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FLUORITE

(FINAL RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

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12 Fluorite

Fluorite is a very popular mineral, and it naturally occurs in all colours of the spectrum. It is one of the most varied coloured mineral in the mineral kingdom, and the colours may be very intense and most electric. Pure fluouite is colourless and the colour variations are caused by various impurities. It is a mineral with veritable bouquet of brilliant colours from hallmark colour purple to blue, green, yellow, colourless, brown, pink, black and reddish orange. The rich purple colour is by far the most famous and popular colour. It is an important commercial source of fluorine. Fluorite plays a vital role in the manufacturing industry and major consuming industries are chemical, cement, iron & steel, electrode, etc. It is also used to produce synthetic cryolite without which aluminium extraction is not possible.

Fluorite is commonly deposited by hydrothermal solution sourced from igneous intrusions. The mineralisation occurs as veins or replacement deposits either by the filling of cavities and fissures or by the replacement of the host rock, typically carbonates.

Mainly two grades of fluorite are involved in consumption and trade, namely, the acid grade (acidspar) containing more than 97% CaF_2 and the sub-acid grade analysing 97% or less CaF_2. The sub-acid grade includes metallurgical (60 to 85% CaF_2) and ceramic (85 to 95% CaF_2) grades and is commonly known as metallurgical grade (metspar). Fluorite production in the country is meagre when compared with the world production.

In addition to the natural fluorite production, synthetic fluorite is recovered as by-product during uranium processing, petroleum alkylation and stainless pickling. While processing phosphate rock the by-product, fluorosilicic acid, obtained from phosphoric acid plants also supplements fluorite as a source of fluorine.

RESERVES/RESOURCES

As per NMI data base, based on the UNFC system, the total reserves/resources of fluorite in the country as on 1.4.2015 have been estimated at 18.18 million tonnes. Out of these, 0.29 million tonnes are placed under reserves category (further classified into 0.22 million tonnes under proved category and 0.06 million tonnes under probable category). Remaining Resources comprise 17.89 million tonnes.

By States, Gujarat accounts for 66% of the total reserves/resources having 12 million tonnes, followed by Rajasthan with 5.24 million tonnes (29%), Chhattisgarh 0.55 million tonnes (3%) and Maharashtra 0.39 million tonnes (2%). Gradewise, the resources are classified into marketable grade which accounted for 81% of the total resources, low grade (17%) and unclassified grade (2%) (Table-1).

EXPLORATION & DEVELOPMENT

The exploration and development details, if any, are given in the review on Exploration & Development in "General Reviews'.

PRODUCTION & STOCKS

The production of fluorite (graded) at 1,313 tonnes in 2017-18 increased by 12% as compared to that in the previous year.

There was only one reporting mine in 2017-18 as compared to two in 2016-17. The entire output was reported by a public sector mine located in Chandrapur district of Maharashtra owned by Maharashtra State Mining Corporation Ltd (Tables -2 to 4).

The mine-head closing stocks of fluorite (graded) were 98,359 tonnes in 2017-18 as against 97,794 tonnes in 2016-17 (Table-5).

The average daily labour employed in fluorite mines in 2017-18 was 41 as against 46 in the previous year. The domestic price of fluorite are furnished in the General Review on 'Prices'.

Table – 1 : Reserves/Resources of Fluorite as on 1.4.2015
(By Grades/States)

(In tonnes)

Grade / State	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						
All India : Total	**224824**	**63860**	**-**	**288684**	**4976749**	**745390**	**571311**	**1713833**	**6218421**	**3522537**	**145183**	**17893423**	**18182107**
By Grades													
Marketable	224824	63860	-	288684	4976749	586080	406111	-	5757010	2497534	145183	14368666	14657350
Low	-	-	-	-	-	3790	9680	1710348	445660	1000003	-	3169481	3169481
Unclassified	-	-	-	-	-	155520	155520	3485	15751	25000	-	355276	355276
By States													
Chhattisgarh	-	-	-	-	65889	153132	9288	185485	5573	126088	-	545455	545455
Gujarat	-	-	-	-	4279230	-	-	-	5723360	2001920	-	12004510	12004510
Maharashtra	224824	63860	-	288684	-	-	-	-	-	100000	-	100000	388684
Rajasthan	-	-	-	-	631630	592258	562023	1528348	489488	1294529	145183	5243458	5243458

