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REPORT OF

NATIONAL PETROLEUM COUNCIL'S

COMMITTEE ON OIL COUNTRY TUBULAR GOODS

July 29, 1952

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REPORT OF
NATIONAL PETROLEUM COUNCIL'S COMMITTEE
ON OIL COUNTRY TUBULAR GOODS

The report presents the results of a study of size ranges of casing and tubing for oil and gas wells. For the first time, a comprehensive survey was made covering both the sizes of tubular goods actually used and the desired sizes as reported by petroleum operators from every oil and gas area. The findings therefore should be of broad general interest, not only to Government authorities concerned with the allocation of these materials but also to those in the petroleum and steel industries who have an interest in pipe requirements.

Authority and Purpose

On October 19, 1951, Mr. H. A. Stewart, Acting Director of the Oil and Gas Division of the Department of the Interior in a letter to Mr. Walter S. Hallanan, Chairman of the National Petroleum Council, requested that the Council:

> "...appoint a committee to make a comprehensive study to determine the most desirable range of sizes and weights for present needs in petroleum production operations and the relative proportion of each expressed in terms of footage and tonnage..."

The Agenda Committee of the Council approved this request on October 31, 1951. A pertinent portion of the Agenda Committee's report including Mr. Stewart's request is attached as Exhibit A. In accordance with this authority, a committee of 18 members of the Council was appointed to make the study.

Subsequent analysis of the Committee's assignment and preliminary investigation of the problem by a Working Group of the Committee raised certain questions with regard to the scope of the work. These questions were clarified by Mr. Stewart in a letter dated January 25, 1952, a copy of which is attached as Exhibit B.

Briefly, the clarifications and modifications as to the assignment were as follows: (1) Exclusion of drill pipe for which adequate information as to sizes was already available, according to Mr. Stewart.

(2) Exclusion of weight ranges within a given size.

(3) Exclusion of tubular goods for use in foreign operations.

(4) Limitation of the findings to percentages only rather than total tons of feet of pipe required by the industry.

On the basis of this authority and the facts developed by its Working Group, the Committee undertook the task of determining the desirable size ranges for casing and tubing.

Method of Procedure

A careful review of the problem in the light of all possible sources of basic information revealed that there were three broad alternatives for conducting the study as follows:

(1) A survey based on PAD data.

(2) A survey based on steel industry data.

(3) An industry survey by the Committee.

Despite the fact that a vast amount of information was available from the various forms submitted to PAD by petroleum operators, the Committee found this information unsatisfactory in many respects as a basis for arriving at the industry's required pipe pattern. The forms submitted to PAD would require detailed analysis and adjustment before they could be used and many of the necessary adjustments would be extremely difficult. For example, most if not all of the PAD applications for tubular goods are based on 100 percent producing wells and the pipe pattern therefore made no allowance for dry holes. In addition, the requirements set out in these applications were affected in some instances by the operator's ability or judgment as to what specifications he believes that he will be able to obtain rather than the specifications that he would desire if

available. Also, in certain cases, it was believed that casing weights were overstated and the tonnage excessive. Such problems as these would make it very difficult to analyze the information on the file in the Petroleum Administration for Defense. Representatives of PAD agreed with these views and the Committee decided it was impractical to base the survey on the data available from this source.

The possibility of using steel industry data on past production or shipments of tubular goods was explored thoroughly by this Committee. It was the consensus of opinion, however, that this would not constitute satisfactory evidence of present needs of the petroleum industry. The past history mill shipments would be distorted by the abnormal use of second-hand materials, conversion pipe and foreign materials, as well as the forced substitution of less desirable sizes and weights. It would be very difficult to compensate for these factors and develop a firm basis for the correct pattern. While the historical mill pattern will be helpful in connection with the Committee's work, it was agreed that additional evidence would be needed to document the present needs in petroleum production operations.

In view of the fact that neither the PAD information or the steel industry data was deemed to be satisfactory as a basis for the Committee's study, it was necessary to obtain basic information from some other source. Every effort was made to find a practical approach to the problem that would impose a minimum burden of work upon the industry. It was the conclusion of the Committee, however, that present needs could be established only by surveying the industry through a questionnaire. A questionnaire was prepared, reduced to the bare essentials believed to be necessary in order to obtain adequate information on pipe requirements by sizes. A copy of the questionnaire form is attached to this report as Exhibit C.

The general approach used in the survey and questionnaire was to request information as to the sizes of casing and tubing actually used in wells completed during the fourth quarter of 1951 as compared with the desired sizes that operators would have used, if available, in these same wells. A breakdown was specified between new pipe vs second-hand or rerun pipe. The fourth quarter of 1951 was selected as a recent period representative of a relatively high rate of drilling activity. In order to determine if all areas were included in the survey, operators were requested to show the number of wells and total footage completed during the quarter by states and principal areas.

