KERR-McGEE CORPORATION
INTERNAL CORRESPONDENCE

TO H. R. Sager

DATE November 30, 1978

FROM C. L. Russell

SUBJECT Southwestern Refining Co.
Industrial Hygiene Survey

I conducted an industrial hygiene survey at Southwestern Refining Company November 13-17, 1978. The purpose of the survey was two fold. One, to evaluate employee exposure to potential contaminants in the paint and welding shops. Two, to establish a guideline for the development of an in-house monitoring program at the refinery.

Paint Shop

The paint shop was utilized to paint miscellaneous items. An exhaust fan 33 inches in diameter was located on the east wall approximately five feet above the floor. Less than an hour of painting was scheduled during the week of November 13.

Xylene vapors were evaluated with Drager detector tubes. Samples were collected in the worker's breathing zone while spray painting three different items on November 14.

Time	Location	Xylene Concentration
9:17 a.m.	Item on floor 12 feet from fan	270 ppm
9:30 a.m.	Item hanging 6 feet from fan	115 ppm
9:40 a.m.	Item on bench 3 feet from fan	None detected

OSHA applicable standard 8-hour time-weighted average 100 ppm

Andy Ruiz, a Roy Hunt contract painter, wore monitoring equipment during the 46 minute painting period. The sample was analyzed by Southwestern's laboratory for lead content. The concentration was 0.26 mg/M^3 versus the present OSHA standard of 0.2 mg/M^3 as an 8-hour time-weighted average (TWA). A new OSHA standard scheduled to become effective February 1, 1979, will reduce the permissible limit to 0.05 mg/M^3 as an 8-hour TWA.

Based on the levels of xylene and lead which resulted from limited painting operations, a potential overexposure could develop during more lengthly painting operations. Further survey work is warranted to better define the full shift exposure. However, based on the limited survey I conducted, I recommend a paint booth be installed in the paint shop to accommodate all items painted. Attached are pages 5-70 and 5-71 from Industrial Ventilation, which establish design and ventilation rates for paint booths.

I recommend the mandatory use of a respirator approved by NIOSH for protection against lead and xylene. The employee wore a 3M 8710 respirator which was not approved by NIOSH for either contaminant.

I was informed that paints containing the highest percent lead by weight were utilized on structures throughout the refinery. All painters need to be surveyed to evaluate the lead exposure when using the various paints.

Welding Shop

Employees in the welding shop wore monitoring equipment while performing normal duties. Samples were analyzed for iron, zinc, manganese, and lead by the Southwestern laboratory. As indicated in Table I, all samples were well below the OSHA applicable standards for iron, zinc, and manganese. Except for samples AA10 and AA11, 0.07 and 0.13 mg/M^3 respectively, all lead samples were below the new OSHA standard of 0.05 mg/M^3. I believe the source of lead was from welding some materials which had previously been painted. Further survey work is warranted for welding previously painted materials to better define exposure to lead. This would be particularly applicable for maintenance welding throughout the refinery.

Two welding rods, Arcaloy 310 and McKay E 309CG-16, contain significant quantities of chromium and nickel. The OSHA applicable standards are chromium, 1 mg/M^3; and nickel, 1 mg/M^3 as 8-hour time-weighted averages. These two rods are normally used to repair vessels. Surveys to determine employee exposure to chromium and nickel are warranted.

Detector tubes were utilized to evaluate ozone and nitrogen dioxide levels of MIG welders. Samples were collected in the breathing zone of employees. As indicated in Table II, ozone levels ranged from none detected to 0.1 ppm. Based on the actual time spent welding, the OSHA 8-hour TWA of 0.1 ppm was not exceeded.

As indicated in Table III, nitrogen dioxide levels ranged from none detected to 0.2 ppm versus the OSHA 8-hour TWA of 5 ppm.

Anti-spat material was periodically sprayed on the MIG welders. The label on DynaFlux Anti-Spat indicated chlorinated hydrocarbons were contained in the material. Chlorinated hydrocarbons should never be used around welding operations as they can readily change to phosgene in the presence of heat. The DynaFlux brand was found to be a substitute brand and was taken out of service. The normally used brand is Lake Welding D-Spat. The label did not indicate the presence of chlorinated hydrocarbons. Waylon Litton requested information from Lake Welding to confirm the absence of chlorinated hydrocarbons.

Monitoring Program

Justification:

Due to an increased awareness for the potential occupational exposure to toxic materials and an increase in the number of controlled substances by the government, it is important to evaluate employee exposures to all materials within the workplace. In order to evaluate the many varied work experiences, an in-house industrial hygiene program needs to be developed at each facility. An ongoing industrial hygiene program has as its primary objective the routine assessment of environmental conditions to which workers are exposed. A monitoring program is comprised of three distinct tasks: an initial comprehensive industrial hygiene evaluation, routine sampling, and interpretation of data collected.

