

STATE REVIEWS



# Indian Minerals Yearbook 2015

(Part- I)

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STATE REVIEWS  
(Rajasthan)

(FINAL RELEASE)

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## RAJASTHAN

### Mineral Resources

Rajasthan is the richest state in terms of availability and variety of minerals in the country and produces about 30 different minerals. Rajasthan is the sole producer of lead & zinc ores, selenite and wollastonite. Rajasthan was the sole producer of garnet (gem) till 2004-05. Almost entire production of calcite, natural gypsum and silver in the country comes from Rajasthan. The State is a major producer of ball clay, calcite, clay (others), copper ore/conc., felspar, fireclay, limestone, ochre, phosphorite/rock phosphate and steatite. The State is also an important producer of marble of various shades. Makrana area is the world famous centre for marble mining.

The State possesses substantial share of the total resources of potash (94%), lead & zinc ore (89%), wollastonite (88%), silver ore (88%), gypsum (82%), ochre (81%), bentonite (75%), fuller's earth (74%), diatomite (72%), felspar (66%), marble (63%), asbestos (61%), copper ore (54%), calcite (50%), talc/steatite/soapstone (49%), ball clay (38%), rock phosphate (31%), fluorite (29%), and tungsten (27%).

Important minerals that are found to occur in the State are: **asbestos (amphibole)** in Ajmer, Bhilwara, Dungarpur, Pali, Rajsamand & Udaipur districts; **ball clay** in Bikaner, Nagaur & Pali districts; **barytes** in Alwar, Bharatpur, Bhilwara, Bundi, Chittorgarh, Jalore, Pali, Rajsamand, Sikar & Udaipur districts; **calcite** in Ajmer, Alwar, Bhilwara, Jaipur, Jhunjhunu, Pali, Sikar, Sirohi & Udaipur districts; **china clay** in Ajmer, Barmer, Bharatpur, Bhilwara, Bikaner, Bundi, Chittorgarh, Dausa, Jaipur, Jaisalmer, Jhunjhunu, Kota, Nagaur, Pali, Sawai Madhopur & Udaipur districts and **copper** in Khatri belt in Jhunjhunu district & Dariba in Alwar district. Deposits of copper are also reported at Ajmer, Bharatpur, Bhilwara, Bundi, Chittorgarh, Dausa, Dungarpur, Jaipur, Jhunjhunu,

Pali, Rajsamand, Sikar, Sirohi and Udaipur districts. Occurrences of other minerals, namely, **dolomite** in Ajmer, Alwar, Bhilwara, Chittorgarh, Dausa, Jaipur, Jaisalmer, Jhunjhunu, Jodhpur, Sikar & Udaipur districts; **felspar** in Ajmer, Alwar, Bhilwara, Jaipur, Pali, Rajsamand, Sikar, Tonk & Udaipur districts; **fireclay** in Alwar, Barmer, Bharatpur, Bhilwara, Bikaner, Dausa, Jaisalmer, Jhunjhunu & Sawai Madhopur districts; **fluorspar** in Ajmer, Dungarpur, Jalore, Jhunjhunu, Sikar, Sirohi & Udaipur districts; **garnet** in Ajmer, Bhilwara, Jhunjhunu, Sikar & Tonk districts; **gypsum** in Barmer, Bikaner, Churu, Sri Ganganagar, Hanumangarh, Jaisalmer, Jalore, Nagaur & Pali districts; **iron ore (haematite)** in Alwar, Dausa, Jaipur, Jhunjhunu, Sikar & Udaipur districts; **iron ore (magnetite)** in Bhilwara, Jhunjhunu & Sikar districts; **lead-zinc** in Zawar in Udaipur district, Bamnia Kalan, Rajpura-Dariba in Rajsamand & Rampura/Agucha in Bhilwara district have been reported. Lead-zinc occurrences have also been reported from Ajmer, Chittorgarh, Pali and Sirohi districts. **Lignite** deposits are found to occur in Barmer, Bikaner, Jaisalmer, Jalore, Nagaur and Pali districts. Flux grade **limestone** occurs in Jodhpur and Nagaur districts and chemical grade limestone in Jodhpur, Nagaur and Alwar districts. Cement grade deposits of limestone are widespread in Ajmer, Alwar, Banswara, Bhilwara, Bikaner, Bundi, Chittorgarh, Churu, Dungarpur, Jaipur, Jaisalmer, Jodhpur, Jhunjhunu, Kota, Nagaur, Pali, Sawai Madhopur, Sikar, Sirohi and Udaipur districts. **Magnesite** in Ajmer, Dungarpur, Pali & Udaipur districts; **marble** in Ajmer, Alwar, Banswara, Bhilwara, Bundi, Chittorgarh, Dungarpur, Jaipur, Nagaur, Sikar, Sirohi & Udaipur districts; **mica** in Ajmer & Bhilwara districts; **ochre** in Baran, Bharatpur, Bhilwara, Bikaner, Chittorgarh, Jaipur, Sawai Madhopur & Udaipur districts; **pyrite** in Sikar district; **pyrophyllite** in Alwar, Bhilwara, Jhunjhunu, Rajsamand & Udaipur districts; **quartz/silica sand** in Ajmer, Alwar, Bharatpur, Bhilwara, Bikaner, Bundi, Chittorgarh, Dausa,

**Table – 1 : Reserves/Resources of Minerals as on 1.4.2010/1.4.2013\* : Rajasthan**

Mineral	Unit	Reserves				Remaining Resources						Total Resources (A+B)		
		Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333		Reconnaissance STD334	Total (B)
			STD121	STD122			STD221	STD222						
Apatite*	tonne	-	-	-	-	-	-	51521	1016000	-	-	1067521	1067521	
Asbestos	tonne	1694398	4588	797073	2496059	108785	3065861	87802	42101	4526861	57800	11119651	13615710	
Balliclay*	tonne	6275408	350832	2845470	9471710	4301217	1100691	18676	-	14045369	-	22341015	31812725	
Barytes*	tonne	1344448	111108	77397	222953	6018	4782	37808	311500	2304688	-	2768727	2991680	
Bauxite*	'000 tonnes	-	-	-	-	-	-	-	-	528	-	528	528	
Bentonite	tonne	-	11415982	574950	11990932	-	-	-	222017000	139423096	25730000	411526101	423517033	
Calcite*	tonne	1261868	38025	1360678	2660571	283227	144688	539285	1037038	3090782	-	7737971	10398542	
China clay*	'000 tonnes	70012	7603	22497	100113	11524	14008	1260	4067	271314	749	332405	432517	
Copper*														
Ore	'000 tonnes	23348	-	66119	89466	3566	228	19186	100256	574818	5060	719628	809094	
Metal	'000 tonnes	186.93	-	885.33	1072.26	5.40	3.29	88.78	686.60	2278.24	15.18	3397.97	4470.23	
Corundum**	tonne	-	-	-	-	-	-	-	-	11925	-	11925	11925	
Diatomite	'000 tonnes	-	-	-	-	634	-	-	-	1440	-	2074	2074	
Dolomite**	'000 tonnes	70000	5344	18730	94074	8416	10242	16132	25480	322617	784	505333	599407	
Feldspar*	tonne	1808327	7793709	8837983	34715019	9839519	4042309	3154174	668648	25859733	-	53231215	87946234	
Fireclay*	'000 tonnes	8543	659	5000	14202	195	1071	2256	2580	45536	-	52221	66423	
Fluorite*	tonne	-	-	-	-	631630	592258	1528348	489488	1294529	145183	5243458	5243458	
Fuller's Earth	tonne	-	-	-	-	-	-	-	350000	189709080	-	190059080	190059080	
Garnet	tonne	6251	10700	9299	26250	214	39868	2013	17694	85690	-	172166	198416	
Gold*														
Ore	(primary)	-	-	-	-	-	-	-	4600000	50193000	64032720	63000	118888720	
Metal	(primary)	-	-	-	-	-	-	-	6.67	103.34	113.55	0.07	223.63	
Granite	(Dim.)	-	-	-	-	-	-	-	-	-	-	-	-	
Stone)	'000 cu m	5581	100380	4500	110461	38462	-	-	-	9021742	20000	9080204	9190665	
Graphite*	tonne	-	-	-	-	47600	-	165920	250000	1450034	-	1913554	1913554	
Gypsum*	'000 tonnes	20821	81	15834	36736	3405	63397	750	710604	237550	-	1018810	1055546	
Iron ore*	'000 tonnes	7382	3644	380	11406	3892	4619	471	11510	7044	-	27535	38941	
Iron ore*	(Magnetite)	17875	-	16090	33965	595	12374	10113	-	554904	15422	593407	627373	
Kyanite	tonne	-	-	-	-	13097	-	10606	-	-	-	23703	23703	

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Table - 1 (Concl.d.)

Mineral	Unit	Reserves				Remaining Resources				Total Resources (A+B)				
		Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331		Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)
			STD121	STD122			STD221	STD222						
Laterite**	'000 tonnes	-	-	-	-	-	-	-	-	60490	62860	123350	123350	
Lead-zinc* ore	'000 tonnes	34289	66200	2306	102795	5055	2818	8944	10189	186575	1380	527127	629922	
Lead metal	'000 tonnes	657	1422.30	35.61	2114.91	107.52	98.92	150.90	212.04	2110.83	-	8349.57	10464.48	
Zinc metal	'000 tonnes	3716.40	7041.10	135.60	10893.10	360.27	162.20	421.07	426.97	7777.55	0.53	22992.74	33885.84	
Lead-zinc metal	'000 tonnes	-	-	-	-	-	-	-	-	117.55	22.37	139.92	139.92	
Limestone	'000 tonnes	1740173	91434	428111	2259717	141539	1607076	4438479	467462	720874	914330	19400121	21659838	
Magnesite*	'000 tonnes	6	0	2	8	906	1589	2118	-	149	-	53796	53804	
Manganese ore*	'000 tonnes	1104	-	647	1751	-	-	-	-	4030	-	4030	5781	
Marble	'000 tonnes	103736	172337	98	276171	-	2037	25606	-	90000	-	95258	1231429	
Mica#	kg.	7515531	21957	2767649	10305137	13633000	310	927638	48973690	16673890	50015	100090117	110395254	
Ochre#	tonne	37586097	178095	13637968	51402160	15626752	11546886	16820861	1824210	896371	19196918	65911998	117314158	
Potash Million tonnes	-	-	-	-	-	-	-	-	-	16936	22	20419	20419	
Pyrite	'000 tonnes	-	-	-	-	13667	-	22917	9590	26310	18392	90876	90876	
Pyrophyllite#	tonne	139650	-	187041	326691	54308	38989	110709	232212	68587	277249	782054	1108745	
Quartzite	'000 tonnes	163	-	86	249	-	18	18	-	706	-	742	991	
Quartz- silica sand#	'000 tonnes	132135	10472	27757	170364	40583	13344	23433	3202	7658	-	162103	332467	
Phosphorite/ Rock	phosphate* tonne	40664109	-	477000	41141109	1161961	20857437	4588355	152633	79750	28032783	2627650	57500569	
Sillimanite Silver*	tonne	-	-	-	-	300	-	519	-	-	-	819	819	
Ore	tonne	64700000	-	44900000	109600000	17368349	88200	64136031	51700000	42970000	172642579	-	348905159	
Metal	tonne	5211.30	-	2694	7905.3	107.38	0.26	270.95	3463.6	1804.88	15613.93	-	21261	
Talc-steatite- soapstone#	'000 tonnes	28719	2705	14770	46193	6155	7323	19196	1685	837	50768	5	85969	
Tungsten*	tonne	-	-	-	-	-	-	-	-	963666	17000628	5964000	23928294	
Contained WO <sub>3</sub>	tonne	-	-	-	-	-	-	-	1421.44	90171.5	2115	-	93707.94	
Vermiculite Wollastonite	tonne	-	-	-	-	20623	2759	4428	-	13000	2883	-	43693	
	tonne	2289869	-	197253	2487122	3750545	-	3724191	76088	3325042	1213352	-	12089218	

