSTEMATIC AND UNFORGIVABLE OMISSION OF LOW-RMR DATA FROM THE DRAWINGS AND THE CONCLUSIONS DEPENDENT ON THEM. THEY HID THE BAD NEWS.

Figure 1 illustrates the point. It represents conditions on a horizontal slice through the ore body, roughly in the middle of the ore body (see lower sketch).

At top left in the upper drawing, RQDs, is a large ominous patch of reds and oranges. This is appropriate, because the cores there are broken and the RQDs are low. Look again at the front cover of this report. Does that look like "solid rock"?

But now look at the middle drawing, RMRs. That ominous red/orange patch does not show up!

Hey! We, like everybody else, had assumed that we were being fed sound engineering information; but now we smell a rat. Existence of the rat was confirmed when we obtained a tabulation of RQDs and RMRs for "our" eight holes. THE LOW RQD VALUES WERE ON RECORD, BUT CORRESPONDING RMRs WERE MISSING. THOSE LENGTHS OF POOR CORE HAD BEEN OMITTED AS IF THEY DID NOT EXIST. MINE PLANNERS, REGULATORS AND OUTSIDE REVIEWERS ALIKE DID NOT NOTICE THE DECEPTION. It is subtle and clever, although not especially smart.

SO SAFETY WAS INTENTIONALLY COMPROMISED. We checked all eight of "our" cores and found the same "mistake" in all of them. In Hole 64, one of the 26 chosen by K/G to represent the rocks in and around the crown pillar, **87** feet of poor core was omitted from the RMRs.

Curious to see how much the missing lengths had affected the apparent RMRs on the tables and the drawings, I took the RQD/RMR records of the upper part of "our" eight holes – assigned low or zero RMRs for the low-RQD core – then recalculated the weighted RMR averages for the upper 100 ft., 200ft. and 300 ft. of core in each, as if evaluating the three proposed thicknesses of crown pillar.

I WILL COME BACK TO THE BUSINESS OF "WEIGHTING IN THE AVERAGES."

The results appear on page 7. Note that the highest RMR number in and around the crown pillar is 62.5. There are no 70s, 80s or 90s. All are sub-standard. And that was reported in February 2008. **If I had looked into the RMR dry-rock issue AT THAT TIME THE NUMBERS WOULD HAVE BEEN 10 POINTS LOWER THAN THESE! Maybe 15 points lower.**

While I will never endorse the K/G methods, I conclude that – using their "methodology" and their numerical input, corrected for obvious "errors" – the outcome has to be that the structure, as planned, will be UNSTABLE.

After his relatively short study the MDEQ's #1 mining expert, David Sainsbury, stated that the conclusions in the application were not considered to be defensible, which means that they could not be supported by fact. We are in agreement.

Their other expert, Wilson Blake, opined that he could not explain the omission of critical data – that it was not a normal procedure. He reviewed only a small part of the application; therefore, the final statement in both of his reports – a recommendation that the permits be approved – was unwarranted and should be questioned.

SO WHAT IS TO BE DONE?

I WOULD REJECT THE APPLICATION, IMMEDIATELY, AS INCOMPLETE AND INADEQUATE AND SERIOUSLY DEFECTIVE, DECEPTIVE, DANGEROUS AND INCREDIBLY INCOMPETENT.

It is not unreasonable to assume that anybody who reads this warning and does nothing about it will share the consequences if anything goes wrong at the mine.

If there is to be another application I would steer it away from the proposed bulk mining and toward a more selective method, with smaller openings, to be backfilled quickly with strong material. Then the ground could be controlled

Jack Parker, Mining Engineer

Toivola, Michigan 49965

There you have my conclusion and recommendations.

In case you have the need and the stomach for supporting stories – I have added a short bonus section.

