

Denver Cases

February 15, 1941 - Summary of Clinical Observations

Of six men who have worked in the plant all now have or have had some degree of intoxication. Severity of symptoms varied from a few nights of insomnia [REDACTED] in a part owner of the plant with slight exposure to one very severe case, the outcome of which is not yet predictable, [REDACTED]. In addition one employee [REDACTED] whose work was mainly outdoors and [REDACTED] and son (age 4) had a potential exposure as a consequence of going in and out of the plant. They showed no definite signs of intoxication when seen on February 14, 1941.

The separate records of each are attached. The diagnosis and prognosis given in each case is subject to interpretation, that it was to a degree based upon the history of exposure which we have reason to believe was not given correctly in all instances. It is probable that all exposures were more severe than indicated in the histories.

Willard Machle, M. D.

### The Plant

The factory was inspected on February 13, 1941. The plant is housed in a 1-1/2 story brick building, concrete floored and well illuminated. Situated on the corner of Alameda Avenue and Parker Road just outside the southern limits of Denver, is in close relation to but one dwelling. The lot at the rear is used for dumping cast-off equipment, slag and autoclave- still-residue. Ethyl chloride, sodium, and lead are stored on the first and second floors of the building and the alloy is made on the second floor. On the first floor, or ground level in the rear, is situated the reaction chamber, condenser and boiler room, the alloy being carried down a flight of wooden stairs or on the dumb-waiter, when charging. The discharge line from the condenser follows wall of the room to outside lean-to where a 10 gal. glass visible with a faucet on the bottom is used to cut yield. Wastes drain onto ground outside lean-to through garden hose. There is no sewerage connection. Filtering is done in the open air outside lean-to and open melt-pot there is used to reclaim lead from residues.

