

## XANIDU TRADERS\*

### 1. Preliminary Problem Statement

Xanidu Traders, a privately held U.S. metals broker, has acquired an option to purchase 1,000,000 kilograms of partially refined molybdenum ore from the Zeldavian government for \$5.00 per kilogram. Molybdenum can be processed into several different products which are used in semiconductor manufacturing, and George Xanidu, the owner of Xanidu Traders, estimates that he would be able to sell the ore for about \$8.00 per kilogram after importing it. However, the U.S. government is currently negotiating with Zeldavia over alleged dumping of certain manufactured goods which that country exports to the U.S. As part of these negotiations, the U.S. has threatened to ban the import of a class of materials which includes molybdenum from Zeldavia. If the government refuses to issue an import license for the molybdenum, then Xanidu will have to pay a penalty of \$1.00 per kilogram to annul the purchase of the molybdenum.

Xanidu has used the services of Danial A. Analyst, a consulting decision analyst, to help in making decisions of this type in the past, and George Xanidu calls on him to assist with this analysis. From prior analyses, Xanidu is well-versed in decision analysis terminology, so he is able to talk in fairly technical terms with Analyst.

Analyst: As I understand it, you can buy the 1,000,000 kilograms of molybdenum ore for \$5.00 a kilogram and sell it for \$8.00, which gives a profit of  $(\$8.00 - \$5.00) \times 1,000,000 = \$3,000,000$ . However, there is some chance that you cannot get an import license, in which case you will have to pay \$1.00 per kilogram to annul the purchase contract. In that case, you will lose  $\$1.00 \times 1,000,000 = \$1,000,000$ .

Xanidu: Actually, some chance may be an understatement. The internal politics of Zeldavia make it hard for their government to agree to stop dumping their manufactured goods over here. The chances are only fifty-fifty that I will be able to get the import license. As you know, Xanidu Traders is not that large a company. The \$1,000,000 loss would be serious, although certainly not fatal. On the other hand, making \$3,000,000 would certainly help the balance sheet

### 2. A New Alternative

Analyst: Maybe there is a way to reduce the risk. As I understand it, the reason you need to make a quick decision is that Zeldavia has also offered this deal to other brokers, and one of them may take it before you do. Is that really very likely? Maybe you can apply for the import license and wait until you know whether it is approved before closing the deal with Zeldavia.

Xanidu: That's not very likely. Some of those brokers are pretty big operators. Dropping \$1,000,000 wouldn't make them lose any sleep. I'd say the odds are better than two to one that someone else will take the deal if I don't act now. Let's see now, two-to-one odds translates into a 2/3 probability. Yes, the chances are higher

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\* Material in this case is adapted from the "Ore Case" in R. V. Brown, A. S. Kahr, and C. Peterson, *Decision Analysis: An Overview*, Holt, Rinehart and Winston, New York, 1974.

than that there is about a 0.70 probability that someone else will take Zeldavia's offer if I wait until the import license comes through.

### 3. The Value of Additional Information

Analyst: Is there any other way of obtaining additional information? Perhaps there is something that doesn't take as long as waiting for import approval.

Xanidu: Well, there's always John S. Leaze. He is a Washington-based business consultant with good connections in the import licensing bureaucracy. For a fee, he will feel out his contacts and see if they think the license would be granted. Of course, his assessment that the license will come through is no guarantee. If somebody in Congress starts screaming, they might shut down all imports from Zeldavia. They are really upset about the dumping in the Rust Belt, and Congressmen are starting to take some heat. On the other hand, even if Leaze thinks the license won't come through, he might be wrong. Zeldavia might stop the dumping, and then the license would certainly be granted.

He has a pretty good record on calling these things, but not perfect. And he charges a lot for making a few telephone calls.

Analyst: How good has he been?

Xanidu: He's done some assessments for me, as well as other people I know. I'd say in cases where the import license was ultimately granted, he called it right ninety percent of the time. However, he hasn't been so good on the license requests that were turned down. In those cases, he only called it right sixty percent of the time.

Analyst: You commented earlier that he was expensive. How much would he charge?

Xanidu: This is a pretty standard job for him. His fee for this type of thing is \$10,000.

### 4. Uncertainty About the Selling Price

Analyst: How firm are the \$8.00, \$5.00, and \$1.00 figures you gave me earlier?