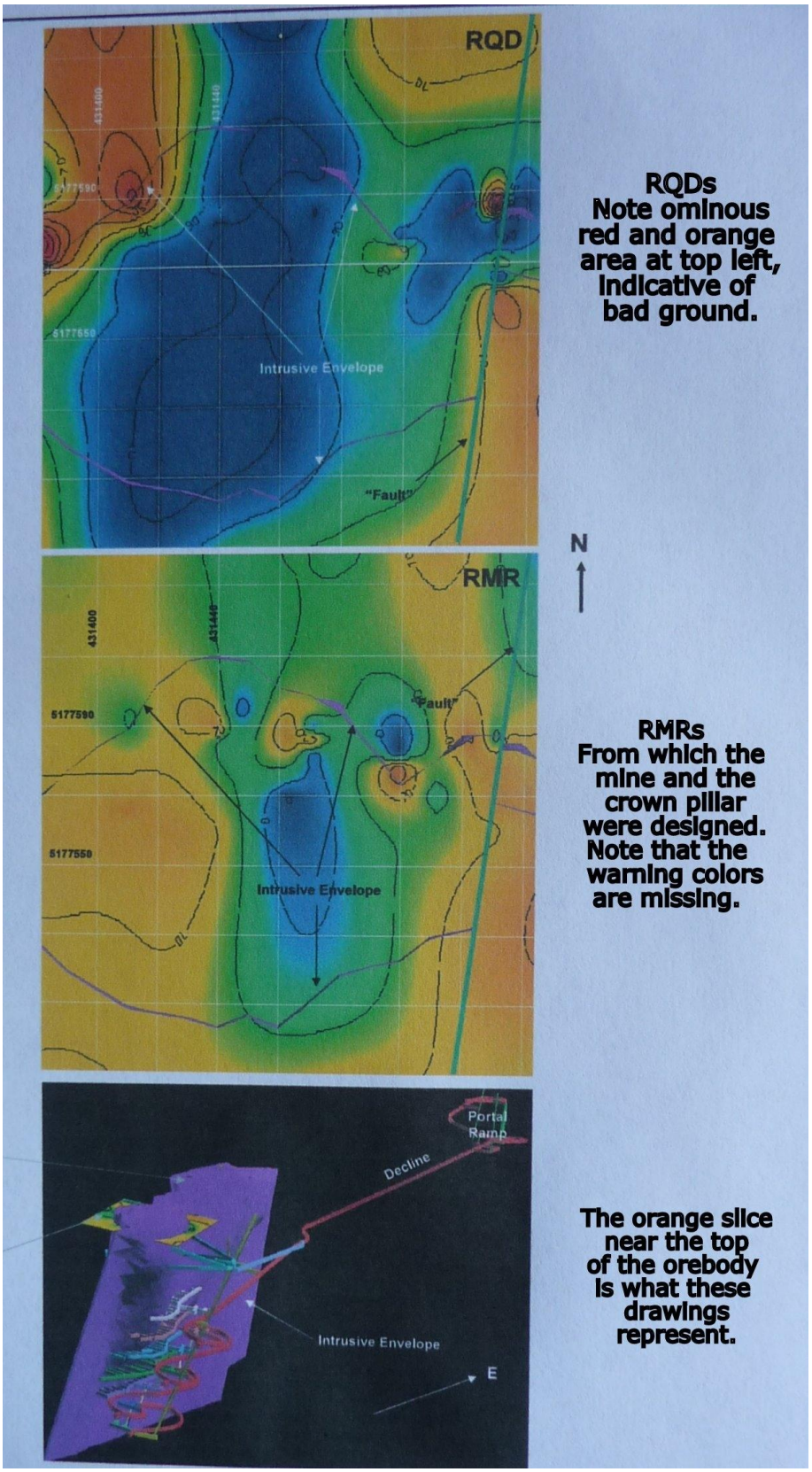

RQD
431400
431440
5177590
5177550
Intrusive Envelope
"Fault"
RQDs
Note ominous red and orange area at top left, indicative of bad ground.
N
RMR
431400
431440
5177590
5177550
"Fault"
Intrusive Envelope
RMRs
From which the mine and the crown pillar were designed. Note that the warning colors are missing.
Portal
Ramp
Decline
Intrusive Envelope
E
The orange slice near the top of the orebody is what these drawings represent.

Figure 1

A tabulation: Crown pillar eight holes RMRs revisited Feb 2008.

