Appendix C

Survey of Mineral Industry on Techniques, Parties, Costs, Acreages, and Times For Exploration, Development, and Production of Various Mineral Occurrence Types in the Onshore United States

A. Introduction

During the conduct of the study, it became apparent that consideration of many critical areas of the Federal onshore mineral laws, such as diligence requirements, acreage limits, length of tenure, ability of industry to pay royalties, roles of prospectors and small exploration groups, assessment work, and other areas, could be greatly improved by collection and presentation of basic data on the techniques, parties, costs, acreages, and times involved in exploitation of various types of mineral deposits,

Such basic data were not available in the detail, completeness, and form required for useful analysis. Therefore, with the assistance of the Advisory Committee for this study, the Office of Technology Assessment (OTA) prepared a questionnaire and forms to obtain such data from industry. The questionnaire is reprinted in edited form in section B below. Summary tables for each of the four general categories of mineral occurrence types are presented in section C, followed by the completed forms for each individual mineral occurrence type (the forms are arranged in the same order as the mineral occurrence types in the summary tables).

Each form was filled out by an active mineral explorationist knowledgeable on the particular mineral occurrence type and employed by (or consultant to) one of the larger companies exploring for such occurrences, under the overall direction of the heads of the exploration groups of such companies. The companies involved were AMAX Inc., Anaconda, ASARCO Inc., Homestake Mining Company, Mobil Oil Company, Occidental Minerals Corporation, and Texasgulf Inc. Ray E. Gilbert, a mineral exploration consultant, also contributed data.

The Office of Technology Assessment greatly appreciates the cooperation of these individuals and companies and is particularly appreciative of the efforts of Leo Miller and George Erdosh of Texasgulf Inc., who coordinated the data gathering effort.

The forms were filled out under a very short time constraint and were meant to indicate orders-of-magnitude rather than precise statistics.

B. The Questionnaire
OTA Survey of Mineral Industry on Techniques, Parties, Costs, Acreages, and Times for Exploitation of Various Mineral Occurrence Types on Onshore U.S. Land

The office of Technology Assessment of the U.S. Congress is a research arm of the Congress that is charged with providing accurate and objective information to the Congress in areas designated by chairpersons of congressional committees or by OTA'S bipartisan Congressional Board.

OTA is currently engaged in a study of the Federal onshore mineral and mining laws for use by the Congress, particularly the Senate Committee on Energy and Natural Resources and the House Committee on Interior and Insular Affairs. It is expected that the study will be relied upon heavily by those committees and by officials in the executive branch in formulating and considering various proposed revisions to the Federal onshore mining and mineral leasing laws.

Consideration of many critical areas of the laws, such as diligence requirements, acreage limits, length of tenure, ability of industry to pay royalties, role of prospectors and small exploration groups, assessment work, and other areas, could be greatly improved by collection and presentation of basic data on the techniques, parties, costs, acreages, and times involved in exploitation of various types of mineral deposits. This survey is intended to gather such data.

1. The Forms

Table C. 1 lists the mineral occurrence types for which OTA would like to obtain data. [Table C. I has been moved to section C.] Although data on each type is not necessary, it is hoped that all of the more significant types, such as Marine Sedimentary (Oil and Gas) and Vein and Replacement Deposits [Gold, Silver, Copper. Etc.) will be covered. Complete coverage, of course, would provide the best data source for analysis and use.

The types are divided into four categories which appear to present different sorts of problems in exploitation: surficial, stratabound-extensive. stratabound-discrete, and discordant. A good sample of types from each category is essential to the success of the data gathering effort. General descriptions of each category are:

Surficial—generally unconsolidated and unburied mineral deposits resulting from weathering or deposition during late geologic time;
Stratabound-extensive—large laterally continuous mineral deposits confined to a single stratigraphic unit;
Stratabound-discrete-randomly distributed and/or discontinuous mineral deposits, essentially confined to specific stratigraphic units; and
Discordant-mineral deposits that transect strata and/or are related to intrusive rocks, volcanic activity, etc.

Form 1 is to be used to provide summary statistics for each of the mineral occurrence types listed in table C.1. Form 1 asks for data on the range (minimum. average, maximum) of cost, acreage, and time required by different individuals and companies for different deposits of the same type. Care should be taken to make sure the ranges include the smallest as well as the largest type of operation. If there is a great variation in cost, acreage, or time between larger and smaller participants, the variation and the reason for it should be noted (e.g., in the Additional Comments column). Only data for onshore mineral exploitation in the United States or similar areas (e.g., Canada) should be used. If no U.S. data is available, foreign data can be used to estimate what the costs, acreages, and times would be in the United States. (Indicate on form, in Additional Comments column, that foreign data was used as basis for estimate.)

The data used for form 1 should include data on failures as well as successes in exploration, development, and production. This should be fairly easy to do since the form is broken down into four exploration stages in addition to development and production, and it is also broken down for each stage into the techniques used. Thus, data can be listed by technique in each stage, whether the technique was successful or not in a particular case, so that a larger sample of data is used which more accurately reflects the overall aggregate costs of a mineral exploitation program or project. (Note that separate listing of the data for successes and failures is not requested; it is merely desired that all available data be used to estimate the range of costs, acreages, and times for a particular technique or stage of exploitation.)

Preferably, the ranges should be for mineral exploitation on Federal land in the Western United States exclusive of Alaska. The Additional Comments column should be used to indicate any substantial variations from this range for areas such as Alaska or the Midwest (if appropriate, simply give percentage increase or decrease). If data is only available for an area other than the Western United States, either estimate the data for occurrences in the Western United States from similar deposits elsewhere or give the data for the other deposits—in either case, explain in the Additional C_{om}-ments column.

2. Detailed Instructions

OTA form 1 is merely an expansion of the mineral exploitation activities, methods, costs, and times tables prepared by Paul Bailly of Occidental Minerals Corporation for various conferences and workshops. An example of one of Bailly's tables, listing 10 different ventures, is attached to this questionnaire [the table has been moved to section C], and it should indicate the distinctions between the two stages of Target identification and the two stages of Target Investigation on form 1. Form 1 also includes the development and production stages, which have their traditional meaning. The Bailly example also illustrates the sorts of techniques (activities or methods) that should be listed and the use of O, F, or L to indicate whether the technique is an Office, Field, or Laboratory method or activity. It is not necessary to list land acquisition as a separate activity on Form I; however, if land acquisition costs are included, they should be listed separately from all other costs in the appropriate stage.

Explanations and instructions for each column heading on Form 1 are presented immediately below. Form 1 usually calls for minimum, average, and maximum figures.

Main Activities and Methods: see Bailly example.

0.F. or L: Office, Field, or Laboratory—see Bailly example.

1.S. M, or L: Individual prospector or explorationist, Small firm or group of individuals, Medium-sized firm, or Large firm. For Form 1, give percentage which each group (I, S, M, or L) makes up of those performing each activity (or participating at each stage) of the exploitation of the mineral occurrence type. Do not count, e.g., an individual as an I participant if he or she is funded by an S, M, or L participant. Arbitrary definitions of I, S, M, and L are: I—no more than 2 people working together spending less than $10,000 per year on mineral exploitation; S— no more than 50 people working together spending less than $250,000 per year; M—expenditures of less than $2,500,000 per year; L—expenditures of $2,500,000 or more per year. **[Note:** Some respondents, instead of listing quantitative percentages of participation, used an "X" to indicate participation by one or more of the four categories of participants.]

Direct Cost; Cost exclusive of land acquisition cost, taxes, etc., which however can be listed separately from all direct costs. Costs should be reported in 1977 dollars (i.e., past costs should be adjusted to current equivalent 1977 figures). Overhead should be reported, but separately from direct costs as either a dollar figure or a percentage of direct costs.

Area Being Investigated, Area Covered: Area in square miles covered by activity or to which technique is applied, which is usually distinct from:

Area Under Cluim, Option, Lease, Etc: Area in acres for which exploitation rights were acquired or optioned prior to activity or use of technique.

Duration of Each Stage: Divided into three categories, each reported in months:

Without Any Delays: Time in months required for activity or method in the absence of any delays due to economics, regulatory restrictions, etc. Includes time lost due to normal climatic change in seasons, although any very significant climatic or seasonal loss in time common in a particular geographic region (e.g. Alaska) should be noted in the Additional Comments column, Also includes any normal delay due to company's inability to fund all possible projects simultaneously,

Delays Due to Economics, Technology (Nonregulatory): Delays in addition to normal delays occasioned by, e.g., drop in metal prices, too low an ore grade, lack of technological development (rather than normal wait for delivery or manufacture of on-the-shelf technology),

Delays Due Solely to Regulation; Delays in addition to normal and nonregulatory delays which do not overlap such delays and are caused by governmental orders, restrictions, or refusals to act (e.g., on permit application).

Additional Comments: Any additional comments. Should be used to describe significant variations in costs, times, or acreages resulting from geographic location (e. g., Alaska) or size of participant (e.g., individual prospector versus large firm),

C. Tables and Forms

The following pages contain: (1) the Bailly table and the table of illustrative mineral occurence types that were attached to the questionnaire, (2) summary tables, one for each of the four general categories of mineral occurrence types, and (3) the completed forms, one for each individual mineral occurrence type. The completed forms, including comments, have not been edited by OTA beyond regrouping of numbers where appropriate.

Main Activities and Methods During the Four Stages of Exploration for Ten Successful Ventures Previous to a Decision that a Profitable Surface Mine Can Be Opened

Exploration Stages	[illegible] Search for a New Porphyry Copper Ore Deposit in Southwest U.S.A.	VENTURE #2 Search for Blind Stratiform Lead-Zinc Deposit in Carbonate Formations	VENTURE #3 Search for Massive Sulfide Deposit with Base-Precious Metal Values in Canadian Precambrian Shield	VENTURE #4 Search for a New Iron Deposit in Precambrian Shield	VENTURE #5 Search for a New Placer Gold-Tin Deposit in Alaska	VENTURE #6 Search for a New Phosphate Deposit in Southeastern Coastal U.S.A.	VENTURE #7 Search for a New Uranium Deposit in Clastic Formation of Western U.S.A.	VENTURE #8 Search for a New Coal Deposit in Western U.S.A.	VENTURE #9 Search for a New Cement-Grade Limestone Deposit in U.S.A.	VENTURE #10 Search for a New Gravel Deposit Near Urban Center in U.S.A.
REGIONAL APPRAISAL (Stage #1)	O-Geologic Compilation* O-Photogeologic study (rock units and structure) O-Structural analysis* F-Field inspection of area selected from air and / or on ground*	O-Geologic Compilation* O-Paleogeologic and Paleogeographic reconstructions	O-Geologic Compilation* O-Photogeologic study (rock units, contacts and structures)	Geologic [illegible] compilation*	O-Geologic Compilation* O-Photogeologic study (geomorphology)	Geologic compilation* Study of water well cuttings Photogeologic study (formation mapping) Geologic field check and reconnaissance	O-Geologic compilation* O-Photogeologic study (formation mapping paleogeography, structure)*	O-Geologic compilation (marketing area)*	O-Geologic compilation (for "marketing" area)* O-Photogeology	None
RECONNAISSANCE (Stage #2)	[illegible] logic mapping of outcrops* F-Stream Sediment geochemical surveys F-Aeromagnetic survey F-Gravity survey in gravel-covered areas F-Reconnaissance induced Polarization survey of covered areas	[illegible] for stratigraphic and facies data* Photogeologic study Stream Sediment geochemical surveys Mercury Sniffer Surveys	Airborne Electromagnetic Survey* (with or without aeromagnetic) Stream Sediment geochemical survey Field inspection of anomalous areas	F-Aeromagnetic Survey F-Photogeology, formation structure F-Reconnaissance for national mapping*	Reconnaissance panning* Reconnaissance drilling and sampling-physical separation of heavy minerals	Airborne Radiometric Survey Reconnaissance drilling for stratigraphy* Chemical analyses of drill samples and ore dressing tests on high grade samples*	F-Airborne Radiometric Survey* F-Reconnaissance mapping of formations facies* F-Drilling for stratigraphy and facies information	F-Field check of sections containing coal seams* F-Reconnaissance drilling for stratigraphy and coal thickness F-Chemical and calorific check of outcrops or drill samples (not badly burned)	Examination of outcrops and sampling* Reconnaissance drilling for stratigraphy and chemical analyses of all limestone samples*	O-Compilation of geologic information for suburban area* F-Reconnaissance auger drilling and testing of gravel
SURFACE INVESTIGATION OF TARGET AREA (Stage #3)	[illegible] structural-alteration mapping of outcrops L-Petrographic-mineralogy-trace element study of rock samples F-Detailed Induced Polarization Survey of anomalous covered areas		[illegible] of outcrops if any* F-Detailed helicopter-borne or ground electromagnetic (and magnetic) survey* (or detailed Induced Polarization Survey F-Detailed stream sediment and / or soil geochemical survey	F-Detailed mapping F-Detailed ground magnetic surveys*	F-Detailed magnetic survey	F-Detailed radiometric ground survey F-Detailed mapping of outcrops if any*	F-Detailed radiometric ground survey F-Detailed mapping of outcrops			
DETAILED THREE DIMENSIONAL PHYSICAL SAMPLING OF TARGET AREA (Stage #4)	F-Drilling* / Logging* L-Mineralogical, Chemical analyses and physical tests on samples (cores and cuttings)* F-Down-hole geophysical surveys L-Amenability tests on ore-grade mineralization O-Reserves computations* O-Preliminary Valuation* **F-Investigation of water problems and water availability for plants*** F-Investigation of suitability of ground for plant, tailings, dump and town sites F-Shaft sinking or tunneling to obtain bulk samples L-Ore dressing bulk tests	as for Venture #1	Same as for Venture #1	Same as for Venture #1	Same as for Venture #1 excluding down-hole geophysics and tunneling	Same as for Venture #1	Same as for Venture #1	as for Venture #1	Same as for Venture #1 excluding down-hole geophysics	Same as for Venture #1 excluding down-hole geophysics and tunneling

At the end of each stage all results are integrated and area of interest redefined.

Legend: O = Office study, F = Field investigation, L = Laboratory tests

*** = activity of method which is indispensable**

Source: Barry, "Exploration Methods and Requirements," Table 2.1, in American Institute of Mining Engineers, *Surface Mining*, Ch. 2 (1968).

Table C.1 Illustrative Mineral Occurrence Types

SURFICIAL		NONSURFICIAL					
		STRATABOUND-EXTENSIVE		STRATABOUND-DISCRETE		DISCORDANT	
Geologic Environment	Typical Ores	Geologic Enironment	Typical Ores	Geologic Environment	Typical Ores	Geologic Environment	Typical Ores
Aluminous Clays and Latenites	"Bauxite, Kaolinite	Bedded Precambrian	"Iron, Copper, Gold	Marine Sedimentary	'011 and Gas, Bromine, Bante	Breccia Pipes	"Uranium, Molybdenum, Copper, Gold, Diamond
Latentes	"Nickel (Cobalt)	Marine Sedimentary	" Phosphate, Iron, 011 Shale, Manganese	Continental Sedimentary (Sandstones and Fossil Placers)	" Uranium (Vanadium), Gold, Titanium	Porphyries	"Copper-Molybdenum, Gold, Tin
Stream Placers	Gold, Silver, Platinum Tin, Rare Earths, Iron, Gem Stones	Marine Evaporite	" Potassium " Sodium "Sulfur, " Gypsum, Lithium, Mangesium	Lacustrine Evaporites	" Gypsum, " Trona, " Boron	Pegmatites	Lithium, Fluorine, Beryllium, Rare Earths, Mica, Feldspar, Columbium, Tantalum
Coastal Placers	Titanium, Zirconium, Chromium, Rare Earths, Gem Stones	Continental Sedimentary	"Coal, 011 Shale, " Boron, Sodium	Fossil Laterites	Bauxite	Veinn and Replacement Deposits	"Gold, "Silver, Copper, Alunite, Mercury, Lead, Zinc, Bante, Fluorine, Tungsten, Molybdenum, Uraium. Iron, Graphite, Gem Stones, Native Sulfur, Gilsonite
Residual Deposits	Bante, Iron, Manganese, Titanium, Phosphate, Columbium, Vermiculite	Continental Volcanic	Bentonite	Young Tuffs and Related Sedimentary	Beryllium, Mercury, Fluorite, Native Sulfur		
Brines in Evaporites	"sodium, " Potassium, "Magnesium, " Boron, Lithium. Tungsten	Stratiform Igneous Complexes	" Iron Chromium Platinum Group Metals Vanadium	Shale Hosted Massive Sulfides	'Copper-Lead-Zinc-Silver	Massive Sulfide Pipes	Copper-Lead-Zinc-Silver (Gold, Pyrite)
Supergene Enrichment	Copper, Silver, Lead, Zinc, Gold, Manganese			Carbonate Stratiform	"Zinc-Lead-Bante-Fluorine (Copper, Cobalt)	Rhyolitic Volcanic	"Tin, Tungsten, Bismuth
				Volcanogenic Massive Sulfides	"Copper-Lead-Zinc-Silver (Gold, Pyrite, Bante)	Mafic and Ultra mafic Intrusive	Nickel-Copper, Olivine
				Metamorphic	Garnet, Kyanite, Graphite	Podiform Ultramafic	Chromium, Copper, Iron, Nickel, Asbestos
						Anorthosite Complexes	Titanium, Iron, Vanadium
						Veins in Ultramatic	Asbestos, Talc
						Veins in Meta-morphosed Dolomites	Talc
						Salt Domes	"Sulfur
						Carbonate and Alkalic Complexes	Phosphate, Rare Earths, Iron, Titanium Columbium Copper

* Described in Ad Hoc Geological Committee on Remote Sensing from Space, *Geological Remote Sensing from Space* (1977)

Table C.2 Summary Mineral Exploitation Statistics for Surficial Mineral Occurrence Types

