

RELEVANCE TREES AND WEIGHTING MATRICES

A. INTRODUCTION

At the beginning of this assessment there was a general requirement for a detailed analysis of the purposes, policies, and issues of stockpiling. These may be put in the four categories of stockpiling policies, stockpiling procedures, stockpiling alternatives, and stockpiling impacts. The methodology chosen for analysis is the construction of relevance trees. These are described in more detail later in this discussion. Basically, the relevance trees serve as a detailed method for organizing the assessment. The relevance trees categorize policy, criteria, exogenous factors triggering stockpiling actions and issues and impacts pertaining thereto.

The relevance trees are particularly useful in the construction of the scenarios and technology forecast. By breaking the entire stockpiling subjects down into their constituent building blocks, the important areas may be recognized and then incorporated in the scenarios and technology forecasts. The effort of actually constructing the stockpiling relevance trees is a very educational one, requiring a forced education of the authors which directly leads to a better understanding and more constructive assessment in all of the later tasks.

The relevance trees are particularly useful in showing the construction of the stockpiling systems basic blocks which consist of: criteria for stockpiling, price of materials, policies, procedures, and materials. All of these areas are treated in great detail in the relevance trees.

In chapter V the impacts on the economic, social and political areas due to stockpiling critical material are examined and tested. The impacts and interest groups who are affected and their various relationships are shown in the relevance trees here. The interest groups are shown as Level 5 of the first three relevance trees. From the detailed relevance trees structure, the important interest groups may be selected for examination in the impact areas.

Finally, the relevance trees focus in great detail on stockpiling policies, procedures, issues, and activities, and serve as a guide for coordinating the candidate stockpiling policies and the impacts in order to determine the overall policy implementation for stockpiling key materials.

Hence, it is seen that the construction of the relevance trees in great detail facilitates doing the other tasks, outlining the entire project in detail, and shows

the general relationship of the policies, issues, and impact areas in the overall stockpiling policies project. The following is a more detailed discussion of the stockpiling relevance trees themselves and details the method of construction and organization of them. The top levels of the relevance tree for all of the key materials are presented here. However, only the lower levels for the specific key material of iron/iron ore is presented in this assessment. The relevance trees for the other metals and nonmetallic minerals will be essentially the same. For fibers and fuels, some of the lower levels in the relevance trees will be necessarily different.

The relevance trees show a hierarchical structure for stockpiling policies. Each of these relevance trees has several levels. Each level contains a disaggregation of the information contained in the next higher level. The logic linking the levels is revealed by a set of statements (displayed on the tree at the left) defining the content of each level.

For each material, four relevance trees are developed: (1) a stockpiling policy for dealing with reasons for stockpiling; (2) a stockpiling procedure tree concerned with methods of stockpiling; (3) a stockpiling activities tree identifying ancillary programs which may be associated with stockpiling; and (4) a stockpiling impacts tree which shows where and how the impacts of stockpiling will be felt. The lowest level of each tree identifies those interest groups which are most closely affected or which impact on stockpiling policies. The same groups may appear at several positions on level 5 of a given tree as well as on level 5 of the other trees. Where this occurs, it indicates the interplay of policies of the three trees.

B. RELEVANCE TREES

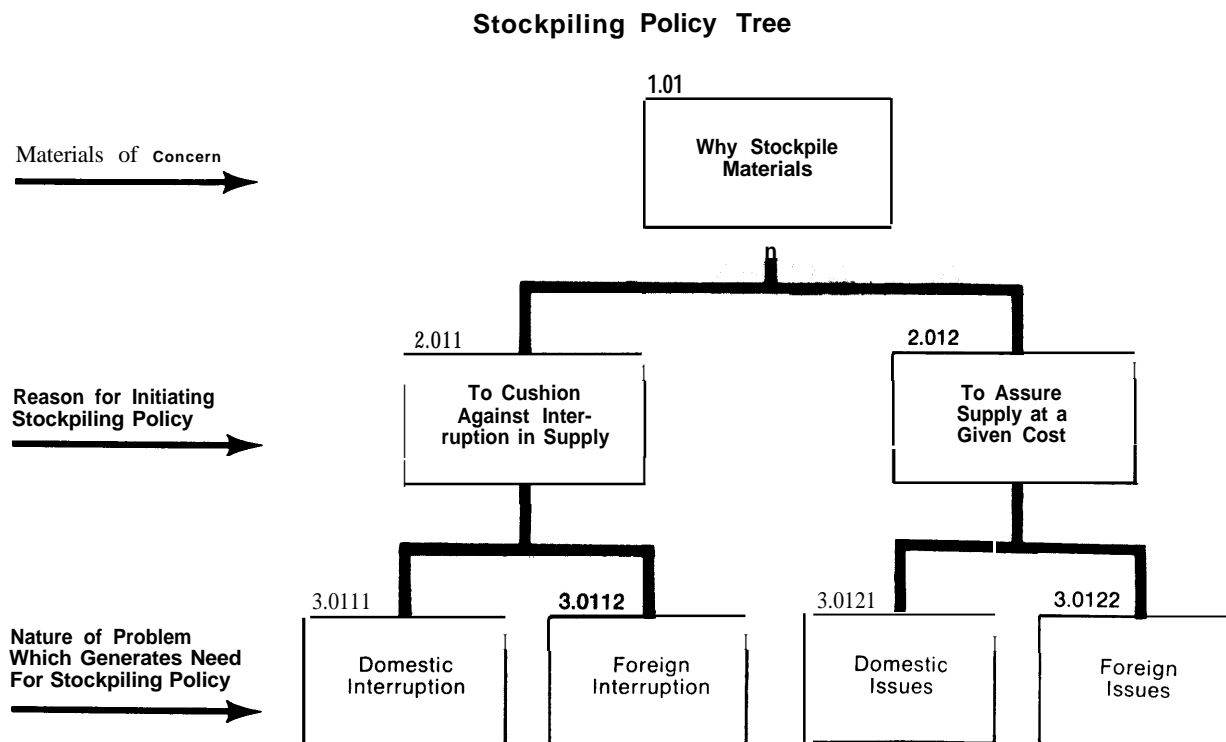
The logic of the individual relevance trees is outlined below:

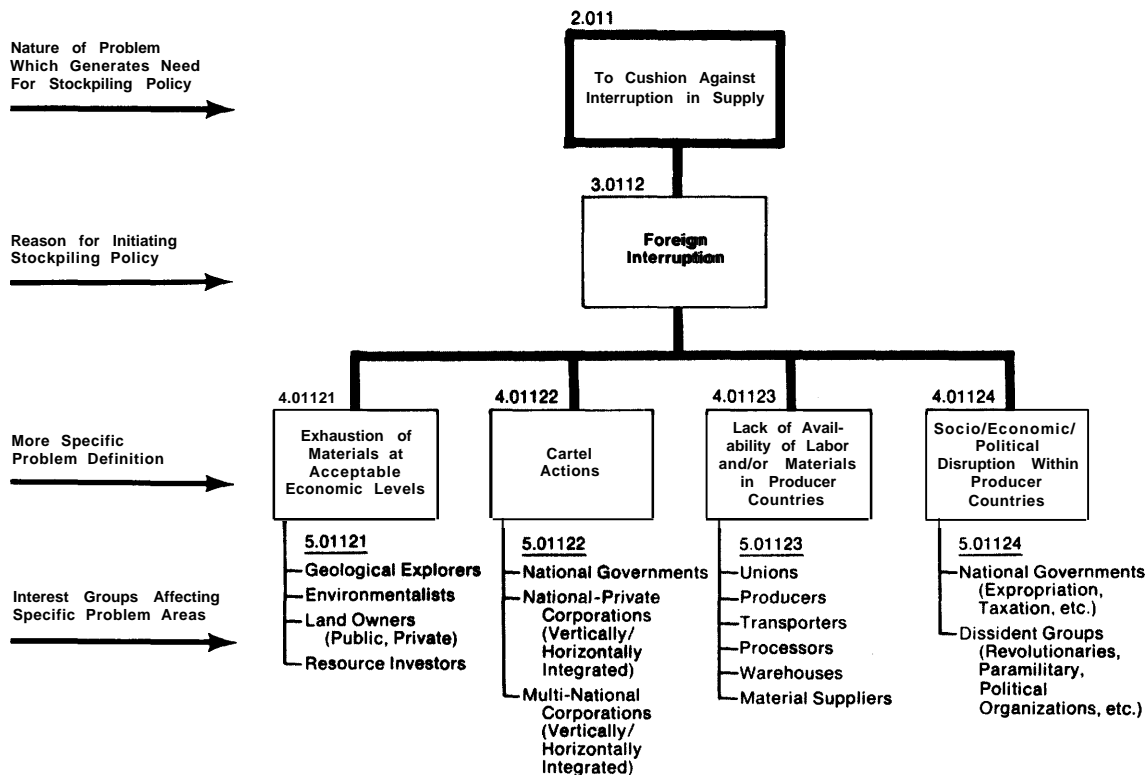
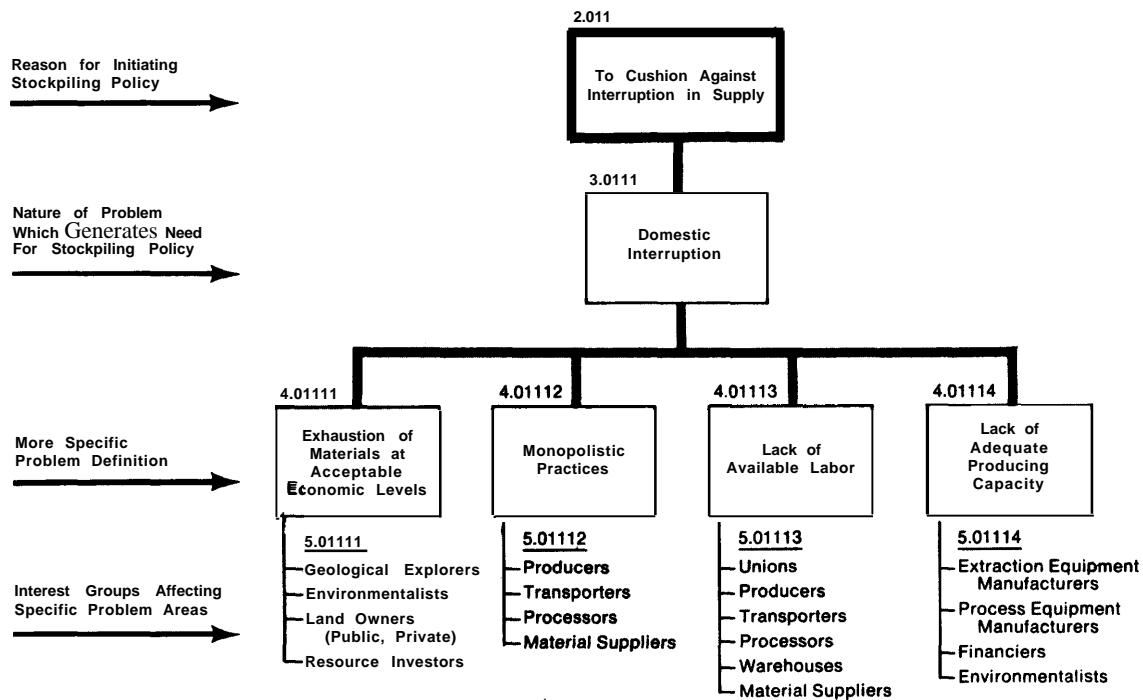
- The Stockpiling Policy Tree begins with the question, Why stockpile a particular material? (Level 1). Level 2 shows two general reasons for initiating stockpiling: to maintain a supply in case of cutoffs from primary sources, and to provide protection against economic pressures. Level 3 identifies the material resource problem areas as being domestic and foreign. The problems which may be alleviated by stockpiling are detailed on Level 4. The lowest level (Level 5) shows those interest groups which can be expected to impact on the specific problems.
- The Stockpiling Procedure Tree deals with the question, How can a particular material be stockpiled? (Level 1). Level 2 shows the two areas of concern: domestic and foreign. On Level 3, general methods of stockpiling are identified. Specific storage procedures are shown on Level 4. Level 5 (the lowest level) identifies the interest groups that may be affected by the stockpiling procedures.
- The Alternates to Stockpiling Tree derives from the question, What activities may stockpiling a particular material stimulate (Level 1)? The general policies which may be initiated as a result of stockpiling are given on

