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were discovered, but is not yet hooked up to production, you don't have a line into it, a transmission line, the value of the non-producing field would expand as it was developed. There is no doubt of it.

SEN. ORSINI: I'm still not clear. If we would have had an ad valorem tax in Alaska 20 years ago, at what point in time would we start getting ad valorem taxes from Prudhoe Bay?

MR. PASCHALL: At Prudhoe Bay there would have been a basis for taxation of a very modest nature sometime in 1969. When was the discovery, wasn't it late 68?

SEN. POLAND: 69.

MR. PASCHALL: Okay, by mid 1969. So you have a well or two there and you know there's something there. It's going to be pretty puny, a very small value indeed because a pipeline at that time even was almost speculative you might say. And there were a lot of big "if's". There was a lot of discounting of income down the line, tremendous investments to be made before the field could become productive. It would have been a nominal value. A nominal value but perhaps discernible value in 1969. At that time almost the only stand a petroleum appraiser could have made in a way was to say, "Well, there's some value here because I'm sure the operators wouldn't give it away but it can't be very much yet." It demands development to some extent in order to determine value.

SEN. BUTROVICH: You know when we had our sale, big sale in 69, Gulf bought a block of six leases and promised a hundred million bucks, bid almost a hundred million bucks for them. They probably thought there was something there too. How would you as an appraiser appraise those six leases, for example, if you had such a tax?

MR. PASCHALL: Well, you talk about another matter now, Senator. You are talking now about government leases acquired on a bonus bid, but without any development, maybe without even any wildcatting.

nothing, except the company's own geological and geophysical work of course. I have a very dim view of the value of properties like that. I tend to look at them as worth something immensely less than the bid paid for them. I've had some lively debates and I happen to disagree with several assessors in California who are strongly inclined put those properties on the role as possessor interest immediately at the price of the winning bid. But without burdening you with it here, unless you want to be burdened, I can give you the background of an analysis that was published in the Society of Petroleum Engineers book, the Journal of Petroleum Technology. It demonstrates that those bids do not, have not, represented value in the long run. The more parties bid, on the North Slope there were a great many parties involved indeed, they are more apt in the case of sealed bonus bidding, that there's a case apt to arise that the person who acquired the lease actually paid too much. It's a peculiar situation, but that's what it comes down to. I wouldn't want to advise you, let's say I don't want to advise you at all on that matter. That is an assessment problem. In California, for example, under the law the assessor can levy assessment on the possessory right that the lessee acquired when he turned in the highest bonus bid. The assessor makes his own best judgement of what he thinks it is worth and really the only thing he has to go on is the bid itself. That's a legal proposition. If it ever arose sometime when you specifically wanted my professional input on a value of a given parcel that had been acquired then I might go to work, put some time in on it and figure out what a value of it might be. But I'm addressing myself here primarily, and I think your committee is, to the matter of ad valorem taxation of established oil and gas finds, call them reserves, of whatever size.

SEN. BUTROVICH: I'm also interested in your remark about ad valorem tax stimulating development and I just wondered. I can see how that could be possible and certainly a fact. For if you do develop, you've got a pipeline to put the oil in. But when you don't have a market, in other words, when you have a product but you can't market, how do you stimulate development when you don't want what a development well is going to cost you?

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MR. PASCHALL: Can you give me a specific example of this product that doesn't have a market?

SEN. Butrovich: Prudhoe Bay.

MR. PASCHALL: Well, Prudhoe Bay has a market. It just doesn't have an outlet. There is very definitely a market for the oil so that it's quite possible to make a rational appraisal of Prudhoe Bay and then consider that that net income that's going to be derived from Prudhoe Bay is not going to commence until some given later date, mid 1977 or whatever it may be. So that would diminish the value of the field below what it would be if it were producing right now or beginning to produce right now, because the income won't start until some future date. But I don't believe, sir, that it would be correct to say that it wouldn't have a market. It just doesn't have a physical outlet to that market right now.

SEN. BUTROVICH: Let's say it doesn't have a market today or next year.

MR. PASCHALL: That doesn't mean that it doesn't have value though, does it? We know it has value. None of the operators would be content to give it away. They would demand a sizable sum of money for their interest in it and that would represent the value of the property. It is quite possible that all of the evidence is at hand to make a pretty good appraisal of Prudhoe Bay.

SEN. ORSINI: What is the rate of return that they are currently using on this type of evaluation?

MR. PASCHALL: The rate of return we're using or that I would recommend using? There happens to be a difference.

SEN. ORSINI: Either or both.

MR. PASCHALL: Well, of course, this is always a difficult matter. In 1971 we made the first study that was ever made of oil property sales and actually rationally the only way to get the proper rate of return, the proper discount rate, is to analyse sales, compare the future net income that is derived to the buyer's anticipated, let's say to the buyer's sale price, compare his anticipated future

net income to his purchase price and relationship between those using what is called the discounted cash flow rate of return method would give you that rate of return, a discount rate.

Now we did that on a great many oil properties, representing sales of about \$250,000,000 and came up with a rate that applied at that time in 1971. Since that time that rate has increased because of the increase in borrowing rates. More recently I've been engaged in an analysis to find out the effect on the rate that we use, the effect on it that's going to be caused by the elimination of the depletion laws. It happens that in appraising fields, the way that I happen to appraise fields, that we do in California, we use pre-income tax net income. That is, it is net income, operator's net income plus income tax. Operator's themselves use post-income tax net income. We use pre-income tax and therefore our discount rate tends to be--this tends to make it a little higher than what it would be on a after tax basis. Now the tax element itself has been changed because of the loss of the depletion allowance tax preference. And this means that we are going to have to raise the discount rate. I'll give you my opinion of the rate that should apply right here in Alaska now, let's say now, early in 1975. In fact, it's my opinion this week. I am working on the subject right now and I could change, but I think it would be somewhere around 16%.

I mention for those of you in the audience, particularly if there are any oil people here, who think the internal rates of return as 15% or so on equity and that it looks like I am really being very generous, it's not quite the case. The rate that I am talking about is a weighted average of the rate of return on debt and equity. It's a so-called total property rate of return.

And when anybody buys an oil property of any consequence anyway he typically does it partly with borrowed money so you have this debt leveraging in there that has to be brought into effect. That debt is the same as the debt on your house, let's say, the mortgage on your home. It's a part of the value of the property and one has to bring together the two elements of debt and equity and their respective rates of return and balance them. It's this balance or overall total property rate of return that I am saying is about 16%. Furthermore, I'm talking now on a

pre-income tax basis where normally industry's goal of 15% is an after-income tax basis upon equity only. It's kind of an involved subject but I'm giving you some basics.

SEN. ORSINI: You are able to damp out the windfall or even the wipe out situation? Of course, recently the windfall is a rise in the value in the land.

MR. PASCHALL: Well, the windfall profit tax is, if enacted, is going to be, let's say can best be taken account of I would suggest, by the effective price of oil it produces. I would rather try to handle the windfall profit tax in the oil pricing area rather than in the discount rate area. For example, I made computations in California and have come up with, (you would come with a somewhat higher figure in the mid-continent) but I have come up with an average price of oil of something like \$6.50 per barrel at the wellhead, \$6.40 or \$6.30, for all oil if the windfall profits tax were enacted. And I would then want to use that price in computing my gross income in an appraisal and let the discount rate be a separate issue.

SEN. HUBER: My question is could you make any comments on the applicability of a tax such as we are proposing here either in the Governor's bill or in my bill or the other ones which you have studied, how it might work on the leasehold interest of an oil company that had bought their lease and right to produce from the Federal Government in a former federal reserve, it's availability for the State to get taxation on that leasehold interest, if that's done elsewhere, in California, and how it might work?

MR PASCHALL: You are moving into a legal area here and I'm not sure just how it is handled in your own constitution or statutes. Again, in California, the position of the lessor doesn't concern us whatsoever. We have many on-shore federal leases. Calvin Hill, which was discovered in 1928 is about 50% USL, United States Land, with a nice 12½% royalty rate on it. It happens that even under our law which is different from yours, I think ours is a little harsh in this regard, really, the federal royalty isn't even taken into account as a cost. The leasehold interest is

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treated as if it were 100% ownership and the entire value of the lease is determined on that basis. But, let's say someone looking at it from the operator's standpoint would say, "Well, this is definite cost. It goes to the federal government. It's nothing that we can in any way profit from." But even if that standpoint were adopted, the case would still remain in California that there would be an 87½% leasehold interest there that would be subject to taxation as a possessory interest or possessory right.

SEN HUBER: This in effect, then, gets to taxing the valuation of the possessory interest of companies in what is actually federal land.

MR. PASCHALL: That's right. This applies also with our state off-shore lands, and it will apply with the OCS lands in California. And it's not only the case with oil properties. We have substantial mining properties. For the last few years I've been appraising a large tungsten mine in the California eastern desert area. It's entirely on unpatented mining claims. When the operator gets through there, major mining company gets through, they'll just walk off and leave the mining claim. They don't own them, but that is completely ignored in the process of appraising the property. It's just as if the mining company itself owned the land.

SEN. ORSINI: One thing that concerns a number of people is native corporation owned land. Oil or whatever is discovered there, who pays the taxes and how is the tax derived in the condition where the native corporations own the sub-surface rights also?

SEN. HUBER: Madam Chairman, if I may interrupt you, I don't believe that our witness here today has that legal expertise and I have went over with him whether he was competent to testify in those areas and I would like to suggest that there probably will be people here who will have this.

MR. PASCHALL: I decided not to become an expert on the Native Claims Settlement Act.

SEN. POLAND: Back to what I believe Sen. Butrovich had in mind when he was speaking of assessing Prudhoe Bay, starting back in

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maybe 1969, when although there might have been a market for the product there was no way of getting the product to market through no fault of the companies. Would you still act?

MR. PASCHALL: Madam Chairman, when you say through no fault of the company, we're putting an issue into it that is outside of my area of expertise. Let's say, all I would say is this, if an ad valorem tax system prevailed in Alaska on oil and gas properties of a nature similar to the one that I was telling you about here earlier, it would have been possible and proper to appraise Prudhoe Bay and subject it to ad valorem taxation in the same way, I would suggest, as this gas field that I mentioned to you that has been shut in for three years down in California. The value of it I remarked would have been quite nominal in 1969 and the value of it would have increased each year for two reasons. One is that the operators were continuing to drill wells and thereby expand their knowledge and feeling of the reserve so it was known better and better how much oil was there and what the productive capability of the field was. And the other is that each year you're moving one year closer to the time when that production would start and this enhanced the present worth, that future income at a higher present worth as it moved nearer capture, nearer reality. In that remark, again this might help you. I'll get out the table that I made out. This table right here is my economic analysis of the income and expenses for Prudhoe Bay. Now it required this much paper because there are just all kinds of expenses that I put in here. I might remark that prospective future capital expenditures are just as important to the appraiser as prospective future operating expenses. So I brought in such things here as future costs for oil gathering centers and all sorts of things that weren't at Prudhoe at the date of my appraisal. The day of appraisal was in January, 1973. You will notice, actually, that although there are some things here which begin in the first year, and I think those must be well drilling costs, it is not until the fifth or sixth year following the date of my appraisal that I ran in the first production, because I assumed at that time that 1978 was actually going to be the first year of production, even though I was making the appraisal as of January 1, 1973. So, here I had oil pro-

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duction, gross income minus all this great array of expenses coming over to net income, and those of you who are close enough can see that the first four years net income are in brackets, meaning that actually, the field would be running at a net loss for the first four years following the date of my appraisal.

SENATOR HUBER: Five on there.

MR. PASCHALL: Five? Is that it? Five. Yes, that is correct. Thank you. And then finally, on the sixth year I show the field moving into the black, in effect beginning to generate a positive net income and continuing thereon, and after about three, or it looks like, looking through the paper here, about seven or eight years of constant income, by then began declining income in line with my estimate of the decline in production. So here's a case, perhaps, Sen. Butrovich, this will clarify the matter for you if it hadn't before, here's the way that I handled the matter, or let's say that anybody would have handled the matter, of appraising an oil field which is not yet productive but whose presence is actually known. Any of you are welcome to have a look at this in detail afterward. And I might remark that after coming over to the net income I was using a discount rate of that time of 13%, by the way, I have here in this next to last column the present worth factors that were applied at 13% to each year's net income. And finally the right hand column is the present worth of each year's net income. I think you'll find this pretty standard procedure, the thing that I have done here.

SEN. HUBER: I'd like to expand on your question if I could a moment. I think that it's an important consideration. Assume that at the time you assessed this and with all the problems that arose with the trans-Alaska gas line, and as you know they tried the ice-breaker and the Manhattan made the trip and carried one barrel of oil out at the cost of many millions of dollars and gave that idea up, let's say, to this present time the oil companies had developed the field well enough to tell they get a nine or ten million barrel field there or more and that instead of a pipeline being built it was now determined economically infeasible until some future time and they don't know when that would be, to have any way to economically get it out of there. If you were the assessor responsible,

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what kind of effect would that have on the value of the field?

MR. PASCHALL: Are you talking about the oil or the gas now?

SEN. HUBER: Oil or gas, either one. Let's say that it was determined that at this time, even right now, that they couldn't build the line and there was no way to get it out of there, which is ridiculous, but let's say that they did. I'd like you to recite what you think it would do to the value of your assessment.

MR. PASCHALL: Well, such things occur. Similar things have occurred. In fact, I'll tell you about one fascinating case that I am following with great interest. It's the case of the Elk Hills oil field in Kern County. Elk Hills is presently producing 2500 barrels a day and has a capacity right now of 150,000 which can probably be boosted fairly well above that, to 200 or a little better, a substantial oil field that is shut-in and has been since all of us, just about everybody were very small children. Now the field happens to be owned and always has been owned 80% by the Federal Government and 20% by Standard Oil Co. of California. Standard itself acquired the sections, their property, in turn from the Southern Pacific Railroad clear back around the turn of the century. Well, when the Navy decided in the 1920's that ultimately all wars were going to be won by battleships fueled with oil they set up Elk Hills as a naval petroleum reserve and shut it in with very firm stipulations of what would be required to open it. It was kind of fascinating. I was called in by the county assessor one time to assist him in figuring out when that thing was going to be opened. And this is similar kind of problem. It may sound different but it's not. I was shown a document, one of the Standard Oil lawyers showed me a document that stated that the field could go on production only if the Secretary of the Navy requested it, the President counter-signed it and Congress said it was O.K.. Now that's about as tight as you can turn a valve and so, this is about eight or nine years ago, I shook my head when I saw that because the price of oil was pretty low then and we really didn't have any of the problems that we have now. I considered it was very remote indeed. I told the assessor, "Aw heck, give it 20 years," which put the present worth of it down at a very low level indeed. Now he has a full

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time professional on his staff to help him and I'm not back in on that act anymore. But I know the man who does do the work and he told me, "Boy, two years ago when this embargo hit and the price of oil went up I decided that the opening of Elk Hills was pretty imminent." And maybe he is right, but you can speculate on these things. So he has made his best estimate which, instead of 15 or 20 years, is something like three years away. But what is it? It's nothing but his best estimate of a very complex political and economic situation. Maybe it's going around the horn telling you that but it's kind of a fascinating little tale. If the assessor were stuck with that same kind of a situation, any assessing officer relative to Prudhoe Bay with the situation that you proposed, Senator, he would just have to exercise his best judgement and fight it out, that's all. Work it out.

SEN. BUTROVICH: It would end up being a very low valuation.

MR. PASCHALL: Yes sir, that's correct. It would very definitely lower the value, because it would make more and more remote the time at which the property could generate a net income.

REP. GRUENING: Thank you, Madam Chairman. To follow that up, since the discount rate, discount factor is tied to the time when you can have the oil flowing, to what extent would you, to what extent do you feel that an ad valorem tax, just oil, would have an incentive to delay on the part of Alyeska. I don't know if that maybe takes in a lot of factors, but is there any possibility that it would some delay?

MR PASCHALL: Well, this is a matter of opinion, now. I've been trying you know to stick to facts as best I can but you have asked me here for an opinion. I can't see why the prospect of an ad valorem tax would delay or retard the completion of the line or the hook-up of the field at all. In fact I would think that they would just be knocking themselves out to get to producing as fast as they could in order to get off the ad valorem tax and go on to the severance tax. Let's say and generate income with which to pay the tax. I'd better put it that way, that would be a better way to put it. Right now the field is not generating any income so any tax that they pay right now would be paid from revenue

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from some other source and naturally that's disadvantageous to them and would be to anybody. So the operators would therefore be highly desirous to get to producing and pay Prudhoe Bay taxes with Prudhoe Bay money.