Xanidu: The \$5.00 buying price is firm. It is easy to see that a lot of money can be made at that price, so if I don't buy at that price, someone else will. Zeldavia isn't going to budge on that. The \$1.00 figure to back out of the contract is also fixed. If I didn't pay that, nobody in that part of the world would work with me, and I'd be out of business.

The \$8.00 selling price is not so firm. Molybdenum prices have been volatile lately. The actual price could be anywhere from \$5.00 to \$10.00. The low end of that range isn't too likely, though. The chances are better than fifty-fifty that I will be able to sell for more than \$8.00.

Analyst: Could you sell for more than \$10.00?

Xanidu: Maybe if there is an embargo or something like that, but it's not likely. The chances of selling for more than \$10.00 are not more than one in a hundred.

Analyst: How about the chances you have to sell for less than \$5.00?

Xanidu: That's not very likely either probably about the same one-in-a-hundred chance as selling for more than \$10.00.

Analyst: You said that the chances are greater that you will be able to sell for more than \$8.00 than for less than that amount. Is that true for \$8.50 also?

Xanidu: No, the chances are greater of selling for less than \$8.50 than for more than \$8.50. I'd say the chances are equal of selling for more or less than \$8.30 a kilogram.

Analyst: Suppose things turn out well, and you can sell for more than \$8.30. Is it more likely that you will be able to sell for more than \$9.00 or less than \$9.00?

Xanidu: It's certainly more likely that I would have to sell for less than \$9.00 even if the price is above \$8.30. Remember that I said the chances are only one in a hundred of selling for more than \$10.00. I'd say that if the price is above \$8.30, then it is equally likely that I will sell for more or less than \$8.60.

Analyst: How about if the price is less than \$8.30?

Xanidu: Well, there is more uncertainty on the low end. A big user of molybdenum right now is Intercosmic Semiconductor. They have a proprietary chip manufacturing process that uses a lot of molybdenum. If somebody figures out a better process, the market for molybdenum would loosen up some. I'd say that if the price is less than \$8.30, it is equally likely to be above or below \$7.60.

Analyst: With the numbers you just gave me, it should be equally likely that the price is below \$7.60, between \$7.60 and \$8.30, between \$8.30 and \$8.60, or above \$8.60. Does that sound right?

Xanidu: Yes, that sounds right.

## 5. The Time Value of Money

Analyst: We've been talking as though all the cash flows associated with this deal will occur at the same time. Is that true?

Xanidu: No. I would have to pay Lease right away if I hire him, but the cash flows for the ore transaction would be over a twelve month period. I would contract with a purchaser right after completing the deal with Zeldavia. However, the ore would be received in three equal shipments one immediately, one in six months, and the final one in a year. I would receive payment for each shipment at the time of shipping and would pay Zeldavia at the same time, so I wouldn't have to borrow money to finance the purchase.

Analyst: How long will it be until the import license is resolved?

Xanidu: Not very long. Only a few days. As I said earlier, the only reason I don't just wait for a resolution on the license before completing the deal is that someone else is likely to take the deal first.

Analyst: What about the annulment penalty of \$1.00 per kilogram? When would that be due?

Xanidu: Just as soon as the licensing issue is resolved.

Analyst: I understand from previous work I have done for you that you always give real (deflated) figures when you are discussing future cash flows. Did you do that here?

Xanidu: Yes. Also, you can use my standard five percent discount rate on those real-dollar cash flows.

## **6. Attitude Toward Risk Taking**

Analyst: I also understand from my previous work with you that financial risks of the size involved in this deal would be uncomfortable but would not sink Xanidu Traders. If you could, you would buy some insurance against the potential loss, but you are not going to avoid the deal just because of the possible loss.

Xanidu: That s correct.

Analyst: I recall that you told me in the past that you would be just willing to accept a deal with a fifty-fifty chance of making \$2,000,000 or losing \$1,000,000. However, if the upside were \$2,100,000 and the downside were \$1,050,000, you would not take the deal.

Xanidu: That s correct.

Analyst: All right. I have everything I need to do an analysis. Let me go crank up my computer, and I ll get back to you in a couple of hours.

Xanidu: Okay. Hopefully, no one else will take the deal in the meantime!

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