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	1. Aluminous clays and laterites-kaolinite and bauxite		5	5	15	75	85	200	590	25%	1K	10K	100K	=	—	—	6	10	18	2	4	12	0	6	—	
	2. Laterites-nickel		—	—	—	X	10	19.5	26	15%	2K	6K	30K		—	—	1.5	2.5	3.5	—	—	—	—	—	—	
	3. Stream Placers-gold, silver, tin		X	X	X	—	—	3	15	Incl.	—	—	—	-	—	—	1	—	3	—	—	—	—	—	—	
	4. Coastal Placers-titanium		0	33	33	34	15	20	25	5%	1K	8K	10K	_	—	—	—	10	—	—	8	—	0	0	0	
	5. Residual deposits-phosphate		0	10	30	60	10	16	30	4	10K	100K	1000K		—	—	4	6	8	—	—	—	—	—	—	
	6. Brines in evaporites		—	—	—	—	2	6	12	3	10K	100K	1000K	=	—	—	1	3	6	—	—	—	—	—	—	
	7. Supergene enrichment-copper, silver, etc		9	9	32	50	4	12	20	4	1	100	1K	-	—	—	4	8	15	4	4	4	1	1	1	
	8. Supergene enrichment-silver		—	—	—	X	—	35	—	15	—	1K	—	-	—	—	—	12	—	—	—	—	—	—	—	
	Total																									
Stage 2: Detailed Reconnaissance	1. Aluminous clays and laterites-kaolinite and bauxite		5	10	25	60	60	250	1020	27%	10	40	100		—	—	6	15	40	0	2	12	0	6	—	
	2. Laterites-nickel		—	—	—	X	10	30	35	15%	100	300	500		—	—	1	2	2.5	—	—	—	—	—	—	
	3. Stream Placers-gold, silver, tin		—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—	—	—	
	4. Coastal Placers-titanium		10	30	30	30	—	10	—	5%	—	1K	—		—	—	—	10	—	—	8	—	—	0	—	
	5. Residual deposits-phosphate		0	10	30	60	50	80	145	15	100	1K	10K		4K	10K	7	10	20	—	—	—	0	1	5	
	6. Brines in evaporites		—	—	—	—	8	21	48	8	4	20	1K	-	—	—	2	7	18	—	—	—	—	—	—	
	7. Supergene enrichment-copper, silver, etc		2	8	25	65	32	108	200	26	1	5	50	-	2K	10K	7	15	33	5	5	5	0	1	2	
	8. Supergene enrichment-silver		—	—	—	X	—	60	—	25	—	3	—		1K	—	—	12	—	—	—	—	—	—	—	
	Total																									
Stage 3: Detailed Surface Investigation of Target Area	1. Aluminous clays and laterites-kaolinite and bauxite		5	5	5	85	80	160	360	15%	6	12	40	3.8K	7.7K	25.6K	6	12	36	0	2	6	4	18	—	
	2. Laterites-nickel		—	—	—	X	16	28	39	15%	5	7	15	2K	3K	6K	2.3	4.5	6.8	—	—	—	—	—	—	
	3. Stream Placers-gold, silver, tin		X	X	X	—	14	—	42		1	—	10													
	4. Coastal Placers-titanium		20	20	30	30	2	12	30	5%	1	10	25	640	6.4K	16K	8	24	40	5	—	8	2	3	4	
	5. Residual deposits-phosphate		0	10	30	60	35	90	140	18	3	5	12	600	1K	8K	2	5	12	—	—	—	0	1	3	
	6. Brines in evaporites		—	—	—	—	5	25	50	6	4	12	100	1.2K	7.6K	60K	2	5	14	—	—	—	0	6	60	
	7. Supergene enrichment-copper, silver, etc		0	8	30	62	60	125	300	45	1	3	10	100	1K	10K	5	15	22	1	5	12	1	3	6	
	8. Supergene enrichment-silver		—	—	—	X	—	110	—	30	—	3			1K			10								
	-																									

Table C.2 (Cont'd)

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	1. Aluminous clays and laterites-kaolinite and bauxite		1	4	20	75	1.7K	5.7K	12.3K	20%	3	6	20	1920	3.8K	12.8K	24	36	60	3	12	30	5	14	20	
	2. Laterites-nickel		—	—	—	X	4542	8081	14262	15%	1	2	2.5	2K	3K	6K	24	36	48	18	24	36	24	36	48	
	3. Stream Placers-gold, silver, tin		—	X	X	—	120	—	1000		1	—	10													
	4. Coastal Placers-titanium		0	0	50	50	49	345	1662	5%	1	5	10	640	6.4K	16K	12	24	50	1	2	5	4	6	24	
	5. Residual deposits-phosphate		0	0	35	65	100	200	460	36	3	5	12	600	1K	8K	6	12	36	3	6	10	1	6	20	
	6. Brines in evaporites		—	—	—	—	55	340	1.2K	36	4	12	100	1200	7.6K	60K	9	24	42	—	—	—	0	6	60	
	7. Supergene enrichment-copper, silver, etc.		0	0	12	88	750	3500	6300	1200	1	3	10	1K	5K	10K	27	54	186	8	42	192	5	30	72	
	8. Supergene enrichment-silver		—	—	—	X	—	1000	—	250	—	2	—	—	2K	—	—	18	—	—	6	—	—	2	—	
	Total																									
Stage 5: Development	1. Aluminous clays and laterites-kaolinite and bauxite		1	2	5	92	75K	280K	361K	10%	1	2	6	1.9K	3.8K	12.8K	36	48	60	6	12	24	12	36	—	
	2. Laterites-nickel		—	—	—	X	23K	30K	35K	20%	0.5	1	1.5	2K	3K	6K	38	48	63	—	—	—	12	18	24	
	3. Stream Placers-gold, silver, tin		—	X	X	—	—	10K	50K																	
	4. Coastal Placers-titanium		0	0	50	50	—	—	—	—	5	10	15	3.2K	6.5K	10K	—	—	—	—	—	—	—	—	—	
	5. Residual deposits-phosphate		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	6. Brines in evaporites		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	7. Supergene enrichment-copper, silver, etc.		0	0	5	95	5135	81K	502K	1290	1	2	10	1K	5K	10K	48	75	156	42	66	144	48	78	108	
	8. Supergene enrichment-silver		—	—	—	X	—	3600	—	900	—	2	—	—	2K	—	—	36	—	—	—	—	—	—	—	
	Total																									
Stage 6: Production	1. Aluminous clays and laterites-kaolinite and bauxite		1	2	5	92	—	—	—	—	—	—	—	1.9K	3.8K	12.8K	—	—	—	—	—	—	—	—	—	
	2. Laterites-nickel		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	3. Stream Placers-gold, silver, tin		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	4. Coastal Placers-titanium		0	0	50	50					5	10	15	3.2K	6.4K	10K										
	5. Residual deposits-phosphate		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	6. Brines in evaporites		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	7. Supergene enrichment-copper, silver, etc.		0	0	5	95	—	—	—	—	1	2	10	1K	5K	10K	—	—	—	—	—	—	—	—	—	
	8. Supergene enrichment-silver		—	—	—	X	—	—	—	—	—	2	—	—	2K	—	—	—	—	—	—	—	—	—	—	
	Total																									

Table C.3 Summary Mineral Exploitation Statistics for Stratabound Extensive Mineral Occurrence Types

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Regional Appraisal	1 Bedded Precambrian gold-uranium-base metal		3	20	35	42	1	9	45	1	5	1K	300K	—	—	—	0.2	2	10	0.8	3.5	6	0	0	0	
	2 Marine sedimentary-phosphate		0	10	40	50	2	6	12	3	10K	100K	1000K	—	—	—	1	3	6	=	—	—	=	—	=	
	3 Marine evaporite-potash		15	25	30	30	5	10	20	15%	1K	1000K	1000K	—	—	—		—	—		—	—		—		
	4 Continental sedimentary-coal		12	20	33	35	3	10	14	15%	100	140	200	—	—		3	8	10		—	—		—	—	
	5 Stratiform igneous complex		—	—	—	X	53	153	362	195	500	40K	100K	—	—	—	6	18	42	—	—	—	—	—	—	
Stage 2: Detailed Reconnaissance	1 Bedded Precambrian gold-uranium-base metal		1	20	35	44	1	30	180	3	5	40	500	—	—	—	0.2	2	24	0	0.5		0	0	0	
	2 Marine sedimentary-phosphate		0	10	40	50	8	21	48	8	500	2K	10K	—	—	—	2	6	14	—	—	—	—	—	—	
	3 Marine evaporite-potash		15	25	30	30	3	6	8	15%	200	4K	8K	—	—	—	—	—	—	—	—	—	—	—	—	
	4 Continental sedimentary-coal		20	23	28	29	3	9	12	15%	50	0	140	—	—	—	2	6	8	—	—	—	—	—	—	
	5 Stratiform igneous complex		—	—	—	X	319	607	1075	372	—	—	—	10K	20K	50K	12	27	90	—	—	—	—	—	—	
Detailed Surface Investigation of Target Area	gold-uranium-base metal		0	20	35	45	15	110	430	12	0.3	2	7	200	1K	4K	1	7	20		1	1	0	4	12	
	2 Marine sedimentary-phosphate		0	5	10	85	3	9	24	3	4	52	200	2.5K	7.6K	13K	2	5	14	—	—	—	0	4	100	
	3 Marine evaporite-potash		15	20	35	35	0	0	0	0	200	5.0	800	1K	8K	15K	6	12	18	8	16	20	36	60	?	
	4 Continental sedimentary-coal		0	10	45	45	20	160	275	15%	25	5	70	640	1K	5K	6	12	18	—	—	—	3	4	6	
	5 Stratiform igneous complex		—	—	—	X	1172	2355	5744	1005	10	20	50	10K	15K	25K	16	24	48	1	6	12	1	3	6	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	1 Bedded Precambrian gold-uranium-base metal		0	10	40	50	285	1800	7400	180	0.3	2	7	200	1K	4K	16	50	78	7	19	35	12	24	72	
	2 Marine sedimentary-phosphate		0	0	40	60	260	1191	4295	55	4	12	200	2.5K	7.6K	13K	12	30	60	—	—	—	0	24	100	
	3 Marine evaporite-potash		2	10	38	50	420	840	1010	15%	200	500	800	1K	8K	15K	12	18	24	18	24	30	24	36	42	
	4 Continental sedimentary-coal		0	10	45	45	25	40	60	15%	—	—	—	5K	10K	25K	6	12	24							
	5 Stratiform igneous complex		—	—	—	X	2810	4735	7654	1435	4	10	20	2560	6.4K	13K	24	36	48	3	9	18	3	3	18+	

Table C.3 (Cont'd)

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to eg			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 5: Development	1 Bedded Precambrian-gold-uranium-base metal				—	—	—	—	—	—	—		—	—	—	—		—	—	—	—	—	—	—	—	
	2 Marine sedimentary-phosphate		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	3 Marine evaporite-potash																									
	(a) conventional mine		100	4	46	46	72K	85K	106K	15%	10	30	50	1K	8K	15K	18	30	42	15	24	30	21	27	33	
	(b) solution mine			C	30	70	95K	121K	185K	15%	10	30	50	5K	8K	15K	18	20	24	20	22	26	26	28	36	
	4 Continental sedimentary-coal			1C	45	45	22K	59K	86K	15%	—	—	—	5K	10K	25K	12	24	36	11	20	30	6	10	24	
	5 Stratiform igneous complex		°	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Stage 6: Production																										

Table C.4 Summary Mineral Exploitation Statistics for Stratabound Discrete Mineral Occurrence Types

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
				S	M	L	Min	Avg	Max	Over-	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	1 Marine sedimentary-oil and gas		—	—	—		110	350	600	20	1K	5K	40K	—	—	—	1	6	12	—	—	—	—	—	—	
	2 Continental sedimentary-uranium		—	—	X	—	75	125	250	25	4K	6K	10K	—	—	—	6	15	24	1	2	3	—	—	—	
	3 Lacustrine evaporite		0	10	30	60	2	6	12	3	10K	100K	1000K	—	—	—	1	3	6	—	—	—	—	—	—	
	4 Fossil laterite		2	3	15	80	100	286	680	20%	1K	20K	100K	—	—	—	12	21	62	4	14	30	2	10	12	
	5 Shale Hosted massive sulfide-copper		0	10	30	60	2.5	8	15	10%	2K	15K	25K	—	—	—	1.5	3.5	7	—	—	—	—	—	—	
	6 Shale Hosted massive sulfide-Pb-Zn-Ag		—	—	—	X	15	29	51	15%	4K	12K	30K	—	—	—	1.75	3.5	7	—	—	—	—	—	—	
	7 Carb Strat -Ba, F		8	17	28	47	9	18	28	15%	7.5K	10K	15K	—	—	—	7	10	14	—	—	—	—	—	—	
	8 Carb Strat -Pb-Zn-Cu		6	14	30	50	9	18	28	15%	7.5K	10K	15K	—	—	—	7	10	14	—	—	—	—	—	—	
	9 Volc Mass Sulfide		0	30	30	40	40	95	150	14	10K	100K	1000K	—	—	—	6	14	28	—	—	—	—	—	—	
	10 Metamorphic		0	50	40	10	7	20	35	3	1K	10K	50K	—	—	—	2	5	8	—	—	—	—	—	—	
Stage 2: Detailed Reconnaissance	1 Marine sedimentary-oil and gas		—	—	—	—	1300	6.5K	22K	—	1K	5K	40K	—	—	—	12	36	60	1	2	6	0	2	6	
	2 Continental sedimentary-uranium		—	—	X	—	150	400	700	80	2K	4K	6K	—	—	—	9	15	30	1	3	5	1	3	5	
	3 Lacustrine evaporite		—	10	30	60	8	21	48	8	4	20	1K	—	—	—	2	6	14	—	—	—	—	—	—	
	4 Fossil laterite		5	10	25	60	50	230	980	27%	10	40	100	—	—	—	6	15	40	0	12	12	0	6	0	
	5 Shale Hosted massive sulfide-copper		0	10	30	60	12.5	81	137	10%	2K	15K	25K	—	—	—	2	10	15	—	—	—	—	—	—	
	6 Shale Hosted massive sulfide-Pb-Zn-Ag		—	—	X	X	60	122	244	15%	2K	3K	8K	—	—	—	2.5	5.5	12	—	—	—	—	—	—	
	7 Carb Strat -Ba, F		8	17	31	44	11	18	19	15%	100	200	400	—	—	—	1	3	3	—	—	—	—	—	—	
	8 Carb Strat -Pb-Zn-Cu		7	14	25	55	112	369	781	15%	100	200	400	200	300	500	3	6	13	0	6	12	4	18	32	
	9 Volc Mass Sulfide		0	30	30	40	25	65	130	13	100	200	400	—	—	—	4	8	15	—	—	—	—	—	—	
	10 Metamorphic		0	50	40	10	10	20	40	4	500	2K	5K	—	—	—	2	4	5	—	—	—	0	1	3	
Stage 3: Detailed Surface Investigation of Target Area	1 Marine sedimentary-oil and gas		—	—	—	—	600	1100	1800	—	—	—	—	50K	200K	1.5M	12	24	60	1	2	6	—	—	—	
	2 Continental sedimentary-uranium		—	—	X	—	175	475	850	95	8	30	150	5K	20K	100K	6	12	24	1	3	5	1	2	3	
	3 Lacustrine evaporite		0	5	30	65	5	25	50	6	4	12	100	1.2K	7.6K	60K	2	5	14	—	—	—	0	6	60	
	4 Fossil laterite		5	5	15	75	80	160	360	15%	6	12	40	3.8K	7.7K	26K	6	12	36	0	2	6	4	12	0	
	5 Shale Hosted massive sulfide-copper		0	10	30	60	9	20	72	10%	—	—	—	100	1K	10K	1	2	4	—	—	—	—	—	—	
	6 Shale Hosted massive sulfide-Pb-Zn-Ag		—	—	X	X	40	59	101	15%	10	15	40	6K	8K	12K	3.5	6	9	—	—	—	—	—	—	
	7 Carb Strat -Ba, F		9	25	33	33	20	75	140	15%	5	9	17	2K	2K	4K	4	10	12	1	2	2	2	6	12	
	8 Carb Strat -Pb-Zn-Cu		4	14	40	42	17	46	75	15%	5	10	20	2K	7K	12K	12	12	12	—	—	—	—	—	—	
	9 Volc Mass Sulfide		0	30	30	40	25	50	95	10	10	25	60	1.5K	4K	10K	5	12	25	—	—	—	0	8	16	
	10 Metamorphic		0	50	40	10	21	37	58	7	3	5	15	500	1K	5K	3	5	10	—	—	—	0	1	5	

Table C.4 (Cont'd)

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min		Max	Min	Avg	Max	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	1. Marine sedimentary-oil and gas		—	—	—	—	1K	5K	20K	50	10	50	200	1.6K	24K	128K	1	3	6	—	—	—	—	—	—	
	2. Continental sedimentary-uranium		—	—	X	—	700	2K	4.4K	330	2	4	8	5K	20K	100K	30	45	72	3	6	12	10	20	50	
	3. Lacustrine evaporite		0	0	30	70	55	340	1.2K	36	4	12	100	1.2K	7.6K	60K	9	36	60	—	—	—	0	6	60	
	4. Fossil laterite		1	4	20	75	1.7K	5.7K	12.3K	20%	3	9	40	1.9K	3.8K	12.8K	24	36	60	3	12	30	5	14	20	
	5. Shale Hosted massive sulfide-copper		0	5	20	75	24	231	668	10%	—	—	—	100	1K	10K	6	17	40	—	—	—	2	9	18	
	6. Shale Hosted massive sulfide-Pb-Zn-Ag		—	—	X	X	10.7K	14K	24.8K	15%	1	2	2.5	4K	7K	9K	36	60	100	24	36	60	24	36	48	
	7. Carb. Strat.-Ba, F		4	20	37	39	530	980	1550	15%	3	5	10	500	1K	4K	6	12	24	2	4	6	6	12	24	
	8. Carb. Strat.-Pb-Zn-Cu		0	13	42	45	3K	13.9K	30K	15%	3	7	15	1.9K	4.5K	9.6K	21	29	160	9	36	60	12	12	24	
	9. Volc. Mass. Sulfide		0	10	35	55	137	275	523	38	2	5	10	1K	4K	10K	8	15	36	—	—	—	0	6	24	
	10. Metamorphic		0	50	40	10	45	105	203	15	1	2	4	300	500	5K	6	12	30	—	—	—	0	4	12	
Stage 5: Development	1. Marine sedimentary-oil and gas		—	—	—	—	555	5.3K	31K	67	4	15	50	1.3K	4.5K	16K	4	14	39	5	6	9	0		2	
	2. Continental sedimentary-uranium		—	—	X	—	—	60K	—	—	2	4	8	5K	20K	100K	—	—	—	—	—	—	—	—	—	
	3. Lacustrine evaporite		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	4. Fossil laterite		1	2	5	92	75K	280K	361K	10%	1	2	6	1.9K	3.8K	12.8K	9	14	20	3	5	10	6	17	—	
	5. Shale Hosted massive sulfide-copper		0	0	20	80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	6. Shale Hosted massive sulfide-Pb-Zn-Ag		—	—	—	X	95K	120K	145K	20%	0.25	0.5	0.75	4K	7K	9K	18	24	30	—	—	—	12	18	24	
	7. Carb. Strat.-Ba, F		2	22	38	38	362	4658	8510	15%	1	2	6	500	1K	4K	18	36	90	4	7	12	6	18	48	
	8. Carb. Strat.-Pb-Zn-Cu		0	14	43	43	2002	5010	7020	15%	3	7	15	1.9K	4.5K	9.6K	12	24	36	24	30	40	12	20	36	
	9. Volc. Mass. Sulfide		0	0	30	70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	10. Metamorphic		0	30	50	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Stage 6: Production	1. Marine sedimentary-oil and gas		—		—	—	—	—	—	—	2	7	25	1.3K	4.5K	16K	—	—		—	—	—	—		—	
	2. Continental sedimentary-uranium		—	—	X	—	—	.111	1 1 1 1	≡	2	4	8	5K	20K	100K	—	—	—	—	—	—	—	=	—	
	3. Lacustrine evaporite		—	—	—	—	—				—	—	—	—	—	—	—	—	—	—	—	—	—		—	
	4. Fossil laterite		1 1 .	IN	5	92	—				—	—	—	1.9K	3.8K	12.8K	—	—	—	—	—	—	—		—	
	5. Shale Hosted massive sulfide-Copper			°	20	80	—			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	6. Shale Hosted massive sulfide-Pb-Zn-Ag		—	1	—	—	—	1 1 1 1 1	1 1 1 1 1	1 1 1 1 1	—	—	—	—	—	—	—	—	—	—	—	—	—	1 1 1 1 1	—	
	7. Carb. Strat.-Ba, F		o	: 1 1	—	—	—				—	—	—	—	—	—	—	—	—	—	—	—	—		—	
	8. Carb. Strat.-Pb-Zn-Cu		—		45	45	—				:	7	15	1.9K	4.5K	9.6K	120	300	200	—	—	—	—		—	
	9. Volc. Mass. Sulfide		—		—	—	—				—	—	—	—	—	—	—	—	—	—	—	—	—		—	
	10. Metamorphic		—		—	—	—				—	—	—	—	—	—	—	—	—	—	—	—	—		—	

