COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS

RECORDS:

1946/39

NOTES ON COLLECTION OF MINERAL STATISTICS

by

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15928/65

1946/39

NOTES ON COLLECTION OF MINERAL STATISTICS.

Below are set out the headings (slightly amplified from the report of the Sub-Committee on Mineral Statistics, November, 1945) under which Mineral Statistics might be collected.

In recording the production for any year, the aim should be to establish the tonnage mined in that year and if the ore is treated the concentrates produced from that ore and the metal or other product eventually obtained or, in the case of exports, recoverable from the concentrates. The exact location of the mine or quarry should be clearly stated in all returns.

Attached are lists of metals and minerals products under the appropriate classes. The more important items, for which production figures on a quarterly basis are desirable, are shown in block capitals.

The following information is required from metal and mineral producers -

Class A. Gold Ores, including gold-quartz, gold-antimony, arsenical gold ores, etc. (type to be stated).

1. Ore raised (not including waste rock) in tons of 2,240 lb.

2. Ore milled in tons of 2,240 lb.

3. Assay value of 1 or 2, or both if available, and of all recovered metals and oxides e.g. Sb., As_2O_3, if present.

4. Concentrates produced in tons of 2,240 lb. Assay content - gold and silver in oz. per ton, also percentage of antimony, arsenious oxide, etc. if present.

5. Bullion recovered by cyanidation - crude oz. with gold and silver content.

6. Bullion recovered by amalgamation - crude oz. with gold and silver content.

7. Sum of 5 and 6 with gold and silver contents and values (Mint figures.)

8. Similar figures as under headings 1 to 7 for tailings treated.

9. Totals from 7 and 8.

10. Destination of ore, concentrate or bullion.

11. Other products recovered e.g. antimony, arsenious oxide, copper etc.

Class B. Ores from which Metals are recovered, e.g. Lead-Zinc-Silver, Copper, Tin, etc. (full list is given later in this statement).

1. Ore raised in tons of 2,240 lb.

2. Ore milled in tons of 2,240 lb.

3. Assay value of 1 or 2, or both if available, in per cent or oz. per ton of all recovered metals.

4. Concentrates produced - for example.

a. Lead - tons with estimated content of meta. zinc, gold, silver, antimony, etc.)

b. Zinc - tons with estimated content of metal (zinc, lead, silver, cadmium, etc.) and value at mine.

c. Others - tons lb. or oz. with estimated contents of all recoverable metals and values at mine.

5. Metal or metals produced at mine, or estimates of recoverable metal or metals.

6. Ore, concentrates, metal and other products despatched from mine. Immediate destination with details of metal contents and value (details of final destination of various products, their metal contents and values can be obtained from the various treatment works but the full story should be obtained one way or the other, and should be related to the mine from which the ore was produced irrespective of whether treatment is completed in the State of origin or not).

7. Similar data as under headings 1 to 5 is required for tailings treated, etc.

Class C. Ores which are either sold as mined or as concentrates, e.g. those of tungsten, molybdenum, manganese, chromium, etc. (a full list is given later in this statement).

These could be dealt with fairly simply provided the type and grade of ore are ascertained where required, e.g. grade of tungsten concentrates and whether wolfram or scheelite, grade of manganese ore or concentrates and type if known. The following headings cover the particulars required:

1. Total crude mineral (or ore) mined in tons of 2,240 lb.

2. If concentrated or sorted at mine, quantity of each product recovered, e.g. wolfram, tin-wolfram, wolfram-bismuth, tin-tantalite, etc.

3. Grade of 1 or 2, or both if available, stating content of each recoverable metal (or oxide or sulphide in accordance with normal usage) if more than one present.

4. Details of quantities, grades and values of products despatched from mine (whether as 1 or 2).

5. Destination of parcels to be stated.

Class D. Non-Metallic minerals, e.g. felspar, diatomite, fluorite.

The same headings as given under C will cover the information required. Specifications of grade and/or mineral content are given in the list later in this statement.

Class E. Coal.

Figures available on coal are satisfactory.

Class F. Products of dredging and alluvial workings. (Full list given later in this statement).

1. Cubic yards treated.
2. Cubic yards overburden removed.
3. Metal or concentrates recovered at mine, with content of each metal.
4. Concentrates, metal, or other products despatched from mine, giving immediate destination and details of metal content and value.