HOLE NUMBER	THICKNESS AVERAGED	WEIGHTED AVERAGE RMR	
55	100FT	53	
	200	57.6	
	300	62.5	
60	100	27.5	
	200	44	
	286	49.7	bottom of hole
62	100	3	
	200	38	
	300	28 … there is a 111ft gap in RMR data. Maybe 41 if I assign a low RMR to part of it.	
64	---	0	No RMR assigned to upper 126ft!
	200	46.7	
	300	55	
67	100	36	upper 41 ft had no RMR given.
	200	45	
	300	52	
69	100	40	no RMR for upper 40 ft
	200	56	
	300	57	
99	100	52	no RMR for upper 57 ft
	200	55	
	300	56	
101	100	28	no RMR for upper 56 ft
	200	49	
	300	53	

I used the KEMC RMRs. Assigned RMR of zero where RQDs were too low. Calculated weighted average RMRs for the three proposed thicknesses of crown pillar.

If I had subtracted the 10 points, for wet conditions, from the KEMC RMRs the new weighted averages would be even lower than shown.

RMR equivalent descriptions: 90-100 very good; 70-90 good; 50-70 fair; 25-50 poor; 0-25 very poor.

Minimum requirement for stability is not clear in document, is probably 70.

IF THAT IS SO THE CROWN PILLAR WILL NOT BE STABLE AT ANY OF THESE EIGHT HOLES, EVEN IF 300FT THICK.

A bonus section.

**A SHORT, GUIDED TOUR THROUGH THE APPLICATION,
POINTING OUT A FEW ADDITIONAL PITFALLS.**

THE ROCKTYPES: All of them are very old, Precambrian, pre life on earth, no witnesses.

1. Sedimentary. The ancient equivalent of sandstones and siltstones, altered somewhat by time, pressure and elevated temperature. Generally grey in color.

2. Igneous – formed in fire. Intruded molten from great depth, tens of thousands of feet, into the sediments – fracturing some and thrusting them up and aside, assimilating some and adding juices to some. Generally dark in color and heavy. Recognized by geologists as gabbro, peridotite, feldspathic peridotite and pyroxenite, all closely related. Hornfels is a product of alteration at the contact of igneous and sedimentary rocks.

From our design point of view all are much stronger than the sediments. While I have little faith in the compressive strengths given on page 7 of the K/G Geotech report, they are useful for comparison.

Sandstone 9,315 psi, siltstone 10,730 psi.

Feldspathic peridotite 13,340, Gabbro 17,255, Peridotite 17,400

Pyroxenite 19,720, Hornfels 21,170 psi.

Note the ridiculous degree of precision in those numbers.

Never forget that they come from perfect little specimens, not typical of the rock masses.

At the bottom of page 10 of the July 7, 2006 Golder report we learn that the crown pillar is comprised primarily of peridotite – so peridotite strength was used in mine design. 17,400 psi.

Suspecting malarkey I went to their "Lithologs," which record rock types and depths in all 27 of the holes deemed representative of crown pillar conditions. They appear in my chart as **Figure 2**, on the next page.

Figure 2

Do you agree that peridotite is the primary rocktype in the crown pillar? (Plum color.)

Do you see a considerable proportion of sediments there (green)?

Is it fortuitous that they selected peridotite (17,400 psi) and disregarded the sediments (9,135 and 10,730 psi)?

How would that affect their predictions of structural stability?

When you see the variety of rock types in the crown pillar do you think that it is appropriate to select only one for design purposes?

Suppose that you have a pile of 2x4s in your yard – spruce, basswood, pine and oak – would you design your house as if they all exhibited the strength of oak?

If K/G were to object that much of the green is in the walls, not the roof of the mine, I would respond by observing that I would not expect the roof of my house to stand if the walls collapsed.

A CLOSER LOOK AT ONE OF THE CORES. I chose Hole 67, which is one of the 27 selected by KEMC as being representative of the rocks in the crown pillar. Hole 67 is near the middle of the Lithic Log chart. Depths are given in meters (to confuse? Just multiply by 3.3 to convert to feet). Only the uppermost 300 ft are shown, to include the crown pillar rocks.

At Hole 67 the upper 12m (41ft) is sand, clay and gravel. Then comes 27 ft of peridotite, weathered and fractured of course. Then 10.6 ft of hornfels – and 27 ft of pyroxenite, then 35 ft of hornfels, 45 ft of siltstone, 15 ft of hornfels, 27 ft of gabbro, then 277 ft of peridotite. Definitely not all peridotite, right?

