

## THE STRATEGIC MINING OF JAPAN - ANNEX D

## Summary Of Transport Capacities

## Under Blockade

The following is a summary of the composition of the various transport capacities under blockade which are referred to in the text of the main paper as the basis for arriving at appraisal of probable economic traffic under blockade. The summary may also be a convenient reference for the relative importance of various facilities which will still be available under full scale blockade.

1. Imports.

Open Port List	Open Port Capacities	Rail Clearance Capacities	Net Port Capacity
Aomori	1.74*-1.92	1.76-3.85	1.74-1.92
Funakawa	.62- .80		
Sakata	.18- .18		
Tsuchizaki			
Total	<u>.80</u> <u>.98</u>	1.26-1.46	.80- .98
Fushiki	2.85 -3.59		
Higashi-Iwase	.80 -1.09		
Total	<u>3.65</u> <u>4.68</u>	2.98-3.28	2.98-3.28
Kagoshima	2.04 -2.04	2.00-2.00	2.00-2.00
		Total	<u>7.52-8.18</u>

2. Inter-island Movements.

## Hokkaido to Honshu

Hakodate-Aomori Rail Ferries	2.1	2.1
Movement in small coasters to Funakawa Tsuzizaki and Sakata up to the capacity of the U-etsu line	.28	.66
Coal shipments to Kamaishi for local use	.25	.375

\*All figures in millions of metric tons.

Movement to Kamaishi, Ofunato, Miyako and Hachinohe for shipment south over, Tohoku line	0	2.0
Possible allocation of an additional 20,000 g.r.t. of small vessels to move coal to Niigata or Shiogama **	<u>.6</u>	<u>.6</u>
Total	3.83	5.95
Kyushu To Honshu		
Kammon Tunnel	15.8	21.2
Small vessels, barges and sailing craft on the Inland Sea--an indeterminate amount but certainly not less than could be carried by a total 200,000 g.r.t. of such craft*	<u>4.0</u>	<u>5.6</u>
Total	19.8	26.8

10 February 1945

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\*These figures might very possibly be doubled.

\*\*It would be surprising if the enemy under stress of blockade did not at least match the allocation he has already made to the Shiogama run in order to maintain this important traffic.

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STRATEGIC MINING OF JAPAN - ANNEX E

Economic Potential Under Blockade

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Economic Potential Under Blockade

## I. CONCLUSIONS.

1. This annex discusses the distribution of commodity imports and the levels of industrial output possible in Japan proper under conditions of blockade\*. Two scales of blockade are considered:

Scale A. Full scale blockade imposed by land-based aircraft. This blockade will limit imports into Honshu and Kyushu from the continent to about 6.75 million tons\*\*. Inter-island shipments to Honshu will be limited to 4.6 million tons from Hokkaido and to 22.6-23.2 million tons from Kyushu.

Scale B. An extension of the full scale mine blockade to north Honshu ports supplemented by bombing of non-minable ports. Imports into Honshu and Kyushu will be further reduced at least to 3.5 million tons\*\*\* and inter-island shipments from Hokkaido to Honshu will be further reduced to 2.4-3.6 million tons\*\*.

2. In arriving at the levels of industrial output possible under these scales of blockade, the assumption is made that Japan makes the best of the situation, i.e., that goods are shipped in concentrated form and that production is localized with a view to minimizing the burden on available ports. Given this assumption, the conclusions in their most general terms are:

Scale A. Full scale blockade by land-based aircraft would cause steel production to fall to 4.5 million tons from its present 5 million ton level.

Otherwise, it would generally permit essential war production to continue at minimum required levels and would allow sufficient food imports to maintain a subsistence diet without drawing on reserves.

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\*Unless otherwise specified, all figures are in terms of millions of metric tons.  
 \*\*Two types of cargo movements are unaffected by these blockades:

1. Imports from the continent to Hokkaido lie outside the blockade.
2. Inter-island shipments from Honshu to both Hokkaido and Kyushu are in smaller volume than are those in the opposite directions and are, therefore, not limited.

\*\*\*At this level of port capacity, necessary outbound shipments would very possibly interfere with inbound shipments, reducing the volume of the latter to less than 3.5 million tons.

Scale B. Extension of the blockade to North Honshu ports would, within a matter of months, reduce steel output by 1/3 from its present level and since the need to conserve available supplies of equipment would, therefore, become extreme, would affect military plans at once. It would also lead to a serious reduction in reserves of industrial supplies and foodstuffs.

II. SUMMARY OF PATTERNS OF SHIPMENTS

3. The tabulations below summarize the probable patterns of commodity movements in the areas affected by the two scales of blockade considered. First, the import patterns may be compared:

	Imports: Continent to Honshu/Kyushu	
	Blockade Scale A	Blockade Scale B
Aluminum	.025	.025
Aluminous shale	.725	.725
Iron concentrates	.235	.0
Pig iron	2.540	1.340
Coking coal	.625	.560
Salt	.350	.250
Foodstuffs	2.000	.500
Miscellaneous	.250	.100
Totals	6.750	3.500

If the full scale blockade were extended to North Honshu ports, it is believed that Japan would maintain fully its imports for the aluminum industry, and so far as possible would maintain imports for the iron and steel industry. These ends could be accomplished only by cutting food imports to a level so low that reserves would have to be drawn upon and by cutting salt and miscellaneous shipments to extremely low levels\*

\*See footnote on following page.

