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Indian Explosives Act (IV of 1884)

Indian Petroleum Act (VIII of 1899)

B. No. 123 C & J. 1911

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TWELFTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA

BEING HIS

Annual Report for the Year ending 31st March 1911

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CALCUTTA
SUPERINTENDENT GOVERNMENT PRINTING, INDIA
1911

Price annas 8 or 9d.

70

1870

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Twelfth Annual Report of the Chief Inspector of Explosives, India.

No. 868.

FROM

LIEUT.-COLONEL C. A. MUSPRATT-WILLIAMS, R.A.,
Chief Inspector of Explosives in India,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
Department of Commerce and Industry.

Simla, dated the 26th May 1911.

SIR,

I have the honour to submit herewith a Report of the work of my Department during the year ending 31st March 1911.

2. During the year 1910, 148 licenses (or one less than in the previous year) were granted in British India under Rule 17 of the rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 202 or 5 less than in 1909, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India during the year 1910 is given in Appendix A, and a statement showing the number of magazines and licenses granted during the past ten years is shown in Appendix B.

3. During the year, 391 inspections of magazines were made; a number of magazines being inspected two or three times. Those magazines are inspected most frequently, which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive, which on account of its greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more than other explosives. The Roburite Factory at Karachi was also inspected twice.

4. The magazines generally are in good order, and as usual I have found magazine owners most willing to carry out recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

5. The physical condition of all explosives in the different magazines during the year was found to be good with the exception of the following explosives, which were found to have deteriorated or to have become defective, and were destroyed:—

- (a) 170 lbs. Schultze Powder from the Bombay Port Trust magazine.
- (b) 12 Dynamite Cartridges from the Bengal Coal Company's magazine at Giridhi.

- (c) 700 lbs. Roburite from Messrs. Gladstone Wyllie and Company's Mining Works magazine at Baghitand.
- (d) 19 lbs. Blasting Gelatine from the Bobilli Mining Company's magazine at Chinaravyam.
- (e) 12 Coils Fuse from the Damuda Coal Company's magazine at Barmondia.
- (f) 550 lbs. Gelnignite from Messrs. Shaw Wallace and Company's magazine at Gondhoodi.
- (g) 8 lbs. Gunpowder from the Borea Coal Company's magazine at Solanpur.
- (h) 9,940 Coils of Fuse from Messrs. Parry and Company's magazine at Madras.
- (i) 46 Coils Fuse from the Equitable Coal Company's magazine at Huriladih.
- (j) 570 lbs. Compressed Powder from the Assam Railways and Trading Company's magazine at Margherita.
- (k) 22 lbs. Carbonite from the Barakar Coal Company's magazine at Loyabad.
- (l) 16 Coils Fuse from Messrs. Gillanders Arbuthnot and Company's magazine at Barakar.
- (m) 118 Detonators from the Great Indian Peninsula Railway Company's magazine at Mohpani.
- (n) 40 Coils Fuse from the Assam Bengal Railway Company's magazine at Haflong.
- (o) 1,215 lbs. Gelnignite from the PENCH Valley Coal Company's magazine at Chandametta.
- (p) 2 Dynamite Cartridges from the Sitarampur Coal Company's magazine at Kalikapur.
- (q) $4\frac{3}{4}$ lbs. Monobel Powder and 4 Dynamite Cartridges from Messrs. F. F. Christien and Company's magazine at Tisree.

6. During the year under report, no thefts of explosives from magazines were reported to this office. In October

Thefts from magazines. last year a store-keeper of one of the large feeder magazines in Bengal misappropriated Rs. 1,266, being the price realised by him for the sale of explosives, which he did not credit to the firm. He eventually, however, made good the amount to his firm. He was prosecuted and sentenced to one year's rigorous imprisonment and a fine of Rs. 2.

7. Two thousand five hundred and two tons of explosives were imported into British India during the year 1910, the value being Rs. 22,24,782. Full details

Import of explosives. showing the different kinds of explosives imported and the value of each are given in Appendix C. From this Appendix it will be seen that though the value of fireworks imported into Bengal is given, the quantity imported is not shown, as the Collector of Customs states that the quantity imported is not recorded in his office. A comparative statement showing the quantity of explosives imported during the last five years is given in Appendix D.

8. A list of explosives at present authorised for importation into British India for general sale has been published

Authorised explosives. in the *Gazette of India*, for information. This list will be found in Appendix E.

9. As it has been found at inspections of magazines that in many cases magazine owners have applied for licenses for the storage of a quantity of explosives far in excess of their actual requirements, licensees have been addressed in consequence and asked, where possible, to reduce the quantity of explosives licensed to be stored, with the result that some of the magazine owners have considerably reduced the quantities in their applications for renewal of licenses.

10. The following amendments were made to the rules under the Indian Explosives Act, 1884 (IV of 1884), during the year :—

Explosives Rules.

- (a) An addition was made to clause (2) of rule 1 of the rules for the manufacture, possession and sale of explosives exempting from the rules toy fireworks, such as caps for toy pistols, under such conditions and in such quantities as the Local Government on the recommendation of the Chief Inspector of Explosives might from time to time determine.
- (b) A similar exemption was made in the third paragraph of the preamble to the rules for the transport and importation of explosives.
- (c) An important amendment was made to Rule 9(2) of the rules for the manufacture, possession and sale of explosives and to Rule 8(2) of the rules for the transport and importation of explosives, eliminating Fulminates (Class V) from being used in manufactured fireworks, and, as the expression "Fulminate," as defined in the Explosives rules referred to above, includes any preparation consisting of a Chlorate with Sulphur or a Sulphuret with or without carbonaceous matter, it follows that the use of Sulphur Chlorate mixtures, such as the mixture of Chlorate of Potash with Sulphide of Arsenic, is now forbidden in the manufacture of fireworks. I recommended the prohibition of these mixtures in India in the year 1899, but it was then found unadvisable to adopt this course, but the very serious accidents that have since occurred from the use of these mixtures in fireworks, and the fact that such mixtures have also been used constantly in the preparation of cocoanut and other bombs, have rendered it imperative to prohibit them now.
- (d) Hitherto a person has been allowed by the rules to possess for private use and not for sale Dynamite and other high explosives up to a limit of 10 lbs., without a license, on a simple permit by a Magistrate or Police Officer. Circumstances have rendered it advisable that these explosives should not be possessed even in such small quantities, without proper supervision, and, therefore, Rule 11(3) (ix) of the rules for the manufacture, possession and sale of explosives has been cancelled.
- (e) A second proviso has been added to sub-Rule (2) of Rule 14 of the rules for manufacture, possession and sale of explosives so as to allow a licensee in the Presidency of Bombay to possess subject to the conditions of his license for a period of seven days any quantity of manufactured fireworks not exceeding 1,000 lbs. on a permit from a Magistrate of the 1st Class or Commissioner of Police.
- (f) Rule 14 (4) of the Explosives Rules for possession has been cancelled and a new one (Rule 14A) introduced allowing licenses to be granted to contractors, cultivators and other persons to possess at the same time not more than 100 lbs. Gunpowder, 10 lbs. of other explosives and 100 Detonators required *bonâ fide* for blasting purposes. These licenses are to be granted without fee, *vide* amendment to Rule 28 (2) and revised Form E.
- (g) Persons granted licenses in Forms F or J have now to report all losses, shortage of stock or thefts of explosives to the nearest police station, *vide* condition (8) and (10) of license Forms F and J, respectively.
- (h) Holders of licenses in Form J have to provide at their own expense for the safe custody of their magazines a guard of such strength as the District Magistrate or Commissioner of Police may consider sufficient, *vide* condition 15 of license Form J.
- (i) Hitherto licenses for the transport of explosives required for blasting purposes have been granted under the rules framed under the Indian Arms Act, 1878 (XI of 1878), but now by the introduction of a new Rule 8A to the rules for the transport and importation of explosives, these licenses have to be granted in Form II under the latter rules.

Petroleum.

