Louis Anna
Wade Johnston

Cleveland, Ohio

Refinery #4015

Joint History of Exposure

Tank #209, a Q storage tank of 85,000 BBl capacity, belonging to the Texas Company but situated at the Gulf Terminal was pumped out in May 1937 preparatory to cleaning. (A placard had not been affixed to the tank as there was no record of blending or spiking in the 3 years of life and service of the tank.) After the contents had been evacuated from the tank with the exception of a 3-6 inch water bottom, it was allowed to stand empty for two months, 3 manheads being left open for purposes of ventilation. Tests for explosive mixtures in air were carried out in the tank early in July 1937, and a sample of sludge was secured from beneath the water bottom. As the air tests revealed no combustible mixtures, the tank was considered to be safe for cleaning. Accordingly on Wednesday 14th July, Johnston pumped the residual water from the tank, entering the tank several times in the process. This procedure occupied the greater part of the day. On Thursday 15th July, the cleaning was begun by Krynovich, Johnston entering the tank several times to give instructions and follow the progress of the work. On the day of 15 July, Krynovich worked approximately 6 hours, his time being divided equally in 15 minute shifts inside and outside the tank. A canister mask was on hand but was not worn by Krynovich. In the cleaning, no attempt was made to clean the walls or supports; efforts were limited to the bottom where the sludge was brushed and swept from the periphery of the tank to the center sump by means of a broom. The sludge was hosed down and was wet during the entire cleaning operation except for occasional dry spots which appeared after the initial brushing. On occasions these were again gone over with the broom but no dust was in evidence at any time - either within the tank or upon the faces or clothing of the workers. Krynovich felt badly at the end of the day and the following morning - Friday 16th July - returned to work with the complaint of illness and gastric distress, and refused to re-enter the tank. He remained at work outside the tank assisting and handling buckets of sludge which were passed out by Anna who worked in the tank Friday 16th, for 8-9 hours. Anna's time was spent alternately inside and outside tank as his predecessors. No respirator was worn. The sludge had been wetted down again on Friday and though a few dry spots were seen, no dust was in evidence. Friday night noticed anorexia but was not ill - did not return to work Saturday 17th due to holiday.

Johnston worked in tank most of morning of Friday 16th July without mask. Noted some anorexia at lunch time and in afternoon continued work but wore canister mask for remainder of working day. He cleaned out center sump hole, handing the buckets of sludge to Anna who carried them out to the manhole. No unusual odors were noted by any of the men, no dust was observed nor was there sneezing or conjunctival irritation. Air-line respirators were not provided, though one was available it was left in the storage room doubtless as a consequence of there being but 50 feet of hose while the diameter of the base of the tank was ± 110 feet. It is assumed that Johnston, who was immediately in charge of the work, wore the canister mask as a consequence of his familiarity with the hazard in his capacity as Ethyl

Company clothes and gloves were not provided for the men, rubber boots only being used.

INDIVIDUAL RECORDS

[redacted] - (Data obtained from Dr. Bryson, house physician, Dr. Cannon, hospital records, and employers). Patient was feeling poorly when he left work on Friday 16 July. Wife telephoned on Monday 19th to inform management that K. was ill. He was sent to a Dr. Castle under whose care he remained until 25th July 1937. Dr. Castle was of the opinion that the symptoms were due to the prevailing heat and over-indulgence in food and drink. Nothing was done for the man. On the following Monday - 26th July - patient consulted Dr. Bryson who found him sick, anxious, hysterical and fawning, he was very excitable with exaggerated reflexes but at the time of examination was coherent and oriented with reasonably good insight. On the nights of 24th and 25th July, patient had been delirious and was manageable with great difficulty though on the morning of 26th July he was reasonably cooperative. He was sent to the hospital at noon, 26th July, where he remained quiet till evening with increasing nervousness, excitement and jerky tremors. At 10:00 P.M. he was definitely delirious, was out of bed, running about hallways, was restrained where he remained through the night. Patient was somewhat more quiet the morning of 27th July (in night had received 3 doses 1/100 gr. scopalamine (h) and one in early morning) although he continued to have active hallucinations. At 11:30 A.M. morning of 27th July, tore out of straight jacket and went to bathroom where he was found playing with water faucets - was incontinent (urine and feces), had extreme thirst and would not eat. During afternoon struggling increased up to 8:00 P.M. and trembling and excitement became more marked. At 9:00 P.M. (July 27th) there began generalized clonic and tonic convulsions involving all muscles at different times, including the eye and scalp muscles. Opisthotonus was marked from time to time. Convulsions were continuous till 10:15 P.M. when patient fell into confused semi-coma which continued until 10:30 P.M. when he died with hyperthermia (105°F). The pulse at 10:00 P.M. was 130/minute - there was progressive slowing till 10:30 when rate was 60 immediately preceding death. No liquids and no food was taken for a number of hours. Coughing was noted frequently in the afternoon hours. A loss of 20-30 % was estimated to have occurred during the period of illness.