Now comes the important part: look again at the core photos just inside the front cover of this report.

They show the physical condition of cores in the crown pillar. Would you describe it as favorable? Stable? Solid rock? YOUR REACTION IS IMPORTANT BECAUSE THIS IS THE UPPER PORTION OF THE CROWN PILLAR. IT CONTRIBUTES LITTLE OR NO STRUCTURAL STRENGTH BUT ADDS DEAD LOAD. AND YET K/G ALWAYS INCLUDE THOSE UPPER ROCKS IN THEIR CROWN PILLAR THICKNESS AS IF THEY WERE AN ASSET.

This is one of those places at which no RMR was assigned – so the hazard did not show on the RMR drawings issued to designers, regulators and reviewers. Obviously the system has been tweaked in many ways to deceive the unwary.

I will attach part of the RQD/RMR tabulation to illustrate the omission. See **Figure 3** below.

HoleID	from_m	to_m	RQDPct
04EA064	0	8.84	0
04EA064	8.84	11.89	0
04EA064	11.89	13.26	14
04EA064	13.26	14.94	37
04EA064	14.94	17.07	77
04EA064	17.07	17.98	13
04EA064	17.98	19.96	69
04EA064	19.96	20.57	18
04EA064	20.57	21.95	64
04EA064	21.95	24.08	80
04EA064	24.08	27.13	88
04EA064	27.13	30.18	79
04EA064	30.18	33.22	83
04EA064	33.22	35.05	69
04EA064	35.05	36.27	75
04EA064	36.27	38.25	71
04EA064	38.25	41.3	96

HoleID	from_m	to_m	RMR76
04EA064	38.25	41.3	59
04EA064	41.3	42.37	78
04EA064	42.37	45.45	57
04EA064	45.45	48.46	67
04EA064	48.46	51.51	66
04EA064	51.51	54.56	68
04EA064	54.56	57.61	69
04EA064	57.61	59.16	73
04EA064	59.16	60.66	85
04EA064	60.66	63.7	84
04EA064	63.7	66.75	78
04EA064	66.75	69.8	60
04EA064	69.8	72.85	65
04EA064	72.85	75.9	79
04EA064	75.9	78.94	79
04EA064	78.94	81.84	59
04EA064	81.84	84.95	61

At left, on the RQD chart, the upper 11.89m is sand, clay and gravel. Then come poor rocks.

At right the RMRs begin at 38.25m, thus missing 38.25-11.89 =26.36m =87ft of RMRs, which are thus hidden from designers.

Figure 3

I'll show you another way to hoodwink the weary reader.

Look at the next figure, **Figure 4**, which shows the upper part of an RQD log, Hole 101. One is accustomed by now to the idea that K/G works with 3.3m samples, close to 10 ft/box, and one scans the table to get a general impression of core quality. At the top of Hole 101 is a zero, not good, but halfway expected in weathered rocks. Then come a couple of 100s – a nice surprise, somewhat reassuring.

HoleID	from_m	to_m	RQDPct
05EA101	0	16.5	2
05EA101	16.5	16.76	100
05EA101	16.76	17.07	100
05EA101	17.07	18.75	94
05EA101	18.75	20.57	85

HoleID	from_m	to_m	RMR76
05EA101	17.07	18.75	68
05EA101	18.75	20.57	65
05EA101	20.57	22.4	68
05EA101	22.4	24.54	70
05EA101	24.54	26.82	64

Figure 4

Take another look and notice the lengths of those two samples. One is 10" long and the other 12". So rather than having 20 ft. of excellent core we have less than 2 ft. which survived in lengths greater than 4". We were deceived.

One clue to finding these tricks is to look for a very good number in a group of bad ones. It just doesn't look right.

This is where "Weighted average" comes in. In calculating averages I "weighted" each RQD by multiplying it by the length of that sample, then divided total product by total length. You can imagine what happens to averages if you either include or omit a bunch of zeroes.

Lest you think that this trickery was confined to the crown pillar I'll show you a part of Hole 69, at a depth around 400ft – where the RMR is missing from 68 ft of core. That is not in the crown pillar but in the production levels, from 110.5m to 131.06m.