The production and value of the following items, which may be included by the Mines Departments of the States in their Annual Reports, should not be included in tabulating the total production and value of the mineral industry.

Calcium silicide.

Carbide.

Coke.

Ferro-silicon, ferro-manganese, ferro-tungsten, etc.

Lime.

Portland Cement.

Sulphuric acid.

Superphosphate.

Following are Tables in which are given lists of metals and minerals in the various classes referred to above (except A and E which do not require further description) and the unit in which production should be expressed. Some explanatory remarks have also been added -

Class B. Ores from which metals are recovered e.g. Lead-Zinc-Silver, Copper, Tin, etc.

(Note: Many metals are recovered as byproducts from ores of other metals and hence production can only be expressed in terms of metal recovered, and no figures can be given for ores of these metals).

Metal.	Production Statistics to be expressed as.	Remarks.
Antimony	Tons metal	Produced as - (1) Antimony ore - (2) Gold-Antimony ore. These are sent to O.T. Lempriere & Co.Ltd. or exported. (3) In lead-zinc and copper concentrates and ores. Sent to Broken Hill Associated Smelters at Port Pirie or to Electrolytic Refining & Smelting Co. Port Kembla and antimony produced as antimonial slag, which is converted to antimonial lead. Antimony content of antimonial slag and antimonial lead required.
Antimonial lead	Tons ant. lead	Antimony and lead content required (see antimony).
ALUMINIUM	Tons metal	For ore see Bauxite (C).
BISMUTH	Tons metal	Obtain bismuth produced by O.T. Lempriere from each parcel.
CADMIUM	Tons metal	Contained in lead-zinc ores and recovered from zinc concentrates by Electrolytic Zinc Co. of Australasia, at Risdon Tasmania; also recovered by Broken Hill

Metal.	Production Statistics to be expressed as.	Remarks.
CADMIUM -Cont.		Associated smelters at Port Pirie and may be produced in future at Mt. Isa.
Caesium	Troy oz. metal	Contained in minerals lepidolite and pollucite, also in caesium-bearing beryl from Wodgina, W.A. Metal not produced in Australia.
Calcium	lb. metal	No known mining of ore for calcium, although it may be extracted from lime on a small scale. Metal not produced in Australia.
Cerium	---	See monazite (D)
Cobalt	Tons metal	As for Cadmium. Cobalt is also contained in cobalt ore which may be mined as such.
Columbium	lb. columbium and tantalum metal	Occurs as columbite and tantalite, containing oxides of columbium and tantalum. Metal not produced in Australia. See Columbite (C)
COPPER	Tons metal	Copper ore usually contains gold and silver; copper may be recovered from lead-zinc, gold and other ores.
Germanium	Troy oz. metal	Not produced in Australia at present. Recovered from zinc ores.
Indium	Troy oz. metal	Recovered from zinc and copper ores - not produced in Australia at present.
Iridium	Troy oz. metal	Metal not produced in Australia. Constituent of osmiridium. See Osmiridium (F)
IRON	Tons pig iron	Produced at Newcastle, Port Kembla, Whyalla.
LEAD	Tons metal	Collection lead statistics should aim to show lead produced or recoverable from shipments during each period.
Mercury	lb. metal	Mostly retorted at mines.
Nickel	tons metal	No Australian production at present.
Palladium	troy oz. metal	Produced at Port Kembla by B.H.S. Ltd. (Laboratory scale only)
Platinum	troy oz. metal	As for Palladium. See also Class F - Alluvial.
Radium		See uranium ore (C)

Metal.	Production Statistics to be expressed as	Remarks.
Rhodium	Troy oz. metal	Not produced in Australia at present. Constituent of osmiridium (F)
Ruthenium	Troy oz. metal	Not produced in Australia at present. Constituent of osmiridium (F)
Selenium	lb. selenium	Produced at Port Kembla by E.R.S. Limited. Ore from which obtained required if possible.
SILVER	Troy oz. metal	From gold, lead-zinc, copper and other ores.
Tantalum	lb. tantalum lb. columbium	Occurs as tantalite and columbite. No Australian production of tantalum metal at present. See tantalite (C)
Tellurium	lb. tellurium	As for selenium.
Thallium	lb. thallium	No Australian production.
Thorium	lb. thorium	See monazite (D)
TITANIUM		See rutile and ilmenite (F)
TUNGSTEN	Tons metal	See wolfram and scheelite (C)
Yttrium	Tons Metal	See gadolinite (D)
ZINC	Tons metal	As for lead.
Zirconium		See zircon (F)

CLASS C. ORES SOLD AS MINED OR AS CONCENTRATES.