Figures rounded off

Table – 2 : Producer of Fluorite, 2017-18

Name and address of producer	Location of mine	
	State	District
Maharashtra State Mining Corporation Ltd, Plot No. 7, Ajni Square, Wardha Road, Nagpur-440 015, Maharashtra.	Maharashtra	Chandrapur

Table – 3 : Production of Fluorite (Graded), 2015-16 to 2017-18
(By States)

(Qty in tonnes;Value in `'000)

State	2015-16		2016-17		2017-18 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India/	**2333**	**12965**	**1175**	**6733**	**1313**	**7097**
Maharashtra	2333	12965	1175	6733	1313	7097

Table – 4 : Production of Fluorite (Graded), 2016-17 & 2017-18
(By Sector/States/Districts)

(Qty in tonnes; Value in `'000)

State/District	2016-17			2017-18 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	**2**	**1175**	**6733**	**1**	**1313**	**7097**
Public Sector	2	1175	6733	1	1313	7097
Gujarat	**1***	-	-	-	-	-
Vadodara	1*	-	-	-	-	-
Maharashtra	**1**	**1175**	**6733**	**1**	**1313**	**7097**
Chandrapur	1	1175	6733	1	1313	7097

: *Only labour reported

Table – 5 : Mine-head closing Stocks of Fluorite, 2016-17 & 2017-18
(By States)

(In tonnes)

State	2016-17	2017-18 (P)
India	**97794**	**98359**
Gujarat	84372	84371
Maharashtra	13422	13988

MINING

Maharashtra State Mining Corporation (MSMC) operates Dongargaon fluorite mines in district Chandrapur, Maharashtra. Mining is carried out by semi-mechanised opencast method. The run-of-mine is hand sorted for marketing of fluorite (graded).

BENEFICIATION

Fluorspar is beneficiated by hand sorting followed by gravity concentration methods such as heavy media, jigs and tables in order to separate calcite and silicate mineral impurities. Low grade fluorite produced is used after beneficiation in the industries. GMDC has a beneficiation plant of 500 tpd capacity located at Kadipani to produce acid grade (96% CaF_2) and metallurgical grade (90% CaF_2) fluorite upgrading the low grade fluorspar ore from 23-25% CaF_2 by flotation method. Besides, it has facility to produce MFC & MET grade powder analysing 75 to 85% CaF_2 & 85 to 92.5% CaF_2, respectively, starch briquettes (81% CaF_2 min) and silicate briquettes (79% CaF_2min). As per annual report of GMDC 2016-17, the Government of Gujarat has accorded approval for setting up beneficiation plant of 40,000 MTPA capacity at Kadipani, district Vadodara in joint venture with Gujarat Fluoro Chemicals Ltd, Noida and Navin Fluorine International, Mumbai. Selection of suitable technology is completed and further necessary action will be taken. GMDC conducted a pilot study for Fluorspar Beneficiation Plant of ore through BGRIMM China and the ore has been found suitable for producing Acid Fluorspar. EPC contract will be finalised soon.

CONSUMPTION

Fluorite consumption was 4,000 tonnes in 2016-17. The major consuming industry is the Iron & Steel Industry which accounted for more than 50% of the total consumption. Industry-wise consumption of fluorite is given in Table-6.

Table- 6 : Estimated Consumption* of Fluorite 2014-15 to 2016-17 (By Industries)

(In tonnes)

Industry	2014-15	2015-16	2016-17
All Industries	**63100**	**63500**	**4000**
Alloy steel	1400	1500	400
Cement	4100	4100	-
Chemical	53300	53400	-
Electrode	2100	2000	1500
Ferro alloys	200	200	-
Iron & steel	1700	2000	2000
Others (aluminium, foundry glass, Refractories)	300	300	100

Figures rounded off

**Includes actual reported consumption and/or estimates made, wherever required and due to paucity of data, hence coverage may not be complete*

Apparent consumption of fluorite is around 2,15,223 tonnes during 2017-18

SPECIFICATIONS

BIS has prescribed IS: 8587-1993 (First Revision, Reaffirmed 2011) for acid grade fluorite for use in Chemical Industries, and IS: 4574-1989 (Second Revision, reaffirmed 2008) for fluorite in Metallurgical Industries.