Figures rounded off.

\* Reserves/Resources as on 1.4.2013.

# Declared as minor mineral vide Gazette notification dated 10.2.2015.

Note: The proved and indicated balance recoverable reserves of crude oil and natural gas as on 1.4.2015 are 37.33 million tonnes and 36.95 billion cu m, respectively.

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Jaipur, Jaisalmer, Jhunjhunu, Jodhpur, Kota, Pali, Rajsamand, Sawai Madhopur, Sikar, Sirohi, Tonk & Udaipur districts; **quartzite** in Ajmer, Alwar, Jhunjhunu & Sawai Madhopur districts; **rock phosphate** in Alwar, Banswara, Jaipur, Jaisalmer & Udaipur districts; **talc/steatite/soapstone** in Ajmer, Alwar, Banswara, Bharatpur, Bhilwara, Chittorgarh, Dausa, Dungarpur, Jaipur, Jhunjhunu, Karauli, Pali, Rajsamand, Sawai Madhopur, Sirohi, Tonk & Udaipur districts; **vermiculite** in Ajmer & Barmer districts and **wollastonite** in Ajmer, Dungarpur, Pali, Sirohi & Udaipur districts are found.

Other important minerals that occur in the State are: **apatite** in Udaipur & Sikar districts; **bauxite** in Kota district; **bentonite** in Barmer, Jaisalmer & Jhalawar districts; **corundum** in Tonk district; **diatomite** in Barmer & Jaisalmer districts; **emerald** in Ajmer & Rajsamand districts; **fuller's earth** in Barmer, Bikaner & Jodhpur districts; **gold** in Banswara, Bhilwara, Dausa, Sirohi and Udaipur districts; **granite** in Ajmer, Alwar, Banswara, Barmer, Bhilwara, Chittorgarh, Jaipur, Jaisalmer, Jalore, Jhunjhunu, Jodhpur, Pali, Rajsamand, Sawai

Madhopur, Sikar, Sirohi, Tonk & Udaipur districts; **graphite** in Ajmer, Alwar & Banswara districts; **kyanite** and **sillimanite** in Udaipur district; **manganese ore** in Banswara, Jaipur, & Pali districts; **potash** in Jaisalmer & Nagaur districts; **silver** in Ajmer, Bhilwara, Jhunjhunu, Rajsamand, Sikar & Udaipur districts and **tungsten** in Nagaur & Sirohi districts (Table-1). District wise reserves/resources of lignite in the State are provided in Table-2.

Deposits of **petroleum** are located in the Bikaner-Nagaur and Barmer-Sanchore basin and those of **natural gas** in Jodhpur and Jaisalmer basins in the State.

### Exploration & Development

National Oil Companies (NOC) continued their seismic survey for petroleum and natural gas during 2014-15.

The details of exploration activities conducted by various agencies for lignite and other minerals during 2014-15 are furnished in Table - 3.

**Table – 2 : Reserves/resources of Lignite as on 1.4.2015 : Rajasthan**

(In million tonnes)

District	Proved	Indicated	Inferred	Total
<b>Total</b>	<b>1168.53</b>	<b>2670.84</b>	<b>1887.34</b>	<b>5726.71</b>
Barmer	495.23	2380.03	1336.49	4211.75
Bikaner	560.30	230.24	309.28	1099.82
Jaisalmer & Barmer	-	-	13.80	13.80
Jaisalmer & Bikaner	-	-	2.21	2.21
Jalore	-	-	76.08	76.08
Nagaur & Pali	113.00	60.57	79.04	252.61
Jaisalmer	-	-	70.44	70.44

*Source: Coal Directory of India, 2014-15.*

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Table – 3 : Details of Exploration Activities in Rajasthan, 2014-15

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
<b>GSI</b>							
<b>Base metal</b>							
Alwar	Mejorh-Bamanwas-Bisoni block, south west of Mundiawas-Khera area	-	-	-	-	-	- G4 stage investigation for copper and associated precious metal was carried out. The rock types exposed in the area belong to the Alwar and the Ajabgarh Group of the Delhi Supergroup and lies within the Alwar sub-basin of North Delhi Fold Belt (NDFB). Based on surface indications of mineralisation in the form of malachite stains, fresh sulphides and old workings, three potential areas have been demarcated i.e. Angari block, Bisoni block and Mejorh block. The analytical results of the bedrock samples of the Angari block ranges from 10 ppm to 0.18%. The investigation has been completed.
-do-	Mundiawas block, Mundiawas-Khera area	-	-	5	-	-	- G3 stage investigation of copper and associated precious metals was carried out. The block is a part of the Alwar basin of North Delhi Fold Belt comprising rocks belonging to the Thanagazi Formation of the Ajabgarh Group of the Delhi Supergroup. Investigation was carried out in Mundiawas Block to test the sub surface continuity of the Cu and associated precious metals. The rock types exposed are mica schist, quartzite, carbon phyllite, felsic meta-volcanics, dolomite and amphibole-bearing dolomite and are traversed by quartz and calcite veins. Five boreholes drilled during FS 2014-15 intersected significant sulphide mineralisation in the form of specks, disseminations, stringers, fracture filling and occasional massive sulphides in the form of chalcopyrite, arsenopyrite, pyrrhotite and minor pyrite. Part analytical results of borehole MUBH-1 show mineralisation between 198.0 – 203.0 m = 5.0 m × 3.66% Cu at 0.2% Cu cut off with 19.11 g/t Ag, 200.0 – 202.40 m shows 2.40 m × 7.29% Cu (at 1.0% Cu cut off) with 33.64 g/t Ag. The investigation has been completed.
Alwar	Khera SE Block, Mundiawas- Khera area	-	-	4	-	-	- G3 stage exploration was carried out for Copper, which is located in the SE of the Khera main block. The rock types exposed are interbanded sequence of felsic meta-volcanic rocks (lithic meta-tuff), quartzite, phyllite, carbon phyllite and tremolite bearing dolomitic marble belonging to the Thanagazi Formation of the Ajabgarh Group of the Delhi Supergroup. The general strike of the litho sequence in the area is NNE-SSW

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Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							with moderate to steep dips towards west. Four boreholes drilled during FS 2014-15 intersected significant sulphide mineralisation. In the form of occasional foliation parallel, specks, stringers, fracture and vein filled chalcopyrite and pyrrhotite. Part analytical results received show significant Cu mineralisation intersected in the borehole KEBH-6 as given below: Cu lodes at 0.2% Cu cut off: 127.0-147.75= 20.75 m × 0.41%, 151.25-164.75= 13.50 m × 0.34%, 169.30-171.30= 2.0 m × 0.30%, 175.30-178.30= 3.0 m × 0.21%, Cu lodes at 0.5% Cu cut off: 127.55 - 129.70 = 2.15 m × 0.50%, 139.25 - 147.25 = 8.00 m × 0.66%, 157.15 - 160.25 = 3.10 m × 0.70%.
Alwar	Khera Block, Mundiyawas-Khera area	-	-	2	-	-	Exploration by deep drilling (UNFC-G3) was carried out to evaluate the depth continuity & grade of the one at deeper levels. The block is located nearly 5 km SSW of tehsil headquarter Thanagazi in Alwar district, Rajasthan and forms a part of the Alwar basin of the North Delhi Fold Belt comprising rocks belonging to the Thanagazi Formation of the Ajabgarh Group of the Delhi Supergroup. Two boreholes drilled intersected light grey to dark grey coloured felsic meta volcanic with thin bands of felsic tuff, scapolite rich bands and thin cherty quartzite bands and tremolite bearing marble. A number of thin smoky quartz occurs at different depths along the borehole. Bluish quartz and clasts of feldspar present at places. Besides, zone of brecciation/fault zone observed with angular fragments set in finer matrix. The boreholes intersected sulphide mineralisation in the form of specks, disseminations, foliation parallel, vein filling, fracture filling and occasional massive chalcopyrite, arsenopyrite and pyrrhotite. The boreholes are in progress.
Bhilwara	Kundiyan- Parameswarapura and Dhamana-Devariya Block	-	-	-	-	452	G4 stage investigation for base metal was continued since FS 2013-14. During FS 2014-15, geochemical sampling on 100 m × 25 m grid pattern has been carried out in Dhamana-Devariya block. Mapping revealed two distinct lithounits exposed in the area, they are calc silicate and amphibole bearing calc silicate rock in the form of alternate bands, belonging to the Rewara Formation of Pur-Banera Group of