REP. GRUENING: I guess what I'm saying is that, I haven't looked at the chart yet, but I guess the amount of tax they would be paying up until the time the oil starts to flow is such that it would encourage them, in other words, by stepping up the time that oil flows, in other words if it flows in 78 as opposed to 77 they would be paying, let's say in 76, a lesser tax. Tied with the price of oil which maybe, if they anticipate the price of oil is going up, maybe there would be an incentive to delay. I don't know what or to what extent.

MR PASCHALL: Well, now, as to whether they pay a lesser tax or not, I don't know because that is up to your legislative body here as to tax rates etc.. But I'd go back to stipulate that the big overwhelming consideration of the operator would be to be paying his taxes on that particular field from income derived from that field and not from elsewhere. It's just providing a drag on let's say the entire corporation to have to get money from elsewhere to pay tax on a non revenue producing enterprise. Now you mentioned something else here that is very critical that I wanted to get to and it has escaped me for the moment. You went on to something else that you closed with.

REP. GRUENING: The price of oil.

MR. PASCHALL: Oh yes. I've heard the oil industry accused of, in California and throughout the U. S., in some instances of holding back on production till the price went up. I can't quite go along with that. I think that most people in the oil industry feel that from the price standpoint they never had it so good. The price has gone up and they are generating excellent revenue from the fields that they are producing. Furthermore, with the present price of money generally, the price of oil would have to go up at 10% per year, let's say, just to make up for the loss in interest on the money that they might otherwise have gotten. And right now, we're not at all sure

that the price of oil is going up, are we? The net profits tax wouldn't do that to presently exempt oil. It would reduce the income from it. So I don't believe that, just my own professional impression from observing the industry, I don't believe that you are going to have any hold-back on production because somebody is waiting around to get a higher price. I don't believe that makes current economic sense.

REP. GRUENING: Madam Chairman, could we have some extra copies of that chart? I'm curious to look at it.

SEN. POLAND: We could have some zeroxed.

REP. GRUENING: Not now. I just mean at sometime.

MR. PASCHALL: You mean my appraisal sheet here? Sure.

SEN. POLAND: Are there any further questions of Mr. Paschall?

SEN. RADER: Mr. Paschall, we are talking about a short call on our revenues occurring maybe next March or April, a possibility. It has been suggested to us that we could, that we should enact a tax, set up our levy, make our assessments and perhaps when we come back in January establish our mill rate at that time for collection of money within several months. Is that a feasible time schedule, to set something like this up and get in operation make the assessment, send out your notices?

MR. PASCHALL: Between now and next January 1st?

SEN. RADER: Yes.

MR. PASCHALL: Yes, Sir. Yes it is.

SEN. RADER; Now, what if we didn't do anything now, but next January 20th enacted a basic law. What kind of a time schedule would you have, do you think before you could make assessments, get your notices out, have your boards of equalization appeals, whatever you have to do?

MR. PASCHALL: How many fields, one thing I've been meaning to ask

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someone and I haven't done so, how many fields are in this category that would be subject to such a tax, to enact this legislation?

How big is the job? Roughly. The number of fields would give me a pretty good hint this way.

SEN. RADER: The suggestion was that we would exempt any field for a period of five years after discovery or after lease. I think that that would probably, if you limit it only to oil and not to gas, which is another problem I want to ask you about, limit it only to oil and not to gas.

MR. PASCHALL: Limit what?

SEN. RADER: Limit the tax only to oil, the right to produce oil and not on the right to produce gas. The reason for that is that we have some gas fields in Cook Inlet which have been capped for more than five years and it was intended by at least some people that this bill would apply only to Prudhoe Bay and wanted to work out exemptions which would be constitutional as between property owners but that they really only intended to apply to Prudhoe Bay.

Before we get into that, let me ask you this. How about the five year exemption for example. Is that a reasonable exemption in this type of taxation?

MR. PASCHALL: I was a little puzzled by the wording in one of the bills in that it said something about "the time that the discovery is made or from one other time, whichever comes first." And for the life of me, I couldn't figure how one of them might have come before the other. I have forgotten which it was now.

SEN. HUBER: It was lease, five years from the time of lease or discovery whichever comes first.

SEN. RADER: Well, joint venture, contract, or any other agreement that is made for the oil and gas development of a part or all the lands subject to that lease or property. Any other agreement, I wonder if that would mean that an agreement that occurred five years before that, some people joint ventures bidding seismic

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work. I'm looking at two sets.

MR. PASCHALL: That's what puzzled me, Senator. I was wondering how an agreement might precede discovery.

SEN. RADER: The same thing occurred to me. I was going to ask you that too.

MR. PASCHALL: I couldn't understand it.

SEN. RADER: Let me ask you this. Do you think we could write a definition here which would be reasonably certain to give in effect a five year release I'd say from the time of discovery probably, tied on to some time. Have you ever seen a bill written like that?

MR. PASCHALL: That's your option. Really, I don't know whether I'd really care to express an opinion on it.

SEN. RADER: You don't see anything particularly wrong from an assessor's point of view?

MR. PASCHALL: No. You'd have the assurance in all likelihood that if a discovery of any consequence was made that you'd know by that time just about what you had there. That is, the assessor's job should not be too difficult by that time in estimating a value on the property, as opposed to estimating a value immediately after discovery, which is very difficult indeed.

SEN. RADER: Do you have any feel as to what descriptive term we should use as a triggering mechanism to start the running of the five year period?

MR. PASCHALL: I'd want to get off in the corner and think about it. I hate to just throw something out here.

SEN. RADER: O.K. Let's assume you made it from discovery, then. Let's assume that for discussion here, because we have that in our bill, and my question was, in case we got down, what if we don't

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do anything and passed a bill say next January 20? How long would it take to go through your procedures of assessment, valuation, notices, boards of equalization, appeals, some kind of appellate procedure and then the collection of taxes?

MR. PASCHALL: Are you talking about just Prudhoe Bay itself, now?

SEN RADER: Probably, that's what you've got into these other things. Well, let me ask you even if you had several, you'd get more assessors.

MR. PASCHALL: I'd want a minimum of three months, at least that, three or four on the first time around, because there are a lot of people to see on something like that and a lot of things to do.

SEN RADER: Three months from the time that the bill was enacted until you could expect the paid notices to go out?

MR PASCHALL: Three months from the time somebody started to work on it. Now, if there were much of a delay between the time of enactment and the time somebody was employed to start the job it would impose a terrible burden on him. Incidentally, I'll just have to say this without regard to the dry gas fields in the Kenai, I'd hate to appraise Prudhoe Bay and be told to ignore the gas in doing it. This really poses a peculiar situation for an oil property, or appraiser of oil and gas property.

SEN RADER: Would you care to discuss that?

MR. PASCHALL: Well, it's simply that the two are mixed in the reservoir, for one thing, to a great extent. There is a gas cap at Prudhoe Bay plus a lot of oil-associated gas. They are produced together to a great extent. There's going to be a cost, in the early years at least, injecting gas back into the reservoir prior to the time the gas pipeline is built, if one is built. So you have--it's just one big ball of wax--and it's pretty hard to take it apart and apply a value just to the oil and not to the gas. Gas is undoubtedly, is probably a very valuable item, although I saw the results of a study here recently that indicated it might not be. I'd always thought of it as an element of considerable value.

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SEN RADER: Are you saying that you don't think it could satisfactorily be broken out as a matter of assessment or that it just would be difficult?

MR. PASCHALL: It would not just be difficult, it would be arbitrary.

I could do it but it would be arbitrary. I'd have to make some arbitrary decisions. Now, arbitrary decisions are not necessarily difficult. Sometimes they are very easy to make, but they are hard to justify. And this is the problem you'd be up against in my mind, slicing it up that way.

SEN BUTROVICH: Well, if I heard you right, in the beginning you were talking about appraising leases, fields, and you were talking about value and I can't figure out how you could value them properly if you didn't value both the gas and oil.

MR. PASCHALL: Well, that's what I'm saying Senator. I don't think I could either. If I were ordered to do it, in effect, by somebody in some situation, I could do it and say, "Here's what I've done. I'm not sure if I believe it but here it is." You know, this kind of thing.

SEN. HUBER: Madam Chairman, could we expand right in this same idea. I think that we were getting into a capped in, shut in gas wells in the Cook Inlet area that do exist and would be subject to a tax. I'd like Bob to comment on them because my understanding of what he has explained here would be that if those wells are some distance away from production yet due to various economic or other kind of factors, legal factors, whether a market exists, how long it takes to build a liquification plant or something like that, wouldn't those be self-adjusting if I understand this right? The value would be lower and lower and lower unless you were looking at how soon it could be produced. In this case maybe they're getting close to production. Isn't it a self-adjusting thing?

MR. PASCHALL: I would say so. Yes.

Unless there are some special circumstances that prevail that you could tell me about, I'm not sure how, let's say why the gas field should differ, the dry gas fields in the Kenai, should differ in

economic character from Prudhoe Bay. It may be longer until they are hooked up, the price in general and the ultimate gross income may be lower, and the value lower etc., but in principle, from the standpoint of valuation, they are the same kind of thing.

SEN. HUBER: They are probably contrary. They are probably now, because there is some liquification plants and stuff there and some shipment going out of there, and smaller fields, they are ---

SEN. RADER: I guess so. But I don't know that much about it.

SEN. HUBER: I'm not sure of what the situation is down there. I'm sure there are some people that would tell us why they shouldn't be taxed around there.

SEN. RADER: Have you chanced to actually look at these various bills that we have before us, as to workability? Have you had a chance to read them?

MR. PASCHALL: The bills? Yes, sir, I have. I don't have them with me. I had some marginal notes on them and I didn't bring them along. In fact, they are over in Sen. Huber's office. I had some comments on them. There is one item I might mention. It is a little one, but as a professional I was a little unhappy with it. And that is, at one point, and I think everybody, I've looked at all four of them, refers to the discounted value of a future net income, something like that. I wanted to bring this to somebody's attention that it is not values that are discounted. I was remarking on this earlier. It is the net income that is discounted and the discounted net income becomes the value. So actually the proper wording there in the bill there should be the value of the discounted net income, rather than the discounted value of the net income. It's a minor but rather important point relative to financial analysis, let's say. If you wanted to ask me about some specific items, I might be able to respond to them but I don't have my copies with me.

SEN. RADER: I was just wondering if there were any particular items in it that you felt to be unworkable, not understandable.

MR. PASCHALL: Well, there was one of the bills, I responded to Senator Huber in a letter on it, there was one of the bills that

I felt was unworkable and I believe that you can tell me which one it was, Senator. I found myself in a revolving door in trying to figure out how to work it. And as I made a rough attempt to figure out how each of them would be administered. Now by this, I mean if you get, for one thing, this tax offset, a matter of a prospective offset of future severance taxes by current ad valorem taxes if the bill were enacted. But one of them had an offset of the severance tax by the ad valorem and vice versa and I couldn't get myself out of the labyrinth in trying to work that one out. I didn't see how it was possible to have this dual offset business.

SEN. HUBER: Some of the problems, if I may, some of the problems that arose were that the present tax law, which of course was written for the oil properties and pipeline transportation tax, was basically used on several of the bills as the foundation figuring that this would be a proper foundation and you'd do certain things to it. That's true in my bill and it's true in at least one or two of the bills in the House, and I don't know if it's true in Steve's final bill or not, but if you recall the administration did bring in the last bill. When it came to several areas like this some of us fellows who had wading around in the swamp draining it and the alligators were chewing away you know, by that time we got enough of the water out of the swamp that the administration got up on top a little bit and came up with some better ideas and some of the better ideas they came up with is putting this in a whole new chapter because of certain other things that will take place, that we keep running into. And so, the administration bill is a little further along in some of the things than the other bills are. Each is built on the other and I don't believe it probably will be the final perfect product, if there is such a thing.

REP. COWPER: Madam Chairman, I would like to respectfully demur from Sen. Huber's characterization of our bill as being final. It may change colors a lot. (Laughter)

MR PASCHALL: I might mention, Senator Rader, without reference to any specific bill, I did comment earlier when I was making my general presentation on the incorrectness of the use of the terms "tax on reserves" or "tax on oil in place" because I had in mind statements made in one or two of the bills. I'm not sure it is

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present in all of them but this would be one area, for example, where I believe it would be advisable to watch the terminology very carefully and be sure that the bill states exactly what is to be subject to ad valorem taxation. I didn't see any problems generally in administration because there were fairly simple statements of what had to be done.

SEN: POLAND: Are there further questions?

SEN HUBER: Madam Chairman, before he leaves you might see that it is quite obvious from the fact that we have so many bills before us, even here we are talking about three, and there's more than that before the legislature on the same subject, that the principles that Mr. Paschall is talking about needs applying, the practical principles of ad valorem taxation, needs applying to the actual bills. And so, probably there would be some changes made. I can see some. I would suggest that this committee think of listening to a final or a near final bill later in the week. I suspect that something like that is in the making, with more ideas probably, than Mr. Paschall has said too. I think he has some others to hear from.

SEN. POLAND: Thank you very much Mr. Paschall.

WACO SHELLEY May I ask one more question? I am Waco Shelley of the Mobil Oil Corporation. You mentioned that someone had testified here that the amount of tax had been missed by a factor of about 20. Do you have what you think this tax would amount to on Prudhoe Bay, per year? Do you have a number?

MR PASCHALL: No sir. I can tell you that my value, as about two years ago was \$4,768,000,000. Now I think, let's say it's a fair assumption to state that the value of Prudhoe Bay would now probably be greater than that. But, there are all kinds of things operating on it. We do have in all likelihood, regardless of the threat of an excess profit tax, we do have the prospect of a higher price of oil than I used in my appraisal. We also are much closer to the time at which Prudhoe Bay will begin to produce. We also, let's say, the operators also have behind them a great deal in the way of capital investments that I was anticipating as of two years ago. Those

three things all indicate an increase in the value of the fields. On the other hand the increased cost of the pipeline has a deleterious effect on the wellhead price so maybe I was wrong in my first statement on price. Also I would contemplate using a higher discount rate than I did in my appraisal of two years ago were I to reappraise the field myself right now. You can see it's a mixed bag and I would not want at all to just say, you know, Prudhoe Bay is now worth about so much. It would demand considerable work and considerable revision of what I did earlier to know, but I would estimate it would probably be higher. Now as to taxes, of course, this is another issue and I refuse to concern myself in that now. We get into mill rates and other budgetary and decisions.

REP. COWPER: Madam Chairman. I think, Mr. Shelley, that overstatement by 20 times was in reference to a figure used by Mr. Tom Kelly in reference to Kemik field, Artic Slope region. He gave a figure and Mr. Paschall reviewed that figure, I believe, and came up with something that was about 5% of the figure that was given by Mr. Kelly.

MR. PASCHALL: Sir, if I may comment on that further. Now I remember exactly what it was and I'll be a little more precise. It was actually Mr. Adams, I believe, of the Native Corporation who was speaking and he was tying value into gross income. Now, he did it on two counts. He was thinking of the entire field and he was also considering the Native Corporation's possible tax liability if their net profit interest was subject to taxation. So I made some roundhouse approaches to the text of those two situations, the entire field and the net profits interest if it was subject to taxation. On the entire field basis, his overstatement would have been about 8 times. Looking at the net profits interest tax aspect of it, my rough estimate was that his estimate tax was 20 times too great. You see, we are looking at two different elements there, the net profits interest and the total field.

SEN. HUBER: We can thank Mr. Shelley for the right questions again. That came from testimony before our committee if you remember, and there was a two point,,, we had a little discussion of this prior to getting in here, there was a 2.1 million dollar

estimate and the remark that went with it is, that would break us. And that same figure, from the 2.1 million, I believe Mr. Paschall broke that down to \$89,000. That's quite a fling between 2.1 million dollars and \$89,000 and that's where that figure came from. We want to thank Mr. Shelley for really bringing the right question up again. He always comes up that way.

MR. SHELLEY: Thank you, Senator.

REP. ITTA: I'd like to inform this committee since you are mentioning about the Arctic Slope Regional Corporation that they will be down here again this week and they'll be providing the people that are concerned with taxes with additional information as to how it affects our region.

