E.R.A.P-TYPE VERSUS FIFTY-FIFTY AGREEMENTS

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The NIOC-ERAP agreement of 1965 was, by all accounts, a revolutionary step in the evolution of oil company/host government relations. Iranians, who have shown a greater awareness of the international aspects of this complex industry, derive a good deal of pleasure in the knowledge that once again they have been pace-setters. in the field of oil diplomacy and the drawing up of an oil agreement which embodies quite original features and which has already become an example for all progressive oil producing countries throughout the world.

Oil agreements of course have evolved from the early D'Arcy-type "concessions" of nearly a century ago — which were basically charters for the exploitation of vast territories in return for a share of the concessionaire's profits — through the agreements of the twenties and thirties yielding royalties based on tonnage of oil sales, and the "profit-sharing" agreements of the early fifties, which subjected the producing "profits" to tax, and finally to join-venture participation agreements introduced by Iran in 1957. The NIOC-ERAP agreement, however, represents a radical departure from the established pattern. The relationship is no longer one of concession of exploitation rights, as in most of the conventional 50:50 agreement, nor even one of partnership between equals entailing "rights" of ownership of the oil produced, but of a "service contract", under which the contractor accepts certain obligations for the financing and execution of oil production operation in return for the rights to purchase a portion of the oil produced at special prices.

So fundamental is the difference between the "profit-sharing principles of the early fifties and the service contract concept embodied in the NIOC-ERAP agreement that many people, even in the industry, are still somewhat uncertain as to the advantages of the "service contract" vis-a-vis the conventional 50:50 agreement. They tend to compare — thanks to persistent and

subtle hints from major oil — companies the total income that it is estimated
Iran would receive under the ERAP agreement with what is currently   obtained
under the Consortium agreement. Or, if more analytically-minded,   they apply,
without adequate safeguards, the per barrel income criterion, which has   the
glint of "scientific method". But they overlook the essential   requirement of
smoothing inequalities inherent in the comparison of new territories with tho-
se that have been subjected to nearly half a century of exploration and   in-
vestment effort. Nor is any adjustment made for inequalities resulting   from
, the randomness associated with the vagaries of geology and the whims   of for-
tune.

      That major oil company spokesmen have been at pains to discredit the ERAP
agreement from the beginning is not surprising. After all, it is   less   than
two decades since the generalization of the fifty-fifty principle of "profit-
sharing" throughout the Middle East, and although the major oil   contracts of
the area are now "securely" wrapped up in agreements worded in highly   tech-
nical language and extend relatively far into the future,   it   is   obviously
wiser to let sleeping dogs lie than to try and placate them once they are dis-
turbed. It would indeed be naive to imagine that the   Armaco   representative's
warning at the Sixth Arab Petroleum Congress at Baghdad in March 1967, to the
effect that the generalization of the ERAP-type agreement throughout the Arab
world would "shrivel their $50 billion ten-year revenue to $45 billion",   was
solely out of concern for the welfare of the Arabs.

      Unfortunately producer country views on the ERAP-type agreement have not
so far been properly expressed, and the little that has appeared in print has
not stood up to searching criticism from vested interests. In Iran   the   only
piece of writing with any pretensions was printed in the   NIOC   publication
"Newsletter" of November 1966 where an attempt was made to show how the   ERAP
agreement "profit sharing" would work out in practice. The   methodological
shortcomings of the article — not to mention the errors in the writer's inter-
pretation of the agreement — prompted a Harvard student of the oil   industry
to produce his widely publicized paper [1] in which he successfully   ridiculed
the findings of the "Newsletter" article and contended that the ERAP agreement,
far from providing a 90:10 split of profits in favour of Iran, could not even

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1. See Thomas Reynolds Stauffer, *The ERAP Agreement: A Study in Marginal Taxa-
   tion Pricing,* paper presented at the Sixth Arab Petroleum Congress in Bagh-
   dad, March, 1967.

come up to the level of the Consortium agreement of 1954.

Mr. Stauffer takes the "Newsletter" article to task for ignoring, in the evaluation of benefits, the effects of the not insignificant costs of financing of capital required for the development of an oil production   venture, and also of the loss of benefits resulting from the deferrment of   incomes. These considerations, argues Mr. Stauffer, drastically reduce Iran's alleged 90 per cent share as shown in popular static methods of presentation. He then goes on to assign values for prices, costs and production levels from hypothetical fields exploited under identical conditions, but under the differing agreement terms,and proceeds to produce cash flow schedules to show the income that would accrue to Iran annually under each agreement. His findings are that, under the ERAP agreement, Iran receives economic benefits that are less advantageous than those she would have received under a 50:50 agreement. In fact, he goes as far as to contend that the ERAP agreement gives a profit-split which is "in all cases less than 45:55".

Detailed study of Mr. Stauffer's thesis and fully-documented   exposition of the conceptual and interpretational errors that are responsible for his curious and unconvincing findings, would probably be of little interest save to the specialist versed in the intricacies of the two agreements, and the reader will not be burdened with a full discussion here. Only the   most glaring inconsistencies will be dealt with in so far as they help in an understanding of the problem.

It is the purpose of this paper to provide an unbiased frame-work within which the economic benefits derivable by Iran from the ERAP agreement can be compared with those which would have been obtainable under a conventional fifty-fifty agreement of the type signed with the Consortium companies.   In the analysis that follows no attempt has been made to include any evaluation of intangible benefits (such as the advantages of having control of investments and operations, etc) inherent in the ERAP agreement. Only such economic benefits as are capable of being uniformly evaluated on an objective market valuation basis have been discussed. For the benefit of those readers who may not be familiar with the two agreements, the first part of the paper deals, very briefly, with the general financial aspects of the two   agreement types. Without taking account of the scheduling of outlays and incomes, a static relationship will be developed between the income of each party   to each agreement, and the factors affecting that income. This is more in order to establish the basic financial relationships under the agreements, and to

highlight the constituents of income, than to provide a means of measurement
applicable in all circumstances. Thereafter, economic models of production
set-ups under varying productivities on the lines visualized by Mr.Stauffer,
using his own assumptions, will be constructed, and relevant cash flow sched-
ules will be developed so that the annual income obtainable by each party
may be determined. A summary of the findings, based on the results of the
working of the models under each of the agreement types, is given at the end
together with supporting detailed tables and explanatory notes. Since three
hypothetical cases of production set-ups, involving average, higher than ave-
rage, and lower than average investment requirements are considered, it is
hoped that any bias resulting from the assumption of data affected by the
"intensity of investment" will be removed if the results are presented as
falling within a range of values rather than as definite figures.

Financial Provisions of the Two Agreement

Under the fifty-fifty agreement capital required for exploration and
development is provided free of interest by the Consortium member companies,
and is, on the average, amortized within 10 years. "Trading Companies",which
are set up by each of the member companies, and are registered in Iran, pur-
chase crude oil produced by the producing company (an operating company en-
trusted with exploration and production) at the well-head at a price equi-
valent to $12\frac{1}{2}$ per cent of its posted price at the point of export, and sell
it, in Iran, at posted price, to their affiliates.[1] The difference between
the "gross receipts" - i.e, posted price, and the "deductible expenses" — of
the trading companies, is subject to tax at the rate of 50 per cent. Deduc-
tible expenses in practice comprise operating costs, amortizations of explo-
ration and development costs, the $12\frac{1}{2}$ per cent "stated payment" paid to NIOC,
and an "allowance" which was negotiated under the 1965 Supplemental Agree-
ment and which is to be eliminated over several years, but, which is curren-
tly around $6\frac{1}{2}$ per cent of the posted price.