11. During the year under report, 540 licenses for the storage of non-dangerous petroleum, regarding which this Department was concerned or consulted, were granted. This is an increase of 62 as compared with last year. A list of these installations, corrected up to 31st December 1910, and showing the districts in which they are located, is given in Appendix F, and a statement showing the number of licenses granted during the past six years is given in Appendix G. In addition to the number of licenses shown in Appendix F there are of course a very large number of storage godowns for the possession of non-dangerous petroleum in non-bulk, licensed by District Officers, of which this Department has no cognizance.
12. There are also a number of godowns licensed for the storage of dangerous petroleum in non-bulk throughout the country, and the Inspectors of Explosives and I have inspected some of these, when their existence has been brought to our notice, or where they are near non-dangerous petroleum installations or contain more than 500 gallons of petrol.
13. During the year the Chief Inspector of Explosives personally visited the large bulk oil installations at Madras, Bombay, Karachi, Calcutta (Budge Budge and Narculdanga), Chittagong and Rangoon, and also the oil fields of Burma and Assam. He in addition inspected a number of the minor installations. In all 666 inspections of non-dangerous petroleum premises were made. One hundred dangerous petroleum godowns were also inspected by this Department.
14. The large petroleum installations are usually under efficient European supervision and are in good order and well looked after.
15. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosine oil in combined bulk and non-bulk are stored, and are looked after by native Agents, employed by the large oil firms. The oil for these installations is supplied from the major installations at the different ports, and the retail trade is carried out in them. A great deal of inspection of these minor installations has been done by this Department during the last five years with the result that their condition is very much improved, and the generality of them are in very good order. As a matter of fact, when an installation is found not up to the mark at an inspection, it is usually due to the fact that some new Agent has been recently appointed, who has not realised what is required of him. The Oil Companies do not hesitate to change their Agents if several unsatisfactory reports are made of the installations under their charge.
16. During the year 1910, 159,451 gallons of dangerous petroleum and 70,109,315 gallons of non-dangerous petroleum were imported by sea into British India. The details are given in Appendix H and also the quantity of dangerous and non-dangerous petroleum produced in Assam and Burma during the year, as well as during the last five years.
17. Of amendments to the Petroleum Rules or of questions under consideration in connection with them during the year, the following are the most important:—
- Petroleum Rules.
- (a) A proviso has been added to Rule 5 of Chapter III of Part II whereby petroleum having a flash point above 150°F. may be stored in installations or storage sheds under less restrictive conditions than non-dangerous petroleum of a lower flash point.
 - (b) The question of permitting the storage of dangerous petroleum in bulk is under consideration, and it is probable that such storage will be permitted.
 - (c) The Government of Burma have, after consultation with me, issued conditions to be observed by licensees holding licenses in Form N for the possession of dangerous petroleum or partly dangerous and partly

non-dangerous petroleum in bulk, at or near wells, pumping stations or refineries. A copy of these conditions will be found in Appendix I.

- (d) As a result of a Conference, at which I was present in Burma, certain draft conditions for the control and management of refineries in Burma were formulated. A copy of these as finally issued will be found in Appendices J and K.

18. In the Burma Government Gazette of 1st April 1911 the Local Government published rules under the Upper Burma Oil Fields Regulations, 1910, for the control of oil winning operations and the prevention and extinction of fires in an oil field. These rules came into force on May 15th, 1911.

19. During the year it was noticed at inspections of petroleum installations that in a large number of cases the lightning conductors on the iron tanks were insulated by wood from the metal of the tanks, and I consequently issued a Circular letter to the firms asking them to remove this insulation and to place the conductors in metallic contact with the tanks. In India the lightning conductors are usually on the tanks themselves, but Sir Boverton Redwood, the well-known Petroleum Specialist, who is Adviser to the Home Office in England, in giving his opinion in 1902 on the subject of lightning conductors said:—

“An injudiciously placed or defectively constructed lightning conductor may be worse than useless, but in my opinion a good system of conductors is a safeguard which it is desirable to have.

“Probably the best arrangement for effectively protecting a tank or group of tanks consists of 3 or 4 poles (each fitted with a pointed conductor in good contact with moist earth) fixed in the ground at approximately equal distances apart round the tank but at some feet distant from it, and with lines of ordinary barbed wire passing from pole to pole over the top of the tank, this wire being in electrical contact with the conductors. The points of the conductors on the poles should be quite sharp and should preferably be gilt or platinised to keep them in good condition. In addition the tank itself should be in electrical contact with moist earth.”

The system above described has not, however, been adopted by oil firms to any great extent as, although there can be no doubt as to its being the best arrangement, at the same time it is somewhat more expensive and elaborate than the ordinary system. During this year a difference of opinion occurred between one of the oil firms and myself as to the methods necessary in carrying out the “Pole” system of protection, and consequently I addressed Sir Boverton Redwood on the subject, and he has very kindly replied giving me full information. As it is a matter of general interest, and, as it does not seem to me desirable that the information obtained should be pigeon-holed, I hope he will not mind my making public the various points on which he has given me an opinion, which are as follows:—

- (a) Each pole should be provided with an earth-plate in order to diminish the risk of imperfect earthing.
- (b) For the same reason each conductor should be connected with its own earth-plate.
- (c) The barbed wire should extend diagonally across the tank from pole to pole so as to form a network over the tank. If only three poles are used, the arrangement (which is better suited for a group of tanks than for a single tank) would be as shown in Fig. 1 below, but if 4 poles are provided, which is preferable for a single tank, it would be better to have them also connected round the tank as shown in Fig. 2 below.
- (d) Iron poles would be preferable to wooden poles, and in that case the pole itself should be made the conductor.
- (e) The barbed wire should be at a distance of several feet (say, six feet) above the tank.

(f) The tank itself should be effectively earthed, independently of the pole conductors.

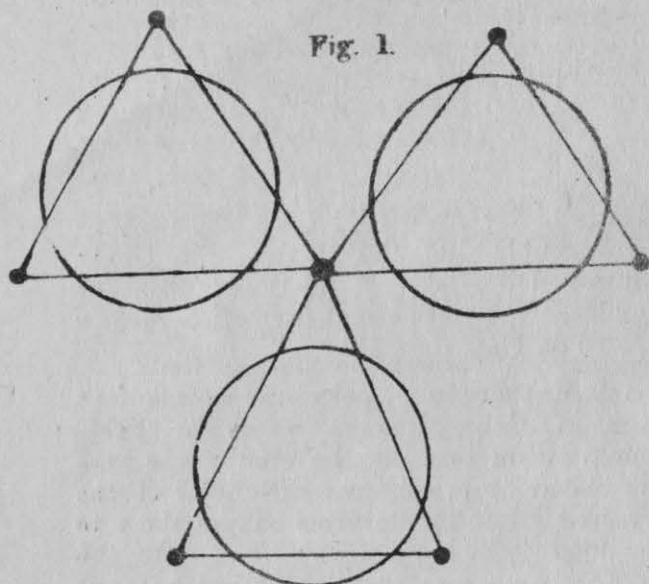


Fig. 1.

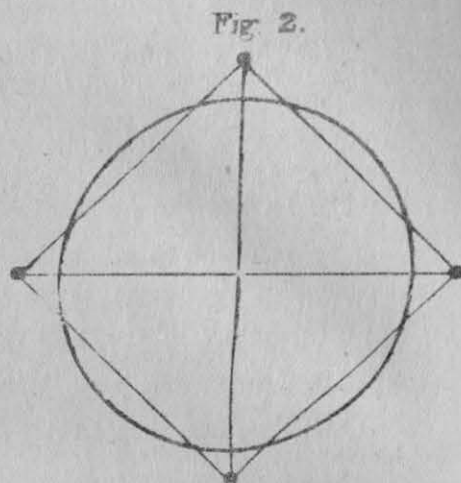


Fig. 2.

20. While I was in Burma in January this year I was asked by the Secretary

Motor launches.

to the Government of Burma to visit the motor launch "Columbus" and the motor

schooner "Mascot" in which explosions had recently taken place, causing in the latter vessel considerable loss of life. I was asked to give my opinion on the cause of the accidents and to make any suggestions for their prevention. In the case of the "Columbus" there was no doubt that the accident was occasioned by absolute carelessness, as there were about 100 empty unplugged petrol tins as well as a few full tins being carried on the boat in close proximity to the crew and passengers, so that any light or match struck was bound to cause an accident and this is what must have happened. The case of the "Mascot" was somewhat different, and I think deserves a full account in this report. I boarded the vessel in company with the Deputy Conservator of the Port and elicited the following facts. The motor auxiliary screw schooner "Mascot" at the time of the explosion, which occurred at about 7-30 P.M. on the 10th January 1911, was lying at her moorings in the Rangoon River. She belonged to Messrs. Attia and Maneckji, and had only just been built and handed over to them by Messrs. Bulloch Brothers of Rangoon. She was about to make her maiden voyage to the Cocos Islands with a miscellaneous cargo including kerosine, and at the time of the accident a water boat was alongside her for the purpose of filling the water tanks on board with fresh water for the use of the crew during the voyage. The "Mascot" was of 169.43 gross tonnage, schooner rigged, and had an auxiliary motor engine capable of driving her about 6 knots under favourable conditions. For the supply of motor spirit there were four main tanks built into the hold of the vessel and capable of holding a supply of about $3\frac{1}{2}$ tons per tank. For direct supply to the engine there were 2 deck tanks fitted with air pipes for carrying off vapours and these feeder tanks could be filled from the main tank by means of the engines or by an independent hand pump. Just before the explosion occurred, the water hose from the water boat was by some mistake on the part of some of the crew of the water boat connected to the after hold bilge hold instead of to the water tanks. When it was found that the water was not going into the water tanks, there was a dispute as to where it was going and three members of the "Mascot's" crew seizing a hurricane lantern, which had been brought on board by the water boat men, entered the after hold, which had up till then been covered up, to ascertain if the water was going into this hold. There was immediately an explosion, and the three men who entered the hold as well as one other man near them eventually died of the injuries they received. I was astonished to find practically no signs of burning in the "Mascot" and this made me consider the accident could not have been caused by leakage of vapour from the petrol tanks, as in that case there would have been a flash back to the place of leakage and the ship would certainly have been set on fire. I noticed, however, that the iron work of the after hold in which the explosion occurred was