4. Next, the Hokkaido-to-Honshu movements may be compared:

	Inter-island: Hokkaido to Honshu	
	Blockade Scale A	Blockade Scale B
Pig iron	.440	.440
Steel	.190	.190
Coal (range)	( 1.700 3.700	( .100 1.300
Foodstuffs	1.400	1.400
Miscellaneous	.270	.270
Total (range)	( 4.000 6.000	( 2.400 3.600

\*(Footnote for preceding page) While imports into Hokkaido from the continent would not be affected by blockade, minimum figures may be set forth:

	Imports: Continent to Hokkaido	
	Blockade Scale A	Blockade Scale B
Iron concentrates	1.100	.0
Coke	.250	.0
Pig iron	.0	.600
Coking coal	.225	.050
Salt	.100	.100
Foodstuffs	.100	.100
Miscellaneous	.050	.050
Totals	1.825	.900

Minimum imports into Japan proper would total about 8.6 million tons for blockade Scale A and 4.4 million tons for Blockade Scale B. These figures are of direct use in estimating the minimum gross tonnage of ships required under the two scales of blockade. It may be noted, however, that Japan might logically make shipments larger than the minimum to Hokkaido in order to accumulate stocks to move on to Honshu if the blockade should be relaxed.

It is believed that the impact of extension of blockade to North Honshu ports would be made to fall entirely on coal shipments. As pointed out above, extension of the blockade would render Japan's steel and food positions so tight that internal movements could not be sacrificed.

5. The pattern of shipments from Kyushu to Honshu would be about the same under the two scales of blockade:

	:	Inter-island: Kyushu to Honshu, Blockade Scales A and B
Steel	:	.800
Coal	:	17.300
Foodstuffs	:	.750
Miscellaneous	:	.450
Additional	:	
capacity for products	:	( 3.300
other than coal	:	( 3.900
Totals (range)	:	<u>(22.600</u> (23.200

It is believed that Kyushu could not spare more than 17.3 million tons of coal to fill the deficit on Honshu. This explains the existence of capacity to ship 3.3-3.9 million tons of goods above the minimum level. The remainder of this annex explains the shipping estimates just summarized and analyses the probable levels of industrial output in the industries affected.

### III. ECONOMIC POTENTIALS IN INDIVIDUAL INDUSTRIES.

6. Aluminum. Under blockade on Scale A Japan could meet fully its estimated minimum aluminum requirements. It is believed that Japan will require 200,000 tons of aluminum in 1945, of which aircraft will account for 162,000 tons. Total requirements in Japan proper are estimated at 170,000 tons and those on the continent at 30,000 tons. It is assumed that Japan must henceforth rely entirely upon aluminous shale. Aluminum capacity on the continent is estimated at 55,000 tons leaving an export surplus of 25,000 tons. Remaining requirements in Japan proper (145,000 tons) must be met by the importation of 725,000 tons of shale.

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It should be noted that if aluminum capacity on the continent increases, it will be possible to make a net saving of 4 tons of cargo for every additional ton of aluminum shipped. Given this possibility and the further consideration that incident to attack on the aircraft industry, aluminum requirements may decrease, it is plausible to believe that cargo requirements may, over a year, decrease by perhaps 20 per cent or 150,000 tons.

7. Aluminum requirements have such high priority that they would probably be fully met even under an extension of blockade to North Honshu ports. The following tabulation gives for reference possible aluminum supplies available in Japan proper appropriate to specified import tonnage allocations:

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Import allocation  
(m.t.)

Aluminum available  
Japan proper (m.t.)

750,000

170,000

500,000

120,000

250,000

70,000

8. Steel. Present production of intermediate steel in the Japanese empire is believed to be at the annual rate of about 5 million tons and to be used entirely in channels closely related to the maintenance of fighting strength. Under blockade/<sup>on Scale A</sup>production at the rate of 4.5 million tons could be maintained if the following organization of the industry were adopted:

- (a) Steel production on the continent would be held to 380,000 tons. On the one hand this is about the top limit of high priority steel which can be manufactured on the continent and is probably slightly above recent rates of output. On the other hand, limiting production to 380,000 tons would free a maximum of pig iron for shipment to Japan.
- (b) Steel production in Japan proper would total 4.12 million tons\*, 230,000 tons in Hokkaido, 3.42 million tons in Honshu, and 1.44 million tons in Kyushu.
- (c) The practical limit of pig iron production on the continent is 2.96 million tons; the 2.54 million tons not used locally to produce steel is assumed to be sent to Japan. Since Hokkaido produces more pig iron than it can process, this imported pig iron would logically go to Honshu or Kyushu. Analysis shows that the final burdens upon shipping are about equal whether the pig iron is processed on Honshu or Kyushu. Since most of

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\*A small part of this steel might be shipped to the continent, but would not be a burden on shipping capacity.

