

INTER-CORPORATE CORRESPONDENCE

October 12, 1992

TO: C. Stennett/Manager Environmental, Health & Safety
FROM: T. Alvarado/Safety Trainer Auditor
SUBJECT: Industrial Hygiene Plan

The attached is the proposed Industrial Hygiene Plan for Coastal Refinery & Marketing Inc. Corpus Christi facility. Please review and advise, if more detail is required.

RAM 0002266

INDUSTRIAL HYGIENE PLAN

- I. Introduction
- II. Areas to be Monitored
 - A. East Plant
 - B. West Plant
 - C. Quintana Plant
 - D. General Plant Operations
- III. Environmental Stresses
 - A. Heat Stress
 - B. Noise
 - C. Ventilation Survey
 - D. Airborne Hazards, Particulates & Chemicals
- IV. Monitoring Methodology
 - A. Personnel Monitoring
 - B. Passive Monitoring
 - C. Area Sampling
 - D. Grab Sampling
 - E. Noise Dosimetry
 - F. Heat Stress
 - G. Ventilation Survey
- V. How to be Accomplished
 - A. In-House Safety Personnel
 - B. Outside Vendor
 - C. Combination

INDUSTRIAL HYGIENE PLAN

- I. The intent of this proposed Industrial Hygiene Plan is to determine the concentration and levels of various environmental stresses of which there might be possible exposure to CRMI employees. It will also contribute to compliance with 29CFR 1910.119, 29 CFR 1910.1000, 29 CFR 1910.1028, 1910.1200, as it pertains to substances listed and limited levels specified.
- II. Areas to be monitored will include the East, West and Quintana Plants and General Plant Operations (ie./laboratory, pumping, WWT, welding shops):
 - A. East Plant
 1. Alkylation Unit
 - a. Asbestos
 - b. Hydrofluoric Acid
 - c. Propylene
 - d. Total hydrocarbons (hexane, Heptane, Nonane, Pentane)
 - e. Noise
 2. Nonene
 - a. Asbestos
 - b. Toluene
 - c. Noise
 - d. Total Hydrocarbons (Hexane, Heptane, Nonane, Pentane)
 3. FCCU
 - a. Asbestos
 - b. H₂S
 - c. Ammonia
 - d. Catalyst
 - e. Nitrogen Oxides
 - f. Total Hydrocarbons (Hexane, Heptane, Nonane, Pentane)
 - g. Noise
 4. LEU
 - a. Total Hydrocarbons (Hexane, Heptane, Nonane, Pentane)
 - b. Butane
 - c. Propylene
 - d. Noise
 - e. Asbestos
 5. Manifold Pit
 - a. Total Hydrocarbons (Hexane, Heptane, Nonane, Pentane)
 - b. Benzene

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6. Loading Racks
 - a. Propane
 - b. Butane
 - c. Isobutane
 - d. Gasoline
 - e. Jet fuels
7. Boiler House
 - a. Asbestos
 - b. Noise
 - c. Heat Stress
8. Co-Gen
 - a. Noise
 - b. H₂S
9. ISOM
 - a. Benzene
 - b. H₂S
 - c. Asbestos
 - d. Noise

B. West Plant

1. Coke Cuttings
 - a. Polynuclear Aromatics (PNA's)
 - b. Asbestos
 - c. Noise
 - d. Coke Dust
2. Coker Blowdown
 - a. Benzene
 - b. Total Hydrocarbons (Hexane, Heptane, Nonane, Pentane)
 - c. Noise
 - d. Asbestos
3. Sulfur Recovery
 - a. Total Hydrocarbons (Hexane, Heptane, Nonane, Pentane)
 - b. Benzene
 - c. H₂S
 - d. Noise
 - e. Asbestos

4. Coker/Kero/Gas Oil HDS
 - a. PNA's
 - b. H_2S
 - c. Noise
 - d. Asbestos
5. Crude/Vacuum/Diesel HDS
 - a. PNA's
 - b. Benzene
 - c. H_2S
 - d. Asbestos
 - e. Noise
6. Gas Oil/LEU
 - a. Total Hydrocarbons
 - b. Benzene
 - c. Asbestos
 - d. Noise
7. Platformer
 - a. Benzene
 - b. Total Hydrocarbons
 - c. Asbestos
 - d. Noise
8. Merox Unit
 - a. Total Hydrocarbons (Hexane, Heptane, Nonane, Pentane)
 - b. Gasoline
 - c. Asbestos
 - d. Noise