(In most cases the metal in the ore is not recovered as such)

Metal or Mineral.	Production Statistics to be expressed as	Remarks.
ARSENIC	Tons arsenious oxide (As_2O_3)	Arsenic produced mainly from ores of other metals, mostly gold. Source of ore or concentrates required. Should be stated whether output crude or refined. Assay values of ore usually given as arsenic metal content, of arsenic production as As_2O_3 content. As_2O_3 contains 75.75 per cent As.
BAUXITE	Tons bauxite	Information required is content of alumina (Al_2O_3) stating whether this is free, available or total alumina. Analyses showing silica (SiO_2); ferric oxide (Fe_2O_3) titania (TiO_2) and water content are desirable. If used for production of aluminium, metal obtained from ore should be ascertained.
Beryllium ore	Tons beryl (12% BeO)	Content of beryllia (BeO) required. Standard is 12% BeO and production statistics should be reduced to equivalent amount of beryl containing 12% BeO.
Chrome Ore	Tons metallurgical grade ore. Tons refractory grade ore.	Chromic oxide (Cr_2O_3) content should be stated.
Columbite	Tons concentrates	Content of columbium metal and tantalum metal to be stated. Assay usually state content of Cb_2O_5 (70% Cb) and Ta_2O_5 (83.2% Ta).
Ilmenite	Tons ilmenite	TiO_2 content required. Obtained in Australia only from beach sand deposits. See ilmenite (F)
IRON ORE	Tons iron ore	Separate into (1) Iron ore as such - used for iron and steel production. (2) Manganiferous iron ore. (3) Ironstone used for flux. Percentage of iron and manganese in (1) and (2) required.
MANGANESE ORE	Tons battery grade ore Tons metallurgical grade ore. Tons other types ore.	Manganese content stated as manganese dioxide (MnO_2). Manganese content stated as Metal.
MANGANIFEROUS IRON ORE	Tons ore	See under iron ore.

Metal or Mineral.	Production Statistics to be expressed as	Remarks.
MOLYBDENUM	Tons molybdenite (90% MoS_2).	MoS_2 content of concentrates required. Production statistics should be converted to concentrates containing 90% MoS_2.
PYRITE	Tons pyrite	Sulphur content required.
Rutile	Tons rutile	TiO_2 content required. Obtained in Australia only from Beach Sand deposits; see Rutile (P)
SCHEELITE	Tons scheelite 65% WO_3.	WO_3 content of concentrates required. Statistics in terms of 65% WO_3 concentrates.
Tantalite	Tons concentrates (too variable in composition to be recalculated to standard grade)	Content to be stated of tantalum and columbium metal. Assay values are usually given as tantalum pentoxide (Ta_2O_5), which contains 88.2 per cent. tantalum, and columbium (niobium) pentoxide (Cb_2O_5), which contains 70 per cent columbium.
Titanium ore		See Rutile and Ilmenite (P)
TUNGSTEN ORE		See wolfram and scheelite
Uranium Ore	lb. uranium dioxide (U_3O_8)	Assays given usually as U_3O_8.
Vanadium Ore	lb. vanadium pentoxide (V_2O_5)	No Australian production at present.
WOLFRAM	Tons wolfram (65% WO_3)	As for scheelite.
ZIRCON	Tons zircon	Obtained in Australia only from beach sand. See Zircon (P)

CLASS B. NON-METALLIC MINERALS.