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the shipments would have to enter Japan via North Honshu ports, 1.7 million tons out of the total of 2.54 million tons is allocated to Honshu.

- (d) It is believed that under blockade conditions Japan might produce 3.75 million tons of iron ore and pyrites yielding 1.5 million tons of contained Fe. The Hokkaido ore, 250,000 tons, would be smelted locally, using primarily local coal. The remaining 3.5 million tons would be produced in Honshu and Shikoku. Of this one-half might logically be sent to Kyushu for smelting. Whether Honshu/Shikoku ore is processed in Honshu or Kyushu, coking coal must come in via North Honshu ports. If it is processed on Kyushu, steel must move to Honshu; if on Honshu, non-coking, as well as coking coal must be imported. Statistically, processing in Kyushu places the smaller burden on ocean shipping. As against this it should be noted that the only large, well developed iron ore deposit is at Kamaishi in North Honshu, and that rail shipments virtually the length of Honshu or even combined rail and Inland Sea barge shipments would be very burdensome.
- (e) Imported pig iron and local ore would account for about 3.52 million tons of steel. For the remaining 600,000 tons Japan would have to import 1.34 million tons of concentrates. These concentrates should obviously be allocated primarily (1.1 million tons) to Hokkaido since its ports would remain open, and only secondarily to Kyushu. In both cases local coal (for coke) is used for smelting. Smelting on Kyushu, however, would mean that both the concentrates and coking coal would utilize limited port capacity.

- (f) In Hokkaido the local ore and imported concentrates would yield about 690,000 tons of pig iron. Of this amount 250,000 tons would operate the steel mills at capacity, and 440,000 tons would be sent to Honshu. Of about 230,000 tons of steel produced, perhaps 190,000 tons would be sent to Honshu, the remainder being used locally\*.
- (g) In Kyushu the ore from Honshu/Shikoku and the imported pig iron and concentrates would yield about 1.44 million tons of steel. Of this it is assumed 640,000 would be used locally and 800,000 sent to Honshu\*.
- (h) In Honshu, the local ore and imported and Hokkaido pig iron would yield 2.45 million tons of steel. This, together with Hokkaido and Kyushu steel, would make a total of 3.42 million tons available of which a small part would be exported.

on scale A

9. While under blockade Japan could continue steel production at or near its present rate, allocations of steel to individual industries would be expected to change sharply. Specifically, the allocation for shipbuilding would be expected to drop, say from 1.2 million tons to 600,000 tons. Since blockade would reduce many merchant ships to idleness, a heavy building program presumably would not be maintained. The steel released from shipbuilding could be added to present allocations for ammunition and ordnance, which are far lower than are needed to offset prospective wastage.

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\*The point of final consumption of intermediate steel cannot be estimated directly from available data. It is believed to be reasonable to assign 1% or 40,000 tons to Hokkaido, 82% or 3.12 million tons to Honshu, and 17% or 640,000 tons to Kyushu. The consequences of error in this allocation, however, are slight. The Hokkaido shipments must, in any case, be very small. As indicated in paragraph 1, there is enough slack in the Kyushu to Honshu capacity to take care of steel shipments larger than those allowed for.

10. The effect upon steel production of three measures supplemental to the proposed full scale blockade may be noted:

- A. Extension of the blockade to North Honshu ports with the result that available import capacity is halved. (Blockade on Scale B).
- B. Destruction of 60% of the pig iron capacity on the continent.
- C. A combination of A and B.

The results are tabulated below:\*

	: Annual rate of intermediate : steel production in Japa- : nese Empire.	: Reduction in annual : rate of intermediate : steel production : under given supple- : mental measure.	
			: Mil. m.t. : Percent
Full scale blockade	: 4.50	: :	: :
Supplement A	: 3.28	: 1.22	: 27.0
Supplement B	: 3.56	: 0.94	: 20.9
Supplement C	: 2.99	: 1.51	: 33.7

The final effects of these supplemental measures would emerge only after perhaps six months. In all cases the reduction would be cushioned by the availability of excess scrap no longer needed to circulate within the system. Destruction of part of the mainland pig-making capacity would leave pig iron previously made in the pipeline. Offsetting this factor would be the fact that some time would be required to organize increased shipments of ore and to prepare to handle this ore in Japan proper. Extension of the blockade would leave supplies previously shipped available to be turned into steel. Other similar considerations could be adduced. Two general conclusions may be drawn:

\*These results were calculated on the same assumptions as those in paragraph 8.

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- (a) An extension of the blockade to North Honshu ports would cause a larger reduction in steel production than would destruction of 60% of pig making capacity on the continent. The deficit, finally reaching 27%, would fall almost entirely on direct military items.
- (b) The additional effect of destruction of 60% of the continent pig making capacity (given an extension of the blockade to North Honshu ports) would be relatively small in proportion to the scale of the attack which would be involved. The deficit would increase by 290,000 tons or by 6.7 per cent.

