

AVON FIRE BRIGADE

INCIDENT REPORT THURSDAY 3 OCTOBER 1996

ALBRIGHT AND WILSON UK LTD AVONMOUTH WORKS SMOKE LANE AVONMOUTH BRISTOL BS11 OYT

INCIDENT REPORT

Albright and Wilson UK Ltd Avonmouth Works Smoke Lane Avonmouth Bristol BS11 OYT

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Thursday 3 October 1996

Time Of Call: 1033 Hours

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Reporting Officer:-

Assistant Divisional Officer 1 'A' Division Headquarters

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AVON FIRE BRIGADE

1 PURPOSE OF REPORT

This report has been prepared for the purpose of examining Avon Fire Brigade's response, actions and procedures at a 'Fire of Special Interest'. It is not intended to identify any act, defect or omission on the part of any company's personnel or any company's procedures that may have contributed to the cause of this fire.

The incident is the subject of a full investigation being conducted by the Chemical and Hazardous Installations Division of the Health and Safety Executive who have the role of enforcement at this site. Consultation has taken place with Fire Brigade Officers with regard to the 'supposed cause' of the fire and, following further investigations, this will be contained in some detail within a report being prepared by the Health and Safety Executive.

2 DETAILS OF THE CALL

(a) Incident Address:

Albright and Wilson UK Ltd Avonmouth Works Smoke Lane Avonmouth Bristol BS11 OYT

Thursday 3 October 1996

1033 Hours

999 from Albright & Wilson

Multiple, in excess of 20

Pump Ladder A3 Avonmouth Pump Ladder A3 Avonmouth Aerial Platform A3 Avonmouth Operational Support Unit A3 Avonmouth Pump A1 Temple 2 x Pump Ladders A1 Temple Pump Ladder A2 Southmead Pump Ladder C5 Bedminster

(b) Date of Incident:

- (c) Time of First Call:
- (d) Method of Call:
- (e) Number of Calls:
- (f) Fire Brigade First Attendance:

| (g) | Fire Brigade Officers First Attendance: | Sub O1 , A3 Avonmouth Lff1 , A3 Avonmouth |
|-------------|---|--|
| (h) | Fire Brigade Commanders of Incident: | Deputy Chief Fire Officer 1 ; (Incident Commander) DO1 Divisional Commander 'A' Division (Fireground Commander) |
| (i) DETA | Total Fire Brigade Attendance: (at the height of the incident) | 23 x Pumping Appliances 1 x Aerial Platform 1 x Chemical Incident Unit 1 x Operational Support Unit (Foam) 1 x Control Unit 1 x Breathing Apparatus Service Vehicle 121 x Firefighting Personnel 13 x Supervisory Officers (including Press and Hospital Liaison). |
| | | |

3 Ι

Albright and Wilson, Avonmouth Works, is located at Ordnance Survey Grid Reference 5238 8080 on Survey Map Number 48/58 and occupies 17 acres on the eastern side of Smoke Lane, Avonmouth. In a radius of 2.5 km lies the residential area of Lawrence Weston to the South East, the village of Avonmouth to the South West and the village of Hallen to the East. Also within this radius lies; Royal Edward Docks, another large chemical complex, industrial units, and fuel storage depots.

The site produces organic speciality chemicals for the Biocides, Flame Retardant and Phosphorus Specialities Businesses. The Company stores and uses various quantities of a multitude of Hazardous Substances but at the beginning of 1996 application was made to the Health and Safety Executive for authority to increase their holding of Propylene Oxide above the 50 tonne threshold. The application was approved and the site became a 'CIMAH' site in April 1996. They have formulated an 'on-site' plan but an 'off-site' plan has yet to be developed.

The north-eastern corner of the site, about 3 acres, is occupied by an oil and solvent recovery plant in a fenced off area which is owned by Chemical Recoveries Limited. Access and egress to this compound is achieved only through the Albright and Wilson site.

The life risk on site is 100 persons during daytime and 17 persons at night.

4 EVENTS BEFORE ARRIVAL OF FIRE BRIGADE:

Albright and Wilson's personnel recounted that in the morning on the day of the fire a 'tank container' arrived on site loaded with 20 tonnes of epichlorohydrin which had been ordered from Czechoslovakia. It was driven to the storage compound located at the furthest south - east perimeter of the site which comprised three storage vessels. The larger one was used for storing methylene-di-bromide and the two smaller ones for epichlorohydrin (EPI). The tanker was drawn alongside the compound and connected by pipework and hose to the EPI storage tank closest to the rhyne and loading of the vessel began. (See 11 - Plans of Site).

Albright and Wilson report that they received an urgent telephone call from the hauliers in Belgium informing them that the 'tank container' delivered that morning did not in fact contain epichlorohydrin but contained sodium chlorite solution. Personnel at the storage compound were immediately informed by telephone and they began to close down the loading process which, up to this point, had transferred about 80% of the contents into the storage vessel. These personnel then recount observing a large vapour cloud in the form of a white mist around the tanker and the vessel and, upon hearing the sound of a pressure-release valve operating, began to evacuate the immediate area. As they made their escape they recall witnessing a 'massive explosion' followed by a 'severe fire' behind them. One of the 8 employees in the vicinity suffered minor injuries in his haste to escape but the remaining seven were able to ensure that all persons were accounted for and began such tasks as sounding the warning sirens and closing down plant etc.

5 ACTION BY THE FIRE BRIGADE

At 1033 hours a 999 call was received from the security gatehouse at Albright and Wilson reporting an explosion and fire. The pre-determined attendance of seven pumping appliances, an aerial platform and the operational support unit were despatched to the scene. Also mobilised were the Commander of 'A' Division and two of his Operational Supervisory Officers.