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1. To enable comparison with the ERAP agreement,which is not involved in re-
   fining, no account is taken of the refining operations of the Consortium
   companies, which,in any case, are of little financial importance.

Under the NIOC-ERAP agreement, capital funds required for development, as well as for exploration operations, are provided by the Second Party. If and only if, exploration activity is successful, and commercially exploitable reserves are discovered, the exploration expenditure, free of interest, will start to be repaid within 15 years of commercial production. Development capital, however, is treated as an interest-bearing loan to NIOC, repayable in equal instalments within 5 years of production. One half of any reserves that are found will be set aside as "National Reserves", which are to be exploited exclusively for NIOC's account. Between 35 per cent and 45 per cent of ERAP's crude production (depending on the distance of the producing fields from the seaboard) are guaranteed for sale to ERAP at a special favourable price. This price is equal to the sum of the total production costs (including amortization of exploration expenditure with 15 years and of development capital investments within 10 years) plus 2 per cent plus half the difference between realization price of the crude and its total production costs. In the exercise that follows, it will be assumed that ERAP's entitlement to purchase crude at special prices is 40 per cent of what it produces as contractor from its half of reserves.

If p is the f. o. b. posted price of crude at the port of export, in cents per barrel

c in c/bbl. is the variable operating costs of production

e in c/bbl. is the exploration expenditure amortization

d in c/bbl. is the development capital expenditure

a in c/bbl. is the "expensable" OPEC discount allowance

a' in c/bbl. is the market discount - i.e, the differential between posted price and market realization - and,

i in c/bbl. is the cost of financing capital for development

we will have, when exploiting the first half of the reserves under the 50:50 agreement:

		c/bbl.
Realizations from crude sales	$p-a$	c/bbl.
Royalty of 12½%	$0.125p$	"
Deductible expenses	$0.125p+c+d+e+a$	"
Taxable income	$p - (0.125p+c+d+e+a)$	"
Tax at 50%	$0.4375p-0.5(c+d+e+a)$	"
Iran's total income	$0.5625p-0.5(c+d+e+a)$ " (1)

Second Party's income (net of $(p-a')-(c+d+e)-$

costs, taxes and interest) $[0.5625p-a'-0.5(c+d+e+a)-i]$ "

                 or $0.4375p-a'-0.5(c+d+e)+0.5a-i$ "   (2)

And, when exploiting the second half (which involves no exploration expen-
diture) we have:

Deductible expenses $0.125p+c+d+a$ c/bbl

Taxable income $p-(0.125p+c+d+a)$ "

Tax at 50% $0.4375p-0.5(c+d+a)$ "

Iran's total income $0.5625p-0.5(c+d+a)$ "   (3)

Second Party's net $0.4375p-a'-0.5(c+d)+0.5a-i$ "   (4)

Average income from both halves will therefore be:-

Iran: $\frac{1}{2}(1)+\frac{1}{2}(3)$ $0.5625p-0.5(c+d)-0.25e-0.5a$ "   (5)

Second Party: $\frac{1}{2}(2)+\frac{1}{2}(4)$ $0.4375p-a'-0.5(c+d)-0.25e+0.5a-i$"   (6)

Iran's % share of

profits:$\frac{(5)}{(5)+(6)}\times100$ $\dfrac{0.5625p-0.5(c+d)-0.25e-0.5a}{p-a'-(c+d)-0.5e-i}\times100\%$ (7)

Under ERAP's exploitation of the first half reserves, we have:-

Production costs and interest: $c+d+e+i$ "

Sale price to ERAP $0.5(p-a')+0.52(c+d+e)$ "

Iran's receipts for 40% sales
to ERAP $0.2(p-a')+0.208(c+d+e)$ "

Iran's receipts for 60% sales $0.6(p-a')$ "

Iran's total income (net of costs
and interest) $0.8(p-a')-0.792(c+d+e)-i$ "   (8)

Second Party's profit on sales $0.4(p-a')-0.2(p-a')-0.208(c+d+e)$"

                 or $0.2(p-a')-0.208(c+d+e)$ "   (9)

And from Iran's exploitation of the "National Reserve"fields we have:-

Production costs and interest $c+d+i$

Net receipts $(p-a')-(c+d+i)$ "   (10)

Average Iran income: $\frac{1}{2}(8)+\frac{1}{2}(10)$ $0.9(p-a')-0.896(c+d)-0.396e-i$ "   (11)

Average ERAP income: $\frac{1}{2}(9)$ $0.1(p-a')-0.104(c+d)-0.104e$ "   (12)

Iran's % share of

profits: $\frac{(11)}{(11)+(12)}\times100$ $\dfrac{0.9(p-a')-0.896(c+d)-0.396e-i}{(p-a')-(c+d)-0.5e-i}\times100\%$ (13)

We now have two expressions - (7) and (13) -- giving Iran's   percentage
share of the disposable income from the sales realization of each barrel of
total crude produced, after meeting production costs, and the financing costs
of borrowed capital. Which is the larger?

In the first place it will be noted that one issue which used to blur our thinking on this matter - namely, the inequality of the basis of comparison - has been removed.No longer are we comparing the host country's share of "profits" as defined differently in each case. The disposable profits are exactly the same in both cases. Furthermore, appropriate adjustment has been made to account for the financing costs of development capital, which are borne entirely by the Second Party under the 50:50 agreement.

Consider expression (7). If, for the time being, we ignore a — the"OPEC discount allowance", which is currently around $6\frac{1}{2}$ per cent of the posted price — we find that the minimum value that it can assume is $56\frac{1}{4}$ per cent. Depending on the value of c,d,e, and particularly, of i, this percentage, representing Iran's share of the realized profits, could of course become greater. Since i is likely to be a good deal higher than 0.5a, one can immediately see that Iran's share of the disposable profits will, in general, be higher than $56\frac{1}{4}$ per cent.

As to expression (13) - Iran's percentage share under the ERAP agreement - we note that if the value of i is relatively insignificant, then Iran's minimum share of the realized profits will be 90 per cent. In general, the higher the value of i relative to the other determinants, the further away will Iran's profit-split percentage be from 90 per cent.

Since theoretically the variables could assume a whole spectrum of values, let us find the condition under which Iran's profit-split or, better still, Iran's per barrel income - under the ERAP agreement, falls to the level of that under the 50:50 agreement. This condition is fulfilled when we get:-

$$0.9(p-a')-0.896(c+d)-0.396e-i=0.5625p-0.5(c+d)-0.25e-0.5a$$

i.e. when a' = 0.375p-0.44 (c+d)-0.55a-1.1e

To ascertain the extent to which a' can go safely in practice, we now give reasonable values to these other variables. Suppose the total per barrel costs of production (exclusive of exploration amortization) are equal to 20 cents and the interest costs of financing capital for development investments amount to as much as 10 cents per barrel throughout the life of the reservoir. Furthermore, let the exploration expenditure refund be the mi-

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1. This is an exceptionally generous estimate, because development capital will normally be amortized within 5-8 years - so that computed over the whole life of the reservoir, the per barrel interest charge would be considerably less.

nimum 10 cents per barrel stipulated in the ERAP agreement. Under these con-
ditions we find that Iran's per barrel income from the ERAP agreement   will
fall down to the level of that from the 50:50 agreement, when:

$$a' = 0.375p - 8.8 - 1.6 - 11 + 0.065p$$

i.e., when $a' = 0.41p - 21.4$

Now if the quality of the crude oil produced is similar to that of Gach
Saran (Iranian Heavy) crude, so that its posted price is $1.63 per barrel,
we find that the discount off posted price will have to be nearly 46 cents a
barrel before Iran's per barrel income under the ERAP agreement falls to the
level of that under the 50:50 agreement. A market discount of 46 cents   (or
28 per cent of posted price) means that the realization price would have to
be as low as $1.17 per barrel - a situation which would be somewhat unusual
even for the heavier sour crudes in the Persian Gulf.