11. Coal. Japan's coal position under blockade can be suggested only very tentatively. In order not to complicate the analysis unduly, the text which follows is built upon what are believed, on balance, to be the most reasonable assumptions available. The general conclusions thus reached are:

- (a) Japan proper can, if necessary, meet essential coal requirements at a steel production level of 4.5 million tons without importations, except for about 900,000 tons of coking coal. This amount of coking coal, essential to the iron and steel industry, would surely be provided for in allocating the limited receiving capacity available under blockade.
- (b) Given the correctness of current estimates of domestic production, coal shortage would occur only in Honshu. Even there the shortage would probably not limit the production of high priority military and civilian products.

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There is, however, some ground for believing that the effect of blockade would be more severe than the text indicates. The argument for this view is stated below\*.

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\*Current intelligence indicates that Japan is now importing coal at the rate of at least 2.3 million tons per year. The question arises how this fact can be reconciled with the position taken in this annex that Japan requires no imported coal, except coking coal, and could in fact manage with as little as 46.5 million tons. Three possible explanations of imports at the 2.3 million ton level are indicated:

- (a) That Japan is stockpiling coal, particularly coking coal, in anticipation of further attrition of shipping. While no specific investigation of this possibility has been made, general analysis of current intelligence has in no instance indicated that this stockpiling is taking place on a significant scale.
- (b) That production of coal in Japan may be lower than 52 million tons. This is a real possibility. While FEA has credited Japan with 54 million tons output, there is a good deal of intelligence which indicates that production has recently been declining in Japan. Pre-war production touched 50 million tons in 1938. Desperate efforts made thereafter yielded small results. There is far more reason to believe that production may now be below 52 million tons than to believe that it is above this figure. It is certain, however, that the pressure to exploit home resources would be greater under blockade. The bottleneck of limited port capacity would be greater than is the present bottleneck imposed by a shortage of bottoms. It is, therefore, logical to maintain that under blockade production might reach 52 million tons while it is now at a lower figure, imports accounting for the difference.
- (c) That current requirements are such that 2.3 million tons of imported coal are required, or a total of, say, 53-55 million tons, and that further, because of the need to conserve shipping, these requirements are at or near the minimum. These figures must be compared with the estimate of 46.5 million tons (including coking coal) used in this annex. The term "minimum requirements" is, of course, highly elastic in the case of a product such as coal. Japan requires more than the 4.5 million tons of steel which would be possible under mine blockade from present fixed bases. Coal consumption by the iron and steel industry is now probably 1.25 million tons greater than that allowed for in this annex. Bunker coal requirements, at present limited by the tonnage of ships available, are greater than they would be under blockade, more tightly limited by the capacity of ports to which ships could bring cargo. Other similar specific instances, accounting in part for the difference in the figures, could be cited. Some part, however, can only be explained in terms of the fact that in the area of coal consumption related indirectly to immediate military strength some further contraction is possible even if the initial level assumed is restricted.

To take the more pessimistic possibility from Japan's point of view it may be argued that minimum requirements under blockade would aggregate about 52 million tons (present requirements being treated (cont'd on following page)

appropriate to blockade on Scale A

12. The most probable general statistical picture is summarized in the tabulation which follows:

	<u>Hokkaido</u>	<u>Honshu</u>	<u>Kyushu</u>	<u>Total</u>
1. Local production	15.0	7.0	30.0	52.0
2. Coking coal imports	<u>.2</u>	<u>.3</u>	<u>.4</u>	<u>.9</u>
3. Total supply	15.2	7.3	30.4	52.9
4. Minimum requirements	<u>4.4</u>	29.0	<u>13.1</u>	<u>46.5</u>
5. Surplus	10.8	—	17.3	6.4
6. Deficit		21.7		

Shipments to Honshu to Meet Minimum Requirements

7. Pro Rata between Hokkaido and Kyushu	8.35		13.35	21.7
8. Maximum Hokkaido Minimum Kyushu	10.8		10.9	21.7
9. Maximum Kyushu Minimum Hokkaido	4.4		17.3	21.7
10. Capacity Available For Coal	1.7- 3.7		20.6-21.2	22.3-24.9

The implications of the term "Minimum Requirements" are discussed below with reference to individual industries. Lines 5 and 6 show that the coal surpluses on Hokkaido and Kyushu are more than large enough to fill the 21.7 million tons deficit on Honshu. Lines 7 to 9 show ranges within which coastal shipments to Honshu might lie from the point of view of availability of coal. Line 10, compared with line 9, shows that available port capacity for coal in North and South Honshu respectively is such that the coal shipments from

(footnote cont'd)

as a minimum on the basis of the prima facie evidence that scarce shipping is being used to import 23 million tons of coal, and being written down by the amount of accountable cases in which coal consumption would be less under blockade than it is at present because of shortages of other supplies such as iron ore). In this case, while Japan as a whole would have sufficient coal, there would be a deficit of around 7 million tons on Honshu and Kyushu together, since all of the surplus in Hokkaido could not be shipped. The deficit on Honshu alone might then be about 5 million tons.

under blockade on Scale A, Hokkaido would be minimized. The coal deficit on Honshu, would run from 700,000 tons to 2.7 million tons, or from 2.4 to 9.3 percent.