USES

Acid grade fluorite is used as a feedstock in the manufacture of hydrofluoric acid (HF) and to produce aluminium fluoride (AlF_3). The major use of HF is for the production of a wide range of fluorocarbon chemicals, including hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), and fluoropolymers. But, owing to environmental concerns, part of chlorofluorocarbons (CFCs) are replaced by HCFCs. HF is used in the manufacture of uranium tetrafluoride required to make nuclear fuel and fission explosives. It is also used in stainless pickling, petroleum alkylation, glass etching, oil & gas well treatment and as etcher/cleaner in Electronic Industry.

HF is used in the manufacture of a host of fluorine chemicals used in dielectrics, metallurgy, wood preservatives, herbicides, mouthwashes, decay-preventing dentifrices, plastics and water fluoridation.

AlF_3 manufactured from acid grade fluorite is used as a flux in electrolytic recovery of aluminium. On an average, worldwide consumption of fluorides is about 21 kg for every tonne of aluminium produced. This ranged from 10 to 12 kg per tonne in a modern pre-baked aluminium smelter and about 40 kg in an old Soderberg smelter without scrubber.

Ceramic grade fluorite containing 85 to 95% CaF_2 is used in Ceramic Industry as a flux and as an opacifier in the production of flat glass, white or opal glass and enamels. The addition of 10-30% ceramic grade fluorspar to glass makes it opaque, white and opalescent. It is also used in the manufacture of magnesium, some manganese chemicals and welding rod coating.

Metallurgical grade fluorite is used primarily as fluxing agent by Steel Industry. It is added to slag to make it more reactive through increased fluidity. Fluorite of different grades are used in the manufacturing of aluminium, cement and glass fibres. It is also used in the melt shop by Foundry Industry.

INDUSTRY

Many fluorine-based chemicals like hydrofluoric acid, aluminium fluoride, cryolite, sodium silicofluoride and hydrofluorosilicic acid were produced by chemical and fertilizer industries in the country.

In addition to material produced indigenously, substantial quantity of high grade fluorite was also imported to meet the demand of the fluorine-based Chemical Industries.

The Tanfac Industries Ltd is a joint sector company of TIDCO and Aditya Birla Group at Cuddalore, Tamil Nadu. It is engaged in the manufacture of fluorine chemicals, such as, aluminium fluoride, anhydrous hydrofluoric acid, sodium silico fluoride, ammonium bifluoride, potassium fluoride, and various other fluorine-based chemicals. The company has an annual installed capacity of 16,500 tonnes each of aluminium fluoride and anhydrous hydrogen fluoride, 67,200 tonnes of sulphuric acid, 14,000 tonnes of hydrofluoric acid and 3,400 tonnes of speciality fluorides. The Company's topline has gone up by 19% in the year 2017-18 due to increased sales volume of HF, Aluminium Fluoride and Sulphuric Acid. Revival of IBAP plant by successfully reducing the cost of production through process optimisations and sucessfully developing and marketing value added products out of by-products generated from the IBAP process.

Navin Fluorine Industries Ltd, Surat, Gujarat, has an installed capacity of about 22,000 tpy of hydrofluoric acid. The Company produces a number of fluorine chemicals, namely, hydrofluoric acid, cryolite, aluminium fluoride and various other organic and inorganic fluorine-based chemicals.

Apatite and rock phosphate containing 3 to 4% CaF_2 is another useful source for recovery of fluorine. Coimbatore Pioneer Fertilizer Ltd has reported production of sodium silicofluoride in the past. Hydrofluorosilicic acid producing units were Rashtriya Chemicals & Fertilizer Ltd, Mumbai, whereas Dharamsi Morarji Chemical Co. Ltd, Ambernath, Maharashtra no longer reported production of fluorine chemicals. Aluminium fluoride was being produced by Southern Petrochemical Industries Corporation Ltd, Thoothukudi, Tamil Nadu with an installed capacity of 2,560 tpy.