Graph No. 1 shows the relationship between the State's per
barrel income from each of the two agreement types and the market   discount
under the cost-price conditions visualized.

Shortcomings of Static Analysis

The above type of "static" analysis, while popular and easily   compre-
hensible, has certain drawbacks in that it ignores the dynamic aspects inhe-
rent in a changing set-up. It provides a kind of still picture of the reali-
ty at a certain moment in time during the period of maturity of the venture,
when investments have been made and production is on an even keel. It   has
been, quite correctly, criticised as inadequate for the expression of chan-
ging situations. The necessity for rapid repayment of development loans du-
ring the early years of the ERAP agreement deprives Iran of any significant
income during those years. This in itself, particularly for a   developing
country where development projects abound and capital is scarce, entails a
"waiting" cost which has to be accounted for if a fair comparison is to   be
made. It is therefore necessary to adjust for differences in the time pattern
of income receipts by means of a discounting procedure whereby the   present
values of deferred income receipts are evaluated at less than their nominal
amounts. Mr. Stauffer's use of a 15 per cent rate, compounded annually, for
the discounting of future incomes, may be on the high side, and, as   such,
produce a bias towards the 50:50 agreement; but the principle is not dispu-

ted and in the analysis that follows this rate has been accepted.

Cash Flow Comparison of the Two Agreements

An impartial comparison of the financial advantages of the two agreements, based on strict application of the relevant clauses, has been attempted on the lines of the cash flow schedules presented by Mr. Stauffer. In order to make the results at every stage comparable, and enable all calculations to be verified with the agreement terms, it was found convenient to accept Mr. Stauffer's general methodology as well as his basic data and assumptions, in so far as they are not inconsistent with the clauses of the agreements. As mentioned before, no account has been taken of any intangible advantages which are incapable of being easily evaluated in terms of money, and it has been assumed in the economic models representing the three levels of investment intensity (Mr. Stauffer's "higher", median" and "lower") that the fields are developed under identical programmes. For those readers who are not familiar with Mr. Stauffer's paper the following brief description outlines its assumptions and general methodology.

Under Case One, which is representative of exploitation of fields requiring a rate of investment higher than average Middle East rates, it has been assumed that $22½ million have been spent on exploration prior to the discovery of any reserves capable of commercial exploitation. The two halves of the reserves are exploited separately under each agreement. It has been assumed that another $22½ million has been spent on development drilling and other pre-production investments for each half. Annual capital expenditure in millions of dollars (col. 1) for the provision of production plants, pipelines, storage and loading facilities required to bring up annual production in millions of tons (col. 2) to the required level of 4 million tons, in each half is $7½ million during the first 6 years. There after, only $3 million annually in capital expenditure is considered necessary to maintain production and to offset a 5 per cent reservoir decline. Variable operating costs per ton of production (exclusive of exploration expenditure, amortization and capital depreciations) are taken as $0.35 (5 cents/bbl.) and it is assumed that the posted price of the crude is $11.90 per ton and the market realization price is $9.80 ($1.70 per bbl. and $1.40 per bbl. respectively [1]).

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1. For ease of calculation 1 ton of crude has been considered to be the equivalent of 7 barrels.

Further, it is assumed that ERAP's entitlement to crude purchases at the special price is 40 per cent of the production from the ERAP fields.

Detailed calculations leading to the determination of Iran's income from the sale of crude produced from the ERAP fields, after meeting operating costs, development loan amortization instalments, and the year's capital expenditure, are given in the A series tables. Full explanations are given in Appendix 1, and the calculations are given step by step so as to enable the reader to follow and verify the results with a minimum of difficulty. In the B series tables the calculations for the determination of Iran's total income, including the income from the exploitation of the National Reserve fields, are shown. The latter fields are, in accordance with the ERAP agreement, similar to the ERAP fields in respect of reserves, and it is assumed that they will be exploited in the same manner and under similar programmes. It must be noted that there are no exploration expenditure amortizations involved in this case. The question of financing capital for their exploitation should present no greater difficulty than that of the main, largely virgin, territories; but in order to ensure against any bias, it has been assumed that such development loans are repaid within 5 years, and attract interest at a higher rate, i.e., 8 per cent per annum, consolidated every quarter. The C series Tables show the steps leading to the determination of Iran's total net income from the exploitation of the two halves of reserves under the terms of the 50:50 agreement. In the D series Tables are shown the Second Parties' gross receipts, under each gross of cash agreement, after meeting the variable operating costs and payments to Iran. Thus, the Second Party's repayment of development capital and exploration expenditure has to be met, in both cases, from these "incomes". In the case of the ERAP agreement it has been assumed that ERAP puts up all the capital, including the portion required for the development of the "National Reserves". This assumption is merely a device to make its gross income comparable with that of the Second Party under the 50:50 agreement, and, in view of the low risks involved and the higher rate of interest postulated, is not considered at all unreasonable. Even if the objection is raised that ERAP may not be interested in such a deal, the fact remains that, under the terms visualized, it should not be difficult to obtain loans from the money market for such low risk ventures as the exploitation of known reserves, and the assumption of such vicarious obligations by ERAP is merely a paper device.

In the E series Tables the incomes of the two parties to   each   agree-
ment are set down side by side. These are shown graphically in Graphs 2, 3
and 4. It will be seen that the annual incomes under the ERAP agreement   in
all three cases start somewhat later but climb to much higher levels.   How-
ever, it is recognised that in view of the differences in the time   pattern
of receipts, the two income streams are not strictly comparable and   would
have to be adjusted for these differences. One method, which is widely   used
in the petroleum industry, is to apply discount factors to convert   future
incomes into their present worth. The choice of a proper rate of interest in-
volves subjective considerations which are better excluded from such an exer-
cise, and, despite the fact that Mr. Stauffer's use of a 15 per cent   rate
does not escape objections, it has been accepted here. A high discount rate,
as can be readily appreciated, will naturally favour the 50:50 agreement be-
cause under this agreement no interest payments are involved and,   further-
more, development expenditure amortization is not as rapid as under the ERAP
agreement.

The results of the calculations, together with other criteria   are sum-
marized at the end of the paper. Perusal of the summary reveals   certain
points, which merit consideration.

First, it will be noted that in accordance with expectations, Iran's 15
year total income under the working of the ERAP agreement is in   all   cases
considerably higher than that yielded by the 50:50 agreement. As can be seen
from the accompanying graphs, Iran's annual income under the ERAP   agreement
is nil during the inital two or three years of exploitation, in contrast with
the 50:50 agreement which yields an income right from the first year.   How-
ever, once the development loans have been amortized, the ERAP agreement in-
come shoots up to a much higher level and is maintained at about   the   same
rate throughout the life of the agreement. Even when these incomes   are hea-
vily discounted,[1] it will be found that the present value of Iran's   income
is in all cases higher under the ERAP agreement than under the 50:50   agree-
ment.

Second, it will be seen that, as a result of the above, Iran's share of
the "profits" (as defined) is higher in the ERAP agreement than in the 50:50
agreement. This is not confined to the totals of the actual undiscounted in-
comes: the advantages of the ERAP agreement are evident even after the app-
lication of the heavy discount factors, as the following tabulation   shows:

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1, The present value of 1 in 10 years at 15 per cent is about 0.25.

