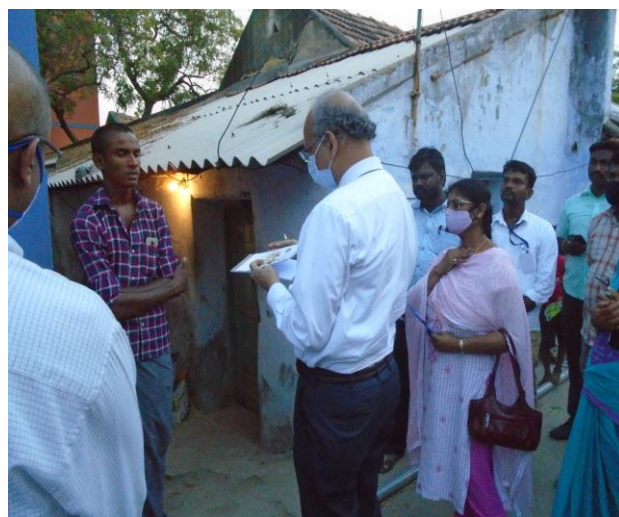


**BEFORE**  
**THE NATIONAL GREEN TRIBUNAL**  
**PRINCIPAL BENCH, NEW DELHI**

**News item published in The New Indian Express dated 12.2.2021 titled  
“At least 19 dead in Virudhunagar Firecracker factory blast, more than 30  
injured”.**



**Report of the Committee Appointed by the National Green  
Tribunal in the matter of O. A. No. 44 of 2021**

**April 2021**

**BEFORE THE NATIONAL GREEN TRIBUNAL**

**PRINCIPAL BENCH, NEW DELHI**

Original Application No. 44 of 2021

**In re: News item published in The New Indian Express dated 12.2.2021 titled  
“At least 19 dead in Virudhunagar Firecracker factory blast, more than  
30 injured”.**

**INDEX**

<b>S. No.</b>	<b>Particular</b>	<b>Page no.</b>
<b>1.</b>	<b>Report of the Committee Appointed by the National Green Tribunal in the matter of O. A. No. 44 of 2021</b>	<b>1-36</b>
<b>2.</b>	<b>Annexure – I, Copy of Hon’ble NGT order dated 16.02.2021</b>	<b>37 - 41</b>
<b>3</b>	<b>Annexure – II, - Drawing indicating the location of the sheds with markings of the shed that were razed to ground and which had been partially damaged</b>	<b>42</b>



**Date: 22.4.2021**

**Place : Chennai**

**Justice K. Kannan**

**Chairman of the Committee**

Former Judge of Punjab & Haryana and  
Madras High Courts

**BEFORE THE NATIONAL GREEN TRIBUNAL**

**PRINCIPAL BENCH, NEW DELHI**

Original Application No. 44 of 2021

In re: News item published in The New Indian Express dated 12.2.2021 titled “**At least 19 dead in Virudhunagar Firecracker factory blast, more than 30 injured**”.

**REPORT FILED BY THE COMMITTEE APPOINTED BY THE  
TRIBUNAL**

**I. THE MANDATE**

The mandate to the committee on a newspaper report about a blast at a fireworks factory at Sri Mariammal Fireworks at Achankulam that took place on 12.2.2021 at about 1.30hrs was issued by the National Green Tribunal, Principal Bench on substantial question of issues of environment relating to compliance of the Manufactures, Storage and Import of Hazardous Chemical Rules 1989 and Chemical Accident (Emergency Planning, Preparedness and Response) Rules 1996 framed under the Environment (Protection )Act of 1996. The committee has been tasked to report on (**Annexure – 1** Copy of NGT order dated 16.02.2021)

- (a) The sequence of events;*
- (b) Causes of failure and persons and authorities responsible therefor;*
- (c) Status of onsite and offsite plans, mock drills and safety SoPs;*
- (d) Extent of damage to life, human and non-human; public health; and environment-including, water, soil, air;*
- (e) Steps to be taken for compensation of victims and restitution of the damaged property and environment and the cost involved;*
- (f) Remedial measures to prevent recurrence.*

## II. COMPOSITION OF THE COMMITTEE

1. Thanks to the Registrar of NGT, Southern Zone Bench, Chennai, a physical meeting had been called at the office of the NGT Southern Zone Bench, Chennai on 22.2.2021 when the Dr M.T Karuppiah., Scientist - E, from Ministry of Environment & Forest & Climate Change, Smt. H.D. Varalaxmi, Regional Director & Shri R. Rajkumar Scientist - D from CPCB, Chennai, Dr. D.C. Pandey, Controller of Explosive, from PESO, Smt. K. Sasikala, Joint Director, from the Office of the Chief Inspector of Factories and Smt. J. Josphine Sahayarani, EE & Smt. M. Veda, AEE, from TNPCB had also assembled. Smt. H.D. Varalakshmi, Regional Director, CPCB Chennai hosted a virtual meeting on 24.2.2021, with M/s K. Kannan, Prof Nagarajan, Head of the Department of Chemical Engineering from IIT-M, his nominee Prof. Rajagopalan also from IIT-M, Dr. M.T. Karuppiah, Scientist - E, MoEF & CC, S.M.Kulkarni, Dy CCE, Hyderabad and Shri M. V. Senthil Kumar, Director of Industrial Safety & Health (FAC) all joining only to familiarize themselves and chart out a plan of action during the personal visit at the site of the accident planned to take place on 26.2.2021. The strategy was to gather first-hand information about the sequence of events at the site at Sri Mariammal Fireworks Factory and see some factories in the vicinity where there were sound industrial practices, which were accident free for several years.
2. The visit happened as it was planned. In attendance were: M/s (1) K.Kannan, (2) Dr.Karuppiah, (3) H.D.Varalakshmi, (4) Prof Rajagopalan, (5) S.M.Kulkarni, (6) Mangala Ramasubramanian, DRO, Virudhunagar and (7) M. V. Senthil Kumar, Director of Industrial Safety and Health (FAC). In compliance of Hon'ble NGT order, Er. M. Vijayalakshmi, Joint Chief Environmental Engineer, TNPCB, Tirunelveli and Er. G.Ramraj District Environmental Engineer, TNPCB, Virudhunagar coordinated with

Committee in all respects and made all logistic arrangements for field visit of committee as well as meeting with departments concerned and families of dead & injured people.

3. After the site visit, they met the Collector of Virudhunagar, Mr. R. Kannan who had organized three separate sessions of meetings. In the first meeting, apart from his personal participation, the State Officials who were the stakeholders such as the Collectorate, the District Police, the Fire station Officials, Revenue Officials, Director of Industrial Safety and Health and the State Pollution Control participated; the second was with members of the Public including the Office bearers of the Fire Works Manufacturers Association and the third was with victims of the accident and their family members. They also visited some of the victims at the Senthil hospital at Sattur and condoled the death of two members of the families who had died in the accident at the Padanthal village.



விருதுநகர் மாவட்ட ஆட்சியர் அலுவலக கூட்டரங்கில் இன்று (26.02.2021) வெம்பக்கோட்டை வட்டம் அச்சங்குளம் ஸ்ரீ மாரியம்மாள் பயர் ஓர்க்ளில் பட்டாசு தொழிற்சாலையில் ஏற்பட்ட வெடிவிபத்து தொடர்பாக மத்திய சுற்றுச்சூழல் மற்றும் மாசுக்கட்டுப்பாட்டு வாரியக்குழு தலைவர் திரு.கே.கண்ணன்., அவர்கள் தலைமையில் அனைத்துத் துறை அலுவலர்களுடன் ஆய்வுக்கூட்டம் நடைபெற்றது. உடன் மாவட்ட ஆட்சித்தலைவர் திரு.இரா.கண்ணன்.,இ.ஆ.ப., அவர்கள், மண்டல இயக்குநர், மத்திய மாசுக்கட்டுப்பாட்டு வாரியம் திருமதி.வரலெட்சுமி, மத்திய சுற்றுச்சூழல் வனம் மற்றும் பருவநிலை மாற்றம் விஞ்ஞானி திரு.கருப்பையா, வேதியியல் பொறியியல் துறை (IIT) தலைவர் திரு.ராஜகோபால் சீனிவாஸ், வெடிப்பொருள் துணைத்தலைமை கட்டுப்பாட்டு அலுவலர் திரு. குல்கர்னி, பேரிடர் மேலாண்மைத் துறை - திரு.மங்களராமசுப்ரமணியன்(மாவட்ட வருவாய் அலுவலர்), இயக்குநர் தொழிலக பாதுகாத்தல் மற்றும் சுகாதார செயலர் திரு.செந்தில்குமார் உட்பட அரசு அலுவலர்கள் பலர் கலந்து கொண்டனர்.