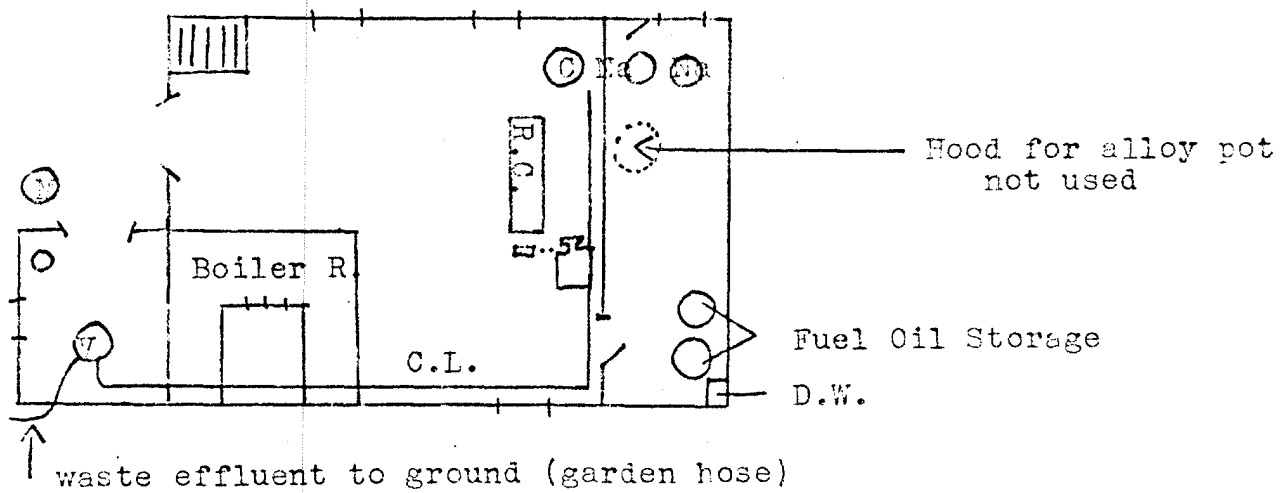
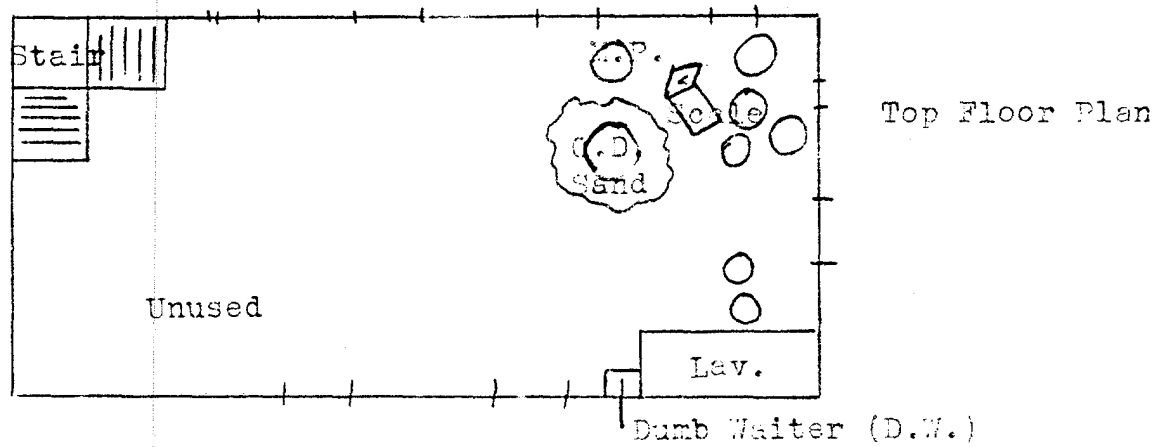
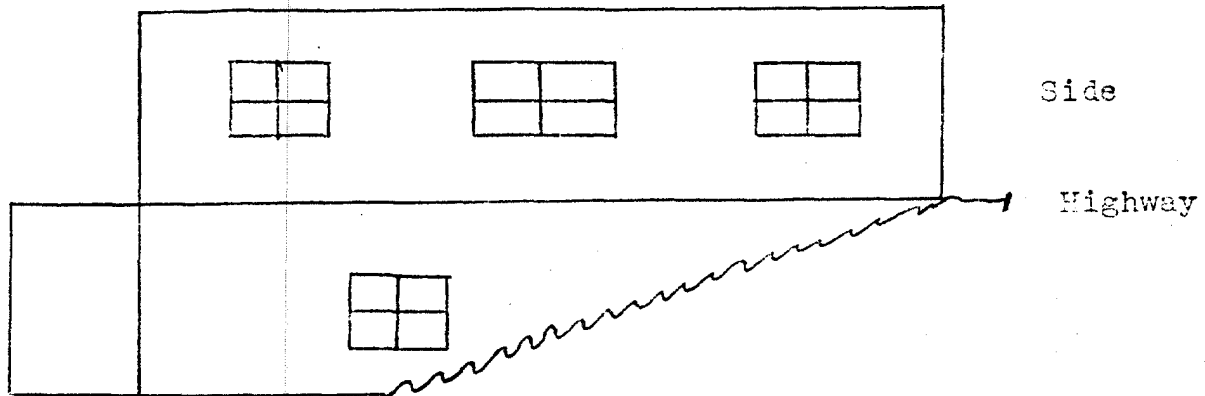
The general layout is given in the attached sketches.

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Plant (Continued)



Equipment drawn somewhat larger than actual. Most of plant space unused.

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## Hygienic Conditions in the Plant

### 1. Hazards

The only ventilation in the plant is that which occurs naturally through the open windows and this combined with the fact that no efforts are made to keep lead from escaping into the air as fume or off the floors in handling, makes the conditions unbelievably bad. There is continuous contamination of the air by lead dusts and at least once daily there is added to this further contamination by lead and alloy fume and the vapors of T.E.L. From the point of view of what has happened the last is the worst at the moment, but the hazard from inorganic lead impresses us as being equally great if sufficient time were allowed for its full effects to be evidenced. In fact the severity of symptoms, presence of stippling and atypical behavior of Loehr suggest that the T.E.L. intoxication has been complicated by severe exposure to inorganic lead.