Table C.5 Summary Mineral Exploitation Statis
Discordant Mineral Occurrence Types

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage: Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			Additional Comments
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	1 Breccia pipes		—	X	X	X	14	—	76	—	—	000K	—	—	—	—	—	—	—	—	—	—	—	—	—	
	2 Porphyry copper		—	—	—	X	16	101	191	143	2K	7K	20K	--	-	--	7	16	34	--	--	—	—	—	—	
	3 Biogenic sulfur		0	10	30	60	2	6	12	3	10K	100K	1000K	—	—	—	1	3	6	—	—	—	—	—	—	
	4 Vein-replacement		25	25	25	25	6	14	55	5%	1	10	20	—	—	--	6	12	60	—	—	—	—	—	—	
	5 Mass. sulf. pipes- Base & Precious metals		5	10	30	55	3.7	38	635	25%	100	2K	100K	—	—	—	0.5	1.5	18	0.01	1	6	0	0.2	4	
	6 Mafic-ultramafic		0	20	40	40	2	6	12	3	10K	100K	1000K	—	—	—	1	3	6	—	—	—	—	—	—	
	7 Anorthosite complexes		0	20	30	50	1	2	3	1	10K	100K	1000K	—	—	-	1	2	3	—	—	—	—	—	—	
	8 Vein-ultramafic		0	5	10	85	4	20	155	25%	100	10K	25K	—	--	—	1	5	22	0	4	8	0	1	2	
	9 Vein-dolomite		40	40	20	0	3	10	19	10%	100	500	1K	—	—	—	1.5	4	8	--	--	--	—	—	—	
	10 Carbonatite-alkalic		0	20	40	40	4	7	15	1	10K	20K	50K	—	—	—	3	5	9	—	—	—	—	—	—	
Stage 2: Detailed Reconnaissance	1 Breccia pipes		—	X	X	X	5	—	30	—	100	—	1K	—	—	—	—	—	—	—	—	—	—	—	—	
	2 Porphyry copper		—	—	—	X	135	368	822	318	30	50	80	0	4K	12K	9	21	30	0	—	2	0	—	6+	
	3 Biogenic sulfur		0	10	30	60	8	21	48	8	1	12	50	—	--	--	2	6	14	—	—	—			--	
	4 Vein-replacement		25	25	25	25	2	11	27	5%	1	10	20	—	—	—	1	8	16	—	—	—	-	-	--	
	5 Mass. sulf. pipes- Base & Precious metals		4	16	30	50	22.2	113	1540	25%	1	500	10K	20	1K	5K	0.5	9	48	0	9	--	0	6	40	
	6 Mafic-ultramafic		0	20	40	40	20	129	578	19	1	500	5K	—	—	—	2	12	36	--	—	—	—		—	
	7 Anorthosite complexes		0	20	30	50	16	42	128	11	100	2K	5K	--	—	—	1	3	9	—	—	—		—	—	
	8 Vein-ultramafic		0	4	9	87	5	22	400	25%	5	200	2K	—	—	—	0.5	3	18	0	2	--	0	2	8	
	9 Vein-dolomite		45	40	15	0	11	24	45	—	—	—	—	—	—	—	4	9	17	--	--	—	—	—	—	
	10 Carbonatite-alkalic		0	10	45	45	50	70	160	7	20	50	200	—	—	—	3	6	12	—	—	—	—	—	—	
Stage 3: Detailed Surface Investigation of Target Area	1 Breccia pipes		X	X	X	X	7	-	30	—	1	—	20	640	—	12.8K	2	9	18	—	—	--	--	—	—	
	2 Porphyry copper		—	—	—	X	592	935	1284	425	2	3	5	5K	10K	20K	18	24	32	1	5	12	1	3	6	
	3 Biogenic sulfur		0	0	40	60	7	17	72	5	1	4	12	600	2.6K	10K	2	6	16	—	—	--	0	7	54	
	4 Vein-replacement		26	28	23	23	3	25	60	5%	0.1	3	5	50	1K	5K	7	20	60	6	10	24	5	24	12+	
	5 Mass. sulf. pipes- Base & Precious metals		1	10	25	64	5	41	350	25%	0.1	5	40	40	2K	40K	0.3	7	26	1	5	20	0	0.2	14+	
	6 Mafic-ultramafic		0	20	40	40	8	20	50	6	1	4	50	100	2.5K	30K	1	6	20	—	—	—	0	4	72	
	7 Anorthosite complexes		0	10	30	60	20	30	70	6	2	4	20	1K	2.5K	10K	1	3	6	—	—	--	0	1	10	
	8 Vein-ultramafic		0	5	10	85	6.5	65	370	25%	1	15	100	100	1K	10K	2	10	90	1.5	7	60	1	6	46+	
	9 Vein-dolomite		20	50	30	0	2	7	16	—	—	—	—	40	100	500	1	1.5	3	—	—	—	--	--	--	
	10 Carbonatite-alkalic		0	10	45	45	47	73	160	14	5	40	88	3.2K	15K	30K	6	15	35	—	—	—	0	3	28	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	1 Breccia pipes		—	—	—	—	175	—	1700	—	—	—	—	640	—	12.8K	3	6	12	—	—	—	—		—	
	2 Porphyry copper		—	—	—	X	2810	4735	7654	1435	1	2	3	2K	2.5K	3K	23	36	48	3	9	18	3	3	18+	
	3 Biogenic sulfur		0	0	40	60	31	131	696	—	1	4	12	600	2.6K	10K	3	12	48	—	—	—	0	6	48	
	4 Vein-replacement		0	10	45	45	200	6.1K	15.5K	15%	0.1	1	3	50	200	2K	30	42	56	8	10	16	6	3	46	
	5 Mass. sulf. pipes- Base & Precious metals		1	10	30	59	76	549	6624	25%	0.1	0.5	2	40	500	2K	6	20	72	6	12	90	1	8	8+	
	6 Mafic-ultramafic		0	10	40	50	170	763	3K	50	1	4	50	100	2.5K	30K	9	24	48	—	—	—	0	2	48	
	7 Anorthosite complexes		0	0	25	75	213	463	883	30	2	4	20	1K	2.5K	10K	9	24	40	—	—	—	0	'	50	
	8 Vein-ultramafic		0	0	10	90	155	928	4630	25%	0.1	0.4	2	100	1K	10K	4	20	52	4	10	48	4	8	36+	
	9 Vein-dolomite		5	45	50	0	23	68	148	--	—	—	—	40	100	500	4	10	21	—	—	—	—	-	—	
	10 Carbonatite-alkalic		0	5	40	55	193	463	878	31	3	6	15	1K	3K	10K	12	24	50	—	—	—	0	6	25	

Table C.5 (Cont'd)

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 5: Development	1. Breccia pipes		—	—	—	—	3.5K	—	8.2K	—	0.5	—	3	640	—	6.4K	24	—	36	—	—	—	—	—	—	
	2. Porphyry copper		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	3. Biogenic sulfur		0	0	30	70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	4. Vein-replacement		0	10	45	45	15K	30K	50K	15%	0.1	0.3	2	50	200	2K	12	24	36	6	12	18	16	24	60	
	5. Mass. sulf. pipes-Base & Precious metals		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	6. Mafic-ultramafic		0	0	30	70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	7. Anorthosite complexes		0	0	10	90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	8. Vein-ultramafic		0	0	10	90	6.1K	21.9K	406K	25%	—	—	—	—	—	—	18	36	84	5	28	60+	8	20	20+	
	9. Vein-dolomite		0	40	60	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	10. Carbonatite-alkalic		0	0	50	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Stage 6: Production	1. Breccia pipes		—	—	—	—																				
	2. Porphyry copper		—	—	—	—																				
	3. Biogenic sulfur		—	—	—	—																				
	4. Vein-replacement		—	—	—	—																				
	5. Mass. sulf. pipes-Base & Precious metals		—	—	—	—																				
	6. Mafic-ultramafic		—	—	—	—																				
	7. Anorthosite complexes		—	—	—	—																				
	8. Vein-ultramafic		—	—	—	—																				
	9. Vein-dolomite		0	40	60	0																				
	10. Carbonatite-alkalic		—	—	—	—																				

Geologic Environment: Surficial Aluminous Clays & Laterites
Typical Ores: Kaolinite & Bauxite for U.S. of America

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geological Compilation	O	0	5	10	85	15	50	150	20%	1K	10K	100K				2	6	12							
	Photogeological studies (rock units weathering)	O	0	5	10	85	20	50	100	20%	1K	20K	100K				6	10	12							
	Land use compilation	O	0	0	20	80	10	40	60	20%	1K	2K	50K				1	2	4	2	4	6				
	Field inspections of several selected areas	F	5	5	25	65	30	70	200	30%	100	1K	20K				2	6	18	0	4	12	0	6		
	Compilation and evaluation	O	5	5	25	65	10	40	80																	
	Total						85	200	590	25%							6	10	18	2	4	12	0	6		
Stage 2: Detailed Reconnaissance	Geological mapping	C or F	1	4	20	75	20	40	100	20%	10	40	100				4	12	24	0	Cracwm:	Loam	0	6		
	Soil geochemistry	C or F	1	4	20	75	10	20	40	10%	10	40	100				4	12	24	0			0	6		
	Drilling and sampling	F	5	10	25	60	20	150	800	30%	5	20	50				6	12	36	0			2	6		
	Compilation and evaluation of data	O	5	10	25	60	10	40	80	30%	10	40	100				2	4	8							
	Total						60	250	1020	27%							6	15	40	0	2	12	0	6		
Stage 3: Detailed Surface Investigation of Target Area	(Land acquisition)	F	10	20	20	50	(40)	(200)	(400)	10%	6	12	40	3840	7680	25600	4	12	36	0	2		4	12		
	Preliminary Feasibility study	O	5	5	5	85	40	80	200	10%	2	4	8				2	6	12	0	2	4				
	Preliminary Environmental studies (eco. legal Political)	F	5	5	5	85	40	80	160	20%	20	80	200				6	12	36	0	2	6	4	12		
	Total						80	160	360	15%							6	12	36	0	2	6	4	18		

Geologic Environment: Surficial Aluminous Clays & Laterites
Typical Ores: Kaolinite & Bauxite for U.S. of America

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Detailed Drilling and assaying	F	1	4	20	75	700	1500	3000	30%	6	12	40	1920	3840	12.8K	6	12	24	2	3	12	2	6	12	
	Metallurgical Testing	F	1	4	20	75	100	200	400	10%	6	12	40				3	12	24	0	2	4				
	Reserve calculation	O	5	10	25	60	20	40	80	10%	6	12	40				1	2	4	0	2	3				
	Environmental Studies	F	1	4	20	75	100	400	1000	20%	6	12	40				12	12	12	0	2	3	2	6	12	
	Preliminary Mine Planning	O	1	4	20	75	20	40	80	10%	6	12	40				2	4	6	0	2	3				
	Compilation of Data & Feasibility Study	O	1	4	20	75	20	100	200	10%	6	12	40				2	4	6	0	1	1½				
	(Land Acquisition)	F	5	10	25	60	(300)	(2K)	(4K)	10%	6	12	40				12	12	12	0	6	12	0	6		
	Fill-in Drilling & Assaying	F	1	4	20	75	200	1000	2000	30%	3	6	20	1920	3840	12.8K	4	6	8	1	2	4	2	4	8	
	Bulk Sampling & Metallurgical Testing	F	5	10	25	60	100	700	1500	20%	3	6	20				4	8	16	0	2	4	1	6		
	Mining Tests	F	1	4	20	75	100	400	1000	20%	3	6	20				8	16	32	0	2	3	2	6		
	Preliminary Engineering for Plant, etc	O	1	4	20	75	50	300	700	10%	3	6	20				4	6	8	0	1	2				
	Final Feasibility study	O	1	4	10	85	100	300	700	10%	3	6	20				6	8	12	0	1	2				
	Environmental Studies	F	1	4	10	85	100	400	1000	20%	3	6	20				12	12	12	0	1	2				
	Legal Work	O	1	4	10	85	100	300	600	10%	3	6	20				6	8	12	0	1	2				
	Total						1710	5680	12.3K	20%							24	36	60	3	12	30	5	14	20	
Stage 5: Development	Mine Construction	F	1	2	5	92	20K	50K	100K	10%	1	2	6				24	36	60	6	12	24	12	36		
	Mill Construction	F	1	2	5	92	20K	50K	100K	10%							18	24	36	6	12	24	12	36		
	Infrastructure Construction	F	1	2	5	92	20K	50K	100K	10%							12	24	36	6	12	24	12	36		
	Permits	O	1	2	5	92	50	100	200	10%				1920	3840	12.8K	12	24	36				12	36		
	Environmental studies & work	F/O	1	2	5	92	15K	30K	60K	10%							24	36	48	6	12	24	12	36		
	Geological & Technical studies & Drilling	F/O	1	2	5	92	100	300	600	20%							12	18	24	6	12	24	12	24		
	Total						75.2K	280K	361K	10%							36	48	60	6	12	24	12	36		

Geologic Environment: Surficial Aluminous Clays & Laterites
Typical Ores: Kaolinite & Bauxite for U.S. of America

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 6: Production		F	1	2	5	92	10K	20K	40K	10%							12	24	36				6	2		
		F/O	1	2	5	92	20K	50K	100K	15%				1920	3840	12.8K										
		F					8K	16K	32K																	
		F					7K	14K	28K																	

Geologic Environment: Surficial — Laterites
Typical Ores: Nickel

Form 1
Summary Mineral Exploitation Statistics
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	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic Compilation	O				X	1	2.5	4		4K	12K	60K	—	—	—	5	7.5	10	—	—	—	—	—	—	
	Paleogeography studies	O		X			2	3	4					—	—	—	5	7.5	10	—	—	—	—	—	—	
	Field Reconnaissance of pre-mineral rocks	F				X	7	14	18	15%	2000	6000	30000	—	—	—	5	10	15	—	—	—	—	—	—	
	Total						10	19.5	26	15%							15	25	35							
Stage 2: Detailed Reconnaissance	Geologic mapping of pre-mineral rocks	F				X	10	30	35		100	300	500	—	—	—	10	20	25	—	—	—	—	—	—	
	Geochemical sampling	F				X				15%				—	—	—				—	—	—	—	—	—	
	Total						10	30	35	15%							1	2	2.5							
Stage 3: Detailed Surface Investigation of Target Area	Detailed geologic mapping of target areas	F				X	12	20	25		50	100	150	—	—	—	2	4	6	—	—	—	—	—	—	
	Detailed geochemical sampling of target area	F				X	2	3	7	15%	5	7	15	2K	3K	6K	—	—	—	—	—	—	—	—	—	
	Mineralogical studies	L		X			2	5	7		—	—	—	2K	3K	6K	25	5	75	—	—	—	—	—	—	
	Total						16	28	39	15%							2.25	4.5	6.75	—	—	—	—	—	—	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling, logging					X	400	2500	3000		10	20	25	2K	3K	6K	—	—	—	—	—	—	—	—	—	
	Assaying						20	125	150		—	—	—	2K	3K	6K	24	36	48	—	—	—	—	—	—	
	Metallurgical studies						10	100	300		—	—	—	2K	3K	6K	—	—	—	—	—	—	—	—	—	
	Amenability studies						5	10	15		5	10	15	2K	3K	6K	2	2.5	5	—	—	—	—	—	—	
	Hydrology						50	100	200		5	10	15	2K	3K	6K	CONTINUAL			—	—	—	18	24	36	
	Order of magnitude studies						1	5	10	15%	5	10	15	2K	3K	6K	25	1.0	2.0	—	—	—	—	—	—	
	Environmental studies						50	150	400		5	10	15	2K	3K	6K	CONTINUAL			—	—	—	24	36	48	
	Budget estimates						10	100	200								3	8	12							
	Definitive estimates						4000	5000	10^4		5	10	15	2K	3K	6K	—	—	—	18	24	36	—	—	—	
	Total						4.54K	8.1K	14.3K	15%							24	36	48	18	24	36	24	36	48	
Stage 5: Development	Open-pit mine																									
	Mine planning & pre production stripping					X	5K	7K	10K	20%	5	1	15	2K	3K	6K	8	12	18				12	18	24	
	Mine, plant construction					X	18K	23K	25K								30	36	45							
	Total						23K	30K	35K	20%							38	48	63				12	18	24	
Stage 6: Production																										
	Total																									

Geologic Environment: Surficial — Stream Placers
Typical Ores: Gold, Tin, Silver, Diamonds

Form 1
Summary Mineral Exploitation Statistics
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	Main Activities and Methods, in Chronological Sequence	O, F, or L		Percentage of Each Activity Done by			Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage: Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			Additional Comments
				S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	1. Regional appraisal mainly literature to locate largest areas of alluvium-first countrywide, then state wide	O	One looks for area with history of mining	×	×			1	5	in-cluded	1 to 10		No limit other than size of deposit	**see below			mo		3 mos							The greatest time consumer could be 3, i e picking up land.
	2. Locate most favored areas from study of source rocks.	O		×	×			1	5	in-cluded																
	3. Visit the area to ascertain land position-who holds lands and what portion of it is available for what price.	F		×	×			1	5	in-cluded																
	Total							3	15																	
Stage 2: Detailed Reconnaissance	This stage would probably be omitted unless the taking of a few widely-spaced large samples from natural exposures in cliff faces in streams incised in the alluvium can be regarded as detailed reconnaissance.																									
Stage 3: Detailed Surface Investigation of Target Area	As described under stage 2: detailed reconnaissance	F		×	×		.4		42		1 to 10															At the end of this stage we would know whether to proceed or get out.
	Total						.4		42																	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling with churn-type drill on a grid pattern. Initially the grid lines could be as much as ½ to 1 mile apart with individual holes 500 to 1000 ft. apart. This drill pattern would be closed.	F		X	X		120		1000		1 to 10															At the end of this state, assuming success, we would be considering the cost of a dredge & a dredging operation.
	Total						120		1000																	
Stage 5: Development	No gold dredge has been built since the 50s other than by the Russians who incidentally had sent over one of California's Yoba Dredges on which their present dredges are no doubt patterned.			×	X		* A dredge today would cost any where from $10 million to $50 million. To recommission an old one would cost close to $10 million.				*NOTE*: As previously stated, it would appear that even if a dredging operation finally cleared the environmentalists, the time and costs involved in doing this would be considerable and very few companies will be game to try.															
Stage 6: Production											A medium-sized gold dredge would shift approximately 8,000 to 12,000 yards in a 24-hour period, which is about 300,000 yards for a 30-day month. With a grade of 1 .100 oz Au/ cubic yard, which is higher than average by possibly a factor of 2, the average monthly ounces of gold recovered would be 3,000, which at a gold price of $140/ ounce = $420,000 gross per month, or $5,040,000 per annum. We might net 15% of this. *NOTE*: In Alaska, or elsewhere where permafrost exists, the dredging year is 180 days.															