Translated form of News paper clipping

(A meeting held on 26.02.2021 at conference Hall of District Collector Office, Virudhnagar under the Chairmanship of Justice K. Kannan, to study the Fire cracker accident occurred at Acchankulam



*SriMariammal Fire Works, Vembakottai Block along with concerned Department officers. The study meeting was attended by Thriu. R. Kannan, IAS, District Collector, Smt H.D. Varalaxmi, Regional Director, CPCB, Chennai, Thiru Karuppaiah, Scientist MOEF&CC, Chennai, Prof.S.Rajagopalan, Chemical Engineering Dept. IIT, Chennai, Thiru Kulkarani, Deputy Chief Controller of Explosives, Thiru Mangala Ramasubramanian, DRO, Department of Disaster Management, Thiru Senthilkumar, Director of Industrial Safety and Health (FAC) and Many government officers )*



### III. THE SEQUENCE OF EVENTS - THE TIMELINES

**Table no. 1 : Details of Incidents with Date**

<b>Date</b>	<b>Incident</b>	<b>Remarks</b>
20.1.2011	License 5/2011 issued to M/s Mariammal Fireworks, Achankulam, hamlet of Vembakottai village originally issued by the Collector, Virudhunagar	The licensee is a partnership firm consisting of Santhanamari and 3 others

15.7.2016	License renewed under Explosives Rules, 2016	License issued valid up to 31.12.2020
10.12.2020	Licence renewed under Explosives Rules, 2016	Licence renewed up to 31.3.2023
24.12.2020	Sulphur licence	Issued by the Collector, valid from 1.1.2021 up to 31.12.2025
12.02.2021	There was a blast at Shed N0.37 at 13.30 hrs. Information received at the fire station at Vembakottai at 13.44hrs, which was about 8 kms from the accident site.	One fire engine TN 38A 0707 with 9 firemen arrived from Vembakottai, Vehicle TN66A 1017 with 10 firemen arrived from Sivakasi and vehicle TN 66A 0236 with 8 firemen arrived from Sattur.
12.02.2021	Victims admitted to Sivakasi Govt hospital	12 persons were declared brought dead and 53 persons were injured
12.02.2021	Elayirampannai PS in Cr No 28/2021 registered at 2100 hrs registered under Section 308, 304 part 2 and 109 IPC read with 9B1(A) of Indian Explosive Act and 99 JJ Act.	Out of 12 persons arrayed as accused, A1 Santhanamari, A2 Sakthivel, A5 Ponnu Pandiyan, A6 Velraj, A10 Jayaramu have been arrested. A3 Raja, A4 Sivakumar, A7 Ponnu Raj, A8 Murugan, A9 Manohar, A11 Kasturi and A12 Veni are still reported to be absconding.

#### IV. SITE CHARACTERISTICS

##### *Ocular details*

1. The committee visited the scene of occurrence on 26/02/2021 at around 10.30 hours. Sri K.Sundaresan, Dy.Chief Controller of Explosives, Head of the office of PESO, Sivakasi and District Fire Officer, Virudhunagar, Shri

K.Ganesan, Police Authorities, officers of Directorate of Industrial Safety and Health, Industry members were present at the time of visit. They briefed about the details of the premises and took around the entire premises.

2. Shed Nos 7(Gun Powder Mixing shed), 10 (Pellet Making shed), 11 (Fuse Over Pasting shed), 12(Fuse Making shed), 20/20A(Fuse Making/Dipping shed), 21(Drying Platform), 22(Manufacturing and Finishing shed), 25(Manufacturing and Finishing shed), 32(Pellet Making shed), 34(Intermediate Drying Platform), 36(Shell Loading shed), 37(Shell Loading shed), 38(Tube Loading shed) & 41(Shell Loading Shed) **totaling 14 sheds have been completely razed to ground.**
3. Shed Nos.9(Pellet Drying shed, 13(Manufacturing and Finished shed), 14(Twinkling Star Dipping shed), 15(Drying Platform), 16(Manufacturing and Finishing shed), 17(Manufacturing and finishing shed) 18(Manufacturing and Finishing shed), 19(Manufacturing and Finishing shed), 23(Drying platform), 24(Manufacturing and Finishing shed), 30 A/B/C(Magazine), 31(Packing shed), 35(Shell Loading shed), and 39(Pellet Transit shed) **total of 14 sheds are partially damaged.**
4. Shed Nos 4 (Ingredient shed), 5(Sulphur Store), 6(White Powder Mixing shed), 8(Pellet Drying shed), 26(Transit shed for Fuse), 27(Transit shed for fireworks), 28(Latrine), 33(Transit shed for pellets), 40(Tube Loading shed), 43 (Aluminum Store), 44(Charcoal Store) **total of 11 sheds either their doors damaged or cracks in walls).**
5. Several burnt/charred marks all over the ground and inside of sheds were noticed. Raw Materials used for fireworks manufacturing like empty cardboard shells, empty cardboard tubes, labels were found lying/scattered here and there in the scene. Labels of Sree Barani Fireworks Industries, Sri Gomathi Fireworks Factory, Sri Marutham Fireworks were also found. Items like Keys, Tiffin Boxes, baskets, Water bottles, Shoes, Chappels and burnt clothes were found in the scene. The doors of the magazine, the wire mesh to



the ventilators of the magazine, lightning conductors of the magazine were found damaged and several cracks were noticed in the walls and roof of the magazine. The vehicles with registration numbers TN22CS5857/ TN49AM2036/TN67BD4893 were found parked near the magazine and found damaged due to the impact of fire and explosion. Some photographs taken at that time are seen below:





6. Extent of damage to human life: From the records of District Magistrate, Virudhunagar, the list of dead and injured is para IX below.

**1. Facilities at Sri Mariyammal Fireworks**

**Table no. 2: Details of activity sheds**

Sl. No.	Description of shed	Shed Nos.	Capacity of each shed	Man limit
1	Chemical mixing and filling shed	6,7	5kg X 2 = 10	2x2=4
2	Fuse Dipping-curing/making/pasting shed	11,12 (20,20A)	2.5X3=7.5	3X2=6
3	Twinkling star dipping shed	14	1X5=5	1X2=2
4	Manufacturing and Finishing shed	13,16,17,18,19,22, 24,25	8X25=200	8X4=32
5	Drying Platform	15,21,23	3X25=75	3X4=12
6	Transit Shed for Fuse	26	1X200=200	1X2=2
7	Transit Shed for Fireworks	27	1X500=500	1X2=2
8	Pellet Drying shed	8,9	2X25=50	2X2=4
9	Pellet Making shed	10,32	2X5=10	2X2=4
10	Pellet Transit Shed	33,39	2X50=100	2X2=4
11	Intermediate Drying Platform	34	1X25=25	1X4=4

12	Shell/Tube Loading sheds	35,36,37,38,40,41	6X5=30	6X2=12
			1212.5 Kg	88

**2. Physical features at the site at the time of site visit**

Totally 14 sheds were **completely razed to ground**.

**Table no. 3: Details of Sheds razed to ground**

Shed No.	Activity
7	Gunpowder mixing shed
10	Pellet making shed
11	Fuse over pasting shed
12	Fuse making shed
20, 20A	Fuse Dipping and Curing shed
21	Drying Platform
22	Manufacturing & Finishing shed
25	Manufacturing & Finishing shed
32	Pellet Making shed
34	Intermediate Drying Platform
36	Shell Loading shed
37	Tube loading shed
38	Tube loading shed
41	Shell loading shed

14 sheds were **partially damaged in the accident**

**Table no. 4: Details of Partially damaged Sheds**

Shed No.	Activity
9	Pellet Drying shed
13	Manufacturing and Finishing shed
14	Twinkling Star Dipping shed
15	Drying Platform
16	Manufacturing and Finishing shed
17	Manufacturing and Finishing shed
18	Manufacturing and Finishing shed
19	Manufacturing and finishing shed

23	Drying platform
24	Manufacturing and Finishing shed
30(A/B/C)	Magazine
31	Packing shed
35	Shell Loading shed
39	Pellet Transit

(Annexure II - indicating the location of the sheds with markings of the shed that were razed to ground and which had been partially damaged)

**3. Predominant activity at the sheds**

The unit was manufacturing mainly aerial fireworks and other fireworks items.

**V. INFRASTRUCTURAL DETAILS OF THE FIREWORKS UNIT**

1. License Capacity : 1212.5 kg
2. Man limit : The persons working in the manufacturing facilities are limited to 88 persons as approved by PESO.
3. Explosive magazine capacity: 70,000 kgs
4. Design drawing of the fireworks unit having a site plan and construction plan approved by PESO is enclosed.
5. Details of licenses: ( Under ER 2008)
  - A. The following licenses have been granted by Petroleum & Explosives Safety Organization (PESO), Nagpur.
    - a. Fireworks Manufacturing license No.E/HQ/TN/20/1217(E47284) valid upto 31/03/2023 now under suspension after the accident.
    - b. Fireworks magazine license No.E/HQ/TN/21/1642(E47286) valid upto 31/03/2022 now under suspension after the accident
  - B. Licenses granted by the District Authority:
    - a. Arms Act license No.(for Sulphur): 05/2011 valid till 31/12/2025.
  - C. License granted by the Directorate of Industrial Safety and Health, Govt.of Tamil Nadu



a. VNR 06884.

6. Sree Mariyammal Fireworks is a partnership firm consisting of following partners. Sri M.Shandhanamari, S/o Sri T.Muthiah Thevar is an occupier. The subject license is valid upto 31/3/2023.( But under suspension now)

7. Details of Authorized persons:

**Table no. 5 : Authorized Persons**

Sl. No.	Name	Age	Position	Address
1	M.Shandhanamari S/o T.Muthiah Thevar	55	Authorised Signatory/ Occupier/ Partner	Samidevanpatti village, Elayirampannai post, Sattur TK, Dist. Virudhunagar.
2	S.Ponraj S/o M.Shandhanamari	27	Partner	-do-
3	S.Murugan S/o M.Shandhanamari	25	Partner	-do-
4	S.Manoharan S/o M.Shandhanamari	23	Partner	-do-

8. Foreman's certificate was issued to Sri Loganathan having certificate No.E/SS/TN/FM/791(E73819) as the competent person to supervise and monitor activities in the manufacturing premises. The certificate was valid upto 29/04/2018 beyond which no renewal had been applied. At the time of the accident, there was no authorized foreman.

## **VI. SOME TECHNICAL DETAILS**

### ***a. Aerial fireworks:***

1. Aerial fireworks which move by their own propulsions or shoot into the sky through a mortar consisting of paper tube or casing filled with combustible

KK

material to deliver sound and pyrotechnic effect and includes shells and rockets.