Upon arrival the crews were confronted with a severe chemical fire which involved; the drum handling building, the tank container and its drive unit, the EPI Storage area, the highly flammable compound, and the 'packaged special waste' storage area (see Photograph No 2). An area of approximately 80 m by 30 m was 'well alight' and emitting white chemical vapours and heavy black smoke into a strong south westerly wind. Further explosions were occurring within the fire area creating airborne fire columns some 50 metres in height and 45 gallon metal drums were exploding and being propelled into the atmosphere then coming to land at various locations around the fireground (See Photograph No 4). Unconfined burning chemical spillages were also flowing along the access roads.

The first appliances arrived within four minutes of the call and proceeded to the large open area at the centre of the site where they were met by the site Safety Officer and the Plant Engineering Manager who comprehensively briefed the Officer in Charge as to what had occurred confirming that all persons were accounted for and indicating which chemicals were

involved. They also warned him that the free flowing chemical fire was in danger of threatening the sodium thiocyanate tanks and a loaded chemical tanker which was parked alongside the tanks on the access road (See Photograph No 1). The Officer in Charge sent the assistance message "Make pumps ten" and initiated a foam attack on the chemical spillage fire in the access road. A Supervisory Officer arrived and, with the exception of those dealing with the spill fire, ordered the withdrawal of all personnel because of the risk of further explosion and the hazards presented by the propelled 45 gallon metal drums. A message was sent to Brigade Control at 1057 hours "Confirmed Major Incident". The Divisional Commander, 'A' Division, took the role of Incident Commander and nominated his two Supervisories as Fireground Commanders with the following tasks and priorities;

- i) Boundary cooling operations from stand off positions using Jetmaster Monitors.
- ii) Major foam attack to the seat of the fire from stand off positions using Slim-Jet Foam Monitors.
- iii) Removal, or protection, of unaffected Road Tankers parked in various positions around the fire area, and

iv) All operations to be conducted by personnel wearing breathing apparatus, with minimum numbers exposed for the minimum amount of time.

At 1105 hours a report was received at the fireground that a building adjacent to the Albright and Wilson site had received severe blast damage causing a building collapse with persons trapped. Three of the oncoming appliances were immediately diverted to attend at Bristol Bending Ltd, Burcott Road, Avonmouth where they quickly established that a light false ceiling and some shelving had collapsed. There were no persons trapped but five casualties had suffered minor injuries. These appliances were then reverted to fighting the chemical fire.

Preparations began for the boundary cooling operations and the foam attack but it rapidly became apparent that insufficient hydrants were accessible due to their locations and that the site internal water main had insufficient pressure and flow to sustain such an operation. Numerous water spray projection and deluge systems were operating on the surrounding plants which were extremely effective in preventing fire spread but they had the effect of creating a 'water shortage' for fire fighting operations. This caused some delay in producing foam but eventually alternate off-site water supplies were identified and fire fighting commenced. At one time water was being taken, via a portable pump, from the rhyne running the length of the west side of the site until it was discovered that this was connected to the rhyne adjacent to the fire area into which flammable liquids were flowing.

Simultaneously 3 chemical road tankers were removed from the scene of operations, with the assistance of company personnel. One containing 20 tonnes of Propylene Oxide was removed from the large open compound close to the appliances, one containing 20 tonnes of Phosphorus Oxychloride was removed from the access road near the sodium thiocyanate tanks and the other, which was loaded with 20 tonnes of Chlorine, was disconnected and removed from the chlorine loading bay. (see Photograph No 1).

Access and egress from the site was solely by means of the entrances in Smoke Lane with the remainder of the site surrounded by a rhyne which made it impossible to establish a further forward control point which would provide an alternate access through which appliances and water could be brought in from other sources upwind. Should there have been a change in wind-direction during firefighting, then the only vehicular access points may well have become untenable.

At 1115 hours Deputy Chief Fire Officer1 assumed command and sent the message "Make pumps 20, 3 additional Supervisory Officers required". At this time a message was received via fireground radio from the Police Helicopter, which was hovering over the scene, offering the facility for a Senior Fire Brigade Officer to be flown above the incident for reconnaissance purposes. The Divisional Commander boarded the helicopter and for the following hour and a half was able to view the scene of operations from above providing an invaluable service via hand-held radios to the Fireground Commanders below. From this position he was able to; advise locations for foam and water monitors to be sited and direct their trajectories, describe the direction of fire spread and hazards in its path and, using the infra-red facility on the helicopter video camera, he was able to direct crews to heated vessels, tanks and drum storage. This also enabled the whole operation to be recorded on video camera.

As firefighting operations progressed and breathing apparatus crews were able to penetrate the plants towards the fire, one team reported the discovery of two civilian personnel using hand-held jets to cool tanks located at the entrance to the chemical recovery compound. They were not wearing any breathing protection and were standing in smoke downwind of the burning EPI compound and tanker. They later claimed that they had entered the compound to extinguish a small consequential fire in a container within the compound which had been ignited by flying debris. This fire had been reported from the helicopter and was being continually monitored utilising the inbuilt thermal image camera in case of likely spread. Further investigation revealed a further five employees in a portacabin downwind in the smoke. They were all evacuated but Helicopter video pictures taken later revealed that the two men had returned to continue to operate the water jets.

At 1211 hours DCFO 1 sent the following message "Fire surrounded, 2 x Slimjet Foam Master Monitors, 1 x Jetmaster, 4 FB5X, 8 Water Jets, 30 Breathing Apparatus in use". The fire was now being controlled and crews were moving in towards the seat of the fire locating hot spots and cooling them under the direction of the Officer in the Helicopter using the thermal image camera. This operation was so effective that on two occasions crews were directed to cool vessels that were, in fact, designed to store hot water for use in the chemical production process.