SUBSTITUTES

Olivine or dolomitic limestone was used as substitute for fluorite in Iron & Steel industry. The by-product fluorosilicic acid from phosphoric acid production is used as a substitute in aluminium fluoride production.

ENVIRONMENT

Fluorine attracts environmental concern. Use of fluorine in drinking water has begun to wane. Fluorine is toxic in high concentration but beneficial in low concentration. Although fluorine has been under attack ever since its use in water in 1949, the only significant health problem with which it has been linked was 'Fluorosis', a disease that involves health defects and bone lesions. This problem is caused by concentration of fluoride that is much higher than the permissible levels in municipal water supplies. As per Indian Standards, the permissible limit of fluoride in the drinking water is 1.5 mg/l. "Defluoridisation by adsorption" is a common economical and efficient method for removal of excess fluoride from drinking water. Electrolytic precipitation based on use of aluminium salts and by electrochemical route, etc. are the other few methods used for defluoridisation.

Fluorine is at the centre of controversy over chlorofluorocarbons (CFCs), which causes depletion of atmospheric ozone layer that protects the earth from ultraviolet radiation, a major cause of skin cancer. The hydrofluorocarbon (HFC) and hydrochlorofluorocarbon (HCFC) compounds, which have been developed as an alternative to CFC, require more hydrofluoric acid than CFC and are expected to boost fluorite consumption. These greenhouse gases are being phased out in stages. It is reported that even if CFC emission is stopped, the present level of these gases may take up to ten years to reach the upper atmosphere where they could persist for a century or more.

According to United Nations Environment Programme (UNEP), an international agreement to curtail illegal trade in CFC and other ozone depleting chemicals came into effect on 10th November 1999. The agreement, which was authorised through an amendment to the Montreal Protocol in 1997, requires nations to create licensing system for international sales of ozone depleting chemicals. Further, as a part of the Montreal Protocol, 129 nations agreed on a three-year funding package to enable developing countries to continue their efforts to phase out CFC and other ozone depleting chemicals, and accordingly, the Fund's Executive Committee approved major agreements with China and India to finance the shutdown of CFC production facilities in the two countries during the next ten years.

The United Nations Environment Programme (UNEP) has prepared a Montreal Protocol Handbook that provides additional detail and explanation of the provisions. CIESIN's Thematic Guide on Ozone Depletion and Global Environmental Change presents an in-depth look at causes, human and environmental effects, and policy responses to stratospheric ozone depletion.

The use of the low global warming Potential (GWP) hydyrofluroolefins refrigerant HFO-1234 yf is suggested as a preferred replacement of HFC- 134a by both the U.S. Environmental Protection Agency and the EU Daimler in Europe has opted for CO_2 based air conditioning refrigerant in its 2017 Mercedes E and S class cars.

WORLD REVIEW

The world total reserves of fluorite were 310 million tonnes. World reserves are concentrated mainly in Mexico (22%), China (14%) followed by South Africa (13%) and Mongolia (7%) (Table- 7).

World production of fluorite in 2016 and 2017 remained at 5.80 million tonnes (Table-8).

China (66%), Mexico (13%), Vietnam (4%) and South Africa (3%) were the principal producing countries of fluorite in 2017.

To give generalised view of the development in various countries the country-wise description is sourced from latest available publication of Minerals Yearbook 'USGS 2015' is furnished below :

China

China reported fluorspar reserves of 39 MT for 2014, significantly higher than the most recent USGS estimateof 24 MT. The trend of reported reserves suggests ongoing exploration and development of China’s fluorspar resources.

Germany

To comply MAC directive, automobile manufacturer Daimler AG (Daimler) announced that it will introduce CO_2 based air-conditioning system in specific model of passenger car in 2017. Daimler objected to its use and said it was unable to implement the technology. If successfully deployed, the CO_2 based system would represent the first viable alternative to fluorinated MAC refrigerants.

Kenya

Kenya fluorspar company suspended operations at its processing plant in western Kenya for two months in june 2015 citing quality issues, reduced global demand and competition from new producers. The company intended to sell 30,000 t of accumulated fluorspar stock prior to resuming operations.