2. Aerial fireworks consist lifting charge (gun powder), pyrotechnic composition for (pellet and powder form), star and colour fitted with igniting fuse in a contrivance made up of hard cardboard pipe. On ignition of fuse, the lifting charge gets initiated and due to thrust the colour pyrotechnic composition charge is ejected into the sky to give light and colour effect with different patterns.

***b. Chemical characteristics***

1. A pyrotechnic composition is a substance or mixture of powders (Potassium Perchlorate, Potassium Nitrate, Barium Nitrate, Sulphur, Aluminum Powder, Magnesium or any other chemical or compound approved by PESO) designed to produce an effect by heat, light, sound, gas/ smoke or a combination of these. These mixtures are extremely fast burning and the reactions are exothermic, producing light or sound or both effects on ground or in air or in both. These mixtures are sensitive to shock, friction, impact and electrostatic discharge. This composition should not be handled by any inexperienced and unskilled person who is not familiar with their properties and hazards associated with it. The pyrotechnic compositions can be set off with spark energy as little as 0.1 – 10 milli joules.
2. Aluminium powders are inflammable and hazardous and if moisture is present, the hazard is multiplied. Pyrophoric Aluminum reacts violently with water to generate inflammable hydrogen gas and enormous heat and facilitates quick spread of fire.

KK



## **VII. POSSIBLE CAUSES OF FAILURE AND PERSONS AND AUTHORITIES RESPONSIBLE**

1. It must be remembered that the persons who were in shed nos. 36 and 37 have died and the sequence of events are recreated on gathering details/inputs from District Authorities, Police, Fire & Rescue Personnel, officers of PESO, Industry stakeholders, and public including the families of injured and killed. The circumstances leading to the accident are hypothesized as under, by irrefutable inferences arising from objective materials collected, statements elicited and examination of physical features.
2. Instead of operating the unit for his own, the occupier of the factory Santhanamari S/o Muthaiah, in spite of knowing the fact that the factory should not be leased out, had leased out to persons like (1) Sakthivel, (2) Raja, (3) Sivakumar, (4) Ponnupandi, (5) Velraj (as per FIR 28/2021 of Elayirampennai PS, in Virudhunagar District in the state of TN).
3. The lease holders had been using the premises for manufacturing aerial fireworks items. Since they are leaseholders and not themselves licensees, they paid no attention or care to follow the rules and regulations under Explosives Rules, 2008, Conditions of the license, safety circulars and standard operating procedures, etc. Also, the unit was in operation without obtaining Consent to Operate from the Tamil Nadu Pollution control Board.
4. They had employed workers exceeding the limit of persons to be employed in such hazardous activities and caused workers to handle hazardous/dangerous chemicals/pyrotechnic mixtures in quantities more than the prescribed limit, thus exceeding both Human Limit and Explosive Limit. And they allowed workers to work outside the dedicated places and thereby causing accumulation of chemicals/pyrotechnic mixtures/semi-finished fireworks items/finished fireworks items in front of them in open areas under trees in an unorganized and haphazard manner throwing safety to wind. On 12.2.2021, the workers started the manufacturing activities of mixing

pyrotechnic compositions and filling them into shells and tubes, packing, labeling, and finishing as fireworks. All these hazardous activities were allowed to continue without the presence of Certified Foreman as required under Explosives Rules, 2008. The Certified Foreman is a competent person to supervise the manufacturing process/activity in a fireworks factory as per the requirement of Explosives Rules 2008.

5. To rush up the finishing process, the workers were allowed to use incompletely dried colour pellets by the lease holders for making fireworks items (this is called in fireworks industry as shot drying). Incompletely dried pellets are susceptible for auto-decomposition and by that process, enormous amount of heat and fire could be generated which might be the source of fire that originated in the shed Nos.37 & 38. The fact that there had been a deep crater on the floor of sheds Nos.37 & 38 established this probability. And from there, the fire must have got propagated. Since the workers were present both inside and outside the sheds, and the quantity of chemicals and pyrotechnic mixtures were kept in large quantities and strewn everywhere, the fire spread quickly and the fire and explosion engulfed the entire area. The fire spread was very quick and ferocious, workers found it difficult to escape from the scene resulting in huge fatalities and injuries. The spread of fire all over the factory was due to ignition by chemical and hazardous materials and mixtures kept in open areas, under trees, in very unsafe and haphazard manner and since these were aerial fireworks items, due to their inherent missile effect, they started flying hither and thither in all directions causing huge impact in terms of casualty/injury/damage to properties.
6. The materials have been gathered by the police as well as by us. Three samples had been reportedly collected by the police at three different spots within the licensed premises based on which forensic evidence has been collected from Kaliswari College.

KK

**Table no. 6 : Sample I:(DIL Single shot) Manufacturer: Sri Mariammal Fireworks**

Sl No	Components	Report
a	White pellets	1. Barium Nitrate 29.678 to 30.20% 2. No Lead
b	Black pellets	1. No Barium Nitrate 2. No Lead salts
c	White pellets	1. Barium Nitrate 2. No Lead salts

**Table no. 7 : Sample 2 details**

a	Black pellets	1. No Barium Nitrate. 2. No Lead salts
b	White ball inside plastic ball	1. Barium Nitrate present in the range 20.426 to 20.526% 2. No Lead salts
c	White powder	1. No Barium salts. 2. No Lead salts.

**Sample 3:** Black colour pellets - Manufacturer: Mariammal Fireworks

Analysis:

1. Sample contains potassium nitrate, sulphur, carbon and dextrin.
2. Barium and Lead salts are absent.

The samples were also tested by us using various sophisticated analytical techniques available at IIT-M including Energy Dispersive X-Ray Analysis, Inductively Coupled Plasma spectroscopy analysis, and Differential Scanning Calorimetry Analysis specially for the presence of banned

substance potassium chlorate. The battery of tests did not establish the presence of potassium chlorate, a banned substance (as per the notification of the government of India dated 27<sup>th</sup> Jan 1992 and decisions of the Supreme Court) suspected as could have been used.

7. These are not one-off incidents. There have been recurrent accidents over a period of time. Even after the accident that the report draws upon, there were subsequent event on 25.2.2021 at 4.25 pm at another site at M/s Thangaraj Pandian Fireworks at Kalayarkurichi (v) Pudhupatti PS, where they were both human casualties (4 dead and 20 injured) and property damage.
8. Each one of the transgressions could not have happened over night. Deployment of persons more than authorised, the manner of stocking the manufactured goods, the places where they were operating have all contributed to place being rendered exceedingly susceptible to accident.
9. The causes for the blast could be summarized as under:
  - i. Sublease of the premises by the licensee.
  - ii. Deployment of more personnel at the site than numbers authorised.
  - iii. Friction/impact caused by mishandling of fireworks composition.
  - iv. Flouting of safety norms by carrying out, mixing chemicals used for fireworks outside the sheds and in open spaces.
  - v. Lack of constant vigil at the place by inspection by the Inspector of Factories and the representatives of Controller of Explosives.\*
  - vi. Stocking of fireworks in a manner that should not have been done.
  - vii. Lack of observance of appropriate attire of safety to prevent catching of fire.
  - viii. Drying of colour pellets under direct sunlight instead of drying under shadow.
  - ix. Handling sensitive pyrotechnic composition susceptible for impact and friction in a casual /unsafe manner.

- x. Auto decomposition of colour pellets resulting in generation of heat and fire.
- xi. Complete ignorance /non- compliance of Explosives Rules,2008, Standard Operating Procedures, Safety Circulars/Advisories, employing untrained workers.

\* This is stated by one of us, Dr.Kulkarni, is on account of insufficient manpower. Indeed, no frequency of inspection has been defined under rule 128 of Explosive Rules. To have effective control on approximately 1000 fireworks manufacturing units in Sivakasi and associated fireworks storage shops, the present strength of four officers of the license issuing authority is not sufficient. Also, in the view of one of us, Dr. Kulkarni, the government's ease of doing business has reduced inspection frequency, and lessened the compliance burden that impacts the number of such accidents. Rule 135 of the Explosives Rules provides immunity to officers/ employees of the government or any authority constituted under the Act and rules in respect of anything which is done in good faith in pursuance of the Act and the Rules.

### **VIII. APPLICABLE ENACTMENTS AND RULES RELEVANT FOR INDUSTRIAL SAFETY**

1. Under the Environment (Protection) Act, 1986., which is the umbrella legislation, Union of India has notified two sets of Rules namely- The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (MSIHC).

(i) The Chemical Accidents (Emergency Planning, Response Preparedness and Response) Rules, 1996.

(ii) The MSIHC Rules -further amended in October, 1994 and January, 2000 to widen the scope and provide for stricter controls. The main objectives of the MSIHC rule are to

- To prevent major accidents arising from industrial activities
- Limiting the effects of such accidents

The Rules endeavor to achieve these objectives by having a quantity-based approach. The requirement can be grouped as low level, medium level and high level as shown below:

***Low Level Control:***

- Proof of safe operation
- Reporting major accident
- Preparation of MSDS
- Proper labeling of container
- Information regarding imports

***Medium Level Control***

- Low level control and
- Notification of site
- Preparation of On-site/Off –site Emergency Plan
- Informing public likely to be affected

***High Level Control***

- Medium level control, and
- Safety report
- Safety audit.

2. The low-level requirements are applicable to industrial activities having hazardous chemicals in quantities less than that of the prescribed threshold quantities. These units must show evidence that they have identified major accident hazards and have taken adequate steps to prevent major accidents and to limit the consequences of such accidents.
3. The middle level requirements are applicable to units having hazardous chemicals in quantities equal to or more than the prescribed threshold quantities. These units must notify their sites by submitting a detailed report and obtain approval for the activity. The unit is further required to prepare the On-site Emergency Plan detailing how major accidents at the site will be dealt with.
4. The high-level requirements are applicable to industrial activities having certain hazardous chemicals in quantities more than the prescribed quantity



that is higher than middle level threshold quantity. Such units are required to prepare an elaborate Safety Report and are also required to carry out periodical Safety Audit.