13. The tabulation which follows gives tentative estimates of minimum coal requirements by industry in the three principal islands of Japan proper. These figures will be explained in the paragraphs below:

	<u>Hokkaido</u>	<u>Honshu</u>	<u>Kyushu</u>	<u>Total</u>
Heavy Industry	1.000	3.100	2.600	6.700
Electric power	.100	3.700	5.600	9.400
Synthetic oil	1.800	2.000	.700	4.500
Bunker	.400	.300	.800	1.500
Totals	<u>3.300</u>	<u>9.100</u>	<u>9.700</u>	<u>22.100</u>
Chemical				7.000
Railways				7.000
Textiles				1.000
Cement				2.900
Gas				1.300
Food				2.000
Other				3.200
Totals	<u>1.100</u>	<u>19.900</u>	<u>3.400</u>	<u>24.400</u>
Grand Totals	<u>4.400</u>	<u>29.000</u>	<u>13.100</u>	<u>46.500</u>

14. In justifying the estimates of minimum requirements tabulated above, reference will be made to "1935-38 consumption" and to COA estimates for 1943". The former are based upon official Japanese statistics. The latter were developed by the COA Sub-committee on Far Eastern Coke and Coal Industries. They reflect the high levels of industrial activity which were believed to prevail in 1943 and since they allow for 16 million tons of coal imports (out of a total of 68 million tons required) implicitly assume no shortage of shipping.

15. In the Heavy Industry category the coal requirements for iron and steel production are derived directly from the estimates discussed above in paragraph 4. The totals allocated to pig iron production include allowance for coking coal to be imported from the continent or Karafuto in the amount of 200,000 tons for Hokkaido, 300,000 tons for Honshu, and 400,000 tons for Kyushu. The remaining industries in this category include shipbuilding and non-ferrous



metals. The COA allotted 21 percent of the total coal for Heavy Industry to these industries. In this report the allotment is 27% of the total for Heavy Industry. It is believed that coal allocations for Heavy Industry would be maintained at the level of 3.1 million tons in Honshu even if the maximum total deficit of 2.7 million tons developed\*.

16. Under blockade sufficient local coal would be available to allocate 9.4 million tons to the electric power industry. Total output would then approximate 47.7 billion KWH. On the island of Honshu 3.0 to 3.5 million tons of coal would be available and total output would then range from 33.9 to 34.5 billion KWH. It can be stated with confidence that these levels cover, and possibly considerably more than cover, minimum requirements.

17. This conclusion is supported by comparison with estimates of generation developed by FEA. These estimates show that if estimated present capacity were used at customary prewar rates, total output in Japan would total 53.4 billion KWH and in Honshu would total 38.0 billion KWH. The output which blockade/would permit is only 10.6 percent lower than the FEA level for Japan as a whole and 9.2-10.1 percent lower for Honshu alone. The FEA levels include at least this much cushion and possibly more. Individual estimates of the power requirements of most of the leading power consuming industries fall considerably short of adding up to the 53.4 billion KWH total even though these industries in a number of cases (notably iron and steel) were assumed to be operating at much higher rates than they are known to be at the present time.

13. While the analysis above goes only so far as to state that under blockade minimum power requirements could be filled, there is considerable ground for believing that blockade/would leave the present situation substantially unchanged. The fact that production in some of the leading power

\*Or of 5 million tons, as suggested in the footnote to paragraph 7.

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consuming industries has declined supports this view. So also does the fact that if Japan is now consuming a total of only 53-55 million tons of coal it would hardly be logical to allocate much more to the power industry than blockade/would allow. This hypothesis suggests the conclusion that the anti-<sup>on Scale A</sup>shipping campaign has, insofar as coal imports are concerned, already had substantially its full possible effect upon power production. It suggests, further, that direct attack upon steam power plants would have to cut through substantial capacity unused because of a shortage of coal, and that the importance of hydro plants has been correspondingly raised.

19. Coal requirements for synthetic oil are derived from current E.O.C. estimates of present production in Japan proper. On the assumption that owing to loss of access to N.E.I resources, Japan needs badly all oil that can be produced in the Empire, these requirements are treated as a minimum. While the size of available stocks is uncertain, they are believed to be large as compared to current output. The following generalizations may, therefore, be made:

- (a) Synthetic oil production would be affected by blockade, if at all, only on Honshu.
- (b) The total effect of a shortage of coal for synthetics on Honshu would be small and slow to emerge because of the cushion of stocks.
- (c) Extension of the blockade would not affect this situation appreciably.

20. Bunker coal requirements can be suggested only very tentatively. The 1935-38 consumption averaged 4.5 million tons and the COA estimate for 1943 was 4.0 million tons. The 1.5 million ton figure in paragraph 9 is an order of

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magnitude reflecting the great reduction in the size of the Japanese merchant fleet and the reduction in the length of voyages. This latter increases the possibility of doing all bunkering in coal surplus areas. Bunker requirements on Honshu would be nominal and would not be affected by blockade.