* Generally speaking, large companies are no longer interested in placers other than perhaps tin in Malaysia and in Russia for two reasons: 1) Insufficient dollars in the ground, and; 2) Unlikelihood of being environmentally allowed to disrupt ground.

** I really think one can forget about any future major placer operations in view of the politician's attitude toward preservation of the status quo of the environment resulting from pressure from vociferous, well organized, intelligent, but ignorant minority groups.

So, unless the above comments are noted and action taken by Politicians, then the time taken in completing this form is wasted and is costing us dollars.

Geologic Environment: Surficial — Coastal Placers
Typical Ores: Titanium (Ilmenite)

Form 1
Summary Mineral Exploitation Statistics
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																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
				S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Literature research	O		33	33	34	5	10	15	5%	1K	8K	10K	None	None	None		6			6		0	0	0	Work could be done by very small operators
	Field inspection	F		33	33	34	5	5	5	5%		4K		0	0	0		2			2			0		
	Wide-spread surface sampling of dark sands along roads, etc	F		33	33	34	5	5	5	5%		4K		0	0	0		2			2			0		
	Total						5	20	25	5%								10			8		0	0	0	
Stage 2: Detailed Reconnaissance	Surface sampling in areas of free access at say 400' intervals	F		33	33	33						1K		0	0	0		4			4					
	Land work determination of ownership, etc.	O	25	25	25	25		10		5%		1K		0	0	0		6			6			0		
	Total							10		5%								10			8			0		
Stage 3: Detailed Surface Investigation of Target Area	(Land Acquisition)	O	25	25	25	25	(5)	(15)	(30)	5%	1	10	25	640	6.4K	25K	4	20	24		?			0		Federal Prospecting Permits now take more than 2 years to be issued. Exact length of delay will not be known until Federal permit is issued
	Surface sampling	F	25	25	25	25	2	10	25	5%	1	20	50	640		25K								?		
	Auger sampling 400' intervals	F			50	50	08	8	2	5%	1	10	25			16K	2	4	6	4		8	2	3	4	
	Assay of sample	I			50	50	08	8	2							16K	2	2	2	1			0	0	0	
	Plotting, drafting	O			50	50	01	1	1							16K	1	1	1	1			0	0	0	
	Total						2	12	30	5%							8	24	40	5	?	8	2	3	4	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Churn drilling at 400'	F			50	50	6	68	400	5%	1	5	10	640	6.4K	16K	2	20	50	1	2	5	4	6	24	
	Bulk Sampling	F			50	50	8	1	12	5%	1	5	10	640	6.4K	10K	1	2	3	1	1		0	5	10	
	Environmental base line studies	E			50	50	5	25	100	5%						10K	12	18	36	1	1		0	0	0	
	Environmental impact study	O			50	50	10	50	650	5%						10K	4	8	24	1	1		0	0	0	
	Operating permits	O			50	50	10	00	500	5%						10K							6	12	60	
	Total						49	345	662	5%							2	24	50	1	2	5	4	6	24	
Stage 5: Development	Construction	F			50	50	5	7	25	5%				3.2K	6.4K	10K	10	2	24	5	5	5	0	3	6	
Stage 6: Production																										

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Geologic Environment: Surficial — Residual Deposits
Typical Ores: Phosphate

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic appraisal, regional area selection	O		10	30	60	5	8	15	2	10K	100K	1000K	—	—	—	2	3	4							
	Air-photo, topographic and geologic map studies of selection	O					5	8	15	2	10K	100K	1000K				2	3	4							
	Total						10	16	30	4							4	6	8							
Stage 2: Detailed Reconnaissance	Geochemical and or soil surveys	F		10	30	60	15	25	45	5	10	1K	10K	2K	4K	8K	2	3	6							
	Geologic reconnaissance mapping	F					15	25	40	5	10	1K	10K	2K	4K	8K	2	3	6							
	Overburden check drilling	F					20	30	60	5	10	20	1K	2K	4K	0K	3	4	8					1	5	
	Total						50	80	145	15							7	10	20					1	5	
Stage 3: Detailed Surface Investigation of Target Area	Detailed geologic mapping	F		0	30	60	10	25	35	5	3	5	12	600	1K	8K	1	2	3				—	—	—	
	Detailed geochem and or soil survey	F					10	30	40	6	3	5	12	600	K	8K	1	2	3				—	—	—	
	Trenching	F					10	25	50	5	3	5	12	600	1K	8K	1	2	3				0	1	3	
	Analyses	L					5	10	15	2	—	—	—				1	2	3				—	—	—	
	Total						35	90	140	18							0	5	12				0	1	3	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Overburden: grid drilling	F			35	65	40	70	150	10	3	5	12	600	1K	8K	3	8	18	1	6	10		6	20	
	Deep trenching or shaft sinking	F			35	65	20	60	150	12							2	5	15	1	2	5		3	15	
	Engineering and economic feasibility studies	O					10	20	40	4							2	5	10	—	—	—	—	—	—	
	Pilot plant operation	F					30	50	120	10							2	5	15	1	3	5	1	2	5	
	Total						100	200	460	36							6	12	36	3	6	10	1	6	20	
	Total																									

Geologic Environment: Surficial — Brines in Evaporites

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Esc.. Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Study of geological literature & maps, selection of geologically economically and politically favorable target regions	O					2	6	12	3	10K	100K	1000K				1	3	6							
	Total						2	6	12	3							1	3	6							
Stage 2: Detailed Reconnaissance	Study of geological literature and maps, selection of specific target areas	O					3	9	18	3	4	20	1K				1	3	6							
	Surface geologic study & sampling	F					5	12	30	5	4						1	4	12							
	Total						8	21	48	8							2	7	18							
Stage 3: Detailed Surface Investigation of Target Area	Extensive sampling	F					5	25	50	6	4	12	100	1.2K	7.6K	60K	1	3	8							
	(Land acquisition)	F					(2)	(25)	(500)	(5)	4	12	100	1.2K	7.6K	60K	1	3	8				0	6	60	
	Total						5	25	50	6							2	5	14				0	6	60	
Stage 4: Detailed Three-Dimensinal Physical Sampling of Target Area	Drilling, sampling	F					8	100	250	5	4	12	100	1.2K	7.6K	60K	1	18	24				0	6	60	
	Analyses of samples	L					5	10	50	1							1	18	24							
	Beneficiation studies	L					5	50	250	5							1	18	24							
	Feasibility study	O					10	50	100	5				2.6K	7.6K	60K	3	12	18							
	Marketing study	O					12	30	60	5							2	6	12							
	Pilot beneficiation	F					15	100	500	15							3	6	18							
	Total						55	340	1.2K	36							9	24	42				0	6	60	
Stage 5: Development																										
	Total																									
Stage 6: Production																										
	Total																									

Geologic Environment: Surficial — Supergene Enrichment
Typical Ores: Cu, Ag, Pb, Zn, Au, Mn

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet of 2

	Main Activities and Methods, in Chrological Sequence	O, F or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
				S	M	L	Min	Avg	Max	Over-	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic Compilation	O	10	10	30	50	1	3	5	1	1	100	1K	0	0	0	1	3	6	1	1	1	0	0	0	
	Structural Studies	O	10	10	30	50	1	3	5	1	1	100	1K	0	0	0	1	2	3	1	1		0	0	0	
	Compilation of Previous Mining Activity	O	10	10	30	50	1	3	5	1	1	50	100	0	0	0	1		3	1	1		0	0	0	
	Field Survey	F	5	5	40	50	1	3	5	1	1	100	200	0	0	0	1	2	3	1	1	1	1	1	1	
	Total						4	12	20	4							4	8	15	4	4	4				
Stage 2: Detailed Reconnaissance	Surface Mapping of rocks, Alt	F	5	10	25	60	5	15	25	5	1	3	10	100	1K	10K	2	6	12	1	1	1	0	0	0	Time for Land acquisi not included
	Rock, Soil Geochem	F	5	10	25	60	10	25	50	5	2	10	50	100	1K	10K	2	3	12	1	1	1	0	0	0	
	Petrog, mineralogic studies	L	0	5	10	85	2	3	5	1	1	1	5	—	—	—	1	2	3	1	1	1	0	0	0	
	Geophysics (IP, SP, Mag	F	0	5	10	85	10	50	100	5	5	5	10	100	2K	10K	1	2	3	1	1	1	0	1	2	
	Field inspection of Anomalies	F	0	10	40	50	5	15	20	10	5	7	10	100	2K	10K	1	2	3	1	1	1	0	0	0	
	Total						32	108	200	26							7	15	33	5	5	5		1	2	
Stage 3: Detailed Surface Investigation of Target Area	Detailed geologic and alteration mapping	F	0	10	40	50	5	25	50	10	1	3	10	100	1K	10K	1	7	10	0	0	0	0	0	0	
	Detailed Surface geochemistry	F	0	10	40	50	5	25	50	10	1	3	10				1	7	10	0	0	0	0	0	0	
	Preliminary Drilling	F	0	5	20	75	50	75	200	25	1	2	5				3	8	12	1	5	12	1	3	6	
	Total						60	125	300	45							5	15	22	1	5	12	1	3	6	
Stage 4: Detailed Three-Dimensional Physical Physical Sampling of Target Area	Drilling	F	0	0	20	80	100	750	2000	250	1	1	10	1	5K	9K	12	30	96	1	6	36		6	2	
	Prelim Metallurgical Testing	L	0	0	20	80	50	250	300	50	1	3	10				3	10	12	1	6	36	0	0		
	Driving underground workings for bulk sample	F	0	0	10	90	200	500	1000	200	1	1	2				3	18	36	2	12	48	1	6	24	
	Final Metallurgical Environmental and support studies		0	0	10	90	200	1500	2000	500	1	3	10				6	15	18	2	12	48		12	24	
	Feasibility Study	O	0	0	5	95	200	500	1000	200	1	3	10				12	15	24	2	6	24		6	12	
	Total						750	3.5K	6.3K	1.2K							27	54	186	8	42	192	5	30	72	

Geologic Environment: Surficial — Supergene
Typical Ores: Cu, Ag, Pb, Zn, Au, Mn

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 5: Development	Permits	O	[illegible]	[illegible]	1[illegible]	[illegible]	10	25	50	15	1	3	10	[illegible]	5K	10K	12	18	48	6	12	36	12	18	24	
	Mine-Mill Design and Engineering	L	0	0	0	90	25	150	300	25	1	3	5				12	18	36	12	18	36	12	18	24	
	Site Preparation	F	0	0	10	90	100	1K	2K	250	1	2	5				12	15	24	12	18	36	12	18	24	
	Construction of Mine Mill	F	0	0	5	95	5000	80K	500K	1000	1	2	5				12	24	48	12	18	36	12	24	36	
	Total						5.1K	81.2K	502K	1290							48	75	156	42	66	144	48	78	108	
Stage 6: Production	Operating Permits	O	[illegible]	[illegible]	5	95	25	50	100	50		3	0	K	5K	OK	12	24	36	6	12	36	6	18	36	
	Labor Negotiations	O	[illegible]	[illegible]	5	95	25	50	100	75	—	—	—	—	—	—	6	10	12	6	12	36	6	12	36	
	Town Site	F	[illegible]	[illegible]	5	95	200	500	1K	200	1	2	3				12	18	24	6	12	36	6	12	36	
	Mine-Mill Shakedown	F	0	[illegible]	5	95	20[illegible]	500	1K	500	—	—	—				3	6	12	6	12	36	6	10	12	
	Total						45[illegible]	1.1K	2.2K	825							21	48	84	24	48	144	24	52	130	

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Geologic Environment: Surficial — Supergene Enrichment
Typical Ores: Silver

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead		Area (Sq. Mi.) Being Investigated		Area (Acres, Under Claim, Option, Lease, Etc.	Duration (Months) of Each Stage			Additional Comments
			I	S	M							Without Any Delays	Plus Non-Regulatory Delays	Plus Delays Due Solely to Regulation	
Stage 1: Regional Appraisal	Geologic Compilation	O													
	Field Examination	F													
	Total														
Stage 2: Detailed Reconnaissance	Surface Geochem	F				X	50	20	3		1K	6			
	Prelim Geol Mapping	F				X	10	5	3		1K	6			
Stage 3: Detailed Surface Investigation of Target Area	Geol Mapping	F				X	10	5	3		1K	3			
	Drilling	F				X	100	25	1		1K	3			
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling	F				X	1K	250	2		2K	9	6	04	
Stage 5: Development	Metallurgical Work	L			X		300	75	—		2K	12			
	Mine-Mill Engr	L			X		300	7	2			12			
	Feasibility	O			X		1K	25	2			12			
	Construction	F				X	2K	500	1			24			
	Total						36K					36			
Stage 6: Production	Permits	O				X	250	75	2		2×	18			
	Mine Mill Shakedown	F				X	250	75	—			6			
	Total														

Geologic Environment: Stratabound Extensive-Bedded Precambrian
Typical Ores: Gold or Uranium or Base Metals

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic Compilation	O	3	25	35	42		4	20	0	1K	50K	300K	—	—	1	0.2	0	6.0	0.8	1.0	3.0	1	1	—	Zero minimum means the method was not applicable or the project was abandoned before the method would have been applied
	Potogeology	O	3	25	35	42	0	2	10	0	25	100	1K	—	—	1	0	0.5	2.0	0	0	1.0	1	1	—	
	Geologic field check	F	3	25	35	42	0	N	5	0	5	40	500	—	—	1	0	0.5	1.0	0	0.0	1.0	1	1	—	
	Geophysics Compilation	O	3	25	35	42	0	-	5	0	25	1K	10K	—	—	1	0	0.2	1.0	0	1.0	1.0	1	1	—	
	Total							9	45								0.2	2	10	0.8	3.5	6	0	0	0	
Stage 2: Detailed Reconnaissance	Reconnaissance mapping	F	1	20	35	44		10	100	1	5	40	500	—	—	—	0.2	2	24	—	—	—	—	—	—	See Comment under Regional Appraisal. May be concurrent
	Geochemical sampling and analysis	F	1	20	35	44	0	5	25	0.5	5	40	500	—	—	—	0	2	24	—	—	—	—	—	—	
	Ground radiometric Reconnaissance	F	1	20	35	44	0	1	5	0.1	5	40	500	—	—	—	0	0.5	2	—	—	—	—	—	—	
	Airborne geophysical	F	1	20	35	45	0	15	50	1.5	5	40	500	—	—	—	0	0.2	0.5	—	0.5	1	—	—	—	
	Total		1				1	30	180	3							0.2	2	24	0	0.5	1	0	0	0	
Stage 3: Detailed Surface Investigation of Target Area	Geologic mapping	F	0	20	35	45	10	30	90	3	0.3	2	7	200	1K	4K	1	4	12			1	—	—	—	See comment under Regional Appraisal. May be concurrent
	Sampling and analysis	F	0	20	35	45	5	15	30	2	0.3	2	7	200	1K	4K	1	4	12		1	1	—	—	—	
	Ground geophysical	F	0	20	35	45	0	10	40	1	0.3	2	7	200	1K	4K	0	3	6	0	1	1	—	—	—	
	Trenching	F	0	20	35	45	0	5	20	1	0.3	2	7	200	1K	4K	0	1	2	0	0	0	0	4	12	
	Drilling	F	0	20	35	45	0	50	250	5	0.3	2	-	200	1K	4K	0	2	8	0	-	1	0	4	12	
	Total		—				15	110	430	12							1	7	20				0	4	12	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Areas	Drilling	F	—	10	40	50	250	1K	5K	100	0.3	2	▪	200	1K	4K	12	24	48	4	8	16	6	12	36	See comment under Regional Appraisal
	Underground work for bulk samples	F	0 0	10	40	50	0	700	2K	70	0.3	2	7	200	1K	4K	0	18	30	0	6	10	6	12	36	
	Sampling and assaying	L	0 0	10	40	50	10	40	200	3	0.3	2	7	200	1K	4K	12	42	60	-	2	4	0	0	0	
	Ore dressing tests			10	40	50	15	40	100	3	0.3	2	7	200	1K	4K	2	6	12	-	2	3	0	0	0	
	Feasibility studies	O	0	10	40	50	10	40	100	4	0.3	2	7	200	1K	4K	2	3	6	-	1	2	0	0	0	
	Total						285	1.8K	7.4K	180							6	15.0	28	7	9	35	12	24	72	
Stage 5: Development	Not qualified to complete this																									
	Total																									
Stage 6: Production	Not qualified to complete this																									

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Geologic Environment: Stratabound Extensive-Marine Sedimentary
Typical Ores: Phosphate

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Study of geological literature & maps, selection of geologically economically & politically favorable target regions	O		10	40	50	2	6	2	3	10K	100K	1000K					3	6							
	Total						2	6	2	3								3	6							
Stage 2: Detailed Reconnaissance	Study of geological literature and maps, selection of specific target areas	O		0	4[a]	50	3	9	18	3	500	2K	10K					3	6							
	Aerial photography, surface geologic study & sampling	F					5	12	30	5	500	2K	10K					4	12							
	Total						8	21	4[a]	8								6	4							
Stage 3: Detailed Surface Investigation of Target Area	Gamma ray surveys of water wells, geologic mapping & sampling	F		5	10	85	3	9	24	3	4	12	200	2.5K	7.6K	13K	1	3	8				0	2	12	
	(Land acquisition)	F					(10)	(500)	(5000)	6						13K	1	3	8				0	2	100	
	Total						3	9	24	3							2	5	14				0	4	100	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Areas	Drilling, sampling	F			40	60	100	500	2000	6	4	12	200	2.5K	7.6K	13K	4	18	36				0	24	100	
	Analyses of samples	L					5	25	75	1							4	18	36							
	Beneficiation studies	L					10	100	300	5							2	12	36							
	Compilation and study of data	O					8	36	60	1							4	18	36							
	Feasibility study	O			35	65	25	100	300	12							6	12	24							
	Sinking test pit	F					100	500	1500	25							3	6	12							
	Marketing study	O					12	30	60	5							2	6	12							
	Total						260	1191	4295	55							12	30	60				0	24	100	
Stage 5: Development																										
	Total																									
Stage 6: Production																										
	Total																									