5. The MSIHC rules require the occupier to disclose the necessary information to the public in the neighborhood that is likely to be affected by a major accident at the site.
  - i. The Chemical Accidents (Emergency Planning, Response Preparedness and Response) Rules, 1996 complement the MSIHC Rules and provide much needed statutory backup for Crisis Management setup and organizational support. The Chemical Accidents (EPPR) Rules, 1996 envisage a **Four-tier Crisis Management System** in the country at the Central, State, District and Local levels. The Central Crisis Group is to be headed by the Secretary, Environment & Forests, the State Crisis Group by the Chief Secretary, the District and Local Crisis Groups by the District Collector and Sub-Divisional Magistrate respectively.
  - ii. **Central Crisis Group (CCG)**

The Central Government has constituted a Central Crisis Group (CCG) for management of chemical accidents and has set-up a Crisis Alert System (CAS). The CCG and the CAS are responsible for rendering advice and help during an emergency. The CCG has also been entrusted with the task of continuously monitoring the post-accident situation and to suggest measures for prevention and recurrence of such accidents. In order to be able to respond quickly during an emergency, a small Co-ordination Committee has been constituted.

3. As part of the Rapid Safety Audit for the Major Accident Hazard (MAH) units, compliance with respect to following acts/rules shall also be assessed:
  - o The Manufacture, Storage and import of Hazardous Chemicals Rules, 1989 amended 2000. Schedule-5 of the Rules prescribes the duties and

responsibilities of the authorities concerned with corresponding legal backing.

- The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996
- Public Liability Insurance Act, 1991, amended 1992 and the Public Liability Insurance Rules, 1991, amended 1993.
- Explosive Act, 1884 and Explosive Rules, 1983, Gas Cylinder Rules, 2004 and Static and Mobile Pressure Vessels (Unfired) Rules, 1981.
- The Factories Act, 1948 and The Tamil Nadu Factories Rules 1950.

**IX Violations under Explosives Rules, 2008:**

1. Rule 7
2. Rule 19
3. Rule 26(7)
4. Rule 28
5. Conditions 26 and 35
6. Violations of SOPs (issued from time to time by Licensing Authority).

**X. STATUS OF ONSITE AND OFF-SITE EMERGENCY PLAN MOCK DRILLS AND SAFETY SoPs:**

***Onsite status:***

- a. Various training programmes were reported to have been arranged for certified foremen/ supervisors/ managers by PESO, Sivakasi from time to time.
- b. Directorate of Industrial Safety and Health(Govt. of TN) has established a dedicated Training Centre at Sivakasi to impart training for various levels of stakeholders of the industry.

KK

- c. Mobile Team under the aegis of Additional Director of Industrial Safety and Health, Virudhunagar is available for making surprise and routine inspections of factories in Virudhunagar District.
- d. No illustrative posters for observing safety at the site or even in another factory premises that the committee visited, though posters were exhibited to the committee at the time of meeting with public officials.
- e. Instructions of safety at the site are too long and scripted in small letters.
- f. Absence of personal supervisions by the foreman.

*Offsite status:*

**A. Six important stages of fireworks manufacture**

- 1. Storing & weighing of chemicals
- 2. Mixing of Chemicals
- 3. Filling of Chemicals
- 4. Manufacturing of firecrackers
- 5. Packing of finished crackers
- 6. Moving & storing in the Magazine

**1. Storing & weighing of chemicals:**

- i. Raw Materials shall be stored separately and shall be weighed using weighing scale exclusively provided for each raw material.
- ii. Weighing scale and measuring weights shall be made of Non-Ferrous materials.
- iii. Only the trained and assigned persons shall be allowed in the ingredient shed for weighing the chemicals.

**2. Mixing of chemicals:**

- i. All the raw materials shall be carried to Mixing room separately in non-ferrous containers exclusively used for the purpose.

- ii. Chemicals required only for half-an-hour manufacturing shall be mixed.
- iii. Before entering the Mixing and filling rooms, all workers shall discharge the static electricity in the copper plated provided for that purpose.

### **3. Filling of Chemicals**

- i. Before filling the pellets, it shall be ensured that the pellets are dried properly and shall be free from any dirt or grit.

### **4. Manufacturing of firecrackers:**

- i. The tip composition for *chakra* shall be mixed only for half an hour requirement and work shall be completed within the time. Worker shall not be allowed to go out of the working shed before completion.
- ii. The manufactured products shall be exclusively dried in the drying platform.
- iii. Cutting of fuses shall be done only by experienced workers under proper supervision.
- iv. Every day, the collected waste shall be safely transported and disposed by a trained worker by using the burning pit after the working hours of the factory under the supervision of the foreman.
- v. Pellets shall be manufactured only in the manufacturing shed. It shall be dried under the roofed drying shed and shall not be dried in other open places in between the working sheds.
- vi. Aluminum powder shall not be used for making colour pellets.

### **5. Packing of finished crackers:**

- i. Finished crackers shall be packed in paper boxes and arranged in the boxes in such a way that the crackers shall not be dislocated during transportation.
- ii. The carton boxes shall not be dragged in the floor & it shall be handled gently to avoid friction.

### **6. Moving & storing in the Magazine:**

- i. The magazine shall be fitted with lightning arrester and the carton boxes containing finished crackers shall be placed in safe manner.

- ii. Packing and storing of semi-finished products shall not be carried out inside the magazine.

**B. General safety guidelines**

1. All workers should wear cotton dresses before entering the factory.
2. Electronic devices like mobile phones, radio shall not be carried inside the premises where fireworks are manufactured, handled, stored or used.
3. Workers who are under the influence of intoxicants shall not be allowed inside the factory.
4. Automotive equipped with engines or motors which are capable of generating spark shall not be allowed inside the factory premises.
5. All the safety provisions under Schedule XXIV of Rules 95 of Tamil Nadu Factories Rules 1950 shall be strictly followed.

**C. Directions by Hon'ble National Green Tribunal – Status of Onsite and Offsite Action taken to bring the fireworks factory under hazardous process Industry**

1. In 2006, Home Department, Government of Tamil Nadu has suggested the feasibility of either transferring the Fireworks from the “Dangerous Operations” category to “Hazardous Process” category or providing two different categories within the dangerous operation category for bigger and smaller firework factories.
2. The Director of Industrial Safety and Health, then Chief Inspector of Factories, sent proposal to Government to bring the fireworks factories under the first schedule of the Factories Act, 1948 so that the specific provisions, relating to hazardous process under Chapter IV A could be made applicable. The compulsory disclosure of information by the occupier (Section 41B), specific responsibility of the occupier in relation to hazardous processes (Section 41C), permissible limits of exposure of Chemicals and toxic substances (Section 41F), workers participation in Safety Management (Section 41G), right of workers to

warn about imminent danger (Section 41H) would automatically apply to Fireworks Factories if covered under the first Schedule.

3. Government considered the proposal and issued amendments in G.O. (Ms) No.271, Labour and Employment (M2) Department Dated.23.12.2010.
4. But the Tamil Nadu Fireworks and Amorce Manufacturers' Association (TANFAMA) filed a writ petition in the Hon'ble High Court of Madras against the impugned G.O. and obtained an interim stay for its operation. The counter affidavit has been filed on 30.11.2011 and case is pending till date.
5. The preparation of onsite emergency plan and offsite emergency plan are mandatory for the factories covered under the hazardous process. Since the stay granted by the court is still in operation, the provision of hazardous process industries could not be applied to fireworks industries. Hence, the orders issued by Hon'ble National Green Tribunal could not be implemented in fireworks factories since the above factories could not be covered under first Schedule of Factories Act, 1948 as explained above.

#### **XI. EXTENT OF DAMAGE TO LIFE, HUMAN AND NON HUMAN, PUBLIC HEALTH ENVIRONMENT, INCLUDING WATER, SOIL, AIR**

##### **a. Damage to Life, Human and Non-Human:**

- i. Up to 30.3.2021, 27 persons have died of whom 11 were males and 16 were females. Persons injured as on 30.3.2021 are 26 of whom 14 are males and 12 are females.
- ii. 14 sheds were completely razed to the ground and 25 sheds were partially damaged.
- iii. Vehicles damaged.
  1. Tata 407 bearing registration No. TN22CS 5857
  2. TN38AM2036
  3. TN67BD4893 Gasto

KK



**List of Persons dead:**

**Table No. 8 : Date wise details of dead people**

S/No	Date of Death	Male	Female	No of Persons
1	12.02.2021	7	11	18
2	13.02.2021	1	0	1
3	14.02.2021	1	0	1
4	19.02.2021	0	1	1
5	24.02.2021	0	1	1
6	25.02.2021	1	0	1
7	03.03.2021	0	1	1
8	08.03.2021	1	0	1
9	16.03.2021	0	1	1
10	30.03.2021	0	1	1
<b>Total</b>		<b>11</b>	<b>16</b>	<b>27</b>

**Table no. 9 : Details of Dead people**

Sl. No	Name of the deceased person	Age	sex	Marital status	Worker/supervisor/foreman
1	Selvi Santhiya.D/o Gunaseelan	20	F	unmarried	worker
2	Tmt. Karpagavalli, W/o Rajasekar	22	F	Married	Worker
3	Tmt. Nesamani W/o Devasirvatham (Late)	32	F	Married	Worker
4	Tmt Thangalakshmi W/o Krishnakumar	46	F	Married	Worker
5	Tmt. Panjavarnam W/o Marimuthu	55	F	Married	Worker
6	Thiru Bakiyaraj S/o Veyilmuthu	45	M	Married	Worker
7	Tmt. Selvi W/o Bakiyaraj	40	F	Married	Worker
8	Tmt. Dhanalaxmi W/o Perumal	45	F	Married	Worker
9	Tmt. Usha W/o Muniyasamy	35	F	Married	Worker
10	Thiru Ravichandran S/o Krishnasamy	58	M	Married	Worker