Mineral	Statistics as	Content required (if possible) of	Remarks.
Agate	lb.		
Alunite	tons	potash (K_2O).	Alumina (Al_2O_3) content also desirable.
Alums (natural)	tons		Minerals include Kalinite, halotrichite etc. No known production in Australia.
Amblygonite	tons	Lithia (Li_2O)	Phosphorus pentoxide (P_2O_5) content also desirable.
Amethyst	cerats		See gemstones.
Andalusite	tons	Alumina (Al_2O_3)	
Anhydrite	tons	Calcium sulphate ($CaSO_4$)	See gypsum.
Apatite	tons	Phosphorus pentoxide (P_2O_5)	
ASBESTOS	tons		State kind and grade. Kinds: Chrysotile (White asbestos) Crocidolite (Blue asbestos) Amphibole - Tremolite Actinolite Anthophyllite Amosite. Grades: Usually Nos.1, 2 and 3 according to length of fibre. Grades should be defined.
Asphalt	tons		Natural asphalt not produced in Australia.
BARITE (Barytes)	Tons	Barium sulphate ($BaSO_4$)	Tonnage of each grade, usually Nos.1,2 and 3 - arbitrary grades depending on colour and purity.
BENTONITE	tons		Grades 1st and 2nd for Queensland bentonite. Statistics should be divided into swelling and non-swelling bentonite.
Borates (natural)	tons	Boric oxide (B_2O_3)	Natural borates include borax or tincal, kernite or rasorite or secorite, colemanite, ulexite or boronatrocalcite, sassolite or sassolin, boracite or stassfurtite. No known production in Australia.

Mineral	Statistics as	Content required (if possible) of	Remarks
Bromine	lb.	Bromine	Obtained from natural brines and seawater. No known production in Australia.
Brucite	tons	Magnesia (MgO)	Not mined in Australia
BUILDING STONE	tons	Blocks	Kind of stone to be stated.
Calcium Chloride	tons	Calcium chloride ($CaCl_2$)	Obtained from brines and seawater (also as by-product of ammonia - sodn process).
Calcite (Iceland Spar)	lb.		For optical use.
Carbondioxide	Millions of cu.ft.	CO_2	Only carbon dioxide produced from natural sources such as gas wells or mineral springs can be regarded as a mineral product. At present none is so obtained in Australia.
Celestite	tons	strontium sulphate ($SrSO_4$)	
Chalcedony	tons	silica (SiO_2)	See agate, opal, silica, etc.
Chalk	tons	calcium carbonate ($CaCO_3$)	
Chiastolite			See andalusite; may be used as a gemstone
CHINA STONE	tons	felspar and quartz	See Cornish Stone and felspar.
CLAY	tons	alumina (Al_2O_3)	Should be recorded according to purpose for which used Ball clay (ware clay) Bentonitic clay Brick clay (including shale etc) Cement clay. Fireclay. Pipe clay Pottery clay Tile clay. Other clays. See also bentonite, Fuller's earth, kaolin.
Coral	tons		See limestone.
CORNISH STONE	tons	felspar and quartz	Same as China Stone - mixture of felspar and quartz with felspar predominating.

Mineral.	Statistics as	Content required (if possible) of	Remarks.
DAMOURITE	tons		Type of mica mined in S.Aust.
DIAMONDS	carats		State whether used as gems or abrasives.
DIATOMITE	tons		
DOLOMITE	tons	magnesia (MgO) lime (CaO).	
Dumortierite	tons	alumina (Al_2O_3)	
Emerald	carats		See gemstones.
Emery	lb.	alumina (Al_2O_3)	
Epsomite	tons	magnesium sulphate ($MgSO_4.7H_2O$)	Obtained mainly from natural brines and seawater.
FELSPAR	tons	potash (K_2O) soda (Na_2O)	Type should be stated Potash or soda felspar.
Fireclay			See clay.
Flint pebbles	tons		
FLUORITE	tons	calcium fluoride (CaF_2)	Classify into acid grade. (85% CaF_2) Ceramic grade 95% CaF_2. Metallurgical grade.
FULLER'S EARTH	tons		State whether requires activation or not.
Gadolinite	tons	Yttrium trioxide (Y_2O_3)	
Garnet	tons		As abrasive - see also gemstones.
GEMSTONES	carats, unless otherwise stated 1 carat = 3.168 gr. = 205.6 milligrams (metric carat = 200 mg. not used in Aust.)		Includes agate, amethyst, chiastolite, diamond, emerald, garnet, jasper, olivene, opal, rhodonite, ribbonstone, ruby, spinel, staurolite, sapphire, tourmaline, topaz, turquoise, zircon.
Glauconite	tons	Phosphorus pentoxide (P_2O_5)	See greensand.
Granite	tons		See building stone; state other uses.
GRAPHITE	tons	carbon	Classify into: flake, crystalline, amorphous.
GRAVEL	tons		State type of material.
Greensand	tons	Glauconite	
Guano	tons		
GYPSUM	tons	$CaSO_4$	