Coverage of Survey

In order to obtain a meaningful picture of industry requirements by pipe sizes, it was necessary to obtain a representative coverage. Therefore, questionnaires were mailed to all those known to be engaged in drilling activities in the United States as revealed by the records of the Petroleum Administration for Defense. The PAD furnished this mailing list and questionnaires were sent to approximately 6,300 operators. The Committee recognized that information would not be obtained from all of these 6,300 operators. Many would not be active and would not have used casing or tubing during the period under study. Others would be unable to supply the information in sufficient detail.

The questionnaires received from operators were as follows:

	(number)
Containing adequate & useable information	1,016
Containing inadequate information	55
Reporting no activity	530
Total Returns	1,601

In order to test the adequacy and representative nature of the data furnished in these returns, comparisons were made based on the number of wells completed and the footage drilled both for the country as a whole and by areas. These comparisons show the following coverage:

U.S. Drilling Activity-4th Quarter 1951

	Total Industry (per Oil and Gas Journal)	Reported on NPC Questionnaires	Percent of Total Industry
Number of wells completed	11,784	8,521	72.3%
Total Footage Drilled	46,911,535	37,295,386	79.5%

The above percentages for wells completed and footage drilled are not directly comparable. This is due in large part to the fact that some operators included all footage drilled in the fourth quarter of 1951 rather than only the footage for wells completed during the quarter. This tends to overstate the footage in relation to the wells drilled. It will be noted, however, that the coverage indicated by these figures represents over 70 percent of all industry drilling. In the Committee's judgment, this constitutes an adequate basis on which to appraise the industry's requirements by pipe sizes.

Further evidence of the adequacy of the coverage is shown by the fact that the 1,016 useable returns included 152 from so-called "Class B" or larger operators (who drilled 40 wells or more in the PAD base period) and 864 from smaller operators designated as "Class A" by PAD.

In addition, a review of the reported drilling by states and areas shows a good representation from a geographical standpoint. Substantially more than 50 percent of the wells were covered for most states. The few areas where the coverage was less than 50 percent

represented shallow drilling and a relatively less important part of the total tonnage. Evaluation of the coverage by areas leads to conclusion that increased coverage for the few areas with lower percentages reported would have no significant effect upon the results.

Casing and Tubing Size Ranges

All useable returns have been tabulated and combined to show both the size ranges actually used during the fourth quarter of 1951 and the range that these operators would have used if the desired pipe had been available. The detailed results for both footage and tonnage by sizes are presented in Table I and Table II of this report. The reported size ranges for casing, expressed as a percent of total tons, may be summarized from Table I as follows:

Size	Casing Size Range as Percent of Total Tons: Actually Used (percent)	Would Have Used if Available (percent)
4-1/2"	.826	.552
5"	.674	.651
5-1/2"	31.348	32.939
6"	.085	.071
6-5/8"	1.966	1.436
7"	31.905	31.078
7-5/8"	2.559	2.715
8-5/8"	9.201	9.064
9-5/8"	8.299	8.331
10-3/4"	9.434	9.409
11-3/4"	.599	.603
13-3/8"	2.640	2.709
16"	.359	.364
20"	.090	.063
22"	.003	.003
24"	.009	.009
26"	.003	.003
Total	100.000	100.000

The same comparison for tubing based on the results of the survey as shown in Table II is as follows:

Nominal Size	Outside Diameter	Tubing Size Range as Percent of Total Tons: Actually Used (percent)	Tubing Size Range as Percent of Total Tons: Would Have Used if Available (percent)
1"	1.315"	.055	.046
1-1/4"	1.660"	.245	.252
1-1/2"	1.900"	.096	.095
2"	2-3/8"	63.857	63.940
2-1/2"	2-7/8"	31.728	31.512
3"	3-1/2"	3.095	3.237
3-1/2"	4"	.109	.108
4"	4-1/2"	.815	.810
	Total	100.000	100.000

The above percentages are based on all casing and tubing including new pipe from regular mill sources, conversion or foreign sources as well as second hand or rerun material. The breakdown between new pipe vs. second hand or rerun is shown in Table I.

For comparison with the results of this survey, Table III shows a summary of U. S. mill shipments of tubular goods by sizes for the years 1945-1951, inclusive.

Analysis of Findings

The information obtained through this survey is unique and original. It represents the first collective expression from oil and gas operators with regard to their casing and tubing requirements by sizes. The individual replies showed a wide variety of problems, many of which are obscured in the summary tabulations. These problems as well as the overall results warrant analysis and comment in this report.