Geologic Environment: Stratabound Extensive-Marine Evaporite
Typical Ores: Potash

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Compilation of geologic literature/mapping	O	10	20	35	35																				
	Oil/gas well log studies	O	15	25	30	30																				
	State and Federal Survey visits	O	15	25	30	30																				
	Basin analyses	O	15	25	30	30					500K	1000K	1000K													
	Choice of basin to be investigated	O	15	25	30	30	5	10	20	15%	1K	4K	8K	—	—	—	NA	—	—	—	NA		NA			
	Total						5	10	20	15%																
Stage 2: Detailed Reconnaissance	Detailed well log analysis	O	15	25	30	30	2	3	4		1K	4K	8K	—	—	—										
	Determination of property	O								15%																
	Distribution/ownership	F	15	25	30	30	1	3	4		200	500	800	—	—	—	NA				NA		NA			
	Total						3	6	8	15%																
Stage 3: Detailed Surface Investigation of Target Area	Option to lease property	O F	15	20	35	35	(5)	(20)	(75)		200	500	800	1K	8K	15K	6	12	18	8	16	20	—	—	—	Issuance of Prospecting Permits or even competitive leases is practically non-existent Carlsbad, N.M. Area has best near-term chance for exploring Federal ground for Potash
	Federal Ground	O	25	25	25	25	(4)	(10)	(16)		200	500	800	1K	8K	15K	NA	NA	NA	—	—	—	36	60	?	
	File Prospecting Permit									15%																
	State Ground	O	25	25	25	25	(0.3)	(2)	(3.2)		200	500	800	500	4K	7.5K	1	2	3				1	3	3	
	Total						0	0	0								6	12	18	8	16	20	36	60	?	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Baseline Environ. Study	O F	0	5	45	45	20	40	60								12	18	24	—	—	—	—	—	—	
	Dia. drilling and radiometric logging	F	2	10	38	50	100	200	700		200	500	800	1K	8K	15K	12	18	24	18	24	30	24	36	42	
	Assay costs									15%																
	Solution Mining Potential	F	0	10	90		250	500	1000								6	12	18	12	18	24	24	30	42	
	Drilling greater than 3,500 ft. depth; less than 9,000 ft. depth: Engineer Feasibility	O F	0	5	45	45	50	100	250								6	12	18	—	—	—	—	—	—	
	Total						420	840	1010	15%							12	18	24	18	24	30	24	36	42	

Geologic Environment: Stratabound Extensive-Marine Evaporite
Typical Ores: Potash

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
				S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 5: Development	File for Necessary Permits-obtain	O	5	15	40	40	2	3	4		[illegible]	30	50	[illegible]K	8K	15K	6	[illegible]2	[illegible]8	—	—	—	18	24	30	
(a) Conventional Mine	Dev. Surf. Dia. Drill	F	0	10	40	50	200	400	1.4K	5[illegible]	[illegible]	30	50	[illegible]K	8K	15K	6	.2	[illegible]8	—	—	—	12	18	24	
	Shaft Sink	F	0	4	46	46	2K	5K	15K		[illegible]	30	50	[illegible]K	8K	15K	6	[illegible].2	[illegible]8	3	15	21	NA	NA	NA	
	Refinery Construct (1.5 mill typ K20 cap)	F	0	0	30	70	70K	80K	90K		[illegible]0	30	50	1[illegible]	8K	15K	12	18	24	15	21	27	21	27	33	
	Total						72.2K	85.4K	106.4K	15%							18	30	42	15	24	30	21	27	33	
(b) Solution Mine	Drill & Rig Prod. wells (15-20)	F	0	0	30	70	4500	6000	[illegible]0[illegible]	15%	[illegible]0	3[illegible]	5[illegible]	5K	8K	15K	18	20	24	20	22	26	26	28	32	
	Construct Evap. Ponds or Crystallizer	F	0	0	30	70	35K	50K	[illegible]0[illegible]		[illegible]0	3[illegible]	5[illegible]	5K	8K		12	14	18	14	16	20	20	22	26	
	Refinery Const (1.5-2.0 million typ K20 cap.)	F	0	0	30	70	55K	65K	75K		[illegible]0	3[illegible]	5[illegible]	5[illegible]	8K		18	20	24	20	22	26	26	28	32	
	Total						5K	12.1K	185K	5%							18	20	24	20	22	26	26	28	36	

NOTE: Reference to a definitive study of Potash Mining in the U.S. can be had by:

1) Preliminary Regional Environmental Analysis Record Oct. 1975 - Potash Leasing in Southeast New Mexico. Approx. 800p.
2) Executive Summary and Supplement-Environmental Analysis Record Spring, 1976-Potash Leasing in Southeastern New Mexico. 187 p.
3) Adams, S.S., 1975, *Potash* in: Industrial Minerals and Rocks, 4th Ed. S.J. Lefond, Editor, pp. 963-990.

Geologic Environment: Stratabound Extensive-Continental Sedimentary
Typical Ores: Coal

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	D, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1 Regional Appraisal	Compilation geology	O	10	20	35	35	2	6	8	15%	100	140	200	—	—	—	2	6	8	—	—	—	—	—	—	
	Regional mapping	F	15	20	30	35	1	4	6		50	100	140	—	—	—	1	3	4	—	—	—	—	—	—	
	Total						3	10	14	15%							3	8	10	—	—	—	—	—	—	
Stage 2: Detailed Reconnaissance	Prospect examination	F	25	25	25	25	2	6	8	15%	50	100	140	—	—	—	2	6	8	—	—	—	—	—	—	
	Compilation	O	10	20	35	35	1	3	4		50	100	140				2	6	8							
	Total						3	9	12	15%							2	6	8							
Stage 3: Detailed Surface Investigation of Target Area	Initial leasing	F	25	25	25	25	(10)	(100)	(250)		25	50	70	640	1K	5K	3	6	9							
	Initial drilling and mappin	F	0	10	45	45	15	150	250	15%							3	4	6	—	—	—	3	4	6	
	Preliminary evaluation	O	5	15	30	50	5	10	25																	
	Total						20	160	275	15%							6	12	18				3	4	6	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Lease: purchase of total project area	F	0	10	45	45	(2K)	(6K)	(20K)	15%	—	—	—	5K	10K	25K	6	12	24							
	Baseline environmental study		0	10	45	45	25	40	60								2	3	4							
	Total						25	40	60	15%							6	12	24							
Stage 5: Development	Development drilling	F	0	10	45	45	2K	4K	6K	15%	—	—	—	5K	10K	25K	12	24	36	5	0	0	6	10	24	
	Apply for permits, federal, state, county, municipal	O	0	10	45	45	0.5	1	5	15%	—	—	—				—	—	—	—	—	—	—	—	—	
	Environmental impact statement	O	0	0	50	50		**			10	20	50				12	24	36	6	7	8		NA		**cited as 5 to 10% of total capital cost
	Engineering feasibility study	O	0	10	45	45	50	75	100	15%	—	—	—				6	12	18		3	6		NA		
	Transportation study	O	0	10	45	45	60	100	150	15%	—	—	—				3	6	12	000	3	6				
	Marketing study	O	0	10	45	45	60	100	150	15%	—	—	—				3	6	12		3	6				
	Total capital cost of mine preparation, including facilities		—				20K	55K	80K								—			—						
	Total						22K	59K	86K	15%							12	24	36		2	30	6	10	24	

Geologic Environment: Stratabound Extensive-Stratiform Igneous Complex
Typical Ores: Iron, Chromium, Platinum, Nickel

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, In Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic Concept	O				X	--	-	—	42	500	40K	100K			-	0	12	24							
	Geologic Data Compilation	O				X	4	7	21	7							1	2	6							
	Prospector Submittals	O F					2	4	7	4							0.5	1	2							
	Geophysical Ex. Data Comp	O					4	7	21	7								2	6							
	Air Photo Interpretation	O					4	7	21	7								2	6							
	Geologic Reconn	F					4	14	21	4								4	6							
	Aeromagnetic Survey	F O					30	100	250	00							1	6	12							
	Geochemical Reconn	F O					7	14	21	14							1 3 2	4	6							
	Land Acquisition										100	500	1K	10K	20K	50K										
											In U.S. this size area difficult to acquire by claiming															
	Total						53	153	362	195							6	18	42							
Stage 2: Detailed Reconnaissance	Geologic Mapping						11	28	42	28							3	8	12							
	Geophysical Surveys Airmag						20	50	100	50							3	6	12							
	EM IP						50	100	200	100							6	12	24							
	Ground Magnetics						20	36	72	36							6	12	24							
	Geochem Survey						7	11	21	11							2	3	6							
	Drilling for Geochem Stratigraphic Data						200	350	500	115							3	6	12							
	Data Compilation Go-No Go Decision						11	32	140	32							3	9	40							
	Land Acquisition													10K	15K	25K										
	Total						319	607	1075	372							12	27	90							

Geologic Environment: Stratabound Extensive-Stratiform Igneous Complex
Typical Ores: Iron, Chromium, Platinum, Nickel

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet 2 of 2

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to eg			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 3: Detailed Surface Investigation of Target Area	Geologic Mapping	F					11	28	42	28	10	20	50	10K	15K	25K	3	8	12	0	2	6				
	Geochemical Survey	F					7	11	21	11							2	3	6							
	EM IP Surveys	F					25	70	100	70							3	8	12							
	Prelim Envir Impact	F O					4	7	11	7							1	2	3							
	Petrographic-Mineralogic Studies	L					4	4	7	4							1	1	2							
	Geologic Compilation-Reserve Computation	O					21	35	63	35							2	3	6							
	Diamond Drilling	F					1K	2K	5K	650							12	18	24	1	4	6	1	3	6	
	Geophysical D H Logging	F O					100	200	500	200							2	3	4							
	Total						1172	2355	5744	1005							16	24	48	1	6	12	1	3	6	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Areas	Drilling - Logging	F					1K	1500	2K	500	4	10	20		64*0	13K	12	18	24		4	6		3	6	
	Core Analysis	L					4	4	7	4							1	1	2							
	Geophysical D H Logging	F					20	20	20	20							3	3	3							
	Reserve Calculations	O					7	14	21	14							2	3	6							
	Prelim Metallurgical Tests	L					25	50	100	50							1	3	6							
	Prelim Feasibility Investment	O					4	7	11	7							1	2	3							
	Plant Site Invest	F					4	7	11	7							1	2	3							
	Envir Impact Study	F O					21	63	84	63							6	18	24				0		inf	
	Shaft Sinking	F					1500	2K	3300	200							11	11	11	2	5	2	2		12	
	Met Testing	L					200	1K	2K	500							3	6	12							
	Feasibility Study	O					25	70	100	70							2	6	12							
	Total						2810	4735	7654	1435							24	36	48	3	9	18	3	3	18+	

Geologic Environment: Stratabound Discrete-Marine Sedimentary
Typical Ores: Oil & Gas Play (Lower 48)
Estimated 5-year cycle for Phase I through IV Exploratory Phase

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet of

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by			Direct Cost ($000) of Each Activity or Method, Excluding Overhead			Overhead	Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	Min	Avg	Max		Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal Geology and Geophysics-published data collections	Stages: Assessment of																								
	1 Basin potential Mgt recommends entry	O	See Comment No. 1			A Staff 100	300	500	20	1K	5K	40K	See comment No. 2			1	6	12		NONE			NONE		1 No good way to estimate percentage of each activity by others. 2 Generally no land holdings at this phase
	2 Literature search	O				B Data Collection																			
	3 Accumulate published data, log files, reports, etc	O				10	50	100																	
	4 Assemble regional reports, maps cross-sections, etc	O																							
	5 Regional field trips	F																							
	Total					110	350	600								1	6	12		0			0		
Stage 2: Detailed Reconnaissance Proprietory data collecting and prospect generation	1 Exploration team assigned	O				A Staff 300	500	2000	.5	1K	5K	40K				12	36	60	Permit Delays Environmental Clearance 1	2	6	0	1-2	6	1 Incipient stage of acreage acquisition. 2 Field operation restricted in some areas to summer months.
	2 Seismic operations	F				B Data Collection																			
	3 Field geology	F																							
	4 Data purchase	O				1K	6K	20K																	
	5 Begin interpretation of data	O																							
	6 Lab studies of samples, etc	L																							
	7 Maps and prospects generated	O																							
	8 Recommend land purchase	O																							
	Total					1.3K	6.5K	22K								12	36	60	1	2	6	0	2	6	

Geologic Environment: Stratabound Discrete-Marine Sedimentary
Typical Ores: Oil & Gas Play (lower 48)
Estimated 20 years development and production

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 3: Detailed Surface Investigation of Target Area Area Prospect definition and land acquisition	Stages 1. Begin land acquisition O = 25% F = 75%	O F					A. Staff 500	600	800	60				50K	200K	1.5M	12	24	60	A. Fee Lands 0	1	6				Acquisition land on prospects
							B. (Land Costs) (1K)	(2.5K)	(6K)											B. Federal Lands 1	2	6				
	2. Detail seismic and geological as needed	O F					C. Detail Data 100	500	1000																	
	3. Final interpretation and montage preparation	O																								
	4. Proposal to drill to mgt	O																								
	Total						600	1100	1800								12	24	60	1	2	6	—	—	—	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area Drilling operations-wildcat wells	1. Drill prospects run borehole surveys, production testing as required	F					1K	5K	20K	50	10	50	200	Approximate 25% | 75% | 100% of prospect acreage leased before drilling commences			1	3	6							Specific prospect evaluation
	Total						1K	5K	20K	50							1	3	6							
Stage 5: Development	1. Scoop & Design	O				*	10	20	50	3	4	15	50	1280	4480	16K	1	2	3	—	—	—	—	—	—	*Reporting for a Major Operator
	2. Roads & Locations	F				*	10	60	300	6		Same			Same		1	1	2	0	1	3	—	—	—	
	3. Production Facilities	F				*	25	150	500	15		Same			Same		2	3	6	0	1	3	—	—	—	
	4. Devlpmt. Drilling	F				*	500	5000	30000	40		Same			Same		3	12	36	3	4	6	0	1	2	
	5. Flow Lines	F				*	10	20	100	3		Same			Same		1	2	3	2	2	3	—	—	—	
	Total						555	5250	30950	67							4	14	39	5	6	9	0	1	2	
Stage 6: Production	1. Contract Sale	O				*	2	3	5	1	2	7	25	1280	4480	16K	1	2	3	—	—	—	0	1	1	*Reporting for a Major Operator
	2. Pipeline Connection	F				*	—	—	—	—		Same			Same		1	2	6	1	2	3	0	0	1	
	3. Unitization	O				*	5	7	10	1		Same			Same		3	4	6	2	3	4	0	1	3	
	4. Water Disposal, Injection	O				*	2	3	5	1		Same			Same		1	2	3	1	2	3	0	0	1	
	5. Improved Recovery	F				*	50	300	1000	30		Same			Same		3	6	12	3	4	6	—	—	—	
	Total																									

Geological Environment: Stratabound Discrete-Continental Sedimentary (Sandstone)
Typical Ores: Uraninite, Coffinite (Open Pit)

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	1 Select Basin	O			100		25	50	100	10	Western U.S			0	0	0	3	6	9	0	0	0	0	0	0	
	2 Literature Exam	O			100		25	25	50	5	Western U.S			0	0	0	2	4	6	0	0	0	0	0	0	
	3 Field check for proper host rock, alteration & possible mineralization	F			100		25	50	100	10	4K	6K	10K	0	0	0	3	6	12	1	2	3	0	0	0	
	Total						75	125	250	25							6	15	24	1	2	3				
Stage 2: Detailed Reconnaissance	1 Subsurface study of an area by use of gamma & electric logs, map major paleo drainage	O			100		25	25	50	5	2K	4K	6K	0	0	0	3	6	9	0	0	0	0	0	0	
	2 Conduct regional geo-physical programs	F			100		100	350	600	70	2K	4K	6K	0	0	0	6	12	24	1	2	3	1	2	3	
	3 Select best areas from above activities plus what land is available. Best geological prospect not always available	O			100		25	25	50	5	1K	2K	3K	0	0	0	2	4	6	0	1	2	0	1	2	
	Total						150	400	700	80							9	15	3	1	3	5	1	3	5	
Stage 3: Detailed Surface Investigation of Target Area	1 Examination of area for surface showings of host rock, alteration & mineralization	F			100		25	50	100	10	4K	6K	10K	0	0	0	3	6	12	1	2	3	0	0	0	
	2 Check land for previous activity & possible staking by competitors	O F			100		25	25	50	5	500	1K	2K	0	0	0	1	2	3	0	1	2	0	0	0	
	3 Local geophysical program	F			100		25	50	100	10	200	400	600	0	0	0	3	6	9	0	1	2	0	1	2	
	4 Possible radiometrics, geochemical or radon programs	F			100		100	350	600	70	2K	4K	6K	0	0	0	6	12	24	1	2	3	1	2	3	
	5 (Acquisition of land by staking or by negotiation)	F			100		(50)	(200)	750)	(40)	8	30	150	5K	20K	100K	4	6	12	1	2	3	1	2	3	
	Total						175	475	850	95							6	12	24	1	3	5	1	2	3	

Geologic Environment: Stratabound Discrete-Continental Sedimentary (Sandstone)
Typical Ores: Uraninite, Coffinite (Open Pit)

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	1. Some broad-spaced drilling	F			100		50	250	500	50	8	30	150	5K	20K	100K	6	9	12	1	2	3	1	2	3	
	2. Grid Drilling on close-spaced pattern	F			100		500	1K	2.5K	200	2	4	8				24	36	48	2	4	6	1	2	4	
	3. Establish field camp, roads, etc	F			100		25	50	100	10							2	4	6	1	2	3	1	2	3	
	4. Calculation of reserves	O			100		25	50	100	10							2	4	6	1	2	3	0	0	0	
	5. Engineering studies	O F			100		50	100	200	20							6	12	24	2	4	6	1	2	3	
	6. Environmental studies & permits	O F			100		50	200	400	40							6	9	12	1	2	3	6	12	36	
	Total						700	2K	4.4*	33°													°	2°	50	
Stage 5: Development	1. Continuous drilling	F			100		1K	1.5K	2K	300	4	8	16	5K	20K	100K										
	2. Establish permanent camp				100		2K	4K	6K		2	4	8													
	3. Filing fed. & state reports & permits				100		250	500	750											6	12	24	6	12	24	
	4. Mine development				100			32K									Any one of these stages may be delayed by 6 mos - 2 yrs. by non-regulatory or regulatory reasons									
	5. Mine plant				100			2K																		
	6. Mill Construction				100			15K																		
	7. Transportation				100			5K																		
	Total							60K												6	12	24	6	12	24	
Stage 6: Production	1. Mining				100		12.5K				2	4	8	5K	20K	100K	Lifetime of property									
	2. Milling				100		35K																			
	3. Rehabilitation of Environment				100		5K																			
	Total						53K																			

Geologic Environment: Stratabound Discrete-Lacustrine Evaporite

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, In Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Study of geological literature & maps, selection of geologically economically and politically favorable target regions	O		10	30	60	2	6	12	3	10K	100K	1000K				1	3	6							
	Total						2	6									1	3	6							
Stage 2: Detailed Reconnaissance	Study of geological literature and maps, selection of specific target areas	O		10	30	60	3	9	18		4	20	K					3	6							
	Surface geologic study & sampling	F					5	12	30		4							4	12							
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling, sampling	F			30	7*	8	100	250	5	4	12	100	1.2K	7.6K	60K	1	18	24				0	6	60	
	Analyses of samples	L					5	10	50	1							1	18	24							
	Beneficiation studies	L					5	50	250	5							1	18	24							
	Feasibility study	O					10	50	100	5				2.5K	7.6K	60K	3	12	18							
	Marketing study	O					12	30	60	5							2	6	12							
	Pilot beneficiation	F					15	100	500	15							3	6	18							
	Total					=	55	340	1.2K	36							9	36	60				0	6	60	

Geologic Environment: Stratabound Discrete-Fossil
Typical Ores: Kaolinite & Bauxite for U.S. of A.