Iran's Share of Gross "Profits"

				Case 1	Case 2	Case 3
Actual Incomes	Under	50:50	%	55	57	59
	"	ERAP	%	68	73	77
Discounted Incomes	"	50:50	%	53	55	57
	"	ERAP	%	55	61	68

A point worthy of notice is that with fall in the capital/output ratio, Iran's share improves under both agreement types; but this improvement is much more pronounced in the case of the ERAP than in the 50:50 agreement. The implication is clear: Iran obtains a better share of the profits under an ERAP-type agreement than under a 50:50 agreement, but in the case of low-cost, high productivity, fields this advantage is considerably improved.
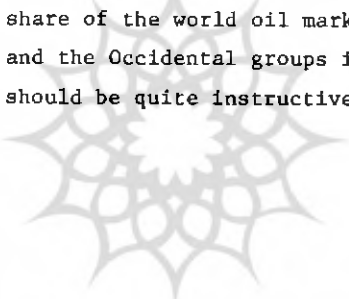
Third, it has been suggested that one criterion that can be applied is the tax-paid cost of the crude to the Second Party to each agreement. As far as Iran is concerned, of course this is a negative criterion, but in so far as access to cheap tax-paid crude might enable destructive competition in the international oil market, the majors concern is understandable. As can be seen from the summary, it does not follow that ERAP obtains crude cheaply all the time. ERAP's crude purchases will be cheap when either (1) realization are unduly lower than postings, or, (2) the fields are prolific and total costs are very low. However, when it is realized that in contrast to the 50:50 agreement, which virtually puts all of the crude production at the disposal of the Second Party[1], ERAP's entitlement to low-cost crude is, on the average, no more than $17\frac{1}{2}$ per cent to $22\frac{1}{2}$ per cent of total production. Hence, in so far as fears of price-cutting are concerned, the 50:50 agreement provides far greater opportunities.

Fourth, few will seriously dispute the fact that oil being a wasting asset a higher per barrel income should normally be indicative of a better deal Iran's per barrel income of 92-104 cents under the ERAP agreement is 24 per cent to 30 per cent higher than 74-80 cents obtainable under the 50:50

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1. The $12\frac{1}{2}$ per cent "oil in kind", or NIOC's entitlement to export certain quantities of crude under recent arrangements for barter to Eastern European countries, do not affect the issue, because the former is priced at posted prices, and the latter at prices, which are reported to be somewhat similar to the familiar "half-way prices".

agreement.

Thus, there remains no doubt that the ERAP agreement, is, for a   host country, superior to the conventional 50:50 agreement. However, from a pragmatic viewpoint, when the likely total income that is obtainable under   each agreement is considered, the choice may not favour an ERAP-type agreement if it merely provides a bigger slice out of a smaller cake, nor even it it affords the country a higher per barrel price for a lower number of   barrels. The final economic criterion is the actual income that is likely to be obtained under each agreement type. The major international oil companies, who are by and large the proponents of the 50:50 agreement, score a point here, because of the generally-believed fallacy that greater downstream facilities and more extensive markets necessarily imply higher offtakes. Comparison of annual rates of increase in crude offtake by the Consortium companies in Iran (which control a dominant share of the world oil market) with those of such independents as the Oasis and the Occidental groups in Libya, with their relatively limited markets, should be quite instructive.

SUMMARY

Comparison of Economic Advantages of the ERAP
Agreement v. Fifty-Fifty Agreements from Iran's Viewpoint

	Case I		Case II		Case III	
Total 15-year crude production $(10^6$ tons)	99.0		178.6		278.0	
Total 15-year sales realization $(10^6$ $)	970.2		1750.8		2724.4	
Total 15-year variable operating costs $(10^6$ $)	34.8		62.4		97.3	
Total 15-year gross receipts $(10^6$ $)	935.4		1688.4		2627.1	
	ERAP	50:50	ERAP	50:50	ERAP	50:50
Total 15-year Iran Income $(10^6$$)	638.3	514.8	1232.2	962.8	2021.6	1550.9
Total 15-year PV of Iran Income $(10^6$$)	166.8	160.3	311.9	280.7	535.7	447.3
Iran's Share of 15-years gross receipts (%)	88.2	55.0	73.0	57.0	77.3	59.0
Average tax-paid crude cost to 2nd party (c/bbl.)	88	80	84	82	80	85
Iran's average income (c/bbl.)	92	74	99	77	104	80
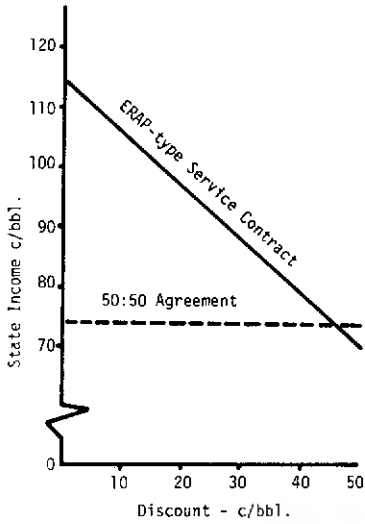
Graph No. 1 - Income per barrel as a function of market discount.
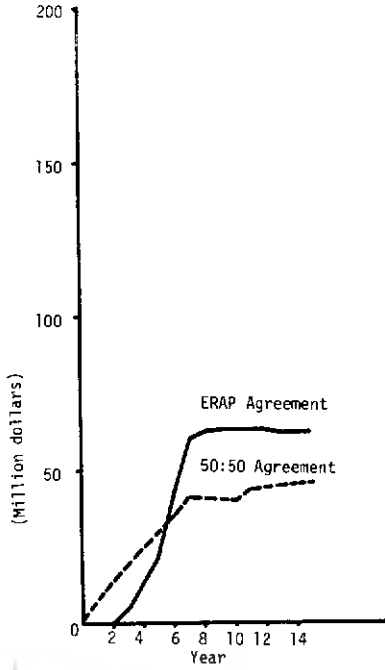
Graph No. 2 - Iran's annual income under ERAP and 50:50 agreements. Case one ("Heavy" Investment Requirements).
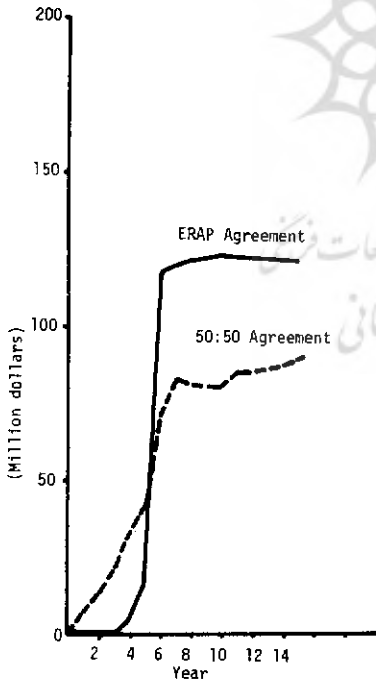
Graph No. 3 - Irans's annual income under ERAP and 50:50 agreements. Case two ("Medium" Investment Requirements).
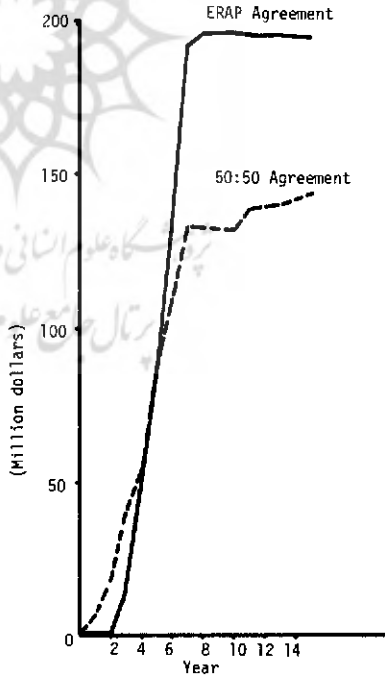
Graph No. 4 - Iran's annual income under ERAP and 50:50 agreements. Case three ("Light" Investment Requirements).