all freshly painted red, and on asking Mr. Attia, the owner of the vessel, if this paint had any naphtha in its composition to make it dry quickly, he at once said he had supplied the paint and that it had a large percentage of naphtha in it. Directly I heard this, I felt sure this paint was the cause of the accident. Presumably the drums of paint had been taken down into the hold to paint the iron work, and after the painting had been done, the hold was closed up without any means being taken by means of fans to get rid of the vapour given off from the paint and this vapour would lie at the bottom of the hold and would certainly form an explosive mixture with the air in the hold. I recommended the Government of Burma to bring "Motor boats" under the Indian Steam Vessels Act or Indian Ports Act so that these boats might be registered and surveyed, and to draw up Rules for their control similar to those laid down in 1909 by the Board of Trade in England. I suggested that a Committee should be formed consisting of the Port Officer, Deputy Conservator of the Port, a Marine Engineer, and a representative of one of the oil firms to extract from the English Rules such rules as they might think suitable for the Port of Rangoon and to add any others they thought necessary. This Committee was formed, and I attended some of its sittings, and the rules they have drawn up will, I believe, shortly be forwarded to the Government of India for consideration.

Accidents.

21. No explosions or accidents have occurred during the year under review in the magazines or in the one Explosives Factory (The Roburite Factory at Karachi) licensed in British India. A list of accidents that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1910, and that have been reported to this Department, is given in Appendix L and gives a short account of each one. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 63 accidents causing 77 deaths and injuries to 102 persons. Comparative statements given in Appendices M and N show the total number of accidents and the number of persons killed or injured by them during the last five years. As stated in my previous reports it is very doubtful whether all accidents that occur are duly reported to this Department, and therefore it is very possible that the statistics given are underestimated. I notice that in some parts of India accidents appear more prevalent than in others, but I am inclined to think that such difference may be occasioned by the local authorities in some places being more careful in carrying out instructions to report accidents than they are in others.
22. There were 9 accidents from Gunpowder during the year, causing 10 deaths and injuries to 11 persons. These accidents were chiefly due to proper precautions not having been taken during blasting operations or in the manufacture of country powder.
23. Nitro-Compounds were responsible for four accidents, from which one person was killed and four injured.
24. Twenty-one accidents from fireworks caused the death of 30 persons and injuries to 58 others. It will be noticed from the details of the accidents that a large number of these were caused by Sulphur Chlorate mixtures, the use of which, as stated earlier in this report, is now prohibited, and if this prohibition is strictly enforced, there is no doubt the number of accidents from fireworks will be considerably reduced.
25. There were 19 accidents from petroleum during the year which were responsible for 29 deaths and injuries to 19 persons. The burning of the Irrawaddy Flotilla Company's steamer "Kashmir" of which an account was given in Appendix H of last year's Annual Report, was responsible for 17 of these deaths. It will be seen from a perusal of the accidents given in Appendix J (Serial Nos. 35 to 53) that carelessness is a prominent feature in most of them. In India the petroleum accidents are caused usually by lights being brought into proximity to oil

vapour, to kerosine lamps being upset or falling down, and to kerosine being poured on to fires or into lighted lamps.

26. There were two accidents from chemicals reported during the year causing the death of two persons and injuries to one.

Chemicals.

27. Eight accidents occurred from miscellaneous dangerous articles and substances, and were responsible for five deaths and injuries to nine persons.

Miscellaneous accidents.

28. During the year Government have been very free from accidents as particulars of only one accident at the Ammunition Factory, Dum Dum, causing injuries

Government accidents.

to three persons, were received by this Department.

29. The number of inspections done by this Department during the year is a record one, *viz.*, one thousand, one hundred and fifty-seven. To give some idea of the work and the ground covered, I give the following details.

During the 12 months, 1st April 1910 to March 1911, the Chief Inspector of Explosives was away from Head Quarters on inspection duty for 170 days and travelled 21,526 miles, the two Inspectors were away for 298 days and 250 days and travelled 29,629 and 28,496 miles, respectively. In conclusion I owe my grateful thanks to my Inspectors for the able assistance they have given me, and I cannot speak too highly of their services. In addition to their ordinary work they have been frequently called away in the middle of inspections to examine suspicious packages and to give evidence in Court in connection with outrages.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col, R.A.,*

Chief Inspector of Explosives in India.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1910.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	Total.	Renew-ed.	New.	Total
Ajmer-Merwara	Ajmer	1	..	1	1	..	1
	TOTAL	1	..	1	1	..	1
Bengal	Burdwan	21	..	21	18	..	18
	Darjeeling	3	..	3	3	..	3
	Gaya	3	..	3	3	..	3
	Hazaribagh	14	..	14	11	..	11
	Hooghly	4	..	4	1	..	1
	Howrah	1	..	1	1	..	1
	Manbhum	18	2	20	15	2	17
	24-Parganas	2	..	2	1	..	1
	Sambalpur . . . . .	..	1	1	..	1	1
	Singbhum	5	..	5	3	..	3
TOTAL	71	3	74	56	3	59	
Bombay	Ahmedabad	3	1	4	3	1	4
	Bombay	18	2	20	11	2	13
	Dharwar	2	..	2	1	..	1
	Kaira . . . . .	..	1	1	..	1	1
	Karachi*	9	..	9	4	..	4
	Kolaba	3	..	3	3	..	3
	Panch Mahals	1	..	1	1	..	1
	Thana	1	..	1	1	..	1
TOTAL	37	4	41	24	4	28	
Burma	Hanthawaddy	3	1	4	2	1	3
	Mergui	1	..	1	1	..	1
	Ruby Mines	1	..	1	1	..	1
	Tavoy . . . . .	..	1	1	..	1	1
	Yemathin	1	..	1	1	..	1
TOTAL	6	2	8	5	2	7	
CENTRAL PROVINCES	Balaghat	1	..	1	1	..	1
	Betual	2	..	2	1	..	1
	Bhandara	1	..	1	1	..	1
	Bilaspur	1	..	1	1	..	1
	Chindwara	2	1	3	2	1	3
	Jubbulpur	1	..	1	1	..	1
	Nagpur	5	1	6	3	1	4
	Narsingpur	2	..	2	1	..	1
	Raipur	4	..	4	4	..	4
TOTAL	19	2	21	15	2	17	
EASTERN BENGAL AND ASSAM	Cachar	2	..	2	1	..	1
	Lakhimpur	1	..	1	1	..	1
	TOTAL	3	..	3	2	..	2
MADRAS	Anantapur	3	..	3	2	..	2
	Chingleput	3	..	3	2	..	2
	Kistna	1	..	1	1	..	1
	Madras	19	..	19	5	..	5
	Nellore	4	2	6	2	1	3
	Nilgiris	2	..	2	1	..	1
	Tanjore	4	..	4	3	1	4
	Trichinopoly	3	..	3	3	..	3
	Vizagapatam	5	..	5	3	..	3
TOTAL	44	..	46	22	2	24	

* At Karachi there is in addition a Roburite Factory licensed under Rule 15.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	Total.	Re-newed.	New.	Total.
PUNJAB	Rawal Pindi	1	..	1	1	..	1
	TOTAL	1	..	1	1	..	1
UNITED PROVINCES	Cawnpur	1	..	1	1	..	1
	Gharwal	3	..	3	3	..	3
	Lucknow	1	..	1	1	..	1
	Meerut	1	..	1	3	..	3
	Shahjehanpur	1	..	1	1	..	1
TOTAL	7	..	7	9	..	9	
SUMMARY.							
AJMER-MERWARA		1	..	1	1	..	1
BENGAL		71	3	74	56	3	59
BOMBAY		37	4	41	24	4	28
BURMA		6	2	8	5	2	7
CENTRAL PROVINCES		19	2	21	15	2	17
EASTERN BENGAL AND ASSAM		3	..	3	2	..	2
MADRAS		44	2	46	22	2	24
PUNJAB		1	..	1	1	..	1
UNITED PROVINCES		7	..	7	9	..	9
		189	13	202	135	13	148

APPENDIX B.

Summary of Magazines and Licenses granted under Rule 17 for the ten years ending 1910.

	MAGAZINES.			LICENSES.		
	Under renewed license.	Under new license.	Total.	Re-newed.	New.	Total.
1901	76	10	86	83	11	94
1902	121	26	147	85	19	104
1903	129	17	146	87	14	101
1904	138	12	150	96	9	105
1905	139	15	154	95	13	108
1906	150	19	169	105	15	120
1907	164	9	173	118	8	126
1908	167	19	186	119	15	134
1909	178	29	207	128	21	149
1910	189	13	202	135	13	148

APPENDIX C.