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Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Bhilwara	Between Salampura and Dariba block	-	-	3	484.85	-	<p>rocks. The surface indications of sulphide mineralisation in the block found in the form of profuse malachite stains &amp; disseminations of chalcopyrite, bornite and covellite in the exposed calc silicate and amphibole bearing calc silicate rock. Samples for petrochemical (12 nos.) and petrological studies were collected from the area. Out of the 440 nos. geochemical samples, 52 nos. of samples are bed rock samples and 388 nos. are soil samples. Besides the bed rock/soil sampling, a total of 12 nos. are of channel samples. The analytical results of all the samples are awaited. The investigation has been completed.</p> <p>A G4 stage investigation for basemetal was taken up in northern extension part of Salampura block, Pur-Banera Belt. Mineralisation in this block is associated with garnet-biotite-sericite schist, magnetite bearing calcareous schist, Banded Magnetite Quartzite (BMQ) and calc-silicate sequence. The litho-ensemble of this block belongs to Tiranga and Samodi Formation of Pur-Banera Group of Bhilwara Supergroup of Archaean age. The presence of old working, oxidised and gossanised material and presence of BMQ are the important surface manifestations of mineralisation. A total of 484.85 m drilling was carried out in three boreholes numbered SBH-17, SBH-18 and SBH-19. These boreholes were planned to test the soil geochemical anomaly of Cu, Pb and Zn at 60 m to 80 m vertical depth i.e. first level intersection. SBH-17 intersected two Cu and one Pb+Zn mineralisation, Cu mineralised zone-I from 36.65 m to 40.65 m (4 m × 0.12% Cu); zone-II from 126.00 m to 130.30 m (4.30 m × 0.95% Cu); Pb+Zn mineralised zone-I from 64.15 m to 66.90 m (2.75 m × 1.0% Pb+Zn). This borehole was closed at depth of 164.65 m. The borehole no SBH-18 and 19 intersected soil geochemical anomaly at first level mineralisation and were closed at depth of 153.70 m and 166.50 m, respectively. Chemical analytical results of these two boreholes are not received. The investigation has been completed.</p>

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Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Bhilwara	Rampuriya- Gadariyakhera North block	-	-	3	450	192	Investigation for base metal and associated precious metals was taken up with an objective to assess the potentiality of base metals (Pb & Zn) and associated precious metals in Rampuriya-Gadariyakhera North block, Bhilwara district Rajasthan. The lithounits prevailing in this area are amphibole (Gedorite)-garnetquartz-mica schist, banded magnetite quartzite (BMQ), garnet-quartz-mica schist intruded at places by quartz veins. There are two BMQ bands; the western BMQ band trending NNE-SSW, reddish in colour, feebly magnetic with thickness varying from few centimetres to few meters is favourable host rock for mineralisation. Results of three channels cut south to north from western BMQ band gave encouraging results viz. 1) RCH- 4 - 1.7 m × 2.5% Pb+Zn (Southern most), 2) RCH-8 - 9.5 m × 1.86% Pb+Zn, RCH-9 - 8.6 m × 1.19% Pb+Zn (Northern most). Three nos. of boreholes namely BRG-1, BRG-2 and BRG-3 (150 m each) were planned to check the subsurface continuity of mineralisation below the above mentioned channels. A total drilling of 450 m was carried out and a total of 192 nos. of processed core samples were submitted to Regional Geochemical Laboratory, WR. Geophysical logging of all the three boreholes was also carried out. The dominant lithology intersected in all the boreholes is garnet quartz mica schist. Borehole BRG-1 (Southern most) intersected the mineralised zone of 1.90 m × 4-5% Pb + Zn (V.E.) from 105.70 m to 107.60 m depth along the borehole and 0.47 m × 3-4% Pb + Zn (V.E.) from 117.90 to 118.37 m. BRG-2 intersected a mineralised zone of 2.68 m × 1-1.5% Pb + Zn (V.E.) from 87.60 to 90.28 m, 1.92 m x 1% Pb + Zn (V.E.) from 90.88 to 92.80 m, 0.53 m × 1-1.5% Pb + Zn (V.E.) from 100.75 m to 101.28 m and 0.47 m x 1-1.5% Pb + Zn (V.E.) from 110.33 to 110.80 m. BRG-3 intersected mineralised zone of 1.58 m × 1-1.5% Pb + Zn (V.E.) from 71.49 to 73.07 m, 0.68 m × 1-1.5% Pb + Zn (V.E.) from 76.33 to 77.01 m, 0.59 × 0.5-1% Pb + Zn (V.E.), from 81.16 to 81.75 m, 0.50 m x 1% Pb + Zn (V.E.) from 92.65 to 93.15 m, 0.30 m × 1.5 - 2 % Pb + Zn (V.E.) from 96.96 to 97.26 m, 0.47 m × 0.8-1% Pb + Zn (V.E.) from 103.38 to 103.85 m.

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## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Bhilwara and Ajmer	In and around Hanutiya, Garvar, Sapola, Devpura and Dhanikhera village of Masuda tehsil	1:10000	51	-	-	304	Investigation for base metal and gold in Sandmata Complex terrain was taken up. An area of 51 sq km was mapped by large scale geological mapping (on 1:10000 scale) in order to locate new target areas of base metal and gold mineralisation. Larger part of the mapped area falls in the Sandmata Complex and Mangalwar Complex of Bhilwara Supergroup. Surface indication of mineralisation is found in the form of several detached old working pits, slag heaps, malachite encrustation and fresh sulphides (pyrite, chalcopyrite, azurite) occur in gritty conglomerate. There is a series of 4-5 old-workings on the northwestern part of the Hanutiya metasedimentary sequence. This gossanised/ oxidised zone consists of cherry-red encrustation of sulphide and yellowish stains of limonite occurring in the mapped area. Gritty conglomerate with schistose matrix with detrital tourmaline is the main host rock for sulphide mineralisation. The sulphide mineralisation in the Hanutiya area is mainly controlled by lithology i. e. gritty conglomerate. Sulphides occur as specks and dissemination. The strike of the zone of mineralisation is NE-SW which is parallel to the regional strike of rocks indicating structural control on mineralisation (axial traces of both $F_1$ & $F_2$ fold). Mineralisation is also associated with the silicification (low temperature hydrothermal alteration). The northeastern extension of already explored Hanutiya block has been demarcated for possible zone of mineralisation based on the presence of profuse malachite stain, oxidation and gossanisation within the gritty conglomerate. The zone extends 350-400 m in strike, with a width from 100 m to 150 m. Importantly it is in continuation of old working zone in the southwest. The litho-geochemical prospecting was carried out in the area to establish the anomalous zone of basemetal and gold mineralisation. Oxidized/gossanised rocks with indication of mineralisation were sampled (grab and chip sampling). Total 304 nos. of bedrock samples (grab & chip) were processed following standard procedure and submitted for the chemical analysis. Total analyses of 149 nos. of bedrock samples have been received, out of which one sample of slag from Hanutiya area resulted 2.6% Cu, two samples from sheared quartz vein from nearby Sapola analysed

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## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							0.37% Pb, 0.14% Cu and 0.24% Pb, respectively. One sample from gritty conglomerate from the extension zone of already explored Hanutiya block yielded 2.6% Cu.
Jaipur and Alwar	Tehla-Khoh- Bighota area	-	-	-	-	-	- A G4 stage investigation for basemetal and associated precious metals was taken up. The rock types exposed in the study area comprises calcareous, arenaceous and argillaceous rocks of Raialo Group of Delhi Supergroup. Rocks of Dogeta, Serrate and Tehla Formations are exposed between Baldevgarh and Tehla area. Based on surface indications of mineralisation in the form of malachite stains and fresh sulphides, channel sampling was carried out to the west of Palpur, west of Baldevgarh area, north of Baldevgarh area and west of Kho area. The analytical results of BRS samples show 0.21% Cu at west of Palpur, 0.34% Cu at NW of Tilwari-Dabkan area, 0.22% Cu from Doli-khan stone quarries SW of Palpur. The investigation will continue in FS 2015-16.
-do-	In Bokri and Malwali prospects of eastern Khetri metallotect	1:2000	1.19	-	-	520	Investigation was taken up for copper and associated minerals in gap area situated between explored Bokri and Malwali prospects. During FS 2014-15, an area of 1.19 sq km has been mapped on 1:2000 scale along with pitting and trenching of 50 m <sup>3</sup> . A total of 460 nos. of bed rock samples were collected on 100 m × 25 m grid and 60 nos. of pitting and trenching samples were also collected. The surface manifestations of mineralisation are development of gossans as observed at places in the fault zone, malachite staining within the thin discrete shear zone, malachite and azurite staining over magnetite quartzite and at places in calc-silicate body. The calc-silicate body shows mineralisation of chalcopyrite, pyrrhotite, pyrite and bornite associated with blotches of recrystallised calcite. Chemical analysis of 116 of bed rocks samples from calc-silicate rocks and quartzite shows copper values from 20 ppm to 6616 ppm (0.66 %). A total of 3 nos. of bed rock samples have been assayed with over 0.10 % Cu.
Sikar	West of Nanagwas area	-	-	4	1065.95	-	G3 stage investigation for base metal was taken up. The area exposes rocks belonging to the Kushalgarh Formation of the Ajabgarh Group of the Delhi Supergroup. The principal lithounits exposed in the mapped area include

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## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							<p>amphibole marble, biotite marble, dolomitic marble, scapolite biotite schist, garnet-mica schist, quartzite, quartz veins and calcite veins. Two mineralised zones MZ-I &amp; MZ-II were delineated on surface. MZ-I in the northern part of mapped area, extending for about 450 m in strike length while MZ-II extends for about 800 m in strike length. Both these zones were drilled by 10 number of borehole and a resource 8.05 MT × 0.34% Cu (at 0.2% cut-off) has been estimated by cross section method. During field season 2014-15, a total of 1065.95 m drilling has been completed in 4 second level boreholes (WNBH-11 TO WNBH-14) in the northern part of the area. All the boreholes show thickening of zones with depth. Sulphide mineralisation occur in the form of disseminated, vein/vug filled, fracture filled and stringers of bornite (<math>2\text{Cu}_2\text{S}\cdot\text{CuS}\cdot\text{FeS}</math>), chalcopyrite (<math>\text{CuFeS}_2</math>), covellite (<math>\text{CuS}</math>), Chalcocite (<math>\text{Cu}_2\text{S}</math>) and pyrite (<math>\text{FeS}_2</math>). First borehole WNBH-11 was planned behind borehole WNBH-1 to intersect the lodes intersected in borehole WNBH-1 at depth. Depth of this borehole is 308.95 m. Analytical results of borehole WNBH-11 shows the following Cu lodes at 0.2% Cu cut- off 226.25 m to 232.50 m (6.25 m × 0.40% Cu), 237.80 m to 244.10 m (6.30 m × 0.28% Cu), 274.70 m to 279.75 m (5.05 m × 0.24% Cu), 288.86 m to 291.75 m (2.89 m × 0.20% Cu) and 293.90 m to 296.00 m (2.10 m × 0.31% Cu). WNBH- 12 is the second level borehole planned for deeper level intersection of the lodes intersected by WNBH-2. The borehole WNBH-12 was drilled up to 256.20 m depth. Analytical results of borehole WNBH-12 show the following Cu lodes at 0.2% Cu cut-off, 158.70 m to 171.85 m (13.15 m × 0.31% Cu), 180.20 m to 205.95 m (25.75 m × 0.22% Cu), 209.15 m to 225.65 m (16.50 m × 0.12% Cu) and 230.05 m to 232.00 m (1.95 m × 0.14% Cu). The third borehole WNBH-13 has been planned as second level borehole in between the boreholes WNBH-4 and WNBH-9 to test the subsurface continuity of copper mineralisation between WNBH-4 and WNBH-9. Analytical results are yet to be received. The investigation has been completed.</p>