Clays & Laterites Summary Mineral Exploitation Statistics for a Specific Mineral Occurrence Type

Form 1

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geological Compilation	O	0	5	10	85	15	50	150	20%	1K	10K	100K	—	—	—	2	6	12							
	Protogeological studies (rock units)	O	0	5	10	85	20	50	100	20%	1K	20K	100K				6	10	12							
	Paleogeological reconstitutions	O	0	0	10	90	10	20	40	20%	1K	2K	100K				6	10	12							
	Land Use compilations	O	0	0	20	80	10	40	60	20%	1K	2K	50K				1	2	4	2	4	6				
	Field inspections of several selected areas	F	5	5	25	65	30	70	200	30%	100	1K	20K				2	6	18	0	4	12	0	6	0	
	Aeromagnetics of selected areas	F	0	5	10	85	5	16	50	10%	500	2K	10K				2	3	4	2	6	12	2	4	6	
	Compilation & evaluation	O	5	5	25	65	10	40	80																	
	Total						100	286	680	20%							12	21	62	4	14	30	2	10	12	
Stage 2: Detailed Reconnaissance	Geological Mapping	F	1	4	20	75	20	40	100	20%	10	40	100				4	12	24	0	2	6	0	6	0	
	Drilling and sampling	F	5	10	25	60	20	150	800	30%	5	20	50				6	12	36	0	2	12	2	6	0	
	Compilation and evaluation of data	O	5	10	25	60	10	40	80	30%	10	40	100				2	4	8							
	Total						50	230	980	27%							6	15	40	0	2	12	0	6	0	
Stage 3: Detailed Surface Investigation of Target Area	(Land Acquisition)	F	10	20	20	50	(40)	(200)	(400)	10%	6	12	40	3.8K	7.7K	25.6K	4	12	36	0	2	0	4	12	0	
	Preliminary Feasibility Study	O	5	5	15	75	40	80	200	10%	2	4	8				2	6	12	0	2	4				
	Preliminary Environmental Studies (Eco. Legal. Political)	F	5	5	15	75	40	80	160	20%	20	80	200				6	12	36	0	2	6	4	12	0	
	Total						80	160	360	15%							6	12	36	0	2	6	4	18		

Geologic Environment: Stratabound Discrete-Fossil Aluminous Clays & Laterites
Typical Ores: Kaolinite & Bauxite for U.S. of A.

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Detailed Drilling and Assaying	F	1	4	20	75	700	1500	3000	30%	6	12	40	1.9K	3.8K	12.8K	6	12	24	2	3	12	2	6	12	
	Metallurgical Testing	F	1	4	20	75	100	200	400	10	6	12	40				3	12	24	0	2	4				
	Reserve Calculations	O	5	10	25	60	20	40	80	10	6	12	40				1	2	4	0	2	3				
	Environmental Studies	F	1	4	20	75	100	400	1000	20	6	12	40				12	12	12	0	2	3	2	6	12	
	Preliminary Mine Planning	O	1	4	20	75	20	40	80	10	6	12	40				2	4	6	0	2	3				
	Compilation of Date & Feasibility Study	O		4	20	75	20	100	200	10	6	12	40				2	4	6	0	1	1½				
	(Land Acquisition)	F	5	10	25	60	(300)	(2K)	(4K)	10	6	12	40				12	12	12	0	6	12	0	6	0	
	Follow Drilling and Assaying	F	1	4	20	75	200	1K	2K	30%	3	6	20	9K	3.8K	12.8K	4	6	8	1	2	4	2	4	8	
	Bulk Sampling and Metallurgical Testing	F	5	10	25	60	100	700	1.5K	20	3	6	20				4	8	16	0	2	4	1	6		
	Mining Tests	F	1	4	20	75	100	400	1K	20	3	6	20				8	16	32	0	2	3	2	6		
	Preliminary Engineering for plant etc	O	1	4	20	75	50	300	700	10	3	6	20				4	6	8	0	1	2				
	Final Feasibility study	O	1	4	10	85	100	300	700	10	3	6	20				6	8	12	0	1	2				
	Environmental Studies	F/O	1	4	10	85	100	400	1K	20	3	6	20				12	12	12	0	1	2				
	Legal Work	O	1	4	10	85	100	300	600	10	3	6	20				6	8	12	0	1	2				
	Total						1710	5680	12.3K	20%							24	36	60	3	12	20	5	14	20	
Stage 5: Development	Mine Construction	F	1	2	5	92	20K	50K	100K	10%		2					2	3	5	½	1	2	1	3		
	Mill Construction	F	1	3	5	92	20K	150K	100K	10							5	2	3	½	1	2	1	3		
	Infrastructure Construction	F	1	3	5	92	20K	50K	100K	10							1	2	3	½	1	2	1	3		
	Permits	O	1	3	5	92	50	100	200	10				9K	3.8K	2.8K		2	3				1	3		
	Environmental studies & work	F/O	1		5	92	15K	30K	60K	10							2	3	4	½	1	2	1	3		
	Geological and Technical studies and drilling	F/O	1		5	92	100	300	600	20							1	1½	2	½	1	2	1	2		
	Total						75K	280K	361K								9	14	20	3		10	6	7		

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet 3 of 3

Geologic Environment: Stratabound Discrete-Fossil Aluminous Clays & Laterites
Typical Ores: Kaolinite & Bauxite for U.S. of A.

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 6: Production	Start-up	F	1	2	5	92	10K	20K	40K	10																
	Replacement of equipment over life of mine	F O	1	2	5	92	20K	50K	100K	15				1.9K	3.8K	12.8K										
	Annual Cost of Personnel	F					8K	16K	32K																	
	Other op costs	F					7K	14K	28K																	
	Total						45K	100K	200K																	

Geologic Environment: Stratabound Discrete-Shale Hosted Massive Sulfides
Typical Ores: Copper-Lead-Zinc-Silver

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet 1 of 2

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic compilation	O		10	30	60	2	6	12	10%	2K	15K	25K				1	3	6							
	Geologic field check	F		10	30	60	0.5	2	3	10%							5	5	1							
	Total						2.5	8	15	10%							1.5	3.5	7							
Stage 2: Detailed Reconnaissance	Stream, soil and rock geochemical surveys	F		10	30	60	10	75	125	10%	2K	15K	25K				2	10	15							
	Field inspections of anomalous areas	F		10	30	60	2	5	10								5	1	2							
	Photogeologic study	O		10	30	60	5	1	2								25	5	1							
	Total						12.5	81	137	10%							2	10	15							
Stage 3: Detailed Surface Investigation of Target Area	Mapping of outcrops	F		10	30	60	5	1	2					100	1K	10K	1	5	1							
	Detailed soil, rock geochemical survey	F		10	30	60	1.5	4	10								1	5	1							
	Detailed ground electromagnetic survey or induced polarization survey	F		10	30	60	4	10	50								1	5								
	Trenching	F		10	30	60	3	5	10								5	1	2							
	Total						9	20	72								1	2	4							
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling-logging	F		5	20	75	15	200	600	10%				100	1K	10K	1	6	12				2	9	18	
	Chemical analyses of cores	L		5	20	75	1	10	25								5	1	3							
	Down-hole geophysics	F		5	20	75	2	5	10								5	1	2							
	Amenability tests on ore-grade mineralization	L		5	20	75	4	12	25								2	6	12							Fine-grained nature of this ore may be serious problem
	Reserves Computations	O		5	20	75	1	2	4								5	1	2							
	Preliminary valuation	O		5	20	75	1	2	4								5	1	2							
	Site investigations	F		5	20	75											1	5	12							
	Shaft sinking for bulk samples	F		0	20	80																				
	Bulk sample tests			0	20	80																				
	Total						24	231	668	10%							6	17	40				2	9	18	

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet 2 of 2

Geologic Environment: Stratabound Discrete-Shale Hosted Massive Sulfides
Typical Ores: Copper-Lead-Zinc-Silver

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 5: Development					20	80																				
	Total																									
Stage 6: Production					20	80																				
	Total																									

Geologic Environment: Stratabound Discrete-Shale Hosted Massive
Typical Ores: Lead-Zinc-Silver

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet of 2

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic compilation	O				×	2	4	8		4K	12K	30K	—	—	—	0.25	0.5	1	—	—	—	—	—	—	
	Stratigraph correlation	O		X		×	3	6	10		4K	12K	30K	—	—	—	0.5	1.0	2	—	—	—	—	—	—	
	Structural analysis	O				×	3	5	8	15%	4K	12K	30K	—	—	—	0.5	1.0	2	—	—	—	—	—	—	
	Field Reconnaissance of pre-mineral rocks within area being investigated	F				×	7	14	25		200	400	1K	—	—	—	0.5	1	2	—	—	—	—	—	—	
	Total						15	29	51	15%							1.75	3.5	7							
Stage 2: Detailed Reconnaissance	Geologic mapping of pre-mineral rocks	F				×	10	20	40		100	200	400	—	—	—	1.0	2.0	4	—	—	—	—	—	—	
	Geochemical sampling stream-ground water	F				×	5	9			2K	3K	8K	—	—	—	1.0	2.0	4	—	—	—	—	—	—	
	Gravity surveys	F			×		30	60	8	15%	250	500	1.2K	—	—	—	1.0	2.0	5	—	—	—	—	—	—	
	Induced polarization surveys	F			×		15	33	66		12	30	60	—	—	—	0.5	1.5	3.0	—	—	—	—	—	—	
	Total						60	122	244	15%							2.5	5.5	12.0							
Detailed Surface Investigation of Target Area	tion of potential target areas	F				X	2	8	6		9	15	40	6K	8K	12K	0.25	8	20	—	—	—	—	—	—	
	Detailed geochemical analyses of target areas	F/L		X			2	3	7	5%	3	5	12				2.0	3	3.5	—	—	—	—	—	—	
	Detailed gravity surveys	F			X		3	6	8		0	15	25				0.75	1	5	—	—	—	—	—	—	
	Detailed induced polarization surveys	F			X		33	42	70		6	9	15				0.5	1	2	—	—	—	—	—	—	
	Total						40	59	101	15%							3.5	6.0	9.0	—	—	—	—	—	—	

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet 2 of 2

Geologic Environment: Stratabound Discrete-Shale Hosted Massive Sulfides
Typical Ores: Lead-Zinc-Silver

	Main Activities and Methods, in Chronological Sequence	D, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
				S	M	L	Min	Avg	Max		Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling-logging	F				×	600	1000	2000		1 0	2 0	2 5	4K	7K	9K	18	24	36	—	—	—	—	—	—	
	Assaying	L			×		18	35	66		1 0	2 0	2 5				—	—	—	—	—	—	—	—	—	
	Metallurgical studies	L			×		10	100	300		1 0	2 0	2 5				1	24	36			—	—	—	—	
	Amenability studies	O				×	0 5	1 0	1 5		0 5	1 0	1 5				0 2	0 25	0 5			—	—	—	—	
	Hydrology	F		×			50	100	200		4K	8K	30K				CONTINUAL			—		—	18	24	36	
	Order of magnitude studies	O				×	1 0	5 0	10	15%	0 25	0 5	0 75				0 25	1 0	2 0	—	—	—	—	—	—	
	Environmental studies	F			×		50	150	400		4K	6K	12K				CONTINUAL			—	—	—	24	36	48	
	Shaft sinking for bulk samples	F				×	2000	2500	3500		0 25	0 5	0 75				6	8	10	—	—	—	6	12	24	
	Budget estimate	O				×	10	100	200		0 25	0 5	0 75				3	8	12	—	—	—	—	—	—	Delays due to low metal prices or metallurgical problems
	Definitive est	O				L,	8000	10^4	18000		0 25	0 5	0 75				18	24	30	24	36	60	—	—	—	
	Total						10739	13991	24781	15%							36	60	100	24	36	60	24	36	48	
Stage 5: Development	Underground Mine																									
	Mine planning & development of drifts, cross cuts raises, shafts	F				×	20K	30K	45K	20%	0 25	0 5	0 75	4K	7K	8K	18	24	30	INDEFINITE			12	18	24	
	Plant Construction	F				L,	75K	90K	100K																	
	Total						95K	120K	145K	20%							18	24	30				12	18	24	

Geologic Environment: Stratabound Discrete-Carbonate Stratiform
Typical Ores: Barite-Fluorite
NOTE: (1) Wrn U.S. (2) Mid-continent

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional* Appraisal (1) & (2)	Compilation (includes structure, stratigraphy, geophysics, geochemistry) Literature imagery Map: 1" = 80 mi																									*Because of similar origin, exploration for barite fluorite is similar to exploration for carbonate hosted base metals. Because of the lower unit value & the somewhat greater areal extent of barite fluorite occurrences, the allowable expenditures and the amount of drilling (to feet) is usually less. The "halo" occurrence that is often observed on district scale—barite fluorite around, above or below base metals has been used to locate detailed reconnaissance areas. Similarly, peripheral scout drilling for base metals metals has led to location of fluorspar barite deposits.
	1" = 8 mi																									
	1" = 4 mi	O	5	15	30	50	5	7	10		7.5K	10K	15K	—	—	—	6	9	12	—						
	Survey oil-water well cuttings (2)	L	10	20	35	35	1	3	5					—	—	—	0	3	6	—						
	Regional drainage sediment-orientation (1)	F	5	10	20	65	2	5	8	15%				—	—	—	1	3	6	—						
	Prospect exam-familiarization mapping (1)	F	15	20	30	35	1	3	5					—	—	—	1	3	6	—						
	Total						9	18	28	15%							7	10	14							
Stage 2: Detailed Reconnaissance (1) & (2)	Compilation geology geochemistry, geophysics	O	5	15	30	50	2	4	6		100	200	400				1	2	3	—						(taking of property position sometimes deferred to next stage following some types of geophysical surveys . . .)
	Field mapping	F	10	20	35	35	2	4	6	15%							1	3	3	—						
	Drainage sediment surveys	F L	5	10	20	65	2	3	8								1	2	3							
	Evaluation	O	10	20	35	35	5	7	9								1	1	1							
	Total						11	18	19	15%							1	3	3							
Stage 3: Detailed Surface Investigation of Target Area	Geophysics EM-barite & fluorite (for stratigraphic & structural mapping) (1)	F	5	10	30	55	2	3	4	15%	5	9	17	—	—	—	0.5	1	2	—	—	—	—	—	—	
	Gravity barite (1) & (2)	F	5	5	45	45	5	10	20	15%	5	9	17	—	—	—	2	3	4	—	—	—	—	—	—	
	Target selection (1) (claim stake) (100cl.)	F	25	25	25	25	(20)	(20)	(40)	15%	5	9	17	2K	2K	4K	1	1.5	2	0.5	0.5	0.5	—	—	—	
	(Option to lease pur) (2 yr.) (2)	O F	10	30	30	30	(80)	(150)	(200)	15%	5	9	17				2	3	8	1	1	1	—	—	—	
	Geochem soil sampling (1) & (2)	F	10	30	30	30	2	4	6	15%	5	9	17				0.5	1	2	—	—	—	—	—	—	
	Environmental base line study (1) & (2)	O F	0	10	45	45	5	50	100	15%	5	9	17	2K	2K	4K	1	2	3	1	2	2	—	—	—	
	Dozer trenching (1)	F	25	35	30	30	6	8	10								1	1	1	—	—	—	2	6	12	

Geologic Environment: Stratabound Discrete-Carbonate Stratiform
Typical Ores: Barite-Fluorite
Note: (1) Wrn. U.S. (2) Mid-continent

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet 2 of 2

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 4: Detailed Three-Dimensional Physical Sampli of Target Area	Drilling (1) & (2) 1,000 ft ctrs	F	0	20	40	40	150	300	500		5	9	17				3	6	12	1	2	3	6	12	24	
	Access via adit (1)	F	5	20	35	40	300	500	800		3	5	10	500	1K	4K	6	12	24	2	4	6	6	12	24	
	Trenching via dozer (1) & (2)	F	05	30	25	25	30	50	60	15%	3	5	0				2	2	2	0.5	0.5	0.5	6	12	24	
	Assays analyses	L	5	20	35	40	5	25	35		3	5	0				1	2	3	—	—	—	—	—	—	
	Bulk sampling	F L		20	35	40	10	35	50		3	5	0				2	3	4	—	—	—	—	—	—	
	Beneficiation (bench tests)	L		10	45	45	25	50	75		3	5	0				3	6	8	—	—	—	—	—	—	
	Initial feasibility study	O	8	10	45	45	10	20	30		3	5	10				1	2	3	—	—	—	—	—	—	
	Total						53e	980	1550	15%							6	12	24	2	4	6	6	12	24	
Stage 5: Development	Permit Applics (Fed St Co Mun)	O	10	30	30	30		3	10	15%		2	6	500	1K	4K	6	12	36	2	3	4	6	12	36	
	Environ impact study-company support	O F	0	10	45	45	50	70	250								12	18	24	—	—	—	—	—	—	
	Engineering pit design or underground planning	O	0	10	40	40		10	50								1	6	12	—	—	—	—	—	—	
	Drilling (Surf)	F	0	20	40	40	10	50	100								6	12	24	—	—	—	2	3	e	
	Drilling (undrgrd)	F	0	20	40	40	0	25	100								3	6	8	—	—	—	1	2		
	Mine Develop	F	5	25	35	35	100	1500	3000								1	8	16	2	4	8	2	3	*	
	Plant construction	F	0	20	40	40	200	3000	5000								6	12	24	2	3	4	2	3	*	
	Total						362	4658	8510	15%							8	36	80	4	7	12				
Stage 6: Production																										

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Geologic Environment: Stratabound Discrete-Carbonate Stratiform
Typical Ores: Lead-Zinc-Copper - Wrn. U.S. - Midcontinent