Statement showing the imports of explosives by sea into British India from other countries in the year 1910.

	IMPORTS, 1910.						Total.
	Bengal.	Bombay	Sind.	Madras.	Burma.	Eastern Bengal and Assam.	
<i>Quantity.</i>							
Gunpowder, black lbs	59,515	141,495	18,125	17,287	6,280	..	242,702
„ smokeless „	9,725	4,725	22,025	1,075	626	..	38,176
Ammonal . . . . . „	..	..	..	..	..	..	..
Dynamite „	79,968	10,000	8,000	212,668	50,000	..	360,636
Blasting Gelatine „	9,968	20,000	5,000	607,500	33,990	..	676,458
Gelignite or Gelatine Dynamite „	9,968	80,000	2,000	59,000	28,000	..	178,968
Monobel Powder . . . . . „	..	..	..	..	..	..	..
Other nitro-compound explosives „	96,236	500	..	..	..	..	96,736
Detonators No.	200,000	311,000	105,000	1,677,000	394,556	..	2,687,556
Fireworks lbs.	..	2,968,651	90,744	128,745	222,601	..	3,410,741
TOTAL „	265,380	3,225,371	145,894	1,026,275	341,497	..	5,004,417
TOTAL No.	200,000	311,000	105,000	1,677,000	394,556	..	2,687,556
<i>Value in Rupees.</i>							
Gunpowder, black	54,700	60,508	6,009	10,425	5,929	..	137,571
„ smokeless	24,897	14,426	27,593	3,510	2,146	..	72,572
Ammonal . . . . .	..	..	..	..	..	..	..
Dynamite	64,901	8,009	6,356	172,662	40,254	..	292,182
Blasting Gelatine	9,624	18,958	4,628	571,315	29,353	..	633,878
Gelignite or Gelatine Dynamite	8,112	63,499	1,694	48,876	22,573	..	144,754
Monobel Powder . . . . .	..	..	..	..	..	..	..
Other nitro-compound explosives	25,041	317	..	..	..	..	25,358
Detonators	2,370	4,923	1,739	36,294	7,842	..	53,168
Fireworks	78,104	637,546	32,538	43,400	73,711	..	865,299
TOTAL	267,749	808,186	80,557	886,482	181,808	..	2,224,782

APPENDIX D.

Comparative statement showing the imports of explosives by sea into British India, from other countries, during the five years 1906 to 1910.

	1906.	1907.	1908.	1909.	1910.
Gunpowder, black lbs.	168,353	170,299	256,753	213,854	242,702
„ smokeless „	39,745	29,317	37,615	39,412	38,176
Ammonal . . . . „	..	..	250	..	..
Dynamite „	352,207	262,495	350,474	453,016	360,636
Blasting Gelatine „	906,400	1,085,050	726,796	805,080	676,458
Gelignite or Gelatine Dynamite . . „	132,594	175,040	165,208	132,032	178,968
Monobel Powder „	2,000	..	..	..	..
Other nitro-compound explosives . „	72,921	89,256	77,616	48,016	96,736
Detonators No.	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556
Fireworks lbs.	2,410,388	2,446,428	1,504,896	1,339,733	3,410,741
TOTAL lbs.	4,084,608	4,257,885	3,119,608	3,031,143	5,004,417
TOTAL No.	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556

APPENDIX E.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Calcutta, the 1st March 1911.

No. 287.—With reference to Notification No. 4555—4, dated the 31st May 1907, of the Government of India, Department of Commerce and Industry, publishing rules to regulate the transport and importation of explosives, the following list of “authorized explosives” referred to in rule 9 (I) of the above rules is published for general information :—

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India, for general sale :—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

CHILWORTH SPECIAL POWDER.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in the rule for testing explosives, published with Notification No. 4555—4, dated the 31st May 1907. referred to above.

Division 1.

BALLISTITE.

BLASTING GELATINE.

CARBONITE.

CELTITE.

CORDITE.

CORDITE, M. D.

DYNAMITE.

GELATINE DYNAMITE No. 1.

GELATINE DYNAMITE No. 2 OR GELIGNITE.

MONOBEL POWDER.

PHENIX POWDER.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE No. 2.

E. C. SPORTING POWDER.

EMPIRE POWDER.

GUNCOTTON.

IMPERIAL SCHULTZE GUNPOWDER.

NEGRO POWDER.

NOBEL'S SPECIAL POWDER.

N. S. SMOKELESS.

PICRIC ACID.

PICRIC POWDER.
 ROBURITE.
 RUBY POWDER.
 SMOKELESS DIAMOND.
 TONITE OR COTTON POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

PERCUSSION CAPS.
 RAILWAY FOG SIGNALS.
 SAFETY CARTRIDGES.
 SAFETY FUZES FOR BLASTING.
 SAFETY ELECTRIC FUZES.

Division 2.

CARTRIDGES FOR CANNON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
 CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
 ELECTRIC FUZES.
 FUZES FOR SHELLS.
 TUBES FOR FIRING EXPLOSIVES.
 WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
 DETONATORS.
 ELECTRIC DETONATORS.
 FRICTION TUBES.
 FUZES FOR SHELLS.
 TUBES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2.—Manufactured Fireworks.

MANUFACTURED FIREWORKS.
 ALUMINIUM TORCHES.
 AMORCES.
 CHINESE CRACKERS.
 ELECTRIC SPARKLERS.
 LIGHT SIGNALS.
 MAGNESIUM TORCHES.
 PYROTECHNIC MATCHES.

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R.A.*,
Chief Inspector of Explosives in India

APPENDIX F.

*List of non-dangerous petroleum installations licensed during the year 1910.

Province.	District.	No.	Province.	District.	No.	
Ajmer-Merwara	Ajmer	4	Central Provinces	Akola	6	
	TOTAL	4		Amraoti	6	
Baluchistan	Quetta	1		Bhandara	4	
	TOTAL	1		Bilaspur	3	
Bengal	Balasure	3		Buldana	9	
	Bankura	1		Chanda	2	
	Bhagulpur	5		Damoh	2	
	Birbhum	1		Hoshangabad	4	
	Burdwan	7		Jubbulpur	6	
	Calcutta	6		Nagpur	4	
	Champaran	2		Narsingpur	3	
	Cuttack	3		Nimar	5	
	Darbhanga	3		Raipur	3	
	Darjeeling	2	Saugor	3		
	Gaya	4	Seoni	2		
	Howrah	3	Wardha	9		
	Khulna	1	TOTAL	71		
	Manbhum	4	Eastern Bengal and Assam.	Backergunge	1	
	Midnapur	2		Bogra	2	
	Monghyr	3		Chittagong	5	
	Mozufferpur	4		Dacca	3	
	Murshidabad	1		Dinajpur	3	
	Nadia	5		Jalpaiguri	2	
	Patna	4		Kamrup	1	
	Purnea	6		Lakhimpur	2	
	Sambalpur	5		Pabna	3	
	Saran	3		Rajshaye	3	
	Shahabad	3		Rangpur	4	
Sontal Parganas	6	Sylhet		2		
24-Parganas	9	TOTAL		31		
TOTAL	96	Madras	Anantapur	3		
Bombay	Ahmedabad		5	Bellary	4	
	Ahmednagar		3	Chingleput	5	
	Belgaum		6	Coimbatore	6	
	Bijapur		6	Cuddapah	2	
	Bombay		5	Ganjam	4	
	Broach		7	Godavery	6	
	Dharwar		12	Guntur	4	
	Hyderabad (Sind)		1	Kistna	5	
	Karachi		6	Kurnool	2	
	East Khandesh		4	Madras	7	
	West Khandesh		5	Madura	7	
	Nasik		5	Malabar	11	
	Poona	3	Nellore	3		
	Satara	3	North Arcot	4		
	Sholapur	3	Salem	3		
	Surat	6	South Arcot	10		
	Thana	4	South Canara	1		
	TOTAL	84	Tanjore	12		
	Burma	Hanthawaddy	7	Tinnevely	8	
		Magwe	12	Trichinopoly	4	
		Mandalay	2	Vizagapatam	3	
		Mingyin	1	TOTAL	114	
		Pokoku	7	Mysore	Bangalore	10
		Prome	3		TOTAL	10
Thayetmyo		1	N.-W. Frontier Province		Peshawar	3
TOTAL	33	TOTAL		3		

* This list includes godowns for the storage of non-dangerous petroleum.

Province.	District.	No.	Province.	District.	No.
Punjab	Amritsar	4	United Provinces	Bareilly	4
	Delhi	4		Basti	3
	Jullunder	2		Benares	3
	Lahore	4		Cawnpur	3
	Ludhiana	3		Dehra Dun	1
	Multan	1		Etawah	3
	Rawal Pindi	3		Fyzabad	3
	Sialkot	3		Ghazipur	1
	Umballa	6		Gonda	2
TOTAL	30	Gorakpur		3	
Secunderabad	Secunderabad	2		Jaunpur	1
	TOTAL	2		Jhansi	3
United Provinces	Agra	4		Lucknow	3
	Aligarh	2		Meerut	4
	Allahabad	4		Moradabad	3
	Azamgarh	1		Muttra	1
	Bahraich	1		Saharanpur	3
	Ballia	1		Shahjehanpur	3
	Bara Banki	1		TOTAL	61

SUMMARY.