Classification of the 1,016 useable returns showed that 545 operators or 53.6 percent did not need any change in casing or tubing size pattern or weights. The remaining 471 operators or 46.4 percent reported one or more type of change in size or weight as being desirable. Thus, it is indicated on the basis of this survey that somewhat more than half of the oil and gas operators are satisfied with the size

pattern of tubular goods available while slightly less than half desire some type of change. This, of course, does not imply that half of the total tonnage is in undesirable sizes. The changes apply to only a part of the total pipe reported by the 471 operators who were not satisfied with the size ranges available to them.

The following changes in pipe were indicated as desirable by reporting operators. Some wanted more than one type of change, but only the most important was considered when listing. All cases where size changes were desired are shown:

Wanted new over second-hand	103
Wanted second-hand over new	4
Wanted lighter pipe in same size	98
Wanted heavier pipe in same size	38
Wanted size changes	221
Drilled wells - ran no pipe	7
	471

In reviewing the 221 reports indicating size change the primary tendency was toward the following:

Wanted 5-1/2" instead of smaller sizes	36
Wanted 5-1/2" instead of 7"	92
Wanted 5-1/2" instead of other larger sizes	14
Total 5-1/2"	142
Wanted 7" instead of 5-1/2"	36
Wanted 7" instead of other smaller sizes	18
Wanted 7" instead of larger sizes	13
Total 7"	67
Wanted Other Changes	129

The balance of the other changes were principally in larger pipe sizes, partly as a result of changing production string sizes. There was one or more wanting every possible change in casing, however. Better coordination of needs and availability would have eliminated some of these cases, particularly in the 5-1/2" and 7" sizes.

In tubing, 26 wanted 2-3/8" over 2-7/8", and 20 wanted the reverse, 2-7/8" over 2-3/8".

In addition to the changes recorded on questionnaires, a considerable number were accompanied by letters or had remarks written on the reports which reflected their operating difficulties. Much of this had no bearing on the survey, telling only of their difficulties in getting pipe enough to drill the wells they wanted, their inability to secure an allotment from the P.A.D., or their inability to use the allotment in purchasing pipe after they get it. The use of liners instead of full production strings by reason of scarcity was mentioned by several as an undesirable practice. Excess quantities of large casing with inadequate tonnage in oil strings and tubing handicapped many operators. It is a reasonableconclusion that there is a real problem of distribution. The industry has had to resort to unusual and costly procedures to lessen the effects of shortages and distribution difficulties.

With regard to the use of second hand or rerun material, the tabulations show the following tonnage:

	Actually Used		
	Casing (tons)	Tubing (tons)	Total (tons)
New	323.401	60,602	384,003
Second-Hand	35,817	6,779	42,596
	359,218	67,381	426,599

	Would Have Used		
	Casing (tons)	Tubing (tons)	Total (tons)
New	333,366	62,605	395,971
Second-Hand	19,404	5,148	24,552
	352,770	67,753	420,523

From this it can be seen that the use of second-hand material was 10% of the total tonnage. No information as to the approximate proportion of useage in second-hand material has heretofore been available. It can also be seen, however, that the desire of operators is to use less than they did, dropping it to 6%.

The matter of casing size demand, particularly in production string sizes, 4-1/2" through 7", is of primary concern in this survey. This group of sizes involves 79% of the total footage wanted and 67% of the total tonnage wanted. In this connection, the mills have been increasing the proportion of production string footage in the smaller sizes, notably 5-1/2". This is indicated in the figures in Table III showing the comparative relationship of tonnage sizes for the period 1945-51 inclusive. The survey percentages show only a comparative small increase of 2.814 percentage points over 1951 mill shipment percentage for 5-1/2" casing as being desired by operators (32.939% vs. 30.125%). From operators reports it can be seen that this involves an increase in footage of 801,268 feet and a reduction in average weight per foot of .36 pounds. The increase in footage would be greater if all needs were furnished from regular domestic mill production instead of partly from conversion and imports. The tendency toward the use of 5-1/2" casing in the 14 pound weight is obvious from the average weight in 15,281,341 feet of 15.20 pounds per foot. Actual useage was affected to an undetermined extent by considerable quantities of 5-1/2" 17# lapweld which were then and are now available. This is the lightest weight which that type is usually made or is generally useable. It is a substitute for 5-1/2" 14# seamless or electric-weld casing, but is of much lower strength which affects the setting depths considerably.