11	Thiru Chinnathampi S/o Rajendran	36	M	Unmarried	Worker
12	Thiru Rengaraj S/o Muniyandi	57	M	Married	Worker
13	Thiru Kannan S/o Rajarathnam	48	M	Married	Worker
14	Thiru Sankaranarayanan S/o Mariappan	60	M	Married	Worker
15	Thiru Karuppasamy S/o Perumal	58	M	Married	Worker
16	Tmt. Sankareswari , W/o Shanmugavel	75	F	Married	Worker
17	Tmt.Mallika W/o Ponnusamy	60	F	Married	Worker
18	Tmt. Poomari W/o Marikannan	54	F	Married	Worker
19	Thiru Gopal S/o Muniyasamy	30	M	Married	Worker
20	Thiru Vanaraj S/o Jeyaraj	51	M	Married	Worker
21	Tmt. Vaijeyanthi Mala W/o Pechimuthi	35	F	Married	Worker
22	Tmt. Jeya S/o Paulraj	30	F	Married	Worker
23	Thiru Kaliappan S/o Karuppasamy	30	M	Married	Worker
24	Tmt Rajammal W/o Sundra Gurusamy	54	F	Married	Worker
25	Thiru Micheal Raj S/o Yesaiah	40	M	Married	Worker
26	Tmt. Santhanamari W/o Karuppasamy	36	F	Married	Worker
27	Tmt. Veerlakshmi	40	F	Married	Worker

**Table no. 10 : List of Persons injured**

S/N	Name and Address	Sex	Age	Injury Percentage
1	Tmt.Pushpam W/o.Thangasamy,Nadusoorankudi, Sattur Taluk.	Female	60/2021	40%
2	Thiru.Muthupandi S/o.Kaliappan, Soorankudi, Sattur Taluk.	Male	-	70%
3	Tmt.Sanmugavadivu W/o.Uthrakumar	Female	55/2021	40%

	Nadusoorankudi,Sattur Taluk.			
4	Thiru.Devasahayam S/o Vethakani Anbinagaram	Male	21/2021	40%
5	Tmt.Sankareshwari W/o.Kandasamy Elayirampennai, Vembakottai Taluk.	Female	60/2021	10%
6	Tmt.Mery,W/o.Rajasekar,Nadusoorankudi, Sattur Taluk.	Female	-	40%
7	Tmt.Balasubhu W/o.Veyilmuthu Nadusoorankudi,Sattur Taluk.	Female	47/2021	40%
8	Thiru.Muthukutti S/o.Kannan,Nadusoorankudi, Sattur Taluk.	Male	19/2021	40%
9	Thiru.Veyilmuthu S/o.Madasamy Nadusoorankudi,Sattur Taluk.	Male	60/2021	40%
10	Tmt.Malayammal W/o.Nagaraj,Sattur	Female	46/2021	40%
11	Selvi.Saktheeswari D/o.sundarraj Nadusoorankudi,Sattur Taluk.(Child accompanied with mother)	Female	9/2021	Head Injury 20%
12	Tmt.Vasantha,W/o.Nadarajan Nadusoorankudi, Sattur Taluk.	Female	45/2021	40%
13	Thiru.Brucelli,S/o.Innisayar Ameerpalayam, Sattur Taluk	Male	21/2021	40%
14	Thiru.Karuppasamy S/o.Ponnusamy Padandal, Sattur Taluk.	Male	25/2021	40%
15	Thiru.Bhaskar S/o.Thangaiah Sattur	Male	60/2021	60%
16	Thiru.Kaliraj,S/o.Gurusamy Sri Rengapuram	Male	38/2021	40%
17	Tmt.Yesu Backiam, W/o Thangamani Anbinagaram, Vembakottai Taluk.	Female		
18	Thiru.AnthonyRaj, S/o Rajendran, Anbinagaram, Vembakottai Taluk.	Male		
19	Tmt.SoosaiRathinam, W/o Backiyaraj, Nadusoorangudi,Sattur Taluk	Female		
20	Tmt.Jeyarani W/o.Anthonycroos Kollapatti,Sattur Taluk	Female	28/2021	40%
21	Thiru.Suburaj,S/o.Raj Nadusoorankudi,Sattur Taluk.	Male	34/2021	40%
22	Thiru.Karuppasamy S/o.Murugan Kansapuram,Watrap Taluk	Male	25/2021	40%
23	Tmt.Karthika W/o Muthuraj, Nadusoorangudi,Sattur Taluk	Female	-	Minor Injury

24	Thiru.Muthuraj S/o Veyilmuthu Nadusoorangudi, Sattur Taluk	Male	-	Minor Injury
25	Thiru.Manikandan S/o.Ganesan Thayilpatti,Sivakasi Taluk	Male	37/2021	Minor Injury
26	Thiru.Chinnaraj S/o.Veyilmuthu Nadusoorankudi,Sattur Taluk.	Male	29/2021	Minor Injury

**b. Damage to Public Health, Environment including Water, Soil, Air**

1. As per the information from Tamil Nadu Pollution Control Board, M/s Sree Mariammal Fire Works has not obtained the Consent to Operate under the Water Act 1974 and the Air Act 1981. It is also informed that water is being used for mixing of soil and no water used in other process of fireworks, hence no wastewater is being generated.
2. The Fire work factory is located more than 1 km from the human habitation. During fire accident, explosion of finished and unfinished crackers contributes to smoke. The smoke throws up the particulate matter (PM<sub>10</sub> & PM<sub>2.5</sub>), SO<sub>2</sub> and NO<sub>x</sub> to atmosphere. The accident was non-premeditated and spontaneous in nature. Quantification of emissions due to explosion was not made due to absence of the monitoring system (Ambient Air Quality stations) in the nearby area and also no incidents of effect on public health reported in the offsite/surrounding area, hence no assessment of monetary damages for environmental degradation is attracted.
3. It is also informed that, during explosion, no water was used for dousing the fire. During field visit of committee, we noticed the building debris, viz broken bricks, cement mortar in the accident site. We also observed no water bodies in the area and no sign of soil pollution. Hence committee felt that no requirement of assessing the cost towards the environment.

## **XII. STEPS TO BE TAKEN FOR COMPENSATION OF VICTIMS**

### ***a. State assistance***

1. Compensation is reported to have been so far provided at Rs. 3,00,000 to 16 cases of death and Rs. 1,00,000 for one injured, both under CM Fund.
2. The injured persons have a range of injury of burns from 20% to 75%. Some have also been discharged as outpatients.
3. Some injured have taken at Rajaji Government Hospital at Madurai, some people at Grace Kennet hospital at Madurai, some more were taken at Senthil Hospital & Dhanuskodi hospital at Sattur and some at Government hospital at Thoothukudi.

### ***b. Norms for compensation***

1. The compensation that is payable for victims of the tragedy could never be arbitrary. The need to compensate or right to secure compensation could themselves be not a matter of debate at all. Only the scale of compensation and the persons who would become liable to pay the compensation will require to be appraised.
2. There are several compensation regimes for deaths and injuries and different enactments which are dis-similar and grossly variant. The Workmen Compensation Act, which is surely applicable, provides compensation that will have scales of compensation determined on the age and the income of the workman. The liability shall be on the principal employer. Here the problem is that the licensee has sub-leased the premises to three different persons whom we have named above but have not gathered statements from any one of them since they appear to be in judicial custody after arrest, pending investigation into criminal offences instituted against them.

KK

3. The Public Liability Insurance Act casts an absolute liability, caps the entitlement to a paltry sum of Rs.50,000/- for death and Rs.25,000/- for grievous injury. It cannot be efficacious to look for relief under the said Act.
4. The scales of compensation under different enactments for transport accidents as in Carriage by Air Act, Railways & Motor Vehicles Act are different. In the first three enactments set out, there is absolute liability and the compensation ranges between Rs.8 lakhs and Rs.15 lakhs. The Motor Vehicles Act contemplates three regimes: absolute liability under Section 140, prescribing Rs.2 lakhs for death, Rs.50,000/- for grievous injuries and compensation up to Rs.800,000/- under a structured formula of strict liability norm under Section 163A. Just compensation under Section 166 is what is most scientific and driven essentially through two decisions in *Sarla Varma Vs. DTC* – (2009) 6 SCC 121 and as modified by *National Insurance Company Vs. Pranay Sethi* – (2017) 16 SCC 680. The compensation is determined based on a multiplier formula which will be applied against the multiplicand that is quantified as the likely contribution to the family by the deceased victim. The conventional heads of claims, such as, loss to estate, loss of love and affection, loss of consortium towards spouse, funeral expenses are all added. In the amendment contemplated by Amendment Act 32 of 2019, the minimum threshold amount that will become payable shall be not less than Rs.5 lakhs for fatal accident and Rs.2 lakhs for grievous injuries.
5. In traumatic accidents such as bomb blasts or fire accidents due to electrocution or terrorist activities, public law remedies have been resorted to, where the compensation shall not always be made to depend on the age of the victims and the number of dependents. They are invariably fixed sums within the broad age brackets, such as persons less than 20 years of age and above the said age limit. In *MCD Vs. Uphaar Tragedy Victims Association* – (2011) 14 SCC at page 481 – the compensation was fixed at Rs.10 lakhs in the case of those aged more than 20 years and Rs.7.5 lakhs to those aged less than 20 years and compensation of

Re.1 lakh was awarded to each of the injured victims. The amount carried interest at 9%.