Level 2. Level 3 specifies the policies sufficiently so that programs derived from these policies can be identified on Level 4. The lowest level (Level 5) shows those interest groups which would be directly affected by these programs,

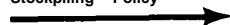
- The stockpiling impact tree begins, at Level 1, asking where, throughout the world, the impact might be felt. The major divisions recognized are: the United States, other countries which import the material, countries which export the material, countries which could export the material or substitutes, and countries which have secondary dependence on the material

(e.g., countries which import products manufactured from the material). At Level 2, the relevance tree centers on the question, "How might the impact be felt?" Here, the divisions are social, economic, political, legal, and other. The domain of the impact is next addressed at Level 3. The impacts can be felt totally internally to the country, or in relations between the country and others. Level 4 consists of a further subdivision of the domain, and Level 5 addresses the areas of the impacts themselves (e.g., institutional viability, political stability between nations, and trade alliances). In all, this relevance tree of impacts produced approximately 355 impact areas,





Reason for Initiating
Stockpiling Policy



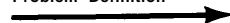
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To Assure Supply
at a Given Cost

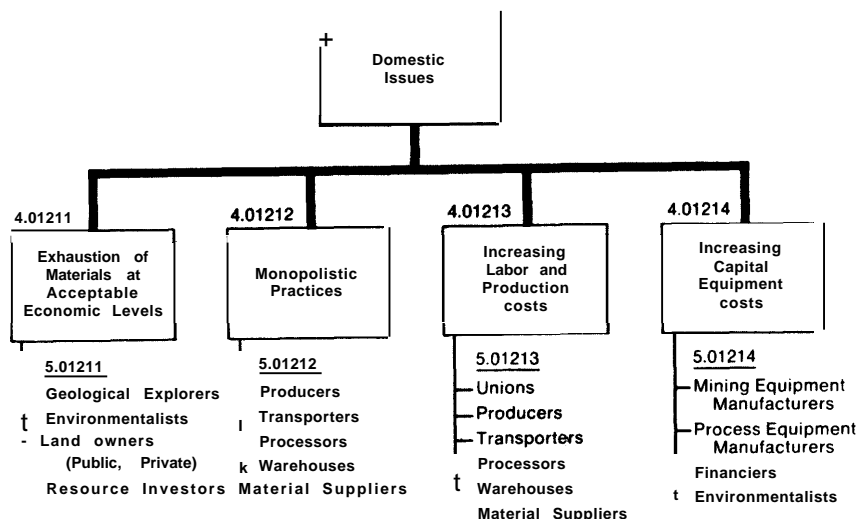
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Nature of Problem
Which Generates Need
For Stockpiling Policy

More Specific
Problem Definition



Interest Groups
Affecting Specific
Problem Areas



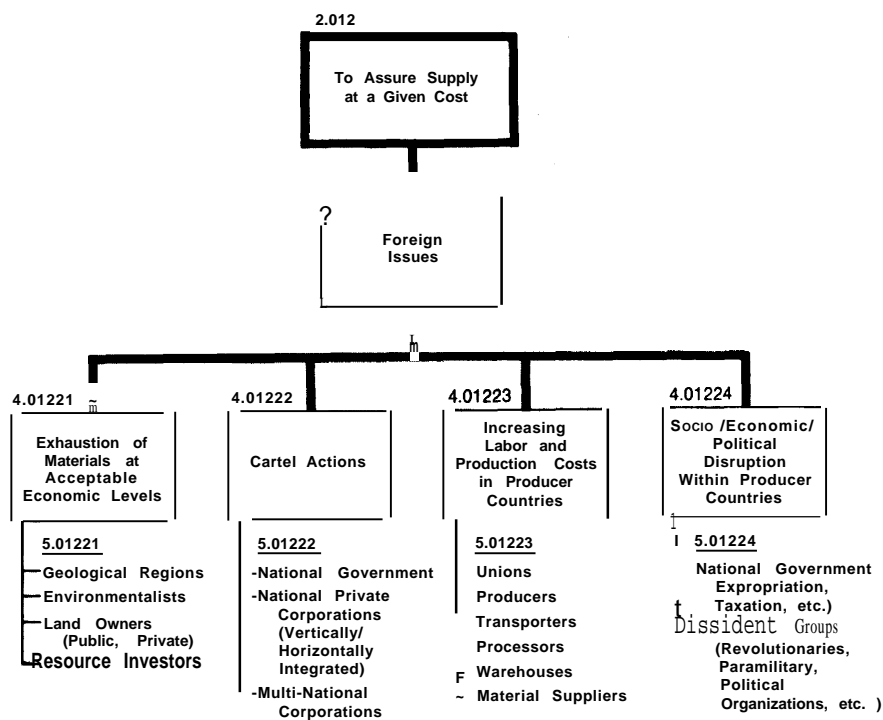
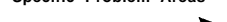
Reason for Initiating
Stockpiling Policy

Nature of Problem
Which Generates Need
For Stockpiling policy

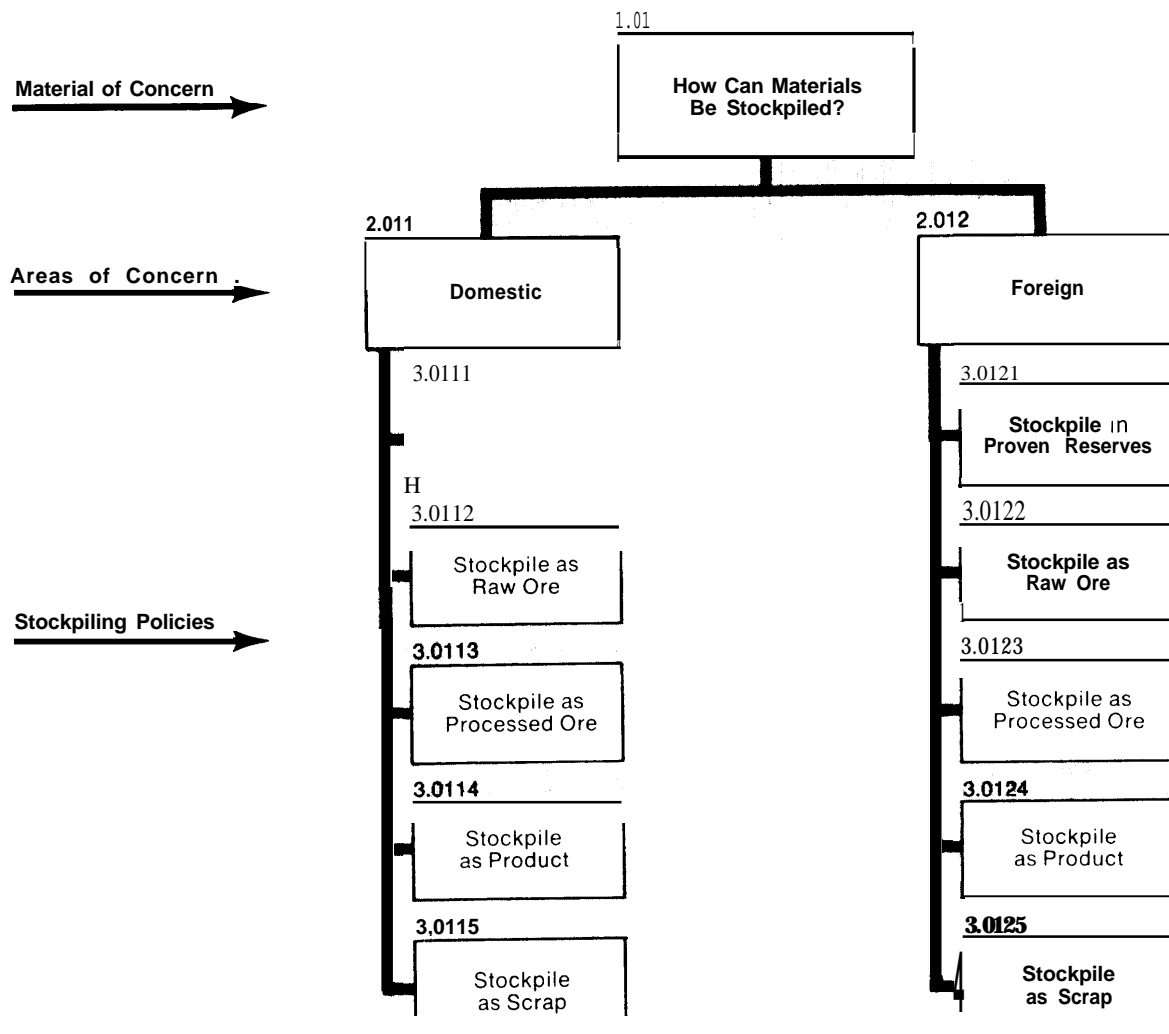
More Specific
Problem Definition

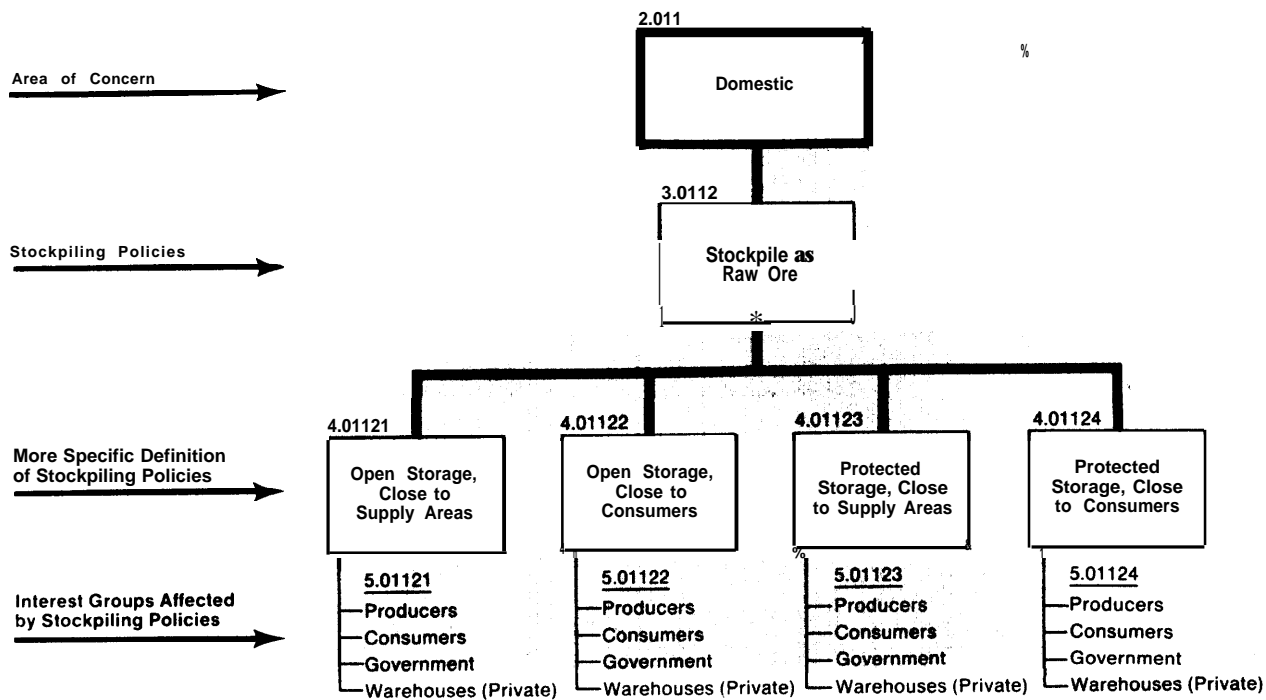
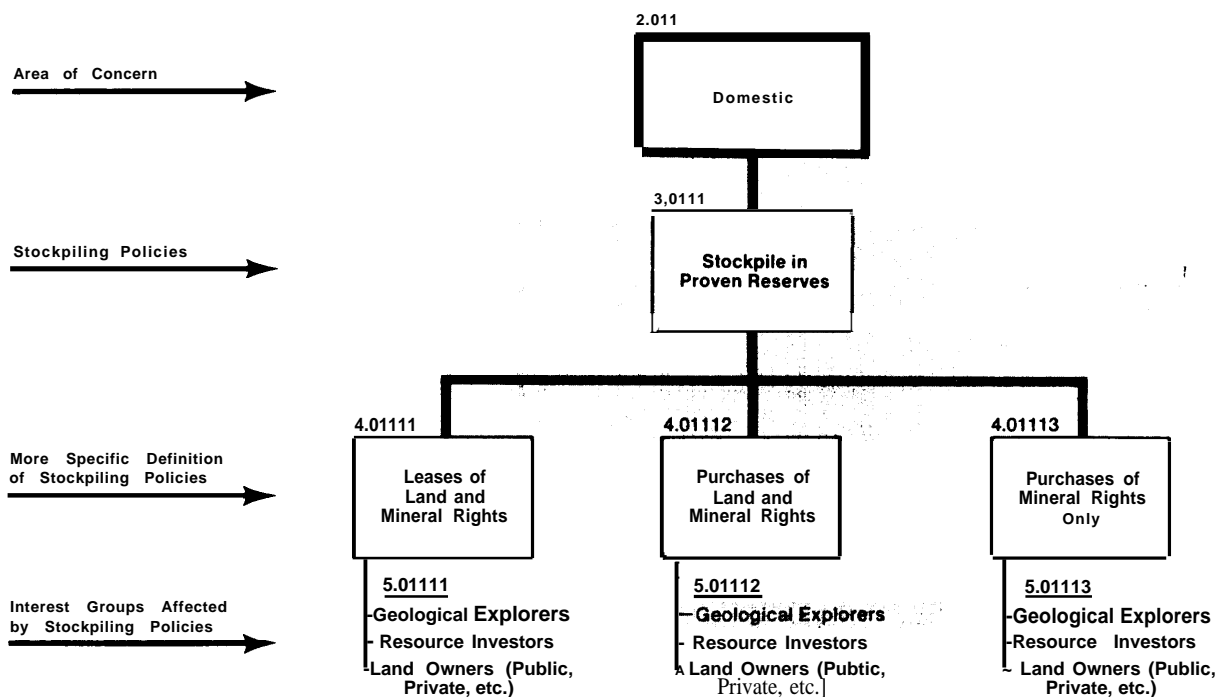