The tendency toward using smaller sizes than 7" for production strings is more clearly seen in the following:

4-1/2" through 6-5/8"	7"
35.649% Wanted	34.784% 1951 Shipments
31.736% 1951 Shipments	31.078% Wanted
3.913% Increase	3.706% Decrease

While the summary shows an increase in small sizes and a corresponding decrease in desire to use 7", it has already been shown herein that 54 operators preferred 7" over smaller sizes. Some of the tonnages involved in this preference were quite large. Some small operators expressed a preference for 7" 17# and complained about their inability to secure it and being forced to use 7" 20# instead. In the overall picture, there is not much indication of a demand for lighter weight 7", however. The summary shows an average weight per foot of 22.82# actually used and 22.44# wanted.

The percentage of casing from 7-5/8" up, known collectively as large casing, shows a demand almost identical with 1951 mill shipments. The desired weights are approximately the same.

The general trend in tubing sizes is toward 2-3/8". Here again we find quite a demand in the opposite direction, with some operators wanting 2-7/8" instead of 2-3/8". The use of other sizes is necessary for specific and infrequent circumstances which involves little tonnage. Considering casing and tubing as approximately 95% of all oil country tubular goods produced, (the remaining 5% being drill pipe) the total oil country tubular goods desired for the wells in this survey would be 442,655 tons. On this basis, tubing represents 15.3% of the total. This is approximately what the regular mills produce. It does not take care of maintenance and repair requirements. The difference, while not great, is cumulative, resulting in a shortage of tubing within the industry which has been felt for years. It has only been overcome by securing conversion tubing from manufacturing sources outside the regular oil country tubular goods mills.

The tabulations show a considerable trend toward 2-3/8" tubing as reflected in the following figures:

2-3/8"	2-7/8"
63.940% Wanted	40.127% 1951 Shipments
55.038% 1951 Shipments	31.512% Wanted
8.902% Increase	8.615% Decrease

In addition to the above analysis of size ranges, the data submitted on the questionnaires show the following relationships between casing and tubing tonnage and drilling:

Wells Drilled - 8,521
Footage Drilled - 37,295,386

	Used Tons	Would Have Used Tons
Casing	359,218	352,770
Tubing	67,381	67,753
Total	426,599	420,523
Tons per Well	50.06	49.35
Tons per M Ft.	11.44	11.27

Summary and Conclusions

The National Petroleum Council's Committee on Oil Country Tubular Goods has surveyed size ranges for casing and tubing used in oil and gas wells. The survey covered more than 70 percent of all drilling activity. In the judgment of the Committee, there was adequate representation both geographically as well as types and sizes of operators. The results therefore are believed to be representative, within reasonable and practical limits, of the petroleum industry's needs by sizes for drilling operations within the United States.

This survey and report is the first of its kind and contains information not available heretofore. Those concerned with the question of tubular goods sizes are urged to consider the report in full together with the tubular data. In brief, it may be concluded that the

size ranges desired collectively by all oil and gas operators do not differ widely from the percentage range available from all sources. This conclusion necessarily requires certain qualifications. Some individual operators reported considerable differences. Also, an important increase in the percentage demand for 2-3/8" tubing is indicated. To obtain their needs, operators have had to utilize second-hand and rerun material, conversion pipe and imports from foreign mills to an abnormal extent. In addition, problems of distribution that inevitably accompany a condition of shortage have created serious situations of imbalance. These conditions multiply the effect of the relatively small differences in percentages by sizes, and involve additional costs for many operators. It is hoped that this study will contribute toward a solution of some of these difficulties.