04EA069	98.91	100.6	100	04EA069	105.46	108.8	54
04EA069	100.58	102.7	71	04EA069	108.81	109.7	60
04EA069	102.72	105.5	77	04EA069	109.73	110.5	50
04EA069	105.46	108.8	70	04EA069	131.06	134.1	49
04EA069	108.81	109.7	72	04EA069	134.11	137	56
04EA069	109.73	110.5	50	04EA069	137.01	139.9	64
04EA069	110.49	111.1	0	04EA069	139.9	143.1	59
04EA069	111.1	112.8	62	04EA069	143.1	144.5	59
04EA069	112.78	113.7	33	04EA069	144.48	145.1	47
04EA069	113.69	115.8	94	04EA069	145.08	148.4	67
04EA069	115.82	117.7	63	04EA069	148.43	149.4	73
04EA069	117.65	118.9	89	04EA069	149.35	152.4	68
04EA069	118.87	120.7	49	04EA069	152.4	155.5	71
04EA069	120.7	121.9	64	04EA069	155.45	158.5	69
04EA069	121.92	125	54	04EA069	158.5	161.5	67
04EA069	124.97	128	33	04EA069	161.54	164.6	67
04EA069	128.02	131.1	54	04EA069	164.59	166.4	63
04EA069	131.06	134.1	44	04EA069	166.42	169.5	65
04EA069	134.11	137	86	04EA069	169.47	171.3	69

Figure 5

Well, here's just one more obvious "mistake":

THIS IS A FACT: NOBODY CAN PREDICT THE STABILITY OF A CROWN PILLAR UNLESS THE STATE OF STRESS IS KNOWN. WITHOUT THAT INFORMATION THEY ARE GUESSING. The mass of rock, with all its faults and weaknesses, is held in place by horizontal compressive stress, or restraint, NOT BY THE STRENGTH OF LITTLE SPECIMENS. I repeat – **NOBODY CAN DO IT. But K/G claim to have done it. Another falsehood.**

In court we offered a simple demonstration to show the significance of lateral restraint - simple, inexpensive, conclusive and lasting less than half an hour. The judge said "OK."

A standard concrete block in excellent condition (RQD and RMR both 100) was to be held 2 meters (6 feet) above the head of the KEMC lead attorney by his assisting attorney (both having impeccable credentials) as he sits in a comfortable chair, facing the cameras, thoughtfully stroking his moustache, eyes lifted toward heaven. To support the block the lady was to apply only compression to the ends of the block, with her hands. That was the set-up. I would go out for a cup of tea and return in 20 minutes or so, accompanied by a janitor equipped with mop and pail.

The attorney cleared his throat and changed the subject, as if to decline the offer.

Something similar happened at the nearby Athens iron mine, where a crown pillar of "jaspilite," a very strong rock, 1800 ft thick, collapsed overnight because it was bounded by near-vertical faults and dikes, with wet and slippery contacts – known locally as "soaprock." Lateral compression and friction were lacking and the rockmass fell as a plug. Sainsbury was directed, by the DEQ, to remove this case history from his reports, for rather obvious reasons. Incidentally – K/G's crown-pillar expert told the court that the crown pillar rock (UCS 45,000 psi) resembled wet coffee grounds! Hm.