C. Quintana

1. Hydrocracker/SMR
 - a. PNA's
 - b. H_2S
 - c. Noise
 - d. Asbestos
2. Reformer/Naptha HDS
 - a. Total Hydrocarbons
 - b. Benzene
 - c. Asbestos
 - d. H_2S
 - e. Noise

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- 3. TBA
 - a. Total Hydrocarbons (Hexane, Heptane, Nonane, Pentane)
 - b. Asbestos
 - c. Noise

- 4. Sour Water Stripper
 - a. Ammonia

D. General Plant Operations

- 1. Analytical Laboratory
 - a. Benzene
 - b. Acetone
 - c. MEK
 - d. Ventilation Survey
- 2. Pumping Department
 - a. Lead Compounds
 - b. Benzene
 - c. H₂S
- 3. Welding Shops
 - a. Welding Fumes
 - 1) Nickel
 - 2) Iron
 - 3) Manganese
 - 4) Titanium
 - b. Noise
- 4. General Plant
 - a. Bulk Asbestos Survey
 - b. Noise Survey

III. Environmental Stresses

The environmental stresses to be monitored are as follows:

- A. Heat Stress
- B. Noise
- C. Ventilation Survey
- D. Airborne Hazards, Particulates and Chemicals as listed:

Acetone

Propylene

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Ammonia
Benzene
Chlorine
Chromium Compounds
Cyclohexane
Ethylbenzene
Hydro Fluoric Acid
Lead Compounds
Methyl Ethyl Ketone (MEK)
Methanol
Nickel Compounds
Nitrogen Oxides

Propylene
Sulfuric Acid
Toluene
Xylene

IV. Monitoring Methodology

Monitoring shall be accomplished by the following methods:

- A. Personnel Monitoring - battery powered low-flow air samplers by filter media at the breathing zone.
- B. Passive Monitoring - Collar Clips
- C. Area Sampling - Airborne Hazards and Particulates by impinger method.
- D. Grab sampling - By use of diffusion tubes. Detector tubes or colormetric tubes.
- E. Noise dosimetry
- F. Heat Stress - by dry bulb/wet bulb globe temperature and heat index charts.
- G. Ventilation Survey - by use of velometer.

V. How to be Accomplished

The Industrial Hygiene Plan can be accomplished by a walkthrough survey of areas that need attention and interviews with Unit Supervisors and Operators sharing exposure concerns. Once areas are identified the media will be selected. The plan can be implemented by inhouse safety personnel or contracting an outside vendor, or a combination of both.

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INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
EAST PLANT:									
Alkylation Unit									
	Hydrofluoric Acid		✓	29CFR1910 Subpart G	3 ppm	3 ppm			Establish Baseline
	Propylene		✓	29CFR1910 Subpart G					Classified as an Asphyxiant
	Total Hydrocarbon	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required Personnel monitoring required for those above action level
Nonene Unit:									
	Toluene		✓	237.12	100 ppm	200 ppm			
	Total Hydrocarbon	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR. TWA	OSHA PEL 8HR. TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers 2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required Personnel monitoring required for those above action level
FCCU									
	Ammonia		✓	29CFR1910 Subpart G	25 ppm	25 ppm			
	Catalysts								
	Nickel		✓	29CFR1910 Subpart G	1 µ/m³	1 µ/m³			Establish baseline for determining proper respiratory protection
	Platinum		✓	29CFR1910 Subpart G	1 µ/m³	1 µ/m³			Establish baseline for determining proper respiratory protection
	Hydrogen Sulfide	✓		29CFR1910.1000 2.2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Nitrogen Oxides		✓	29CFR1910 Subpart G	25 ppm	25 ppm			

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Total Hydrocarbon	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910 95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level
LEU									
	Butane		✓	29CFR1910 Subpart G	800 ppm	800 ppm			
	Propylene		✓	29CFR1910 Subpart G					Classified as an asphyxiant
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers 2.0 fibers	0.1 fibers		Annual monitoring required

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR. TWA	OSHA PEL 8HR. TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Manifold Pit									
	Benzene	✓		29CFR1910.1028	1.0 ppm	1.0 ppm	.5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers 2.0 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Loading Racks									
	Butane		✓	29 CFR 1910 Subpart G					
	Propane		✓	29 CFR 1910 Subpart G					Classified as an asphyxiant