SEN. ORSINI: Despite your attempt at avoidance of how much money you could raise on the North Slope, I think that it is a very pertinent question as far as the legislature is concerned. If in fact, you could only raise a few thousand or even a few hundred thousand dollars, we obviously would have to look a lot further to try to find some money. If several hundred billion dollars is available in property ad valorem tax, then perhaps we need look no further. Really, the amount of money that we could be expected to get within the next couple of years is very critical, as far as we are concerned, on decisions on these concepts. And I don't know if it's our function or what but I would sure like to know how much we would, either say some 20 mills or some other such arbitrary mill rate, how much we could raise in the next couple of years.

MR. PASCHALL: Mr. Shelley's comments too bore on that and specifically on my value here and again I'll say, and this is just a roundhouse estimate at present, that the value of the field is probably greater now than it was two years ago, just about certainly greater. How much greater, I don't know but looking at this figure two years ago I would say that five billion dollars would be a rock bottom figure for the value of the field now. And of course, that's only a 5% increase over what I estimated two years ago. It's probably greater than that increase. Just an estimate, and believe me Senator, it is just an estimate now. Right now you'd be looking at a floor, a value floor of about five billion dollars on Prudhoe Bay.

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SEN. ORSINI: That's the present value at which we would tax?

MR. PASCHALL: If you have 100% assessment ratio. Yes, sir.

SEN. ORSINI: We do. So then, probably now if we had a 20 mill 100% rate we would get one billion dollars.

MR. PASCHALL: One hundred million. I think I got my decimal point right.

SEN. ORSINI: Right, O.K.

MR. PASCHALL: One hundred million would be 20 mill rate of five billion dollars.

SEN. ORSINI: No, 20 mill rate would be one billion.

MR. PASCHALL: No sir, one billion would be 20 cents. Move it over another notch there.

SEN. RADER: Incidentally, what kind of rate, how many mills, what's your assessment situation in California?

MR. PASCHALL: It varies radically, because the local tax rate prevails on property down there. As a result we have rates that vary. Now we talk in terms of dollars per hundred dollars of assessed value, a levy on assessed value. We have a 25% ratio. I'll try to make some quick conversions. We go from as low as 16 mills to as high as 36 mills.

SEN. RADER: On 100% valuation?

MR. PASCHALL: Yes, sir, on 100% valuation. And again this depends completely on the local jurisdictions. In some areas, particularly in very highly urbanized areas in both Los Angeles and Orange Counties, they are up in the 36 mills range. In the rural communities in the western side of the San Joaquin Valley, in the Sacramento Valley and the gas fields area, it's more of the nature of 16 mills, something like that.

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SEN. RADER: Is that mill rate the mill rate the same that's applied to business buildings, homes etc.?

MR. PASCHALL: Yes, it is. For anything within that particular taxing jurisdiction. And the taxing jurisdictions, I might mention, are an absolute mess. We have something over twenty thousand tax rate areas, they are called, and each tax rate area is a unique combination of the rates that apply on schools, county general rate, special district rates like water districts, sewer districts. There are tremendous number of these areas.

SEN. RADER: How about the situation, I understand that Texas and Louisiana, other states, use this type of a tax in different areas. Are you familiar with their methods or procedures?

MR. PASCHALL: No sir I am not. I might mention that we had, i.e., local jurisdictions had the right to set any mill rate levy that they wanted up until a year or two ago. And now there's been a lid put on it with special provisions for higher rates under certain circumstances. I don't even know what they are. I haven't bothered to learn the technical reasons that would allow a school district, for example, to exceed its limit. So that most tax increases, most property tax increases in California are resulting now from rising assessments and not from rising tax levels. That wouldn't necessarily apply to oil properties, of course.

SEN. POLAND: Thank you very much, Mr. Paschall.

(Unrecognized speaker): I have one question. Is Mr. Paschall up as a technical advisor to your committee? Were his expenses paid by this committee or state legislature or what?

SEN. POLAND: Legislative Counsel.

(Same as above.): So the state of Alaska is paying for it?

SEN. HUBER: Madam Chairman, I can answer that. He is engaged under the authority of our special committee, Senate Committee on Taxation and Revenue, and the funds are made available through a grant by the legislative counsel.

The state of Alaska is paying for Mr. Paschall's trip here and his salary to be here. I think maybe the committee should establish, I think, that we had to get permission for Bob to be here. I think that his employer should be stated in California.

MR. PASCHALL: I am actually serving as a consultant to Sen. Huber's Special Committee but I am doing it on my vacation time as a moonlighting venture, in effect, from the California State Board of Equalization for which I work on a regular basis.

MR. EUGENE WILES: I would like to ask Mr. Paschall, as I understand it, your valuation is on net profits interest, is that correct? This evaluation of the five billion dollars?

MR. PASCHALL: It's what I term the net operating net income for the property. That was what was discounted.

MR. WILES: Operating net income? And how do you reach operating net income when the pipeline hasn't been built and you don't know what it's going to cost? You don't know what it's going to cost for a barrel of oil. What production figures do you have to come into that?

MR. PASCHALL: Well, for example, you mentioned that you don't know what it costs to bring out a barrel of oil. There were some field rules hearings before the state Division of Oil and Gas several years ago in which the companies provided certain information to the State. One of the things they provided were three estimates of the rate of decline of the typical Prudhoe Bay well and of course this was immensely helpful to me in my own estimates of the prospective future rate of production. There's undoubtedly a lot of hard work that had gone into that, that I was able to take advantage of.

MR. WILES: Basically, this is shown on your paper there, isn't it?

MR. PASCHALL: Yes sir, or in the report I stipulate in the report the reasons for the selection of every one of the estimates I employed.

MR. WILES: Are these estimates, are you guessing at what

the production is? Are you guessing at what the pipeline is going to cost us? What I'm trying to get is, how do you get an operating net profit from something that isn't operating?

MR. PASCHALL: We don't call them guesses, sir. We call them professional estimates. A while ago, you mentioned the operating costs. I was a little baffled at first, on operating expenses and it's a very important element and then I realized that the information provided to the state Division of Oil and Gas allowed me to back into an operating cost. It amounted to this, that on their own presentations, industry had indicated an economic limit of 100 barrels per day wells. For those of you who are not familiar with it, the economic limit is the time at which daily gross income and daily expenses meet and you are no longer generating a net income per day at the well. All right, they stipulated the 100 barrels per day economic limit. It also happens that I made the professional estimate, the professional judgement, that the wellhead price of oil would be \$2.95 at that time. So here all I had to do was multiply \$2.95 x 100 and 365 days a year and I had an operating expense of about \$108,000 per well per year. So on the industry's own data I had a pretty good tool to work with and came up with a figure that was a pretty sizeable one and it seemed like it would be in the ball park for that kind of operation. I made similar judgements for everything else that's cranked into the --- (interruption)

MR. WILES: If an appraiser were hired under this situation, would he use that same information, or what? Or, how would he get his information other than that?

MR. PASCHALL: Well, he wouldn't certainly not at this time. You're asking, for example, if an ad valorem tax were enacted by the state and somebody was employed by the state to make the appraisal, would he use that same information?

MR. WILES: Could he use it?

MR. PASCHALL: No, sir. He would by this time be able to acquire much later, much more consequential, much more precise information.

MR. WILES: But he would make his evaluation as a result of it.

MR PASCHALL: That's correct. He would still have to engage in some estimates in judgement. But every appraisal, I don't care if it's even of your own home, is an estimate of value and the appraiser in any instance has to engage in estimates in arriving at a value.

MR. WILES: Thank you very much. I'm just sort of baffled about having operating net expenses or net profit if you don't have anything operating.

MR. PASCHALL: Those are anticipated future net income.

SEN. HUBER: Bob, just to get a little further on the question. Just a very few years back, I had an electronic business in Fairbanks that was serving quite a few people that were active on the North Slope, geophysical companies many of them, including some of the producing companies etc., and it was in a two-way radio business that had buildings and facilities etc., is the problems basically different here than those of the North Star Borough in Fairbanks if they had hired you to place an estimated value on my property for purposing of taxation?

MR PASCHALL: Only in that I might have appraised your property using your replacement costs less depreciation approach to value rather than the income approach. I might mention in that regard, I stress the income approach to value to you here today. I haven't talked about anything else. There are two other fundamental approaches to value of property, generally. One is the cost approach, that is roughly that property is worth what it costs, or it is worth what it originally cost less depreciation that has occurred since the time it was built or bought. That's the cost approach to value. The other is the sales approach to value. We have all used, or most of us have used the sales approach to value ourselves, personally, in buying a home. We go out to buy a home and we test the market and we pay for a house about what we find houses are selling for. We're looking at the direct market here and here's the sales comparison approach to value. When you get to oil properties generally and a property like Prudhoe Bay particularly, it's obvious that cost is completely irrelevant. The costs of

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developing Prudhoe Bay has to my mind no reference to it's value. We can't use the sales approach directly because we don't have sales of properties like Prudhoe Bay and we aren't apt to have one. The only thing like it is the East Texas field and it has hundreds of operators versus the handful here and there are no comparable sales. So this turns the appraiser directly to the income approach to value. I would stipulate that this is not bad because this is what the oil industry itself does in buying oil properties and is what banks do when they loan on oil properties. They too make income type appraisals, recognizing their pitfalls and recognizing that professional judgement has to prevail on many occasions.

SEN. BUTROVICH: Do you remember what the rate was on that field that you say was blocked off for quite a few years by the federal government? What rate they used in taxing?

MR. PASCHALL: Elk Fields? Now, do you mean the mill rate here, Sen. Butrovich, or what?

SEN. BUTROVICH: Yes.

MR. PASCHALL: I don't know what it is out there. I think,-- I understand that tax rates are fairly high in western Kern County and I think it's about, (let's see, translating really gets me. I'm not used to that.) What would 2½% be, 30 mill or 25? O.K. It's right around 23 or 24, just a little less than 2½% of value, something like that. Now, there I might remark, if the assessor has now gone in and put a substantial value on this little 2500 hundred barrels a day production, (I don't know what it is. I think he has put \$70,000,000 and is proposing to raise that); he is simply anticipating that this thing is going to start producing full bore in the not distant future.

SEN. BUTROVICH: That's on federal land isn't it?

MR. PASCHALL: Well, no the property that he is actually assessing is Standard Oil Company feed property. It happens to be surrounded or intermingled with federal land but it is fee property in that case. That's not really consequential, it's not relevant to the situation, but it is fee property.

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SEN. POLAND: Any further questions? If not, we have a couple of gentlemen from the administration.

Thank you very much, Mr. Paschall.

· PLEASE NOTE: THE PRECEDING PAGES WERE TREATED
· AS A UNIT IN THE ORIGINAL DOCUMENT. ·

Pascha II

EDUCATION

B.A. in Geology, Univ. of Calif. at Los Angeles, 1933
Graduate Work, U.C.L.A. and Oregon State Univ., 1940 & 1947
Courses in the income approach to value and the appraisal of industrial properties and of machinery and equipment given by the State Board of Equalization of California, the American Institute of Real Estate Appraisers, and the American Society of Appraisers

EXPERIENCE

Twenty years in petroleum geology in California. Latest industry job was as Senior Geologist, Offshore Area, Signal Oil and Gas Company.

Eleven years as Senior Petroleum Appraisal Engineer (present permanent position) and Principal Property Appraiser, State Board of Equalization, Sacramento. Engage in writing and lecturing on and appraising oil and gas and mining properties. Have appraised oil and gas fields in 15 California counties for property tax purposes. These fields include San Ardo, Kettleman Hills, Kern River, and Rio Vista.

PROFESSIONAL LICENSES AND MEMBERSHIPS

Registered Petroleum Engineer, State of California (No. 537)
Registered Geologist, State of California (No. 8)
Certified Property Tax Appraiser, State of California (No. 15)
Member, Society of Petroleum Engineers of AIME
Member, Amer. Assoc. of Petroleum Geologists
Member, Amer. Institute of Professional Geologists
Member, International Assoc. of Assessing Officers
Associate Member, American Society of Appraisers
RECENT TEACHING EXPERIENCE

Lecturer, I.A.A.O. Seminar on the Valuation of Oil and Mineral Rights, Phoenix, Ariz., December 1971
Speaker, meeting of the Society of Petroleum Accountants, Los Angeles, November 1972
Speaker, Society of Real Estate Appraisers seminar on mineral rights, Modesto, Calif., April 1973
Speaker, Amer. Society of Appraisers seminar on Oil and Mining Property, Toronto, Canada, June 1973

RELEVANT AUTHORSHIP

Co-author and editor of Valuation of Oil and Gas Producing Properties, 1966 (revised 1972), State Board of Equalization, Sacramento, Calif.
Valuation of an Oil and Gas Producing Property, In The Valuation of Oil and Mineral Rights, I.A.A.O., Chicago, Ill. 1972.

MALONE

Sacramento, Calif.
14 October 1973

North Slope Borough
Barrow, Alaska

Gentlemen:

Here is my appraisal of the Prudhoe Bay oilfield for ad valorem tax purposes as of January 1, 1973. All value computations are shown on Appendix A, which is in the pocket at the back of the report. The reasons for the use of the items listed on Appendix A may be found in the body of the appraisal report.

It is possible that my value conclusion of \$4,768 million may be challenged on the ground that I had inadequate data. We should keep in mind in this regard that the operators of Prudhoe Bay received interrogatories asking for detailed information on reservoir data, drilling costs and operating expenses, and the correlative rights of the several lessees. Those interrogatories were ignored.

The report makes it evident that relative paucity of data was not a serious handicap in appraising the field. The value would be 92 percent of that shown on Appendix A if production were carried only through the year 1990. That is the case in the face of the fact that only 77 percent of my oil reserves estimate will then have been produced; that is, more than two billion barrels of reserves will still remain. In short, the effect of present worth minimizes possible errors in reserves estimation, as my report points out.

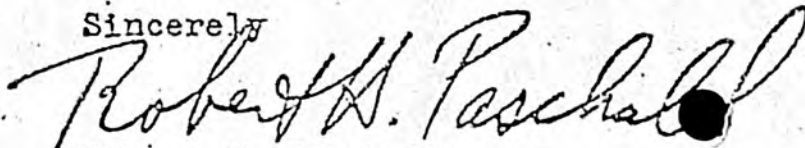
The lack of precise data on expenses is not a serious matter, either. Net income is so high a percent of gross income (about 66 percent in the first few years) that a notable underestimation of expenses would not seriously increase the field's value estimate.

This brings us to the decisions that were most critical to the value determination. There are three of them:

1. The time at which oil production will begin.
2. The first few years' rate of oil production.
3. The price of oil.

All of these things are speculative at present, and do not depend on technical data that are available to some and denied to others. The commencement of production has already been delayed politically, and a further delay of five years from the date of appraisal now seems reasonable. The rate of oil production can be estimated with considerable confidence, and the details are spelled out in the report. Finally, the price of oil in 1978 will depend on global and national economics and politics, and one informed person's estimate is as good as another's.

Sincerely

A handwritten signature in dark ink, reading "Robert H. Paschall". The signature is fluid and cursive, with a large, sweeping "P" and a long, trailing flourish at the end.

Robert H. Paschall
Consulting Valuation Geologist
and Engineer
Reg. Petrol. Engr. Calif. No. 537
Reg. Geologist Calif. No. 8

PRUDHOE BAY OILFIELD
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REPORT ON THE APPRAISAL OF
THE PRUDHOE BAY OILFIELD
NORTH SLOPE BOROUGH, ALASKA*

I. OBJECT OF APPRAISAL AND MARKET VALUE ESTIMATE

The object of the appraisal was to estimate the market value of the Prudhoe Bay oilfield as of January 1, 1973 for ad valorem tax purposes, and to allocate the value between (1) the various assessment parcels and (2) possessory rights in land on the one hand and improvements and personal property on the other. The value of the field is estimated to be

FOUR BILLION SEVEN HUNDRED AND
SIXTY-EIGHT MILLION DOLLARS
(\$4,768,000,000)

The allocation of this total value to parcels and to land, improvements, and personal property is shown in Appendix D to this report.