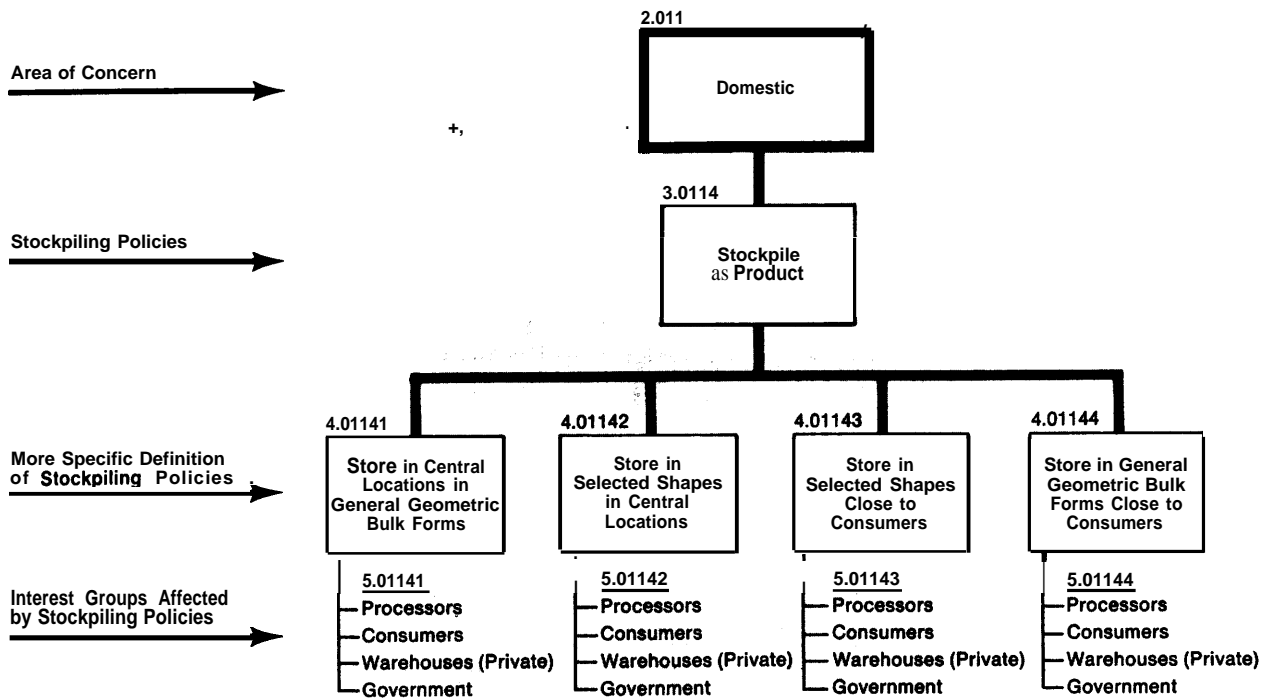
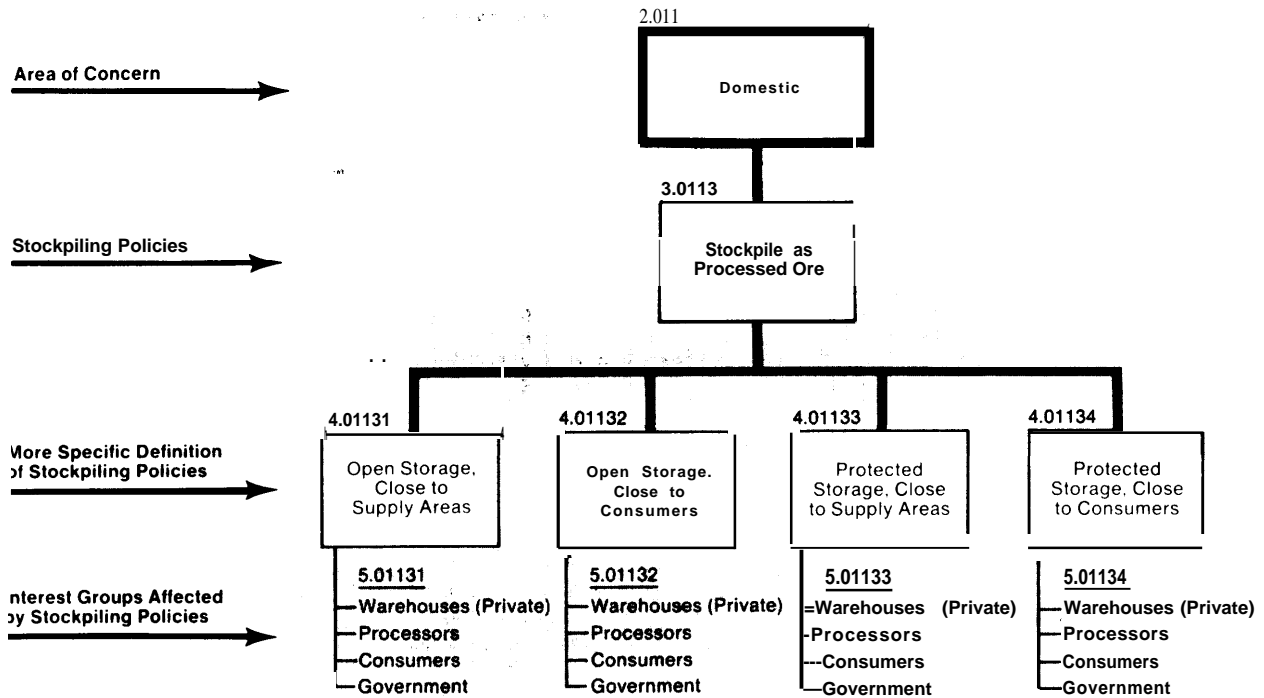
Interest Groups Affecting
Specific Problem Areas

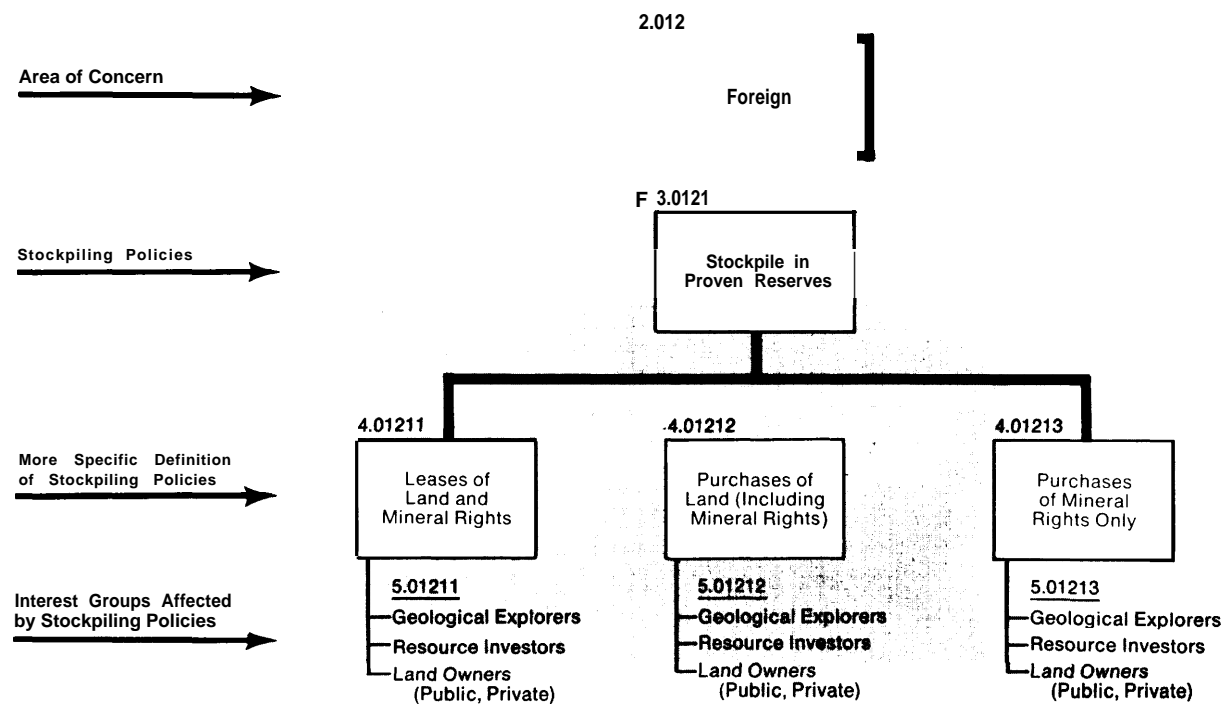
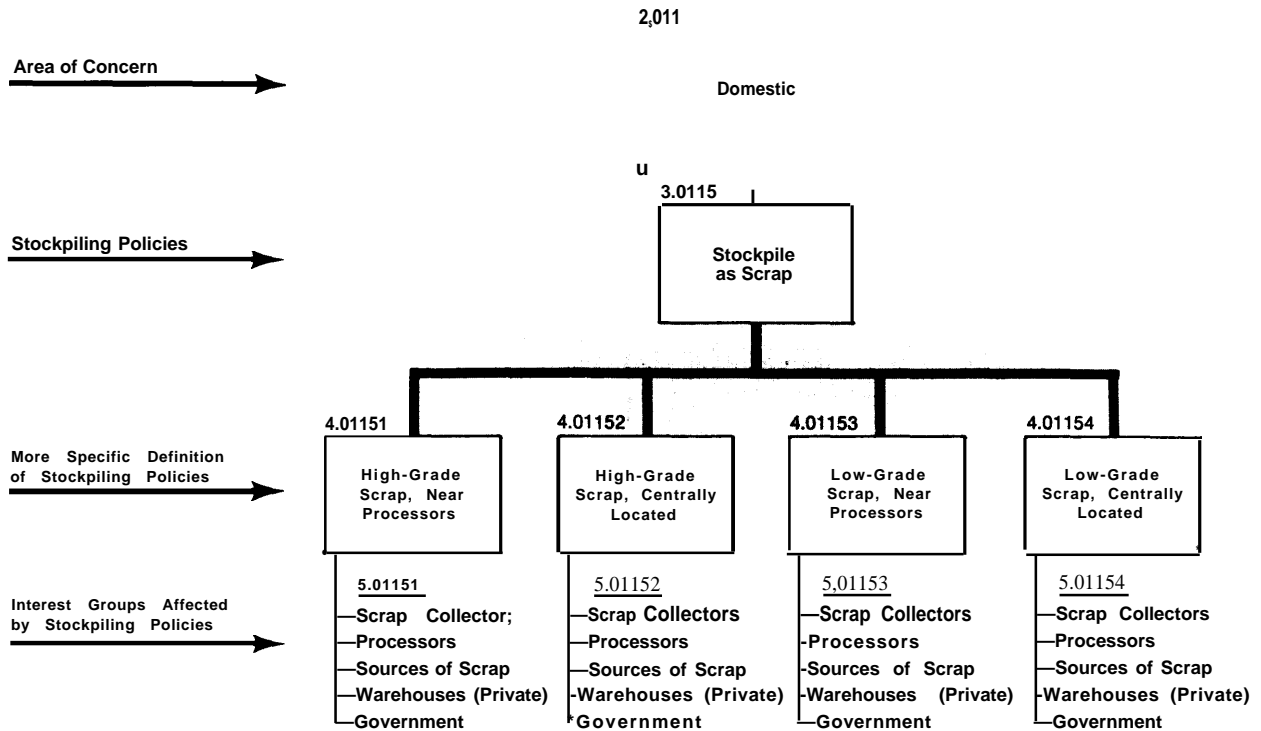