6. In *Dabwali Fire Tragedy Victims Vs. Union of India & Others*, a Division Bench of the P & H High Court provided compensation by examining the recommendations of the One-man Commission that elicited details about the age of the victims, the number of dependents of each of them, the income of the deceased persons, in amounts ranging between Rs.1 lakh and Rs.15 lakhs. The decision of the Division Bench passed in CWP 13214 of 1996 through its decision on 09.11.2009, was confirmed by the decision of the Supreme Court in – (2013) 10 SCC at page 494. In *Sanjay Gupta v State of UP* (2015)5 SCC 283, the Supreme Court was dealing with an incident of devastating fire that broke out in a Consumer Show held at Victoria Park, Meerut. It was organised by a private company through contractors engaged by them after seeking permission from the State Government. It resulted in death of 64 persons and grievous injuries to several others. The Commission of Enquiry found the State and its authorities to be *prima facie* responsible for statutory violations while granting permission and during the show. No doubt, in this case there was no violation of any law in the grant of licence, but there had been a lack of care to see that the premises had been used only by the persons who held the licence.
7. In *Sanjay Gupta (Supra)* the Supreme Court had taken note of the compensation awarded in Uphaar Tragedy Victims Association case, decided in 2011 as well as Dabwali fire tragedy case, decided in 2013. They observed that the State Government should see that the victims did not remain in a constant state of suffering and despair and interim compensation of Rs.30 lakhs was directed to be paid, which subsequently through a direction issued in the same case and reported in (2018) SCC 634, to be distributed on pro-rata basis through the Jurisdictional District Judge.
8. There have been other earlier decisions of the Supreme Court when fixed sums have been awarded through public law remedy. In what was referred as boat

tragedy case dealing with deaths of children due to boat capsizing in *MS Grewal Vs. Deep Chand Sood* (2001) 8 SCC 151, the court awarded compensation at the rate of Rs 5 lakhs for each child and on the recommendations of former Chief Justice Chandrachud's report in *Lata Wadhwa Vs. State of Bihar* in (2001) 8 SCC at page 187 – the compensation ranged between Rs.2 lakhs per child and an amount upto Rs.5 lakhs per adult. To persons who had burn injuries to the extent of 10% or below, the Supreme Court awarded, in modification of the Chief Justice's Report, a minimum amount of Rs.2 lakhs.

9. In all the cases before us, we do not have data of the number of dependents for the deceased persons. In respect of injuries, a few have been treated as outpatients and immediately discharged while some persons are still undergoing treatment. The percentage of burns have varied from 5% to 75%. Unfortunately, among the injured victims, there have been casualties during the treatment, for on as late as 05.04.2021, the tally of dead was 27. In this accident, there is no report of any child as having been injured or dead. We confronted only a few persons who are injured and who are less than 18 years of age. We do not think it would be proper for us to assess compensation for everyone by eliciting the age, income, etc. It will be appropriate to take the examples of lumpsum amounts awarded through public law remedies and allow for independent rights to be pursued by any victim through statutory forums prescribed under the Workmen Compensation Act, if so advised. The Workmen Compensation Act itself does not recognise any payment other than through the Commissioner and any compensation that we will recommend could be directed to be paid to the party under notice to the Workmen Compensation Commissioner so that they are not treated as amounts awarded by 'contracting out'. In the decisions which we have referred, the ex-gratia payment made by the government will not be required to be deducted. On the other hand, we believe that the State Government shall take responsibility for 10% of liability for lack of effective supervision through Inspector of Factories and 10% on the



Central Government for their failure to implement the safety laws. Rest of the 80% shall be levied on the licensee and his lessees jointly and severally and the 10% each as we have fixed on the Central and State Governments shall be several. One of us, (Kulkarni) is of the view that on account of the quoted provision of immunity, the payment by the State and the Centre shall be by way of contribution *in gratis* rather than responsibility by default. Further, as per rule 2(37) of the aforesaid rules, the occupier who has the control and who is responsible for managing the affairs of premises is solely responsible for the accident for the violations of rules and conditions of the licence.

10. Taking note of the fact that in the Uphaar tragedy victims case the maximum compensation was Rs.10 lakhs, but it related to an incident that took place in 1997, almost 25 years back, we will double the compensation for death at Rs.20 lakhs per family of each of the deceased victims and Rs.15 lakhs to persons who have burns in excess of 50% and Rs.10 lakhs for persons who have burns from 25 to 50% and Rs.5 lakhs for persons who have injuries between 5 to 25%. Victims who were treated as outpatients and who had but minor degree of burns or other forms of simple injuries shall be paid Rs.2 lakhs. The amounts shall be directed to be paid within the time the Tribunal may set and direct a further liability of interest at 12% p.a. for default of payment. The compensation is not merely a financial reparation for the loss of lives and injuries that have restitutive attributes but also designed to be punitive for the criminal negligence in carrying out hazardous activities in brazen violation of several laws that we have outlined above. The compensation amounts must necessarily therefore, be higher than what could occasion in a straightforward case of granting compensation as a welfare measure such as under the Workmen's (Employees') Compensation Act.
11. The amounts on the same scales could be made also to victims of accidents in the same district just before and after our visit.

KK

### XIII. REMEDIAL MEASURES TO PREVENT ACCIDENTS

Sl No	Activity	At whose instance
1	Video clips of safety through WhatsApp and mobile devices apart from periodical workshops imparting norms of safety to be circulated to all employees	Central Government – Explosives experts State government – Industrial safety
2.	Strict vigilance to ensure conformity as regards working only in sheds and not in open spaces	PESO and District Revenue Authority
3.	Drone surveillance of various sheds	PESO and District Revenue Authority
4.	Submit the compliance of the occupier once in a six months or quarterly basis and mandated to be uploaded on the public domain on the website of the respective regulatory agency.	Manufacturer/ Licensee
5.	Permanent closure of sheds which have in the past been found guilty of breaches.	Licensing authority
6.	Punitive fines of not less than Rs. 50 lacs for instances of violations of conditions of license such as grant of lease, sublease, employment of more personnel than authorised, use of banned chemicals etc.	Licensing authority
7	Public liability insurance for all factories to be made obligatory.	Collector
8.	Group insurance providing for higher compensation of not less than Rs.5,00,000 than the limit hitherto observed for Rs. 50,000.	Licensing authority
9.	Existing manpower of the various regulatory authorities to be strengthened in	Central government State Government

	order to have periodical post clearance monitoring and ensure better compliance.	
10.	Defaulting industries need to be immediately inventoried and regulated within a time frame	Revenue Division of the Collectorate
11.	Firecrackers' manufacturing and bulk storage facilities under the ambit of Consent Management within specified time frame as mandated	Tamil Nadu Pollution Control Board
12.	Occupational Health surveillance i.e., periodical health check-up of the employees	Directorate of Industrial Safety and Health
13.	Fire-fighting facilities such as dry powder extinguisher, soda ash, limestone etc. are in place to handle the accident in the Fireworks Industry / metal-based fire accident	State Fire Services
14.	Provision for appropriate clothing, gloves, and footwear	Licensee
15.	Increased automation that avoids physical handling of dangerous chemicals and substances	Industrial entrepreneurs/ Dept of Industries & Commerce
16.	Through CSR funds of the industries located in the district, more focus should be given to the development of education to the local communities and their upliftment.	Licensing authorities for MSMEs & Factories Ministry of Commerce/ Company Affairs
17.	Crisis Management System and Co-ordination Committee constituted shall meet periodically and review effective monitoring mechanism and suggest measures for prevention and recurrence of such accidents.	Central Government, State Government and District Collector
18.	As per section 9B of Explosive Act 1884 punishment for certain offences given is very moderate. The same requires legislative review for greater stringency.	Legislature

19.	Since the unit in which the accident occurred is no more in a state to take manufacturing activity, the licence granted by PESO, NOC granted by District Authorities, Arms Act license for sulphur, factories Act license shall be cancelled.	The respective licensing authorities
20.	The workers who are engaged in most hazardous operations viz. mixing, filling of chemicals, colour pellets making shall be certified after training and those alone shall be employed. The unit shall not functional unless these workers are certified.	Licensees/ employers
21.	To monitor the ambient air quality in all clusters of firework factories, minimum of two Continuous Ambient Air Quality Stations shall be installed, through which impact on environment due to incidental explosion can be quantified.	Tamil Nadu Pollution control Board



**Justice K. Kannan**  
**Chairman of the Committee**

Former Judge of Punjab & Haryana and Madras High Courts



**Dr. M. T. Karuppiah**  
Sc. E, Regional Office  
MOEF &CC, Chennai



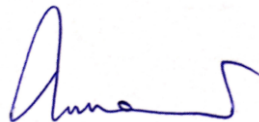
**Smt. H.D. Varalaxmi**  
Regional Director & Sc. E  
CPCB, Chennai



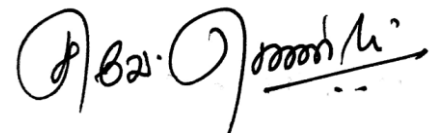
**Sri. R. Mangala  
Ramasubramanian, DRO**  
State Disaster Management  
Authority, Virudhunagar



**Prof. Rajagopalan**  
Dept. of Chemical Engg.  
IIT - Madras



**Shri. S.M. Kulkarni**  
Dy. Chief Controller of  
Explosives, Hyderabad



**Shri. M.V. Senthikumar**  
Director of Industrial Safety and  
Health (FAC)  
Chennai

Item No. 06

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 44/2021

In re: News item published in The News Indian Express dated 12.02.2021 titled **“At least 19 dead in Virudhunagar firecracker factory blast, more than 30 injured”**

Date of hearing: 16.02.2021

**CORAM: HON’BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON  
HON’BLE MR. JUSTICE SHEO KUMAR SINGH, JUDICIAL MEMBER  
HON’BLE DR. NAGIN NANDA, EXPERT MEMBER**

**ORDER**

1. Proceedings in the matter have been initiated on the basis of media report published in ‘The New Indian Express’ dated 12.02.2021 titled **“At least 19 dead in Virudhunagar firecracker factory blast, more than 30 injured”**<sup>1</sup> to the effect that in the process of filling of crackers with chemical 19 persons died and 30 persons (11 are women) critically injured in Nagpur-licensed **Sree Mariyammal Fireworks-factory at Achankulam Village** in Virudhunagar District **at 01:30 pm on 12.02.2021**. Some were taken to the Sattur Government hospital and some to Kovilpatti and Sivakasi Government Hospitals. Compensation of Rs. 2 lakhs to the family of those killed and Rs. 50,000/- to the family of those critically injured has been announced from the Prime Minister National Relief Fund and a sum of Rs. 3 lakhs to the families of those dead and Rs. 1 lakh to the families of those critically injured has been announced out of the Chief Minister’s Relief Fund.