Mineral.	Statistics as	Content required (if possible) of	Remarks.
Iodine	lb.		Obtained from crude nitrates and from natural waters.
Iron oxide			See ochre.
IRONSTONE (flux)	tons		See iron ore (C)
Lepidolite	tons	Lithia (Li_2O)	Not usually mined for its lithium content. Small quantities have been used as mica.
Leucite	tons	Alumina (Al_2O_3)	No known production.
KAOLIN (China clay)	tons	Alumina (Al_2O_3)	See clays.
KYANITE	tons	Alumina (Al_2O_3)	
LIMESTONE	tons	Lime (CaO)	Separate into: Massive limestone; Coral limestone; Sea shells. Exclude lime from Queensland Statistics.
Lithium minerals	tons		See amblygonite, lepidolite, petalite, spodumene.
MAGNESITE	tons	Magnesia (MgO)	
Magnesium chloride	tons	$MgCl_2$	From brines, seawater, etc.
Marble	tons		See building stone.
Marl	tons		
MICA	lb.		Muscovite and phlogopite Crude or commercial. Divided into grades if possible : Extra-extra special, Extra special, Special Special A 1 1 2 3 4 5 6 Scrap mica to be shown separately - partly from mines, partly from cutting shops and processors' factories.
Millstones	ton		State kind of rock.
Mineral Waters	gallons		Natural waters only.
MONAZITE	tons	monazite	Grade of monazite in concentrates required. Analyses showing ceria (Ce_2O_3) and

Minerals.	Statistics as	Content required (if possible) of	Remarks.
MONAZITE - Cont.			thoria (ThO_2) in pure monazite desirable. See monazite (F)
NATURAL GAS	Millions of cu.ft.	Methane (CH_4)	
Nepheline Syenite	tons	Alumina (Al_2O_3)	Not yet mined in Australia.
Nitrates (natural)	tons		Natural nitrates only. Mainly potassium and sodium nitrates. No known production in Australia.
OCHRE	tons	Ferric oxide (Fe_2O_3)	Separate : red oxide yellow ochre umber sienna
OIL SHALE	tons	gallons crude oil per ton	Amount oil recovered also required.
Oilstones	tons		Type of rock.
Olivine	tons		See also gemstones.
OPAL	troy oz.		N.S.W. records value only - desirable to establish quantities.
Oxides			See ochre.
Peat	tons	carbon	No known production.
Petalite	tons	Lithia (Li_2O)	See lithium minerals.
PETROLEUM	barrels		1 barrel = 35 Imp.gals.
PHOSPHATE ROCK	tons	Phosphorus pentoxide (P_2O_5)	
PIGMENT CLAYS	tons	Ferric oxide (Fe_2O_3)	Similar to ochre, but worth recording separately.
Pinite	tons		See pyrophyllite. Some Pambula pyrophyllite is more properly pinite and may in future be so recorded.
Potassium salts	tons	Potash (K_2O)	Sylvite, carnallite, alunite, kainite, nitre(potassium nitrate or salt petre) kalinite, langbeinite, polyhalite, glaserite; also from brines etc.
PYROPHYLLITE	tons	Al_2O_3? MgO?	See also pinite. Pyrophyllite should be recorded separately from talc and steatite. Grades arbitrary: Nos.1 2 and 3.