Survey of Oil Country Casing and Tubing Requirements

TABLE I - CASING

ACTUALLY USED - 4TH QUARTER 1951

Summary of Questionnaires Returned by Operators**

Size (O.D.) (Inches)	NEW PIPE Footage	% Total Footage	Tons	Avg.Wt. Per Ft.	% Total Tons	SECOND HAND AND RERUN Footage	% Total Footage	Tons	Avg.Wt. Per Ft.	% Total Tons	ALL PIPE Footage	% Total Footage	Tons	Avg.Wt. Per Ft.	% Total Tons
4-1/2	407,343	1.372	2,270	11.14	.702	104,013	3.224	696	13.38	1.942	511,356	1.554	2,966	11.60	.826
5	218,740	.736	1,843	16.86	.570	76,337	2.366	579	15.16	1.616	295,077	.897	2,422	16.42	.674
5-1/2	13,481,478	45.422	104,725	15.54	32.382	998,595	30.951	7,885	15.80	22.014	14,480,073	44.003	112,610	15.56	31.348
6	19,947	.067	170	17.10	.053	17,047	.528	134	15.70	.374	36,994	.112	304	16.56	.085
6-5/8	483,782	1.630	5,151	21.30	1.593	184,340	5.714	1,912	20.74	5.339	668,122	2.030	7,063	21.14	1.966
7	8,976,335	30.243	102,814	22.90	31.792	1,069,564	33.151	11,794	22.06	32.929	10,045,899	30.528	114,608	22.82	31.905
7-5/8	642,462	2.165	8,941	27.84	2.765	17,768	.551	253	28.42	.705	660,230	2.006	9,194	27.86	2.559
8-5/8	1,790,507	6.033	25,580	28.58	7.910	529,776	16.420	7,472	28.20	20.862	2,320,283	7.051	33,052	28.48	9,201
9-5/8	1,537,001	5.178	26,770	37.42	8.896	54,882	1.701	1,041	37.94	2.907	1,591,883	4.838	29,811	37.46	8.299
10-3/4	1,643,719	5.538	30,671	37.32	9.484	140,197	4.345	3,218	43.92	8,986	1,783,916	5.421	33,889	38.00	9.434
11-3/4	89,516	.302	2,104	48.00	.650	2,437	.076	48	39.74	.135	91,953	.279	2,152	46.80	.599
13-3/8	339,655	1.144	8,768	51.62	2.711	29,270	.907	715	48.88	1.997	368,925	1.121	9,483	51.40	2.640
16	41,415	.140	1,236	59.70	.382	1,735	.054	53	60.88	.147	43,150	.131	1,289	59.74	.359
20	7,858	.026	308	78.44	.095	380	.012	17	88.42	.047	8,238	.025	325	78.90	.090
22 (L.P.)*	168	.001	10	117.86	.003	--	--	--	--	--	168	.001	10	117.86	.003
24 (L.P.)*	588	.002	31	102.94	.009	--	--	--	--	--	588	.002	31	102.94	.009
26 (L.P.)*	263	.001	9	70.60	.003	--	--	--	--	--	263	.001	9	70.60	.003
Totals	29,680,777	100.000	323,401		100.000	3,226,341	100.000	35,817		100.000	32,907,118	100.000	359,218		100.000

* Line Pipe
** Through July 14, 1952

Table I - Casing continued on following page

Survey of Oil Country Casing and Tubing Requirements

TABLE I - CASING

Summary of Questionnaires Returned by Operators**

WOULD HAVE USED IN SAME WELLS IF AVAILABLE

Size (O.D.) (Inches)	NEW PIPE Footage	% Total Footage	Tons	Avg.Wt. Per Ft.	% Total Tons	SECOND HAND AND RERUN Footage	% Total Footage	Tons	Avg. Wt. Per Ft.	% Total Tons	ALL PIPE Footage	% Total Footage	Tons	Avg.Wt. Per Ft.	% Total Tons
4-1/2	350,531	1.119	1,805	10.28	.541	24,528	1.393	144	11.76	.743	375,059	1.134	1,949	10.40	.552
5	220,816	.705	1,917	17.36	.575	49,695	2.821	378	15.20	1.948	270,511	.818	2,295	16.96	.651
5-1/2	14,745,561	47.091	111,974	15.08	33.590	535,780	30.419	4,227	15.78	21.785	15,281,341	46.204	116,201	15.20	32.939
6	24,510	.078	212	16.28	.064	5,315	.302	37	14.02	.192	29,825	.090	249	16.70	.071
6-5/8	389,860	1.245	4,206	20.58	1.262	87,410	4.963	861	19.70	4.435	477,270	1.443	5,067	21.24	1.436
7	9,227,070	29.468	103,718	22.48	31.112	547,906	31.108	5,918	21.60	30.500	9,774,976	29.554	109,636	22.44	31.078
7-5/8	703,758	2.248	9,478	26.94	2.843	7,042	.400	101	28.68	.520	710,800	2.149	9,579	26.96	2.715
8-5/8	1,887,225	6.027	26,939	28.56	8.081	362,539	20.584	5,034	27.78	25.945	2,249,764	6.802	31,973	28.42	9.064
9-5/8	1,572,391	5.022	28,794	36.62	8.637	30,733	1.744	595	38.72	3.066	1,603,124	4.847	29,389	36.66	8.331
10-3/4	1,703,746	5.441	31,518	37.00	9.454	92,967	5.278	1,674	36.00	8.626	1,796,713	5.432	33,192	36.94	9.409
11-3/4	91,193	.291	2,091	46.86	.627	1,672	.095	35	41.84	.180	92,865	.281	2,126	45.78	.603
13-3/8	346,858	1.108	9,217	53.14	2.765	13,841	.786	338	48.90	1.744	360,699	1.091	9,555	52.98	2.709
16	42,419	.135	1,241	58.52	.372	1,501	.085	45	59.30	.229	43,920	.133	1,286	58.54	.364
20	5,533	.018	206	74.42	.062	380	.022	17	88.42	.087	5,913	.018	223	75.34	.063
22 (L.P.)*	168	.001	10	117.86	.003	--	--	--	--	--	168	.001	10	117.86	.003
24 (L.P.)*	588	.002	31	102.94	.009	--	--	--	--	--	588	.002	31	102.94	.009
26 (L.P.)*	263	.001	9	70.60	.003	--	--	--	--	--	263	.001	9	70.60	.003
Totals	31,312,490	100.000	333,366		100.000	1,761,309	100.000	19,404		100.000	33,073,799	100.000	352,770		100.000