The single precautionary measure employed has been the use of an M.S.A. canister mask with a canister of activated charcoal. This mask has been in use since the plant has been in operation and no time record has been kept of its life. The practice has been to wear the mask only when the reaction chamber is open and then not with regularity. Since the air of the entire building would obviously be contaminated at this time, protection would be limited to one workman using the mask.

In view of the above, conditions of exposure may be

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estimated from the outline that follows:

I. Continuous, of significant magnitude

(a) Lead dusts from floor and equipment, all of which are dirty as a consequence of lack of effort to keep clean.

(b) T.E.L. vapor from residues spilled on floor and left lying about in pans and buckets.

(c) T.E.L. vapor from balls, exposed equipment, open reaction chamber, and seepage from condenser line.

(d) T.E.L. vapor around visible and from water over-flow from steam distillation mainly limited to lean-to and ground outside.

(e) Lead dusts, T.E.L. vapor and decomposition products to anyone near dump in yard, arising from residues, slag, used filters, gaskets and discarded equipment that is left lying about. This place is not fenced and is accessible to children.

II. Discontinuous, severe

(a) Fume from melt pots. To workmen engaged in storing or skimming, exposure may reach levels of 2-600 mg/10 cu m. In addition to exposure of operation causes further increased exposure to all others in building.

(b) T.E.L. vapor from reaction chamber when cleaning and drying. This is the most severe of all exposures. Concentrations of 4-5 mg/L of T.E.L. vapor will be present about autoclave when opened and even higher levels will be reached when the chamber is heated to dry.

(c) Severe exposure of operator is practically a certainty

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when cutting yield in lean-to and when filtering and packaging fluid. Cutting is done from bottom of visible which is situated in a pit (to permit gravity flow) about 5 feet below level of single window - operator crawls into pit to draw off yield.

(d) Severe exposure to operator and those nearby occurs in tear down and repair work. In one instance all operators in plant suffered prolonged attacks of sneezing while one welding repair was going on.

(e) Autoclave has no pressure disc being equipped only with a 3/4" line 6" long with elbow and trip spring safety valve for pressure release. If this type of equipment is used long enough it is certain that it will blow up as a consequence of the uncontrollable reactions that infrequently occur.

(f) A serious fire hazard arises from the manner in which the ethyl chloride is handled. Connections are interrupted frequently and fittings are clamp-type on a garden hose line. Small leaks are probably usual in both rooms in which open gas flames are going and hose will deteriorate rapidly.

(g) Block sodium is cut with a grocers' cheese cutter - no goggles worn.

### III. Sanitary Conditions

(a) Washing and toilet facilities are primitive.

(b) Clothing is not worn and protective gloves not used. Glove usually employed is canvas with leather palm. Those examined at time of use by employees were dirty and had odor

of fluid.

(c) Illumination is good.

#### IV. Conditions Outside Plant

(a) As pointed out above, plant is hazard from fumes, dusts and vapors both to neighborhood and by reason of its close relation to highway.

(b) The refuse dump is open and accessible.

(c) Disposal of contaminated wastes, especially condensates from steam distillation is to subsoil. Across road is dairy farm - 75 yards to dairy building, 100 feet to west is dwelling in rear of which water well is being drilled now. Natural drainage of still effluent is across adjacent farm, including out buildings. See sketch.

#### V. Transportation

(a) Product is shipped in small lots in one gallon cans or less.

(b) Principal customer has been the Albany Oil and Refinery Company, Laramie, Wyoming (25 gal.) who operate a skimming plant at Laramie.