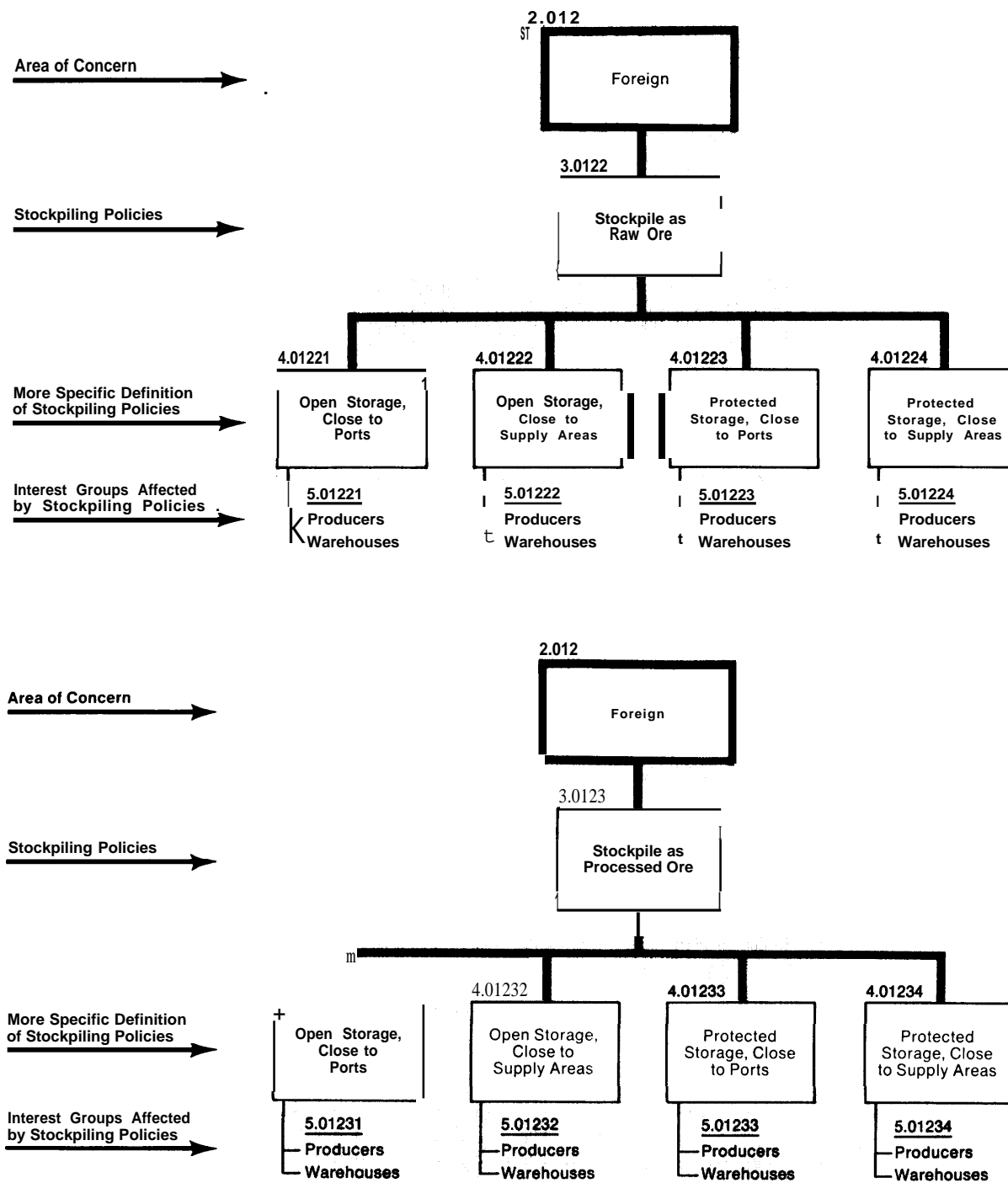
Stockpiling Procedure Tree

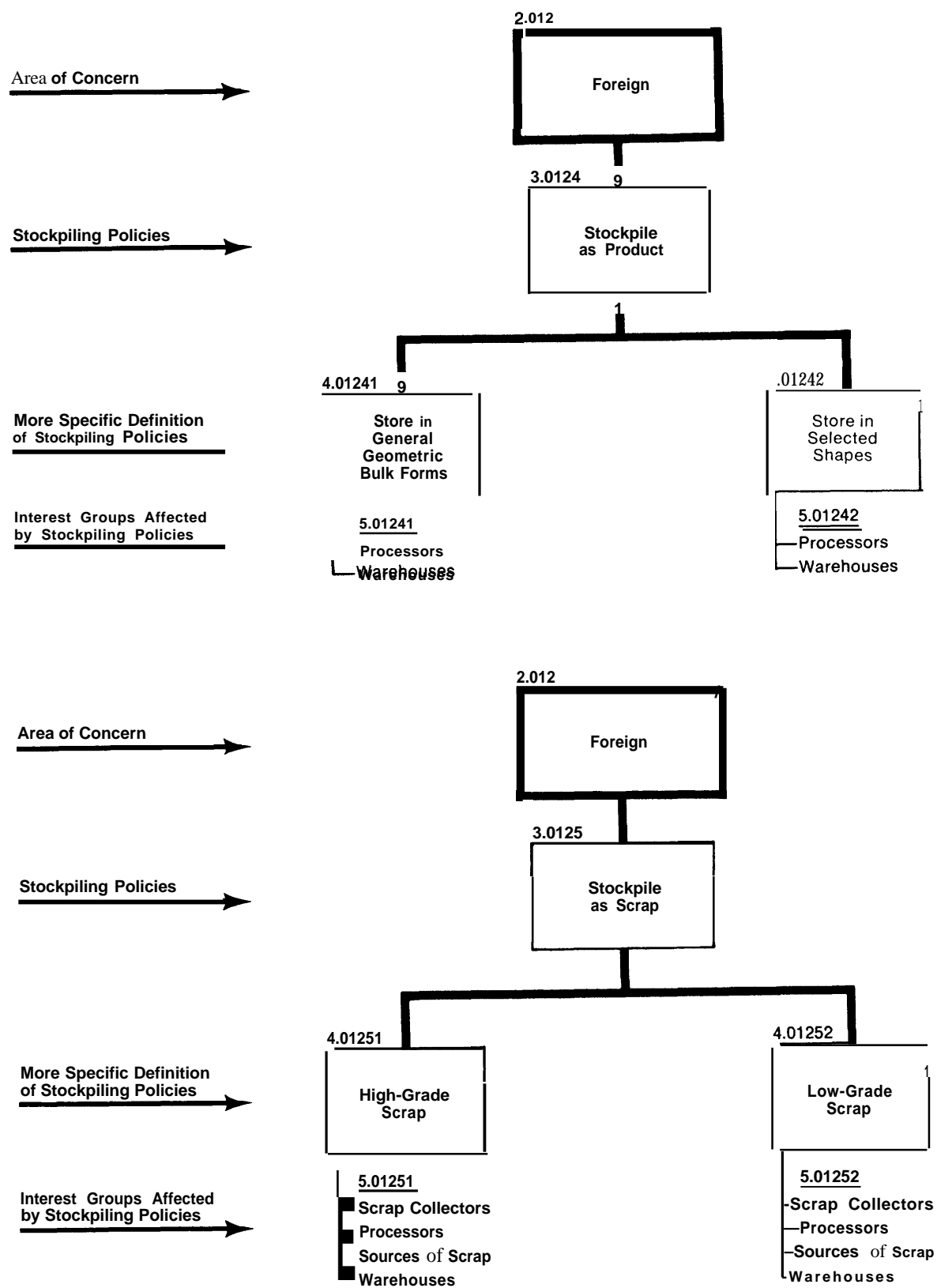




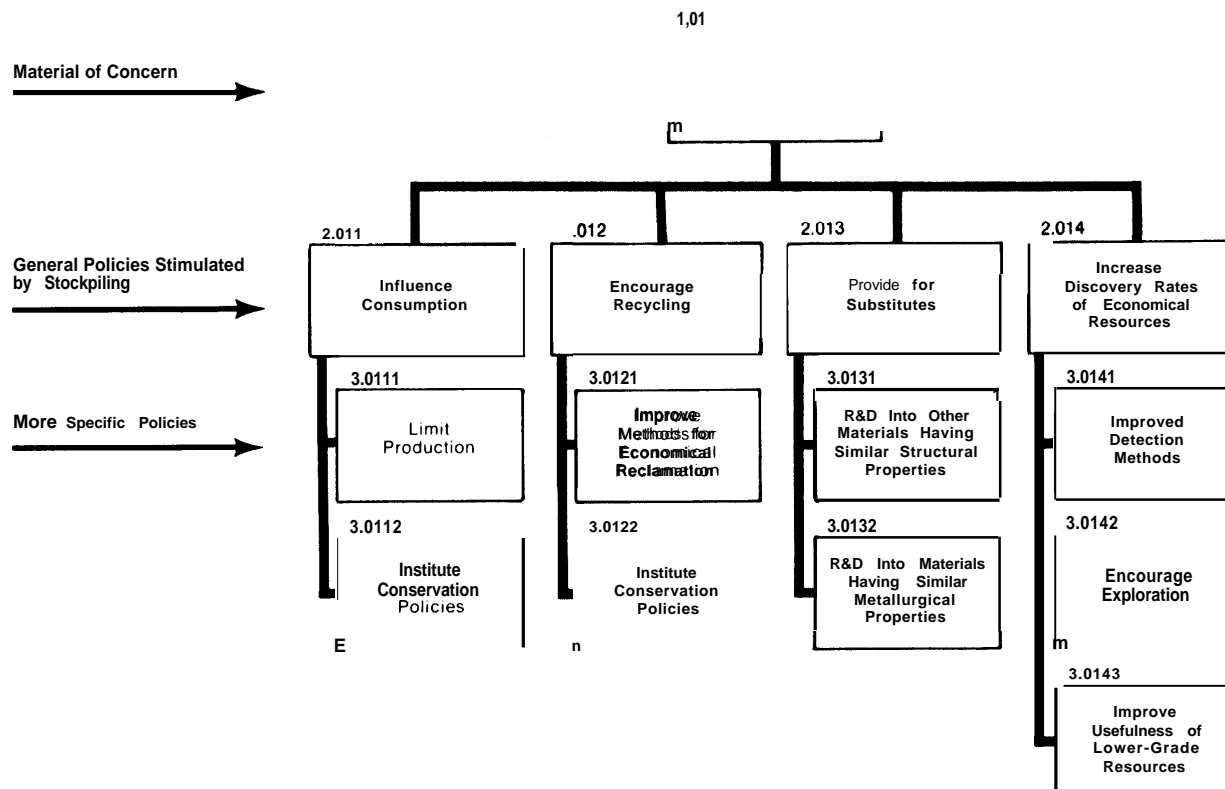


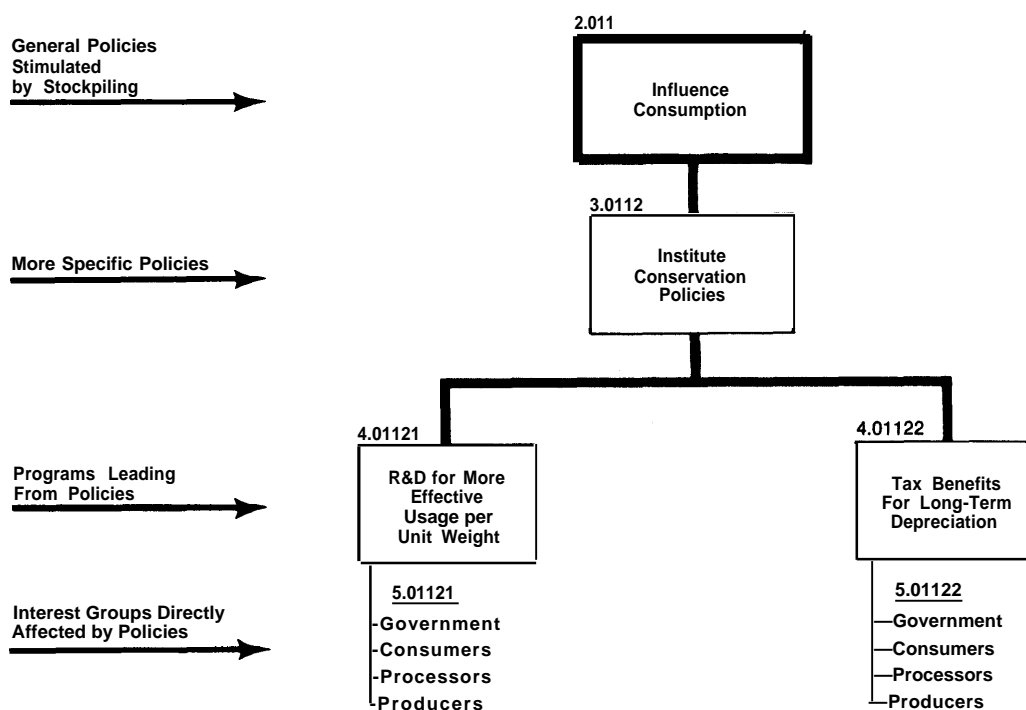
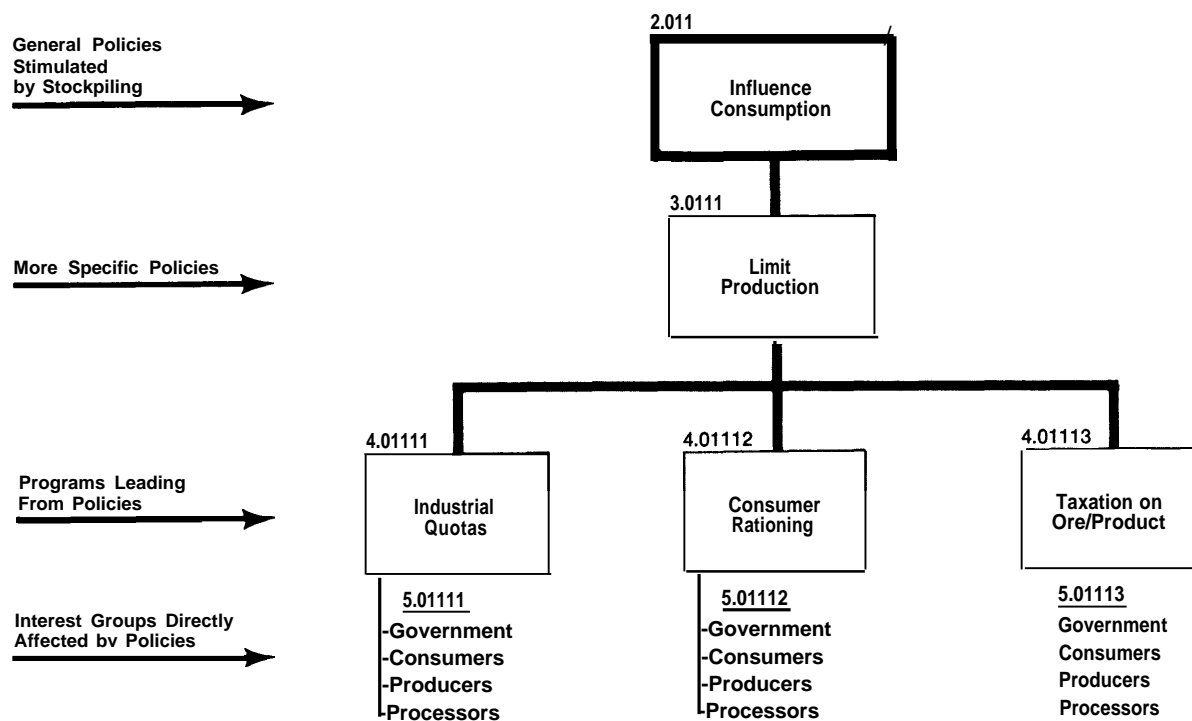




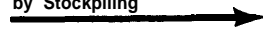


Alternatives to Stockpiling Tree

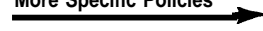




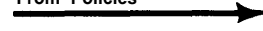
General Policies
Stimulated
by Stockpiling



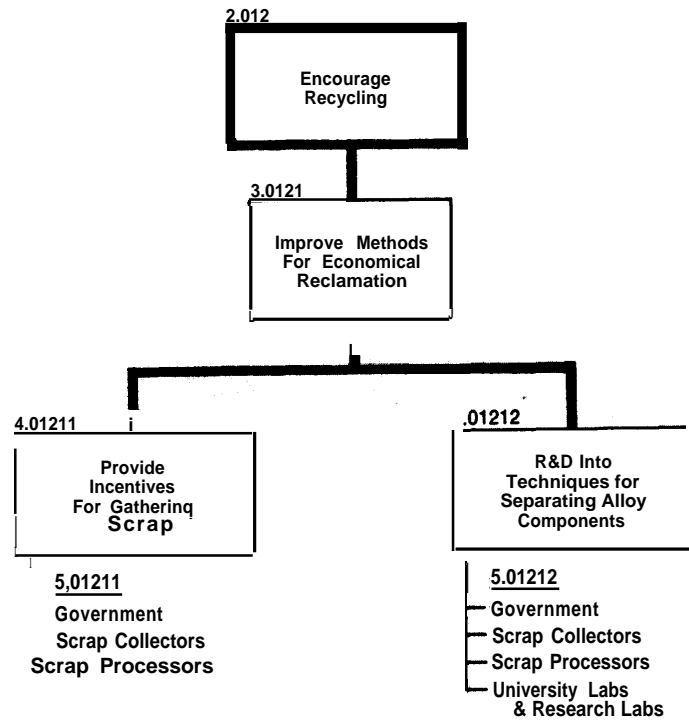