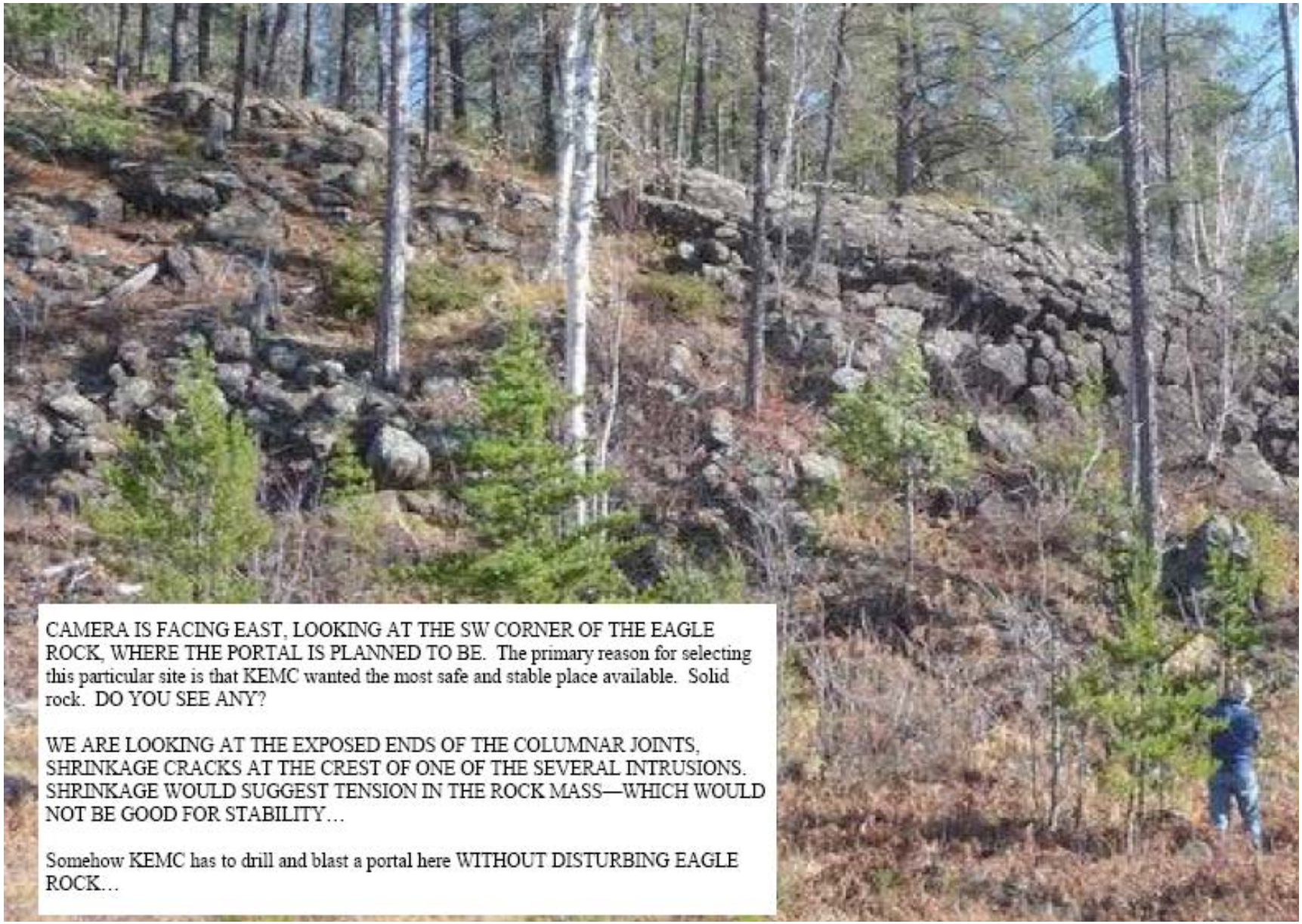
In response to our criticism K/G later plugged in values of horizontal stress determined by averaging a large number of measurements reported from the Canadian Shield, thousands of square miles of it. That, of course, is ridiculous and meaningless for our small and specific area of interest. A first-year mining student would not have approved that assumption, which was more evidence of incredible incompetence.

K/G could have and should have measured stresses in the outcrop close to the ore body, in a week or so, at a cost of less than $15,000 ……..

Enough? You want more?

On the next page, p 13, you'll see the portal site selected by RT for KEMC, the west face of Eagle Rock. The story issued for public consumption was that they wanted solid rock. Does it look solid to you?

Then finally comes another box of core from the crown pillar, your roof rock, as page 14. Think about it.


CAMERA IS FACING EAST, LOOKING AT THE SW CORNER OF THE EAGLE ROCK, WHERE THE PORTAL IS PLANNED TO BE. The primary reason for selecting this particular site is that KEMC wanted the most safe and stable place available. Solid rock. DO YOU SEE ANY?
WE ARE LOOKING AT THE EXPOSED ENDS OF THE COLUMNAR JOINTS, SHRINKAGE CRACKS AT THE CREST OF ONE OF THE SEVERAL INTRUSIONS. SHRINKAGE WOULD SUGGEST TENSION IN THE ROCK MASS—WHICH WOULD NOT BE GOOD FOR STABILITY…
Somehow KEMC has to drill and blast a portal here WITHOUT DISTURBING EAGLE ROCK…

THIS IS FROM YOUR ROOF ROCK!