From information received from the Company Specialists its was established that large quantities of chemicals were involved that would produce fumes considered to be hazardous to health (see 12 'List of Chemicals and Quantities Involved'). Following medical advice all personnel were advised of the likely symptoms of exposure and, as a result, 1 Leading Firefighter and 5 Firefighters were transported from the scene to Bristol Royal Infirmary for a precautionary medical examination and were then subsequently admitted into the Hospital for observation for a period of 48 hours.

At 1234 hours the fire was considered to be under control and the following 'Stop Message' was sent: "2 x Slimjets, 1 x Jetmaster, 4 x FB5X's; 12 Water Jets, 40 Breathing Apparatus, Cooling Jets being sustained for some considerable time, 6 firefighters conveyed to hospital suffering smoke inhalation". Extinction of the fire had consumed 4,000 litres of ARFFFP Foam Concentrate and had used an indeterminable amount of water. Crews began 'making up' equipment and returning to home stations and at 1521 hours attendance was reduced to 3 pumping appliances and the Chemical Incident Unit. At 1937 hours the site was considered safe enough for Company Management and Health and Safety Executive Inspectors to inspect the site and at 2010 hours the site was secured and handed over to HSE control with fire crews returning every two hours for safety inspections.

6 OFF-SITE EFFECTS OF THE FIRE

In addition to blast damage to various premises, considerable volumes of toxic smoke were bring emitted into the air and being carried away from site in the south westerly wind possibly threatening the downwind population. For this reason a 'Major Incident' was declared and the 'Major Incident Plans' of the emergency and support services were initiated. These matters will be dealt with in the individual reports from those respective services and agencies.

7 EFFECTS ON FIRE BRIGADE MOBILISING

The Fire Brigade attended at the scene of operations for some 34 hours but during the 10½ hours lasting from 1030 hours to 2100 hours on 3 October 1996 Fire Brigade Control initiated the following mobilising activities; (see also 13 - Fire Brigade Mobilising Plan).

| | MOBILISING ACTIVITY | APPLIANCE MOVEMENTS |
|---|--|---|
| 1 | Appliances to the Incident (including reliefs): | 31 Pumping appliances6 Special appliances13 Supervisory Officers |
| 2 | Appliances on Stand-By Cover (to other stations): | 24 pumping appliances(including 1 from GloucestershireFire & Rescue1 from Wiltshire Fire Brigadeand 2 from South Wales FireService) |
| 3 | Appliances to Attend Other Incidents (during Albright and Wilson fire): | 21 Fire Calls - 49 pumping appliances, 4 Road Traffic Accidents, 6 persons released by Fire Brigade - 5 Pumping appliances, 4 Rescue Tenders, Other Special Service Calls - 2 Pumping Appliances, |

Total Appliance Movements During Heightened Activity -

111 Pumping Appliances10 Special Appliances13 Supervisory Officers

TOTAL - 134 Movements

8 SUPPOSED CAUSE OF THE FIRE

It is considered that the inadvertent mixing of the chemicals epichlorohydrin and sodium chlorite solution within a vessel caused an exothermic reaction which resulted in the vessel becoming pressurised to such an extent that it ruptured and exploded (See Photograph No 3).

The subsequent release may have been ignited by the mixed chemical naturally reaching its auto-ignition temperature and self combusting or, alternatively, the vapour release may have been ignited from an external source as yet to be determined.

Reporting Officer: 1

Rank: Assistant Divisional Officer

Date: 8 October 1996

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| If none \checkmark box \square and go to Section 7 | to brigade) | | 6 | .4 App | roximat | e numb | er of p | ersons a | at discovery | of f |
| 6.1 Number of non-fatal casualties | | | | in ro | om, ca | abin, co | mpartm | nent, etc. | , of origin | |
| (including those who were rescued) | | | | 1 | 8 | | | | | |
| 7 | | | 6. | .5 Appi | oximat | e numb | er of p | ersons a | t discovery | of fi |
| 6.2 Number of fatal casualties | | | | | | 113 01 0 | unung, | venicie, | eic. | |
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| 6.3 Number of rescues only (exclude those | who were ca | sualties) | 0. | (inclue | ding any | who wer | e casual | lies) | anected pr | open |
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| 6.7 Fatalities, other casualties and r | escues: | | J. | | If | no injury | If no | ot rescued | | |
| Refer to guidance notes for codes. | | | 1 | | | ave Dialik | | | | |
| Use single code in each column 2 to 7 | | | | Main | | Nature | i Rescuer | Rescue d methods | Brigade | |
| Name of person | AgeYrs | Sex | Location | stance | Status | of injury | by | up to 2 | use | |
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| 7, More detailed description | on of fi | ire/fu | irthe | r info | orma | tion (| if applic | cable) | and the | |
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FDR1 (94)

| Report of Fire | | |
|--|----------|----------------|
| | | FILLEC |
| Tick the appropriate box (or boxes) | 1.1 | Brigade i |
| Insert code from codelist or enter number | ا 1.2 | Brigade A |
| Brigade use | 1.3 | Brigade a |
| Write in details | [| 0,1 |
| 2. Incident Information | | |
| AVONMOUTH WORKS. | <u> </u> | |
| SMOKE LANE, | | |
| AVONMOUTH, | | |
| BRISTOL | , | |
| 2.2 Postcode (for buildings) or grid reference | ∃ (if av | ailable) |
| | d refer | ence |
| 2.3 Risk category | | Z f Special |
| 2.4 Name(s) of occupier(s)/owner(s) | sk withi | n area |
| ALBRIGHT AND WILSON U.K | . LT | D. |
| | | |
| | | |
| | | |
| Times | | |
| a) Ignition to discovery | | _ |
| Immediately Under 5 5 to 30 30 mins to O | ver 2 | Not |
| mins mins 2 hours h | ours | known |
| b) Discovery to first call | | |
| Immediately Under 5 5 to 30 30 mins to Ov | ver 2 | Not |
| | Jui 5 | KIIOWII |
| (use 24 hour clock) hour mins day* n | ionth* | vear* |
| 2.6 First call to brigade 1.0 3.3 0.3 1 | .0 | 9.6 |
| 2.7 Mobilising time 1.0 3.4 | | |
| 2.8Arrival of / 0 3 7 | | |
| 2.9 Under control 1 . 7 . 3 .4 | | |
| 2.10 Last appliance 1 1 5 8 0 4 1 | 0 | 96 |
| * Only complete 2.7 to 2.10 if different from 2. | 6 | |