---

<sup>1</sup><https://www.newindianexpress.com/states/tamil-nadu/2021/feb/12/at-least-18dead-in-virudhunagar-firecracker-factory-blast-more-than-30injured-2263148.html>

2. Above information gives rise to a substantial question of environment relating to compliance of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 (“the 1989 Rules”) and Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 (The 1996 Rules), which have been framed under the Environment (Protection) Act, 1986 (EP Act), falling in schedule to the NGT Act, 2010.

3. It is thus necessary to determine the above question and if necessary, award relief under Section 15 of the NGT Act to the victims and for restoration of the environment after determining the liability of the persons engaged in such activity as well as role of the statutory regulators in failing to prevent the same. Further question is preventive measures to avoid recurrence of such incidents in future in such activities.

4. Accordingly, we issue notice to the State of Tamil Nadu, Central Pollution Control Board (CPCB), State Pollution Control Board (State PCB), District Magistrate, Virudhunagar and Sree Mariyammal Fireworks-factory. Notice may be served by e-mail and response, if any be filed before the next date by e-mail at [judicial-ngt@gov.in](mailto:judicial-ngt@gov.in) preferably in the form of searchable PDF/OCR Support PDF and not in the form of Image PDF.

5. To secure credible facts, we constitute following eight-member Committee:

- (i) Justice K. Kannan - Former Judge of Punjab & Haryana, and Madras High Courts, presently at Chennai - Chairman
- (ii) Representative of MoEF&CC – Member
- (iii) Representative of CPCB – Member
- (iv) Representative of State Disaster Management Authority - Member

- (v) Head of the Chemical Engineering Department of the IIT Chennai - Member
- (vi) Nominee of Chief Control of Explosives, Nagpur - Member
- (vii) Nominee of Petroleum and Explosives Safety Organization (PESO), Delhi – Member
- (viii) Chief Inspector of Factories, Tamil Nadu - Member

The District magistrate, Virudhunagar and Regional Office, State PCB may provide logistic support to the Committee to enable their fact-finding and reporting. State PCB will bear the initial cost of functioning of the Committee, including the honorarium to the non-official members to be determined in consultation with them. The Committee will be at liberty to take assistance of such experts, individuals and institutions as may be considered necessary. The State PCB and the CPCB will jointly act as nodal agency for coordination and compliance.

6. The Committee (or such members as the Chairman may decide depending on availability) may visit the site preferably within one week and give its report within one month by e-mail at [judicial-ngt@gov.in](mailto:judicial-ngt@gov.in) preferably in the form of searchable PDF/OCR Support PDF and not in the form of Image PDF. The Committee may specifically report:

- a. The sequence of events;
- b. Causes of failure and persons and authorities responsible therefor;
- c. Status of onsite and offsite plans, mock drills and safety SoPs;
- d. Extent of damage to life, human and non-human; public health; and environment – including, water, soil, air;
- e. Steps to be taken for compensation of victims and restitution of the damaged property and environment, and the cost involved;
- f. Remedial measures to prevent recurrence;

g. Any other incidental or allied issues found relevant.

7. Except for visit to the site at least once, the Committee will be free to conduct its proceedings online. It will be free to take the assistance from any other expert/organization. The Committee may suitably interact with the stakeholders and, apart from considering the present incident, also consider remedial measures for preventing such incident in the area or by other establishments even beyond the said area. The Committee may compile information about existence and working of onsite and offsite plans in terms of 1989 Rules and conducting of mock drills and safety SOPs., number of such units in the area and the carrying capacity of the area to sustain the same, whether siting criteria for such establishments needs to be reviewed having regard to the habitation or other establishments in the vicinity.

8. Since in the recent past, the Tribunal has dealt with similar issues of industrial accidents resulting in deaths and injuries<sup>2</sup> and Expert

---

<sup>2</sup>

- i. Order dated 01.06.2020, relating to incident of gas leak dated 07.05.2020 in **LG Polymers India Pvt. Limited** at Vishakhapatnam, resulting in death of 11 persons and injuries to more than 100, apart from other damage (OA No. 73/2020, In re: Gas Leak at LG Polymers Chemical Plant in RR Venkatapuram Village Visakhapatnam in Andhra Pradesh);
- ii. Order dated 03.02.2021, relating to incident dated 03.06.2020 in a chemical factory, **Yashyashvi Rasayan Pvt. Ltd.** at Dahej, District Bharuch, Gujarat resulting in deaths and injuries and other damage (OA No. 85/2020) (Earlier OA 22/2020) (WZ), Aryavart Foundation through its President vs. Yashyashvi Rasayan Pvt. Ltd. & Anr.);
- iii. Order dated 06.08.2020, in relation to incident of **oil well blow out on 27.05.2020 at Baghjan in the Tinsukia District of Assam** resulting in deaths, injuries and damage to the environment (OA No. 43/2020(EZ), Bonani Kakkar vs. Oil India Limited & Ors.).
- iv. Orders dated 06.07.2020 and 22.12.2020, relating to incident dated 30.06.2020 on account of gas leakage at **Sainor Life Sciences** factory at Parawada in industrial area on the outskirts of Vishakhapatnam (OA No. 106/2020, News item published in the local daily "Economic Times" dated 30.06.2020 titled "Another Gas Leakage at Vizag Factory kills two, critically injures four...");
- v. Orders dated 08.07.2020 and 22.12.2020, dealing with the incident dated 01.07.2020 resulting in death of 6 person and injury to 17 due to blast of boiler in **M/s Neyveli Thermal Power Station** (NLCIL), Cuddalore (OA No. 108/2020, News item published in the "Indian Express" dated 01.07.2020 titled "Tamil Nadu Neyveli boiler blast: 6 dead, 17 injured") and;
- vi. Orders dated 23.07.2020 and 22.12.2020, in relation to incident of **fire engulfed the chemical plant of Visakha Solvents Ltd**, Vizag on 13.07.2020 at Ramky CETP Solvents building in Pharma City resulting in injuries (OA No. 134/2020, News item published on 13.07.2020 in the local daily named "India Today" titled "Massive fire engulf Vizag chemical plant, explosions heard, injuries reported").



Committees in some of such accidents have given reports to this Tribunal, such reports may also be taken into account by the Committee to the extent relevant.

List for further consideration on 30.04.2021.

A copy of this order be forwarded to MoEF&CC, CPCB, State of Tamil Nadu, Justice K. Kannan, a former Judge of Punjab & Haryana, and Madras High Courts, the State PCB, the District Magistrate, Virudhunagar, State Disaster Management Authority, IIT Chennai, Chief Control of Explosives, Nagpur, Petroleum and Explosives Safety Organization (PESO), Delhi, Chief Inspector of Factories, Tamil Nadu and Sree Mariyammal Fireworks-factory, by email for compliance.