AJMER-MERWARA	4
BALUCHISTAN	1
BENGAL	96
BOMBAY	84
BURMA	33
CENTRAL PROVINCES	71
EASTERN BENGAL AND ASSAM	31
MADRAS	114
MYSORE	10
NORTH-WEST FRONTIER PROVINCE	3
PUNJAB	30
SECUNDERABAD	2
UNITED PROVINCES	61
TOTAL	540

APPENDIX G.

Summary of non-dangerous petroleum installation and godowns licensed for the six years ending 1910.

	1905.	1906.	1907.	1908.	1909.	1910.
Ajmer-Merwara	3	3	3	4	4	4
Baluchistan . . . . .	..	..	1	1	1	1
Bengal	67	74	74	79	89	96
Bombay	65	64	76	82	79	84
Burma	10	11	12	17	19	33
Central Provinces	49	49	67	66	69	71
Eastern Bengal and Assam	11	14	16	21	24	31
Madras	49	57	89	97	95	114
Mysore . . . . .	..	..	..	..	8	10
North-West Frontier Province	1	3	3	3	3	3
Punjab	9	12	23	26	28	30
Secunderabad . . . . .	..	..	..	..	..	2
United Provinces	44	44	47	48	59	61
TOTAL	308	331	411	444	478	540

APPENDIX H.

Statement showing the quantity of petroleum imported by sea into British India during the years 1906 to 1910.

NON-DANGEROUS PETROLEUM.

	1906.	1907.	1908.	1909.	1910.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong	1,822,051	5,547,944	6,308,806	8,825,895	6,977,078
Balasore	26,200	..	..	..	..
Chandbali	405,000	270,200	206,150	208,200	259,000
Calcutta	20,342,078	27,342,923	33,379,196	26,599,239	18,642,248
Bombay	17,402,913	22,439,071	24,750,034	24,955,563	24,730,978
Sind	5,007,932	7,171,933	10,448,574	9,719,214	8,295,644
Madras	6,956,459	8,942,869	13,018,601	13,720,767	10,006,706
Burma	1,156,179	1,828,973	2,514,834	1,119,719	1,197,661
TOTAL	53,118,812	73,543,913	90,626,195	85,148,597	70,109,315

DANGEROUS PETROLEUM.

	1906.	1907.	1908.	1909.	1910.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Calcutta . . . . .	..	12,270	20,048	42,965	44,708
Bombay	184,243	92,258	110,390	84,793	79,661
Sind	9,795	2,733	25,801	1,844	28,043
Madras	38,104	25,400	53,756	15,280	6,459
Burma . . . . .	..	..	..	55	580
TOTAL	232,142	132,661	209,995	144,937	159,451

Statement showing the quantity of petroleum produced in Burma and transported into British India during the year 1910.

Dangerous.	Non-Dangerous.
Gallons.	Gallons.
922,481	85,356,057

Statement showing the quantity of petroleum produced in Assam and Burma during the years 1906 to 1910.

NON-DANGEROUS PETROLEUM.

	1906.	1907.	1908.	1909.	1910.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam	1,890,942	1,975,094	2,016,978	2,144,093	2,033,772
Burma	95,848,500	75,397,762	78,044,435	134,080,703	143,387,116
TOTAL	97,739,442	77,372,856	80,061,413	136,224,796	145,420,888

DANGEROUS PETROLEUM.

	1906.	1907.	1908.	1909.	1910.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam	21,855	48,017	67,256	36,588	56,736
Burma	11,670,200	15,043,700	18,055,500	18,479,394	18,245,501
TOTAL	11,692,055	15,091,717	18,122,756	18,515,982	18,302,237

APPENDIX I.

List of Conditions.

1. The rules laid down in Chapter 1 of Part II of the rules published in Judicial Department Notification No. 11, dated the 14th January 1909, shall be duly observed.
2. Each tank shall either be separately surrounded by earth or other non-inflammable material or partially sunk in an excavation. The enclosure thus formed shall be of dimensions sufficient to contain without overflow 10 per cent. more oil than the tank is capable of containing and shall be so constructed as to prevent the escape therefrom of any oil in the form of liquid whether under the action of fire or otherwise. The space enclosed by such wall or embankment, and not occupied by the tank, shall be kept entirely clear and unoccupied.
3. A distance of not less than 300 feet shall be kept clear between one storage tank and another.
4. No tank shall be within 100 feet of a road used for ordinary traffic.
5. Every person managing or employed on or in connection with the place of storage shall abstain from any act whatever which tends to cause fire or explosion and which is not reasonably necessary and shall prevent any other person from doing such act.
6. No light, except a light of such strength, position and character as is not liable to ignite any inflammable vapour or fire of any description, shall be permitted at any time within 100 feet of any tank.
7. No repairs shall be carried out in any tank which contains or has contained petroleum, until the tank has been thoroughly cleared of all petroleum and of all gases and vapours derived from the same.
8. Any accident or explosion occurring within the area specified in the license, whether attended with loss of life or not, shall be reported immediately to the Deputy Commissioner, or to such officer as he may direct. In the event of loss of life the fact shall be reported by telegram.
9. The licensee shall, if and when required to do so, erect efficient lightning conductors to protect the tank.
10. Where the licensing officer calls on the licensee by a notice in writing to execute any repairs of the licensed place which may in the opinion of such officer be necessary for the safety of such place the licensee shall execute the repairs within such period not being less than a week from the date of the receipt of the notice as may be fixed by the notice.

APPENDIX J.

CONDITIONS.

To be attached to permission to refine petroleum in a refinery with a daily average still capacity not exceeding 1,000 gallons.

1. Plans showing the general arrangement of tanks, stills and buildings in the proposed refinery must be submitted to and approved by an officer appointed by the Local Government for this purpose.
2. The materials used in the construction of the still, condensing pipes and oil tanks shall be such as are approved by the officer referred to in condition 1.
3. All buildings in which oil is stored or handled shall be built of fire-proof materials.
4. Each storage tank shall be separately surrounded by a bund or embankment of substantial construction. The enclosure thus formed shall be of dimensions sufficient to contain ten per cent. more oil than the tank is capable of containing and shall be so constructed as to prevent the escape therefrom of any oil in the form of liquid whether under the action of fire or otherwise. Any pipes for drainage purposes must be fitted with stop valves or some other suitable arrangement by which they can be closed except when required for their legitimate purpose.
5. No storage tank, the capacity of which exceeds 50,000 gallons, shall be placed nearer than 450 feet to any still, boiler or furnace.
6. Service tanks (*i.e.*, tanks which contain fuel for boiler and still fires) shall not be of larger size than is necessary to contain twenty-four hours' fuel for the particular fire which they may serve.
7. Running from one end of every still or bench of stills to the other end there shall be a brick wall 18" high or a trench 18" deep enclosing a space not less in length than the length of the still or bench of stills in any part and in breadth not less than ten feet in any part.
8. No naked lights shall be allowed except in the firing spaces of stills or boilers, and no smoking shall be allowed except in spaces or buildings specially provided or allotted for the purpose.
9. A sufficient quantity of dry sand shall be kept near the tanks and stills for use in extinguishing fire in the case of an outbreak. The quantity to be deemed sufficient shall be determined by the Chief Inspector of Explosives for such refineries as he visits periodically, and for other refineries by such officer as may be appointed by the Local Government.
10. Lightning conductors shall be arranged to protect the storage tanks in accordance with the Petroleum Rules.
11. The refinery shall be properly and efficiently fenced round. All gates shall be shown in the plans submitted to Government.
12. Fire walls and efficient separators for drainage shall be shown in the plans referred to in condition 1 and may be required to be erected when deemed necessary by the Chief Inspector of Explosives for such refineries as he visits periodically, and for other refineries by such officer as may be appointed by the Local Government.
13. The occurrence of any fire at the refinery shall be immediately reported to the nearest Police Station.

APPENDIX K.

CONDITIONS.

To be attached to permission to refine petroleum in a refinery with a daily average still capacity of over 1,000 gallons.

1. Plans showing the general arrangement of tanks, stills and buildings in the proposed refinery must be submitted to and approved by an officer appointed by the Local Government for that purpose.

2. The materials used in the construction of the still, condensing pipes and oil tanks shall be such as are approved by the officer referred to in condition 1.

3. All buildings in which oil is stored or handled shall be built of fire-proof materials.

4. Each storage tank shall be separately surrounded by a bund or embankment of substantial construction. The enclosure thus formed shall be of dimensions sufficient to contain 10 per cent. more oil than the tank is capable of containing and shall be so constructed as to prevent the escape therefrom of any oil in the form of liquid whether under the action of fire or otherwise. Any pipes for drainage purposes must be fitted with stop valves or some other suitable arrangement by which they can be closed except when required for their legitimate purpose.