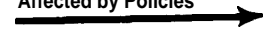
More Specific Policies



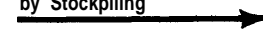
Programs Leading
From Policies



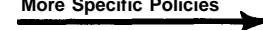
Interest Groups Directly
Affected by Policies



General Policies
Stimulated
by Stockpiling



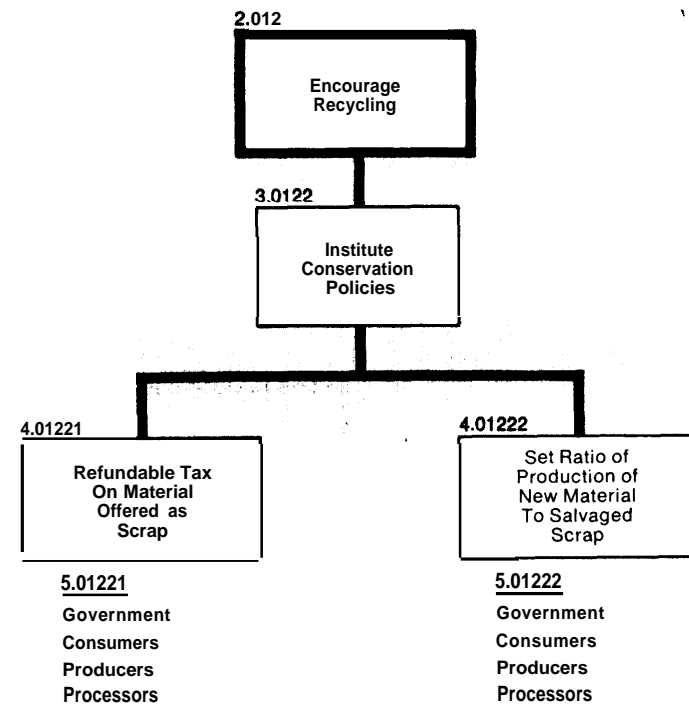
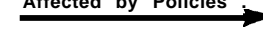
More Specific Policies

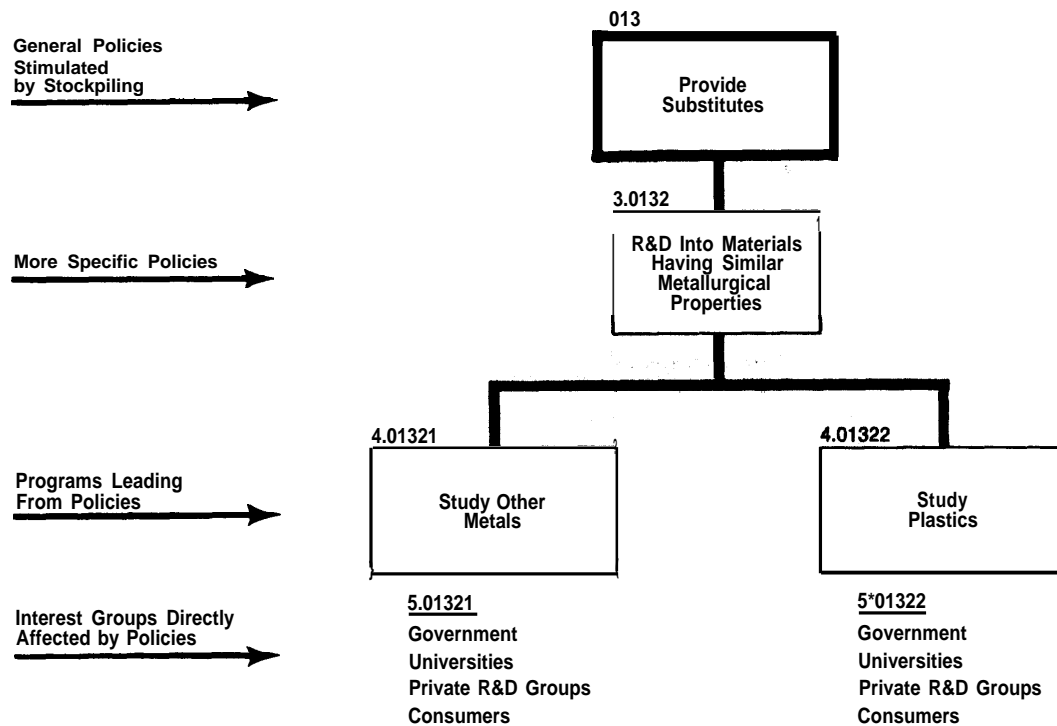
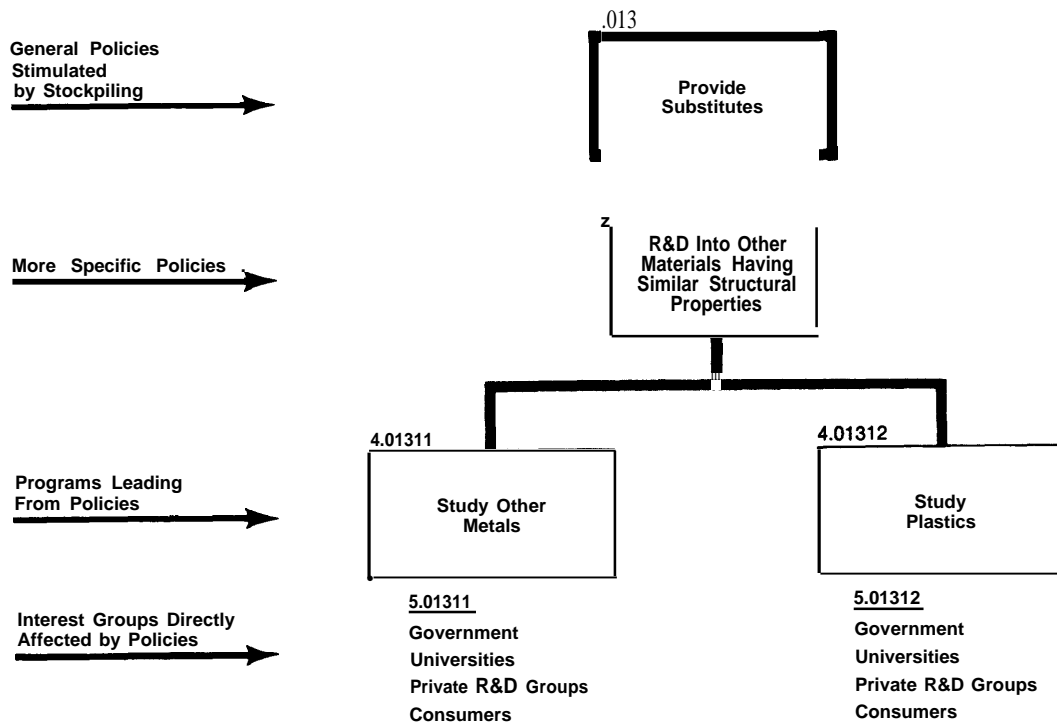


