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TEXAS OPERATIONS
FREEPORT, TEXAS 77541

March 26, 1987

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APR 06 1987

INDUSTRIAL HYGIENE SERVICES

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cc: IHS staff

Estimating Degrees of Exposure and Priority (Hazard) Rating, for our industrial hygiene inventories, is a very subjective process. We juggle a number of variables trying to find the one category that best describes a specific job class/stress combination.

I have tried to take some of the mystery out of the process by defining the variables and applying a simplified system of weighting factors. By multiplying the factors, for all variables, I get a single number for Degree of Exposure or Priority Rating. Using my judgement, I have devised a range of values that correspond to each category of the two rating systems.

I am not suggesting that this approach be used to estimate all degrees of exposure and priority ratings in a given inventory. Instead, this system can be used as a spot check for consistency and to help with some difficult assessments. I have found that the plant folks appreciate this technique since they are better able to understand the thinking process. This would also be a good training tool for new industrial hygienists.

Please review this rating system, particularly the criteria for selecting the degree of exposure or priority rating category. Let me know if you can envision circumstances where my range of values do not result in the "appropriate" rating. If we can all agree on the criteria, we would have a useful tool that could be passed on to the rest of the industrial hygiene community.

George H. Flores
Industrial Hygiene Services

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ESTIMATING DEGREE OF EXPOSURE *****

FACTOR	0	1	2	3
AMOUNT HANDLED	NONE	GRAMS	POUNDS	GALLONS
HANDLE PROCEDURE	----	CLOSED SYSTEM	PARTIALLY OPEN	OPEN
FREQUENCY	----	1/MONTH OR LESS	1/WEEK OR LESS	2 OR MORE PER WEEK
AMOUNT OF TIME	----	15 MIN OR LESS	15 MIN TO 2 HRS	MORE THAN 2 HRS
VOLATILITY	----	LOW VP < 100	MED VP 100-400	HIGH VP > 400
VENTILATION: GEN	----	> 100 FPM	50-100 FPM	< 50 FPM
LOC	----	ENCLOSED	SLOT	CANOPY

MULTIPLY THE SIX FACTORS AND APPLY THE
FOLLOWING CRITERIA:

0 - 4	NEGLECTIBLE EXPOSURE
5 - 32	LOW POTENTIAL FOR EXPOSURE
33 - 324	MODERATE POTENTIAL FOR EXPOSURE
> 324	HIGH POTENTIAL FOR EXPOSURE

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ESTIMATING HAZARD (PRIORITY) RATING *****

FACTOR	1	2	3	4
DEGREE OF EXPOSURE	NEGL	LOW	MOD	HIGH
IH GUIDE - PPM	> 50	11-50	2-10	< 2
- MG/M3	> 7	1-7	0.2-0.9	< 0.2
TOXIC EFFECT	NUISANCE	IRRITANT	SYSTEMIC INJURY	-GENESIS

MULTIPLY THE THREE FACTORS AND APPLY THE FOLLOWING CRITERIA:

1 - 2	FIVE HAZARD RATING
3 - 12	FOUR HAZARD RATING
13 - 30	THREE HAZARD RATING
30 - 48	TWO HAZARD RATING
> 48	ONE HAZARD RATING

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DRAFT #4

DEGREE OF EXPOSURE RATINGS

The degree of exposure (DE) rating is a means of qualitatively estimating employees' potential exposure to those chemical and physical agents present in the workplace. Degree of exposure ratings may vary by job assignment. They provide a relative ranking of exposure potential which has the greatest validity within a plant rather than between different plants. Degree of exposure ratings are intended to describe exposure under normal operating conditions. The degree of exposure is based primarily on the type of operation or condition of use; however, other factors such as the physical properties of the material, general and local ventilation are also considered. It should be emphasized that these ratings are based on the employees' potential degree of exposure; that is, the exposure to be expected if personal protective equipment is not worn.

When assigning degree of exposure ratings to a particular job category, any infrequent but routine job tasks and maintenance procedures should be taken into consideration. In other words, the worst case for routine potential exposure should be factored into the overall degree of exposure rating for that job category.

Plant supervision and industrial hygienists use the following four categories as guidelines for determining the degree of exposure rating.