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Isobutane		✓	29CFR1910 Subpart G					
	Gasoline		✓	29 CFR 1910 Subpart G	300 ppm				
	Jet Fuels		✓	29 CFR 1910 Subpart G					
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers .2 fibers 2.2 fibers	0.1 fibers		Annual monitoring required
Boiler House									
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Heat Stress	✓		29CFR1910					Establish baseline & acclimation periods (See appendix 2)
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required Personnel monitoring required for those above action level
Co-Gen									

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
	Hydrogen Sulfide	✓		29CFR1910.1000 Z-2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
ISOM									
	Benzene	✓		29CFR1910.1028	1.0 ppm	1.0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA.
	Hydrogen Sulfide	✓		29CFR1910.1000 Z-2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers 2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
WEST PLANT:									
Coke Cuttings									

INDUSTRIAL HYGIENE PLAN-CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR. TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Coke Dust	✓		29CFR1910 Subpart G	2 mg/m ³				Required initially to determine concentration & particulate size.
	Polynuclear Aromatics	✓		29 CFR 1910 Table Z-2					
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2 0 fibers 2 fibers 2 0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910 95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level
Coker Blowdown									
	Benzene	✓		29CFR1910 1028	1.0 ppm	1.0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2 0 fibers 2 fibers 2 0 fibers	0.1 fibers		Annual monitoring required

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR. TWA	OSHA PEL 8HR. TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Sulfur Recovery									
	Benzene	✓		29CFR1910.1028	1.0 ppm	1.0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA.
	Hydrogen Sulfide	✓		29CFR1910.1000 Z-2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers 2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Coker/Koro/Gas Oil HDS									
	Polynuclear Aromatics	✓		29 CFR 1910 Table Z-2					

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR. TWA	OSHA PEL 8HR. TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Hydrogen Sulfide	✓		29CFR1910.1000 2-2 Z 37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level
Crude Vacuum/Diesel HDS									
	Polynuclear Aromatics	✓		29 CFR 1910 Table Z-2					
	Benzene	✓		29CFR1910 1028	1.0 ppm	1.0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA.
	Hydrogen Sulfide	✓		29CFR1910.1000 Z-2 Z 37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers 2.0 fibers	0.1 fibers		Annual monitoring required

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR. TWA	OSHA PEL 8HR. TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Gas Oil/Leu									
	Benzene	✓		29CFR1910.1078	1.0 ppm	1.0 ppm	.5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA.
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Merax Unit									
	Gasoline		✓	29 CFR 1910 Subpart G	300 ppm	300 ppm			

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/S HR. TWA	OSHA PEL 8HR. TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910 95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level
Plafurmer									
	Benzene	✓		29CFR1910 1028	1.0 ppm	1.0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for the above action level.
QUINTANA PLANT:									
Hydrocracker/SMR									
	Polynuclear Aromatics	✓		29 CFR 1910 Table Z-2					
	Hydrogen Sulfide	✓		29CFR1910.1000 Z.2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required Personnel monitoring required for those above action level
Reformer/Naphtha HDS									
	Benzene	✓		29CFR1910.1028	1.0 ppm	1.0 ppm	.5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR. TWA	OSHA PEL 8HR. TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Hydrogen Sulfide	✓		29CFR1910.1000 Z.2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers 2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required Personnel monitoring required for those above action level
TBA									
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers 2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING										
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED	
		YES	NO							
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.	
Sour Water Stripper										
	Ammonia		✓	29CFR1910 Subpart G		50 ppm				
GENERAL PLANT OPERATIONS:										
Analytical Laboratory										
	Acetone		✓	29CFR1910 Subpart G	750 ppm	1000 ppm				
	Benzene	✓		29CFR1910 1028	1 0 ppm	1 0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA	
	MEK		✓	29CFR1910 Subpart G	200 ppm					
	Ventilation Survey		✓	29CFR1910 Subpart G					Annual survey is recommended to monitor operability and efficiency of vent hoods	
Pumping Department										
	Benzene	✓		29CFR1910.1028	1 0 ppm	1 0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA	

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Hydrogen Sulfide	✓							
	Lead Compounds			29CFR1910 Subpart G	0.15 mg/m³	0.15 mg/m³			
Welding Shops									
	Welding Fumes								
	Nickel		✓	29CFR1910 Subpart G	0.1 µ/m³				Establish baseline for determining proper respiratory protection
	Iron		✓	29CFR1910 Subpart G	5.0 µ/m³				Establish baseline for determining proper respiratory protection
	Manganese		✓	29CFR1910 Subpart G	1.0 mg/m³				Establish baseline for determining proper respiratory protection
	Titanium		✓	29CFR1910 Subpart G	10 mg/m³				Establish baseline for determining proper respiratory protection
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level
General Plant									