21. With respect to the remaining industrial requirements given in paragraph 3 it is possible only to judge what present minimum requirements may be by using 1935-38 consumption and the COA estimates for 1943 as starting points. These comparisons are as follows:

	1938	1935-38	COA estimate for 1943	Minimum requirements
Chemical	7.3 <u>a/</u>	5.9 <u>a/</u>	14.0 <u>b/</u>	7.0 <u>a/</u>
Railways	4.5	4.2	7.5	7.0
Textiles	4.3	3.9	3.4	1.0
Cement	4.2	3.9	4.0	2.9
Gas	2.4	2.3	1.7	1.3
Food	2.4	2.2	2.4	2.0
Other	5.7	6.0	6.0	3.2
Total	30.8	28.4	29.0	24.4

a/ Includes synthetic gasoline.

b/ Does not include synthetic gasoline.

The COA figures for Chemicals are not comparable with the other figures since they include an undetermined allowance for synthetic gasoline. The minimum allowance is below the 1938 level but 1 million tons above the 1935-38 average. The Railway allowance is held at 7.0 million tons since the burden of essential traffic under blockade would be great. The requirements of the Textile industry must be much lower than they were before the war owing to loss of fiber supplies. Food processing is believed to have declined in Japan, but may be considered essential. The Cement, Gas, and Other categories

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cover a large fraction of uses more or less remotely related to immediate military strength. Collectively their minimum is set at 62-65% of the three comparative levels.

22. No direct basis for apportioning these requirements to the individual islands is available. The breakdown used is 4.5 per cent to Hokkaido, 81.5 per cent to Honshu and Shikoku, and 14 per cent to Kyushu. The most significant figure is that these requirements aggregate 19.9 million tons on Honshu.

23. It is not possible to specify upon which of these industries (and electric power) the burden would fall if a deficit of 2.7 million tons, at the maximum under blockade on Scale A developed on Honshu. The collective deficit would be in the order of 11% below requirements\*. Extension of the blockade to North Honshu ports would reduce coal shipments into Honshu by 1.6 to 2.4 million tons, but since requirements would probably fall by an equal amount, the deficit would not be increased.

24. Salt. Under blockade on Scale A it would be possible for Japan to maintain minimum supplies of salt. OSS estimates that consumption in 1944 amounted to 1.6 million tons and could be held to a minimum of 1.1 million tons. Of this latter amount food uses would account for 300,000 tons, and <sup>and</sup> caustic soda/other industrial uses for 400,000 tons each. Knowing that a high percentage of estimated production in Japan proper, totalling about 650,000 tons, is localized in southwest Honshu, the general pattern of controlling waterborne movement under blockade can be derived:

(a) Total imports would aggregate 450,000 tons.

(b) Hokkaido should logically import its requirements, say 100,000

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\*If the initial deficit reached 5 million tons, as discussed in the footnote to paragraph 11, these industries would bear a 21% deficit.

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tons from overseas, since there is no limitation on its normal port capacity.

- (c) The Honshu/Kyushu/Shikoku deficit of 350,000 tons would be a charge against port capacity remaining after mining.

25. The uses of a substantial portion of total salt supplies have only an indirect relation to maintenance of fighting strength. Given an extension of the blockade to North Honshu ports, shipments through North Honshu would be reduced at least by 100,000 tons or to a total of 250,000 tons.

26. Foods. Under blockade on scale A Japan would still be able to import sufficient food supplies to maintain a subsistence diet without drawing upon stocks. The assumption is made, of course, that average crop conditions prevail in Japan proper and that these provide about 45 billion calories per year. The 5 billion calorie deficit would be met by importing about 2.1 million tons of foodstuffs of which perhaps 1.9 million tons would come in through North Honshu ports. The principal commodities would be rice and soybeans. Smaller tonnages of wheat and soybean oil might be included. Large internal movements of food products to Honshu from Hokkaido are required and smaller movements from Kyushu. The Hokkaido shipments would be expected to aggregate 1.4 million tons and to consist, in rough proportions, of 700,000 tons of potatoes, 400,000 tons of fish, and 300,000 tons of miscellaneous products. The Kyushu shipments might reach 750,000 tons, consisting mainly of sweet potatoes and fish moving to the heavy deficit areas of South Honshu.

27. The size of Japan's food reserves is very uncertain. COA assumed it to equal 10 billion calories. This reserve would permit Japan to reduce imports to 500,000 tons and still maintain consumption at subsistence levels for more than a year if the blockade were extended to North Honshu ports. No reduction in internal movements, however, would be possible.

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28. Miscellaneous. Allowance is made for 300,000 tons of miscellaneous imports under blockade on Scale A. Of this amount 250,000 tons would have to enter Honshu or Kyushu. Wood pulp, fibers, non ferrous and ferro alloy metals, and possibly fertilizer would account for most of these totals. Miscellaneous coastwise shipments to Honshu might total 270,000 tons from Hokkaido (consisting principally of wood pulp and lumber) and 450,000 tons from Kyushu (consisting principally of finished and semi-finished goods). Given an extension of blockade, miscellaneous imports through North Honshu ports would be expected to fall to very low levels—say 100,000 tons. The coastwise shipments from Hokkaido, however, would, by this fact become even more essential and could not be reduced.