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## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Sikar	In southeast area of Palaswala ki Dhani Block	-	-	-	961.5	107	A G3 stage investigation for basemetal was taken up. The area exposes rocks belonging to the Kushalgarh Formation of the Ajabgarh Group of the Delhi Supergroup. The bed rock sampling has been done at a 100 × 25 m grid and collected 107 nos. of samples from the area. The detailed mapping has been carried out in the southeastern part of the Palaswala ki Dhani village, which is the eastern limb of the Palaswala ki Dhani synform. The main lithologies are dolomitic marble, garnet-biotite schist, amphibole marble, ferruginised dolomitic marble, biotite-rich marble and quartzite encountered during mapping. Three surface mineralised zones have been delineated on the studied area. Two zones (MZ-I & MZ-IA) are in the eastern part of the area and third zone (MZ-II) is in western part of the study area. The zone (MZ-I) is the extension of the previously delineated mineralised zone on western limb, which is very thin and shows pinch and swell nature having 2 to 4 m width with 400 m strike length. The Zone (MZ-IA) is the eastern most zone having 250 m strike length and width varies from 2 m to 10 m. The 3 <sup>rd</sup> surface mineralised zone (MZ-II) has been delineated on the western part of the study area having about 200 m strike length with thickness varying between 10 m to 15 m. The surface indications of mineralisation is in the form of malachite staining, intense ferruginisation, presence of occasional fresh sulphides of pyrite, chalcopyrite, bornite and specularite associated chalcocite hosted within biotite rich marble, amphibole marble and dolomitic marble. A total of 961.50 m drilling has been done by targeting the surface mineralised zone. All the boreholes intersected the sulphide mineralisation at the projected depth. However, it is noticed that the concentration of copper mineralisation is weak in all the boreholes. The boreholes intersected two sulphides zone nearly at a depth of 60 m and 90 m along borehole, except borehole PDBH-5. The investigation has been completed.
Sikar	Mahawa North Block	-	-	-	-	296	G4 stage investigation for basemetal was taken up. The evidences of sulphide mineralisation are present in lithounits belonging to Kushalgarh formation of the Ajabgarh Group of the Delhi Supergroup. In the studied area, (Contd.)

## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Sikar	In southeast of Kharagbinjpur	1:2000	0.6	-	-	-	<p>lithounits encountered are banded calc-silicate, dolomitic marble, amphibole bearing marble, amphibolites, mica schist and quartzite and these are traversed by quartzite and calcite veins. The surface evidence of sulphide mineralisation is present in the form of Malachite stains. In total 112 nos. of bedrock samples and 164 nos. of channel samples were collected. Total 20 nos. of samples were collected for petrological and ore petrographic studies. 54 Cu m of trench was dug to check continuity of litho units under soil cover. The partial analytical results available so far indicate encouraging values for Copper. For channel sample the value of Copper ranges from 0.2% to 1.0%, whereas in bedrock samples Cu values range from 0.2% to 0.88%. The investigation has been completed.</p> <p>G4 stage investigation for basemetal was taken up. The rocks exposed belong to the Kushalgarh formation of Ajabgarh Group of Delhi Supergroup. The potential area for mineralisation has been identified on the basis of surface evidences within the mapped area and detailed mapping has been carried out. A total of 0.60 sq km area has been mapped on 1:2000 scale along with channel sampling and bed rock sampling. The lithologies identified in the area are mainly calc-silicates and its variants. Mainly siliceous dolomitic marble, quartz biotite schist ± garnet, dolomitic marble with QBS partings, QBS± amphibole ± garnet, amphibole bearing dolomitic marble, amphibole garnet schist with thin ferruginised dolomitic marble bands, tremolite bearing dolomitic marble. In the northern part of the block, a surface mineralised zone defined by occurrence of disseminations of pyrite and chalcopyrite, in thin bands of ferruginised dolomitic marble without malachite staining. The zone is confined to the western limb of a mesoscopic fold and is exposed discontinuously for a distance of about 1300 m, varying in thickness from 5 m to 15 m. Three Grab samples collected from the northern part of these bands of 0.30 m to 0.50 m in width showing Cu content 0.38%, 0.34% and 0.19%. The investigation will continue in FS 2015-16.</p>

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## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
-do-	Toda Ramliyas block, Nim Ka Thana belt	-	-	6	1037.8	-	G3 stage investigation for basemetal was taken up. The lithounits exposed in the area belong to Kushalgarh Formation of Ajabgargh Group of the Delhi Supergroup. The subsurface investigation by drilling was taken up to test the subsurface copper mineralisation of the 1.5 km strike length (MZ-I) on the basis of analytical results of bed rock and channel samples. A total of 1037.80 m of drilling was done in six boreholes. The borehole TRBH-1 was drilled to a depth of 133.30 m and intersected sulphide mineralisation from 90.00 m to 97.70 m and 101.10 m to 127.00 m with V.E. 0.1-0.2% Cu in the form of disseminations, stringers and veins of chalcopyrite, bornite, covellite, pyrite and specularite. The borehole TRBH-2 was drilled to a depth of 156.70 m and analytical results indicated copper lodes 60.45 - 68.35 = 7.9 m × 0.2% Cu and 94.30 - 103.22 = 8.92 × 0.31% Cu. The borehole TRBH-3 was drilled to a depth of 151.60 m and analytical results show a copper lode 119.20 - 128.20 = 7 m × 0.62% Cu. Borehole TRBH-4 was drilled to a depth of 210.20 m and intersected sulphide mineralisation from 167.35 m to 200.05 m (V.E.0.1-0.2%), the borehole TRBH-5 was drilled to a depth of 210.00 m, which intersected sulphide mineralisation as expected at 180.25 m to 190.65 m (V.E.0.1-0.2% Cu). The borehole TRBH-6 was drilled to a depth of 176.20 m and didn't intersect any significant sulphide mineralisation. The investigation has been completed.
<b>Bismuth</b>							
Ajmer	Areas between Badnor and Patan	1:10000	50	-	-	97	Investigation for bismuth and possible gold mineralisation was taken up. Large scale mapping was carried out on 1:10000 scale covering a total area of 50 sq km. A total of 97 nos. of BRS/SS samples were processed and submitted for analysis. The dominant rock types exposed in the area are comprised foliated biotite granitoids with pegmatitic and leucogranitic intrusions, garnet-staurolite schist and sheared schist with mica fish, sheared metagreywacke-conglomerate, garnet schist, calcsilicate, siliceous dolomite, sheared-metagreywacke, biotite-muscovite schist and pegmatites. One ferruginised brecciated horizon (Gossan) was observed, with imprints of sulphide mineralisation beneath (in the form of

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## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							staining and occurrence of clay), extending for about 1.8 km. About 400 m west of Bar, a mineralised granitoid body (undeformed, quartz-rich granitoid) of dimension 13 m × 5 m is identified. Silver coloured sulphide minerals have been identified to be occurring along with a black coloured mineral (streak-black and soils finger). Bi value of 1.8 ppm has been recorded from a BRS of this lithounit. Stream sediment samples from streams draining western and west-central parts of the study area have analysed anomalous bismuth (0.9 to 3.5 ppm).
<b>Gold</b>							
Banswara	Gundelapara West Block	-	-	9	-	-	G3 stage investigation was carried out to test the sub-surface continuity of the three parallel to sub-parallel mineralised zones (numbered I, II and III from east to west), delineated during FS 2012-13 on the basis of surface geological and geochemical attributes. A total of 9 boreholes have been drilled so far to intersect the mineralisation zones I to III at 100 m interval. All the boreholes proved the subsurface continuity of the mineralised zones. Study of the borehole cores shows that primary sulphides occur mainly in dolomite marble, albite rich rock and amphibolite in order of decreasing abundance. The sulphide mineral assemblage is represented by pyrrhotite, arsenopyrite, pyrite and chalcopyrite in order of decreasing abundance. These occur as dissemination, vein, stringers and at times as massive sulphide bodies. The width of sulphide zones along boreholes varies from 1.00 m to 14.15 m and visual estimate of sulphides ranges from 5 to 8%. Sub-surface exploration has established 100 m, 200 m and 500 m strike continuity of mineralised zones - MZ-I, II and III. Analytical results of the core samples of boreholes GW-1 to 4 revealed the presence of copper zones varying in width along borehole from 1.10 m to 4.05 m, with average grade of copper ranging from 0.13 to 1.08% at 0.10% cut off and 1.0 m stoving width. The investigation is completed.
Banswara Dungarpur and Udaipur	Areas between Khamera and Devlapal	-	-	-	-	8	G4 stage investigation was carried out to assess the nature and potentiality of gold-copper mineralisation. The lithounits of the area form a part of Mangalwar Complex of Bhilwara Supergroup and Aravalli Supergroup. Lithounits present in the study area are granitoids, quartzite, white dolomitic