<u>DE</u>	<u>Description</u>
NEG	Within this job assignment*, the normal conditions of use and the physical properties of the material indicate that both inhalation and skin exposures are likely to be no more than negligible. Characterized by remote handling operations with the equipment isolated from the employees' work area. There is no equivalent exposure category on the T.I.M.E. system since the categories on the T.I.M.E. system serve primarily to determine appropriate handling precautions for known exposure situations. Typical job assignments which might be assigned a DE rating of 'NEG' include computer personnel and secretaries.
LOW	Within this job assignment, the normal conditions of use and the physical properties of the material indicate that both inhalation and skin exposure are likely to be no more than minor. Characterized by work around closed systems; sampling, laboratory work, packaging or dumping of materials with low to moderate volatility or dustiness with sufficient ventilation. The equivalent T.I.M.E. system category would be 'LOW'.

*Job assignment is defined as a group of employees doing the same type of work which results in their having comparable exposures.

MOD Within this job assignment, the normal conditions of use and the physical properties of the material indicate that there is a potential for moderate inhalation and/or skin exposures.

Characterized by manual handling of materials such as sampling, packaging, filter changing or dumping of materials with low to moderate volatility or dustiness using potentially insufficient ventilation. This category may also include handling of materials with high volatility or dustiness if sufficient local exhaust ventilation is present. The equivalent T.I.M.E. system category would be 'MOD'.

HIGH Within this job assignment, the normal conditions of use and the physical properties of the material indicate that there is a potential for high inhalation and/or skin exposures.

Characterized by manual operations such as sampling, packaging, filter changing or dumping of materials with high volatility or dustiness without sufficient local exhaust ventilation. Control is generally achieved through extensive use of protective equipment. The equivalent T.I.M.E. system category would be 'HIGH'.

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PRIORITY RATINGS

The priority rating is useful for representing and communicating the risks present in particular work situations. It is also helpful in establishing industrial hygiene priorities. The priority rating is based on two things: the conditions of use and physical properties (Degree of Exposure Rating), and the toxicity and warning properties of the material (Industrial Hygiene Guide if available). Within a given plant, the rating for a single chemical may be different for various job assignments because of the varying degree of exposure.

Industrial hygienists use the following six categories as guidelines for assigning the priority ratings.

<u>PR</u>	<u>Description</u>
5	The degree of exposure rating, the toxicity of the material, and the warning properties are such that, for this job assignment under normal operating conditions, there is a negligible potential for exposures to approach or exceed acceptable levels. No further exposure evaluation is needed.
4	The degree of exposure rating, the toxicity of the material, and the warning properties are such that, for this job assignment under normal operating conditions, there is a minor potential for exposures to approach or exceed acceptable levels. Only minimal monitoring may be needed to confirm this rating.
3	The degree of exposure rating, the toxicity of the material, and its warning properties are such that, for this job assignment under normal operating conditions, there is a moderate potential for exposures to approach or exceed acceptable levels. Employees' exposures should be monitored regularly or subjectively evaluated by a health professional.
2	The degree of exposure rating, the toxicity of the material, and the warning properties are such that, for this job assignment under normal operating conditions, there is a significant potential for exposures to approach or exceed acceptable levels. Periodic monitoring should be initiated and employees' exposure levels reevaluated on a regular basis.

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- 1 The degree of exposure rating, the toxicity of the material, and the warning properties are such that, for this job assignment under normal operating conditions, there is a high potential for exposures to exceed acceptable levels.

Immediate action by plant supervision and industrial hygiene is necessary to evaluate and control employees' exposure levels to eliminate this high exposure potential. Periodic follow-up documentation is needed to ensure control measures are effective.

- T This "T" category is available to indicate that training has been conducted on certain chemicals which may be encountered on a nonroutine or emergency basis. No degree of exposure* is assigned with this "T" rating since exposures may never occur or may occur to an unpredictable degree. Situations which may be appropriate for a "T" priority rating include:

- a. For Security, Fire and Emergency Response Groups
 - Typically, training is conducted on selected chemicals which may be encountered in an emergency situation.
- b. For Service Groups
 - Training may be conducted on chemicals which are not part of a group's own inventory, but which have the potential for being encountered based on the type and location of the job being performed.

*Note: A dash (-) is used under degree of exposure when a "T" is assigned as a priority rating.

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