5. No storage tank, the capacity of which exceeds 50,000 gallons, shall be placed nearer than 450 feet to any still, boiler or furnace.

6. Service tanks (*i.e.*, tanks which contain fuel for boiler and still fires) shall not be of larger size than is necessary to contain 24 hours' fuel for the particular fire which they may serve.

7. Running from one end of every still or bench of stills to the other end there shall be a brick wall 18" high or a trench 18" deep enclosing a space not less in length than the length of the still or bench of stills in any part and in breadth not less than 10 feet in any part.

8. No naked lights shall be allowed except in the firing spaces of stills or boilers, and no smoking shall be allowed except in spaces or buildings specially provided or allotted for the purpose.

9. A sufficient quantity of dry sand shall be kept near the tanks and stills for use in extinguishing fire in the case of an outbreak. The quantity to be deemed sufficient shall be determined by the Chief Inspector of Explosives for such refineries as he visits periodically, and for other refineries by such officer as may be appointed by the Local Government.

10. To deal with fires, in addition to heaps of sand, hydrants with a minimum pressure of 40lbs. with the necessary hose shall be provided at suitable points. These shall be shown in the original plans of any proposed refinery. Both hydrants and hose shall be kept in a thoroughly efficient condition.

11. The light fractions (*i.e.*, dangerous petroleum within the meaning of section 2, clause (b) of the Indian Petroleum Act, 1899) as they leave the stills shall be at once pumped right out of the refinery to storage tanks and not stored in the immediate neighbourhood of stills and boilers except such quantities as may be pumped direct to service tanks for fuel. Light fractions shall not be disposed of otherwise than in accordance with this condition except with the previous approval of the officer referred to in condition 1.

12. Lightning conductors shall be arranged to protect the storage tanks in accordance with the Petroleum Rules.

13. The refinery shall be properly and efficiently fenced round. All gates shall be shown in the plans submitted to Government.

14. Fire walls and efficient separators for drainage shall be shown in the plans referred to in condition 1 and may be required to be erected when deemed necessary by the Chief Inspector of Explosives for such refineries as he visits periodically, and for other refineries by such officer as may be appointed by the Local Government.

15. The occurrence of any fire at the refinery shall be immediately reported to the nearest Police Station.

APPENDIX L.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1910 to 31st December 1910.

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.
Explosives.						
1	April . . .	Gunpowder . . .	Madura . . .	The Magistrate reported that a native was killed by an explosion of gunpowder which was caused by a spark falling on the powder during blasting operations.	1	..
2	3rd May 1910 . .	„ . . .	Palghat, Calicut	The Magistrate reported that sulphur, charcoal and saltpetre were being pounded in wooden mortar pestles when an explosion occurred fatally injuring three women, two of whom were employed in grinding the materials while the third was engaged in taking out the powder from the mortar in a bamboo basket.	3	..
3	20th May 1910	„ . . .	Pachcham-palaiyam, Salem.	The Magistrate reported that two natives were grinding sulphur, saltpetre and charcoal in a wooden mortar with an iron crowbar when an explosion occurred injuring both of them.	..	2
4	21st May 1910 . .	„ . . .	Mannadakav-undanur, Salem.	The Magistrate reported that a spark from a blue light fell on some blasting powder which exploded injuring six persons.	..	6
5	24th May 1910	„ . . .	Vellakkalpatti, Salem.	The Magistrate reported that while blasting operations were in progress a piece of stone flew out from a blast and hit a girl, breaking her back. The girl was about 350 yards away.	1	..
6	19th July 1910	„ . . .	Rohri . . .	The District Magistrate reported that while blasting, a contractor's cooly, after setting fire to the charges, went and took shelter in a room where some powder was kept, carrying the lit flame stick in his hands. The powder caught fire from a spark and an explosion occurred blowing out the roof and walls and fatally injuring the cooly.	1	..
7	25th July 1910	„ . . .	Thatôn . . .	While blasting a maistry was seriously injured. It is thought probable that the injured man was careless about the disposal of gunpowder he was not actually using at the moment, and that a spark from the matches he was using ignited the gunpowder, which set fire to his clothes and caused the serious injuries sustained.	..	1
8	4th Oct. 1910 . .	„ . . .	Parlakemedi, Ganjam.	The Collector reported that a native was tying about 8 lbs. of gunpowder into small bundles and was smoking a cheroot at the same time, when a spark dropped on the powder causing it to explode, fatally injuring the man and three others who were close by.	4	..
9	6th Oct. 1910 . .	„ . . .	Mangarai, Salem.	The Magistrate reported that a man was examining some gunpowder required for blasting, when a spark from a cigarette which another man near by was smoking, fell on the powder and caused an explosion, badly burning the two men.	..	2
TOTAL . . .					10	11
10	20th Jan. 1910	Dynamite . . .	Kemmendine, Burma.	A Quarter Master Sergeant of the Royal Engineers got permission from his Commanding Officer to break some sinkers which had been sold to a native contractor and while loading a hole in one of the sinkers with dynamite, the charge exploded severely injuring the Quarter Master Sergeant necessitating the amputation of his left fore arm.	..	1
11	21st Jan. 1910 . .	Blasting Gelatine.	Salem . . .	The Magistrate reported that two boys were injured while blasting operations were being carried on, and it is presumed the accident was due to boring too near a misfired charge.	..	2

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.
12	28th Apl. 1910	Dynamite	Myangyaung, Burma.	The Deputy Commissioner, Thatôn, reported that a cooly was working in a pit which formed part of an area blasted the previous evening when an explosion occurred which injured him so severely that he died in a short time. The explosion appears to have been due to the cooly accidentally striking an old charge that had misfired and had been overlooked.	1	..
13	June 1910	Blasting Gelatine.	Madura . . .	During blasting operations a piece of rock flew out and hit a man who was about 380 feet from the place of blasting, practically cutting off his leg.	..	1
TOTAL					1	4
14	March 1910	Firework mixture.	Malekpur, Surat	The Magistrate reported that a small tin box containing a mixture of chlorate of potash and bi-sulphate of arsenic was being carried by a man in a marriage procession. A spark from some fireworks which men let off fell on the mixture in the tin which exploded killing 4 and injuring 2 persons.	4	2
15	2nd May 1910	Firework mixture.	Girgaum, Bombay.	A boy applied a match to a mixture of chlorate of potash and sulphide of arsenic with the result that there was an explosion causing serious injuries to the lad.	..	1
16	7th June 1910	Firework called Burusu.	Madura . . .	The Magistrate reported that a licensee was testing a firework containing charcoal, sulphur, saltpetre and strontium nitrate by placing it in a pot and lighting it. The mixture exploded injuring the man and fatally injuring another.	1	1
17	2nd Aug. 1910	Fireworks	Ludhiana	A native was preparing the ordinary bazar crackers when a cracker fell down over a "Hukka" lying near by and exploded fatally injuring the man and injuring 2 others who were near by. It is presumed the crackers consisted of a sulphur chlorate mixture and pebbles.	1	2
18	29th Aug. 1910	Fireworks consisting of chlorate of potash and sulphide of arsenic and pebbles.	Burdwan	A native lad was preparing a throw down firework and, in pressing the composition, it exploded badly injuring him.	..	1
19	26th Sept. 1910	Fireworks. sulphur chlorate.	Bombay . . .	The Commissioner of Police reported that a woman found some firework mixture in a small tin box which she removed and placed in a handkerchief tying it up very tightly. She accidentally let the bundle fall and an explosion took place causing her slight injuries.	..	1
20	1st Oct. 1910	Fireworks	Salem . . .	A man was rubbing and mixing old gunpowder with bi-sulphate of arsenic to make small bombs when owing to the pressure of the fingers the mixture exploded, injuring two figures in each hand.	..	1
21	9th Oct. 1910	Fireworks (chlorate of potash and sulphide of arsenic).	" . . .	The Magistrate reported that a carter was pushing some bags and a box containing fireworks on his cart, when the box exploded fatally injuring the man.	1	..
22	12th Oct. 1910	Fireworks (throw downs) chlorate of potash and sulphide of arsenic.	Bombay . . .	The Commissioner of Police reported that a cooly dropped a bag containing "throw down" fireworks and an explosion took place resulting in the death of the coolie and three others and slight injuries to another.	4	1
23	17th Oct. 1910	Fireworks (chlorate of potash and red sulphide of arsenic.)	" . . .	The Commissioner of Police reported that, while a tin of these fireworks was being examined, it dropped and exploded injuring 6 Hindu boys.	..	6