* Line Pipe
** Through July 14, 1952

Survey of Oil Country Casing and Tubing Requirements

TABLE II - TUBING

Summary of Questionnaires Returned by Operators**

Size (O.D.) (Inches)	NEW PIPE Footage	% Total Footage	Tons	Avg.Wt. Per Ft.	% Total Tons	SECOND HAND AND RERUN Footage	% Total Footage	Tons	Avg.Wt. Per Ft.	% Total Tons	ALL PIPE Footage	% Total Footage	Tons	Avg.Wt. Per Ft.	% Total Tons
ACTUALLY USED - 4TH QUARTER 1951															
1.315	37,839	.163	37	1.94	.061	--	--	--	--	--	37,839	.146	37	1.94	.055
1.660	179,360	.770	162	1.80	.268	2,246	.087	3	2.40	.040	181,606	.703	165	1.80	.245
1.990	46,587	.200	63	2.68	.103	1,624	.063	2	2.32	.028	48,211	.186	65	2.68	.096
2.375	16,565,291	71.148	38,742	4.66	63.929	1,869,971	72.816	4,286	4.58	63.217	18,435,262	71.314	43,028	4.66	63.856
2.875	6,072,046	26.079	19,673	6.46	32.463	525,873	20.478	1,706	6.48	25.159	6,597,919	25.523	21,379	6.48	31.728
3.500	282,167	1.212	1,337	9.46	2.206	162,468	6.326	748	9.22	11.041	444,635	1.720	2,085	9.38	3.095
4.000	15,774	.068	73	9.30	.121	--	--	--	--	--	15,774	.061	73	9.30	.109
4.500	83,768	.360	514	12.28	.849	5,919	.230	35	11.80	.515	89,687	.347	549	12.26	.815
Totals	23,282,832	100.000	60,601		100.000	2,568,101	100.000	6,780		100.000	25,850,933	100.000	67,381		100.000
WOULD HAVE USED IN SAME WELLS IF AVAILABLE															
1.315	34,943	.145	32	1.80	.050	--	--	--	--	--	34,943	.134	32	1.80	.046
1.660	183,802	.762	168	1.82	.270	2,246	.121	3	2.40	.052	186,048	.716	171	1.84	.252
1.990	46,587	.193	63	2.70	.100	1,624	.087	2	2.32	.037	48,211	.186	65	2.68	.095
2.375	17,358,362	71.967	40,556	4.66	64.781	1,196,105	64.219	2,764	4.62	53.689	18,554,467	71.411	43,320	4.66	63,940
2.875	6,090,498	25.251	19,734	6.48	31.521	498,515	26.766	1,617	6.48	31.407	6,589,013	25.359	21,351	6.48	31.512
3.500	306,416	1.270	1,465	9.56	2.341	158,115	8.489	728	9.20	14.137	464,531	1.788	2,193	9.44	3.237
4.000	15,774	.065	73	9.30	.117	--	--	--	--	--	15,774	.061	73	9.30	.108
4.500	83,598	.347	513	12.28	.820	5,919	.318	35	11.80	.678	89,517	.345	548	12.26	.810
Totals	24,119,980	100.000	62,604		100.000	1,862,524	100.000	5,149		100.000	25,982,504	100.000	67,753		100.000