APPENDIX I

EXPLANATORY NOTES ON TABLES A TO E

Col. 1   Capital Expenditure -- annual development capital expenditure required to achieve, and maintain, the required production level.

Col. 2   Production Level.

Col. 3   Amortization Payment -- 6.7% of exploration expenditure plus 23.4% of pre-production capital expenditure plus 23 .4% of previous year's income deficit, i.e., col. 9, when negative. (The annual instalment required to repay a loan of 1 in n years at i% is equal to

$$\frac{i}{1-(1+i)^{-n}}$$

Col. 4   Depreciation Charge -- 6.7% of exploration expenditure plus 10% of the sum of pre-production capital expenditure and cumulative annual development expenditure, until amortized.

Col. 5   NIOC Sales -- 60% of col. 2@ 9.80.

Col. 6   ERAP Sales -- 40% of col. 2@ "ERAP price". (ERAP price is half realization plus 52% of variable operating costs and unit depreciation charge; i.e., $5. 1 + 0. 52 x \frac{col. 4}{col. 2}$)

Col. 7   Gross Sales -- col. 5 + col. 6.

Col. 8   Net cash -- gross sales less variable operating costs and amortization payments -- i.e., col. 7 — (0. 35 x col. 2 + col. 3.)

Col. 9   Iran's Income -- from first half, under ERAP agreement, and is equal to net cash less capital expenditure for the year, i.e., col.8 - col. 1.

Col.10   Amortization payment — of (National Reserve development loan) — this is the amortization payment on loans raised for the develop-

ment of the fields allocated to National Reserve at 8 per cent repayable in 5 years — i.e., 25.0 per cent of pre-production capital expenditure plus 25 per cent of previous years's income dificit, or col. 13, when negative.

Col. 11   Gross Sales — proceeds of sales of production from National Reserve fields at market realization price, i.e., 9.80xcol.2.

Col. 12   Net Cash — gross sales less operating costs and amortization payments — i.e., col.11-(0.35xcol.2+col. 10).

Col. 13   NIOC Income — net cash less capital expenditure for the year, i.e., col. 12-col.1.

Col. 14   Total Iran Income — from ERAP fields plus income from National Reserve fields — i.e., col. 9+col. 13.

Col. 15   Amortizable Capital Expenditure — (for exploitation of first half) — exploration expenditure plus cumulative total of development expenditure, until amortized.

Col. 16   Unit Income — income per unit of production from first half obtainable by Iran under the 50:50 agreement — which is equal to 0.53p-0.5c-0.5(d+e). Since p is 11.90 and c equals 0.35, unit income per ton = 6. 132- $\dfrac{0.5\text{xcol.15}}{\text{col. 2}}$

Col. 17   Iran's Income — this is Iran's income from first half under the 50:50 agreement and equals col.2xcol.16.

Col. 18   Amortizable Capital Expenditure — (for exploitation of second half) — is equal to col. 15 less total exploration expenditure.

Col. 19   Unit Income — (from exploitation of second half) — equals 0.53p-0.5c-0.5d. Simplified, it is 6.132- $\dfrac{0.5\text{xcol.18}}{\text{col. 2}}$

Col. 20   Iran's Income — (from second half under 50:50 agreement) — is equal to col.2xcol.19.

Col. 21   Total Iran Income —(under 50:50 agreement) — equals col. 17+col.20.

Col. 22   Crude Value — (at realization price, from both halves) — equals 2x col.2x9.80.

Col. 23   Operating Expenses — 2xcol.2x0.35.

Col. 24   Iran's Receipts (under ERAP agreement) — same as col. 14.

Col. 25   ERAP's Gross Receipts — residual from realizations after   meeting
           variable operating expenses and payments to Iran — i.e., col. 22-
           (col.23+col.24)

Col. 26   Iran's Receipts (under 50:50 agreement — same as col. 21.

Col. 27   Second Party's Gross Receipts — (under 50:50 agreement) - residual
           from realizations after meeting variable operating expenses   and
           payments to Iran — i.e., col.22-(col.23+col.26)

Col. 28   Present Value Factor — P.V. of 1@ 15% in n years equals 1.15^{-n}

Col. 29   Iran's Actual Income —(under 50:50 agreement) — same as col. 21.

Col. 30   P.V. of Iran's Income — (under 50:50 agreeement) — col. 28xcol.29.

Col. 31   Second Party's Actual Income — (under 50:50 agreement) — same as
           col.27.

Col. 32   P.V. of Second Party's Income — (under 50:50 agreement) — col.28 x
           col. 31.

Col. 33   Iran's Actual Income — (under ERAP) — same as col. 14.

Col. 34   P.V. of Iran's Income — (under ERAP) — col. 28xcol.33.

Col. 35   ERAP's Actual Income — (under ERAP) — same as col.25.

Col. 36   P.V. of ERAP's Income — (under ERAP) — col. 28xcol.35.

APPENDIX II

Table 1A – Case One

ERAP Development Cash Flow Schedule

Year	(1) Cap Exp	(2) Prod Level	(3) Amort Pays	(4) Deps Chrg	(5) NIOC Sales	(6) ERAP Sales	(7) Gross Sales	(8) Net Cash	(9) Iran Income
1	7.5	1.0	6.8	4.5	5.9	3.0	8.9	1.7	-5.8
2	7.5	1.5	8.2	5.3	8.8	4.1	12.9	4.2	-3.3
3	7.5	2.0	9.0	6.0	11.8	5.3	17.1	7.4	-0.1
4	7.5	2.5	9.0	6.8	14.7	6.5	21.2	11.3	3.8
5	7.5	3.0	9.0	7.5	17.6	7.7	25.3	15.2	7.7
6	7.5	3.5	3.7	8.3	20.6	8.8	29.4	24.5	17.0
7	3.0	4.0	3.7	8.6	23.5	9.9	33.4	28.3	25.3
8	3.0	4.0	1.5	8.9	23.5	9.9	33.4	30.5	27.5
9	3.0	4.0	1.5	9.2	23.5	10.1	33.6	30.7	27.7
10	3.0	4.0	1.5	9.5	23.5	10.1	33.6	30.7	27.7
11	3.0	4.0	1.5	6.8	23.5	9.6	33.1	30.2	27.2
12	3.0	4.0	1.5	6.3	23.5	9.4	32.9	30.0	27.0
13	3.0	4.0	1.5	5.9	23.5	9.4	32.9	30.0	27.0
14	3.0	4.0	1.5	5.4	23.5	9.3	32.8	29.9	26.9
15	3.0	4.0	1.5	5.0	23.5	9.3	32.8	29.9	26.9
	72.0	49.5				122.4			

Note: Revenue and expenditures in million dollars (US). Production in milli-
on tons. Pre-production capital expenditure equals $22.50 million and
those for exploration also $22.50 million. All figures rounded subse-
quently to one decimal point.