No.	Date of accident.	Nature of Explosive or Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Kill-ed.	In-jured.
24	20th Oct. 1910	Fireworks containing sulphur chlorate mixture.	Sendamangalan, Salem.	A native lad was making some fireworks and was mixing the powder and stones, when the mixture exploded injuring him fatally and slightly injuring 5 others.	1	5
25	24th Oct. 1910	Fireworks containing sulphur chlorate mixture.	Bombay .	A coolie was taking off a basket of fireworks from his head when the fireworks fell from the basket and exploded injuring him and six others.	..	7
26	27th Oct. 1910	Crackers	Edappadi, Salem.	The Magistrate reported the occurrence of an accident from crackers to three boys, one of whom was killed. The cause of the accident could not be ascertained, but it is presumed that the boys were making crackers when the accident occurred.	1	2
27	30th Oct. 1910	Fireworks containing sulphur chlorate mixture.	Mallur, Salem .	A man was sitting near a fire and heating 4 bombs when they exploded seriously injuring him.	..	1
28	29th Oct. 1910	Fireworks containing sulphur chlorate mixture.	Bombay .	During the process of manufacture, a bomb dropped on the ground exploding others near by, injuring two men.	..	2
29	1st Nov. 1910 .	Crackers .	Howrah .	A native was letting off crackers when accidentally one of them discharged in his hand injuring him.	..	1
30	1st Nov. 1910 .	Fireworks	Hajjunge, Tippera.	A man pressed 10 seers of gunpowder into a three-quarter inch thick iron bottle, and it was buried in the earth up to the neck. On it being set fire to sparks went up but in a short while they ceased and all of a sudden a tremendous explosion occurred whereby five persons were fatally injured. Portions of the broken iron bottle fell over 30 yards from the place. The man was prosecuted and sentenced to rigorous imprisonment for two years.	5	..
31	2nd Nov. 1910	Fireworks (chlorate of potash and realgar.)	Calcutta .	The Superintendent of Police reported that a native was grinding the two substances together when the mixture exploded, burning him about the face and right arm.	..	1
32	17th Nov. 1910	Crackers consisting of chlorate of potash, sulphide of arsenic and gravel.	Amritsar	The Police reported that, while crackers were being illicitly manufactured in a house, an explosion occurred, blowing off the roof and upper portion of the house, and seriously injuring four men, three of whom died.	3	1
33	30th Nov. 1910	Crackers consisting of chlorate of potash, red orpiment and gravel.	Toungoo, Burma	A lad was explaining to another the method of preparing crackers to be used while exhibiting war pictures at a Cinematograph show when a cracker exploded in his hand causing the mixture which was in a box near by to explode. He was prosecuted and fined Rs. 50.	..	2
34	1st Dec. 1910 .	Fireworks consisting of chlorate of potash and sulphide of arsenic.	Kukana, Ahmednagar.	The Superintendent of Police reported that a son of a licensed firework manufacturer took a large number of fireworks to a fair, no doubt for sale, and it seems that some one pushed the man carrying the fireworks or moved the gunny bag in which they were carried with the result that an explosion occurred killing nine people and injuring about twenty.	9	20
TOTAL					30	58

Petroleum.

35	13th Jan. 1910	Astatki . .	Dayayé, Rangoon.	The "Kashmir," a new steamer belonging to the Irrawaddy Flotilla Company, which was burning astatki, was burnt at Dayayé. A special Court of Enquiry was held to investigate the circumstances of the accident, and a report on the occurrence and the cause thereof was given in last year's Annual Report.	17	..
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No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.
Petroleum.—<i>co td.</i>						
36	7th Feb. 1910	Crude Oil	Syriam	Cultivators had been burning paddy straw to the north of the Indo Burma Petroleum Company's refinery and some oil which had been lying in a creek some 300 yards from the fence became ignited. No damage to life or property appears to have been caused.	..	..
37	18th Feb. 1910	..	Yenangyaung	A fire broke out at the Burma Oil Company's well No. 190 at about 1 to 1-15 A.M. The derrick was burnt down but the engine house was saved. Oil in the receiving tank burnt away but no damage was done to the tank. No other damage was done. It is possible some coolies were stealing oil in the chaung, into which oil from the receiving tank, of which the valve was loose, was escaping, and that one of them lighted a match and the light lit the oil vapour which flashed back to the tank.	..	..
38	22nd Feb. 1910	Petrol	Dhanbaid, East Indian Railway.	An accident was caused by a naked light being brought near open tins of petrol and 3 men were badly burnt by the flames, one of whom succumbed to his injuries.	1	2
39	11th Mar. 1910	Kerosine	Bangalore	The Superintendent of Police reported that an oil engine failed to work and a workman began to try and set it right by heating it from one of the burners of a kerosine oil blow-lamp. Finding that the burner did not work properly, he loosened one of its side nuts, which resulted in the oil being forced out, and becoming ignited, the burning oil scolded severely the workman and another man who happened to be close by.	1	1]
40	21st June 1910	Petroleum vapour.	Fort Gloster (Bowreah).	A fire broke out in one of the Asiatic Petroleum Company's Kerosine oil barges while she was lying empty. The cause of the fire was probably due to smoking going on inside the corrugated iron hut erected upon the deck of the barge.	..	..
41	26th June 1910	Petrol	Delhi	The Deputy Commissioner reported that two natives were removing some tins of petrol from an underground room and to enable them to see, one struck a match which, when nearly burnt out, he threw on the ground and caused an explosion, which injured both men, one of whom died the same night.	1	1
42	3rd July 1910	Heavy Oil	Syriam Refinery of the Burma Oil Company.	A fire occurred in a coking still in the refinery owing to the bottom of the still giving way and falling into the furnace. The heavy oil vaporised and caught fire and there was a flash from the furnace which enveloped the fireman in attendance and burnt him so badly that he died.	1	..
43	11th July 1910	Crude oil	Syriam, Burma	A tank of the Burma Oil Company at Syriam refinery containing 785,000 gallons of crude oil caught fire at about 5-50 A.M., and there was an explosion. The top of the tank was blown off and the contents burnt away like a sort of a candle. The plates of the tank slowly melted and rolled up inwards thus allowing the burning oil to escape from the tank into the moat made round it by an earthen embankment or bund. In time the bund seemed to crack and the oil descended a steep decline into the Company's water-reservoir and the oil eventually burned itself out there. No lives were lost and no other damage was done to the refinery. It is thought probable that the fire was occasioned by some person smoking outside the refinery fence. It was a still heavy morning and the oil vapour from the tank would be lying low and probably was ignited and flashed back to the tank.	..	..

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER PERSONS.	
					Killed.	Injured.
Petroleum—concl'd.						
44	15th July 1910	Petrol	Lucknow	The Assistant Superintendent of Police reported that a chauffeur opened the cover of a pit which is placed under a motor car to facilitate the cleaning of the car, and some petrol vapour spread towards a lamp which was near by and caught fire. Six people were burnt in consequence, the chauffeur and a woman dying from the effects.	2	4
45	17th July 1910	Crude oil	Yenangyoung	About 10 A.M. oil well No. 95 of the Burma Oil Company caught fire and the rig was burned down and the oil in the receiving tank was burned but no other property was damaged. The cause of the fire could not be ascertained.	..	..
46	25th July 1910	Kerosine	Rangoon	A fire occurred at about 8-30 P.M. on a cargo boat which had discharged a cargo of tins of kerosine and returned empty to a refinery for a new cargo. It is probable that the fire originated at the cooking place of the crew and the flames spread very rapidly owing to the impregnation of the timbers of the barge with kerosine.	1	4
47	20th Aug. 1910	"	Guntur	The District Magistrate reported that a coolie interfered with a "Washington" lamp with the intention of increasing the light, and the lamp flared up and exploded injuring two men one of whom died from the effect of the injuries received.	1	1
48	27th Aug. 1910	"	Bombay	A native woman committed suicide by pouring kerosine oil over her clothes and setting fire to them.	1	..
49	31st Aug. 1910	"	"	A native, while asleep with a lighted kerosine oil lamp near by, accidentally upset it over himself. His clothes caught fire and he was fatally burnt.	1	..
50	3rd Oct. 1910	Petrol	"	The Commissioner of Police reported that two natives were filling the tank of a motor car with petrol and as it was dark one of them called a boy to hold a lighted match over the tank so that it could be seen if it was full. As he was doing this, the petrol caught fire, damaging the car, injuring the three men, and slightly damaging a horse and two shigrams.	..	3
51	31st Oct. 1910	Kerosine	"	A tin of kerosine caught fire from some unknown cause and suddenly blazed up and the shop-keeper in order to prevent the shop catching fire threw the blazing tin into the road, burning a native lad who was near by. The shop-keeper also sustained slight burns.	..	2
52	12th Nov. 1910	"	"	Two men were engaged in cleaning a condenser and both were standing on the air pump, while a naked lighted lamp was resting on the bonnet, as one of the men was pouring kerosine oil into the condenser, the breeze blew the flames towards the oil, which caught fire, and both men were severely burnt.	1	1
53	22nd Dec. 1910	"	"	A native woman was lighting a charcoal fire with kerosine oil when her clothes caught fire and fatally burnt her.	1	..
TOTAL					29	19