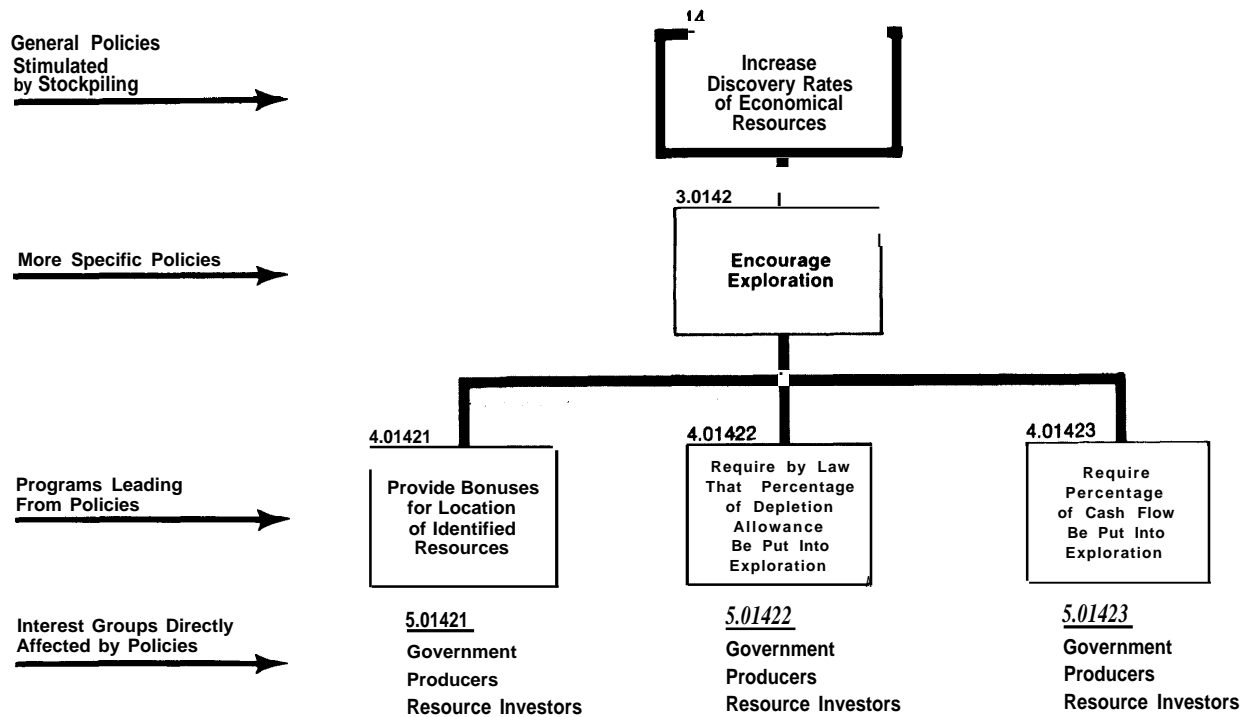
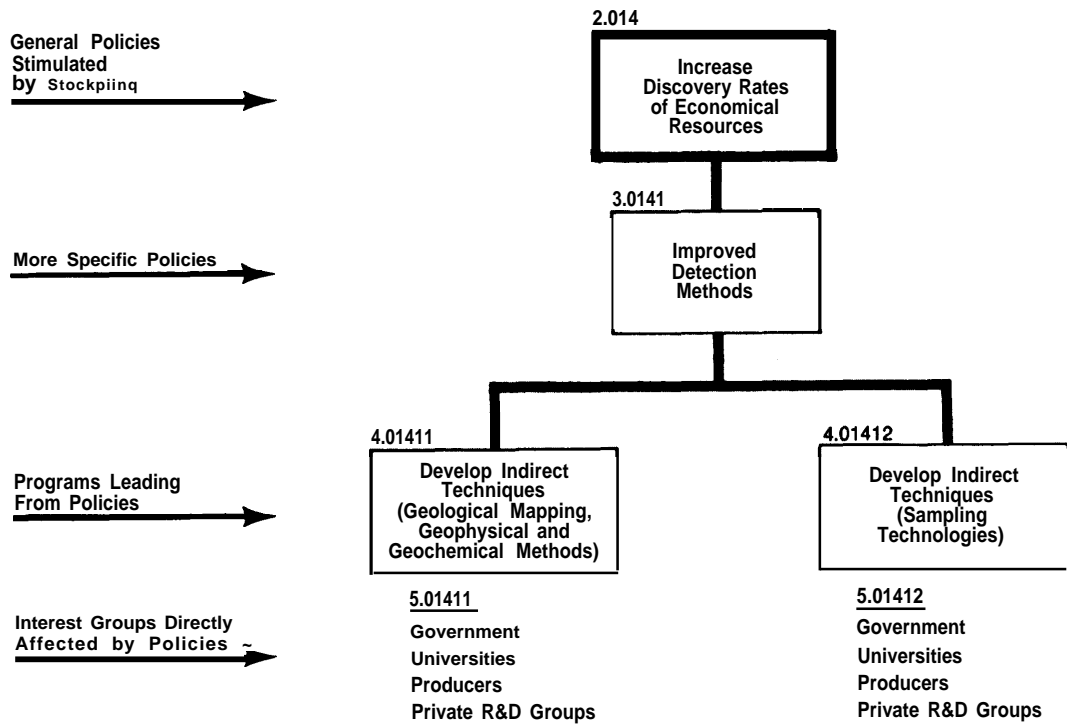
Programs Leading
From Policies

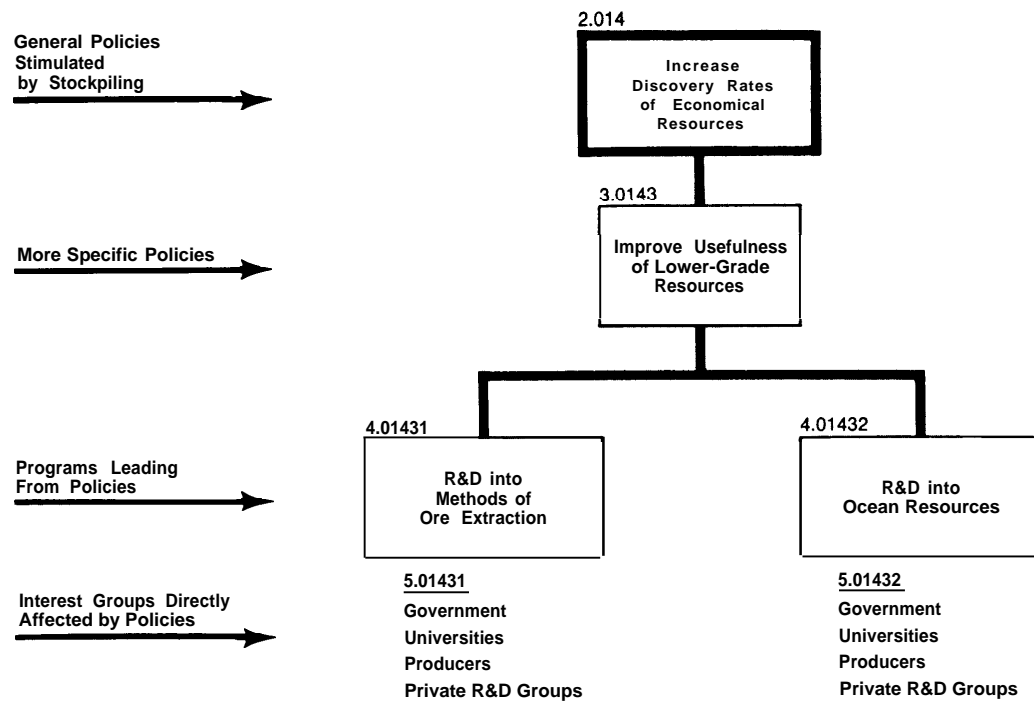


Interest Groups Directly
Affected by Policies

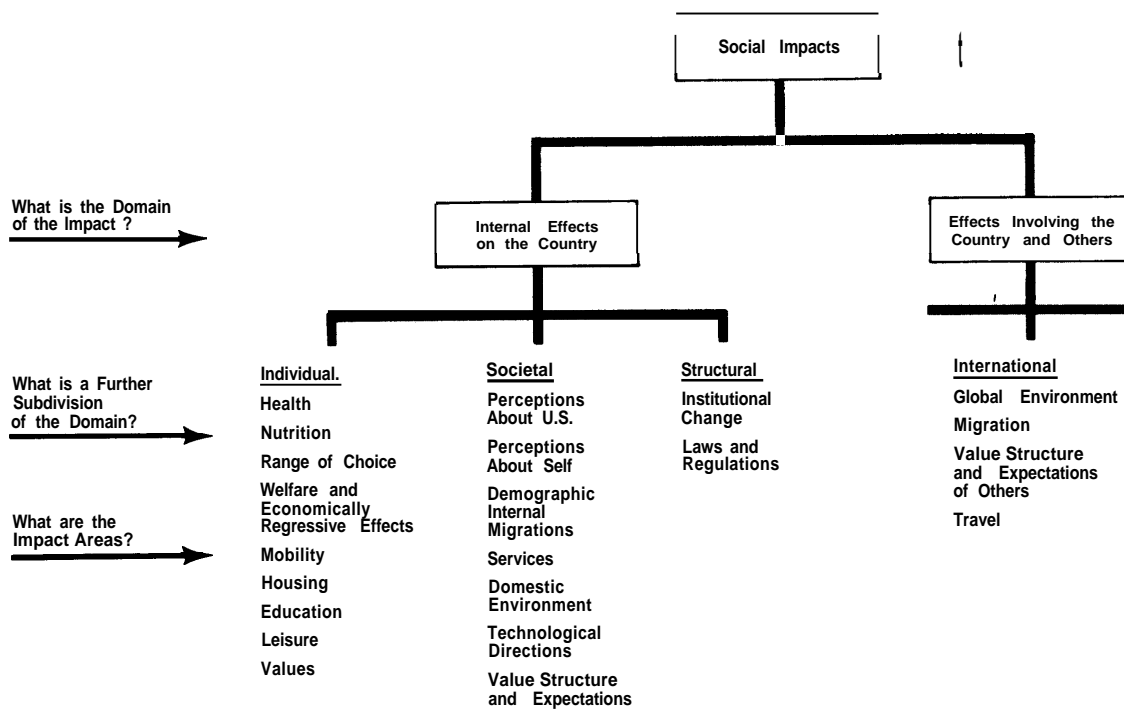
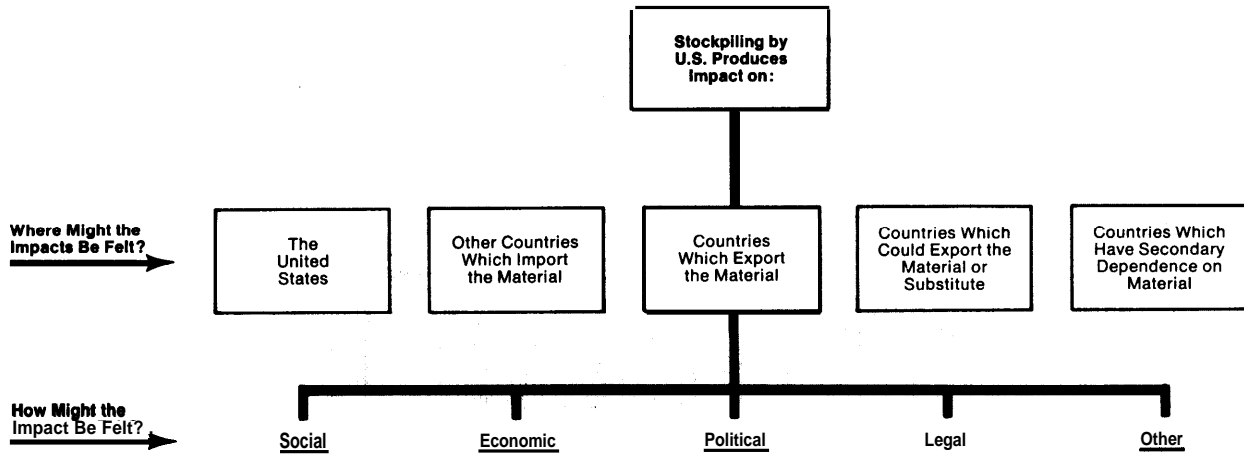