44 LIDBUR 0



| C. Location of Elfe | Fires starting in motor vehicles |
|--|--|
| 3.1 a) Type of property where fire started | If not \checkmark box $[\checkmark]$ and go to Section 4 |
| STORAGE VESSEL IN CHEMICAL PLANT. | 3.10 Make/Model |
| | |
| | 3.11 Fuel of vehicle |
| | Petrol Petrol (not Diesel/ Electric LPG Other - |
| b) If mobile, give location | (not fuel injected known) other oil specify in injected) 3 17 |
| | 3.12 Was vehicle turbo/supercharged? |
| | |
| | 3.13 Registration number |
| | (if available) |
| 3.2 Residential accommodation affected by fire? | 3.14 Year of manufacture |
| No Yes, where Yes, spread Yes, where both Not | 3.15 Part of vehicle where fire started |
| fire started to residential started and spread known only to residential | |
| 3.3 Main trade or business carried on where fire started | 3.16 Was engine running? |
| CHEMICAL MANUEACTURING | (immediately before fire)No Yes Not known |
| Chemene Millour her a king. | 3.17 Other information available eg VIN No, Chassis Noetc |
| | |
| · · · · · · · · · · · · · · · · · · · | |
| 3.4 Multiseated fire | 4. Extinction of fire |
| | Fixed firefighting/venting systems |
| | (in area where fire started) |
| Fires in buildings and ships | 4.1 Type of system (code up to 3) $1 2 3$ |
| If not $$ box $$ and go to 3.10 | See Code list 4.1 |
| (leave blank for ship) | 4.2 Manual or automatic M = Manual A = Automatic Z = Not known |
| Single Multiple Multiple Under Under | 4.3 Did it operate? $A = Yes and extinguished fire \qquad B B B$ |
| same use different use construction demolition | B = Yes and contained (controlled) fire |
| Derelict Unoccupied Other - specify below Not eg. under refurbishment known | 4.4 Number of heads actuated 10 10 |
| | 4.5 Reason(s) for not operating/containing/controlling |
| | Type |
| 3.5 Place where fire started | 2 |
| 3.7. Use of room, cabin or roof space where fire started | 3 |
| | Method of fighting the fire |
| 3.8 Floor, deck of origin | 4.6 Before arrival of brigade |
| Number if above ground/main deck | NONE |
| ✓ [] if ground/main deck | |
| Number it below around/upin deck | 4.7 By brigade up to stop |
| | FROM WITC VIA HUDRANITC |
| e [] ii oner, specily below | |
| | 4.8 Number of main jets used [7] |
| 3.9 Total number of floors in building where fire started | 4.9 Number of local authority appliances 4.2 |
| (leave blank for ship) | attending up to time of stop Pumping Other |

| 5. Supposed cause, damage | 5.7 Abnormal rapid fire development | | | | |
|--|--|--|--|--|--|
| and other fire details | No M Give additional details (if known) | | | | |
| 5.1 Most likely cause | Yes | | | | |
| a) V L L L | | | | | |
| b) caused by | 5.8 Damage caused to: | | | | |
| | ii) room, cabin, compartment etc of origin (buildings, | | | | |
| Child Youth Adult Animal Other (not a Not | ships & vehicles only) | | | | |
| Give additional details of person (if known) | origin (buildings, ships & vehicles only) | | | | |
| PLANT OPERATOR | v) outdoors beyond property; beyond building, ship, | | | | |
| c) Defect, act, or omission giving rise to ignition | plant, vehicle etc | | | | |
| INADVERTANT MIXING OF INCOMPATIBLE | a) %: enter percentage of item/room etc damaged eg. 25 = quarter, 50 = half etc | | | | |
| CHEMICALS CAUSING EXOTHERMIC REACTION | b) Severity: enter code to show severity of damage | | | | |
| 5.2 Source of ignition | $L = Light, \qquad M = Moderate, \qquad 0 = 0evere$ | | | | |
| a) Appliance/installation and other sources | caused by:to i)to ii)to iii)to iv)✓ box(es)by:a % ba % ba % ba % bif affected | | | | |
| EXPLOSION | fire line S | | | | |
| b) Powered by | | | | | |
| c) If source is an appliance, enter the make or model, if known below | heat | | | | |
| N/A | smoke | | | | |
| 5.3 Material or item ignited first | other 20 S | | | | |
| ELAMMABLE CHEMICAL VAPOURS | Total not buildings | | | | |
| b) Composition | to exceed 100 | | | | |
| EPICHLOROHYDRIN AND SODIUM CHLORITE | % of % % % vehicles | | | | |
| 5.4 Material or item mainly responsible for | damaged 100 100 | | | | |
| development of fire a) Description | Number of additional: rooms cabins floors other locations | | | | |
| AS ABOVE | etc | | | | |
| b) Composition | total | | | | |
| | If further description required by brigade use Section 7 | | | | |
| 5.5 Dangerous substances affecting firefighting or development of fire. (Specify up to 2 in order of priority) | 5.9 Estimate of horizontal area damaged | | | | |
| If none \checkmark box \square and go to 5.6 | (a) Area - sq m (b) | | | | |
| a) Material b) Circs. | | | | | |
| EPICHLOKOHYDRIN W | | | | | |
| 2 SODIUM CHLORITE SOLUTION W | Area L 5-9 L Total area | | | | |
| U = being Used W = combination of circumstances Z = not kripwn | by direct 20-49 by fire heat | | | | |
| c) Main effect of substance on fire and/or firefighting | burning 50-99 smoke etc. | | | | |
| LNTENSIFIED FIRE | 100-199 | | | | |
| PRODUCED TOXIC GAS | 200 + | | | | |
| 5.6 Explosion | If over 200 | | | | |
| No occurred First During First and N | 2400 write in to 2400 | | | | |
| go to 5.7 | 50 sq m | | | | |
| b) Materials involved in explosion (specify up (2) | 5.10 Animals killed | | | | |
| if none \checkmark box $[\checkmark]$ and go to Section 6 if ves record up to 3 main species | | | | | |
| Species Number | | | | | |
| c) Containers involved in explosion (specify up to 2) | 1 | | | | |
| 1 2 TOANNE STEEL STORAGE VESSEL | 2 | | | | |
| LO IUNNE SIEEL SIUNIGE VESSEL | | | | | |