Table 1B – Case One
Combined ERAP & National Reserve Development
Cash Flow Schedules

	NATIONAL RESERVE				TOTAL
Year	(10) Amort Pays	(11) Gross Sales	(12) Net Cash	(13) NIOC Income	(14) Iran Income
1	5.6	9.8	3.9	- 3.6	-9.4
2	6.5	14.7	7.7	0.2	- 3.1
3	6.5	19.6	12.4	4.9	4.8
4	6.5	24.5	17.1	9.6	13.4
5	6.5	29.4	21.8	14.3	22.0
6	0.9	34.3	32.2	24.7	41.7
7	–	39.2	37.8	34.8	60.1
8	–	39.2	37.8	34.8	62.3
9	–	39.2	37.8	34.8	62.5
10	–	39.2	37.8	34.8	62.5
11	–	39.2	37.8	34.8	62.0
12	–	39.2	37.8	34.8	61.8
13	–	39.2	37.8	34.8	61.8
14	–	39.2	37.8	34.8	61.7
15	–	39.2	37.8	34.8	61.7
					638.3

Note: Revenue and expenditure in million dollars (US). Production in million tons. Pre-production capital expenditure equals $22.50 million, and those for exploration nil. All figures rounded subsequently to one decimal point. Annual Capital Expenditure same as col. 1 of Table 1 A. Production Level same as col. 2 of Table 1 A.

Table 1C - Case One

Calculation of Iran's Income under 50:50 Agreement

	FIRST HALF RESERVES			SECOND HALF RESERVES			TOTAL
Year	(15) Amortizable Capital	(16) Unit Income	(17) Iran's Income	(18) Amortizable Capital	(19) Unit Income	(20) Iran's Income	(21) Iran Income
1	52.5	3.5	3.5	30.0	4.6	4.6	8.1
2	60.0	4.1	6.2	37.5	4.8	7.2	13.4
3	67.5	4.4	8.8	45.0	5.0	10.0	18.8
4	75.0	4.6	11.6	52.5	5.1	12.8	24.4
5	82.5	4.8	14.2	60.0	5.1	15.3	29.5
6	90.0	4.8	17.0	67.5	5.2	18.2	35.2
7	93.0	5.0	19.9	70.5	5.3	21.2	41.1
8	96.0	4.9	19.7	73.5	5.2	20.8	40.5
9	99.0	4.9	19.6	76.5	5.2	20.8	40.4
10	102.2	4.9	19.4	79.5	5.1	20.4	39.8
11	52.5	5.5	21.9	52.5	5.5	22.0	43.9
12	48.0	5.5	22.1	48.0	5.5	22.0	44.1
13	43.5	5.6	22.4	43.0	5.6	22.4	44.8
14	39.0	5.6	22.6	39.0	5.6	22.6	45.2
15	34.5	5.6	22.8	34.5	5.7	22.8	45.6
			251.7			263.1	514.8

Note: In order to make the results comparable it is assumed that the Second Party in the 50:50 agreement also divides the fields into halves and exploits them separately.

(figures in 10^6 $ -- except cols. 16 & 19).

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Table 1D – Case One
Calculation of Second Party's "Income" under ERAP and
50:50 Agreement

Year	(22) Crude Value	(23) Operating Expenses	ERAP AGREEMENT		50:50 AGREEMENT	
			(24) Iran's Receipts	(25) ERAP's Receipts	(26) Iran's Receipts	(27) 2nd Party's Receipts
1	19.6	0.7	–	18.9	8.1	10.8
2	29.4	1.1	–	28.3	13.4	14.9
3	39.2	1.4	4.8	33.0	18.8	19.0
4	49.0	1.8	13.4	33.8	24.4	22.8
5	58.8	2.1	22.0	34.7	29.5	27.2
6	68.6	2.5	41.7	24.4	35.2	30.9
7	78.4	2.8	60.1	15.5	41.1	34.5
8	78.4	2.8	62.3	13.3	40.5	35.1
9	78.4	2.8	62.5	13.1	40.4	35.2
10	78.4	2.8	62.5	13.1	39.8	35.8
11	78.4	2.8	62.5	13.6	43.9	31.7
12	78.4	2.8	61.8	13.8	44.1	31.5
13	78.4	2.8	61.8	13.8	44.8	30.8
14	78.4	2.8	61.7	13.9	45.2	30.4
15	78.4	2.8	61.7	13.9	45.6	30.0
	970.2	34.8	638.3	297.1	514.8	420.6

Note: The Second Party's "income" under both agreements includes repayments in respect of exploration and development capital expenditure.

(figures in 10^6\$)

Table 1E – Case One

Comparison of Discounted Values of the Parties' Receipts under

ERAP & 50:50 Agreement

	(28) P.V.	50:50 AGREEMENT				ERAP AGREEMENT			
		(29) IRAN	(30)	(31) 2nd Party	(32)	(33) IRAN	(34)	(35) 2nd Party	(36)
Year	Factor	Actual	Disctd	Actual	Disctd	Actual	Disctd	Actual	Disctd
1	0.87	8.1	7.0	10.8	9.4	–	–	18.9	16.4
2	0.76	13.4	10.2	14.9	11.3	–	–	28.3	21.5
3	0.66	18.8	12.4	19.0	12.5	4.8	3.2	33.0	21.8
4	0.57	24.4	13.9	22.8	13.0	13.4	7.6	33.8	19.3
5	0.50	29.5	14.8	27.2	13.6	22.0	11.0	34.7	17.4
6	0.43	35.2	15.1	30.9	13.3	41.7	17.9	24.4	10.5
7	0.38	41.1	15.6	34.5	13.1	60.1	22.8	15.5	5.9
8	0.33	40.5	13.4	35.1	11.6	62.3	20.6	13.3	4.4
9	0.28	40.4	11.3	35.1	10.0	62.5	17.5	13.1	3.7
10	0.25	39.8	10.0	35.8	9.0	62.5	15.6	13.1	3.3
11	0.21	43.9	9.2	31.7	6.7	62.5	13.0	13.6	2.9
12	0.19	44.1	8.4	31.5	6.0	61.8	11.7	13.8	2.6
13	0.16	44.8	7.2	30.8	4.9	61.8	9.9	13.8	2.2
14	0.14	45.2	6.3	30.4	4.3	61.7	8.6	13.9	1.9
15	0.12	45.6	5.5	30.0	3.6	61.7	7.4	13.9	1.7
		514.8	160.3	420.6	142.3	638.3	166.8	297.1	135.5

(figures in 10^6\$,except col. 28)

Table 2A - Case Two

ERAP Development Cash Flow Schedules

Year	(1) Cap Exp	(2) Prod Level	(3) Amort Pays	(4) Deps Chrg	(5) NIOC Sales	(6) ERAP Sales	(7) Gross Sales	(8) Net Cash	(9) Iran Income
1	5.0	1.0	9.0	5.5	5.9	3.2	9.1	-0.3	-5.3
2	7.5	1.5	10.2	6.3	8.8	4.4	13.2	2.5	-5.0
3	11.3	2.3	11.4	7.4	13.7	6.1	19.8	7.6	-3.7
4	16.9	3.4	12.3	9.1	19.6	8.7	28.3	14.8	-2.1
5	25.4	5.1	12.8	11.6	30.4	12.6	43.0	28.4	3.0
6	3.8	7.6	5.8	12.0	45.1	17.7	62.8	54.3	50.0
7	3.8	7.6	4.6	12.4	45.1	17.8	62.9	55.6	51.8
8	3.8	7.6	3.4	12.8	45.1	17.9	63.0	56.9	53.1
9	3.8	7.6	2.0	13.1	45.1	18.0	63.1	57.9	54.1
10	3.8	7.6	2.0	13.5	45.1	18.0	63.1	58.4	54.6
11	3.8	7.6	2.0	10.4	45.1	17.4	62.5	57.5	54.0
12	3.8	7.6	2.0	10.0	45.1	17.3	62.4	57.7	53.9
13	3.8	7.6	2.0	9.3	45.1	17.2	62.3	57.6	53.8
14	3.8	7.6	2.0	8.0	45.1	16.9	62.0	57.5	53.5
15	3.8	7.6	2.0	5.8	45.1	16.4	61.5	56.8	53.0
	104.1	89.3	84.0			209.6			

*Note: Revenue and expenditures in million dollars (US). Production in milli-
on tons. Pre-production capital expenditure equals $30 million and those
for exploration also $30 million.
All figures rounded subsequently to one decimal point.