Mineral	Statistics as	Content required (if possible) of	Remarks.
QUARTZ	tons	Silica (SiO_2)	See also silica, quartzites.
QUARTZ CRYSTAL	lb.	lb. useable crystal	
QUARTZITE	tons	Silica (SiO_2)	See quartz, silica.
Ribbonstone	troy oz.		See gemstones.
ROAD METAL	tons		State kind: basalt dolerite dolomite gravel granite limestone porphyry shale others
ROCKS CRUSHED (other than roadmetal)	tons		State kind and use.
Ruby	cerats		See gemstones.
SALT	tons	Sodium chloride ($NaCl$)	Crude or refined.
SAND	tons	Silica (SiO_2)	Uses: Cement and lime-mortar sand. Foundry sand. Glass sand. Fire sand. Engine sand. Filtration sand.
SANDSTONE	tons	blocks	Purpose used.
Sapphire	cerats		See gemstones.
Sericite	tons		Not produced in Australia.
Shell grit	tons	Calc.carbonate ($CaCO_3$)	See limestone. State purpose for which used.
Sienna	tons		See ochre.
SILLIMANITE	tons	Alumina (Al_2O_3)	
SILICA	tons	silica (SiO_2)	See quartz, quartzite etc.
Slate	tons		For roofing or other usage.
Sodium Sulphate	tons	Sod.sulphate (Na_2SO_4)	Mostly from well brines. Salts include mirabilite, Glauber's salt, glauberite. No known production in Australia.
Sodium Carbonate	tons	Sod.Carb. (Na_2CO_3)	Natural production from brines; also from minerals natron, trona, urao. No production in

Mineral	Statistics as	Content required (if possible) of	Remarks.
Sodium Carbonate - cont.			Australia from natural sources.
Spinel	troy oz.		See gemstones
Staurolite	troy oz.		See gemstones
STEATITE	tons	Magnesia (MgO)	State blocks or lump. Separate from talc. Grades arbitrary: Nos. 1, 2 and 3.
STONE	tons		See building stone, crushed rock, road-metal, ornamental stone etc.
Strontianite	tons	strontium carb. ($SrCO_3$)	
Strontium minerals			See strontianite and celestite.
SULPHUR	tons	Sulphur (S)	May be produced from New Guinea.
TALC	tons	Magnesia (MgO)	State grades: Nos. 1, 2 and 3.
Thorium minerals			See monazite.
Thorianite	lb.	Thoria (ThO_2)	
Titanium minerals			See ilmenite and rutile (F)
Topaz	carats		See gemstones.
Tourmaline	troy oz.		See gemstones
Tripoli	tons	Silica (SiO_2)	Separate from diatomite
Turquoise	troy oz.		See gemstones
Umber	tons		See ochre
VERMICULITE	tons		State tons crude and (?) tons expanded produced.
WHITING	tons	Calc.Carb. ($CaCO_3$)	State if ground limestone or true natural whiting (See chalk.)
Witherite	tons	Barium carb. ($BaCO_3$)	
Wollastonite	tons		
Zeolites	tons		

CLASS F. PRODUCTS OF ELUVIATED AND ALLUVIAL WORKINGS.

Metal.	Production Statistics to be expressed as	Remarks.
Gold	oz. troy	Gold recovered as bullion; both gold and silver content should be obtained from Mint returns and production expressed in Fine oz. (i.e. oz. pure gold contained in bullion).
Ilmenite	Tons ilmenite	Percentage of ilmenite and also if possible of TiO_2 required.
Monazite	tons monazite	Percentage of monazite in concentrates required and if possible Ce_2O_3 and ThO_2.
Palladium	oz. troy	The platinum metals occur as natural alloys in the native platinum and osmiridium which are won from alluvial deposits. Native platinum consists essentially of platinum, and osmiridium of iridium and osmium. The amounts of platinum and osmiridium and their total metallic contents should be obtained.
Platinum	oz. troy	
Osmiridium	oz. troy	
Rhodium	oz. troy	
Ruthenium	oz. troy	
Rutile	tons rutile	Type of concentrate should be stated e.g. rutile concentrates, zircon-rutile, zircon-rutile-ilmenite etc., and content given of each mineral (including monazite, cassiterite, etc.)
Sapphires	Carats	Obtained from alluvial workings in the Anakie district, Queensland.
Silver	oz. troy	See gold
Tin	tons metal	Recovered as tin-oxide (cassiterite) concentrate. Metal content should be obtained.
Tantalite	tons concentrates	As for tantalite (C)
Wolfram	Tons concentrates (65% WO_3)	As for wolfram (C)
Zircon	tons zircon	Type of concentrate should be stated e.g. zircon; zircon-rutile; zircon-rutile-ilmenite, etc. and content given of each mineral (including monazite).