| | | | | | فتعريبه | | | |
|------------|----------------------|--|--------------------------------|------------------------------|---------------------------------------|--|----------------------------------|---------------|
| | 03-0 | DCT-1996 22:32 | FROM AVON FI | RE BDE CON | ITROL | TO BRIGAD | DEHQ | 10. |
| | + | | | | | | | |
| | FIRES I | II | Incider | nt log | | 03 | -OCT-199 | 6 22:30 |
| | + | Incident nur | nber 15802 | | · | | Pa | ge 0001 |
| | Taken Address | 03-OCT-1996 10 ALBRIGHT & WILS SMOKE LANE AVONMOUTH | :33:08 SON | Meth Ty Revis Turno | od 999 (pe EXPLOS ed ut A32 | Op Id OP7 SION A31 A22 | Status Al3 | FI AS All |
| | Grid ref Gen info | 000 00 MAKE PUMPS 10 FOAM UNIT 1 | | Repea Stn g Rsk | C52 ts 024 nd A3 cat A | A35 A12 Fdr F Oic 4/80 | A39 1 | C51 R/C 00 |
| | Caller | MAKE PUMPS 20 | | S Off App | TOP 02 rtd S02 rtd A32 | 03-OCT-1 03-OCT-1 03-OCT-1 | 996 12:3 996 20:1 996 20:1 | 4 B 4 |
| , | Applianc | es | | | | | | |
| | Stn App A3 A32 | Alrt Mob Att 1034 1036 103 | Stop Rtg (7 **** ****] | Cls Off 1514 | Oic SUB 01 | R | D 4 | |
| ··· · · | A3 A31 A2 A22 | 1034 1034 104: 1034 1036 1054 | 2 **** 1514 1 4 **** 1429 1 | 1521 1446 | LFF 1 SUB 0 2 | đ | 4 · 5 | |
| 81 | A1 A13 A1 A11 | 1034 1037 105 1034 1036 105 | 3 **** 1403 1 3 **** 1431 1 | 1431 1511 | SUB 03 STN 0 | 1 | 4 | |
| 8 | C5 C52 A3 A35 | 1034 1037 105 1034 1037 103 | 2 **** 1452] 7 1514 ****] | 1510 1520 | stn o 2 lff 2 | | 5 2 | |
| | A1 A12 A3 A39 | 1034 1036 105 1035 1036 111 | 3 **** 1357 1 7 **** 2000 2 | 1426 2006 | LFF 3 FF 1 | | 22 2 | |
| e) | C5 C51 C4 C41 | 1040 1043 105 1040 1042 105 | 4 **** 1402 1 2 **** 1359 1 | 1423 1411 | LFF 4 LFF 5 | | 4 4 | |
| | C3 C32 C3 C31 | 1040 1044 1053 1051 1055 *** | 2 **** 1106 1 * **** 1106 1 | 1106 1106 | SUB 04 LFF 6 | Ne contra de la co | 5 6 | |
| • | C2 C22 | 1052 **** *** | * **** **** | 1052 | STIN 03 | | 6 | |
| 8 | A1 E11 | 1052 1053 110 | 5 **** **** 1 | 1135 | LFF 7 | 1. | 4 | × . |
| 1 | B4 B49 A3 B42 | 1054 1107 111 1058 1058 111 | 9 **** ****] 1 **** ****] | 1855 1855 | SUB 0 5 | 8 | 5 | |
| | B7 E77 A5 A52 | 1102 1107 113 | 2 **** 1524 1 4 **** 1408 1 | 1609 1426 | SUB 0 6 SUB 0 3 | | 5 | |
| 1 | C3 C32 | 1124 **** 112 | 4 **** 1429 1 | 1443 | SUB 0 4 | | 5 | |
| | C3 C31 C92 | 1125 **** *** | * **** **** : | 1452 | TEE 0 | | 0 | |
| | C5 C92 Al C91 | 1126 1127 114 | 1 **** 1351 : 9 **** 1350 : | 1353 1426 . | LFF 8 LFF 9 | | 5 | |
| | A3 A62 | 1126 1127 112 | 8 **** 1409 : | 1438 | ऽएउ ० 7 | | 6 | |
| • | A6 A61 C2 C21 | 1127 1127 114 | 2 **** 1402 : | 1427 | LFF 10 | | 5 | |
| * | A1 E11 | 1135 1137 114 | 9 **** 1401 : | 1525 | LFF 7 | | 4 | |
| | B6 B62 | 1356 1400 143 | 7 **** 1406 . 7 **** 1753 : | 1431 1827 | STN 04 | | 5 | |
| | Al B61 | 1356 1400 141 | 9 **** 1758 : | 1831 | SUE 08 | | 4 | |
| | A1 T11 C5 B12 | 1356 1403 142 1356 1359 143 | 5 **** 1744 : 3 **** 1536 : | 1813 1628 | STN 05 | 9 | 5 | |
| | A1 A13 | 1706 1706 173 | 2 **** 1928 : | 1930 REL | SUE O 10 | ר ס | 2 2 | |
| | B4 Z28 | 1710 1710 180 | 4 **** **** : | 1853 REL | LFM 11 | | 5 | |
| | A3 A31 | 1723 1723 173 | 1 **** 2009 2 | 2006 REL | SUE 0 1 | 1 | 4 | |
| | B4 B42 | 1710 1710 180 | 4 **** 1914 : | 1947 | LFM 11 | | 2 | |
| | Last add | liance returned | 03-OCT-1996 | 20:14 | | | 2 | |