** Through July 14, 1952

TABLE III

SUMMARY OF CASING, TUBING AND DRILL PIPE SHIPMENTS SIZES BY PERCENTAGES, 1945-1951

Outside Diameter (Inches)	1945	1946	1947	1948	1949	1950	1951
Casing							
4-1/2	0.285	0.307	0.250	0.401	0.349	0.278	0.264
5	0.716	0.767	0.807	0.792	0.643	0.491	0.408
5-1/2	25.199	25.352	26.738	25.616	28.825	28.129	30.125
6	0.735	0.623	0.786	0.364	0.570	0.114	0.147
6-5/8	3.574	1.999	1.648	1.387	0.926	0.983	0.792
7	32.782	33.511	34.319	33.752	31.868	32.971	34.784
7-5/8	1.444	1.641	1.760	1.185	1.994	2.608	2.703
8-5/8	6.332	7.541	6.054	7.161	6.616	5.662	6.373
9-5/8	12.222	12.686	11.378	12.924	11.679	10.226	10.289
10-3/4	10.226	9.813	10.352	11.269	10.950	12.307	10.759
11-3/4	1.639	1.465	1.580	1.012	0.558	0.603	0.586
13-3/8	4.441	4.013	3.944	3.491	4.288	5.441	2.448
16	0.316	0.233	0.258	0.558	0.530	0.087	0.259
20	0.089	0.049	0.126	0.088	0.204	0.100	0.063
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000
Tubing							
1.660	0.216*	0.139*	0.053	0.007	0.007	--	--
1.900	0.042*	0.020*	0.091	0.058	0.027	0.011	--
2-3/8	44.690*	50.964*	50.623	51.978	53.150	60.835	55.038
2-7/8	44.931*	40.569*	41.418	41.077	40.858	36.517	40.127
3-1/2	8.056*	7.027*	6.747	5.900	4.693	2.015	4.166
4	0.319*	0.126*	0.213	0.062	0.126	0.060	0.075
4-1/2	1.746*	1.155*	0.855	0.918	1.139	0.562	0.594
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000
Drill Pipe							
2-3/8	0.412	1.454	0.659	1.280	0.112	2.588	0.379
2-7/8	1.167	2.421	4.513	1.183	5.929	3.410	0.720
3-1/2	14.344	15.806	24.138	16.552	25.764	17.856	19.881
4	0.754	0.203	0.173	0.654	1.264	6.712	4.023
4-1/2	79.483	70.243	58.029	72.484	58.383	66.212	66.692
5	N.S.	N.S.	3.232	2.241	1.869	1.081	6.548
5-1/2	3.285**	8.239**	8.681**	5.506	4.457	2.141	1.637
6-5/8	0.555	1.634	0.575	0.100	0.222	--	0.120
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000

N.S. - Not Shown

* Shown as nominal sizes: 1-1/4, 1-1/2, 2, 2-1/2, 3 3-1/2, 4

** Shown as 5-9/16 except 1947 which shows 5-1/2 equal to 1.742% and 5-9/16 equal to 6.939%

Source: American Petroleum Institute (Manufacturers Subcommittee of the API Committee on Standardization of Oil Country Tubular Goods)

EXHIBIT A

C
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P
Y

EXCERPT FROM REPORT OF THE AGENDA SUBCOMMITTEE

OF THE

NATIONAL PETROLEUM COUNCIL

October 30, 1951

Also, under date of October 19, 1951, Mr. Stewart addressed a letter (copy of which is hereto attached) to Mr. Walter S. Hallanan, Chairman of the National Petroleum Council, requesting that the Council make a study to determine the most desirable range of sizes and weights of oil country tubular goods for present needs in petroleum production operations and the relative proportion of each expressed in terms of footage and tonnage, and to report its findings with such recommendations as may be appropriate.

As provided in the Articles of Organization of the National Petroleum Council, this letter was also considered at the meeting of the Agenda Committee held on October 30, in Washington, D. C., at which meeting it was unanimously agreed to recommend to the Council the appointment of a committee to make the study as requested by Mr. Stewart, and report to the Council.

Respectfully submitted,

A. Jacobsen, Chairman
Agenda Committee of the National
Petroleum Council

EXHIBIT A (Cont.)

UNITED STATES
DEPARTMENT OF THE INTERIOR
OIL AND GAS DIVISION

Washington 25, D. C.

October 19, 1951

Mr. Walter S. Hallanan, Chairman
National Petroleum Council
1625 K Street, N. W.
Washington, D. C.

Dear Mr. Hallanan:

Historically, steel mills in producing oil country tubular goods established certain operating patterns for the production of oil field casing, tubing, and drill pipe, based upon the early methods of well drilling and the demands on the mills for the various sizes and weights.

Today, the almost universal use of rotary drilling rigs and the great increase in the number of very deep producing wells result in a need for relatively greater quantities of smaller sizes of casing, as compared to the former days when the larger percentage of wells were drilled with cable tools. In addition, the average depth of producing wells has increased approximately 90 feet per year during the last several years and in drilling approximately the same total number of wells in 1951 as in 1950, the footage drilled will be approximately ten million feet greater, or an average depth increase of roughly 200 feet per well.

The maintenance by the mills of their old production patterns has resulted in an inadequate supply of smaller sizes of casing now required in production strings, and an excessive supply of large diameter casing.