Necropsy was performed the morning of 28th July by the substitute hospital pathologist - Dr. H. G. Pritzker. The gross anatomical diagnosis was lead encephalopathy and intoxication. Tissues were obtained for analysis.

[redacted]

Saturday - 17th July - visited Dr. Castle (company physician) complaining of malaise, weakness, vertigo, headache, nausea, and anorexia. Became worse and on Sunday 18th July called Dr. Bryson. At that time patient was abed, had been vomiting and was nervous and excitable. Speech was rapid and jerky and there was complaint of constant nausea. Was seen again Monday, 19th July. On night of 17th

July had had delirium with marked hallucinations and had been about threatening people with shotgum. There was complaint of insomnia, terrifying dreams and weakness, but considerable insight was retained. On Monday, 19th July, was ambulatory. Patient was excited but rational and remained oriented throughout the day. Condition remained very much the same for 3 days with excitement etc. by day and with insomnia, restlessness and delirium by night, the nocturnal excitement being, however, subject to control without physical restraint. On Thursday, 22 July, patient seemed definitely better, excitement was less marked though there was complaint of weakness and ease of fatigue. Seen again 28th July. Patient had been weak and depressed with restless sleep and wild dreams and was sent to hospital night of 28th July. Drove own car to hospital and seemed fairly composed for a few hours after admission, then became excitable but without hallucinations or definite delirium. However on morning of 29th had a period of delirium which lasted for a few hours followed by a restless, depressive, excitable state.

30th July - Physical Examination.

G.A. Alert, somewhat nervous with anxious expression. There is a slight coarse labial tremor with rapid speech, the face is flushed, patient is restless, apprehensive and all movements are hyperactive.

T: 97 Pulse: 84 R: 18 Bl.P. 130/64

Head - beginning baldness - otherwise Ok. Movements smooth, normal.

Ears - negative

Eyes - R = L - med. reg. reflexes and E.O.M. ok - conjunctiva clear.

Nose - Not remarkable

Mouth - There is a coarse labial tremor - with coarse vermicular tremor to the extended tongue which deviates slightly to left. Teeth and gums in poor condition with carious stumps and gingivitis of lower incisors. No lead line is present. Tonsils are red. Right is large and edematous, both anterior pillars are reddened.

Neck - Negative musculature. Thyroid normal.

Skin - Excessive perspiration - no pallor.

Chest - R.S.D. 7.5 R.C.D. 2.5 x 10.5

Heart tones clear and regular. There is slightly high pitched P.N. right base below angle of scapula and low in right axilla with some diminution of B.S. but without rales or change in W.V.

Abdomen Not remarkable - no masses or tender areas.

Extrem. Not remarkable.

Reflexes- Tendon hyperactive +++ but not more so than occas. seen in normal subjects. Superficial reflexes ++++ - definitely hyperactive. No clonus or abnormal reflexes.

Muscular system - Muscle tone and power very good - no pronounced weakness - no atrophy or muscle tenderness. Minimal degree myotactic irritability - no ataxia.

Sensation - normal.

Mental - Rational, cooperative and intelligent - amnesia for events from 19th July to 25th July - otherwise normal - insight orientation and judgment ok.

Impression- Subacute TEL intoxication in phase of recovery.

Prognes - Hospital nursing records are appended.

