

INDUSTRIAL HYGIENE SURVEY

CHEVRON U.S.A., INC.

MANUFACTURING

EL PASO REFINERY

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INTRODUCTION

An industrial hygiene review of the El Paso Refinery was conducted by Mr. C. L. Kyllonen of Corporation Industrial Hygiene during visits in April 1983 and June 1984. The primary purpose was to review plant operations and activities in order to identify any potential worker health hazards, based upon walkthroughs of the facility and discussions with employees. Principal findings are discussed below.

DISCUSSION

Refinery Streams

Current toxicity information indicates that potential health hazards can be present in refinery streams. Appropriate personal protective equipment, including impervious gloves and any additional measures such as respiratory protection, use of engineering controls, and good personal hygiene measures are the main elements in minimizing potential exposures to such streams.

Hydrogen Sulfide

Under certain upset conditions, routine detector tube testing of process fuel gas streams, such as from C1909 at the FCCU and from D3906 at the Hydrofiner, could result in the release of H₂S within the operator breathing zone. Remote venting and gas-tight sampling provisions on such streams can be used to minimize potential exposures. Similar remote venting of streams away from the operator breathing zone can minimize H₂S releases when discharging light hydrocarbons from lines at the older crude unit accumulator pots, and when checking for hydrocarbons while draining foul water from C3901 at the Hydrofiner. Personal lead-acetate paper tape H₂S warning devices, occasionally seen within the Refinery, do not provide adequate protection against potential H₂S inhalation hazards due to their lack of distinctive warning properties. A number of MDA Monitox personal H₂S monitor/alarm units have been bought by the Refinery. During work in remote areas (such as water-drawing from sour tankage), such solid-state units can serve as warning devices if potentially-hazardous H₂S is released. Such water-draw sites within the Refinery are provided with signs warning of potential H₂S hazards.

Within the SRU/TGU Control House, it was noted that Channel 25 of the General Monitors H₂S alarm unit does not clearly display which of four sensing locations has triggered the unit, including one near the Control House rooftop air intake. Expansion of the system's display capabilities could provide clearer indication of individual sensing locations. It is understood that the H₂S alarm system is often triggered during collection of D5950 overhead reflux samples. Air monitoring can be useful in determining actual airborne H₂S levels during such work, and/or the need for any additional control measures.

Crystalline Silica

It is understood that conventional sand is used for dry, unconfined abrasive blasting outside the Shop areas. Silica-free abrasive blasting agents are preferred for such purposes, to minimize potential inhalation hazards. It is understood that the use of dust masks approved for silicosis-producing dusts is incorporated within written procedures and followed during recharging activities at the Clay Treaters.

Asbestos

El Paso Refinery Instruction No. 1410 summarizes current requirements for asbestos handling within the facility. Future air monitoring during selected work operations (including gasket cutting at the Storehouse) will be useful in determining actual airborne asbestos concentrations. Isolated stockpiles of older asbestos rope packing materials and other friable asbestos products were spotted during the visit. Substitution of newer asbestos-free materials or appropriate packaging of stockpiled items to control dusting can be used to minimize potential exposure hazards.

Respiratory Protection

3-M Model 9920 respirators approved for toxic dusts, mists, and fumes were observed in appropriate use within the Refinery during our visit. The existing yard air/regulator/filter assembly providing breathing air to the abrasive blasting hoods outside the shops does not comply with existing Federal OSHA requirements regarding documentable air purity.

Inorganic Arsenic

Future air monitoring during maintenance activities involving the Alkylation Plant and associated spent acid storage tanks will be useful in determining whether inorganic arsenic (a trace contaminant within smelter acid) is likely to accumulate within process equipment. The handling, storage, labelling, and usage of inorganic arsenic compounds is regulated by Federal OSHA, including those compounds likely to be present with the Quality Control Laboratory.

Safety Showers and Eyewash Fountains

Existing bottle-type emergency eyewash units seen within the Refinery cannot provide 15 minutes flushing capabilities; hard-piped units are preferred. Numerous safety shower and/or eyewash units have been installed recently, including ones at the Dry Dye Building, near Tank 108, across from the Tankfield Control House, and at the QC Lab bottle washer. All such units are periodically tested, with records maintained on inspection sheets. A permanent safety shower/eyewash was not seen within the Northeast end of the South Alkylation Plant area; no eyewash was observed within the Alkylation Plant Lab Shack.