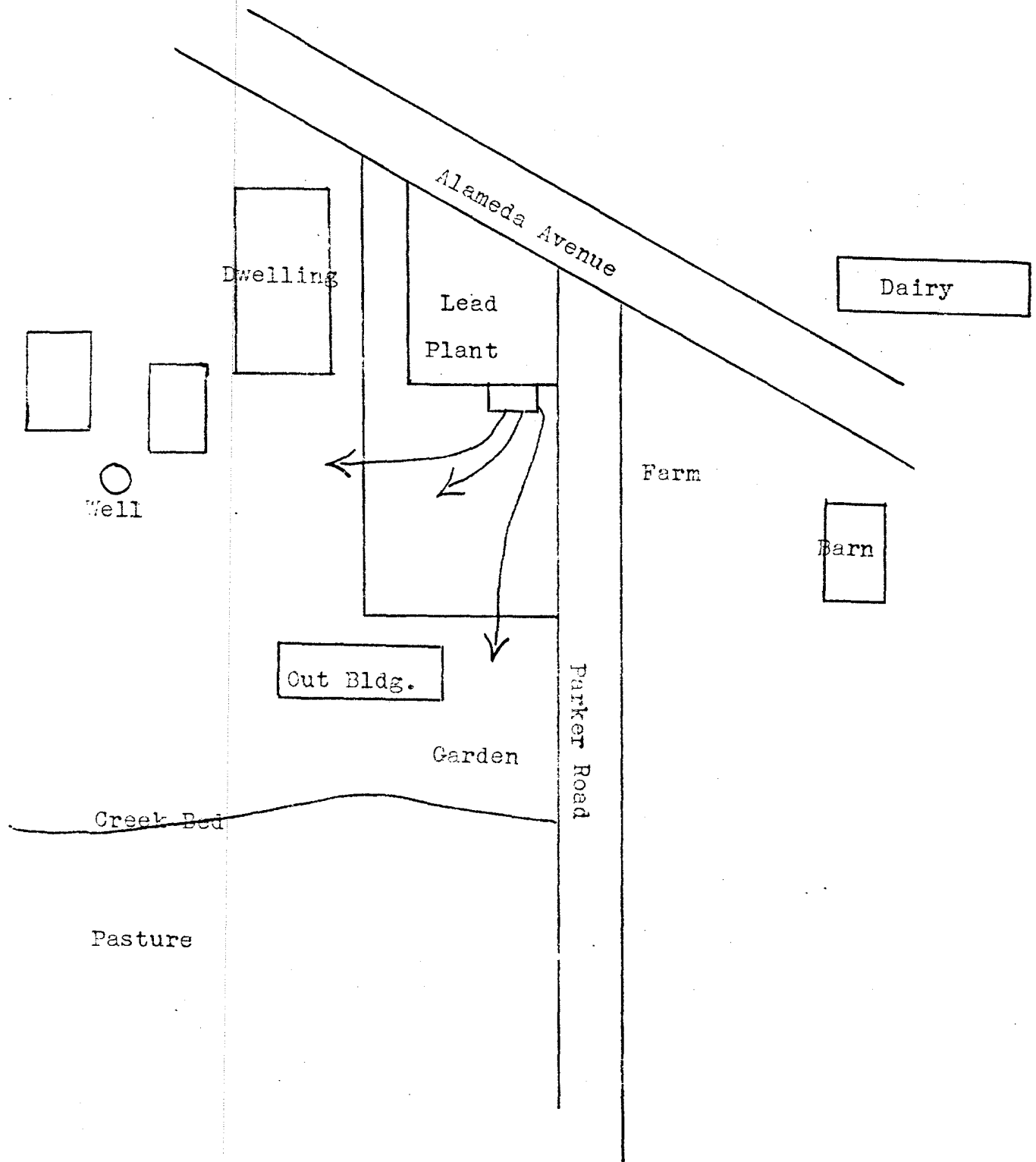
#### VI. Blending

(a) No information is obtainable concerning methods or precautions employed.

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PLANT RELATIONS



Natural drainage follows course of arrows.  
(Soil, sand and loam)

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