The monitoring program must be implemented based on priorities established as a result of a thorough industrial hygiene investigation of the various operations. I will list the primary potential contaminants though the list will not be complete. All materials used in the refinery, including maintenance and laboratory areas, will have to be evaluated for potential contaminants.

Routine documentation of environmental conditions in the workplace is becoming more demanding. The recordkeeping requirements which are being established make it necessary to provide and maintain a documentation of workplace conditions thru routine sampling. Attached is a copy of K-M form #4293, "Industrial Hygiene Survey Data - Workplace Air Monitoring", which I developed to standardize survey data recordkeeping within Kerr-McGee.

A critical aspect of the total industrial hygiene monitoring program is the valid interpretation of the data collected. Sampling data can be evaluated to determine: (1) the significance of data in relation to occupational health standards, (2) to establish, where applicable, cause-and-effect relationships between documented exposure to specific airborne contaminants and medical indices of the health status of workers, and (3) to evaluate the effectiveness of various engineering control measures installed in the workplace.

Manpower

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The individual conducting the industrial hygiene program should have a math and chemistry background. I will assist in training the individual and in establishing an ongoing monitoring program. I anticipate a minimum of two months actual field survey work per year. At least 1.5 mandays more per survey day will be needed for literature review, preparation, calibration of equipment, interpretation of data, and preparation of reports. The individual

will need to devote at least half his time during a year to the industrial hygiene program.

Equipment

Southwestern has several Drager pumps and various detector tubes for monitoring gases and vapors. Southwestern also has six low volume pumps (50-200 cc/minute) and charcoal tubes for monitoring vapors such as benzene. A minimum of three medium volume pumps (1.5-2.5 liters/minute) need to be purchased for monitoring particulates such as welding fumes and lead paint. A single pump and accessory equipment costs approximately $400. Various pumps are available, I recommend the Bendix 44. I will supply necessary information on pumps and accessory equipment. Various membrane matrices will be required for collecting particulate samples. Cost will be approximately $200 per year. I will supply the necessary information for ordering the filter material.

Monitoring

An inventory of chemical and physical agents associated with the processes, including intermediate materials, by-products and wastes needs to be compiled. An initial survey should be completed for one shift for each job position which may experience exposure to a contaminant. Those job positions which indicate an exposure exists should be resurveyed annually. Data indicating overexposure would of course initiate the implementation of engineering control measures. Annual surveys would then confirm the effectiveness of the measures. Monitoring should evaluate full shift breathing zone exposures. Those contaminants which have a ceiling value are to be evaluated with a series of 15-minute samples during a shift.

The following is a list of contaminants and locations to be monitored:

Contaminant	OSHA Standard	Location
Lead, inorganic	0.05 mg/M^3	Painting, welding
Asbestos	2 fibres/cc	Removing old insulation
Hydrogen Sulfide	20 ppm ceiling	When sour crude received--Crude, Isomax, Cat Cracker
Carbon Monoxide	50 ppm	Cat Cracker, Vehicle Maintenance

Contaminant	OSHA Standard	Location
Benzene	10 ppm, 25 ppm ceiling	Crude, Vacuum, BTX platformer, sufolane, loading
Toluene	200 ppm, 300 ppm ceiling	" " "
Xylene	100 ppm	" " "
Naphthalene	10 ppm	Vacuum, Cat Cracker
Octane ?	500 ppm	Dehexanizer, Motor Platformer, Cat Cracker
Sulfur Dioxide	5 ppm	Crude, Cat Cracker
Sulfuric Acid	1 mg/M^3	Water Treatment, Laboratory
Hydrogen Fluoride	3 ppm	Alkylation
Pentane ?	1,000 ppm	Hydrobon, light ends, Loading
Acetic Anhydride	5 ppm	Cat Cracker
Nickel?	1 mg/M^3	Welding
Chromium?	1 mg/M^3	Welding
Iron Oxide	10 mg/M^3	Welding
Zinc Oxide	5 mg/M^3	Welding
Noise	90 dBA	Throughout

As I previously mentioned, this is not a complete list. All materials utilized in the refinery need to be evaluated for potential hazards. I will provide information regarding specific sampling and analytical techniques for each contaminant.

As indicated by the scope of the program, a great deal of planning, coordination, and time will be required to establish an ongoing industrial hygiene program. I suggest that an individual at Southwestern be designated by February 1, 1979, to begin implementation of the program. Please advise me who the coordinator will be, and I will assist as necessary to implement the program.

C. L. Russell

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