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Compilation: includes structure, stratigraphy, geophysics, geochemistry, literature, imagery. Map: 1" = 80 m																									
	1" = 8 mi	O	5	15	30	50	5	7	10		7.5K	10K	15K	--			6	9	12	—	—	—	—	—	—	
	1" = 4 mi																									
	Survey oil, water well cuttings	L	10	20	35	35	1	3	5								0	3	6	—	—	—	-	—	—	*Mostly applicable only in Wrn. U.S.
	*Regional drainage sediment orientation	F	5	10	20	65	2	5	8	15%							1	3	6	—	—	—	—	—	—	
	Prospect exam, familiarization, mapping	F	15	20	30	35	1	3	5								1	3	6		—	—	—	—	—	
	Total						9	18	28	15%							7	10	14							
Stage 2: Detailed Reconnaissance	Compilation: geology, geochemistry, geophys	O	5	15	30	50	2	4	6		100	200	400	--	--	--	—	—	—	--	-		—	—	—	
	Field mapping: photo-geologic	F	10	20	35	35	2	4	6					--	--	—	1	3	6		-	--	—	—	—	
	Drainage sed. sampl.	F	5	10	20	65	3	4	10	15%				--	-		1	2	3	—	—	—	—	—	—	
	Aeromagnetic surveys	F	0	5	40	55	50	100	250					-	--	—	1	2	2	--	—	-	-	--	—	
	Informational drilling (subsurface mapping	F	0	5	40	55	50	250	500					200	300	500	3	4	5	—	—	-	2	6	8	
	Compilation, evaluation	O	10	20	35	35	5	7	9					—	—	—	3	4	5	—	—	—	—	—	—	
	"Target" selection-property acquisition 20 A/claim at $100/yr 2 yr option at $100/A/year)	O	25	25	25	25	(30)	(1515)	(3000)		--	—	—	3K	9K	15K	1	6	12	0	6	12	2	12	24	
	Total						112	369	781	15%							3	6	13	0	6	12	4	18	32	
Stage 3: Detailed Surface Investigation of Target Area	Geochem. soil sampling*	F	10	30	30	30	4	8	10		5	10	20	2K	7K	12K	3	5	12	--	--		--	—	—	*Mostly Wstrn. U.S.
	Geophys. mapping (IP, EM)	F	5	10	30	55	1	3	5								3	5	12	—	—	—	—	—	—	
	Photogrammetry base maps 1" = 200																									
	1" = 100	O	20	20	30	30	2	5	10	15%							3	4	6	--	—	—	--	—	-	
	Environmental studies, baseline data	F	0	10	45	45	10	30	50								12	12	12	--	—	—	-	—	—	Max. fig. Wrn. U.S.
	Total						17	46	75	15%							12	12	12							

Geologic Environment: Stratabound Discrete-Carbonate Stratiform
Typical Ores: Lead-Zinc-Copper - Wrn. U.S. - Midcontinent

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
				S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 4: Detailed Three-Dimensional Dimensional Physical Sampling of Target Area	[1]Drill 1,000' ctrs	F	0	2[a]	40	45	1.1K	4.2K	8.8K		3	7	15	1.9K	4.5K	9.6K	11	15	23	3	12	24	6	6	12	
	[2]Drill 50' ctrs	F	0	1[a]	45	45	1.9K	9.6K	22K	15%							20	29	160	6	24	36	6	6	12	
	Assays - analyses	L	0	2[a]	40	40	25	61	125								—	—	—	—	—	—	—	—	—	
	Dozer work	F	25	35	20	20	25	61	125								—	—	—	—	—	—	—	—	—	
																	In Wrn. U.S. drilling depths can be shallow—say 400-1,000 feet but drilling costs are high—say total $30/ft. In midcontinent drilling depths now average 2000 feet but costs range (total) $12-$15/ft.								
	Total						3.05K	39	3.3K	15%							21	29	160	9	36	60	12	12	24	
Stage 5: Development	Permit applics.	O	10	30	30	30	—	—	—		3	7	15	1.9K	4.5K	9.6K	12	24	36	24	30	40	12	20	36	
	Feasibility studies	O	10	10	45	45					3	7	15	1.9K	4.5K	9.6K										
	Plant / operations design	O	0	20	40	40					3	7	15	1.9K	4.5K	9.6K										
	Surface drilling-200' ctrs	F	0	20	40	40	192	960	1920	15%	3	7	15	1.9K	4.5K	9.6K										
	Shaft sinking $1000/ft.	F	0	10	45	45	1600	3500	4000		3	7	15	1.9K	4.5K	9.6K										
	Drifting $150/ft	F	0	10	45	45	100	300	600		3	7	15	1.9K	4.5K	9.6K										
	Undergd. drilling $25/ft	F	0	10	45	45	50	150	300		3	7	15	1.9K	4.5K	9.6K										
	Environmental Impact statement	O/F	0	10	45	45	60	100	200		3	7	15	1.9K	4.5K	9.6K										
	Total						2002	5010	7020	15%							12	24	36	24	30	40	12	20	36	
Stage 6: Production	Plant / mill constr.	F	0	10	45	45					3	7	15	1.9K	4.5K	9.6K	10 yrs	25 yrs	100 yrs							
	Receipt of final Federal-State-county permits	O								15%	3	7	15	1.9K	4.5K	9.6K										
	Operations	F									3	7	15	1.9K	4.5K	9.6K										
	Total									15%							10	25	100							

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Geologic Environment: Stratabound Discrete-Volcanogenic Massive Sulfides
Typical Ores: Cu-Pb-Zn-Au-Ag

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Selection of volcanic belts	O		30	0	40	5	15	20		10K	100K	1000K		–		1	2	3							
	Geol. Reconn. and selection of volcanic units	F					15	30	50	5	1K	10K	100K				3	6	10							
	Airborne geophysics	F					20	50	80	5	100	500	1K				2	6	15							
	Total						40	95	150	14								14	28							
Stage 2: Detailed Reconnaissance	Geologic mapping & sampling	F		30	30	40	15	40	80	8	100	200	400	–		–	3	6	10							
	Geochemical survey	F					10	25	50	5	100	200	400		–	–	2	5	8							
	Total						25	65	130	13							4	8	15							
Stage 3: Detailed Surface Investigation of Target Area	(Land Acquisition)	F		30	30	40	(10)	(30)	(60)	(4)	–	–	–	1.5K	4K	9K	2	8	15	–	–	–	–	4	8	
	Detailed mapping, sampling	F					10	20	35	4	10	25	60				2	4	8	–	–	–	–	4	8	
	Ground geophys. survey	F					15	30	60	6	5	15	40				3	6	10	–	–	–	–	4	8	
	Total						25	50	95	10							6	12	25					8	16	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Testing geological geophysical targets by drilling	F		0	5	55	25	50	75	5	2	5	10	1.5K	4K	10K	3	5	10	–			–	3	6	
	Detailed drilling	F					50	100	200	5	2	5	10				4	8	12	–			–	–	–	
	Analyses	L					2	5	8			–	–	–			1	2	3				–	–	–	
	Sinking of exploration shaft or drilling for bulk samples	F			30	70	50	100	200	5		1	2	1K		8K	5	12	24					6	24	
	Engineering & economic feasibility	O					10	20	40	2																
	Total						137	275	523	8							8	15	36					6	24	
Stage 5: Development					30	70																				
	Total																									
Stage 6: Production																										
	Total																									

Geologic Environment: Stratabound Discrete-Metamorphics
Typical Ores: Graphite, garnet, kyanite

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic study of favorable metamorphic regions	O		50	40	10	2	5	10	1	1K	10K	50K	—	—	—	1	2	3	—	—	—	—	—	—	
	Selection of most likely areas and field checking	F					5	15	25	2	1K	5K	10K	—	—	—	1	3	5	—	—	—	—	—	—	
	Total						7	20	35	3							2	5	8							
Stage 2: Detailed Reconnaissance	Small-scale geologic appraisal, sampling	F		50	40	10	10	20	40	4	500	2K	5K	—	—	—	2	4	5	—	—	—	0	1	3	
	Total						10	20	40	4							2	4	5	—	—	—	0	1	3	
Stage 3: Detailed Surface Investigation of Target Areas	Detailed geologic mapping, structural studies	F		50	40	10	10	20	30	4	3	5	15	500	1K	5K	2	3	5	—	—	—	0	1	5	
	Trenching & detailed sampling	F					10	15	25	3	2	4	10				2	3	5	—	—	—	0	1	5	
	Analyses	L					1	2	3	—							1	2	3							
	Total						21	37	58	7							3	5	10				0	1	5	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Detailed trenching and drilling	F		50	40	10	15	50	100	5	1	2	4	300	500	5K	4	6	10				0	2	8	
	Engineering feasibility study	O		30	50	20	8	15	25	2							2	4	8							
	Marketing Study	O					2	5	8	1							1	1	2							
	Pilot plant study	F					20	35	70	7							2	4	10				0	2	4	
	Total						45	105	203	15							6	12	30				0	4	12	
Stage 5: Development				30	50	20																				
	Total																									
Stage 6: Production																										
	Total																									

Geologic Environment: Discordant-Breccia Pipes
Typical Ores: Copper, Lead, Zinc, Silver, Molybdenum, Uranium, Gold, Diamond

Form 1
Summary Mineral Exploitation Statistics for a Specific Mineral Occurrence Type

Sheet of 2

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	1 Regional appraisal mainly of literature first country-wide narrowed to state-wide narrowed to specific areas in possibly several different states and several different geologic environments	O		x	x	x	6		36		Millions of square miles															
	2 Visits in field to selected areas in each state to narrow this down to one area	F			x	x	8		40	½	Each area investigated from a few sq. miles to 100 sq. miles															
	Total						14		76																	
Stage 2: Detailed Reconnaissance	1 Selected area say of the order of 100 sq. miles or maybe several hundred mapped at a scale of 1 inch to 1 mile	F		x	x	x	5		30		100		1K													At the end of this period we should have delineated the area of land to be applied for or staked
	Total						5		30																	
Stage 3: Detailed Surface Investigation of Target Area	1 (Land acquisition-staking, front money, etc.)	F	x	x	x	x	(3)	(100) (gross)	(1K) (possible)		1		20	640		12.8K	1		6							
	2 Detailed geologic mapping	F		x	x	x	3		10		1		20	640		12.8K	½		6							
	3 Geophysics	F		x	x	x	3		10		1		20	640		12.8K	½		6							
	4 Geochemistry	F		x	x	x	1		10		1		20	640		12.8K	½		6							
	Total						7		30								2		18							
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling anywhere from 5,000' to 100,000 feet at say $15/ft—						75		1500					640		12.8K	3		12							Duration dependent upon number of drillrigs used plus of course results
	plus underground bulk sample for metallurgical testing						100		200					10-20 acres being drilled												
	Total						175		1700								3		12							

* Doubt if the regional appraisal would be done by individual prospecting. He would probably move into a known mining area with a history of mining.

Geologic Environment: Discordant-Breccia Pipes
Typical Ores: Copper, Lead, Zinc, Silver, Molybdenum, Uranium, Gold, Diamond

Form 1
Summary Mineral Exploitation Statistics for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 5: Development	Shaft						3K		6 K		½		3	640		6.4K	24		36	No experience of this			No experience of this			
	Headframe						100		200								Includes headframe, hoist & underground development									
	Hoist						300		1K																	
	Underground drifting						100		1K																	
	Total						3500		8200								24		36							
Stage 6: Production																										
	Total																									

Minimum of 1,000 tons per day, as much as
10,000 tons per day underground
50,000 tons per day open pit
Ore value = $80 to $150 per ton—much lower in case of open pit copper which could be as little as $50 per ton
We would expect to make 15% profit minimum

Geologic Environment: Discordant-Porphyry
Typical Ores: Copper, Molybdenum

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic Concept	O				X				42	2K	7K	20K	—	—	-	0	12	24							
	Geo Data Compilation					X	4		14	7							1	2	4							
	Prospector Submittal	F/O				X	2	4	7	4							5	1	2							
	Geophysical etc Data	F/O				X	4	7	14	7							1	2	4							
	Aerophoto Interpretation	O				X	0	2	4	2							0	5	1							
	Geo Reconn	F				X	2	14	21	14							1	4	6							
	Aeromagnetic Survey	F/O				X	0	60	120	60							0	2	3							
	Geochemical Reconn	F/O				X	4	7	11	7						.	1	2	3							
	Land Acquisition													0	4K	12K										
	Total						16	101	191	143								16	34							
Stage 2: Detailed Reconnaissance	Geological Mapping	F				X	11	28	42	28	30	50	80							0		12	0		inf	
	Geophysical Surveys:					X																				
	Induced Polarizations	F				X	50	100	125	100							6	12	15							
	Aeromagnetics	F/C					20	50	100	50							1	3	5							
	Ground Magnetics	F/C					18	36	72	36							1	2	3							
	Gravity	F/C					18	36	72	36							1	2	3							
	Geochemical Survey	F					7	11	21	11							2	3	6							
	Data Compilation & Go-No Go Decisions	O				X	11	32	140	32							3	6	9							
	Stratigraphic Drilling Test	F				X	0	75	250	25							0	3	6				0		6	
	Land Acquisition													5K		20K										
	Total						135	368	822	318							9	21	30	0		12	0	1	6+	

Geologic Environment: Discordant-Porphyry
Typical Ores: Copper, Molybdenum

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 3: Detailed Surface Investigation of Target Area	Geologic Mapping	F					11	28	42	28	2	3	5	5K	10K	20K	3	8	12	0	2	6				
	Geochemical Sampling	F					7	11	21	11							2	3	6							
	Induced Polarization Survey	F					25	70	100	70							3	8	12							
	Prelim Envir Impact Statement	F/C					4	7	11	7							1	2	3							
	Petrographic-Mineralogic Studies	L					4	4	7	4							1	1	2							
	Alteration-Structure-Mineralogical Zoning Interpretation-Compilation Reserve	O					21	35	63	35							2	4	6							
	Drilling-Logging	F					500	750	1000	250							12	18	24	1	4	6	1	3	6	
	Geophysical DH Logging	F/O					20	30	40	20							2	3	4							
	Total						592	935	1284	425							18	24	32	1	5	12	1	3	6	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling-Logging	F				×	000	1500	2000	500	1	2	3	2K	2.5K	3K	12	18	24	1	4	6	1	3	6	
	Mineralogical, Chemical, etc. Tests on Core	L				×		4	7	4							1	1	2							
	Down-Hole Geophysical Logging	F					4	20	20	20							3	3	3							
	Reserve Computation	O				XX	20	14	21	14							2	4	6							
	Prelim Metallurgical Testing	L				×	7 25	50	100	50							1	2	6							
	Prelim Feasibility Invest	O				×	4	7	11	7							1	2	3							
	Plant Site Investigation	F				×	4	7	11	7							1	2	3				0		inf	
	Environmental Impact Statement	F/O					21	63	84	63							6	18	(3)							
	Shaft Sinking	F				X	1500	2000	3300	200							11	11	11	2	5	12	2		12	
	Metallurgical Testing	L				×	200	1000	2000	500							3	6	12							
	Feasibility Study	O				XXX	25	70	100	70							2	6	12							
	Total						2810	4735	7654	1435							23	36	48	3	9	18	3	3	18+	

Concurrent

Concurrent

Geologic Environment: Discordant-Biogenic Replacement
Typical Ores: Native Sulphur

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, In Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Study of geological literature & maps, selection of geologically, economically & politically favorable target regions	O		10	30	60	2	6	12	3	10K	100K	000				1	3	6							
	Total						2	6	12	3							1	3	6							
Stage 2: Detailed Reconnaissance	Study of geological literature and maps, selection of specific target areas	O		10	30	60	3	9	18	3	1	12	50					3	6							
	Aerial photography, surface geologic study and sampling	F					5	12	30	5	1	12	50					4	12							
	Total						8	21	48	8							2	6	14							
Stage 3: Detailed Surface Investigation of Target Area	Geologic mapping & sampling	F			40	60	3	9	12	3	1	4	12	600	2 6K	OK	1	3	8				0	1	6	
	Gravity surveys	F					4	8	60	2	1	4	12	600	2 6K	OK	1	2	4							
	(Land acquisition)	F					(10)	(50)	(300)	(5)	1	4	12	600	2 6K	OK	1	3	8				0	6	48	
	Total						7	17	72	5								6	16				0	7	54	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling, sampling	F			40	60	12	80	500	6		4	2	600	2 6K	10K	1	3	36				0	6	48	
	Analyses of samples	L					1	2	6	1							1	3	36							
	Compilation and study of data	O					2	12	40			4	2	600	2 6K	10K	1	4	24							
	Feasibility study	O			30	70	10	25	100								1	6	12							
	Marketing study	O					6	12	50								1	6	12							
	Total						31	31	696								3	12	48				0	6	48	
Stage 5: Development																										
Stage 6: Production																										

Geologic Environment: Discordant-Vein and Replacement Deposits
Typical Ores: Silver-Copper

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Study of records concerning old mining camps	O	25	25	25	25	5	12	50	5%	1	10	20	0	0	0	6	12	60	0	0	0	0	0	0	
	Logging old drill holes, if any	F	25	25	25	25	1	2	5	5%	1	10	20	0	0	0	1	2	4	0	0	0	0	0	0	
	Compilation		25	25	25	25					1	10	20	0	0	0	1	2	4	0	0	0	0	0	0	
	Total						6	14	55	5%							6	12	60	0	0	0	0	0	0	
Stage 2: Detailed Reconnaissance	Geological mapping	F	25	25	25	25	2	10	25	5%	1	10	20	0	0	0	1	6	12	0	0	0	0	0	0	
	Sampling old dumps	F	25	25	25	25	01	1	2	5%	1	10	20	0	0	0	1	6	12	0	0	0	0	0	0	
	Total						2	11	27	5%							1	8	16	0	0	0	0	0	0	
Stage 3: Detailed Surface Investigation of Target Area	(Land acquisition)	O	25	25	25	25	(5)	(50)	(150)	5%	0	3	5	0	1K	5K	6	12	36	6	6	6	4	24*	0	*Requirements variable. Step often omitted in acquired federal lands
	Surface trenching	F	40	40	10	10	1	10	20	5%	0	1	3				1	6	24	1	3	9	3	6	12	
	Geological Mapping	F	40	40	10	10	1	10	25	5%	0	1	3				1	6	12	1	3	9	0	0	0	
	Deep penetration geophysics	F	0	10	45	45	1	5	15	5%	0	1	3				1	2	4	0	1	3	0	0	0	
	Total						3	25	60	5%							7	20	60	6	10	24	5	24	12+	
Stage 4: Production																										

Geologic Environment: Discordant-Massive Sulphide Pipes
Typical Ores: Copper, Zinc, Lead, Silver, Gold

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet 1 of 2

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Field inspection of typical occurrences (possibly in other regions)	F	5	15	30	50	0	2	25	25%	<1	1	10K	—	—	—	—	0.5	12	—	—	—	—	—	—	
	Geologic compilation	O	1	9	30	60	1	5	50	25%	100	2K	100K	—	—	—	0.5	2	12	—	—	—	—	—	—	
	Photogeologic Study	L	0	5	30	65	2	25	500	25%	100	1000	50K	—	—	—	0.5	3	12	—	—	—	—	—	—	many groups omit these steps
	Visual Airborne Survey (for color anomalies)	F	5	10	35	50	0.2	2	10	25%	50	1000	30K	—	—	—	0.01	0.2	1	0.01	0.5	3	—	—	—	
	Field inspection of area selected	F	5	20	30	45	0.5	4	50	25%	20	1000	10K	—	—	—	0.1	0.5	2	—	0.5	4	—	0.2	4	
	Total						3.7	38	635	25%							0.5	1.5	18	0.01	1	6		0.2	4	
Stage 2: Detailed Reconnaissance	Examination of known mineral prospects & submittals	F	5	25	35	35	0.2	5	50	25%	<1	10	100	20	1K	5K	0.1	0.5	4	—	0.5	4	—	0.2	1	
	Reconnaissance mapping (geologic)	F	1	10	39	50	1	25	1K	25%	10	500	10K	—	—	—	0.5	5	24	—	2	12	—	0.5	12	
	Stream sediment & geochemistry	F	1	10	39	50	1	25	150	25%	10	500	10K	—	—	—	0.2	5	24	—	2	12	—	0.5	12	
	Airborne magnetic & electromagnetic surv	F	0	5	30	65	20	48	300	25%	50	300	2K	—	—	—	0.05	0.3	3	—	1	12	—	0.2	1	
	Field inspect of anomalous areas	F	0	5	30	65	0.2	10	40	25%	1	20	200	—	—	—	0.05	3	12	—	2	12	—	0.5	12	
	(Land acquisition) (Staking or optioning)	F/O	10	25	30	35	(0.5)	(50)	(500)	25%	0.1	5	50	40	2K	40K	0.05	3	12	—	5	36	—	5	Several Yrs	
	Total						22.2	113	1540	25%							0.5	9	48	0	9	60	0	6	40	

COMMENTS RE Massive Sulphide Pipes in Form 1

1. The first three stages of exploration for massive sulphide pipes are really applicable to the exploration for strata-bound massive sulphide deposits. In fact, no one searches directly for pipes (as opposed to the massive lenses). The pipes are normally incidental by-products of exploration for the stratabound massive deposits. Some pipes, however, are found as a result of exploration for porphyry copper deposits.
2. Many areas of exploration interest on public lands are held by individuals or small companies. Therefore, they must be acquired by option agreement or purchase prior to doing exploration.
3. The forms do not have time limits. Therefore, I have taken the "time" to mean that from inception of the program to proving a discovery.
4. Many of the separate activities listed, and assigned times are, in fact, carried out simultaneously, particularly in the period of detailed, three-dimensional target exploration.
5. There are no massive sulphide pipe systems per se in production in North America. Should any be brought into production, they could be evaluated on the basis of small porphyry copper systems insofar as the grades, style of mineralization, and shapes are similar.