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Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							marble, grey banded marble, bluish grey marble with phyllitic interbands, meta-greywacke, grey phyllite, staurolite-mica schist, magnetite bearing muscovite-chlorite schist, conglomerate and quartz veins. Granitoids representing basement are present in eastern part of the mapped area. Five mineralised zones (100 to 650 m long) are demarcated in the mapped area. Analytical results of a 12 m long channel at contact of grey marble and grey schist near Sarpotia village indicated presence of 0.34% average Zn. Four bed rock samples from Mokhampura, Ganera, Hirawa and Dhauli Magri villages show Cu values 2012 ppm, 1528 ppm, 1074 ppm and 1105 ppm, respectively. Two bedrock samples collected from ferruginised grey marble and from an old working at Ganera and Mokhampura villages have analysed anomalous Ni (1028 ppm and 1711 ppm). One bedrock sample collected from an old working within grey marble near Sarpotia village has analysed anomalous Pb (1402 ppm). Similarly, another bedrock sample from white dolomitic marble from near to Dhauli Magri village has analysed anomalous Ba (1649 ppm). The investigation is completed.
Dungarpur	Mahurikhera area	1:2000	0.6	-	-	-	G4 stage investigation was carried out to assess the nature and potentiality of gold-copper mineralisation. The lithounits exposed in Mahurikhera area are part of Mukundpura Formation of Debari Group of Aravalli Supergroup comprising fine grained chlorite schist with tourmalinites bands, dolomitic marble, banded marble, silicified marble, brecciated magnetite bearing silicified quartzite and Jasperoid intruded by quartz and pegmatite veins. The litho-assembly is underlain by the Mangalwar Complex represented by coarse grained staurolite bearing quartz-mica schist. Seven mineralised zones (MZ-I to VII) have been demarcated on the basis of surface evidences of mineralisation in the form of old-workings, gossan zones, sulphides including chalcopyrite and pyrite disseminations, malachite stains, silicification, hydrothermal alterations, presence of ore grinding implements and slag dumps in the area. Analytical results of channel samples received so far indicated presence of 1.00 m to 12.00 m thick gold zones with average grade 0.10 ppm to 1.11 ppm at 0.10 ppm

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Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
cut-off. At 0.10% cut-off, width of copper zones varies from 1.00 m to 18.00 m with average copper content 0.10% to 0.45%. The investigation is completed.							
<b>Lignite</b>							
Jaisalmer and Bikaner	Panna area, Palana basin (West Coast Lignite field)	-	-	16	3950.5	-	Exploration under G-4 stage continued under Promotional scheme to locate lignite bearing blocks, establish the stratigraphic set up of the area and preliminary assessment of lignite resource. A total of 119.50 m drilling has been done in two boreholes RPP-7 and 9 without intersecting any lignite seams. Investigation was closed on 30.05.2014. Scout drilling to locate lignite bearing blocks, establish the stratigraphic set up of the area and preliminary assessment of lignite resource in the Charanwala area (27°51'08'' to 27°55'00''N and 72°00'00'' to 72°15'00''E) in the unexplored virgin areas of Palana basin, Bikaner district, Rajasthan, commenced in May, 2014. A meterage of 3950.50 m of drilling has been completed in sixteen boreholes in the block. Geophysical borehole logging of 3063.19 m was carried out in the block. Lignite seams have been intersected in western and northern part of the area. Thickness of individual lignite seam varies from 0.50 m to 3.50 m in the depth range from 109.00 m to 195.00 m. The lignite seam is hosted within the Lower Tertiary Palana Formation. Carbonised leaf impression is observed. Considering the variation in litho-packages intersected, basin tectonics and sedimentary history a conceptualised model of deposition of lignite bearing formation was developed in the area and applied to delineate new areas with progressive success.
<b>Limestone</b>							
Jaisalmer	Bandah area	-	-	10	334.5	213	G4 stage investigation for low silica SMS grade limestone was taken up. A total of 334.50 m core drilling has been carried out in 10 nos. of scout boreholes and collected 213 nos. core samples. Borehole JRB-1 intersected limestone from 1.73 m to 21.62 m with four bands of hard and compact limestone, Borehole JRB-3 intersected limestone from 1.00 m to 12.88 m with two bands of hard and compact limestone, borehole JRB-5 intersected limestone from 4.00 m to 23.50 m with four bands of hard and compact limestone, borehole JRB-7 intersected limestone from 8.80 m to 33.50 m with two bands of hard &

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Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							compact, borehole JRB-8 intersected limestone from 8.00 m to 29.00 m with two bands of hard & compact limestone, borehole JRB-9 intersected limestone from 23.27 m to 35.70 m (12.43) with one band of hard & compact limestone, and borehole JRB-10 intersected limestone from 6.00 m to 30.00 m with two bands of hard & compact limestone. One of the borehole (JRB-4) has intersected gypsecious clay/crystalline gypsum from 1.15 m to 19.50 m. Analytical results of 63 nos. samples show an average SiO <sub>2</sub> -1.24%, CaO-53.7, MgO-0.38, Fe <sub>2</sub> O <sub>3</sub> -0.53 & Al <sub>2</sub> O <sub>3</sub> -0.19, respectively. These results match with the specification of Chemically SMS grade limestone and 11 nos. samples show on an average SiO <sub>2</sub> -5.83%, CaO-50.89, MgO-0.35, Fe <sub>2</sub> O <sub>3</sub> -0.74 & Al <sub>2</sub> O <sub>3</sub> -0.39, respectively, which matches with the specification of cement grade limestone.
Jaisalmer	Miyun-ki Dhani (west)	-	-	18	900	616	G4 stage investigation for limestone was taken up. A total of 900 m vertical auger core drilling has been carried out in 18 nos. (JRMW-1 to JRMW-18) of boreholes at 500 m × 500 m grid pattern and each drilled at 50 m depth below ground level. Total 616 nos. of core samples processed and submitted for chemical analyses. All the boreholes were drilled up to the depth of 50 m below ground level. In the entire borehole hard to compact limestone has been intersected with different thicknesses. The variation in thicknesses is ranging between 2.5 m to 28 m. In most of the boreholes, the hard and compact limestone bearing zone is occurring continuously and in some of the boreholes this limestone is occurring intermittently with the partings of clayey limestone, highly clayey limestone, hard to moderately hard clayey limestone, chalky limestone, foraminiferal/bioclastic limestone, foraminiferal marl, sub-bentonitic clay, calcareous clay and grey shale. Out of analytical results of 274 nos. core samples, the results of 60 nos. indicate the grade matching with SMS (LD) grade with maximum CaO-55.06% and minimum CaO-50.35% and the grade of 62 nos. are matching with the SMS (OH).

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Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
<b>REE</b>							
Barmer	Siwana area	1:12500	-	-	-	31	G4 stage investigation for REE and Rare Metals was carried out. The study area is divided into two blocks. One is Phulan-Devra block (Eastern block) and other is Bhimgoda ka pahar-Koliyasar ka pahar block (Central block). The study area is located in the NE corner of Barmer district. The eastern block is located 15 km NE of Siwana town while central block is located 5 km SW of Siwana town. The area lying to the west and southwest of the Aravali mountain range in Rajasthan, hereafter referred to as the Malani Igneous Suite (MIS), exposes a great variety of igneous rocks comprising acid, intermediate, basic, ultrabasic and alkaline intrusives and extrusives besides sedimentaries. The area covered by LSM (1:12500) comprises different acidic (rhyolite) and basic lava flows, intrusive Siwana granite, late phase dykes i.e. rhyolite, felsites and micro granite dykes. All the lava flows are separated by a tuff or pyroclastic unit. The eastern Phulan-Devra block comprises Siwana rhyolite, Siwana granite, micro granite and felsites dykes. Siwana rhyolites are mainly composed of embayed quartz and feldspar grain within fine grained matrix. It is coarse grained, leucocratic and shows the presence of phenocryst of feldspar (Rapakivi) in the groundmass of quartz, aegirine and riebeckite. Within this rhyolite body, five felsite dykes trending in N20°W-S20°E direction were demarcated. Felsite dykes are mainly composed of quartz, orthoclase feldspar and aegirine and show intergranular texture. These dykes indicate high value of radioactivity i.e. 0.09 mR/hr. The microgranite observed within Siwana granite in and around Devra and Phulan indicates 0.03 to 0.04 mR/hr, while the Siwana granite indicates 0.02 to 0.025 mR/hr. The central block (Bhimgoda ka pahar - Koliyasar ka pahar area) of the mapped area mainly comprises thick lava flow unit (acidic and basic), tuff and pyroclastic unit between two lava flows and late phase rhyolite dykes. Basic lava flows are characterised by ophitic to subophitic texture and composed of plagioclase and amphibole. Few late phase rhyolite dykes also observed. Three small vent areas also identified within the mapped area. Vent is mainly identified by the presence of pyroclastic unit with volcanic bombs. The sizes of the volcanic bombs (clast) are varying

(Contd.)

## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							from 2 cm to 15 cm in length. Geochemical signature of Siwana granite shows that it is A-type granite and peralkaline in nature. The rhyolite of the mapped area is mostly peraluminous in nature. AFM diagram indicates that all the rock types of mapped area are tholeiite in nature. Felsite dykes of eastern blocks are peralkaline in nature. Most of the rock types in mapped area are alkaline to peralkaline in nature. REE mineralisation in the area is supposed to be hosted in late phase felsites, micro granite and rhyolite dykes, Siwana granite and rhyolite and pyroclastic unit rock. Felsite dykes, Siwana granite and rhyolite bears promising locale for REE mineralisation. Analytical result of $\Sigma$ REE in Bed rock sample of felsite dykes, Siwana granite and rhyolite rock indicated significant REE mineralisation in the mapped area. Chemical result of one felsite dykes sample shows $\Sigma$ REE more than 1%. All 16 bed rock samples of granite show $\Sigma$ REE more than 0.1%; out of 16 samples of granite 6 sample show $\Sigma$ REE more than 0.3% with a highest value of 3978 ppm. All 15 bed rock samples of Rhyolite show $\Sigma$ REE more than 0.1%. Three bed rock samples of microgranite show $\Sigma$ REE more than 0.1%. 2 samples out of these 3 sample show $\Sigma$ REE more than 0.4%. Tuff unit also shows anomalous REE value which is ranging from 0.1% to 0.3%. Pb-Zn value in rhyolite dyke is 1.14%. Anomalous Pb-Zn value also observed in Felsite dykes. 3 samples of Rhyolite dyke, 7 samples of Felsite and one sample of Rhyolite flow shows Pb-Zn value greater than 0.1%. Zr value in felsites dykes varies from 0.58% to 0.99% and in rhyolite it varies from 0.1% to 0.59%. The investigation will continue in FS 2015-16.
Bhilwara	Bhagwanpura south-west and southeast block	1:10000	50	-	-	302	G4 stage investigation for REE and Rare metal elements in Bhilwara Pegmatite Belt-Sandmata Complex was carried out. The work carried out included geological mapping on 1:10000 scale with collection of 302 nos. of geochemical samples covering an area of 50 sq km. The geochemical samples both as grab samples and grab chip samples were mostly from pegmatite bodies with few samples from adjoining gneissic rocks. The mapped area exposes rocks of Mangalwar complex which includes mica schist, migmatite, quartzo-feldspathic

(Contd.)

STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							gneisses and amphibolites intruded by aplite and pegmatites, amphibolites aplite and pegmatite. Gneisses which are considered as basement gneisses are having intermittent band of mica schist and amphibolites. Pegmatite bodies profusely intruded within gneisses and mica schist within the two blocks do not show pronounced zoning except presence of quartz core. Separate quartz veins have also been noticed which is milky white with occasional smoky in nature. Chemical analyses of the 86 nos. of bed rock samples collected from pegmatite bodies and gneissic rock are not showing encouraging result of REE and RM. However, one sample collected from gneissic rock has assayed over 1000 ppm of total REE.
Jhunjhunu	Gothara Granite of Khetri Fold Belt	-	-	-	-	421	G4 stage investigation of REE was continued from FS 2013-14 with the objective to explore the REE potential of the Gothara Granite, which intruded the quartzite country of North Khetri Fold Belt. The main lithologies identified during mapping are grey granite, amphibole bearing pink granite, silicified granite, brecciated granite, magnetite bearing quartzite, brecciated magnetite bearing quartzite and magnetite bearing chert and basic rock. At the contact of granite and quartzite breccia zones as well as hybrid rocks occur. Granitization of the country rock (magnetite bearing quartzite) has led to the formation of hybrid rocks. Though patchy in occurrence the breccia zones are more predominant in the Gothara granite north block than in the Gothara granite central block. A total of 421 nos. of grid samples collected on 50 × 20 m interval. Till date chemical analyses of 220 nos. of samples are available, out of which 7 nos. of samples yielded $\Sigma$ REE > 2500 ppm (3.18%), 25 nos. of samples yielded $\Sigma$ REE > 1000 ppm (11.36%) and 106 nos. of samples yielded $\Sigma$ REE > 500 ppm (48.18%). The maximum value recorded is 0.025 mR/hr against a background value of 0.015 mR/hr. An instance of REE bearing phase-Bastanasite is observed in granite sample. In the mapped area of FS 2014-15 the maximum value recorded is 0.04 mR/hr against a background value of 0.015 mR/hr. The investigation has been completed.

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## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Pali	Perva Bisalpur area	-	-	-	-	55	G4 stage investigation for REE and Rare Metals was taken up in the area located in the SW corner of Pali district and 10 km SW of Falna. The area west of Phulad Ophiolite Suite, marking the western boundary of SDFB, exposes isolated patches of gneiss, meta-sedimentary rocks and intrusive granites. The gneisses and high grade metasediments represent basement component, while the low grade metasediments forming the cover sequence are included within the Sirohi Group. The intrusive granites are grouped into the Erinpura granite. Erinpura granite, the major rock type in the mapped area, is leucocratic, coarse grained and porphyritic in nature. Mafic enclave is also observed within the Erinpura granite. Dhani granite is another major rock type in the mapped area. It is mainly observed near Perva village (450 m long elliptical outcrop) and Balvana village. Contact between Dhani granite and Erinpura granite is marked by NE-SW trending fault. REE mineralisation in the area is supposed to be hosted in Dhani granite and in highly carbonatised-ferruginised-silicified brecciated rock. Dhani granite and brecciated rock bears promising locale for REE mineralisation. Analytical result of $\Sigma$ REE in bed rock sample of Dhani granite and carbonatised-ferruginised-silicified brecciated rock depict significant REE mineralisation. Seven samples out of 55 samples show $\Sigma$ REE of more than 500 ppm. Three samples out of seven show greater than 0.1% $\Sigma$ REE. One sample of silicified brecciated rock shows 1.49% Ba value and two carbonatite dyke samples show anomalous Ni value of 746 ppm and 300 ppm, respectively and Cr values of these two samples are 1649 ppm and 2263 ppm, respectively. The investigation has been completed.
Sirohi	Alkaline and carbonatitic plugs associated dyke rocks	1:10000	104	-	-	314	G4 stage investigation of REE in alkaline and carbonatitic plugs and associated dyke rocks was carried out in Sirohi district. The Mandwara Igneous complex is veritable treasure house of igneous petrology with a diverse variety of plutonic, hypabyssal and volcanic rocks of ultrabasic to alkaline nature. The complex located on the eastern flank of Cambay rift zone in the Precambrian Erinpura Granite is one of the northernmost manifestations of Deccan volcanic activity. It mainly consists of three plutons, namely, Musala, Mer and Toa, occupied an area of about 12 sq km. During the FS 2014-15, LSM on

(Contd.)

## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
<b>Hindustan Zinc Ltd (HZL) Base Metals</b>							1:10000 scale is carried out covering an area of about 104 sq km with collections of 314 nos. bed rock samples and 100 m <sup>3</sup> pitting/trenching. A total of 16 nos. of carbonatite dykes have been recorded. All the carbonatite dykes have varied colour, grain size and composition ranging from Calcio carbonatite (sovite, alvikite) to ferro-carbonatite in nature. The strike length of the carbonatite dykes ranges from 15 m to 430 m and width from 15 cm to 1 m. Analytical results of total 58 nos. of bedrock samples collected were received, out of which 09 samples have analysed noteworthy anomalous REE concentration. One sample of carbonatite dyke has analysed 7% total REE with other samples analysing 300 ppm, 800 ppm, 1% and 2% total REE.
Ajmer, Sindesar Khurd, Bhilwara, Kayad, Rajpura Rajsamand, Dariba mines & Udaipur other mines		-	-	14	1629	293	A total of 194,400 m (107,100 m from surface and 87,300 m underground) of core drilling was completed in financial year 2015 at various brownfield exploration sites. Resource additions were primarily reported from Sindesar Khurd Mine, which has now touched reserves and resources of 106 million tonnes as well as from Rajpura Dariba Mine. The reserves and resources of Kayad mine increased from 7.7 million tonnes to 8.1 million tonnes. During the year, gross addition of 19.4 million tonnes were made to reserves and resources prior to depletion of 9.4 million tonnes. Total reserves and resources as on March 31, 2015 were 375.1 million tonnes containing 26.9 million million tonnes of zinc metal, 8.4 million millions tonnes of lead metal and 970 Moz of silver metal and grading 7.2% Zn, 2.2% Pb and 80.4 g/t Ag. Overall mine life continues to be 25+ years.
<b>MECL Base Metal</b>							
Jhunjhunu Chandmari		1:1000	1.1	35	10584.35	2109	Exploration carried out for copper in Chandmari Intervening Block (HCL Contractual) by involving: mapping-1.10 sq km area on 1:1000 scale; drilling-10,584.35 m in 35 boreholes; sampling & chemical analysis-1,965 nos. of primary+ check (drill) and 34 composite samples; petrological studies-85 nos.; mineragraphic studies-24 nos.; specific gravity determination-01 no. and estimation of 11.062 million tonnes (221) resources of copper ore with 0.996% Cu at 0.50% Cu cut off.
Bhilwara Gurla (south) block		1:1000	0.5	08	1352.5	642	Exploration conducted for lead-zinc in Gurla (South) block by mapping - 0.50 sq km on 1:1000 area; drilling-1,352.50 m in 08 boreholes; sampling & chemical analysis-537 nos. of primary + check (drill); fire assay-50 nos.; petrological studies-25 nos.; mineragraphic studies-25 nos.; specific gravity determination-30 nos. and estimation of 0.53 million tonnes (333) of ore with average grade of 0.64% Pb and 2.31% Zn.

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## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
<b>Rajasthan State Mines &amp; Minerals Ltd (RSMML)</b>							
<b>Rock Phosphate</b>							
Udaipur	Jhamarkotra Mines	-	-	14	1629	293	As on 1.4.2015, the balance resources and reserves are placed at 48.024 and 27.388 million tonnes, respectively.
<b>State Directorate of Mines &amp; Geology (DMG)</b>							
<b>Bentonite, Siliceous Earth, Silica Sand, Sand Stone &amp; White Clay</b>							
Barmer	Jasse-Ka Gaon,	1 cm=500 m	100	-	-	12	Reserves not computed.
	Rawat Ka Gaon	1 cm=100 m	05	-	-	-	
	etc.	1 cm= 20 m	03	-	-	-	
<b>Dolomite, Masonry Stone, Quartz &amp; Feldspar</b>							
Rajsamand	Area of Bhim, & Nathdwara Teh.	1:10000 1:4000	20 03	-	-	35	Recommended for future investigation.
<b>Fluorite</b>							
Sirohi	N/v Wan, Andor	1:10000	05	-	-	10	Reserves not calculated.
	& Sardarpura	1:4000	05	-	-	-	
<b>Glaucanite (Potash)</b>							
Chittorgarh	N/v Amalda,	1:50000	100	-	-	20	Prospecting work completed.
	Jalampura, etc.	1:10000	05	-	-	-	
<b>Lignite</b>							
Bikaner	N/v Kenya-ki-Basti and Diyatra	-	-	24	4113.8	122	Geological reserves of 9.79 million tonnes of lignite have been computed. Progressive total is 25.19 million tonnes.
-do-	N/v Bikampur, Tavariwala etc.	1:50000	500	-	-	-	No lignite/carbonaceous zones are found sub-surface.
Jaisalmer	N/v Deunga & Ainta	1:50000	200	01	195	146	Cumulative thickness of lignite found to be 0.55 m.
Nagaur	N/v Phalki, Lunias etc.	1 cm =500 m	400	-	-	10	Carbonaceous zones were identified in tube wells.
<b>Neyveli Lignite Corporation Ltd (NLC)</b>							
Barmer	Baytu block	-	-	01	72.3	-	-
-do-	Bhuriya block	-	-	57	20077.7	300	Work was in progress.
-do-	Matasar Tala block	-	-	01	384	01	-
Nagaur	Gangradi & Ucharda blocks	-	-	54	13486.1	134	Work was in progress.
-do-	Deswal	-	-	15	3393.1	15	-
-do-	East of Gangradi	-	-	05	1244.1	-	Work was completed.
<b>Limestone</b>							
Ajmer	N/v Shyamgarh, Pakriyawas etc.	1 :10000	10	-	-	105	-
		1:2000	04	-	-	-	
Ajmer & Nagaur	N/v Pilwa, Chinwali etc.	1:50000	150	-	-	25	Dolomitic/crystalline limestone was observed.
		1:10000	10	-	-	-	
		1:2000	04	-	-	-	
Chittorgarh	N/v Anjankhera, & Nilod	-	-	09	527	349	Prospecting work completed.