II. APPROACH TO VALUE

The value estimate was made using the income approach to value. Only the income approach was used because (1) it is the approach used exclusively by the petroleum industry, whose member corporations are the only prospective purchasers of all or part of the Prudhoe Bay field, (2) all oil properties appraisal literature stresses the income approach virtually to the exclusion of other approaches, and (3) the other standard approaches to value-- cost and sales-- are inapplicable to Prudhoe Bay. They are not applicable because neither past nor prospective future costs reflect the present value of an oil or gas property and because sales data on properties comparable to Prudhoe Bay are nonexistent. Here are some comments relative to value approaches that may be found in the books listed in the bibliography to this report.

John Campbell's Oil Property Evaluation is the most authoritative book of this type in the commercial field. Campbell takes the income approach so much for granted that it is not possible to quote him regarding its relative importance. That is, he discusses nothing but the income approach in his chapters on "Elements of Oil Property Valuation," "Factors Influencing Oil Economics," and "The Value

*By Robert H. Paschal, Consulting Valuation Geologist and Engineer, Sacramento, California. The date of this report is October 14, 1973. See Appendix E for professional qualifications.

of Money." The latter chapter deals with the present worth concept and the time value of money, which are relevant only to the income approach to value.

Paul Paine's Oil Property Valuation preceded Campbell's work as an industry guide to appraisal. Paine had these things to say on page 9 in the section on "Valuation Methods" in his chapter on "The Scope of Valuation."

"Replacement cost is very seldom workable for oil properties. No two properties are precisely alike..."

"Sales of the same or of similar properties do provide a means of valuation which can be followed on many occasions for oil properties."

"The capitalization of income derivable from a property provides a theoretical approach which has been the basis of most oil-producing property valuations. This is the so-called 'engineering' or analytical appraisal...(The) use of the expected income as a basis for the determination of value has been developed to a high degree...It has found ready acceptance in oilfield practice."

(Underlining added in all of the above cases.)

The Society of Petroleum Engineers of AIME has published a series of articles jointly titled Oil and Gas Property Evaluation and Reserves Estimates. These remarks are made on page 152:

"Where (as is usually the case) the investor has a choice of ventures in which he can invest his money, he will need a single yardstick to rank these ventures according to their profitability.. Several yardsticks are being used in the oil industry which more or less approach this criterion. In the present paper, only two will be considered-- the present-day value (or deferred value) of the total profit, and the internal rate of return..."

(Note: the underlined portion is italicized in the original.)

Finally, the California State Board of Equalization's Assessors' Handbook 566, Valuation of Oil and Gas Producing Properties, comments on all three of the standard approaches to value. Parenthetically, this volume has served since 1966 as a guide to the appraisal of petroleum properties for ad valorem tax purposes in California; the author of this appraisal report was the editor and a co-author of the book.

"(The cost approach) is not applicable to the appraisal of oil and gas properties."
(p.14)

"Market value" is defined at length on pages 13-14, and the comparable sales approach to appraisal is discussed on pages 14-15. It is important here to note this remark:

"...scarcity of sales will usually require that every evidence of market data be investigated and analyzed. There is no excuse for the appraiser to overlook pertinent market data in areas for which this information is scarce."

It is obvious that sales data in the Prudhoe Bay area are sufficiently scarce to invalidate this approach at the present.

The income approach to value is dealt with on pages 16-24. A few quotations are germane to the present appraisal. The quotations within the quotation come from Assessors' Handbook 501, General Appraisal Manual.

"Oil and gas producing properties are generally appraised by the income approach...
'A basic assumption of the income approach is that people purchase property for the income that it will yield...The relevant income that should be used in the income approach is the expected future net income. Past income is not a consideration, except insofar as it may be a guide to future income...The proper income to be used is the one which the typical purchaser and seller would anticipate over the remaining life of the property...'"

The principles contained in those quotations were employed in the valuation of the Prudhoe Bay oilfield.

III. APPRAISAL ELEMENTS

A. OIL AND GAS RESERVES DEFINED

The word "reserves" is defined in this manner by the American Petroleum Institute:

"These are the volumes of crude oil and natural gas which geological and engineering information indicate, beyond reasonable doubt, to be recoverable in the future from oil and gas reservoirs under existing economic and operating conditions. They represent strictly technical judgments and are not knowingly influenced by policies of conservatism or optimism. They are limited only by the definition of the term 'proved.' They do not include what are commonly referred to as 'probable' or 'possible' reserves."

The production and sale of the oil and gas reserves provides the gross income from the property. The estimation of reserves, then, is highly important to oil and gas properties appraisal even though it is, strictly speaking, a technical as well as an economic matter. At the same time, the need for accuracy in the reserves estimate diminishes with the length of time that will be required to produce the oil and gas; this is the case because the present value of oil and gas that are to be produced many years from now is modest. For example, if net income is discounted to present worth at a 13 percent rate, as it is in this appraisal, the present value of a barrel of oil that is produced in the first year is 35 times as great as the value of a barrel that will be produced 30 years from now. With that caveat in regard to the economic significance of reserves, here are some comments on methods of estimation.

Reserves may be estimated variously by the volumetric, material balance, and decline curve methods, which assume a different order of importance at different stages in the life of an oilfield.

The volumetric method is appropriately used only in the earliest portion of the life of a field. In simple terms, the volume of the oil in place is estimated by measuring and/or estimating the total volume of the oil reservoir and the fraction of the reservoir that is occupied by oil (and gas). The key data used in computing the volume consist of (1) the area of the field, (2) the average thickness of the oil reservoir rock (which is a series of sandstones at Prudhoe Bay),

(3) the porosity of the reservoir-- that is, the portion of the rock which consists of open pore spaces, and (4) the fraction of the pore spaces which is occupied by oil, gas, or water. Then, in order to derive the oil reserves estimate, an oil recovery factor must be applied to the volume of oil originally in place.

The material balance method requires the use of a complex equation that relates the volume of oil originally in place to changes in cumulative oil production, the ratio of the volume of gas to the volume of oil, and the effects of the presence of gas on the volume of reservoir oil. It is evident, without being any more technical than that, that some production history is required to make the material balance method useful.

The decline curve method of oil reserves estimation is actually a family of methods, wherein one may graph the relationships variously of (1) the oil production rate versus time, (2) cumulative oil production versus cumulative gas production, et al. Appropriate extrapolation of various curves may afford an estimate of either oil or gas reserves. Again, like the material balance method, the decline curve methods require a history of production in order to be useful.

B. OIL RESERVES ESTIMATE

The preceding paragraphs make it evident that only the volumetric method of reserves estimation is presently available at the Prudhoe Bay oilfield. That is the case, then, with the four estimates cited below.

1. A letter from the president of Atlantic Richfield Oil Corporation to BP Oil and Humble (now Exxon) Oil Corporation, dated August 6 1969, proposed at one point that annual oil production be at a level that is three percent of the original oil in place. Conservation File No. 83 of the Alaska Oil and Gas Conservation Commission, dated November 13-14, 1969, says on page 59 that "...early pipeline capacity could be as high as two million barrels per day." (or 730 million barrels per year). If one combines these two statements, the indicated oil in place is 24.3 billion barrels-- that is, 730 million divided by .03. If one applies a 40 percent recovery factor to this volume of oil in place, the indicated reserve is

9.72 billion barrels.

2. The Oil and Gas Journal, an authoritative trade magazine, noted in an article on the Alyeska pipeline dated

April 23, 1973 that Prudhoe Bay reserves are about

10 billion barrels.

3. I made a volumetric estimate using the geological contour map, cross-sections, and reservoir information that were submitted at the 1969 and 1971 Field Rules Hearings. The details of my estimate may be found in Appendix B of this appraisal report. My estimate of oil reserves is

9.94 billion barrels.

The estimated rate of oil production for the first 25 years of the field's operation is listed on Appendix A. The economic limit of oil production is not yet reached, and production then totalled

9.39 billion barrels.

That production constitutes 94 percent of my volumetric estimate of 9.94 billion barrels and essentially all of its present worth.

C. GAS RESERVES ESTIMATE

The estimate of gas reserves is set out in Appendix B. It is estimated that the amount of gas originally in place is 33.6 billion MCF ("MCF" is the abbreviation for "1,000 cubic feet"). Gas originally in place can also be stated as 33.6 trillion cubic feet. It is further estimated that 75 percent of this amount can be produced economically, yielding a reserve of

25.2 billion MCF.

Appendix A, the Value Computation Sheet, reveals indirectly that only 9.6 billion MCF will have been produced at the end of 30 years from the date of appraisal. That is the product of four times the gas revenue of \$2.4 billion. Appendix A also reveals that the present worth of gas production distant more than 30 years is minimal.

D. GROSS INCOME

1. Sources of Oilfield Income

The annual gross income from an oil property is the product of the barrels produced multiplied by the price per barrel. If natural gas (mainly methane) provides income, the annual production in MCF is multiplied by the price per MCF.

It is assumed here that dry gas will provide some income at Prudhoe Bay beginning two years after oil production commences. This presumes that a gas pipeline will be installed parallel to the proposed oil pipeline from the field to Valdez. Good reservoir practice will probably require the injection of most of the gas back into the reservoir in order to maintain pressure and maximize oil recovery. Gas injection may not be required if it is found that an active water drive is present, but some production history is required to resolve that issue.

2. Prudhoe Bay Product Prices

a. Oil

A price of \$2.95 per barrel is used to compute the gross income from oil. The use of this price constitutes a departure from normal appraisal practice, which typically calls for the use of current price, which would be less than the price that is used. However, an oilfield appraisal normally also involves current production, but it is believed that the Prudhoe Bay field will not begin to produce until 1978. It would be erroneous to employ the current price in computing 1978 and later income when it is evident that upward pressure on oil prices now exists on an international scale.

Oil price rises have been meteoric in the weeks just prior to writing this report. The price of 28-gravity oil rose 20 percent in California between May and September, and even greater increases have been recorded by Mid-East oil. Moreover, the prospect is that, by 1978, the influence of the Arab nations on worldwide oil pricing will be much greater than it is at present.

It is appropriate, however, to use information as close as possible in time to the date of appraisal in computing the price of oil. The writer's experience in property tax appraisal has been in a setting that permits the use of post-lien date information that seriously influences value. The only limitation on use is the closing of the assessor's roll, an action that takes place in California about three and one-half months after the lien date. Alaska law and practice do not provide for a closing date; in other words, it is an open-ended matter. It still seemed advisable not to depart unduly from the lien date in seeking critical information.

Here is the rationale for the oil price determination. The Oil and Gas Journal reported on April 16, 1973 about a meeting in Denver of the American Petroleum Institute. One of the speakers is quoted as saying:

"... (we) peg Persian Gulf crude prices at \$7-10/bbl by 1980."

In early 1973 comparable 28-gravity oil brought \$3.05 per barrel at Cook Inlet oilfields. (It had risen to \$3.45 per barrel for "old" oil at the time of this writing, and the price for "new" oil is now subject to negotiation at a price undoubtedly much higher than \$3.45.) Oil is an international commodity, of course, so Cook Inlet and Persian Gulf oil are at least partly in competition with one another. The well-publicized impending domestic shortage of crude oil, which will be only partially alleviated by Prudhoe Bay production, will place ever-greater upward pressure on the price of American oil. The prospect is offered, then, that Cook Inlet production will be worth about \$8.50 per barrel in 1980-- the mean of the price range proposed at the A.P.I. meeting. If the indicated 15 percent compounded annual price increase is computed in reverse, a Cook Inlet price of \$6.43 per barrel is suggested for 1978.

But, Prudhoe Bay oil will not bring as high a wellhead price as Cook Inlet oil because it must be transported 789 miles by pipeline to a marine terminal that will put it on an economic level with Cook Inlet oil. Pipeline costs are computed here in this manner.

(1) An article on page 118 of the Oil and Gas Journal of June 12, 1972 deals with pipeline costs. It says "Current estimates of the cost of the line to be built by Alyeska Pipeline Service Company run close to \$3 billion." As an aside, it is likely that total costs will exceed this amount, but that is the result of unanticipated carrying charges stemming from the delay in construction. Only replacement costs should be considered in this sort of analysis, so the earlier estimate of \$3 billion will be employed.

(2) The article also states that the system operated by Colonial Pipeline, the largest in the Lower 48 states, cost \$500 million for an annual capacity of 483 billion barrel-miles. Alyeska's pipeline will cost \$3 billion for an annual capacity of 576 billion barrel-miles (at its stated 2,000,000 B/D capacity). Alyeska's line, then, will cost

$$\frac{3000}{500} \times \frac{483}{576}, \text{ or } 5.04 \text{ times as much as Colon-}$$

ial's per barrel-mile of capacity.

(3) The Lower 48's oil and products pipelines grossed \$1.25 billion in 1971, and had a throughput of 1,427 billion barrel-miles (this assumes that the top six carriers, which are listed in the Journal article, had 85 percent of

total throughput. The average cost per barrel-mile in 1971, then, was

\$.000876.

(4) The cost per barrel-mile will be 5.04 times as great as that for the Alyeska pipeline, or

\$.0044.

(5) The total cost per barrel is the preceding figure multiplied by 789, the number of miles from Prudhoe Bay to the pipeline terminal at Valdez:

$\$.0044 \times 789 =$

\$3.48.

(6) Finally, the estimated wellhead price of Prudhoe Bay oil in 1978 is the Cook Inlet price of \$6.43, minus the transportation cost of \$3.48, or

\$2.95 per barrel.

For those who are interested, the total cost of \$3.48 per barrel can be separated into components for (1) pipeline amortization and return on investment and (2) operating expenses. Pipelines are typically regulated by some government agency, and the rate of return is computed on a net after-tax basis. Moreover, the rate of return is a weighted average of debt and equity. Here are the assumptions and computations for the case at hand.

Really should be 30-35 year

- (1) Economic life of line 25 years
- (2) Capital structure:
60 percent debt
40 percent equity
- (3) Debt interest rate (in January 1973) 7.0%
- (4) After-tax and -depreciation return on equity 12.5%
- (5) Weighted average return on total capital 9.2%
- (6) Capital recovery factor for 9.2% and 25 years .1035
- (7) Cost per year for amortization and return on capital is:
 $.1035 \times \$5,000,000$, or \$310,500,000
- (8) Total cost in 25 years' time is
 $25 \times \$310,500,000$, or \$7,762,500,000

(9) Total cost divided by reserves of 9.9 billion barrels yields a cost per barrel of \$.78.

(10) The cost per barrel for operating expenses is \$3.48 minus \$.78, or \$2.70.

b. Dry Gas

The price of natural gas is escalating rapidly at the present time, in recognition of past underpricing and present shortages. Its price at Prudhoe Bay, however, will continue to be minimized because (1) an expensive line must be built to carry it and (2) it must undergo expensive liquefaction at Valdez before it can be exported from Alaska. Therefore, although a wellhead price exceeding 50 cents per MCF (thousand cubic feet) has already been established in several parts of the Lower 48 states, and will very likely exceed 70 cents per MCF by 1978, a Prudhoe Bay price of 25 cents (\$.25) is used in this appraisal.

3. Oil Production Rate and Decline Rate

It was remarked earlier that one of the operators suggested that a maximum production rate of 2,000,000 B/D of oil might be attained. In this regard, an item on the third page of the Oil and Gas Journal's "Newsletter" of June 18, 1973 said:

"State of Alaska and producers there are cooperating to maximize the initial flow when Alyeska pipeline is ready rather than gradually building up throughput."

It is assumed, then, that wells will be drilled as the pipeline is being built (indeed, they are now being drilled), so that the field's initial production rate will be the same as the maximum rate. The current belief of the State Division of Oil and Gas¹ is that the initial rate will be about 1,800,000 B/D, and the Division's apparently conservative estimate is adopted for use in this appraisal.

A set of oil production curves was included in the evidence presented at the February 9, 1971 Prudhoe Bay Field Rules Hearings before the Alaska Oil and Gas Conservation Commission. These annual production decline rates were stated to apply to a well whose initial producing capacity is 1,000 B/D and whose economic limit is 100 B/D:

¹/Personal communication from Division engineers.

Constant percentage decline:
3.5 percent for 71 years

Pressure maintenance by natural water drive:
Zero decline for 25 years
35 percent decline for 10 years

Pressure maintenance by water injection:
650 B/D at zero decline for 39 years
35 percent decline for 9 years

The above estimates are only generally useful for the purposes of this appraisal. The Prudhoe Bay field had 79 Sadlerochit zone wells at the beginning of 1973, versus 51 at the beginning of 1972. The present rate of well completions-- 28 per year-- will result in the field's having 219 wells at the time that production begins in 1978. It is the writer's opinion that those wells will provide an initial production of 1,800,000 B/D.