No.	Date of accident.	Nature of Chemical.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.
Chemicals.						
54	17th Feb. 1910	Ether	Rangoon	In an ice and aerated water factory salt water had been drained off from a tank next to the refrigerator and a hose of fresh water was turned on and the tank washed 4 or 5 times. A Burman and four others went to the tank from which all the water had been drained off, except a few inches on the floor owing to the outlet being a little above the level of the floor. One of the men then went down into the tank with a candle and matches and as he got no smell of ether, he struck a match, when a puff of flame came from the refrigerator, fatally burning the man and burning another about his arms and legs.	1	1
55	9th July 1910	Carbolic acid	Bombay	The Commissioner of Police reported that a Parsee was throwing some carbolic acid about the floor and drain of his cook room, when some of it fell on an open light and flared up. In his attempt to extinguish the fire he got burnt and died from the injuries received.	1	..
TOTAL					2	1
Miscellaneous.						
56	1st Jan. 1910	Matches	Maymo	A case of matches fell on the floor of a Railway wagon and took fire. The cause of the fire was presumably due to bad packing and the case striking the floor, the matches got liberated and presumably rubbing against the prepared surface of the boxes got ignited.	..	..
57	9th Feb. 1910.	Acetylene	Bombay	The Commissioner of Police reported that a man was endeavouring to work an Acetylene Flare lamp and as the lamp did not work satisfactorily he opened the Carbide Retort, and as a cooly carrying a hand lamp approached the lamp, an explosion occurred, burning the man about the face and hands.	..	1
58	28th Feb. 1910.	Oil gas cylinder	Madras	The Commissioner of Police reported the death of a native due to the bursting of an oil gas cylinder. The deceased was evidently handling the cylinder when it possibly dropped and burst.	1	..
59	3rd April 1910	Matches	Maymo	While 96 tins of safety matches were being transhipped from one Railway wagon to another, one of the tins suddenly caught fire, presumably through the matches not being packed securely. The matches must have become liberated from their packets and rubbing against the prepared surface of boxes got lighted.	..	..
60	25th July 1910	Matches (Bengal coloured lights).	Calcutta	A case of matches was being removed from one place to another and through friction of the matches against one another, they caught fire and the whole case was destroyed.	..	..
61	26th Sep. 1910	Bengal matches	Bombay	The Commissioner of Police reported that natives in the Sewri Match Manufacturing Company were removing trays of manufactured matches from the racks to the outer rooms to be packed, when one of the trays caught fire and in trying to throw it outside, it fell on a much larger quantity of matches which also caught fire.	2	1
62	29th Oct. 1910.	Matches	"	The Commissioner of Police reported that a little child lighted a match, which fell on her clothes setting them on fire, and she was severely burnt.	..	1
63	10th Dec. 1910.	Gas	24-Parganas	Some sweepers went at night to clean and attend to a septic tank and one of them put a lantern inside th tank. The light coming in contact with the inflammable gas inside the tank, ignited it and caused an explosion, resulting in two of them being killed and six others injured.	2	6
TOTAL					5	9

Summary of accidents during the year 1910.

Explosives or dangerous and inflammable substances.		ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY.		Ac- cidents not causing loss of life or bodily injury.	Total number of acci- dents.	
		Number of ac- cidents.	NUMBER OF PERSONS			
			Killed.			Injured.
EXPLOSIVES.						
Gunpowder		9	10	11	..	9
Nitro-compounds		4	1	4	..	4
Ammunition . . . . .		..	..	..	..	..
Fireworks		21	30	58	..	21
	TOTAL .	34	41	73	..	34
PETROLEUM.						
Petroleum generally		14	29	19	5	19
	TOTAL .	14	29	19	5	19
CHEMICALS						
		2	2	1	..	2
	TOTAL .	2	2	1	..	2
MISCELLANEOUS						
		5	5	9	3	8
	TOTAL .	5	5	9	3	8
GRAND TOTAL .		55	77	102	8	63

APPENDIX M.

Detailed statement showing the number of accidents and persons killed and injured during the five years 1906 to 1910.

Year.	GUNPOWDER.			DYNAMITE AND OTHER NITRO-COMPOUND BLASTING EXPLOSIVES.			AMMUNITION.			FIREWORKS.		
	Number of acci- dents.	Persons killed.	Persons injured.	Number of acci- dents.	Persons killed.	Persons injured.	Number of acci- dents.	Persons killed.	Persons injured.	Number of acci- dents.	Persons killed.	Persons injured.
1906 .	13	21	28	2	1	2	..	..	..	11	4	14
1907 .	11	18	20	4	..	6	3	..	4	19	12	20
1908 .	19	27	64	4	1	4	1	..	1	22	26	23
1909 .	15	19	26	4	1	5	2	..	2	19	21	41
1910 .	9	10	11	4	1	4	..	..	..	21	30	58
TOTAL	67	95	149	18	4	21	6	..	7	92	93	156
AVERAGE	13	19	30	4	1	4	1	..	1	18	19	31

YEAR.	PETROLEUM.			CHEMICALS.			MISCELLANEOUS.		
	Number of acci- dents.	Persons killed.	Persons injured.	Number of acci- dents.	Persons killed.	Persons injured.	Number of acci- dents.	Persons killed.	Persons injured.
1906	10	9	3	..	..	..	3	1	1
1907	15	9	8	..	..	..	6	7	2
1908	41	37	6	6	..	6	5	2	8
1909	23	17	25	3	6	6	5	4	13
1910	19	29	19	2	2	1	8	5	9
TOTAL .	108	101	61	11	8	13	27	19	33
AVERAGE .	22	20	12	2	2	3	5	4	7

APPENDIX N.

Comparative statement showing the number of accidents and persons killed and injured during the five years 1906 to 1910.

	ACCIDENTS CAUSING LOSS OF LIFE OR BODILY INJURY.			Acci- dents not causing loss of life or bodily injury.	Total number of acci- dents.
	Number of acci- dents.	NUMBER OF PERSONS			
		Killed.	In- jured.		
1906	34	36	48	5	39
1907	50	46	60	8	58
1908	75	93	112	23	98
1909	70	68	118	1	71
1910	55	77	102	8	63
TOTAL	284	320	440	45	329
AVERAGE	57	64	88	9	66

(To be substituted for Appendix I.)

CONDITIONS OF PETROLEUM LICENSE IN FORM "N".

1. The rules laid down in Chapter I of Part II of the rules published in Judicial Department Notification No. 11, dated the 14th January 1909, shall be duly observed.

2. Each tank shall either be separately surrounded by earth or other non-inflammable material or partially sunk in an excavation. The enclosure thus formed shall be of dimensions sufficient to contain without overflow 10 per cent more oil than the tank is capable of containing and shall be so constructed as to prevent the escape therefrom of any oil in the form of liquid, whether under the action of fire, or otherwise. The space enclosed by such wall or embankment and not occupied by the tank, shall be kept entirely clear and unoccupied. Provided that the Deputy Commissioner or such officer as he may appoint in this behalf may sanction the surrounding of several tanks of not greater capacity than 15,000 gallons each by an enclosure of earth or other non-inflammable materials which shall be of dimensions sufficient to contain without overflowing 10 per cent more oil than can be contained by all the tanks enclosed within it and which shall be constructed as above described.

The area within any such enclosure shall be treated as an installation as defined in Rule 1 (d) of Part I of the rules under section 9 of the Indian Petroleum Act, 1899, issued under Judicial Department Notification No. 11, dated Rangoon, the 14th January 1909, and all rules laid down in Chapter I of Part II of the said rules shall be observed within such an installation.

3. A distance of not less than 300 feet shall be kept clear between one storage tank and another. This condition shall not apply to tanks already erected on the date of issue of this license.

4. No tank shall be constructed within 100 feet of any recognised public road. This condition shall not apply to tanks already erected on the date of issue of this license.

5. Every person managing or employed on, or in connection with the place of storage shall abstain from any act whatever which tends to cause fire or explosion and which is not reasonably necessary and shall prevent any other person from doing any such act.

6. No lights other than electric lights or fire of any description shall be permitted within 300 feet of any storage tank.

7. No repairs shall be carried out in any tank which contains or has contained petroleum, until the tank has been thoroughly cleared of all petroleum and of all gases and vapours derived from the same.

8. Any accident or explosion occurring within the area specified in the license whether attended with the loss of life or not, shall be reported immediately to the Deputy Commissioner or to such officer as he may direct. In the event of loss of life the fact shall be reported by telegram.

9. Where the Deputy Commissioner or any officer specially authorised by him in this behalf calls on the licensee by a notice in writing to execute any repairs of a licensed place which may in the opinion of such officer be necessary for the safety of such place the licensee shall execute the repairs within such period, not being less than a week, from the date of the receipt of the notice as may be fixed by the notice.

10. When pipes are used for draining off water from tank enclosures, they shall be fitted with gate-valves or stop-cocks outside the bund.

11. The height of any storage tank shall not be more than three-fifths of its diameter. This condition shall not apply to tanks already erected on the date of issue of this license.