Table 2B – Case Two

Combined ERAP & National Reserve Development

Cash Flow Schedules

		NATIONAL RESERVE			TOTAL
Year	(10) Amort Pays	(11) Gross Sales	(12) Net Cash	(13) NIOC Income	(14) Iran Income
1	7.5	9.8	1.9	-3.1	-8.4
2	8.5	14.7	5.9	-1.6	-6.6
3	8.7	22.5	13.0	1.7	-2.0
4	8.7	33.3	23.4	6.5	4.4
5	8.7	50.0	39.5	14.1	17.1
6	1.2	74.5	70.6	66.8	117.3
7	0.4	74.5	71.4	67.6	119.4
8	-	74.5	71.8	68.0	121.1
9	-	74.5	71.8	68.0	122.1
10	-	74.5	71.8	68.0	122.6
11	-	74.5	71.8	68.0	122.0
12	-	74.5	71.8	68.0	121.9
13	-	74.5	71.8	68.0	121.8
14	-	74.5	71.8	68.0	121.5
15	-	74.5	71.8	68.0	121.0
					1215.2

Note: Revenue and expenditure in million dollars (US). Production in million tons. Pre-production Capital Expenditure $30 million, and those for exploration nil. All figures rounded subsequently to one decimal point. Annual Capital Expenditure same as col. 1 of Table 2 A. Production Level same as col. 2 of Table 2 A.

Table 2C – Case Two

Calculation of Iran's Income under 50:50 Agreement

	FIRST HALF RESERVES			SECOND HALF RESERVES			TOTAL
Year	(15) Amortizable Capital	(16) Unit Income	(17) Iran's Income	(18) Amortizable Capital	(19) Unit Income	(20) Iran's Income	(21) Iran Income
1	65.0	2.9	2.9	35.0	4.4	4.4	7.3
2	72.5	3.7	5.6	42.5	4.7	7.1	12.7
3	83.8	4.3	9.9	53.8	4.9	11.3	21.2
4	100.7	4.7	15.8	70.7	5.1	17.3	33.1
5	126.1	4.9	25.0	96.1	5.2	26.5	51.5
6	129.9	5.3	40.1	99.9	5.5	41.6	81.7
7	133.7	5.3	39.9	103.7	5.5	41.4	81.3
8	137.5	5.2	39.7	107.5	5.4	41.2	80.9
9	141.3	5.2	39.5	111.3	5.4	41.8	80.5
10	145.1	5.2	39.4	115.1	5.4	40.8	80.2
11	83.9	5.6	42.4	83.9	5.6	42.4	84.8
12	80.2	5.6	42.6	80.2	5.6	42.6	85.2
13	72.7	5.7	42.9	72.7	5.6	42.9	85.8
14	59.6	5.7	43.6	59.6	5.7	43.6	87.2
15	38.0	5.9	44.7	38.0	5.9	44.7	89.4
			474.0			488.8	962.8

Note: In order to make the results comparable it is assumed that the Second
      Party in the 50:50 agreement also divides the fields into halves   and
      exploits them separately.

(figures in 10^6\$ -- except cols. = 16 & 19).

Table 2D - Case Two

Calculation of Second Party's "Income" under ERAP and

50:50 Agreement

ERAP AGREEMENT   50:50 AGREEMENT

Year	(22) Crude Value	(23) Operating Expenses	(24) Iran's Receipts	(25) ERAP's Receipts	(26) Iran's Receipts	(27) 2nd Party's Receipts
1	19.6	0.7	–	18.9	7.3	11.6
2	29.4	1.1	–	28.3	12.7	15.6
3	45.0	1.6	–	43.4	21.2	22.2
4	66.6	2.4	4.4	59.8	33.1	31.1
5	100.2	3.6	17.1	79.5	51.5	45.1
6	149.0	5.3	117.3	26.4	81.7	62.0
7	149.0	5.3	119.4	24.3	81.3	62.4
8	149.0	5.3	121.1	22.6	80.9	62.8
9	149.0	5.3	122.1	21.6	80.5	63.2
10	149.0	5.3	122.6	21.1	80.2	63.5
11	149.0	5.3	122.0	21.7	84.8	58.9
12	149.0	5.3	121.9	21.8	85.2	58.5
13	149.0	5.3	121.8	21.9	85.8	57.9
14	149.0	5.3	121.5	22.2	87.2	56.5
15	149.0	5.3	121.0	22.7	89.4	54.3
	1750.8	62.4	1232.2	456.2	962.8	725.6

Note: The Second Party's "income" under both agreements includes repayments in respect of exploration and development capital expenditure.

(figures in 10^6\$)

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Table 2E -- Case Two

Comparison of Discounted Values of the Parties' Receipts under

ERAP & 50:50 Agreement

50:50 AGREEMENT   ERAP AGREEMENT

Year	(28) P.V. Factor	(29) IRAN Actual	(30) IRAN Disctd	(31) 2nd Party Actual	(32) 2nd Party Disctd	(33) IRAN Actual	(34) IRAN Disctd	(35) 2nd Party Actual	(36) 2nd Party Disctd
1	0.87	7.3	6.4	11.6	10.1	–	–	18.9	16.4
2	0.76	12.7	9.7	15.6	11.9	–	–	28.3	21.5
3	0.66	21.2	14.0	22.2	14.6	–	–	43.4	28.6
4	0.57	33.1	18.9	31.1	17.7	4.4	2.5	59.8	34.1
5	0.50	51.5	25.8	45.1	22.6	17.1	8.6	79.5	39.8
6	0.43	81.7	35.1	62.0	26.7	117.3	50.4	26.4	11.4
7	0.38	81.3	30.9	62.4	23.7	119.4	45.4	24.3	9.2
8	0.33	80.9	26.7	62.8	20.7	121.1	40.3	22.6	7.5
9	0.28	80.5	22.5	63.2	17.7	122.1	34.2	21.6	6.0
10	0.25	80.2	20.1	63.5	15.9	122.6	30.7	21.1	5.3
11	0.21	84.8	17.8	58.9	12.4	122.0	25.6	21.7	4.6
12	0.19	85.2	16.2	58.5	11.1	121.9	23.2	21.8	4.1
13	0.16	85.8	13.7	57.9	9.3	121.8	19.5	21.9	3.5
14	0.14	87.2	12.2	56.5	7.9	121.5	17.0	22.2	3.1
15	0.12	89.4	10.7	54.3	6.5	121.0	14.5	22.7	2.7
		962.8	280.7	725.6	228.8	1232.2	311.9	456.2	197.8

(figures in 10^6\$, except col. 28)

Table 3A - Case Three

ERAP Development Cash Flow Schedule

Year	(1) Cap Exp	(2) Prod Pays	(3) Amort Chrg	(4) Deps Sales	(5) NIOC Sales	(6) ERAP Sales	(7) Gross Sales	(8) Net Sales	(9) Iran Income
1	7.5	1.0	9.9	5.9	5.9	3.3	9.2	-1.1	-8.6
2	15.0	2.0	11.9	7.4	11.8	5.6	17.4	4.8	-10.2
3	15.0	4.0	14.3	8.9	23.5	9.9	33.4	17.7	2.7
4	15.0	6.0	14.3	10.4	35.3	14.2	49.5	33.1	18.1
5	15.0	8.0	14.3	11.9	47.0	18.5	65.5	48.4	33.4
6	15.0	10.0	6.1	13.4	58.0	22.8	81.6	72.0	57.0
7	4.5	12.0	4.1	13.9	70.6	26.9	97.5	89.2	84.7
8	4.5	12.0	1.7	14.3	70.6	27.0	97.6	91.7	87.2
9	4.5	12.0	1.7	14.8	70.6	27.1	97.7	91.8	87.3
10	4.5	12.0	1.7	15.2	70.6	27.2	97.8	91.9	87.4
11	4.5	12.0	1.7	11.4	70.6	26.4	97.0	91.1	86.6
12	4.5	12.0	1.7	10.4	70.6	26.2	96.8	90.9	86.4
13	4.5	12.0	1.7	9.3	70.6	26.0	96.6	90.7	86.2
14	4.5	12.0	1.7	8.3	70.6	25.7	96.3	90.4	85.9
15	4.5	12.0	1.7	7.2	70.6	25.5	96.1	90.2	85.7
	123.0	139.0	88.5						869.8

Note: Revenue and expenditures in million dollars (US). Production in mil-
lion tons. Pre-production capital expenditure equals $35 million, and
those for exploration $25 million.
All figures rounded subsequently to one decimal point.