Division of Oil and Gas engineers state that a total of about 400 wells will be drilled in the Prudhoe Bay field. This means that 181 wells will be drilled after the time that the field begins to produce. It is proposed here that their completion will sustain the initial production rate for a period of seven years, that is, through 1984.

It will be noted in Column 7 of Appendix A that the production rate per well declines at 8 to 10 percent annually through 1983. It is estimated that, upon the cessation of drilling, the field's producing rate will then decline at an exponential annual rate of 10 percent for 13 years' time. About 91 percent of the oil reserves will then have been produced. It is judged that gas "blowdown" will then be initiated, that is, reservoir pressure will no longer be maintained by gas injection. The conclusion is that the oil production decline rate will increase to 25 percent at that time.

4. Gas Production Rate

The benefits of gas injection in maximizing oil production were cited earlier. The judgment is made that net gas production will be only 25 percent of total production; that is, 75 percent of produced gas will be returned to the reservoir during the first 20 years of the life of the field.

It is also believed that gas production will not begin until 1980, two years later than oil production. Furthermore, the gas production rate will be one MCF per barrel of oil.^{1/}

^{1/} Alaska Oil and Gas Conservation File No. 83, p. 119, November 1969

Therefore, annual gas sales in MCF for the years 1980-1997 will be one-fourth the number of barrels of oil produced.

It is assumed that this rate will increase beginning in 1998. Gas will no longer be returned to the reservoir, but instead will be produced at such a rate that the remaining reserves will be depleted in 15 years' time.

5. The Economic Limit and Present Worth

The term "economic limit" was used earlier but not defined. It is that point in the producing life of an oil or gas field when gross income is exactly matched by direct operating expenses. The economic limit of Prudhoe Bay oil production would occur in the year 2004 if all 400 wells were retained, but the economic limit for gas production will occur much later.

About 15 billion MCF of gas will remain when oil production becomes uneconomic. The gross revenue from that gas will be very large indeed-- almost \$4 billion. Its present worth, however, is insignificant when compared with the present value of the Prudhoe Bay oilfield itself. In fact, it can be noted on Appendix A that the present value of both oil and gas production for the year 2002 is only \$11 million, which is a minute fraction of the field's value. As a result, value computations were not carried beyond the year 2002.

E. CAPITAL COSTS AND OPERATING EXPENSES

1. Definition of Net Income

It was remarked in section II of this report that "The relevant income that should be used... is the expected future net income." The operating net income that is capitalized into value in this appraisal is the gross income minus all out-of-pocket expenses except income taxes and interest on debt. Both income tax and interest charges are accounted for in the capitalization rate (see following section F). Depletion, depreciation, and amortization "expenses" are book charges that do not require the outlay of cash, and actually contribute to the cash flow from an income-producing property; in turn, cash flow is the money remaining in an entrepreneur's pocket after all expenses. Therefore, these book charges are not subtracted from gross income.

2. Capital Costs

Capital costs comprise money outlays that, for income tax purposes, must be recaptured by the investor over a period of time through book charges to either depletion or

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depreciation. Practically speaking, capital costs in this appraisal are treated the same as operating expenses. This treatment is conservative in that it tends to reduce the value of the property. The reason for this conservative treatment is based on the assumption that a purchaser of Prudhoe Bay would have to engage in most of the required capital investments prior to the time that production and income will begin. As a result, payment for the investments would have to come, at least originally, from corporate resources other than Prudhoe Bay. This suggests that the capital outlays would be paid for with cash on hand or with the proceeds from a short-term loan. It was decided, therefore, to expense the investments rather than to spread their cost out over the typical period of repayment of an equipment loan.

a. Well-Drilling Costs

An earlier section of this report noted that 79 Sadlerochit zone wells had been completed by the date of appraisal and that a total of 400 wells would be required to develop the field. Opinions variously expressed at the Field Rules Hearings in 1971 and by the Division of Oil and Gas indicate that the total drilling and completion cost per well will be about \$1,500,000. That amount is used in this appraisal (see Appendix A).

b. Oil-Gathering Centers

The gathering centers will receive all produced oil and gas, and will contain three-stage separators and other equipment. Three gathering center units have already been installed at a cost of about \$54,000,000. It is estimated that a further expenditure of \$54,000,000 will be required. That expenditure is divided between the years 1976 and 1977.

c. Gas Injection Equipment

The compressor plant and other facilities related to the injection of gas back into the reservoir will cost an estimated \$200 to \$300 million, according to an article in the August 10, 1970 issue of the Oil and Gas Journal. The latter figure is used, and is divided between the years 1976 and 1977.

3. Expenses

a. Oil and Gas Production Direct Operating

No experience is available on which to base an estimate of direct well-operating expenses, which include labor,

power, fuel, workovers, salt water disposal, routine contract work, et al. However, an economic limit for oil of 100 B/D was cited earlier, as well as an oil price of \$2.95 per barrel. Combining these two numbers provides a daily cost per well of \$295 and an annual cost per well of 365 times \$295, or \$108,000. The operating expenses listed for each year on Appendix A, the Value Computation Sheet, are the product of \$108,000 times the number of wells in existence at the beginning of the year, through the year 1997.

b. Gas Injection

Strictly speaking, the expense of returning dry gas to the reservoir depends on the gas volume and on the reservoir pressure which must be overcome to effect injection. It is estimated that this expense will be \$.10 per MCF for the 20-year period prior to blowdown.

c. Gas Production Direct Operating

Direct field operating expenses will still be incurred to produce the gas after blowdown begins. It is assumed here that only 100 wells in the structurally highest area will be required to produce the gas. The writer makes the professional judgment that the operating cost per well-year will be \$25,000.

d. Well Remedial Work and Redrills

Oilwells commonly require maintenance work that varies from field to field depending on such things as casing corrosion, invasion of the well-bore by formation sand, with subsequent destruction of tubing, and other factors. The assumption is made in this appraisal that remedial work will (1) begin the year after all wells have been drilled, (2) end at the twentieth year, when gas blowdown begins, (3) affect ten percent of all wells each year, and (4) incur a cost that is one-third the cost of drilling a new well. In short, beginning in 1985 remedial costs of \$20 million will be incurred each year through 1997. This amount is computed thus:

$$.10 \times 400 \times \$500,000 = \$20,000,000.$$

4. Property Taxes and Gross Production Tax

The prospective property taxes are so small in relation to the total value of the Prudhoe Bay oilfield that their effect on value is ignored. It is contended here that they are accounted for in the capitalization rate.

Section 43.55.010 of the Alaska Statutes supplement sets out the terms of the gross production tax to which produced oil

and gas are subject. That tax will be a levy against future gross income, just as are the expenses set out above. The manner in which it is computed in the appraisal for oil only is as follows:

First 300 B/D/Well:

$B/D/Well \times 365 \times .03 \times \$2.95 \times \text{No. of wells}$

301st to 1000th B/D/Well:

$(B/D/Well \text{ of } 1000 \text{ or less, but greater than } 300, \text{ minus } 300) \times .05 \times 365 \times \$2.95 \times \text{No. of Wells}$

1001st to 2500th B/D/Well:

$(B/D/Well \text{ of } 2500 \text{ or less, but greater than } 1000, \text{ minus } 1000) \times 365 \times .06 \times \$2.95 \times \text{No. of wells}$

More than 2,500 B/D/Well:

$(\text{Field average } B/D/Well \text{ minus } 2500) \times 365 \times .08 \times \$2.95 \times \text{No. of Wells}$

The gross production tax on natural gas is much simpler to compute. That tax amounts to a flat four percent of the gross income from gas sold. That gross income is listed for each year on the Appraisal Computation Sheet.

first year's

It will be noted that the effective production tax on oil is 7.1 percent. The levy declines every year, as the production per well declines; for example, it amounts to 6.4 percent of the gross value of oil production in 1985, and to 4.9 percent in 1995.

5. Royalty Payments

Royalty must be paid to the State of Alaska at the rate of $12\frac{1}{2}$ percent of the gross value of production. A legal question exists in the State of California regarding the ad valorem taxability of the government interest. This stems from the fact that royalty is deemed equivalent to rent and rent should not be subtracted from a property's gross income in computing net income; in fact, net income commonly derives from rent.

However, that issue is still unresolved in California. Moreover, a private oil company cannot buy Alaska's royalty interest nor is it apt to pay another private party for the value of that interest. As a result, royalty is treated as an expense in this appraisal.

F. CAPITALIZATION RATE AND THE TIME DEFERMENT OF INCOME

The future net income from an oil property must be reduced to its present worth in order to obtain an estimate of market value. A prospective buyer will pay for the future net income an amount that will permit him to recapture his invested capital and realize a profit on it at his "target" rate of return. His future profit (return) is the difference between the total net income and the price (present worth) that he pays for the property.

Future net income is reduced to present worth by "discounting" it at the investor's anticipated rate of return. That return is also called the capitalization rate.

The capitalization rate used in this appraisal is 13 percent. The rate is weighted for the rate of return on equity capital and the interest rate on debt. It is assumed that Prudhoe Bay, like any other large mineral or industrial property, would be purchased partly with the use of borrowed money. Since it offers a level of risk that is greater than that of most oilfields, it is assumed here that a purchase would be made 50 percent with equity capital and 50 percent with borrowed money. This is a higher percentage of equity capital than usually prevails in the purchase of oil-producing properties.

An analysis was made in California in 1970-71 of the sales of 175 oil- and gas-producing properties. That analysis^{1/} revealed an average 18.5 percent pre-income tax cash flow rate of return on equity. Also, it was found that the oil industry typically borrows money at a rate that is equal to the corporate prime rate plus three-quarters of one percent to one percent. That fact reveals a loan interest rate of 7.0 (seven) percent on the date of appraisal. The computation of the total-property capitalization rate follows.

<u>Capital Item</u>	<u>Capital Fraction</u>	<u>Rate</u>	<u>Weighted Product</u>
Equity	.50	.185	.0925
Debt	.50	.07	<u>.035</u>
TOTAL CAPITALIZATION RATE			.1275

that is, 12.75 percent, rounded up to 13 percent.

The present worth factors used in the appraisal may be found in Assessors' Handbook 566, Valuation of Oil and Gas Producing Properties.

^{1/} "The Determination of a Total Property Capitalization Rate from the Analysis of Market Data," March 1971, a report to the Standards Committee of the California Association of County Assessors from its Petroleum Standards Advisory Committee.

It will be noted that income from Prudhoe Bay is not anticipated until 1978. The Oil and Gas Journal, on April 16, 1973, quoted a speaker at an American Petroleum Institute meeting as saying:

"...until North Slope production becomes available, perhaps in 1978."

Also, an article in the Journal of May 7, 1973 said:

"Alaska (pipeline) still hopes to begin construction...by summer 1974. But...work could be delayed two years..."

The effect of the delay in production on the present value of the field is conspicuous. The present worth factor for the year 1978 is .510, which means that the first dollar's worth of net income from oil was worth only 51 cents in January 1973.

Another rather impressive fact: if the date of appraisal was January 1978, and the field was just beginning to produce, its value would be in excess of \$9,500,000,000 because of the more immediate receipt of the net income, and because all major capital expenditures would have been made.

IV. A MATTER OF SIZE

One should keep in mind that Prudhoe Bay is a giant oil and gas field with prospective monumental gross income and awesome operating costs. Dealing with Prudhoe Bay numbers has something in common with dealing with astronomy or the national debt. As a result, the valuation equivalent of a light-year is used on the Value Computation Sheet. It consists of stating production and income and expenses in terms of millions. Thus, Prudhoe Bay's first 20 years of production of 9,389,000,000 barrels is stated as 9,389 barrels.

This approach obviously offers computational advantages and saves paper. It is also mathematically rational and in accordance with good appraisal practice. For example, assume that the first 20 years' production was challenged as being excessive to the extent of 40,000,000 barrels and \$118,000,000 gross revenue, a not inconsiderable sum. In most cases this would constitute a drastic professional challenge. In this instance, however, it would amount simply to a claim that production and revenue were overstated by 44/100 of one percent, that is, they were only 99.56 percent correct. Such a challenge may be unanswerable, but it is also unprovable.

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APPENDIX B- COMPUTATION OF OIL AND GAS RESERVES ESTIMATES

1. OIL RESERVES

The volumetric estimation of oil reserves is made with the use of the formula:

$$\text{Reserves} = \frac{A \times h \times \phi \times (1-S_w) \times 7758}{FVF} \times RE$$

where the symbols have these meanings:

A	area in acres
h	net oil sand thickness
ϕ	average porosity (rock volume pore space as a percent of total rock volume)
S_w	water saturation as a percent of pore space
7758	number of 42-gal. barrels in one acre-foot
FVF	formation volume factor, which is the number of barrels of space taken up in the reservoir by one barrel of oil and its included gas
RE	Recovery efficiency, expressed as the percent recoverable of the original oil in place

These elements are assumed to be constants for the Sadlerochit reservoir sands at Prudhoe Bay:

ϕ	22 percent, that is, .22
S_w	20 percent, so that $(1-S_w)$ is 80 percent, or .80
7758	
FVF	1.40

The product of these constants is another constant, 975, which represents the barrels of oil in place per acre-foot of formation. This constant is multiplied by A and h for each of several areas at Prudhoe Bay.

The geologic contour map, cross-sections, and reservoir data that were presented at the Field Rules Hearings in February 1971 were used in the following computations. A professional petroleum geologist or engineer will recognize the cited areas by referring to the map, which is not included in this report.

All of the listed numbers of barrels of oil in place are stated in millions. That is, the first figure listed is actually 13,455 million, or 13.455 billion.

a. Main Area, underlying gas cap

A 46,000
h 300

Oil originally in place:

$$46,000 \times 300 \times 974 = 13,455 \text{ barrels.}$$

b. Main Area, oil ring

A 44,000
h 150

Oil originally in place:

$$44,000 \times 150 \times 975 = 6,435 \text{ barrels.}$$

c. Unresolved shaded area, including only probable area above oil/water contact:

A 13,000
h 150 (rough approximation)

Oil originally in place:

$$13,000 \times 150 \times 975 = 1,901 \text{ barrels.}$$

d. Small fault closure in SE part of T12N-R12E

A 3,900
h 175

Oil originally in place:

$$3,900 \times 175 \times 975 = 665 \text{ barrels.}$$

e. Far western fault closure

A 14,000
h 175 (rough approximation)

$$14,000 \times 175 \times 975 = 2,389 \text{ barrels.}$$

TOTAL OIL ORIGINALLY IN PLACE 24,845 barrels.

OIL RESERVES AT 40% RECOVERY EFFICIENCY 9,938 barrels.

The recovery efficiency was computed using the formula on page 109 of Craft and Hawkins' Applied Petroleum Reservoir Engineering. That formula assumes a water-drive recovery mech-

anism. The mechanism is not yet known at Prudhoe Bay, but the large structural relief and the presence of a giant gas cap point toward high oil recovery. The elements in the recovery efficiency formula and their values at Prudhoe Bay follow.

k (permeability)	265 millidarcies
S _w (water saturation)	.20 (given for Kuparuk River pool in Field Rules Hearings report)
μ (viscosity)	0.81 (at bubble-point)
φ (porosity)	.224
h	200 feet (average)

The formula is:

$$RE = 0.114 \sqrt{(0.272 \log k) \sqrt{(0.256 S_w) - (0.136 \log \mu)}} \\ - (1.538 \phi) - (0.00035 h)$$

and the computation is:

$$RE = 0.114 \sqrt{(0.272 \times 2.4232) \sqrt{(0.256 \times .20)}} \\ - (0.136 \times 0.0908) - (1.538 \times 0.224) - (0.00035 \times 200) \\ = 0.3979, \text{ that is, } 39.79 \text{ percent, rounded to } \underline{40 \text{ percent.}}$$

This estimate of recovery efficiency can be confirmed generally by reference to the empirical factors listed in J.J. Arps' "A Statistical Study of Reservoir Efficiency" (Amer. Petroleum Institute Bulletin D-14, First Edition, 1967, Division of Production, Dallas, Texas). Arps' median recovery efficiency for sandstone reservoirs was 33.8 percent, and the maximum was 67 percent. The reservoir with the maximum RE was better than the median, relative to Prudhoe Bay, in regard to permeability and porosity, but less favorable in regard to water saturation and oil viscosity. Overall, Arps' empirically derived graphs justify the 40 percent RE computed using the formula presented by Craft and Hawkins.