(Contd.)

## STATE REVIEWS

Table – 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of borehole	Meterage		
Chittorgarh	N/v Rasulpura, Bansa etc.	1:4000	03	03	163	82	Prospecting work was under progress.
Dungarpur Munger etc.	N/v Rama, Dad	1:50000 1:10000 1:4000	150 10 02	-	-	100	Reserves will be computed after completing exploration.
Jaipur & Alwar	N/v Bithloda, Mandha etc.	1:4000	04	10	966	178	Anticipated resources are 50.17 million tonnes.
Jaisalmer	N/v Sam	1:50000 1:10000 1:2000	100 15 4.5	29 `	1282	703	Total 239.5 million tonnes of limestone estimated.
Nagaur	N/v Pitasar, Khetolav etc.	1:2000	03	12	553	700	Total 66.70 million tonnes of limestone was inferred.
-do-	N/v Tadas- Bhawanada	-	-	23	866	6.88	Total 343.11 million tonnes of limestone was inferred.
Pali	N/v Bherla- Serva & Aml Karavava	1:10000	10	-	-	24	Reserves not assessed.
Tonk	N/v Khalilpura, Dodwari etc.	1:50000 1:10000 1:2000	150 10 03	-	-	40	Reserves not assessed.
Udaipur	N/v Sayra- Padarda- Rabachh	1:50000 1:10000 1:4000	300 20 2.5	-	-	52	Reconnaissance survey has been done.
<b>Limestone, Clay &amp; Bentonite</b>							
Jhalawar	N/v Gadiya, Semli Bhawani etc.	1:50000 1:10000 1:2000	150 16 2.7	-	-	40	Total reserves estimated at 2.141 million tonnes of limestone, 37,500 tonnes of bentonite and 80,813 tonnes of chert.
<b>Quartz, Clay &amp; Other Economic Minerals</b>							
Bundi	N/v Jajawar, Hanumanpura etc.	1:50000 1:10000 1:2000	155 16 2.5	-	-	42	Total reserves of quartz are calculated at 0.11 million tonnes.
<b>Red Ochre, Laterite &amp; Other Economic Minerals</b>							
Pratapgarh	N/v Achalपुरिया, Amlawad etc.	1:50000 1:10000 1:2000	100 10 1.5	-	-	04	-
<b>Silica Sand, Quartz &amp; Masonry Stone</b>							
Alwar	N/v Jat-ka-Har, Toda etc.	1:10000 1:4000	15 1.5	-	-	20	Reserves not yet calculated.
<b>Soapstone, Magnesite &amp; Serpentinite</b>							
Dungarpur	Between Surata, Wasiya etc.	1:50000 1:10000 1:4000	100 10 05	-	-	05	Work is to be continued.
<b>Decorative Stone/Masonry Stone</b>							
Jaipur, Sikar & Jhunjhunu	Parts of Jaipur, Sikar & Jhunjhunu	1:50000 1:10000 1:4000	100 10 02	-	-	-	-

(Contd.)

## STATE REVIEWS

Table – 3 (Concl.d.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of borehole	Meterage		
<b>Granite</b>							
Bhilwara	N/v Phakoliya, Bhagjana etc.	1:10000 1:4000	10.5 01	-	-	-	-
Jalore	N/v Bala, Sugalia etc.	1:2000	03	-	-	04	Resources not calculated.
<b>Marble</b>							
Banswara	N/v Paloda & Oda-bassi	1:10000 1:2000	10 1.5	-	-	14	-
<b>Masonry Stone</b>							
Alwar	N/v Bhupseda- Kalyan Nagar etc.	1:4000	1.5	-	-	06	Two nos. of plots of masonry stone delineated.
Sirohi	Parts of Sirohi Teh.	1:10000 1:4000	05 0.5	-	-	-	Reserves not calculated.
<b>Rhyolite/Granite</b>							
Barmer	N/v Derasar, Sura, Basra etc.	1 cm=500 m 1 cm=100 m 1 cm= 20 m	250 15 04	-	-	-	Total five plots of masonry stone delineated.
-do-	N/v Thob & Patodi	1 cm=500 m 1 cm=100 m 1 cm=20 m	200 25 04	-	-	-	Total five plots of masonry stone were delineated.
<b>Sand Stone</b>							
Bhilwara	N/v Sukhpura & Barisal Teh. Bijoliya	1:10000 1:4000	10 01	-	-	-	Resources were not estimated.
Barmer	N/v Lalso Ki Dhani Teh. Sheo	1:50000 1:10000 1:2000	100 5 3	-	-	-	Occurrence of sandstone was noticed. About 20 plots have been delineated. Resources were not estimated.
Dholpur	N/v Bhiramad, Pipret etc.	1:50000 1:10000 1:4000	250 10 4.05	-	-	-	Total reserves of 14.11 million tonnes of splittable sandstone were estimated.
Jaisalmer	N/v Dhurasar	1:50000 1:10000 1:2000	100 10 01	-	-	12	Project is completed.
Jodhpur	N/v Bara Kotecha	1:10000 1:2000	10 02	-	-	06	Resources were not estimated.
Karauli	Parts of Mandrayal, Sapotra & Karauli Teh.	1:50000 1:10000 1:4000	250 10 04	-	-	04	Total 9.85 million tonnes of sandstone (spittable) was estimated.
<b>Yellow Limestone/Dimensional Stone (Marble)</b>							
Jaisalmer	N/v Amarsar	1:50000 1:10000 1:2000	50 10 02	-	-	08	Twenty plots of yellow marble have been delineated.

## STATE REVIEWS

**Production**

The value of mineral production (excludes atomic mineral and value for the month of February and March in respect of 31 minerals declared as minor mineral vide Gazette notification dated 10.02.2015) in Rajasthan during 2014-15 at ₹ 33,025 crore increased marginally by 1% as compared to the previous year. The State contributed about 12% to the total value of mineral production in the country and occupied second position among the States in 2014-15. Of the total value, 49% pertains to petroleum (crude). Production of about 30 types of minerals (excluding minor minerals) has been reported from the State of Rajasthan. It was the sole producer of lead and zinc ores and concentrate, selenite and wollastonite. Almost entire production of silver in the country was also reported from the State during 2014-15.

Rajasthan was the leading producer of calcite accounting for 96%, phosphorite 95%, ball clay 92%, ochre 89%, talc/soapstone/steatite 82%, fire-

clay 36% and limestone 21% of the total production of respective minerals in the country. Besides, it was the second leading producer of copper concentrates contributing 41%, petroleum (crude) 24% and kaolin 16% of the nation's output for the year 2014-15. Among the important minerals, production of iron ore increased by 58%, lignite 42%, natural gas (utilised) 20%, phosphorite 14%, manganese ore 10%, limestone 8% as compared to the previous year. Among important minerals, decrease in production was observed in wollastonite and copper concentrates (3% each), petroleum (crude) and silver (6%) as compared to that in the previous year (Table-4).

The value of production of minor minerals was estimated at ₹ 7273 crore for the year 2014-15.

The number of reporting mines in Rajasthan was 541 in the year 2014-15 as against 629 in previous year.

**Table – 4: Mineral Production in Rajasthan, 2012-13 to 2014-15  
(Excluding Atomic Minerals)**

		(Value in ₹ '000)								
Mineral	Unit	2012-13			2013-14			2014-15 (P)		
		No. of mines	Qty	Value	No. of mines	Qty	Value	No. of mines	Qty	Value
<b>All Minerals</b>		<b>508</b>		<b>312342126</b>	<b>629</b>		<b>325542682</b>	<b>541</b>		<b>330252261</b>
Lignite	'000t	6	7100	2776600	6	7600	5136100	6	10800	12590000
Natural Gas (ut.)	m c m	-	685	5665038	-	982	8121266	-	1178	9742211
Petroleum (crude)	'000t	-	8593	156184417	-	9180	166853596	-	8848	160819240
Copper Ore	t	-	982926	-	-	1003052	-	-	947400	-
Copper Conc.	t	2	43245	2876500	2	45656	2850652	2	44150	2609939
Iron Ore	'000t	2	235	198144	4	708	1901189	4	1121	2871545
Lead & Zinc Ore	t	-	8633411	-	-	9281807	-	-	9346349	-
Lead Conc.	t	8	184486	3300883	8	194426	4372536	8	197668	5596580
Zinc Conc.	t	*	1492781	23948683	*	1490662	27389284	*	1501586	31436595
Manganese Ore	t	1	4987	12737	1	5401	14442	1	5965	15294
Silver**	kg	-	373901	21225078	-	349620	15772144	-	327508	11941925
Phosphorite/ rock phosphate	t	2	1692806	6580617	2	1322115	4609618	2	1501996	3839096
Asbestos	t	2	-	-	1	-	-	-	-	-

(Contd.)

## STATE REVIEWS

**Table – 4: Mineral Production in Rajasthan, 2012-13 to 2014-15  
(Excluding Atomic Minerals)**

(Value in ₹ '000)

Mineral	Unit	2012-13			2013-14			2014-15 (P)		
		No. of mines	Qty	Value	No. of mines	Qty	Value	No. of mines	Qty	Value
Ball Clay <sup>#</sup>	t	32	1541981	665585	42	1974501	975423	44	1760526	842596
Barytes <sup>#</sup>	t	1	7352	4783	1	5560	3617	1	3380	2199
Calcite <sup>#</sup>	t	6	72698	26414	4	89936	31544	4	87661	32371
Clay (others) <sup>#</sup>	t	8	152534	34361	10	241396	45627	6	122784	50447
Dolomite <sup>#</sup>	t	1	224826	45243	1	399084	97290	2	381314	99576
Felspar <sup>#</sup>	t	166	892257	245970	237	928320	269207	169	767091	195734
Fireclay <sup>#</sup>	t	10	410331	87771	13	359845	91440	13	253166	62845
Garnet (abrasive)	t	1	614	565	1	715	807	2	725	993
Gypsum <sup>#</sup>	t	29	3510063	1685212	31	3080992	1534541	28	2449155	1275263
Kaolin <sup>#</sup>	t	37	662362	355559	60	870307	372005	51	633175	385663
Laterite <sup>#</sup>	t	-	-	-	1	-	-	1	-	-
Limestone	'000t	26	52540	9192487	27	56754	10604183	28	61544	11050125
Mica <sup>#</sup> (crude)	t	4	79	1975	5	-	-	5	-	-
Mica <sup>#</sup> (waste & scrap) <sup>\$</sup>	t	-	5119	-	-	6635	-	-	2830	-
Ochre <sup>#</sup>	t	13	1676067	546696	15	1375478	458024	12	1971263	774576
Pyrophyllite <sup>#</sup>	t	1	7697	1145	3	17968	3641	-	-	-
Quartz <sup>#</sup>	t	65	173448	40937	62	229814	57248	65	225528	53705
Quartzite <sup>#</sup>	t	1	4489	669	1	4187	1256	1	8285	2485
Silica Sand <sup>#</sup>	t	13	626336	250040	13	611361	276557	10	510703	296991
Sand (others) <sup>#</sup>	t	-	-	-	4	5831	919	3	7232	1484
Talc/soapstone/ steatite <sup>#</sup>	t	65	766742	681223	69	739739	811620	65	633216	771047
Selenite	t	3	7577	10226	1	531	706	2	207	456
Wollastonite	t	3	145667	127468	4	192712	157090	6	186519	162170
Minor Minerals <sup>@</sup>		-	-	75569100	-	-	72729110	-	-	72729110

**Note:** The number of mines excludes natural gas (utilised) petroleum (crude) and minor minerals.

\* Number of mines covered under lead concentrates.