In the petroleum defense mobilization program, it is necessary for the petroleum industry to get maximum utilization from the amount of steel available for manufacture of oil well casing. The Petroleum Administration for Defense has been able by diligent effort to persuade the mills to roll more of the small sized casing than had heretofore been made available, but there is still an excessive amount of the larger pipe being manufactured.

The Petroleum Administration for Defense is anxious to obtain information which would be helpful in formulating recommendations to the pipe mills as to the most desirable production patterns in order to better utilize the steel available to the petroleum industry. Therefore, the National Petroleum Council is requested to appoint a

committee to make a comprehensive study to determine the most desirable range of sizes and weights for present needs in petroleum production operations and the relative proportion of each expressed in terms of footage and tonnage, and to report its findings with such recommendations as may be appropriate.

In view of the critical supply situation in oil country tubular goods a prompt report will be especially useful.

Sincerely yours,

/s/ H. A. Stewart

H. A. Stewart, Acting Director

EXHIBIT B

UNITED STATES
DEPARTMENT OF THE INTERIOR
Oil and Gas Division
Washington 25, D. C.

January 25, 1952

Mr. Walter S. Hallanan, Chairman
National Petroleum Council
1625 K Street, N. W.
Washington, D. C.

Dear Mr. Hallanan:

On October 19, 1951, I addressed a letter to you requesting that the National Petroleum Council appoint a committee to "make a comprehensive study to determine the most desirable range of sizes and weights for present needs in petroleum production operations and the relative proportion of each expressed in terms of footage and tonnage, and to report its findings with such recommendations as may be appropriate."

The Council approved the study and you appointed a committee to undertake it. Representatives of the committee met in Washington on January 8 and 9 for a discussion of the problem and to outline methods of procedure. Several representatives of PAD were present and participated in the discussions.

Some questions were raised as to the exact meaning of some of the words in the request; others as to the exact scope the inquiry would cover. It is therefore desirable to clarify certain points to assist your oil country tubular goods committee in its work Monday, January 28. These clarifications are as follows:

1. Drill pipe should be excluded because adequate information is available to PAD.

2. Exclude study of weight ranges within a given size.

3. Confine the study to domestic operations.

4. Report, by sizes, the percentage range in tonnage and footage considered to be the most desirable pattern for manufacture of oil country casing and tubing.

Sincerely yours,

/S/ H. A. Stewart

H. A. Stewart
Acting Director

NATIONAL PETROLEUM COUNCIL

SURVEY OF OIL COUNTRY TUBULAR GOODS

CASING AND TUBING QUESTIONNAIRE—4th QUARTER 1951

FIRST—Show in columns 1-4 the total casing and tubing by sizes you actually used in all wells (including dry and injection) completed during the fourth quarter of 1951. Do not include drill pipe which is being covered by a separate study. If you used line pipe for casing, include under the comparable casing size.

SECOND—Show in columns 5-8 the total casing and tubing that you would have used in the same wells under good engineering practices if you had been able to obtain the sizes and weights of pipe you desired. For example, if you had to use 17 lb. 5½" casing instead of 14 lb., show reduced tonnage but same footage.

CASING (Outside Dia.)	Actually Used—4th Quarter 1951				Would Have Used in Same Wells if Available			
	Footage		Tons		Footage		Tons	
	New Pipe* (1)	Second-hand & Re-run (2)	New Pipe* (3)	Second-hand & Re-run (4)	New Pipe* (5)	Second-hand & Re-run (6)	New Pipe* (7)	Second-hand & Re-run (8)
4½"								
5"								
5½"								
6"								
6⅝"								
7"								
7⅝"								
8⅝"								
9⅝"								
10¾"								
11¾"								
13⅜"								
16"								
20"								
Total								

TUBING (Nominal Size)	TUBING (Outside Dia.)							
1¼"	1.660"							
1½"	1.900"							
2"	2⅜"							
2½"	2⅞"							
3"	3½"							
3½"	4"							
4"	4½"							
TOTAL								

* Including Conversion and Foreign.

THIRD—For the above pipe, show below the total number of wells completed and total footage drilled in each state during the 4th quarter of 1951.

STATE (For Texas, show by R.R. District; for Louisiana by North or South)	Number of Wells Completed (Incl. Dry & Injection)	Total Footage Drilled (Incl. Dry & Injection)
Total		

FOURTH—Mail to the National Petroleum Council, 1625 K Street, N.W., Washington 6, D. C., by April 22, 1952.

*Submitted by*_____
(Company)

_____

_____
(Address)

*(Date)*_____ *(Signed)*_____