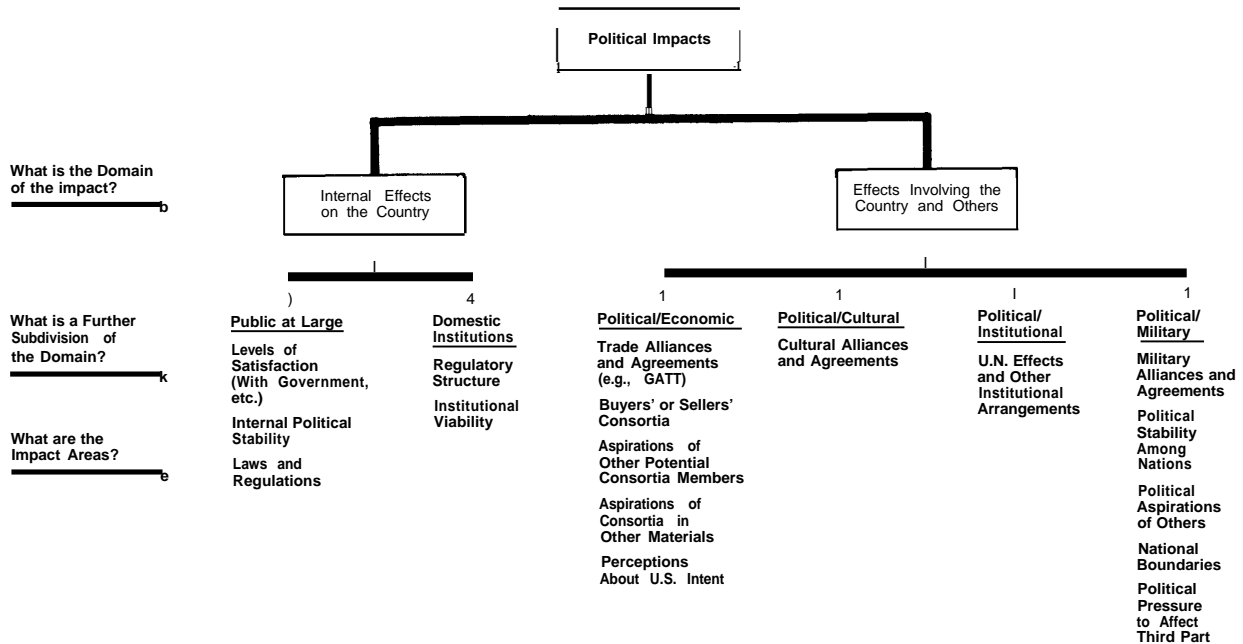
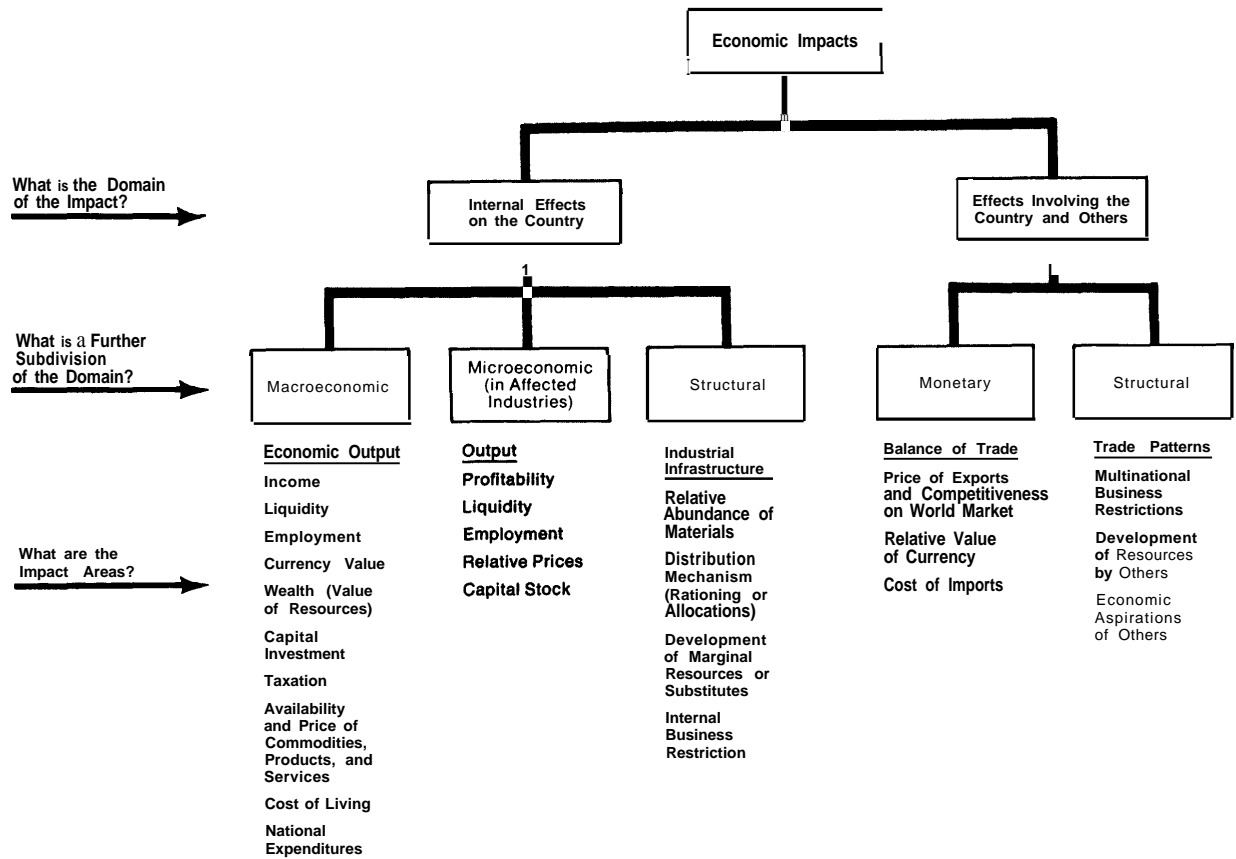


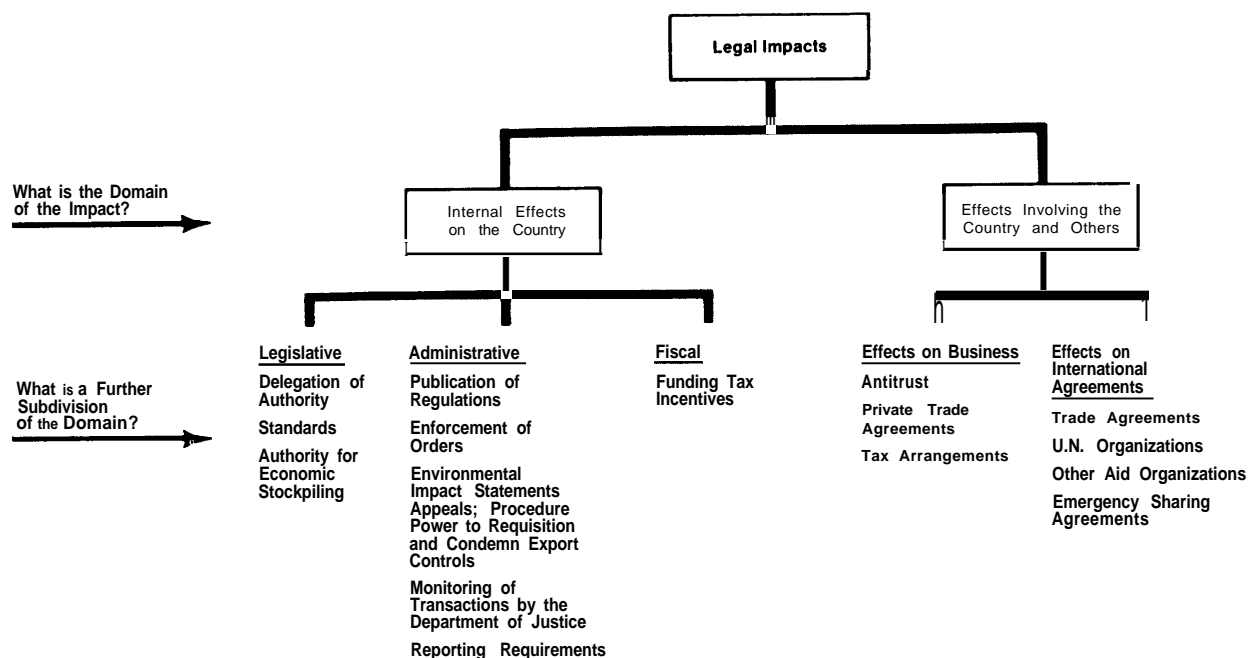




D-1 Stockpiling Impacts Tree







C. IMPACTS EVALUATION MATRICES

As discussed in the chapter describing methodology (chap. I), the importance of the various impacts from the lower level of the impacts tree were weighted for each candidate

stockpiling policy. These weighting matrices were evaluated according to the weights given on each table. These matrices are as follows:

Interest groups affected by SP 1

Important Impact Areas	Resource Development Industry		U.S. Energy Industries	U.S. Minerals Industry	U.S. Transportation	U.S. Business in General	Multinational Business	U.S. Labor	Private Land Owners	Environmentalists	Industries Using the Material	Private R&D Groups	Universities	U.S. Government	Other Importing Nations	Principal Exporters	The Involved Cartel	Other Exporting Countries	Other Potential Exporters	Countries Using Products from Materials
	3	3	3	3	2	2	3	2	0	1	2	0	0	3	3	3	3	3	3	2
22. Balance of trade	3	3	3	3	2	2	3	2	0	1	2	0	0	3	3	3	3	3	3	2
53. Internal political stability	2	2	2	2	1	3	3	3	1	1	1	0	0	3	2	3	3	3	3	2
58. Buyers' and sellers' consortia	2	2	2	2	1	2	3	1	0	0	2	0	0	2	2	3	3	3	3	2
60. Aspirations of other potential consortia members	1	1	1	2	1	1	2	1	0	1	1	0	0	2	2	2	2	2	2	2
66. Political stability between nations	1	1	1	1	1	1	2	1	1	1	1	1	1	3	3	2	3	2	2	2
71. Economy output	2	2	2	2	1	3	3	3	1	2	1	1	1	3	3	3	3	3	3	2
52. Levels of satisfaction with government	1	1	1	1	1	2	2	2	1	1	1	1	1	3	1	1	2	1	1	1
75. Trade alliances and agreements	1	3	3	3	2	2	3	2	0	1	2	0	0	2	3	3	3	2	2	2
59. Aspirations of other potential consortia members	1	1	2	2	1	2	3	1	1	1	1	1	1	2	2	2	3	2	2	1
18. Relative abundance of materials	3	2	3	3	1	1	2	1	1	1	3	0	0	2	2	2	2	2	2	2
TOTALS	17	18	21	21	12	19	26	17	6	10	15	4	4	24	12	24	27	24	23	18