THIS IS AN 8.5-FT. SAMPLE FROM THE "SOLID ROCK" EAGLE CROWN PILLAR.

Part 324.63223—False Representations in Application

- (4) A person who on or after February 1, 2005 intentionally makes a false statement, representation, or certification in an application for or form pertaining to a permit under this part or in a notice or report required by the terms and conditions of a permit issued under this part is guilty of a felony and may be imprisoned for not more than 2 years and shall be fined not less than $2,500.00 or more than $25,000.00 for each violation. If the conviction is for a violation committed after a first conviction of the person under this subsection, the court shall impose a fine of not less than $25,000.00 per day and not more than $50,000.00 per day of violation. With the exception of the issuance of criminal complaints, issuance of warrants, and the holding of an arraignment, the circuit court for the county in which the violation occurred has exclusive jurisdiction. Knowledge possessed by a person other than the defendant under this subsection may be attributable to the defendant if the defendant took affirmative steps to shield himself or herself from the relevant information.
- (5) Upon a finding by the court that the actions taken by a criminal defendant on or after February 1, 2005 pose or posed a substantial endangerment to the public health, safety, or welfare, the court shall impose, in addition to the penalties set forth in subsection (2), a sentence of 5 years' imprisonment and a fine of not less than $1,000,000.00.
- (6) To find a defendant civilly or criminally liable for substantial endangerment under subsection (2) or (5), the court shall determine that the defendant knowingly or recklessly acted in such a manner as to cause a danger of death or serious bodily injury and that either of the following occurred:
- (a) The defendant had an actual awareness, belief, or understanding that his or her conduct would cause a substantial danger of death or serious bodily injury.
- (b) The defendant acted in gross disregard of the standard of care that any reasonable person should observe in similar circumstances.

We told you this in 2007, three years ago!

MORE COMMENTS ON THE SAINSBURY PAPERS
AUGUST 11TH 2007

In the first three papers (attached) a draft report, a final report and a technical memo, Sainsbury provided to the Michigan DEQ and to MFG clear warnings that the conclusions in the mining permit application were inadequate, inaccurate and "not defensible" – which means that they can not be supported by facts..

That should have been enough to stop the permitting process immediately. A screeching halt.

Then, in a fourth document – the one-page letter dated November 9th 2006, Sainsbury wrote to DEQ and MFG that the information provided did not allow an accurate assessment of crown pillar stability but, for reasons not given, he did not elaborate on that statement. That, of course, did not change the conclusions expressed in his first three documents.

In the November 9th letter he said instead that provided mining did not proceed higher than a certain elevation (not clearly defined) …

He wrote "It is recommended", not I recommend, "That the mining permit be limited …" as if implying that it would be granted.

HE OMITTED BUT DID NOT WITHDRAW OR ALTER ANY OF THE EARLIER STATEMENTS, WHICH WERE REPEATED MANY TIMES FOR GREATER EMPHASIS.

THE MOST TELLING OF THOSE STATEMENTS, WITH WHICH I CONCUR, WAS THAT THE VERY FOUNDATIONS OF THE APPLICATION ANALYSES AND DESIGNS – THE ROCK QUALITY CHARACTERIZATIONS (RQD AND RMR) ON WHICH CALCULATIONS, MODELS AND ILLUSTRATIONS WERE BASED - WERE FAULTY, HENCE MISLEADING. HE HIMSELF HAD TO USE THEM BECAUSE NOTHING BETTER WAS PROVIDED.

GIVEN THAT THE ROCK CHARACTERIZATIONS ARE FAULTY – ALL OF THE MINING DESIGNS IN THE APPLICATION ARE ALSO AT FAULT – NOT ONLY THE CROWN PILLAR ANALYSIS. ALL ARE SUSPECT.

I recommend that the first three documents be accepted as written, and acted upon. The November 9th letter should be discarded, but only after its raison d'etre has been established.

Jack Parker
August 11th 2007