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**THE STRATEGIC MINING OF JAPAN - ANNEX F**

**The Export of Military Supplies**

**Annex F**

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THE STRATEGIC MINING OF JAPAN - ANNEX F

THE EXPORT OF MILITARY SUPPLIES

The volume of military supplies shipped from Japan to the northern military areas on the continent during the spring of 1944 is here made the basis of two estimates. One is of the present volume of military supplies shipped to all inner zone theatres. The other estimate is a schedule of the different volumes of military supplies which would be shipped from Japan proper\* in the event that the Japanese were forced to maintain various numbers of troops in active battle status on the continent.

The captured Japanese Staff Logistics Manual\*\* shows the minimum rate of routine supply for troops to be 0.1 cubic meters per person per month, of which as much as 70% may be provisions and forage. The military supplies that moved from Japan to Korea, Manchuria, North China and Central China during the first half of 1944, when related to the averages of the forces indicated in the Weekly Japanese Order of Battle Bulletins, "DGS MID, for that period, correspond quite closely to the 0.1 figure if 70% of requirements represented provisions and forage obtained locally. Military supply movements from Japan to Korea, Manchuria, North China and Central China during several representative months in 1944 are reliably indicated to have been at the following average rates per 1000 men per day for the respective areas; 1.03, 1.18, 1.05, and 1.00 cubic meters per day.

The estimate of 4,507 cubic meters per day of military supplies shipped from Japan proper to inner zone areas as of 10 January 1945 is based on the assumption that the troops in the same four continental areas on 10 January 1945 were being supplied from Japan at the same rate as the first half of 1944.

\*Discounting the possibility of securing any substantial quantity of ordnance supplies on the mainland.

\*\*CINCPAC-CINCPAC, Special Translation #1 (Confidential), p. 28.

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It is also assumed that the rates for the men in the Ryukyus, Formosa and Bonins were similar to those for the continental areas except that for the Bonins a lower degree of self-sufficiency as to food is assured. The rate of supply for the Kuriles as based on the statement in Japanese Staff Logistics Manual that 1.0 cubic meter per man per month must be provided in the northeast areas. On the latter islands very little fodder will be needed and some provisions (fish) will be locally available. The minimum deduction of 50 per cent for provision and fodder is, therefore, taken for this area. The estimated rate for Karafuto is similarly computed except that use is made of the basic rate of 0.5 cubic meters per man per month which is the maximum rate of ordinary field supply according to the Manual. The resulting estimated rates are 16.67 cubic meters per 1,000 men per day to the Kuriles and 8.33 to Karafuto.

For the purpose of estimating the rate at which military supplies may be shipped from Japan as of any particular date in the not too distant future, several

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assumptions are made. One is that those areas now in a comparatively tenuous military position, namely the Kuriles, Bonins, Ryukyus, and Formose, will have been taken or interdicted by Allied operations and it will no longer be necessary or possible to supply them from Japan. It is further assumed that the size, function and degree of activity of the forces in the remaining areas will be substantially unchanged. From the estimate as of 10 January 1945 and the foregoing assumptions it follows that the flow of supplies from Japan for the occupation forces would continue at about the rate of 2637 cubic meters per day which is the estimated daily rate as of 10 January 1945 excluding the supplies to the tenuous inner zone areas.

For convenience in building up a table of possible expenditures, it has also been assumed that if any substantial Japanese force on the continent became engaged in a major campaign, such as the opposition to an American invasion of China or a Russian invasion of Manchuria, the number of troops engaged would represent a net increase in the number of troops on the continent. In other words, while the actual troops involved in the engagement may be from among the numbers now on the continent, the net number of troops remaining in occupation or reserve status would not be materially reduced but kept up to present strength by transfers from Japan proper. Shipments to maintain mainland troops in present status are comparatively small. This assumption, therefore, even if erroneous, introduces but a small overestimate into the computation. It seems unlikely that the number of garrison status troops would increase substantially. As the size of force which would be involved in battle action on the continent is so undeterminate, the final estimates of military supplies exported from Japan are given as a schedule of amounts for various assumed numbers of men in battle status.

Battle Status Requirements. The captured Staff Logistics Manual indicates the range of supply requirements for troops in ordinary field status ("routine supply") to be from 0.3 to 0.5 cubic meters per man per month. Of those supplies, it indicates that from 50 per cent to 70 per cent are provisions and forage. If the latter are locally obtained on the continent and the least deduction is applied to the highest rate and vice versa, the maximum range of requirements from Japan proper becomes 0.09 to 0.25 cubic meters per man per month or 3.0 to 8.3 cubic meters per 1,000 men per day for men in ordinary field status. Table 13 (pp. 26-27) of the Manual indicates that battle rates of replenishment for 13 major supply items are from 1 to 3 times the routine field rate. The unweighted average ratio of 1.87 does not reflect the expenditure of ground ammunition. The ratio between battle and routine ammunition expenditure rates is subject to a wide range of variation, but it would undoubtedly be greater than for any other category of military supplies and would constitute an important if not a major portion of the total of supplies required. If the average battle rate of replenishment for all supplies is taken as 3 times that of the routine field rate, lower and upper limits of the estimated battle rate of 9.0 and 25.0 cubic meters per 1,000 men per day result. The wide range between those limits provides adequately for and at the same time is justified by the wide range of possible variation in the rate of ammunition expenditure under active fighting conditions.