03-OCT-1996 22:32 FROM AVON FIRE BDE CONTROL TO BRIGADE HO P.F _____ Incident log 03-OCT-1995 22:30 FIRES III Incident number 15802 Pace 0002 Officers Off Infd Mob Att Stop Rtg Cls 1039 1041 **** 1052 **** 1859 1914 DO 1 P344 A01 1039 1043 **** 1101 **** 1859 1920 ADO 2 P333 A05 1041 1042 **** 1054 **** 1855 1915 FO 1 F11 A03 1043 1044 **** 1058 **** 1838 1920 ADU 1 P352 1046 1049 **** 1109 1234 1429 1449 DCFO 1 02 1059 1102 **** 1238 **** 1258 1335 FO 2 P315 F05 1106 1114 **** 1114 **** 1243 1303 FO3 01 1120 1122 **** 1132 **** 1228 1229 FO 4 P314 FO3

 A04
 1129
 1130

 1146

 1407
 1410
 ADO 3
 P341

 S02
 1223
 1223

 1540
 DO 2
 HOSP LIAIS

 A06
 1129
 1130

 1522
 1545
 FO 5
 P308

 B04 1130 **** **** **** 1409 1413 FO6 P323 S02 1732 1732 **** 1758 **** 2014 2018 DO 2 P312 Last officer returned 03-OCT-1996 20:18 Services Infd Regd Message Service 1155 ELECTRICITY 1114 WATER ENVIRONMENTAL AGENCY 1047 1243 DR MORLEY HSE 1046 EMERGENCY PLANNING S. LANGDON 1057 1102 WILTS SECT 2/12 Narrative Time Source Op Message 1034 S OP7 Comm key for incident 15802, A3:W, A2:W, A1:W, C5:W, A31:0 1034 S SYS Station Al Wholetime turnout completed 1034 S SYS Station A2 Wholetime turnout completed 1034 S SYS Station A3 Wholetime turnout completed SYS Station Al Wholetime turnout completed 1034 S SYS Station C5 Wholetime turnout completed 1034 S MOB Incident number 15803 Identified as a repeat call 1034 S OP8 Incident number 15804 Identified as a repeat call 1034 S SYS Man ack seen from station A1 1034SSYS Man ack seen from station C51034SSYS Man ack seen from station A2 1034 S SYS Man ack seen from station A2 1035 S OP8 Incident number 15805 Identified as a repeat call 1035 S OP7 Incident number 15806 Identified as a repeat call 1036 S OP7 Comm key for incident 15802, A39:0 1036 S OP7 Incident number 15807 Identified as a repeat call 1036 S OPB Incident number 15808 Identified as a repeat call 1037 S OPB Incident number 15809 Identified as a repeat call 1038 S OP8 Incident number 15810 Identified as a repeat call 1040 S OP8 Incident number 15811 Identified as a repeat call 1040 S OP8 Comm key for incident 15802, C5:W, C4:R 1040 S SYS Station C5 Wholetime turnout completed 1041 S OP8 Comm key for incident 15802, C3:R 1041 S SYS Man ack seen from station C5 1041 S SYS Station C4 Retained turnout 1 completed 1041 S SYS Station C3 Retained turnout 1 completed 1041 S SYS Man ack seen from station C4