2. GAS RESERVES

The estimation of gas reserves employing the volumetric method has these elements in common with oil reserves estimation:

A
h
φ
S_w

In addition, the natural gas volume must be corrected for the effects of pressure, temperature, and the gas's compressibility factor, which depends on the gas composition as well as on pressure and temperature. This formula is used to compute the corrections cited:

$$\frac{PR}{Psc} \times \frac{Tsc}{Tres} \times \frac{1}{z}$$

where the above abbreviations are defined thus:

PR average original reservoir pressure
Psc standard pressure of 14.7 psi
Tsc standard temperature of 60°F
Tres average reservoir temperature
z the compressibility factor at average reservoir conditions

The corrections for the Prudhoe Bay reservoir are:

$$\frac{4125 \cancel{14.7}}{14.7} \times \frac{460 \cancel{60}}{460 \cancel{190}} \times \frac{1}{1.054}$$

A multiplication must also be made by 43,560 to obtain the number of cubic feet in an acre-foot. Then, a division may be made by 1,000,000,000 to reduce the answer from cubic feet to MMMCF, that is, billions of cubic feet. This reduction can be made directly by using .0004356 instead of 43,560.

The product of all corrections for porosity, water saturation, pressure, temperature, compressibility factor, and cubic feet is 0.001639. That constant can be used in conjunction with the area in acres and the net sand thickness in feet to compute the original volume of gas in place.

a. Area of Gas Cap only (no oil present)

A 12,000
h 225.

Gas originally in place:

$$12,000 \times 225 \times .001639 = 4,425 \text{ MMMCF}$$

b. Gas Cap Gas above oil ring (Main Area)

A 46,000
h 120 average

Gas originally in place:

$$46,000 \times 120 \times .001639 =$$

9,047 MMCF

c. Oil-associated Gas (all areas except a and b, above)

The estimate of oil-associated gas in place is computed by multiplying the estimate of oil-originally-in-place by the reservoir gas/oil ratio: ✓

$$24,845 \times \frac{810}{1000} =$$

20,124 MMCF

d. TOTAL GAS ORIGINALLY IN PLACE:

33,597 MMCF

e. GAS RESERVES AT 75 PERCENT OF GAS
ORIGINALLY IN PLACE:

25,198 MMCF

Not uncommonly 90 percent or more of gas-in-place is produced from fields in the Lower 48 states. That level of recovery might be expected of Prudhoe Bay if it were not for the very high cost of production. In any event, the percent recovery of gas used here does not affect the field's present value; this fact was discussed in section III-D-5 of the appraisal report. The same value would have accrued had a recovery efficiency of only 50 percent been used.

Year	Production 1,000,000 bbls. (2)	Revenue at \$2.95 per bbl.	Natural Gas Revenue at \$.25 per MCF (4)	TOTAL REVENUE	No. of wells at end of year	Average BOPD per well
1973					107	
74					135	
75					163	
76					191	
77					219	
78	657	\$1938	\$	\$1938	247	7287
79	657	1938		1938	275	6545
80	657	1938	42	1980	303	5940
81	657	1938	42	1980	331	5428
82	657	1938	42	1980	359	5014
83	657	1938	42	1980	387	4351
84	657	1938	42	1980	400	4500
85	591	1743	38	1781	"	4047
86	532	1569	34	1603	"	3642
87	479	1413	30	1443	"	3280
88	431	1271	27	1298	"	2952
89	388	1145	25	1170	"	2657
90	349	1030	22	1052	"	2390
91	314	926	20	946	"	2150
92	283	835	18	853	"	1938
93	254	749	16	765	"	1740
94	229	676	14	690	"	1568
95	206	608	13	621	"	1410
96	185	546	12	558	"	1267
97	167	493	11	504	"	1144
98	125	369	382	751	100	3425
99	94	277	382	659	"	2575
2000	70	206	382	588	"	1918
01	53	156	382	538	"	1452
02	40	118	382	500	"	1096
	9,389	\$27,696	\$2,400	\$30,096		

- ② Zero decline until new-well drilling ceases; decline of 1 end of 20th year; decline of 25 percent per year
- ④ Net production rate is 25% that of oil through 1997, then per year as blowdown begins.

ALL OTHER ITEMS ARE EXPLAINED IN

CAPITAL COSTS			EXPENSES			PRODUCTION TAX		ROYALTY	TOTAL COSTS	OPERATING	Present Worth	PRESENT
Well- drilling	Gathering Centers	Injection Eqpmnt.	Well- Operating	Remedial Work (12)	Gas Injection (13)	On Oil (variable)	On Gas (at 4%)	at 12 1/2% Total Rev.	EXP. TAXES ROYALTY	NET INCOME	Factors at 13%	WORTH
\$ 42									\$ 42	\$ (42)	.941	\$ (40)
42									42	(112)	.832	(35)
42									42	(42)	.737	(31)
42	\$ 27	\$ 150							219	(219)	.652	(143)
42	27	150							219	(219)	.577	(126)
42			\$ 27		\$ 50	\$ 138		\$ 242	499	1439	.510	734
42			30		50	136		242	500	1438	.452	650
42			33		50	133	\$ 2	248	508	1472	.400	587
42			36		50	132	2	248	510	1470	.354	520
42			39		50	130	2	248	511	1469	.313	460
42			42		50	128	2	248	512	1468	.277	407
42			43		50	127	2	248	490	1490	.245	365
20			43	\$ 20	45	111	2	227	448	1333	.217	289
			43	20	41	97	1	200	402	1201	.192	231
			43	20	37	85	1	190	366	1077	.170	183
			43	20	33	74	1	162	333	965	.150	145
			43	20	30	63	1	146	303	867	.133	115
			43	20	27	55	1	132	278	774	.118	91
			43	20	24	49	1	118	255	691	.104	72
			43	20	22	45	1	107	238	615	.092	57
			43	20	19	38	1	96	217	548	.082	45
			43	20	17	34	1	86	201	489	.072	35
			43	20	16	30	1	78	188	433	.064	28
			43	20	14	28	0	70	175	383	.056	21
			43	20	13	23	0	63	162	342	.050	17
			3	20		23	15	94	155	595	.044	26
			3	5		16	15	82	121	538	.039	21
			3	5		11	15	74	108	480	.035	17
			3	5		8	15	67	98	440	.031	14
			3	5		6	15	62	91	409	.027	11
						\$ 1,720	\$ 97	\$ 3341	\$ 8,234	\$ 21,862		\$ 4,768

that is, \$4,768,000,000

October 1973
Robert H. Paschall
Sacramento Calif.
Reg. Petroleum Eng. (No. 537)
Reg. Geologist (No. 8)
State of California

10 percent per year until
thereafter.
then rises to 1.53 billion MCF
at \$50/M each.
until blowdown begins.

N TEXT OF REI PT.

460 Lovella Way
Sacramento CA 95819
16 February 1976

Senator John Huber, Chairman
Special Committee on Taxation and Revenue
Pouch V
Juneau Alaska 99811

Dear John:

This letter contains my comments on the three proposed bills that you sent to me on February 10. I believe that I can make some useful contributions to the first two. Also, I thought that you might be interested in an economic analysis in which I engaged to indicate the oil industry's approximate position at Prudhoe Bay relative to the return of their investment following the commencement of production in 1977. That analysis is attached to this letter.

SENATE BILL No. 567, PRODUCTION TAX

I will make only one comment on the level of taxation that will be effected by the change in rates. If Prudhoe Bay production commences at a rate of 1,200,000 barrels per day from 400 wells, the net effective tax rate will be 8.2 percent of gross income, versus an effective rate of 5.8 percent under existing law. The ad valorem property tax in California equates with a rate of about 5.5 percent. You have information in your office on comparable rates in Texas, Louisiana, and elsewhere. Now to specific comments.

Page 2, line 3

This line should conclude

"...of the gas and liquid products produced each month
and not injected back into the reservoir."

For some time most of the gas produced from Prudhoe Bay will be returned to the reservoir ("re injected," in normal if incorrect parlance). As a result, the present wording of the bill would result in its being taxed time after time. It is only net production of gas-- that produced less that returned to the reservoir-- that should be subjected to taxation. The wording that I propose will take care of taxation of flared gas, as it should, and gas either used at the field or shipped out in a pipeline.

Page 2, lines 5-22

The cents-per-barrel tax confuses me every time that I encounter it. Is it an alternative tax on production (at an obviously lower level) or an added tax? It reads like an added tax, which puts the production tax at a very high level, indeed. Just asking.

Page 3, lines 8-9

Here and later is the same case that was noted on page 2. Beginning with the last two words on line 8, this should read

"on oil produced or gas produced and not injected
back into the reservoir..."

Page 3, lines 13-15

Same problem. These lines should be revised to read

"(e) Gas produced is considered, for the purpose of this chapter, as gas produced from a lease or property and not injected back into the reservoir."

Page 3, line 26

Same problem. Line 26 should read

"(3) the gross amount of oil produced or gas produced from the property, and in the case of gas, not injected back into the reservoir..."

Page 4, line 1

Same problem. Line 1 should read:

"(4) the total value of the oil produced or gas produced but not injected back into the reservoir..."

SENATE BILL 620, NET PROCEEDS TAX

Essentially all of my comments here were also stated in my report to you of February 8. They bear mainly, though not entirely, on the differences that should be maintained relative to the meanings of the words price, income, and value. Except for Section 43.22.040 my comments are not momentous, but I believe they will contribute to the proper intent and language of a net proceeds tax bill.

Page 1, lines 14-16

These lines should be revised to read

"...collection of a tax based on the operating income to the property from oil and gas, and to provide a rate of taxation on the operating income to the property from oil and gas..." (and conclude line 16 and line 17 as they stand)

It is simply not proper to speak of an "ad valorem tax" on "income." It serves to confuse two types of taxation. Moreover, the use of the word "operating" is necessary to differentiate "net proceeds" from either "gross income" or "net income." "Operating income" or even "operating net income" are essentially synonymous with "net proceeds." On the other hand, gross income is the starting point in computing net proceeds, while "net income" is the level at which the corporate income tax is usually assumed to apply. This may seem like nit-picking, but I have gotten into horrendous disagreements because another person and I were thinking about two different levels of income.

Page 1, lines 21-23

These lines should be revised to read:

"...February 1, with the department a statement showing the gross income from production and the operating and development expenses for each well or field owned or..."

As it stands, without regard for things that follow, an extremely important element is omitted. It might not hurt to add "and net proceeds" after "expenses," but it is not really necessary, because its computation is automatic once one has the gross income and expenses.

Page 2, lines 8,9, 17, 19, and 25

The word "value" should be changed to "income" in each case.

Page 2, lines 23 and 25

The word "well" should be changed to "property" in each case. The net proceeds tax applies to properties, oil people think in terms of properties' incomes, and, also, the word "well" does not take account of multi-well properties.

Page 3, new line 1

A minor item, but I suggest that present item (7) on operating expenses be changed to item (4) and placed just before maintenance and repairs. That is the way it is usually carried on operating statements, and it should be a companion of other direct expenses, rather than separated by "amortization."

Page 3, line 5

The net proceeds tax is not at all like the Federal income tax, and the charge cited here is made for a different reason. The word "amortization" should be used instead of "depreciation." "Amortization" means only one thing, the recapture of capital, which is the goal sought here. As you know, "depreciation" can also mean a loss in value, and we might as well avoid that ambiguity.

Page 3, line 10

The words "the well" should be deleted, since it is operations generally that are involved. Also, the word "development" should be singular; it is never used in the plural in investment language.

Pages 3 and 4, Section 43.22.040

This section should be deleted in its entirety for reasons that I set out in my letter of February 8. First, note that "...money expended for ...development" is permitted as a charge against gross income in item (7) on page 3. But, drilling costs are the largest single element in oil field development costs, so a serious contradiction now exists relative to expensing development costs in Section 43.22.030(b)(7) and amortizing them in Section 43.22.040.

As I noted on February 8, it is much simpler to expense these costs, as proposed in Section 43.22.030(b)(7), and this expensing is in harmony with the income level known as net proceeds, since development costs are a direct obligation at the field level.

Exploration costs simply should not be allowed at all. The net proceeds tax is, to repeat, levied on the operating income from a property (specifically, from a property's oil and gas reserves, since equipment must be amortized in order to subject it to the ad valorem property tax). Past exploration costs, whether they resulted in production or not, have absolutely no relationship to present net proceeds.

If the amortization of exploration costs is permitted as an expense, it will vitiate the net proceeds tax and make it a tax on persons (corporations) rather than on properties. Also, it will compound to an unbelievable degree the administration and auditing of the tax. What does it matter, for example, if a producing lease at Prudhoe Bay is owned by a company that is engaging in seismic work in the Gulf of Alaska? Nothing, I can assure you.

Page 4, lines 5-7

The title of this section should be "NET PROCEEDS TAX LEVIED." It is not an ad valorem tax. Also, lines 6 and 7 should be revised to read

"shall be collected by the department a net proceeds tax
based on the operating income from production..." and so on.

Page 4, lines 14, 15, 19, and 20

The word "value" should be replaced by the words "gross income" in each case.

Page 4, line 23

The word "value" should be replaced by the word "price." You can now appreciate why it is so important to differentiate between the words price, income, and value. They only rarely mean the same thing in the fields of either valuation or taxation, and they never mean the same thing in net proceeds taxation.

Page 8, lines 21-23

First, a minor item. I suggest that "gas" be made item (3), so that it and "oil" are placed next to one another, and not separated by "gross income." More importantly, the word "value" on line 23 should be replaced by

"gross income per barrel of oil or MCF of gas"

Also, you may wish to reconsider the term "FOB price at Alaska border or other convenient point." My own belief here is that the price should be the wellhead price as determined by the Department in terms of Section 43.22060 on page 4.

SENATE BILL 621, EXCESS INCOME SURTAX

You know about my concern over this proposed tax. At the very least, I am convinced that its own excesses and its obvious administrative difficulties will jeopardize the passage of other oil tax legislation introduced in the same session.

I will make only two observations here. One of them is a simple technical point that I have beaten to death earlier in this letter. This particular tax is not an excess value surtax, but an excess profits tax or an excess income tax.

Permit me to offer an analogy with another excess profits surtax that you may wish to consider, and which may highlight the political and economic dangers that lurk in any excess profits tax. Contemplate, if you will, levying an excess profits tax on Alaska landlords. It should be easy to compute. Use a base year of, say, 1972 for Alaska rents, and escalate them each year by the Consumer Price Index. Then, levy a tax on 41 percent of the net income generated by the difference between actual current rents charged and indexed rents. Pretty easy, eh?

Yes, that would be easy, but now consider the problem introduced if the Department of Revenue is charged with determining each year, not an easily indexed rent, but the prospective long-term rent that might be expected. Now it becomes not only politically unpalatable (to landlords, at least) but an economic nightmare. And that's about the case with any effort to levy an excess profits tax.

Sincerely

Robert H. Paschall

Robert H. Paschall
Consulting Valuation Geologist
and Engineer

APPENDIX

This analysis is a fairly straightforward effort to estimate the value, at the time that Prudhoe Bay production commences, of all past investment in the field, and then to estimate the time by which the industry will recoup that investment. It may be useful to you in considering the effect of different tax levies and in responding to similar estimates that may be offered by industry.

It is assumed that past investments will incur lost interest at a conservative rate of 8.5 percent per year, so that the true cost of investment by 1977 will be the original cost plus accrued annual interest. Stated costs for field development were taken from my 1973 appraisal and escalated 50 percent because of the great degree of inflation in recent years. Where certain costs were spread out over a number of years, an "average year" was used to simplify calculations.

<u>Element of cost</u>	<u>Original</u> (i n m i l l i o n s)	<u>Full cost</u> <u>by 1977</u>
1969 lease sale	\$ 900	\$1,728
Exploration	100	192
Development (average year 1974)	<u>1,968</u>	<u>2,513</u>
TOTAL		\$4,433

The next step necessary is to compute the first-year operating net income for Prudhoe Bay, and assume that the net income will prevail for a few years. For this computation I used these elements:

Production rate of 1,200,000 B/D
Price of \$7.00 per barrel at the wellhead
My 1973 operating expenses inflated by 50 percent
The current level of royalty and production tax

These elements yield a gross income per year of \$3,066 million and an operating net income of \$2,390 million.