Canada

The Government of Newfoundland and Labrador, Department of Environment and Conservation, spared the St. Lawrence AGS vein fluorspar project from further environmental review. The project, proposed by Canada Fluorspar Inc., would include four open pit and underground mine operations, capable of storing 2.8 MT of flotation tailings, a mill facility capable of processing 200,000 metric tons per year of fluorspar flotation concentrate.

United Arab Emirates

Gulf Fluor LLC opened a new fluorine industrial complex in Abu Dhabi. Production facilities include a 60,000 t/yr AlF_3 plant, a 54,000 t/yr anhydrous HF plant, and a 140,000 t/yr sulphuric acid plant.

United Kingdom

Mexichem closed its HF production plant in Runcorn and withdrew financial support of Fenix Fluor Ltd, due to price decline of HF in Europe resulting from oversupply in China and the shutdown of numerous operations.

Bulgaria

Solvay SA announced to cease operations in Chiprovtsi fluorspar mine. The company cited reduced demand and depletion of quality ore.

Table – 7 : World Reserves of Fluorite (By Principal Countries)

(In '000 tonnes)

Country	Reserves
World: Total (rounded off)	**310000**
Brazil	1500
China	42000
Iran	3400
Mexico	68000
Mongolia	22000
Morocco	460
South Africa	41000
Spain	6000
USA	4000
UK	4000
Vietnam	5000
Other countries	110000

Source: *Mineral Commodity Summaries, 2019, USGS.*

Table – 8 : World Production of Fluorite (By Principal Countries)

(In'000 tonnes)

Country	2015	2016	2017
World Total	**5800**	**5800**	**5800**
Argentina [e]	30	30	30
Brazil [b]	27	27 [e]	27 [e]
Bulgaria	147	4	-
China[e]	3820	3800	3800
Germany	50	53	45
Iran[d]	57	122	120 [e]
Kazakhstan [e]	100	100	100
Kenya	70	43	7
Mexico	625	656	772
Mongolia [e]	184	168	109
Morocco	81	74	74 [e]
South Africa [e]	135	165	200
Spain	157	163	155
Vietnam	193	218[e]	233 [e]
Other countries	99	140	139

Source: *World Mineral Production, 2013-17, BGS*
b: Including beneficiated and directly shipped material
d : Years ended 20th March following that stated

FOREIGN TRADE

Exports

Exports of fluorite decreased to 471 tonnes in 2017-18 from 608 tonnes in the previous year. Exports were mainly to Bangladesh (40%), Egypt (19%), Kenya (12%) and Indonesia (9%). Exports of aluminium fluoride decreased substantially to 205 tonnes in 2017-18 as compared to 320 tonnes in the previous year. Exports were mainly to Japan (98%) and Nigeria (2%). Exports of hydrofluoric acid increased slightly in 2017-18 to 3,169 tonnes against 2,644 tonnes in the previous year (Tables- 9 to 11).

Imports

Imports of fluorite increased slightly to 2.2 lakh tonnes in 2017-18 as compared to 1.9 lakh tonnes in the previous year. Imports were mainly from China (40%), South Africa (27%), Thailand (16%), Vietnam (9%) and Morocco (3%). Imports of aluminium fluoride, also, increased slightly to 49,759 tonnes in 2017-18 from 46,564 tonnes in the previous year. Imports were mainly from UAE (59%), Indonesia (13%), Canada (9%), Italy (6%), Netherlands (3%) and Mexico (1%). On the other hand, imports of hydrofluoric acid decreased marginally to 249 tonnes in 2017-18 from 314 tonnes in the previous year. Imports were mainly from China (58%), Chinese Taipei/Taiwan (16%) and Germany (15%) (Tables- 12 to 14).