1041 S OP7 Incident number 15812 Identified as a repeat call

1041 S SYS Man ack seen from station C3

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03-OCT-1996 22:33 FROM AVON FIRE BDE CONTROL TO BRIGADE HO P.E +------Incident log FIRES III 03-0CT-1996 22:30 Incident number 15802 Page 0003 -----Narrative Time Source Op Message 1041 S OP8 Incident number 15813 Identified as a repeat call OP6 A31:MAKE PUMPS 10 , FOAM UNIT 1 1042 R OP7 Incident number 15815 Identified as a repeat call S 1042 OP6 Incident number 15817 Identified as a repeat call S 1044 OP8 Comm key for incident 15802, C3:R 1051 S SYS Station C3 Retained turnout 1 completed 1052 S OP8 Comm key for incident 15802, C2:R 1052 S SYS Station C2 Retained turnout 1 completed 1053 5 SYS Man ack seen from station C2 1053 S 1054 S OP8 Comm key for incident 15802, B11:0 1054 S OP8 Comm key for incident 15802, B4:W 1054 S SYS Station B4 Wholetime turnout completed 1057 R OP6 A32: STORAGE PLANE CONTAINING CHEMICAL EPICHLROHYDRIN. PLANT HAS COMPOUNED BY ROAD TANKER CARRYING SODIUM CLORITE, LAST CHEMICAL DOES NOT OXIDISATION, SITUANTION AT PRESENT MAJOR * FIRE INVOLVING 2 CHEMICALS AS DESCIRBED, ALSO CHEMICALS OF * VARYING DISCRIPTIONS, SLIM JETS WATER JETS NOW BEING DRAINED * ON SITE, AVACUATION OF PREMISES MAKE PUMPS 12, ALL PERSONNEL WITHDRAWN, CONFIRMED MAJOR INCIDENT, ADO 1 OIC OP3 Comm key for incident 15802, B42:0 1058 S OP3 Comm key for incident 15802, B7:W 1102 S S SYS Station B7 Wholetime turnout completed 1102 1102 S SYS Man ack seen from station B7 OP6 A01: FROM A01 C31, C32, A52 ARE ATTENDING BURCOTT ROAD 1107 R IMMEDIATELY OP6 Incident number 15823 Identified as a repeat call S 1113 OP6 Incident number 15824 Identified as a repeat call 1115 S OP6 Incident number 15825 Identified as a repeat call 1116 S OP6 Incident number 15826 Identified as a repeat call 1117 S 1117 S OP6 Incident number 15827 Identified as a repeat call 1118 0 OP8 MR ENVO 1 ENVIRONMENTAL OFFICE INFD 1124 S OP8 Comm key for incident 15802, A52:0, C32:0, C31:0 1124 R OP6 A32:DCO 1 - MAKE PUMPS 20, FOUR APPLIANCES TO RV AT BURCOTT ROAD, AVONMOUTH, ALL OTHER VECHICLES TO PROCEED VIA × ST ANDREWS RD, AVONMOUTH, 3 ADDITIONAL SUPERVISORY OFFICERS * * TO ATTEND ST ANDREWS RD, 1 OFFICER TO ATTEND BURCOTT ROAD. S OP8 === System Message === Turnout abandoned by operator ======= 1125 S OP8 Comm key for incident 15802, C5:W 1125 SYS Station C5 Wholetime turnout completed 1126 S OP6 Comm key for incident 15802, C91:0, A62:0 1125 S OPB Comm key for incident 15802, A6:R 1127 S S SYS Station A6 Retained turnout 1 completed 1127 1128 S OP8 Comm key for incident 15802, C2:R SYS Station C2 Retained turnout 1 completed 1128 S SYS Man ack seen from station C2 S 1728 OP6 -----** STOP MESSAGE **-----1130 R A52: ALL PERSONS ACCOUNTED _____ _____ 1135 OP8 Comm key for incident 15802, A1:W S 1135 S SYS Station Al Wholetime turnout completed S SYS Man ack seen from station Al 1135 S OP6 Incident number 15834 Identified as a repeat call 1129 O OPE EPA INFORMED AND ATTENDING 1139

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--------+ FIRES ITT Incident log 03-OCT-1996 22:30 Incident number 15802 Page 0004 . -----Narrative Time Source Op Message 1140 S OP6 Incident number 15836 Identified as a repeat call O MOE TO CU Mem Pub 2 TEL NO Phone No Removed HAS ALL TOXICOLOGICAL 1151 INFO FOR THIS CIMAH SITE * 1151 R OP6 A52: THE ABOVE STOP MESSAGE RE A52 RELATES TO BURCOTT RD NOT ALBRIGHT & WILSON + OP6 Incident number 15839 Identified as a repeat call 1154 S OP6 Incident number 15840 Identified as a repeat call 1155 S 1201 S OP8 Comm key for incident 15802, A19:0 1205 S OP6 Incident number 15842 Identified as a repeat call OP6 Incident number 15843 Identified as a repeat call 1205 S 1211 R MOB A32:FIRE SURROUNDED 2 SLIM FOAM JETS 1 JETMASTER 4 FB5X 8 WATER JETS 30 BA IN USE 1219 O OP6 FROM CONTROL UNIT THE FOLLOWING FF CONVEYED TO HOSPITAL AT 1215HRS Ff 3 Ff 2 Ff 1 ; Ff 6 Ff 5 , Ff 4 NO DETAILS OF INJURIES ALL AT BRI Ff 2 Ff 1 , C Ff 6 * OP6 -----** STOP MESSAGE **-----1234 R 02: 2 SLIM JETS, 1 JET MASTER, 4 X FB5XS, 12 WATER JETS, 40 BA, COOLING JETS SUSTAINED FOR SOME CONSIDERABLE TIME, 6 * FIRE FIGHTERS CONVEYED TO HOSPITAL SUFFERING SMOKE * INHALATION * OP6 INFORM ENIVORNMENAL AGENGY THAT CONTAIMANTED WATER IS 1242 0 ENTERING A RAVINE 1244 S SYS Station Al Admin text completed 1325 0 0P4 AD0 3 ALL FIRE BRIGADE PERSONNEL WITHDRAWN FOR APPROX 1 HOUR WEILE FIRE BRIGADE OFFICERS DISCUSS WITH SITE PERSONNEL HOW TO MAKE SAFE SEVERAL DRUMS OF CHEMICALS WHICH ÷ REACT WITH WATER. OP7 CHEMICAL INFO PASSED TO CIU ON CELOROBENZENE, METHANOL AND 1328 O DIBROMOMETHANE + OP5 B77: REQUEST 4 PUMP RELIEF AS SOON AS POSSIBLE 1348 R 1356 S OP3 Comm key for incident 15802, B62:0, B61:0, T11:0, B12:0 1358 S SYS Station Al Admin text completed 1402 R OP6 B77: REQUEST PCV FROM TRAINING SCHOOL TO LIAISE WITH ADO AT BRI AND CONVEY INJURED FIREFIGHTER TO HOME STATION . 3 1418 S SYS Station C4 Admin text completed SYS Station C2 Admin text completed S 1424 S SYS Station A5 Admin text completed 1439 SYS Station C3 Admin text completed 1459 S 1521 R OP6 T11:T11 NOW CONTROL POINT 1521 O OP7 DO 1 INCIDENT NOW BEING REDUCED TO THREE PUMPS, THREE PUMP RELIEF CREW REQUIRED FOR 1700 HOURS, ALSO RELIEF CREW REQUIRED FOR B42 REFRESHMENTS ARE AVAILABLE ON SITE. T11 NOW CONTROL POINT. OF7 DO 1 AND ADO 2 WILL REMAIN AT INCIDENT. 1535 0 1549 S SYS Station C9 Admin text completed 1604 S SYS Station C5 Admin text completed 1611 S SYS Station C5 Admin text completed S SYS Station A1 Admin text completed 1629 1645 R OP3 T11: BA CREWS WITH THERMAL CAMERA ISOLATING HOT SPOTS AND CHEMICAL SPILLAGE REMAINING WITH CREWING LEVELS FOR 3 HOURS OFFICER RELIEF DO 2 1800 HRS ADO 4 2200 HOURS MESSAGE FROM DO 1