Patient was seen several timeson each of the following dates 30th July, 31st July, and 3 and 4 August. In this time there was slight but obvious steady improvement, the periods of excitement recurred each morning, usually between 7 and 10:00 A.M. and lasted for from 15-30 minutes each, accompanied by increased labial and lingual tremors - vertigo and headache. In no instance was restraint required and cooperation was easily secured. Paraldehyde and high fluid intake were maintained, the response to paraldehyde becoming increasingly good. Patient secured an average of 7 hours sleep nightly and manifested a good appetite for all meals except breakfast which was taken only upon request. Disturbing dreams were not complained of, though muscle pains, weaknss and abnormal sensations in the lower extremities were complained of increasingly. Patient had a subnormal temperature most of the time, though the pulse rate remained in the neighborhood of 80, the B.P. ± 130 systolic and 70 diastolic. Last seen 4th August 1937 - recommended continued high fluid intake, high calcium diet with viosteral, a gradual tapering off on paraldehyde and that patient be allowed up on following morning if not disturbed. Further that he be sent home as soon as 24 hours without paraldehyde have passed in which there has been no excitement or disturbance. He is to return to light work as soon as he feels capable of doing so.

Laboratory

Pb analyses appended.

Hb - 93% 7-29-1937

Poly - 82		Very occasional stippled cell.
Lymph 15		
Mono. 2		
Baso. 1		

Blood chemistry - mgm/100 cc 7-29-1937

Sugar	90.9
N.P.N.	33.8
Urea N	13.5
Creat	1.5
Calcium	9.7
Phosph.	4.3

X-ray 7-29-1937 -

Films of ankles and wrists were negative.

Blood Wasserman 8-2-1937 -

Reported

[redacted]

Felt "fairly well" upon completing work P.M. Friday, 16th July. Was nervous and anxious and sleep that night was broken and restless with wild dreams of terrifying character. Morning of Saturday 17th July, ate very little breakfast, was nauseated, and was annoyed by excessive perspiration. Sunday night 18th July slept well, and returned to work on Monday 19th on which night he slept very poorly - (insomnia, dreams, restlessness etc.) He has worked daily, however, until 28th July 1937 when he was sent to hospital for observation. Sleep disturbance and other prodromal symptoms were noted during week of 18th July, but these had largely subsided prior to admission to hospital. Appetite is now fairly good and he feels composed and rested.

Physical Examination

30th July 1937. Quite, cooperative, not ill or nervous - answers questions deliberately and is apparently normal.

T: 97.6 P. 52 R. 16 B.P. 115/67

Head - negative

Ears - normal

Eyes - R = L - wide, regular. Reflexes and EOM ok

Nose - Not remarkable

Mouth- 1 full crown on canine, several small carious spots. Tonsils are small with some reddening of fossae and anterior pillars - m.m. and lips of good color - no lead line or deposits.

Neck - normal

Skin - Clear - healthy - good color.

Nodes- Not remarkable

Chest- RSD 7.0 RCD 2.5 x 10.0

Heart tones clear, regular, of good quality - Bradycardia. Lungs clear throughout except sl. impairment left lower axilla at side of old pleurisy.

Abdomen - Not remarkable

Extrem. - normal

Reflexes- Tendon reflexes sluggish. Knee K. elicited with difficulty. Biceps and Triceps 0 - Superficial reflexes normally active. No abnormal reflexes.

Muscular System - muscle tone and power good - no atrophy.

Sensorium -Not remarkable. No ataxia or tremor.

Mental - Normal in all respects. No amnesia.

Impression.

Convalescence from mild acute lead tetraethyl intoxication.

Progress

Patient was kept in hospital for completion of collection of samples and was discharged to return to work Monday, 2nd August. He has appeared normal at all times since leaving the hospital.

Management advised to keep employee at light work for week or two and return to previous type employment except that he is to be relieved from work as Ethyl blender until re-examined.

Laboratory

Pb analyses appended - 7-29-1937.

RBC	3,600,000		No stippling noted		
WBC	7,500				
Hb	80%	Poly.	56	Eosin.	2
		Lymph.	40	Baso.	1
				Mono.	1

Blood Chemistry - 7-29-1937

	mgm/100 cc		
Sugar	98.0		
N.P.N.	40.8	Phosphorus	4.5
Urea N.	14.7		
Calcium	10.7		

E.K.G. normal. No explanation offered for bradycardia.