\*\* Recovered at Chanderiya Lead-Zinc Smelter of HZL from lead concentrates produced in Rajasthan.

\$ Includes mine waste and that obtained while dressing of crude mica.

@ Figures for earlier years have been repeated as estimates, wherever necessary, because of non-receipt of data.

# Declared as minor mineral vide Gazette notification dated 10.02.2015.

## STATE REVIEWS

**Mineral-based Industry**

The present status of each mineral-based industry is not readily available. However, the important mineral-based industries in the organised sector in the State are given in Table - 5.

**Table – 5 : Principal Mineral-based Industries in Rajasthan**

Industry/plant	Capacity ('000 tpy)
<b>Cement</b>	
ACC Ltd, Lakheri, Distt. Bundi.	1500
Ambuja Cements Ltd, Rabriyawas, Distt. Pali.	1800
Binani Cement, Binanipuram, Distt. Sirohi.	4850
Binani Cement, Neem Ka Thana, Sikar (G).	1400
Birla Corporation Ltd (Birla Cement Works & Chanderiya Cement Works), Chittorgarh.	3500
J.K.Cement, Nimbahera, Distt. Chittorgarh.	3300
J.K.Cement, Mangrol, Distt. Chittorgarh.	1000
J.K.Cement, Gotan, Distt. Nagaur.	470
J.K. White Cement Works, Gotan, Distt. Nagaur.	410
J.K.Laxmi Cement, Banas, Distt. Sirohi.	4200
Lafarge India Ltd, Nimbahera, Distt. Chittorgarh.	1970
Manglam Cement (Manglam Cement & Neer Shree Cement), Morak, Distt. Kota.	3250
Shree Cement Ltd, Beawar, Distt. Ajmer.	3800
Shree Cement Ltd, Ras, Distt. Pali.	4000
Shree Cement Ltd, Ras (New Unit), Distt. Pali.	2000
Shree Cement Ltd, Kushkhera, Distt. Alwar (G).	4000
Shree Cement Ltd, Suratgarh, Distt. Sri Ganganagar (G).	2000
Shree Cement Ltd, Jobner, Distt. Jaipur (G).	2000
Shriram Cement Works, Kota.	400
Trinetra Cement (Subsidiary of India Cement), Nokhala, Distt. Banswara.	1500
Udaipur Cement Works (Subsidiary of JKCL), Udyog Ltd), Udaipur.	600

(Contd.)

Table - 5 (Contd.)

Industry/plant	Capacity ('000 tpy)
Ultra Tech Cement (Birla White Cement Division), Kharia Khangar, Distt. Jodhpur.	560 (white cement)
Ultra Tech Cement (Aditya I & II), Shambhupura, Distt. Chittorgarh.	5000
Ultra Tech Cement, Kotputali, Distt. Jaipur.	3100
Wonder Cement, Nimbahera, Distt. Chittorgarh.	3300
<b>Chemical</b>	
DCM Shriram Industries Ltd, Kota.	9 (rayon/yarn) 7.7 (sodium sulphate)
Modi Alkalies & Chemicals Ltd, Alwar.	84.2 (caustic soda) 50.3 (Cl), 39.6 (HCl)
<b>Ceramics/Chemicals</b>	
Bikaner Ceramics Pvt. Ltd, Bikaner.	9 (insulators)
Kajaria Ceramics Ltd, Gailpur.	6.5 (mill. sq m)
Kajaria Ceramics Ltd, Malootana.	24.5 (mill. sq m)
Bhalla Chemical Works Pvt Ltd	10 (zirconium Oxychloride & special Zirconia)
Roca Bathroom Product Pvt Ltd, Alwar.	12.9
Roca Bathroom Product Pvt Ltd, Alwar.	2 mill. pc.
<b>Fertilizer</b>	
Adheeshaa Phosphate, Umarada, Udaipur.	132 (SSP)
Arawali Phosphate Ltd, Umra, Udaipur.	40 (SSP)
Arihant Phosphate & Fertilizers Ltd, Nimbaheda, Chittorgarh.	66 (SSP)
Bohra Industries Ltd, Umra, Udaipur.	200 (SSP)
Chambal Fertilizers & Chemicals Ltd, Gadepan	180 (SSP)
Chambal Fertilizer & Chemical Ltd, Gadepan (Unit I & II), Distt. Kota.	2013 (Urea)
Coromandel International Ltd (Formerly Liberty Phosphate Ltd.), Madri, Udaipur.	264 (SSP)
Coromandel International Ltd (Formerly Liberty Phosphate Ltd.), Jagpura, Kota.	132 (SSP)
Devyani Phosphate Pvt. Ltd, Udaipur.	60 (SSP)
Dharamsi Morarji Chemical Co. Ltd, Khemli, Udaipur.	66 (SSP)

(Contd.)

## STATE REVIEWS

Table - 5 (Contd.)

Industry/plant	Capacity ('000 tpy)
Gayatri Spinners Ltd, Hamirgarh, Bhilwara.	30 (SSP)
Indian Phosphate Ltd, Umrada, Udaipur	130 (SSP)
Jagdamba Phosphate, Kota.	132 (SSP)
Jubilant Agri and Consumer Products Ltd, Singhpur, Kapasan, Chittorgarh.	264 (SSP)
Khaitan Chemical & Fertilizers Ltd, Dhinwa, Distt. Chittorgarh.	198 (SSP)
Mangalam Phosphates Ltd, Hamirgarh, Bhilwara.	72 (SSP)
Ostwal Phoschem (India) Ltd, Hamirgarh, Bhilwara.	132 (SSP)
Patel Phoschem (P) Ltd, Umarda, Udaipur.	100 (SSP)
Prem Sakhi Fertx. Ltd, Lakadwas, Udaipur.	66 (SSP)
Rama Phosphates Ltd, Umra, Udaipur.	181 (SSP)
Sadhana Phosphates & Chemicals Ltd, Gudli, Udaipur.	120 (SSP)
Shriram Fertilizers & Chemicals Ltd, Shriramnagar, Distt. Kota.	379.5 (Urea) 113.8 (caustic soda) 13.2 (bleaching powder) 61.2 (HCl) 61.2 (Cl)
Shri Ganapati Fertilizers Ltd, Kapasan, Chittorgarh.	99 (SSP)
Shurvi Colour Chem Ltd, Madri, Udaipur	12 (SSP)
<b>Plaster of Paris</b>	
Abhishek Plaster Industries, Baramsar, Distt. Hanumangarh.	6.1
Agrawal Industries, Nohar, Distt. Hanumangarh.	6.3
Balaji Plaster Industries, Taranagar, Distt. Churu.	6
Balaji Industries, Taranagar, Distt. Churu.	6.5
Ganesh Plaster Industries, Taranagar, Distt. Churu.	6
Gil Brothers, Taranagar, Distt. Churu.	7.1
Hind Plaster Industries, Taranagar, Distt. Churu.	6
	(Contd.)

Table - 5 (Concl.)

Industry/plant	Capacity ('000 tpy)
Jaishri Plaster Industries, Taranagar, Distt. Churu.	6.3
Jagdamba Plaster Industries, Rawatsav, Distt. Hanumangarh.	7
Jai Bhavani Plaster Industries, Baramsar, Distt. Hanumangarh.	6
Jai Sriram Plaster Industries, Taranagar, Distt. Churu.	7.1
M.G. Plaster Pvt Ltd, Taranagar, Distt. Churu.	6.2
Mahabir Plaster Industries, Taranagar, Distt. Churu.	6
Multani Industries, Nohar, Distt. Hanumangarh.	8.4
R.D. Plaster Industries, Nohar, Distt. Hanumangarh.	8.4
R.N. Industries, Bikaner, Distt. Bikaner.	18
Shalimar Plaster & Chemical Industries, Sardarshahar, Distt. Churu.	14
Shri Lakshmi Gypsum, Chak, Distt. Hanumangarh.	6
Shriram Plaster, Taranagar, Distt. Churu.	6.3
SS Plaster Industries, Taranagar, Distt. Churu.	6
Shiv Bhakti Industries, Nohar, Distt. Hanumangarh.	8.4
Tiger Plaster, Sardarshahar, Distt. Churu.	11
The Sardarshahar Plaster & Minerals, Sardarshahar, Distt. Churu.	19.4
Updesh Industries Ltd, Chak, Distt. Hanumangarh.	9
<b>Copper Smelters</b>	
HCL, KCC, Jhunjhunu.	31 (Cu cathode)
<b>Lead &amp; Zinc Smelters</b>	
HZL Zinc Smelter, Debari, Distt. Udaipur.	88 (Zn)
HZL Lead-zinc Smelter, Chanderiya, Distt. Chittorgarh.	85 (Pb) 525 (Zn) 0.833 (Cd)* 168 tonnes (Ag)
HZL, Dariba Smelting Complex, Dariba Distt. Rajsamand.	100 (Pb) 210 (Zn)
* Total for all smelters of HZL.	
(G); Grinding Units.	
<b>Note:</b> Data, not readily available for fertilizer and cement industries on respective websites, hence it has been taken from Indian Fertilizer Scenario, 2015/FAI Statistics, 2014-15 and Survey of Cement Industry & Directory, 2015 respectively.	