TABLE A	DAILY CUBIC VOLUME					
	10 JANUARY 1945			FUTURE DATE		
AREA	Order of Battle (1000 men)	Cubic Meters Per 1000 men per day	Cubic Meters Per Day	Order of Battle (1000 Men)	Cubic Meters Per 1000 men per day	Cubic Meters per day
<b>JAPAN PROPER:</b>						
Kyushu, Honshu and Shikoku	898					
Hokkaido	35					
<b>TENUOUS AREAS:</b>						
Kuriles	98	16.67	1634			
Ryukyus	93	1.00	93			
Bonins	29	1.67	49			
Formosa	94	1.00	94			
<b>QUIET AREAS IN:</b>						
Karafuto	14	8.33	783	14	8.33	783
Korea	127	1.03	131	127	1.03	131
Manchuria	668	1.18	788	668	1.18	788
North China	340	1.05	357	340	1.05	357
East China	124	1.00	124			
Central China	454	1.00	454	578	1.00	578
South China						
<b>TOTALS</b>			4507	1727		2637
<b>BATTLE AREAS:</b>						
Minimum					9.00	
Maximum					25.00	

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The basic derivation of the estimates in Table A are made in terms of cubic meters of supplies. As a measure of the port capacity, the estimated annual rates in cubic meters have been converted to show in Table B the rates in metric tons at which supplies must be moved annually through the ports. The cubic meter estimates are also converted to gross registered tons to show the rates at which shipping space must be provided annually and the amount of shipping required to provide it. All three derived estimates are computed from the commonly accepted working assumptions that one short ton of these military supplies occupies 80 cubic feet and that one gross registered ton of shipping capacity is required for each  $1\frac{1}{2}$  ship tons (or 60 cubic feet). The conversion factor for the weight of the supplies is, therefore, 2.5 cubic meters per metric ton and for total shipping space, 1.7 cubic meters per gross registered ton. The operable ship tonnage required is computed from the assumption of 15 trips per year per vessel\* (equivalent to an average turn around time of  $24\frac{1}{3}$  days).

Consistent with other estimates of port and shipping requirements, the estimates derived in Table B are expressed for convenience in comparison with other figures in the main paper as annual rates although it is realized that it is unlikely that any given number of men will operate under active battle conditions throughout an entire year.

The estimated annual rates of export of military supplies from Japan and the shipping requirements are shown as of 10 January 1945 and for various assumed orders of battle as of some date in the future are shown in Table B. The estimates for the future date are given as a schedule for values of the number of men in battle status varying from 0 to 1,000,000 in units of 200,000. The order of battle and degree of activity of the men not in battle status is assumed to be the same as on 10 January 1945. The estimates of supplies for the total of men

\*This figure squares with present performance and is also the Japanese Army allowance according to the Staff Logistics Manual.

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in battle status and in the 10 January status excludes supplies to the Kuriles, Bonins, Ryukyus and Formosa which are listed as tenuous areas in Table A. These areas are excluded on the assumption that they will have been taken or cut off by the Allies by the time that a major engagement develops on the continent. If these areas were not interdicted the estimates for the future date would all be increased by the amounts on the bottom line of Table B. Those amounts are the same as are used for those areas in the estimates for 10 January 1945. The estimates of supplies and shipping are given as minimum and maximum amounts, reflecting the respective limits of the rate of supply for the men in battle status.

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TABLE B

## ESTIMATED ANNUAL RATES OF EXPORT OF MILITARY SUPPLIES

DATE OF ESTIMATE	ORDER OF BATTLE (thousands of men)	AMOUNT OF SUPPLIES (thousands of metric tons)	SHIPPING SPACE (thousands of gross tons)	SHIP TONNAGE (thousands of gross tons)					
	No. and status as of 10 Jan	Add'l No. in Battle Status	Total	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
10 Jan 45		2041		658		968		65	
	:1727	0	1727	375	375	566	566	38	38
	:1727	200	1927	637	1105	952	1640	64	110
FUTURE	:1727	400	2127	901	1835	1339	2713	90	181
	:1727	600	2327	1163	2565	1725	3787	115	253
DATE	:1727	800	2527	1426	3295	2112	4860	141	324
	:1727	1000	2727	1689	4025	2498	5934	167	396

IF TENUOUS AREAS ARE NOT INTERDICTED, ADD THE FOLLOWING TO RESPECTIVE SCHEDULES:

314	0	314	293	293	402	402	27	27
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