Adarsh Kumar Goel, CP

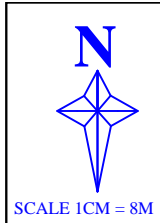
Sheo Kumar Singh, JM

Dr. Nagin Nanda, EM

February 16, 2021  
Original Application No. 44/2021  
DV

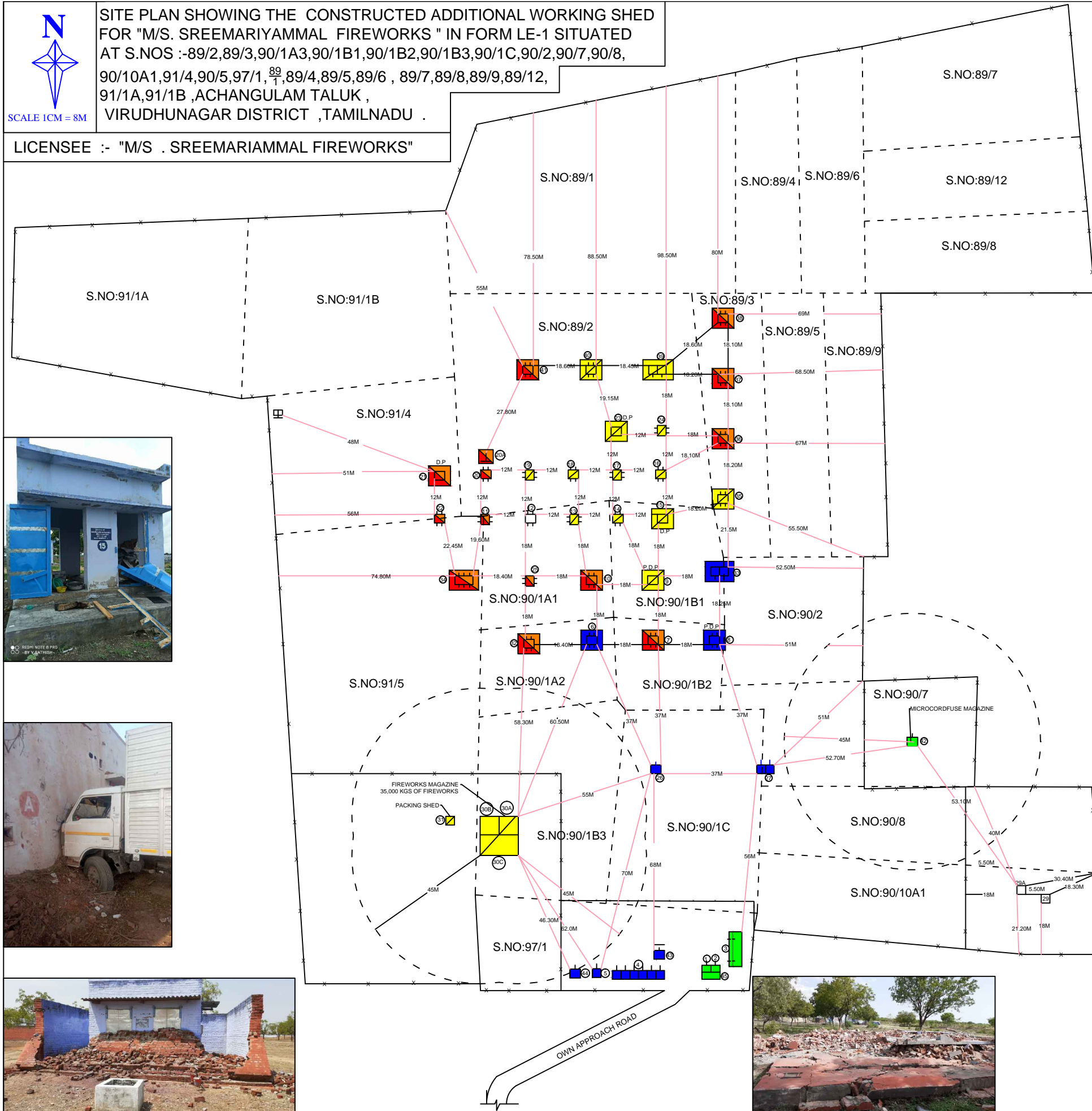
- 
- vii. Order dated **18.12.2020**, in relation to incident of **explosion in a plastic recycling factory at Sujapur in Malda on 1.12.2020** resulting in death of six persons, including two minors and serious injuries to four persons (OA No. 272/2020, News item published in the "Times of India" dated 20.11.2020 entitled "Six killed as blast tears through Malda Plastic recycling factory").
- viii. Order dated **18.12.2020**, in relation to incident of **methane gas leak in a sugar factory** called Lokenete Bapurao Patil Agro Industries Ltd. in Mohol Taluka of Solapur District, Maharashtra on 21.11.2020 resulting in deaths and injuries and other damage (OA No. 274/2020, News item published in the "Indian Express" dated 23.11.2020 entitled "Maharashtra: Two Killed, eight injured in methane gas leak in sugar factory").
- ix. Order dated 08.01.2021, in relation to **Gas Leak in Agro Company** (O.A No. 107/2020, In RE: News item published in the local daily "Indian Express Sunday Express" dated 28.06.2020 titled "Gas Leak in Agro Company Claims life of one")
- x. Order dated 18.01.2021, in relation to News item published in Navbharat Times dated 24.12.2020 titled "**Gas leaks in IFFCO Plant, 2 Officers dead**" (O.A No. 04/2020, In re : News item published in Navbharat Times dated 24.12.2020 titled "Gas leaks in IFFCO Plant, 2 Officers dead")
- xi. Order dated **11.02.2021**, in relation to accident of **toxic gas leak in Rourkela Steel Plant in Orissa**" (O.A. No. 09/2021, In re: News item published in The Indian Express dated 07.01.2021 titled "Four workers dead due to toxic gas leak in Rourkela Steel Plant")

Annexure - II



SITE PLAN SHOWING THE CONSTRUCTED ADDITIONAL WORKING SHED FOR "M/S. SREEMARIYAMMAL FIREWORKS" IN FORM LE-1 SITUATED AT S.NOS :-89/2,89/3,90/1A3,90/1B1,90/1B2,90/1B3,90/1C,90/2,90/7,90/8, 90/10A1,91/4,90/5,97/1, 89/1,89/4,89/5,89/6 , 89/7,89/8,89/9,89/12, 91/1A,91/1B ,ACHANGULAM TALUK , VIRUDHUNAGAR DISTRICT ,TAMILNADU .

LICENSEE :- "M/S . SREEMARIAMMAL FIREWORKS"



S.L NO	DESCRIPTION	NO	DIMENTION	NO OF WORKERS PER SHED	TOTAL NO.OF WORKERS PER SHED	QTY.OF KGS PER SHED	TOTAL QTY.OF KGS
1	OFFICE ROOM	1	3.05 X 3.05	-	-	-	-
2	LABORATORY LABORATORY	1	3.05 X 3.05	-	-	-	-
3	GENERAL STORE ROOM	1	2.20 X 3.05	-	-	-	-
4	INGERDIENT SHED (6 COMP)	1	3.05 X 3.05	-	-	-	-
5	SULPHUR ROOM	1	3.05 X 3.05	-	-	-	-
6	WHITE POWDER MIXING SHED	1	3.66 X 3.05	2	2	5	5
7	GUN POWDER MIXING SHED	1	3.66 X 3.05	2	2	5	5
8,9	PELLETS DRYIND SHED	2	3.66 X 3.05	2	4	25	50
10	PELLETS MAKING SHED	1	3.66 X 3.05	2	2	5	5
11	FUSE OVER PASTING SHED	1	3.66 X 3.05	2	2	2.5	2.5
12	FUSE MAKING SHED	1	3.66 X 3.05	2	2	2.5	2.5
13,16 TO 19,22,24,25	MANUFACTURING & FINISHING SHED	8	3.66 X 3.05	4	32	25	200
14	TWINKLING STAR DIPPING SHED	1	3.66 X 3.05	2	2	5	5
15,21,23	DRYING PLATFORM	3	8.66 X 3.05	4	12	25	75
20	FUSE DIPPING SHED	1	3.66 X 3.05	2	2	2.5	2.5
20A	T SHED FOR FUSE CURING CUTTING SHED	1	3.66 X 3.05	2	2	-	-
26	TRANSIT SHED (FUSE)	1	3.66 X 3.05	2	2	200	200
27	TRANSIT SHED FIREWORKS (2COMP)	1	3.05 X 3.05	2	2	500	500
28	LATRINE	1	1.25 X 0.90	-	-	-	-
29,29 A	WASTE BURNING PIT (EACH -5KGS)	2	3.05 X 3.05	-	-	-	-
30,A,B,C	MAGAZINE (3 COMP) (75,000KGS)	1	-	-	-	-	-
31	PACKING SHED	1	3.05 X 3.05	-	-	-	-
32	PELLETS MAKING SHED	1	3.70 X 3.10	2	2	5	5
33	PELLETS TRANSIT SHED (2 COMP)	1	3.10 X 3.05	2	2	50	50
34	INTERMEDIAT DRYING POLATFORM	1	6.30 X 3.00	4	4	25	25
35,36,41	SHELL LOADING SHED	3	3.70 X 3.10	2	6	5	15
37,38,40	TUBE LOADING SHED	3	3.70 X 3.10	2	6	5	15
39	PELLETS TRANSIT SHED (2 COMP)	1	3.10 X 3.05	-	-	50	50
42	MICRO CORD FUSE MAGAZINE (300KGS)	1	3.75 X 3.10	-	-	-	-
43	ALUMINIUM POWDER ROOM	1	3.60 X 3.00	-	-	-	-
44	CHARCOAL STORE ROOM	1	3.70 X 3.10	-	-	-	-
45	CRECHE SHED	1	6.33 X 4.88	-	-	-	-
TOTAL					88 NOS		1212.5 KGS

S. NO.	SHED NO.	PARTICULARS	DETAILS
1	1	OFFICE ROOM	INTACT
2	2	LABORATORY LABORATORY	
3	3	GENERAL STORE ROOM	
4	42	MICRO CORD FUSE MAGAZINE (300KGS)	
5	45	CRECHE SHED	
1	4	INGERDIENT SHED (6 COMP)	DOORS DAMAGED
2	5	SULPHUR ROOM	
3	6	WHITE POWDER MIXING SHED	
4	8	PELLETS DRYIND SHED	RAZED TO GROUND
5	26	TRANSIT SHED (FUSE)	
6	27	TRANSIT SHED FIREWORKS (2COMP)	
7	33	PELLETS TRANSIT SHED (2 COMP)	
8	43	ALUMINIUM POWDER ROOM	
9	44	CHARCOAL STORE ROOM	
1	7	GUN POWDER MIXING SHED	
2	10,32	PELLETS MAKING SHED	
3	11	FUSE OVER PASTING SHED	
4	20	FUSE DIPPING SHED	
5	20A	T SHED FOR FUSE CURING CUTTING SHED	
6	22,25	MANUFACTURING & FINISHING SHED	
7	21	DRYING PLATFORM	
8	34	INTERMEDIAT DRYING PLATFORM	
9	36,41	SHELL LOADING SHED	
10	37,38	TUBE LOADING SHED	
1	9	PELLETS DRYIND SHED	PARTIALLY DAMAGED
2	13,16, 17,18, 19,24	MANUFACTURING & FINISHING SHED	
3	14	TWINKLING STAR DIPPING SHED	
4	15,23	DRYING PLATFORM	
5	30 A,B,C	MAGAZINE (3 COMP) (75,000KGS)	
6	31	PACKING SHED	
7	35	SHELL LOADING SHED	
8	39	PELLETS TRANSIT SHED (2 COMP)	
9	40	TUBE LOADING SHED	