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Bulk Asbestos Survey	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers .2 fibers .2 fibers	0.1 fibers		Annual monitoring required
	Noise Survey	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Hydrogen Sulfide	✓		29CFR1910.1000 Z.2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required Personnel monitoring required for those above action level.
Crude Vacuum/Diesel HDS									
	Polynuclear Aromatics	✓		29 CFR 1910 Table Z.2					
	Benzene	✓		29CFR1910.1028	1.0 ppm	1.0 ppm	.5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA
	Hydrogen Sulfide	✓		29CFR1910.1000 Z.2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Gas Oil/Leu									
	Benzene	✓		29CFR1910.1028	1.0 ppm	1.0 ppm	.5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA.
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers 2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Microx Unit									
	Gasoline		✓	29 CFR 1910 Subpart G	300 ppm	300 ppm			

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910 95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Plafomer									
	Benzene	✓		29CFR1910 1028	1.0 ppm	1.0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910 1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
QUINTANA PLANT:									
Hydrocracker/SMR									
	Polynuclear Aromatics	✓		29 CFR 1910 Table Z-2					
	Hydrogen Sulfide	✓		29CFR1910.1000 Z-2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	5 fibers 2.0 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Reformer/Naphtha HDS									
	Benzene	✓		29CFR1910.1028	1.0 ppm	1.0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR. TWA	OSHA PEL 8HR. TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Hydrogen Sulfide	✓		29CFR1910.1000 Z.2 Z.37.2	10 ppm				Ceiling concentration - 20 ppm STEL 50 ppm - 10 minutes once/shift
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required Personnel monitoring required for those above action level
TRA									
	Total Hydrocarbons	✓		29CFR1910 Subpart G	Hexane, Heptane, Nonane, Pentane	500 ppm 400 ppm 200 ppm 600 ppm			
	Asbestos	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers 2.0 fibers .2 fibers 2.0 fibers	0.1 fibers		Annual monitoring required

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Noise	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level.
Sour Water Stripper									
	Ammonia		✓	29CFR1910 Subpart G		50 ppm			
GENERAL PLANT OPERATIONS:									
Analytical Laboratory									
	Acetone		✓	29CFR1910 Subpart G	750 ppm	1000 ppm			
	Benzene	✓		29CFR1910 1028	1 0 ppm	1 0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA
	MEK		✓	29CFR1910 Subpart G	200 ppm				
	Ventilation Survey		✓	29CFR1910 Subpart G					Annual survey is recommended to monitor operability and efficiency of vent hoods
Pumping Department									
	Benzene	✓		29CFR1910 1028	1 0 ppm	1 0 ppm	5 ppm		Monitoring required annually STEL (5 ppm) for 15 minutes TWA

INDUSTRIAL HYGIENE PLAN- CHEMICAL MONITORING									
LOCATION	MONITORED CONTAMINANT	MONITORING REQUIRED		REGULATION	ACGIH TLV/8 HR.TWA	OSHA PEL 8HR.TWA	ACTION LEVEL	SAMPLE RESULTS	COMMENT &/OR RECOMMENDED ACTION REQUIRED
		YES	NO						
	Bulk Asbestos Survey	✓		29CFR1910.1001	Amosite Chrysotile Crocidolite other forms	.5 fibers .2 fibers .2 fibers .2 fibers	0.1 fibers		Annual monitoring required
	Noise Survey	✓		29CFR1910.95	90 dBA	90dBA	85dBA		Annual area monitoring required. Personnel monitoring required for those above action level

TABLE 1. Threshold Limit Values for Noise

Duration per Day Hours	Sound Level dBA*
16	80
8	85
4	90
2	95
1	100
1/2	105
1/4	110
1/8	115*

* Sound level in decibels are measured on a sound level meter, conforming as a minimum to the requirements of the American National Standard Specification for Sound Level Meters, S1.4 (1971) Type S2A and set to use the A-weighted network with slow meter response.

* No exposure to continuous or intermittent in excess of 115 dBA.