03-OCT-1995 22:33 FROM AVON FIRE BDE CONTROL

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TO BRIGADE HO

P.0:

03-OCT-1996 22:34 FROM AVON FIRE BDE CONTROL TO BRIGADE HQ

| FIRES III | Incider | nt log | 03-OCT-1996 22:30 |
|-------------|--|--|----------------------------------|
| | ncident number 15802 | | Page 0005 |
| Narrative | | ` | |
| Time Source | D Message | | |
| 1659 O | P7 NEIGHBOURING BRIGADE TO NORMAL | S INFORMED SECTIONS TWO | AND TWELVE BACK |
| 1710 S | P3 Comm key for incider | 1 15802 728.0 | |
| L748 O | P6 A32 NOW CONTROL POIN | TT 19002, 220:0 | |
| L856 S | P4 Comm key for inciden | 15802 B42-0 B48-0 | |
| L900 O | P6 DO 2 NOW IN CHAR | GE OF FIRE GROUND | |
| 1937 R | P8 A32:D0 2 ,SITE NO MANAGEMENT, AND HEAL | W BEING INSPECTED BY DO TH AND SAFETY EXECUTIVE | 2 FACTORY PRIOR TO BEING |
| 010 7 | HANDED OVER TO HSE | | |
| CIU R | SAFETY EVECUTIVE. IN REQUIRED INFORMATION | ECURED AND HANDED OVER T CIDENT NOT CLOSED. FURTH | NO HEALTH AND HER INSPECTIONS |
| 042 0 | DB DO 2 INSPECTIONS NOTICE | REQUIRED EVERY 2 HOURS | UNTIL FURTHER |
| | | (14) | · |

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MATERIALS INVOLVED IN INCIDENT.

| | Quantities | | | |
|--|---------------|----------------|--|--|
| Material | Before | After | | |
| Methylene Dibromide (MDB) | 24,480 kg | 24,480 kg | | |
| Epichlorohydrin | 13,300 kg | 0 kg | | |
| 'Sodium Chlorite' | 18,181 litres | 3,080 litres | | |
| | | | | |
| Flammable Compound | | | | |
| Methanol | . 10,460 kg | 0 kg ? | | |
| Monochlorobenzene | 6,160 kg | 0 kg | | |
| · · · | 61,000 litres | 0 litres ? | | |
| | • | | | |
| Waste Compound | | | | |
| Monochlorobenzene/caustic soda | 1,000 litres | 1,000 litres ? | | |
| Di Ethyl Ethyl Phosphonate (V490) | 10,000 litres | 1,000 litres ? | | |
| Acidic Monochlorobenzene + ethylene dichloride | 1,000 litres | 1,000 litres ? | | |
| Kerosene | 1,000 litres | 1,000 litres ? | | |
| Tris Monochloro Iso-propyl Phosphate (TMCP) carbon filter waste | 3,150 kg | 0 kg | | |
| Inert absorbant + hydrochloric acid | 450 kg | 0 kg | | |
| Inert absorbant + Tris Monochloro Iso-propyl Phosphate (TMCP)/Tris (1,3 Dichloropropyl) Phosphate (TDCP) | 1250 kg | 0 kg | | |
| 2,2-bis(chloromethyl)-1,3-propylene bis (bis(2-chloroethyl) phosphate) (V6) waste | 250 kg | 0 kg | | |
| Inert absorbant + Kerosene | 50 kg | 0 kg | | |
| Methylene-bis-thiocyanate + glass ware | 250 kg | 0 kg | | |
| Cooling Tower Sludge | 400 kg | 0 kg | | |

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NOTE: ? = ASSUMED

S1SHAREDIWKSMGMNT/REG-AFFVNC31096/MWM473IN.SAM11-1 07/10/98









PHOTOGRAPHS



Photograph No 1 - View of the access road down which the main foam attack was made. The Chlorine tanker was removed from the loading bay on the left, the Phosphorus Oxychloride Tanker was removed from the roadway adjacent to the rubbish skip on the night and the Propylene Oxide Tanker from the open compound in the foreground. The Sodium Thiocyanate tanks can be seen behind the waste skip.



Photograph No 2 - View of the full length of the fire area between the 'packaged special waste' compound and the 'drum handing' building.



Photograph No 3 - View showing the Epichlorohydrin vessel which exploded as the product was discharged into it from the road tanker. The lid of the vessel was later discovered some 400 metres away. Note the blast damage to the 'Drum Handling' Building.



Photograph No 4 - View showing the 'Packaged Special Waste' storage area and the Highly Flammable compound from where the 45 gallon drums were being propelled into the air after exploding. This area became the main seat of the fire.



Photograph No 5 - View showing the tanker located for off-loading the Epichlorohydrin into the adjacent vessel. The vessels on their sides to the right of the tanker were disconnected and out of use. They had no particular effect on the fire. Note the remains of the 45 gallon drums in the foreground upon landing.



Photograph No 6 - View showing the damage to the 'Tank Container' and its drive unit.