Geologic Environment: Discordant-Massive Sulphide
Typical Ores: Copper, Zinc, Lead, Silver, Gold

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, In Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 3: Detailed Surface Investigation of Target Area (If old workings are present & accessible, they are mapped & all available drill core logged during the geologic mapping phase.)	Detailed geologic, structural alteration mapping of outcrops	F	1	15	25	54	1	10	100	25%	0.1	5	40	40	2K	40K	0.1	2	12	—	2	2	—	0.2	12	
	Detailed soil, rock and or silt geochemical survey	F	2	10	28	60	3	20	150	25%	0.1	3	20				0.2	2	5	—	1	5	—	0.2	2	
	Detailed geophysical surveys (magnetic, electromagnetic, induced polarization, self potential)	F	1	8	31	60	1	10	75	25%	0.1	3	20				0.1	2	6	—	2	12	—	0.2	infinity	
	Petrographic, petrochemical, mineralogic study of rock samples	L	1	5	24	70	0.1	1	25	25%	0.1	3	20				1	3	12	1	3	5	—	—	—	
	Total						5.1	41	350	25%							0.3	7	26	1	5	20	0	0.2	14+	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Rehabilitate and sample old workings	F	5	15	35	45	5	75	1000	25%	0.1	0.5	2	40	500	2K	2	5	12	1	3	12	—	3	infinity	
	Drilling & Logging	F	1	10	29	60	15	250	2000	25%							2	8	24	2	3	5	—	3	infinity	
	Assays & mineralogical chemical & physical tests of cores & cuttings	L	1	10	29	60	0.1	20	150	25%							0.1	0.5	4	3	8	24	—	—	—	
	Amenability tests of ore grade mineralization	L	1	2	23	70	1	5	100	25%							0.1	1	10	1	2	4	—	—	—	
	Reserve computations	O	1	10	29	60	1	5	20	25%							0.2	2	4	—	1	2	—	—	—	
	Prelim. valuation	O	1	10	29	60	0.5	2	10	25%							0.2	0.5	1	—	1	2	—	—	—	
	Environ. studies	F/O	1	5	34	60	0.5	10	40	25%							0.5	3	15	1	2	5	—	—	—	
	Study water problems & availability	F/O	1	5	34	60	0.5	2	4	25%							0.5	1	3	1	2	2	—	—	—	
	Study area for plant sites, tailings disposal, dump & townsite	F	1	10	30	60	0.5	20	150	25%							0.1	3	7	1	2	3	—	—	—	
	Tunneling or sinking for bulk tests & dp exploration	F	1	2	35	62	50	150	3000	25%							1	3	30	2	2	36	1	2	infinity	
	Bulk ore tests	F	1	2	35	62	2	10	150	25%							0.5	2	6	2	2	12	—	2	infinity	
	Total						76.1	549	6624	25%							6	20	72	6	12	90	1	8	infinity	

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Geologic Environment: Discordant-Mafic-Ultramafic
Typical Ores: Nickel-Copper, etc.

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Over-head	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Study of geological literature & maps, selection of geologically economically & politically favorable target regions	O		20	40	40	2	6	12	3	10K	100K	1000K				1	3	6							
	Total						2	6	2	3							1	3	6							
Stage 2: Detailed Reconnaissance	Study of geological literature and maps, selection of specific target areas	O		20	40	40	3	9	18	3	1	5?0	5K				1	6	24							
	Aerial magnetic surveys & aerial photography	F					12	100	500	0	4	00	1K				1	4	12							
	Surface geologic study & geochem sampling	F					5	20	60	6	1	5?0	500				1	6	24							
	Total						20	129	578	19							2	12	36							
Stage 3: Detailed Surface Investigation of Target Area	Geologic mapping, detailed sampling, ground geophysics (magnetics, EM)	F		20	40	40	8	2?	50	6	1	4	50	?80	2.5K	30K	1	6	?2				0	2	24	
	(Land acquisition)	F					10)	25)	300)	(5)	1	4	50	·00	2.5K	30K	1	2	?2				0	2	48	
	Total						8	20	5?	6								6	20				0	4	72	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Drilling, sampling	F		10	40	50	20	100	500	6	1	4	50	100	2.5K	30K	1	6	24				0	2	48	
	Analyses of samples	I					1	5	25	2							1	6	24							
	Beneficiation studies	I					8	20	100	5							2	6	24							
	Compilation and study of data	O					4	12	30	2	1	4	50				2	6	24							
	Feasibility study	O			30	70	25	100	300	10							1	6	12							
	Marketing study	O					12	26	60	5							2	6	12							
	Sink test pit or shaft	F					100	500	2000	20							3	6	24							
	Total						170	763	3K	50							9	24	48				0		0	
Stage 5: Development					30	0																				
	Total																									

Geologic Environment: Discordant-Anorthosite Complexes
Typical Ores: Iron, Vanadium, Titanium

Form 1
Summary Mineral Exploitation Statistics
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																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Study of favorable regions: geological economical and political selection of broad regions	O		20	30	50	1	2	3	1	10K	100K	1000K	—	—	—	1	2	3	—	—	—	—	—	—	
Stage 2: Detailed Reconnaissance	Study & known magnetic anomalies (published & public data)	O		20	30	50	1	2	3		500	2K	5K	—	—	—	1	2	3	—	—	—	—	—	—	
	Reconnaissance geologic study	F					5	10	25	5	100	200	1K	—	—	—	1	2	3	—	—	—	—	—	—	
	Airborne magnetic surveys	F					10	30	100	5	100	200	1K	—	—	—	1	2	3	—	—	—	—	—	—	
	Total						16	42	128	11							1	3	9							
Stage 3: Detailed Surface Investigation of Target Area	(Land acquisition)	F	—	10	30	60	120	150	120	15	2	4	20	1K	2.5K	10K	1	3	6	—	—	—	0	1	10	
	Geologic mapping sampling	F					10	15	30	3	2	4	20				1	1	3	—	—	—	0	1	3	
	Magnetic (+ other geo-physical) surveys	F					10	15	40	3	2	4	20				1	2	3	—	—	—	0	1	3	
	Total						20	30	70	6							1	3	6				0	1	10	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Areas	Reconnaissance drilling	F			25	75	25	30	50	7	2	4	10	1K	2.5K	10K		2	5				0		15	
	Detailed drilling	F					100	300	600	10	2	4	10				3	15	25							
	Analyses of samples	L					1	3	8	1							1	2	3							
	Establishing geology	O					2	5	10	2	2	4					1	3	5							
	Economic and engineering feasibility study	O			10	90	15	20	40	5							2	4	15		NA			NA		
	Marketing study	O					10	15	25	5							1	2	5		NA			NA		
	Check drilling drilling for bulk sample	F					10	15	50	7								4	8		—	—	1	—	—	
	Sinking of test shaft or pit	F					50	75	100	3		NA					3	6	15	—	—	—	0	0	25	
	Total						213	463	883	30							9	24	40				0	1	50	
Stage 5: Development					10	90																				
	Total																									
Stage 6: Production																										

Geologic Environment: Discordant-Veins in Ultramafic Rocks
Typical Ores: Asbestos, Talc

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

	Main Activities and Methods, In Chrological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic Compilation	O			1	85		5	25		1	10K	25K				0.5	2	12			3			—	
	Photogeology	O			1	85	1	8	100	25	10	3K	100K				0.5	1	5		2	5			—	
	Field Checks	F			1	85	1	5	30	25		500	2K				0.5	2	10		2	5			2	
	Total						4		5	25								5	22	0	4	8	0	1	2	
Stage 2: Detailed Reconnaissance	Geologic mapping	F		5	10	85	2	10	150	25%	10	200	1				0.5	3	8			24		2	5	
	Airborne magnetic survey	F		1	9	90	3	12	250	25%	5	150	2K		—		0.1	0.5	2		2	24		1	5	
	Total						5	20	400	25%							0.5	3	18	0	2	36	0	2	8	
Stage 3: Detailed Surface Investigation of Target Area	Detailed mapping	F		5	10	85					1		100	—		—	1	5	36		2	24	—	1	12	All work beyond this stage is done on the company's property or claims
	Land acquisition	F		1	10	86	1	5	10K	25			1	100	1K	10K	1	1	36		3	24	—	3	24	
	Detailed ground magnetic survey	F		1	11	88	0.1		150	25	0.1		18	100	1K	10K	0.2	1	6		2	5	1	1	10	
	Trenching	F		1	11	88	0.5		20	25	0.1		10	100	1K	10K	0.05	1	2	0.5	2	12	1	3	infinity	
	Reconnaissance drilling	F		1	11	88	5	10	200	25	0.1		10	100	1K	10K	1	1	2	1	2	5	1	3	infinity	
	Total			1			6.5	15	370	25							2	10	90	5	7	60	1	6	46+	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Grid diamond drilling and logging	F			10	90	100	500	1500	25%	0.1	4	1	100	1K	10K	3	18	24	2	6	12	1	3	infinity	
	Mill Tests	L			10	90	1	10	40	25%	—			100	1K	10K	0.5	2	4	1	2	3	—	1	2	
	Resrve computation	O			10	90	1	3	25	25%	1		1	100	1K	10K	0.3	1	4	1	4	10	1	—	—	
	Valuation	O			10	90	1	2	5	25%	—			100	1K	10K	0.1	0.5	1	1	2	5	—	—	—	
	Shaft sinking or pitting for bulk sample	F			10	90	50	400	3000	25%	1			100	1K	10K	1	3	2	2	3	12	3	6	infinity	
	Investigation of water problems	F			10	90	5	8	40	25%	—			100	1K	10K	0.1	1	1	1	3	6	1	3	12	
	Investigate placement of townsite, plants, tailings dumps, etc.	F			10	90		5	20	25%	—			100	1K	10K	0.1	1	4	1	2	4	1	3	12	
	Total						200	1000	4500	25								20	52		9	48		8	36+	

Geologic Environment: Discordant-Veins in Ultramafic Rocks
Typical Ores: Asbestos, Talc

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet 2 of 2

	Main Activities and Methods, In Chrological Sequence	O, F, or L	Percentage of Each Activity Done by			Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
				S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 5: Development	Obtain approval to mine (environmental impact statements, etc.) Strip overburden and prepare pit				0	100	0	50[0]	2[0]00	25%							2	4	8	2	4	12	5	3	infinity	
	Business aspects arrange financing, find customer, hire contractors, staffing, etc.				10	90	50	30[0]	1000	25%							3	6	36	2	5	12	0	3	12	
	Fill-in drilling				10	90	100	00[0]	3000	25%							3	12	36	2	12	24	3	5	infinity	
	Plan open pit				10	90	10	6[0]	150	25%							3									
	Build mill, shops, office, etc.				10	90	6000	2[0]000	400X 10^3	25%							12	6 24	12 48	— 3	3 12	12 infinity	— 5	2 12	5 infinity	
	Total						6.1K	21.9K	406.2K	25%							18	36	84	5	28	50+	8	20	20+	
Stage 6: Production	Operate Mine and Mill																									
	Total																									

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Geologic Environment: Discordant-Veins in Metamorphosed Dolomite
Typical Ores: Talc

	Main Activities and Methods, in Chronological Sequence	O, F, or L	Percentage of Each Activity Done by				Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
			I	S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Geologic compilation	O	40	40	20		2	6	2	10%	100	500	1K				1	3	6							
	Geologic field check	F	40	40	20			2	4								0.5	0.5	1							
	Photogeologic study	O	40	40	20		1	2									0.5	1	2							
	Total						3	10	9	10%								4	8							
Stage 2: Detailed Reconnaissance	Geologic mapping of outcrops and mapping of metamorphic zones	F	40	40	20		5	10	20								2	4	8							
	Detailed visual prospecting	F	50	40	10		6	14	25								3	5	12							
	Total						11	24	45								4	9	17							
Stage 3: Detailed Surface Investigation of Target Area	Detailed geologic and structure mapping	F	20	50	30		1	3	6					40	100	500	0.5	1	2							
	Chemical analysis of all samples	L	20	50	30		1	4	10					40	100	500	0.5	0.5	1							
	Total						2	7	16								1	1.5	3							
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Trenching	F	0	50	40		2	3	5					40	100	500	0.5	0.5	2							
	Drilling and logging	F					5	25	75					40	100	500	1	3	6							
	Chemical & physical tests of ore samples	L	0	50	40		4	6	10					40	100	500	0.5	2	6							
	Reserve calculations	O	0	50	50		1	2	4								0.5	1	2							
	Preliminary evaluation	O	0	50	50		1	2	4								0.5	1	2							
	Pit bulk sampling and testing of sample	FL		40	60		0	30	50								2	4	6							
	Total						2	68	48								4	8	21							
Stage 5: Development				40	60																					
	Total																									
Stage 6: Production				40	60																					
	Total																									

Geologic Environment: Discordant-Carbonatite-Alkalic
Typical Ores: Phosphate, Rare Earths, Columbium, etc.

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet of 2

	Main Activities and Methods, In Chrological Sequence	O, F, or L	Percentage of Each Activity Done by			Direct Cost ($000) of Each Activity or Method, Excluding Overhead				Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
																Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
				S	M	L	Min	Avg	Max	Overhead	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 1: Regional Appraisal	Defining carbonatite rich provinces selecting most favorable regions	O	—	20	40	40	1	2	5	1	10K	20K	50K	—	—	—	1	2	3	—	—	—	—	—	—	
	Investigating & selecting individual complexes for follow-up	O					3	5	10	1	300	500	700	—	—	—	2	3	6	—	—	—	—	—	—	
	Total						4	7	15	1							3	5	9							
Stage 2: Detailed Reconnaissance	Reconnaissance geology selected complexes	F	—	10	45	45	20	30	80	5	20	50	200	—	—	—	3	5	10	—	—	—	—	—	—	
	Airborne magnetic survey	F	—				30	40	80	2	20	50	200	—	—	—	2	3	8	—	—	—	—	—	—	
	Total						50	70	160	7							3	6	12							
Stage 3: Detailed Surface Investigation of Target Area	(Land acquisition)	F		10	45	45	(5)	(15)	(50)	(3)	5	40	80	3.2K	15K	30K	2	5	15	—	—	—	0	2	20	
	Geologic mapping & sampling	F					10	20	50	4	5	40	80				3	6	10	—	—	—	0	1	6	
	Geophysical survey & line cutting	F					30	40	80	8	5	40	88				3	6	10	—	—	—	0	1	6	
	Sample analyses	L					5	10	25	1	5	40	88				1	2	3	—	—	—	—	—	—	
	Geologic study & target selection	O					2	3	5	1	5	40	88				1	2	4	—	—	—	—	—	—	
	Total						47	73	160	14							6	15	35				0	3	28	
Stage 4: Detailed Three-Dimensional Physical Sampling of Target Area	Reconnaissance drilling	F		5	40	55	25	30	50	2	5	40	88	3.2K	15K	30K	2	3	8	—	—	—	0	1	15	
	Detailed drilling	F					100	300	600	10	3	6	15	1K	3K	10K	4	15	25	—	—	—	—	—	—	
	Sample analyses	L					1	3	8	1		NA			NA		1	2	3		NA			NA		
	Establishing geology	O					2	5	10	2	3	6	15	1K	3K	10K	1	3	5		NA			NA		
	Economic & engineering feasibility study				50	50	10	15	40	4							2	4	15		NA			NA		
	Marketing study				50	50	5	10	20	4							1	2	5		NA			NA		
	Obtaining bulk samples pilot plant study				50	50	50	100	150	8							6	10	25		NA		0	6	25	
	Total						193	463	878	31							12	24	50				0	6	25	

Geologic Environment: Discordant-Carbonatite-Alkalic Complexes
Typical Ores: Phosphate, Rare Earths, Columbium, etc.

Form 1
Summary Mineral Exploitation Statistics
for a Specific Mineral Occurrence Type

Sheet 2 of 2

	Main Activities and Methods, in Chrological Sequence	O, F, or L	Percentage of Each Activity Done by			Direct Cost ($000) of Each Activity or Method, Excluding Overhead			Overhead	Area (Sq. Mi.) Being Investigated			Area (Acres) Under Claim, Option, Lease, Etc.			Duration (Months) of Each Stage									Additional Comments
				S	M	L	Min	Avg	Max		Min	Avg	Max	Min	Avg	Max	Without Any Delays			Plus Non-Regulatory Delays			Plus Delays Due Solely to Regulation			
																Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
Stage 5: Development					50	50																			
	Total																								
Stage 6: Procution																									
	Total																								