Table 3B - Case Three

Combined ERAP & National Reserve Development

Cash Flow Schedules

		NATIONAL RESERVE			TOTAL
Year	(10) Amort Pays	(11) Gross Sales	(12) Net Cash	(13) NIOC Income	(14) Iran Income
1	8.8	9.8	-0.6	-6.9	-15.5
2	10.5	19.6	8.4	-6.6	-16.8
3	12.2	39.2	25.6	10.6	13.3
4	12.2	58.8	44.5	29.5	47.6
5	12.2	78.4	63.4	48.4	81.8
6	3.4	98.0	91.1	76.1	133.1
7	1.7	117.6	111.7	107.2	191.9
8	-	117.6	113.4	108.9	196.1
9	-	117.6	113.4	108.9	196.2
10	-	117.6	113.4	108.9	196.3
11	-	117.6	113.4	108.9	195.5
12	-	117.6	113.4	108.9	195.3
13	-	117.6	113.4	108.9	195.1
14	-	117.6	113.4	108.9	194.8
15	-	117.6	113.4	108.9	194.6
				1129.5	1999.3

Note: Revenue and expenditure in million dollars (US). Production in million
tons. Pre-production capital expenditure equals $35 million, and those
for exploration nil. All figures rounded subsequently to one   decimal
point. Annual Capital Expenditure same as col. 1 of Table 3A.   Produc-
tion Level same as col. 2 of Table 3 A.

Table 3C - Case Three

Calculation of Iran's Income under 50:50 Agreement

Year	FIRST HALF RESERVES			SECOND HALF RESERVES			TOTAL
	(15) Amortizable Capital	(16) Unit Income	(17) Iran's Income	(18) Amortizable Capital	(19) Unit Income	(20) Iran's Income	(21) Iran Income
1	67.5	2.8	2.8	42.5	4.0	4.0	6.8
2	82.5	4.1	8.1	52.5	4.7	9.4	17.5
3	97.5	4.9	19.6	72.5	5.2	21.0	40.6
4	112.5	5.2	31.1	87.5	5.4	22.4	53.5
5	127.5	5.3	42.7	102.5	5.5	44.0	86.7
6	142.5	5.4	54.2	117.5	5.5	55.4	109.6
7	147.0	5.5	66.2	122.0	5.6	67.4	133.6
8	151.5	5.5	66.0	126.5	5.6	67.2	133.2
9	156.0	5.5	65.8	131.0	5.6	67.0	132.8
10	160.5	5.5	65.5	135.5	5.6	66.7	132.2
11	97.5	5.7	68.8	72.5	5.8	70.0	138.8
12	87.0	5.8	69.2	62.0	5.9	70.4	139.6
13	76.5	5.8	69.7	51.5	5.9	70.9	140.6
14	66.0	5.9	70.3	41.0	6.0	71.5	141.8
15	55.0	5.9	70.8	30.0	6.0	72.8	143.6
			770.8			780.1	550.9

Note: In order to make the results comparable it is assumed that the Second Party in the 50:50 agreement also divides the fields into halves and exploits them separately.

(figures in $10^6$$ -- except cols. 16 & 19)

Table 3D – Case Three

Calculation of Second Party's "Income" under ERAP and

50:50 Agreement

	ERAP AGREEMENT			50:50 AGREEMENT	
Year	(22) Crude Value	(23) Operating Expenses	(24) Iran's Receipts	(25) ERAP's Receipts	(26) Iran's Receipts	(27) 2nd Party's Receipts
1	19.6	0.7	–	18.9	6.8	12.6
2	39.2	1.4	–	37.8	17.5	20.3
3	78.4	2.8	13.3	62.3	40.6	35.0
4	117.6	4.2	47.6	65.8	53.5	59.9
5	156.8	5.6	81.8	69.4	86.7	64.5
6	196.0	7.0	133.1	55.9	109.6	79.4
7	235.2	8.4	191.9	34.9	133.6	93.2
8	235.2	8.4	196.1	30.7	133.2	93.6
9	235.2	8.4	196.2	30.6	132.8	94.0
10	235.2	8.4	196.3	30.5	132.2	94.6
11	235.2	8.4	195.5	31.3	138.8	88.0
12	235.2	8.4	195.3	31.5	139.6	87.2
13	235.2	8.4	195.1	31.7	140.6	86.2
14	235.2	8.4	194.8	32.0	141.8	85.0
15	235.2	8.4	194.6	32.2	143.6	83.2
	2724.4	97.3	2031.6	595.5	1550.9	1076.2

Note: The Second Party's "income" under both agreements includes repayments
      in respect of exploration and development capital expenditure.

(figures in 10^6\$)

Table 3E - Case Three

Comparison of Discounted Values of the Parties' Receipts under

ERAP & 50:50 Agreement

		50:50 Agreement				ERAP Agreement			
	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
	P.V.	IRAN		2nd Party		IRAN		2nd Party	
Year	Factor	Actual	Disctd	Actual	Disctd	Actual	Disctd	Actual	Disctd
1	0.87	6.8	5.9	12.1	10.5	–	–	18.9	16.4
2	0.76	17.5	13.3	20.3	15.4	–	–	37.8	28.7
3	0.66	40.6	26.8	35.0	23.0	13.3	8.8	62.3	41.1
4	0.57	53.5	30.5	59.5	34.1	47.6	27.1	65.8	37.5
5	0.50	86.7	43.4	64.5	32.3	81.7	40.9	69.4	34.7
6	0.43	109.6	47.1	79.4	34.1	133.1	57.1	55.9	24.0
7	0.38	133.6	50.8	93.2	35.4	191.9	72.9	34.9	13.3
8	0.33	133.2	44.0	93.6	30.9	196.1	64.7	30.7	10.1
9	0.28	132.8	37.2	94.0	26.7	196.2	54.9	30.6	8.6
10	0.25	132.2	33.1	94.6	23.7	196.3	49.1	30.5	7.6
11	0.21	138.8	29.1	88.0	18.5	195.5	41.1	31.3	6.6
12	0.19	139.6	26.5	87.2	16.6	195.3	37.1	31.5	6.0
13	0.16	140.6	22.5	86.2	13.8	195.1	31.2	31.7	5.1
14	0.14	141.8	19.9	85.0	11.9	194.8	27.3	32.0	4.5
15	0.12	143.6	17.2	83.2	10.0	194.6	23.4	32.2	3.9
		1550.9	447.3	1076.2	336.5	2031.6	535.7	595.5	248.1

(figures in 10^6 \$, except col. 28)