Table – 9 : Exports of Fluorite (By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (`'000)	Qty (t)	Value (`'000)
All Countries	**608**	**21579**	**471**	**15316**
Bangladesh	65	1988	190	4637
Egypt	231	7329	89	3229
Syria	++	77	40	2585
Indonesia	144	5497	43	1623
Kenya	-	-	55	1206
Brazil	51	2606	15	810
Bhutan	-	-	21	420
Pakistan	12	414	9	367
Mali	-	-	5	247
Vietnam	2	100	2	111
Other countries	103	3568	2	81

Table – 10 : Exports of Aluminium Fluoride (By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (`'000)	Qty (t)	Value (`'000)
All Countries	**320**	**26455**	**205**	**20352**
Japan	160	16088	200	19242
Nigeria	-	-	5	1013
Belgium	-	-	++	60
Nepal	-	-	++	37
Singapore	++	11	++	11
UAE	160	10254	-	-
UK	++	51	-	-
USA	++	14	-	-
Uganda	++	1	-	-
Israel	++	36	-	-

Table – 11 : Exports of Hydrofluoric Acid (By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (`'000)	Qty (t)	Value (`'000)
All Countries	**2644**	**162160**	**3169**	**231833**
Thailand	720	51663	811	59206
Korea, Rep. of.	1179	49835	1060	57997
Saudi Arabia	210	23914	409	49070
Turkey	-	-	180	10681
Israel	18	1250	125	9419
Bangladesh	73	4506	73	5307
Brazil	-	-	81	6099
Australia	108	4433	107	6941
UAE	32	2910	57	5902
Spain	31	1858	83	5191
Other countries	273	21791	183	16020

Table – 12 : Imports of Fluorite (By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (`'000)	Qty (t)	Value (`'000)
All Countries	**190446**	**2992257**	**221818**	**3958977**
China	85634	1376788	89427	1774347
Thailand	29812	467483	35198	616219
Kenya	28792	435143	3294	47850
Vietnam	24599	359168	19602	319504
South Africa	17118	254891	58832	913482
Morocco	-	-	7644	138669
Pakistan	1213	18052	2190	30306
Spain	486	9314	2075	42496
Turkey	561	6606	1359	18498
Norway	1389	38478	1617	41845
Other countries	842	26334	580	15761

Table – 13 : Imports of Hydrofluoric Acid (By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (`'000)	Qty (t)	Value (`'000)
All Countries	**314**	**26497**	**249**	**30825**
China	209	14233	145	15448
Chinese Taipei/Taiwan	76	4860	40	3553
Germany	22	4134	38	4896
USA	4	2387	1	370
UK	2	693	4	4250
Sweden	1	130	++	194
Belgium	++	60	++	182
France	-	-	++	19
Spain	-	-	20	1825
Saudi Arabia	-	-	1	88

Table – 14 : Imports of Aluminium Fluoride
(By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (`'000)	Qty (t)	Value (`'000)
All Countries	**46564**	**2643714**	**49759**	**2907543**
UAE	19036	1207617	29541	2058832
Indonesia	7540	430314	6300	348329
Italy	6156	403583	2970	230396
Canada	-	-	4344	92219
Netherlands	74	2031	1269	56683
Mexico	-	-	500	33035
South Africa	-	-	1000	21516
Saudi Arabia	-	-	988	19463
Qatar	4689	49627	1725	18755
Norway	-	-	747	15694
Other countries	9069	550542	375	12621

FUTURE OUTLOOK

The major driving factors for fluorite market is the growing Chemical Industry and increasing use of fluorite in Cement, Iron & Steel, Glass, etc. Industries. The Chemical Industry and Glass Industry account for the major share of the fluorite demand globally. As per TANFAC Annual Report 2017-18, global fluoro-chemical market is expected to reach USD 2.2 billion by 2024, growing at a CAGR of 5.3% from 2016 to 2025.

As per USGS report, improvements in steel making technology have also reduced the unit consumption of fluorite per unit tonnes of steel produced. In less developed countries, the quantity of fluorite used as a flux in steel making continues to be much higher, but further efficiency improvements are expected to moderate growth.

As on 01.04.2015, the resources of fluorite in India are 18.18 million tonnes which is considered to be limited resource. Ambadungar Fluorspar Mine of GMDC is the only domestic source of acid grade fluorite, slightly inferior in quality with high phosphorus content. Hence, to meet the requirements, the domestic Chemical Industry will have to depend, both qualitatively and quantitatively on imported fluorite in the coming years, both for direct use and for blending with the domestic acid grade fluorite.