Chemical Additives

Numerous bulk storage and closed-system chemical transfer/injection facilities have been installed recently within the Refinery, eliminating unnecessary operator handling of such materials. Some compounds, such as Betz C-5P Microorganism Control or chromates in cooling towers are no longer used. It is understood that Pave-Bond Anti-Strip is no longer handled at the Asphalt Plant truck racks. Additives facilities at Cooling Tower No. 6 were recently repositioned and provided with correct chemical hazard identification. Unused chemicals formerly stored near the WWTP and other plant locations have been discarded. At the Old Tool Room Area, cleaning agents stored in drums lacked appropriate labels, which would ensure prompt identification in case of emergencies. Refinery locations where Betz Krom-trol is dispensed lacked appropriate chemical hazard identification (yellow lining or equivalent). The material contains chromates (and in some formulations, phosphoric acid). The corrosive antioxidant handled within the Dry Dye Building was lacking similar chemical area hazard identification. Certain Betz Slimicides (including C-30 and DE-364) contain dimethylformamide (DMF), a material whose toxic properties are described in Chevron MIB #1426. Future air monitoring during open-air handling of such slimicides will be useful in determining typical airborne concentrations of DMF. When handling any such compounds, careful work practices and appropriate personal protective equipment are important measures in minimizing potential exposure hazards.

Lead Compounds

Potential exposure hazards to inorganic lead (not to be confused with organic lead compounds such as those in motor fuel anti-knock additives) may exist during certain Refinery work activities. These may include abrasive blasting and hot work on surfaces previously coated with lead-based compounds, work at sites formerly used to weather organic lead tank sludges, and batching of lead acetate solutions with the Quality Control Lab. Inorganic lead compounds are stringently regulated by Federal OSHA. Future air monitoring during such representative work activities will be useful in determining actual airborne inorganic lead concentrations. An appropriate label on the Sixth Street overhead organic lead pipeway, identifying the toxic contents of the line, would ensure better warning in the event of an unexpected release. Other organic lead handling activities at the unloading spots and storage drums appeared to be consistent with Ethyl and Dupont guidelines.

Landfarming Operations

During our visit, it was understood that respiratory protection is routinely worn by the tractor operator during discing or other landfarming activities likely to generate airborne dusts. Future air monitoring during such work will be useful in determining actual airborne dust levels and the adequacy of existing respiratory protective devices.

Sulfur Recovery, Tail Gas Plants

Sulfur seal rodding-out activities at the SRUs could result in the release of SO₂ within the worker breathing zone. Future air monitoring during such work will be useful in determining actual airborne SO₂ levels. At the TGU, it is understood that workers involved in the handling of powdered Murex Vanasol at the Balance Basin wear the recommended respiratory protection due to the irritant properties of vanadium compounds.

Rheniformer and Isomerization Plants

Existing ethylene dichloride (EDC) dedrumming/mixing/injection facilities at these plants could result in the release of EDC vapors while in use. The potential health hazards associated with EDC are summarized in Chevron MIB #554. Alternative chloriding agents or revised handling methods/equipment are possible approaches in minimizing potential worker exposures to EDC.

FCCU

Signs outlining the required respiratory protection are posted within the catalyst fines-handling areas beneath the precipitator. Similar respiratory protection, worn by workers immediately downwind of such fines-handling activities, would serve to minimize potential dust inhalation hazards until revised catalyst handling methods can be investigated.

Crude Unit No. 6

Powdered Merox catalyst formerly used within this plant has been superseded by the water-based slurry formulation, eliminating potential dust exposure hazards. At the time of our visit, no Merox slurry contamination of personal protective equipment among operators was observed.

Laboratory Facilities

At the time of our visit, fume hoods within the Asphalt Plant Lab and QC Lab did not meet minimum recommended Company face velocity specifications; the hood in the Octane Lab similarly did not meet more-stringent Ethyl or Dupont minimum face velocity specifications. It is understood that Designs Engineering is investigating hood improvements. The Octane Lab fume hood was provided with a means of controlling unexpected spillage from the burets. QC Lab bottle washer ventilation system improvements have been made; face velocity measurements performed by Mr. J. M. Driscoll have been within acceptable limits. Only unbreakable plastic containers of laboratory reagents were seen atop the Eagle storage cabinet in the solutions room of the QC Lab. The QC Lab's chemical inventory list will prove useful in future identification of unnecessary stockpiles of little-used chemicals which could otherwise result in potential exposure hazards through mis-handling or improper storage. No aging unstable acids such as perchloric or picric remain in the Lab.

Maintenance

Within the Welding Shop, the use of general dilution ventilation and pedestal fans cannot assuredly control potential welding fume inhalation hazards. The use of local exhaust ventilation devices, collecting the contaminants at their point of generation, is a recognized means of control; the use of appropriate respiratory protection is considered acceptable primarily in the absence of other effective control measures. Within the Machine Shop, it is understood that hearing protection is routinely worn by personnel performing metalspraying, but not likely to be worn by others in adjacent work areas. Due to the high noise levels generated by the metalspray apparatus, appropriate hearing protection can be used to control potential noise exposures among nearby personnel, or the alternate use of noise control barriers. There was visible evidence of overspray behind the metalspray lathe bed and leakage from the ductwork seams between the Clarage fan and the north shop wall. Minor sheet metal fabrication/repair work could control both conditions. Prior spillage of mercury within the Instrument Shop could result in the generation of odorless mercury vapors. The use of vapor depressant compounds during spill cleanup is an appropriate means of controlling such potential inhalation hazards.