Interest groups affected by SP 2

Important Impact Areas	Resource Development Industry	U.S. Energy Industries	U.S. Minerals Industry	U.S. Transportation	U.S. Business in General	Multinational Business	U.S. Labor		Industries Using the Material	Private R&D Groups		U.S. Government	Other Importing Nations	Principal Exporters	The Involved Cartel	Other Exporting Countries	Other Potential Exporters	Countries Using Products from Materials
57. Trade alliances and agreements	1	3	3	2	2	3	2	0	1	2	0	2	3	3	3	3	3	2
54. Laws and regulations	2	2	2	2	3	3	3	1	2	3	1	3	1	2	2	1	1	1
19. Distribution mechanisms	2	2	2	2	3	3	3	1	1	2	1	3	1	2	1	2	2	1
17. Industrial infrastructure	2	2	2	2	3	3	3	1	1	2	1	3	0	0	0	0	0	0
20. Development of marginal resources	3	3	3	2	2	3	1	3	3	2	1	2	2	2	2	2	2	1
21. Domestic business restrictions	2	2	2	2	3	3	3	1	2	3	1	3	1	2	2	1	1	1
55. Regulatory structure	1	3	1	1	3	3	3	1	1	1	1	0	1	2	2	1	1	1
56. Institutional viability	1	1	1	1	2	2	2	0	1	1	1	3	1	1	1	1	1	1
11. Selected industrial output	3	3	3	3	2	3	2	1	1	1	0	1	0	0	0	0	0	0
12. Selected industrial profit	3	3	3	3	2	3	2	1	1	1	0	1	0	0	0	0	0	0
TOTALS	20	24	22	20	25	23	24	10	14	18	7	5	22	10	14	11	11	8

Interest groups affected by SP 3

Important Impact Areas	Resource Development Industry	U.S. Energy Industries	U.S. Minerals Industry	U.S. Transportation	U.S. Business in General	Multinational Business	U.S. Labor	Private Land Owners	Environmentalists	Industries Using the Material	Private R&D Groups	Universities	U.S. Government	Other Importing Nations	Principal Exporters	The Involved Cartel	Other Exporting Countries	Other Potential Exporters	Countries Using Products from Materials
22. Balance of trade	3	3	3	2	2	3	2	0	1	2	0	0	3	3	3	3	3	3	2
58. Buyers' and sellers' consortia	2	2	2	1	2	3	1	0	0	2	0	0	2	2	3	3	3	3	2
1. Economic output	2	2	2	1	3	3	3	1	2	1	1	1	3	3	3	3	3	3	2
17. Industrial infrastructure	2	2	2	2	3	3	3	1	1	2	1	1	3	0	0	0	0	0	0
52 Levels of satisfaction with government	1	1	1	1	2	2	2	1	1	1	1	1	3	1	1	2	1	1	1
53. Internal political stability	2	2	2	1	3	3	3	1	1	1	0	0	3	2	3	3	3	3	2
18. Relative abundance of materials	3	2	3	1	1	2	1	1	1	3	0	0	2	2	2	2	2	2	2
19. Distribution mechanisms	2	2	2	2	3	3	3	1	1	2	1	1	3	1	2	1	2	2	1
57. Trade alliances and agreements	1	3	3	2	2	3	2	0	1	2	0	0	2	3	3	3	3	3	2
59. Aspirations of other potential consortia members	1	1	2	1	2	3	1	1	1	1	1	1	2	2	2	3	2	2	1
TOTALS	19	20	22	14	23	28	21	7	10	17	5	5	26	19	22	23	22	22	15

Interest groups affected by SP 4

Important Impact Areas	Resource Development Industry		U.S. Energy Industries	U.S. Minerals Industry	U.S. Transportation	U.S. Business in General	Multinational Business	U.S. Labor	Private Land Owners	Environmentalists	Industries Using the Material	Private R&D Groups	Universities	U+S ● Government	Other Importing Nations	Principal Exporters	~ @ Involved	Other Exporting Countries	Other Potential Exporters	Countries Using Products from Materials
17. Industrial infrastructure	2	2	2	2	2	3	3	3	1	1	2	1	1	3	0	0	0	0	0	0
19. Distribution mechanisms	2	2	2	2	3	3	3	3	1	1	2	1	1	3	1	2	1	2	2	1
20. Development of marginal resources	3	3	3	3	2	2	3	1	3	3	2	1	1	2	2	2	2	2	2	1
21. Domestic business restrictions	2	2	2	2	3	3	3	3	1	2	3	1	1	3	1	2	2	1	1	1
32. Range of choice	1	2	1	1	2	1	1	2	1	1	2	0	0	3	0	2	2	2	2	0
57. Trade alliances and agreements	1	3	3	2	2	3	3	2	0	1	2	0	0	2	3	3	3	3	3	2
54. Laws and regulations	2	2	2	2	3	3	3	3	1	2	3	1	1	3	1	2	2	1	1	1
18. Relative abundance of materials	3	2	3	1	1	1	2	1	1	1	3	0	0	2	2	2	2	2	2	2
55. Regulatory structure	1	3	1	1	3	3	3	3	1	1	1	1	0	1	1	2	2	1	1	1
56. Institutional viability	1	1	1	1	2	2	2	2	0	1	1	1	0	3	1	1	1	1	1	1
TOTALS	18	22	20	16	24	26	26	23	10	14	21	7	5	25	12	18	17	15	15	10

Interest groups affected by SP 5

Important Impact Areas	Resource Development Industry	U.S. Energy Industries	U.S. Minerals Industry	U.S. Transportation	U.S. Business in General	Multinational Business	U.S. Labor	Private Land Owners	Environmentalists	Industries Using the Material	Private R&D Groups	Universities	U.S. Government			Principal Exporters	The Involved Cartel	Other Exporting Countries	Other Potential Exporters	Countries Using Products from Materials
													U.S. Government	Other Importing Nations	Principal Exporters					
17. Industrial infrastructure	2	2	2	2	3	3	3	1	1	2	1	1	3	0	0	0	0	0	0	0
18. Relative abundance of materials	3	2	3	1	1	2	1	1	1	3	0	0	2	2	2	2	2	2	2	2
19. Distribution mechanisms	2	2	2	2	3	3	3	1	1	2	1	1	3	1	2	1	2	2	2	1
20. Development of marginal resources	3	3	3	2	2	3	1	3	3	2	1	1	2	2	2	2	2	2	2	1
21. Domestic business relations	2	2	2	2	3	3	3	1	2	3	1	1	3	1	2	2	2	1	1	1
54. Laws and regulations	2	2	2	2	3	3	3	1	2	3	1	1	3	1	2	2	2	1	1	1
54. Levels of satisfaction with government	1	1	1	1	2	2	2	1	1	1	1	1	3	1	1	2	2	1	1	1
57. Trade alliances and agreements	1	3	3	2	2	3	2	0	1	2	0	0	2	3	3	3	3	3	3	2
32. Range of choice	1	2	1	1	2	1	2	1	1	2	0	0	3	0	2	2	2	2	2	0
9. Availability and price of commodities	3	3	3	1	1	2	1	1	2	3	1	0	2	2	2	2	2	2	2	2
TOTALS	20	22	22	16	22	21	10	14	14	23	7	6	26	13	18	18	16	16	16	11

Matrix I—Relevance of economic impacts to various SP's, sheet 1

IMPACT AREAS	SP 1	SP 2	SP 3	SP 4	SP 5	WEIGHT
1 Economic Output	4	2	4	2	2	5
2 Income	3	2	3	2	2	4
3 Liquidity	2	1	2	1	1	3
4 Employment	4	2	3	1	2	5
5 Currency Value	3	1	2	1	1	4
6 Wealth (Value of Resources)	4	2	4	2	2	5
7 Capital Investment	4	1	3	1	1	3
8 Taxation	4	1	2	1	1	3
9 Availability and Price of Com- modities	4	3	4	1	4	3
10 Cost of Living	3	1	3	1	1	3
11 Selected Industrial Output	5	4	5	2	4	3
12 Selected Industrial Profit	5	4	5	2	4	3
13 Selected Industrial Liquidity	3	2	3	1	1	3
14 Selected Industrial Employment	5	4	5	2	4	3
15 Selected Industrial Relative Prices	5	3	5	2	2	3
16 Selected Industrial Capital Stock	4	2	4	1	2	2
17 Industrial Infrastructure	5	4	5	4	4	4
18 Relative Abundance of Materials	5	3	5	3	4	4
19 Distribution Mechanisms	5	4	5	4	4	4
20 Development of Marginal Resources	5	4	5	4	4	4
21 Domestic Business Restrictions	5	4	5	4	4	4
22 Balance of Trade	5	1	5	1	1	5
23 Price of Exports	5	1	5	2	2	4
24 Relative Value of Currency	3	1	3	1	1	5
25 Cost of Imports	5	1	4	1	1	4
26 Trade Patterns	5	2	5	2	2	4
27 Multinational Business Restric- tions	5	2	5	2	3	4
28 Development of Resources by Others	5	3	5	3	3	4
29 Economic Aspirations of Others	4	2	4	2	2	3

RELEVANCE KEY

5= Great Relevance

3= Moderate Relevance

1= Little Relevance

0=No Relevance

WEIGHT KEY

5= Extremely important impact area

3= Important Impact Area

1=Of Little Importance

0=No Importance

Matrix 1—Relevance of social impacts to various SP'S, sheet 2

IMPACT AREAS	SP 1	SP 2	SP 3	SP 4	SP s	WEIGHT
30 Health	1	0	1	0	0	4
31 Nutrition	2	0	2	0	0	4
32 Range of Choice	4	3	4	3	4	3
33 Welfare and Economically Regressive Impacts	3	0	3	0	3	4
34 Mobility	5	0	2	0	0	4
35 Housing	1	0	1	0	1	4
36 Education	1	0	1	0	0	4
37 Leisure	4	1	3	2	2	4
38 Values-Domestic	3	0	3	0	2	2
39 Perceptions About U.S.	4	1	4	1	2	3
40 Perception About Self	4	1	4	1	2	4
41 Internal Migrations	0	0	0	0	0	2
42 Services	1	0	1	0	2	3
43 Domestic Environment	3	2	2	3	2	4
44 Technological Directions	5	3	4	5	3	2
45 Value Structure	3	0	3	0	1	2
46 Institutional Change	4	0	4	0	2	4
47 Laws and Regulations	4	3	4	4	3	4
48 Global Environment	3	0	3	0	1	4
49 Migration	1	0	1	0	0	3
50 Values and Expectations	3	0	2	0	1	4
51 Travel	1	0	1	0	0	2

RELEVANCE KEY

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WEIGHT KEY

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Matrix I—Relevance of political impacts to various SP'S sheet 3

IMPACT AREAS	SP 1	SP 2	SP 3	SP 4	SP 5	WEIGHT
52 Levels of Satisfaction with Government	5	3	5	3	4	4
53 Internal Political Stability	5	2	4	2	2	5
54 Laws and Regulations	4	4	4	4	4	4
55 Regulatory Structure	5	4	5	4	4	3
56 Institutional Viability	5	4	5	4	4	3
57 Trade Alliances and Agreements	5	5	5	4	4	4
58 Buyers' and Sellers' Consortia	5	2	5	2	2	5
59 Aspirations of Other Potential Consortia Members	5	2	5	2	2	4
60 Aspirations of Consortia in Other Materials	5	2	4	2	2	5
61 Perception About U.S. Intent	5	3	5	3	3	4
62 Cultural Alliances and Agreements	3	0	3	0	0	2
63 U.N. Effects	4	0	4	0	0	3
64 Impacts on Other International Institutions	4	0	4	0	0	3
65 Military Alliances and Agreements	5	0	4	0	0	4
66 Political Stability Between Nations	5	1	4	2	1	5
67 Political Aspirations of Others	5	1	4	1	1	4
68 National Boundaries	1	0	1	0	0	5
60 Political Pressures on Third Parties	3	2	3	2	2	4

RELEVANCE KEY

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0=NoRelevance

WEIGHT KEY

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1=Of Little Importance

0=No importance