U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 77-95-455

BEREL'S RESTAURANT
DENVER, COLORADO

JANUARY 1978

I. TOXICITY DETERMINATION

A health hazard evaluation was conducted by the National Institute for Occupational Safety and Health (NIOSH) on August 31, 1977, in the kitchen at Berel's Restaurant, Denver, Colorado. At the time of this evaluation, breathing zone and general room air samples were taken for total particulates. Heat stress measurements were also conducted. A health hazard did not exist from exposures to total particulates. Heat stress measurements based on Wet Bulb-Globe Temperature (WBGT) averaged slightly below the NIOSH and American Conference of Governmental Industrial Hygienists (ACGIH) recommended criteria of 79^{0} F. Heat stress was not a health hazard during this evaluation for the acclimatized worker. However, it could be a borderline health hazard for the unacclimatized worker. Confidential employee interviews did not reveal any health problems.

II. DISTRIBUTION AND AVAILABILITY

Copies of this determination report are currently available upon request from NIOSH, Division of Technical Services, Information and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. Information regarding its availability through NTIS can be obtained from NIOSH, Publications Office, at the Cincinnati address.

Copies of this report have been sent to:

1. Representative of Employees
2. Berel's Restaurant
3. U.S. Department of Labor/OSHA - Region VIII
4. NIOSH - Region VIII

For the purpose of informing the 12 affected employees, a copy of this report shall be posted in a prominent place accessible to the employees for a period of 30 calendar days.

I. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare,

following a written request by any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

NIOSH received such a request from cooks at Berel's Restaurant, Denver, Colorado, to evaluate potential exposures to smoke and heat from broilers and fryers located in the restaurant kitchen.

IV. HEALTH HAZARD EVALUATION

A. Kitchen Area

The kitchen area consisted of a charcoal grill, two large gas-fired grills, numerous ovens, and several deep fat fryers. A hood is located directly above the grills, which is doing an adequate job of exhausting vapor, grease, and smoke coming from the food that is being prepared. Cooks working in this area had requested that a health hazard evaluation be conducted.

B. Evaluation Design

Cooks were working directly around the ovens and grills, which were in the specific area of this hazard evaluation request. All workers were monitored for total particulates and heat stress. Each worker was interviewed, and questions were directed at work history and specific medical complaints.

C. Evaluation Methods

All breathing zone air samples were collected on pre-weighed filters using vacuum pumps operated at 1.5 liters per minute.

Heat stress measurements were conducted in this immediate area throughout the 8-hour work shift. These measurements were taken with calibrated thermometers, using all recommended heat stress equipment as provided in the 1977 Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents in the Workroom Environment, ACGIH, pages 58-65. Heat stress measurements were calculated for indoors with no solar load. At the present time WBGT is the simplest and most suitable technique for measuring environmental heat factors as they affect a worker. For this evaluation, WBGT values were calculated according to the following equation: WBGT=0.7 WB + 0.3 GT (indoors with no solar load).

D. Criteria for Assessing Workroom Concentrations of Air Contaminants

The three sources of criteria used to assess workroom concentrations of air contaminants were: (1) recommended threshold limit values (TLVs) and their supporting documentation as set forth by the American Conference of Governmental Industrial Hygienists (ACGIH), 1977; (2) Occupational Safety and Health Administration (OSHA) standards (29 CFR 1910), January 1976; and (3) NIOSH criteria for recommended standard for hot environments, 1972.

Substances	TLV	Permissible Exposures 8-Hour Time-Weighted Exposure Basis (mg/M^3) OSHA Standard	NIOSH Criteria For Recommended Standard
Total Particulates	10	15	----
Heat Stress* (heavy work load for male workers)	79° F.	----	79° F.

mg/M^3 = approximate milligrams of substance per cubic meter of air

* = it should be emphasized that these values are for acclimated workers who are physically fit

Occupational health standards are established at levels designed to protect individuals occupationally exposed to toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

E. Environmental Results and Discussion

Results of environmental sampling showed that workers were not overexposed to particulates. Heat stress measurements illustrate that acclimatized workers are not overexposed to heat. However, heat stress may be a potential hazard for the unacclimatized worker. For a detailed description of heat stress measurements and particulate concentrations, please refer to Tables I and II.

Ventilation measurements were made on the exhaust hood directly above the cooking area. The hood was exhausting approximately 75 linear feet per minute, which was adequate to exhaust vapors, grease, and smoke from the food that was being prepared.

All 12 workers in the immediate area, which included the cooks, were interviewed. None of the workers reported any work-related health problems or symptoms due to excessive heat exposures.

Conclusions

Results of environmental data, confidential employee interviews, and personal observations illustrate that none of the workers were exposed to excessive levels of total particulates. Heat exposures were not a health hazard.

The kitchen area was clean and orderly; no toxic chemical or physical agents were observed. It is the opinion of the Industrial Hygienist that this is a very clean and healthful place to work.

V. RECOMMENDATION

All new cooks should be acclimatized to the hot work areas before allowing them to work an 8-hour shift.

VI. AUTHORSHIP AND ACKNOWLEDGMENTS

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TABLE I

ATMOSPHERIC CONCENTRATIONS OF TOTAL PARTICULATES

Berel's Restaurant - Denver, Colorado

August 31, 1977

Sample Number	Location	Job Classification	Time of Sample	Total Particulates (mg/M^3)	Type of Sample
7	Kitchen	Food Preparation	7:55 AM - 2:30 PM	0.13	BZ
3	Kitchen	Supervisory Cook	8:00 AM - 2:25 PM	0.14	BZ
4	Kitchen	Cook	8:05 AM - 2:25 PM	*	BZ
2	Kitchen	Food Preparation	8:15 AM - 1:25 PM	0.13	BZ
5	Kitchen	Food Preparation	8:20 AM - 2:30 PM	0.05	BZ
10	Kitchen	----	8:25 AM - 2:25 PM	*	General Room
			EVALUATION CRITERIA	10.0	

mg/M^3 = approximate milligrams of substance per cubic meter of air

BZ = breathing zone

* = pre-weighed filters weighed more than the filters did after sample collection

TABLE II

HEAT STRESS MEASUREMENTS

Berel's Restaurant - Denver, Colorado

August 31, 1977

Sample Time	Wet Bulb Temp. (^{o} F.)	Globe Temp. (^{o} F.)	WBGT (^{o} F.)
8:00 a.m.	68	91	75
10:00 a.m.	70	92	77
12:00 noon	73	93	79
2:00 p.m.	71	105	82
		EVALUATION CRITERIA	79 *

WBGT = 0.7 (wet bulb temperature ^{o} F.) + 0.3 (globe temperature ^{o} F.)

* Average WBGT for a 6-hour work period is 78^{o} F.