In 1975 I concluded that the proper venture capital rate for Prudhoe Bay was then 18 percent. I will now lower it to a conservative 15 percent mainly because of a notable decline in the short-term interest rate that applies to oil field loans. If one next applies the operating net income of \$2,390 million to the 1977 full cost of \$4,4330 million, in conjunction with a 15 percent rate of return, it is found that the investment will be recouped in the year 1980, about three years from the commencement of production.

This period of return may appear to be a short one, but these important things should be kept in mind: some large capital investments date back to 1969, so that the total period of recapture (on a pre-income tax basis, at that) will be eleven years for that part of the investment, a very long time indeed for getting one's money back.

An equally important consideration is that the colossal \$6 billion investment in the pipeline is not considered here. If the pipeline is treated as a regulated interstate carrier, the investment will not be recouped for perhaps twenty years. In short, it is evident that Prudhoe Bay has not yet provided a bonanza for the oil industry, but instead has simply incurred very large carrying costs.

460 Lovella Way
Sacramento CA 95819
12 February 1976

Senator John Huber, Chairman
Special Committee on Taxation and Revenue
Pouch V
Juneau Alaska 99811

Dear John:

This letter contains my comments on the outstanding report submitted by Rush Moody, Jr., to you in your capacity as chairman of the Joint Gas Pipeline Impact Committee. Moody's report brings into clear focus Alaska's problems and required decisions on the issue of natural gas, to which you had alluded to me in conversation but ^{of} which I now have a fuller understanding. It is my hope that my own knowledge of and interest in petroleum economics and in production and processing systems will add to Moody's statements, which constitute a **concise** summary of legal avenues and pitfalls. My comments will proceed on a page-bypage path through Moody's report.

Page 1 , future rate of Prudhoe Bay gas production

I was most interested in the footnote on this page bearing on the possibly detrimental effect of producing gas (and selling it) at a high rate at the same time that the oil is produced at Prudhoe Bay. I have been somewhat astonished in the past couple of years over the battle about alternative gas pipeline routes, because my 1973 appraisal of Prudhoe Bay contemplated that large-scale production of gas would not begin until the 18th year of the field's producing life. If my conclusion had any merit at all, I said to myself, why are people now battling over the right to build a line? Mr. Moody's **footnote** indicates a concurrence of our views.

I will give you my opinion on what Alaska should do about this issue and others of great importance in the last paragraph of this letter.

Page 2 , the dangers of nonaction

I agree with Moody's implication that nonaction on Alaska's part at this time is tantamount to a decision, and one that may be injurious to the State's long-term interests. The various impacts of nonaction will become evident later.

Page 3 and pages 5-6 , royalty in cash or in kind

Moody points out the grim effect on the State should it choose to take its royalty in cash, and thus lose control of the gas to the FPC. I made marginal notes on page 3 to the effect that "Apparently State should take only in kind" and "Better take action on a non-cash basis," and then found that Moody said the same thing on pages 5 and 6.

But this decision, on which Moody and I agree, calls for other decisions and positions. For one thing, it requires, as he noted, that the State promote a gas transmission line that lies within the State to the greatest extent possible, which means either the El Paso proposal or a southeasterly route for the Arctic Gas proposal.

But, paragraphs 2 and 3 on page 4 lead me to ask "Does anyone really know how well Kenai gas will provide for Alaska's needs for, say, the next twenty years?" There is no point, because of all the uncertainties involved, to look farther down the line than that. If Kenai can do the job for Anchorage and Fairbanks, this simplifies the problems related to delayed gas production from Prudhoe Bay or of choosing between El Paso and Arctic.

Mind you, there is a way of knowing, or at least of making a very good estimate, in order to answer my question. I will get back to that in the last paragraph. It is evident that the question should be answered, because it is one that may well be asked by the FPC in challenging Alaska's statements on its needs.

Page 6, Decision on disposal of royalty gas

Paragraph 2 continues to deal with the matter of the State's taking its gas in money or in kind, opting for the latter, and I agree. This is a decision that should be made soon, since it will have more merit later than if the decision itself was made much later. Also, you should obtain a legal opinion as to whether the State can take the royalty in kind and then sell it to the interstate pipeline without jeopardizing its right to claim it later. That is, would such a sale of its royalty gas commit it to interstate commerce?

Page 6, State cooperation with gas transporter

The last sentence in the next-to-last paragraph indicates the desirability of the State's remaining on at least speaking terms with the company that transports the gas. Should the State choose to take gas in kind, and either go into the gas distribution business itself or issue a franchise to a distributor, it appears that close cooperation with the transporter may be requisite. That is, for example, if a line were to tap El Paso's proposed line east of Fairbanks to take gas to Fairbanks, the State and El Paso might have to go hand-in-hand to the FPC to make the arrangement. And, for various reasons, the producers would undoubtedly be highly interested spectators.

Page 7, State law controlling out-of-state sales of gas

Paragraph 3 talks of such a law enacted in Texas. To me it smacked of lese majeste on the part of the state, and I scribbled a marginal note "Is this constitutional? May interfere with interstate commerce." Moody's remark in the last paragraph on page 6 shows that he wonders about it, too. There must be a better way to do what you want to do for Alaska. After all, you have only 300,000 population to Texas's 9 or 10 million, and your reserves and production are on the upgrade instead of the downgrade. Texas may be getting a bit desperate; a real pot of gold lies at the end of your rainbow, without getting crosswise with the rest of the United States.

Page 8, extraction of natural gas liquids

Ethane, propane, butane, et al., are known as natural gas liquids, or NGLs for short. I suggest here that Moody is not familiar with normal oil field practice relative to NGLs. If the field gas has an economic content of NGLs, they are extracted at the field by the use of separators or a gasoline plant ("gasoline" here means natural gasoline, which is one of the NGLs). "Natural gas" moving in interstate commerce is, so far as I know, only methane, which is also known as "dry" gas, meaning that the NGLs have been removed.

All of these definitions are intended to point out that no incentive is usually needed to get producers to extract the NGLs from the produced gas. In fact, it is generally considered highly advisable to do so before putting the dry gas back into a reservoir ("reinjecting", as it is called) when desired to maintain the reservoir pressure.

Of course, things may get a little sticky in Alaska because of the pipeline problem. Prudhoe Bay producers might decide to commingle the NGLs with the oil before shipping it to Valdez, where it would leave the State. That's not all bad, however, since that would boost the State's take from the severance tax and from the net proceeds tax, too, should one be enacted.

I will not comment on the prospect that the natural gas might be converted to methanol, other than to say that it is not immediately evident how the State could "encourage" that action. I suggest that economics will be the decider. I see no evident problems here relative to the FPC, by the way, although Moody believes so without saying why.

Page 9, State royalty rate

I will agree that a one-eighth royalty rate is a quite conservative one these days, but there are offsetting factors if one makes comparisons with Texas and Louisiana. For one thing, operating costs in Alaska are enormously higher than in the Lower 48, so if you put the two together-- royalty and operating costs-- your operators will undoubtedly suffer a much bigger bite out of their gross income. Moreover, no other state now has or has proposed a net proceeds tax on oil (let alone an excess profits tax!), so it is certainly economically unsound, and perhaps politically unsound as well, to make comparisons only on the basis of State royalty rates.

Page 9, a return to the subject of interstate commitment

Moody doesn't say, but perhaps you know the answer to what may be a simple but very important question: will natural gas be committed to interstate commerce before it leaves Valdez? Just asking; after all, it will be entirely intrastate until then, and will change carriers at that point.

Page 10, near top: oil development tied to State's needs

I feel a bit uneasy over Moody's statement here for the same reason that applies to the comments about the remarks on page 7 on a State law controlling out-of-state sales of gas. The political problems are ominous, and there are some sizeable economic ones as well. A political problem might be that of bringing 48 other states, or maybe 25 or so, down on your necks, with subsequent congressional "interference." Here is an economic problem: what if an operator leases State lands for a fat bonus bid, puts alot of money into exploration and makes a big discovery, and the State then says "Our law and our present circumstances require that you suspend development until we need the oil (or gas, or money)? That would be a case of Katie, bar the door!

Page 10, a franchise tax on interstate pipelines

Doesn't your present law provide for ad valorem taxation of the Alyeska pipeline? Moody may not know about this. In California at least, the franchise tax is relatively small compared to the ad valorem tax on interstate pipelines. (In fact, in California parlance the "franchise tax" on corporations exactly parallels the Federal income tax, and Moody probably refers to something different, like a business tax or license. But that still should not compare with the ad valorem tax.)

SUMMARY

John, I will close by suggesting early action on a multi-faceted program for Alaska.

1. Take care of the matter of the State's getting its gas in kind rather than in cash.

2. Have a study made that encompasses Alaska's 20-year need for natural gas, the ability of the Kenai to supply it, the cost of a pipeline for Kenai gas to Fairbanks, the probable date at which Prudhoe Bay will be able to ship gas, the matter of whether the State could take its royalty gas from El Paso's proposed line at selected points, and the cost of that program either to the State or to a franchised distributor.

Finally, if my suggestions have any merit whatsoever, Alaska will need a coordinated effort to find the answers and resolve the issues. If it is at all useful to you, I just happen to know someone who is in an excellent position to put together a small team of economists, engineers, and tax experts to do the job. (I forgot: we will need a lawyer, too. Can't seem to avoid them.)

Sincerely



Robert H. Paschall
Consulting Valuation Geologist
and Engineer

460 Lovella Way
Sacramento CA 95819
8 February 1976

Senator John Huber
Special Committee on Taxation and Revenue
Pouch V, Juneau Alaska 99811

Dear John:

This letter constitutes my report on the "Oil and Gas Taxation Report" that you sent to me on January 22. First, let me compliment the author on the high level of writing competence demonstrated, and on the thoroughness with which all issues are treated. The report is also sufficiently well-organized, by which I mean well organized, that I will use its organization as the framework for my response, after I have made some introductory comments.

A second and minor item: I am going to write this response straight through, without retyping. There is no need for Alaska to pay for my services as a typist alone, and I can usually do pretty well putting my final thoughts directly onto paper. However, you may have to forgive an occasional word that is "x'd" out.

I. INTRODUCTION

It is perhaps regrettable that I was not able to work with you in formulating proposed legislation, because it is not always pleasant for either party when one of them is called in later only for critical comments. Please keep in mind, then, that my sole intent at all times is simply to aid you in putting together a tax program that is politically feasible, economically palatable (to investors), simple to administer, and as free as possible from flaws and complexities that will produce future controversy and litigation. With those goals in mind, I will begin with Tax Proposal Two, Excess Value Surtax.

II. EXCESS VALUE SURTAX

First a comment on terminology. It is necessary in valuation work to differentiate between price, income, and value, and I suggest that the meanings employed in valuation are admirably adaptable to taxation. Thus, price is simply the amount paid per unit of a commodity, say a barrel of oil. Gross income is the annual production of units multiplied by the unit price, and net income, in general terms, is gross income minus the expenses incurred in generating the gross income. Finally, value is a many-faceted term, but its use in the field of taxation is probably best confined to the property tax meaning, that is, the amount in money or its equivalent for which a property might sell to a willing and knowledgeable buyer from an equally willing and knowledgeable seller.

These definitions reveal that the proposed tax being discussed here is an excess income surtax. You can be sure that that is the way it would be viewed by taxpayers.

Definitions aside, I would like to suggest that you not press for the implementation of this tax. As noted, it is a tax on income, and so are both the severance tax and the net proceeds tax. Imagine your own shock should it be proposed that a single jurisdiction will impose three separate taxes on your income. This sort of tax, I believe you will agree, could not possibly have a positive effect on investment in Alaska oil prospects. I suggest that, instead, it will have a deleterious effect by its mere presence.

You have already demonstrated that tax revenues can be obtained by adjustment of the severance tax rate and by the addition of the net proceeds tax. It is not at all apparent that the addition of a third tax on income will necessarily increase revenues. But let us explore the real difficulties associated with an "excess income surtax."

The essence of the difficulties is summarized on page 28 of your report, where it is stated in the last paragraph that

"It should be continually recognized that the excess value surtax is based on an estimate of the long term price of energy. Thus, the tax should have a provision for periodic correction and inflation adjustments of the long term price base."

This statement acknowledges that it is not possible to estimate the long-term price, but that instead adjustments must be continually made to the current price. The experience of the past three years shows that anyone's estimate of the long-term price is not worth very much. Not only must one estimate (1) inflation, but a future price-level estimate must also take account of (2) OPEC's actions, (3) development of alternative energy sources, and (4) congressional decisions. An extremely optimistic theoretical economist might be willing to crank these elements into a computer program, but they are not a very sturdy basis for taxation.

Another thing: the entire concept of "excess profits" or "excess income" is an extremely dubious one. Let's get away from oil for a moment, where there is a widespread temptation to think that excess profits are generated, and look at business and industry generally. How would you like to write an excess profits bill for California's row crop farmers (big businessmen, believe me), proposing to tax at a high rate any income from lettuce exceeding 25 cents a head, or Colorado's cattlemen, with an excess profits tax on beef income when the price rose above 40 cents a pound on the hoof? In another area, what about the "excess" profits generated by IBM as its net income increased at a rate of 20 percent per year, year after year, and it came to dominate its industry in a fashion unique in American history? At a personal level, how about the "excess profits" generated by \$1,200-a-week welders on the Alyeska pipeline?

One can go on and draw innumerable examples of good cases of "excess income," but none of them appears to be politically feasible or administratively possible. Why, then, is the case different with oil? I do not believe that it is. As a tax source.

Back for a moment to the tax impact on investment. The last paragraph on page 23 begins

"The excess value tax, as suggested, strives to tax only the income which does not have a direct impact on the investor's long term plans."

Let me ask you, a businessman, this question: what portion of your past or present income does not have an impact upon your plans for investment? All that any of us can say in response to that question is: "Who knows? The more income I have, the more I save or invest in some specific way, or just spend." There really isn't any other answer, is there? And, without serving as a crying towel for the industry, it is doubtful that any of its members can contemplate excess income for many years to come, with the pipeline ballooning in cost from \$1 billion to more than \$6 billion. This is why I believe that an "excess income tax" will be harmful to oil development in Alaska.

Finally, the foregoing remarks indicate the can of worms that administration of such a tax would open. Even if the state employs the brightest, most analytical, hard-boiled people it can find to run the program, they will be continually embroiled in controversy, tax appeals, and litigation. Who needs that?

John, I hope that these remarks do not seem harsh. They are intended mainly to serve you and your legislature and your state. Moreover, they constitute all of the bad news that I intend to convey. The rest of this letter deals with a good tax and good news.

III. NET PROCEEDS TAX

Essentially all elements and all prospective problems of this tax are dealt with in "II. An Oil Tax Base," beginning on page 7, and my comments will parallel that discussion. Before that I would like to remark that, if Alaska did not already have a tax on oil production, I would heartily recommend the net proceeds tax as the only method of taxation. It is equitable, because it is based on the ability to pay; it is simple, in contrast to the Federal income tax; it does not call for the subjective judgments required by an ad valorem property tax; and finally, it is flexible, and tax revenues can be adjusted by adjusting the tax rate. As an aside, I have incorporated these features, in some detail, into the talk that I will give later this month at a seminar on the taxation of coal mines sponsored by the Council of Economics of the American Institute of Mining Engineers in Las Vegas.

By the way, the net proceeds tax is a form of income tax, not an ad valorem tax, which is what it is called near the bottom of page 3 of the report that you sent me. My earlier comments on price, income, and value, and the manner in which the tax base is computed in your report, both demonstrate this fact. Nevada tax officials, too, thought that their own net proceeds tax was an ad valorem tax, simply because they apply the ad valorem tax rate to the tax base. But the method of tax base computation reveals what sort of tax it really is.

Now to a discussion of the elements in the tax base, and of the alternatives set out by the author of your report.

A. Treatment of exploration and development costs (page 8)

1. Exploration costs should not be allowed at all. For openers, ~~the~~ oil industry accounting treats exploration and production as two cost centers. For another, exploration is a chancy thing, and two companies with identical present production may have incurred radically different past exploration costs. For another, current exploration costs seldom have anything to do with current production and income, and the very essence of a net proceeds tax is current income from production. Consider, too, the grim decisions to be made if exploration costs are allowed as an expense. Should all past exploration costs be allowed, going back to, say, 1958? Should costs be allowed only for exploration in finding the production that is taxed, or will distant exploration costs be allowed as well-- e.g., Bristol Bay exploration versus Prudhoe Bay production? A high percentage of exploration costs are incurred in geological and geophysical offices far from a producing oil field, and commonly far even from Alaska. Should those costs be allowed, too?