Values [Values are given in °C and (°F) WBGT]

Work - Rest Regimen	Work Load		
	Light	Moderate	Heavy
Continuous work	30.0 (86)	26.7 (80)	25.0 (77)
75% Work -			
25% Rest, each hour	30.6 (87)	28.0 (82)	25.9 (78)
50% Work -			
50% Rest, each hour	31.4 (89)	29.4 (85)	27.9 (82)
25% Work -			
75% Rest, each hour	32.2 (90)	31.1 (88)	30.0 (86)

A. The range of the dry and the natural wet bulb thermometer should be -5°C to $+50^{\circ}\text{C}$ (23°F to 122°F) with an accuracy of $\pm 0.5^{\circ}\text{C}$. The dry bulb thermometer must be shielded from the sun and the other radiant surfaces of the environment without restricting the airflow around the bulb. The wick of the natural wet bulb thermometer should be kept wet with distilled water for at least 1/2 hour before the temperature reading is made. It is not enough to immerse the other end of the wick into a reservoir of distilled water and wait until the whole wick becomes wet by capillarity. The wick should be wetted by direct application of water from a syringe 1/2 hour before each reading. The wick should extend over the bulb of the thermometer, covering the stem about one additional bulb length. The wick should always be clean and new wicks should be washed before using.

B. A globe thermometer, consisting of a 15-cm (6-inch) diameter hollow copper sphere painted on the outside with a matte black finish or equivalent, should be used. The bulb or sensor of a thermometer (range -5°C to $+100^{\circ}\text{C}$ [23°F to 212°F] with an accuracy of $\pm 0.5^{\circ}\text{C}$) must be fixed in the center of the sphere. The globe thermometer should be exposed at least 25 minutes before it is read.

C. A stand should be used to suspend the three thermometers so that they do not restrict free air flow around the bulbs, and the wet bulb and globe thermometer are not shaded.

D. It is permissible to use any other type of temperature sensor that gives a reading identical to that of a mercury thermometer under the same conditions.

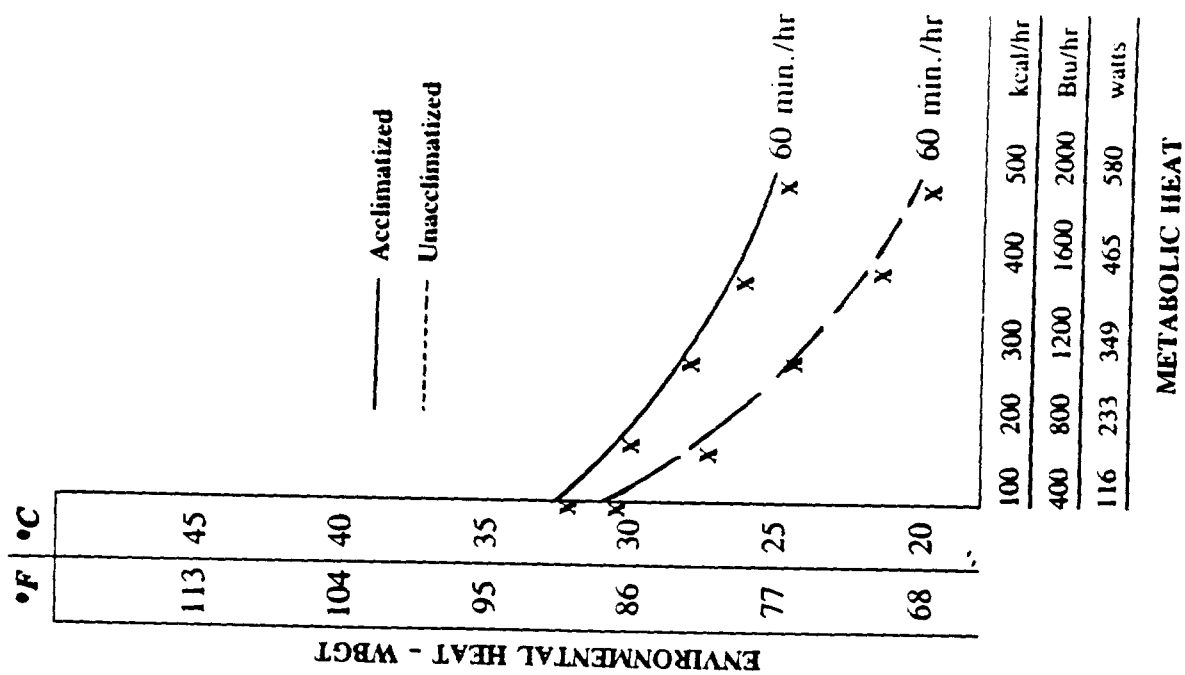


Figure 1 — Permissible heat exposure Threshold Limit Values for heat acclimatized and unacclimatized workers

INDUSTRIAL HYGIENE PLAN 1992

RAM 0002265

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