No, I assure you, only costs chargeable to production should be allowed as an expense.

2. Development costs should be allowed, because they contribute directly to production and, in fact, without them no production would occur. I recommend that they be allowed as an operating expense, even though they are recaptured for Federal income tax purposes by the unit-of-production method of amortization. But we should not cloud the clear waters of the net proceeds tax with income tax mud.

This is probably the best time at which to introduce the concept of net income (net proceeds) as the oil field superintendent views it. He is concerned, as we should be, with all out-of-pocket costs and expenses for which he is responsible in developing and maintaining production. He is not at all concerned about methods of amortization or interest payments deductions or ^{other} ~~the~~ elements so dear to the heart of the accountant or the I.R.S. (Nothing personal, Frank, believe me. The effort here is to deal with the income from a property, not the income to a corporate entity. These are the things that differentiate the net proceeds tax from the Federal income tax.)

~~XXXXXXXXXXXX~~

Annual expensing of development costs simplifies the administration of the net proceeds tax. Otherwise, judgments must be made of the life of the oil field or of the life of the oilfield equipment in order to determine the rate of amortization.

B. Indirect Administrative Costs (page 9)

In all fairness, general overhead incurred in Alaska and truly attributable to a given operation should be allowed, but this one can be a real bear. For example, one oil company here claimed O & A of \$660,000 on an oil field that I was appraising. This turned out to be nothing more (or less) than a head-office accountant's allocation based on gross income, and the field was a large producer. I sat down with the company's representative and worked out a realistic O & A of only \$120,000, and he accepted it without a murmur.

The only consolation about this troublesome expense is that it does not loom as a very large item relative to gross income or to other expenses. (see also second paragraph of next item, "C".)

C. Basis for the "Adjusted Value" (Net Proceeds) (page 9)

The essence of a net proceeds tax is that it is a tax on the income from a property, not to a person, as noted earlier. Therefore a company's (person's) gross income and expenses from several fields should not be consolidated. In short, a field running at a loss incurs no net proceeds tax, but its loss should not be transferable to a profitable field.

The report speaks here of what is to be done about allocation of indirect expenses if more than one field is operated by one corporation. In this case it would be appropriate to allocate on the basis of gross revenue, since the properties are alike. The problem that I cited above involved O & A costs involving refineries, service stations, and you name it. You will have to deal with only overhead costs incurred in Alaska by the production department, and that should not provide any great difficulty.

D. Method of Depreciation (page 10)

The report does not state to what sort of property the "depreciation" (amortization) is to be applied. Development costs are not a problem if they are simply expensed. However, a charge for amortization of the investment in equipment is necessary, since it is subject to ad valorem taxation in Alaska, and if it were not amortized in computing the net proceeds tax it would be subjected to double taxation.

The simplest way, and I believe an equitable one, is to employ a reasonable life of, say, 20 years, and use straightline depreciation. Moreover, this should be done by the use of a capital recovery factor at a reasonable interest rate, say 10 percent. That is, the capital recovery factor should be multiplied by the original cost of equipment, and the product used as an expense. Otherwise, recapture of capital would not be accompanied by a return on investment, and the depreciation would be understated. If this sounds too complicated-- and it is the only thing at all complicated about the net proceeds tax-- we can explore it when we get together. It's a strictly technical item, not a political or administrative one.

E. "Losses" stemming from depreciation (page 11)

This subject has already been covered. New and old entrants to Alaska are treated alike. Exploration costs should not be deductible from production income, and only profitable production (which will be about all of it, I can assure you) will be subject to taxation.

F. Treatment of Bonus Bid Money (page 11)

Item (3) is correct. Bonus bids should not be treated as an expense in computing net proceeds. They constitute pre-production money, and have nothing to do with net proceeds. It would be as improper to allow amortization of a bonus bid as an expense as it would be to do the same in valuing the field for ad valorem tax purposes. "Sunk costs" incurred perhaps far in the past have nothing to do with either present profitability or present value.

G. Treatment of Interest on Debt (page 12)

Interest on debt is a charge against a person, not against a property. I concur with the outlook stated in the first paragraph in your report on this subject. On the other hand, I do not concur with the statement at the top of page 13 that

"...the taxpayer can be placed in the position of paying taxes while not having enough income after other costs to pay the interest on the debt."

By the time a field reaches a marginal stage any debt owing on it has long been paid off. The banks see to this.

Interest on debt should not be treated as an expense in computing the net proceeds to an oil field. Other than the property-versus-person argument, the problem in doing so is well stated on page 13 where it says that doing so

"...would lead into an administrative and accounting quagmire."

I. Treatment of Income from Oil and Gas (page 14)

Again, this should be handled just the way that the production superintendent handles it. He doesn't care where the money comes from. Income from oil, gas, and natural gas liquids should be treated together.

J. Scope of the Net Proceeds Tax (page 14)

I concur with the author that only producing properties should be subject to the net proceeds tax. I have studied refineries income and valuation fairly extensively, and it is rather a nightmare. However, refineries and service stations do not necessarily require "a more complex tax approach." They are assessed and taxed in California on an ad valorem basis, using the cost approach to value, and things work out pretty well, although the industry would probably argue it.

K. Taxation of Royalty Payments

A royalty interest is an interest in land, and is the legal equivalent of rent paid for farmland. Royalty payments should be subtracted from an oil operator's gross income, since the operator does not own that interest. If the royalty interest is owned by the State, it is not subject to taxation. If it is privately owned, it should be separately subjected to the net proceeds tax at its face value, since no expenses are incurred in earning it. By the way, Nevada does this regularly, obtaining the names and addresses of ^oyalty owners from the operators, who are only too happy to provide them.

.....

Comments on the Reporting Forms and Revenue Estimates

It would not serve any useful purpose for me to comment on either of these subjects, since many of my earlier remarks, if adopted, would necessitate changes in both.

I will next study your letter of January 30 on natural gas, and will send you a report on it within a few days.

Sincerely



Robert H. Paschall
Consulting Valuation Geologist
and Engineer

460 Lovella Way
Sacramento CA 95819
22 June 1976

Senator John Huber
Special Committee on Taxation and Revenue
Pouch V
Juneau Alaska 99811

Dear John:

Your letter makes it apparent that this will probably be the last letter that I can write to you at the above specific address. It seems a shame, really, that Alaska should treat such an important mission on an ad hoc basis.

Thanks for sending me the distant early warning about the committee's demise. I am all paid up, so no problem exists.

It was indeed a pleasure working with you, especially last year when the work required my coming to Juneau and meeting head-to-head with everyone involved in the issue. If my personal situation had been just a bit different I would probably have come up there about three years ago to stay a few years. I found it to be a very stimulating place to be. But, Jeanette just can't take the cold weather as I can, so that was not to be.

Here are some more or less untouched areas that we may be able to explore together some day, and on which we have touched lightly in the past. One, of course, is a workable statute on the taxation of mines. I suspect that mines still go untaxed because a rather extreme view was taken by the administration in its efforts last year. It is ^{not} often politically possible, as you will know, to jump from nothing to everything.

Another is the area of possessory interest taxation, especially in regard to timber but not excluding other valuable private rights in public property. Some people up your way are getting a free tax ride, which is really not a healthy thing in the long run or for everyone else in the short run.

All for now, and thank you again for your recent nice note.

Sincerely



Robert H. Paschall

June 15, 1976

Mr. Robert H. Paschall
460 Lovella Way
Sacramento, California 95819

Dear Bob:

The Subcommittee on Taxation and Revenue is in the process of preparing its final report. I want to thank you for the good job that you did for us. The information was most helpful in carrying out the committee's work.

Please review your records to see if all billings and payments have been made. If there is an additional billing or if a payment is missing, please inform me by phone or return mail. The committee will cease to exist and all funds will lapse as of June 30, 1976.

You can be assured that when matters come before the Legislature in your area of expertise that I will recommend that your services be retained. Thank you again for all of your help.

Sincerely,

John Huber

Enclosure

AGO 530309

440 Lovell Way
Sacramento CA 95819
13 May 1976

Mr. John C. Doyle, Administrator
Legislative Affairs Agency
Pouch Y, State Capitol
Juneau Alaska 99811

Dear Mr. Doyle:

I am enclosing a duplicate of a statement for \$750 that I first sent to your office on February 21. That statement dealt with my services during the months of January and February to Senator John Huber's Special Committee on Taxation and Revenue.

I would appreciate an early remittance of the \$750. Last month I had to make my first estimated tax payment on that portion of my 1976 income, and next month I must make the second payment. It seems only proper that the State of Alaska pay me now for that work done four months ago.

Thank you for your very early attention to this matter.

Sincerely

Robert A. Paschall
Robert A. Paschall
Consulting Valuation Geologist
and Engineer

Attachment
cc Senator John Huber

Paid
5-10-76
1 3104550

AGO 530310

Received
03-31-76

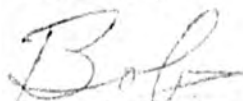
Senator John Huber
Special Committee on Taxation and Revenue
Pouch V
Juneau Alaska 99811

Dear John:

I thought that you might like to see, and pass along, this interview with Governor Edwards of Louisiana. His point of view as Governor of a longtime major oil-producing state may be of interest.

My schedule has been so busy of late that I am almost grateful that I have not received a call to come to Juneau. I have been on the road at least ~~three~~ days a week for ten of the past eleven weeks, and that's a bit much. It was more or less topped this past week by my being offered a county job that pays almost \$6,000 a year more than my job with the state. If that were the only issue it would be overwhelmingly tempting, but there are other considerations, so I'm thinking it over.

Sincerely



Robert H. Paschall

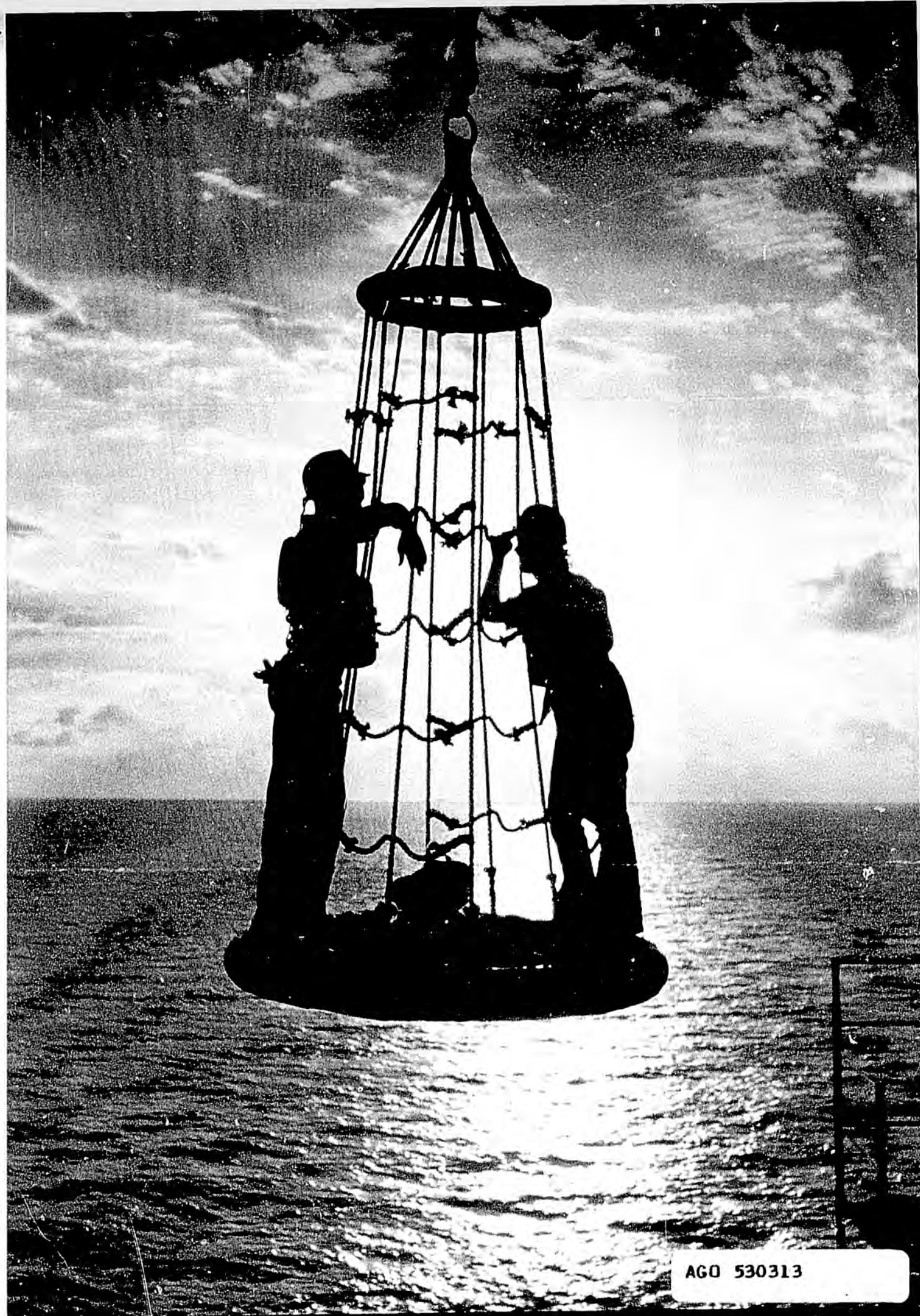
PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT.



AGO 530312

PETROLEUM TODAY

1975/three



AGO 530313

Talk With a Cajun Governor

by Bob Hamm

Edwin W. Edwards has served at all levels of government: Councilman of the small Louisiana town of Crowley, member of the state legislature, U.S. Congressman, and now governor of Louisiana.

Born to a sharecropper family in Louisiana's oil-rich Acadian country, Edwards is a direct descendant of the exiled Nova Scotians described in Longfellow's poem, "Evangeline." He is the first "Cajun" governor of the state since pre-Civil War days.

Edwards has gained national prominence recently for his fiery defense of offshore exploration and production. In this interview, which took place at the Governor's Mansion in Baton Rouge, Edwards talks about that and other aspects of the oil and natural gas situation.

PETROLEUM TODAY: If you could turn back the clock to a time when there was no oil activity in the Gulf of Mexico would you permit its initial entry there?

EDWARDS: Yes. Absolutely. I say that as one who has looked at the total development, and as the governor of a state which has pioneered the development of offshore activity. We would be able to approach it now with all the technology that's been developed. It would be much safer now than it was 35 years ago when it was started.

PETROLEUM TODAY: In the past quarter of a century, approximately 14,000 wells have been drilled off the Louisiana coast. Has there been any lasting damage?

EDWARDS: None to my knowledge. None of the spills ever resulted in oil or noxious materials getting to the coast.

In all offshore exploration, there have been only four really major problems. In only one of

them, the Santa Barbara incident, was there significant damage to the coastline . . . and that was repaired with money put up by the oil companies responsible for the damage. I think that's an excellent safety record.

But more importantly, the technology, machinery and government regulations now are much more effective than they were 6½ years ago. The possibility of blowouts or other accidents is much less today.

PETROLEUM TODAY: You have debated with governors of East Coast states—sometimes on national television—the pros and cons of offshore oil activity. Do they offer any compelling arguments?

EDWARDS: In all candor, no. Most of their arguments have been based on lack of knowledge. They were not aware of the huge number of wells that have been drilled without incident. Many of them envisioned oil and gas rigs as being ugly, dirty, spewing, noisy apparatus a hundred yards offshore, which swimmers had to circumnavigate.

Off the New England coast, we're talking about development of an area that's 60 miles off the coast in 200 feet of water.

You couldn't see an oil or gas rig 60 miles off the coastline from the top of the Empire State Building on a clear day . . . even if New York had clear days.

PETROLEUM TODAY: What was your reaction to the Supreme Court's denial of claims by East Coast states to mineral rights beyond the three-mile limit?

EDWARDS: They got what they deserved. Twenty-five years ago when we were trying to establish that as a matter of states' rights, they were foremost in arguing politically and legally that