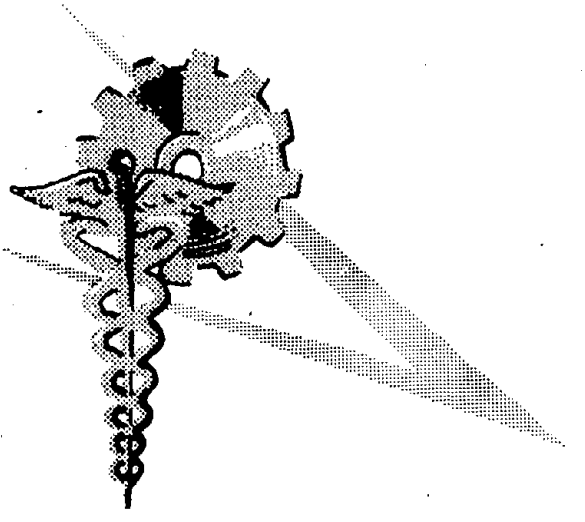
ENVIRONMENTAL HEALTH NEEDS
AT MERRITT ISLAND LAUNCH AREA
KENNEDY SPACE FLIGHT CENTER, FLORIDA



TR-19

JANUARY 1965

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Bureau of State Services (EH)

ENVIRONMENTAL HEALTH NEEDS

AT MERRITT ISLAND LAUNCH AREA

KENNEDY SPACE FLIGHT CENTER, FLORIDA

Howard E. Ayer, Division of Occupational Health
Austin M. Heller, Division of Air Pollution
Samuel W. Hoover, Division of Environmental Engineering and Food Protection
Salvatore J. Trombetta, Division of Water Supply and Pollution Control
Andrew C. Wheeler, Division of Radiological Health

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1014 Broadway, Cincinnati, Ohio 45202

SUPPLEMENTARY MATERIAL (APPENDIXES) REFERRED TO BUT NOT INCLUDED IN THIS DOCUMENT

1. Public Law 88-206, 88th Congress, H.R. 6518, December 17, 1963 (Clean Air Act).

2. "The New Federal Clean Air Act" by Vernon G. MacKenzie, Chief, Division of Air Pollution, U. S. Department of Health, Education, and Welfare, Public Health Service (presented at the Annual Meeting of the Air Pollution Control Association, Houston, Texas, June 1964).

3. Suggested Analytical Methods for Some Common Air Pollutants:

   A. Nitrate in Suspended Particulates.

   B. Sulfate in Suspended Particulates.

   C. Sulfur Dioxide.

   D. Aliphatic Aldehydes.

   E. Formaldehyde.

   F. Acrolein.

   G. Nitrogen Dioxide and Nitric Oxide.

   H. Oxidants (including Ozone).

4. Meaningful Air Quality Measurements on a Limited Budget by Frank E. Bell, Jr., APCA Journal 13, 3, March 1963.

5. A. Suggested Instrumentation and Laboratory Equipment for Industrial Hygiene Engineering Program.

   B. Suggested Instrumentation and Equipment for an Environmental Health Laboratory.

6. Water Pollution Control.

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ENVIRONMENTAL HEALTH NEEDS

AT MERRITT ISLAND LAUNCH AREA

KENNEDY SPACE FLIGHT CENTER, FLORIDA

SUMMARY AND GENERAL RECOMMENDATIONS

A visit to the Merritt Island Launch Area (MILA), National Aeronautics and Space Administration was made on December 4, 1964, by representatives of each of the five environmental health divisions (Air Pollution, Environmental Engineering and Food Protection, Occupational Health, Radiological Health, Water Supply and Pollution Control) of the Bureau of State Services, Public Health Service. The visit was in response to a request from NASA Headquarters that recommendations be given on space, equipment and personnel necessary to maintain an adequate environmental health program for MILA.

A contract for furnishing occupational health services to MILA, including environmental health services, has been awarded to Trans World Airlines, Inc. (TWA), by NASA. A similar contract has been awarded to Pan American Airlines, (PAA), by the Air Force for activities on Cape Kennedy. *Potential health hazards are of the same type in both locations and the division of environmental health responsibilities in the two adjacent areas is awkward and artificial. The desirability of a single or joint environmental health program for the entire complex is unquestionable and every effort should be made by the Agencies and Contractors concerned to effect a single program.* Suggestions for implementation of such a single or joint program are, however, outside the scope of the request and recommendations made in this report concern only MILA.

ENVIRONMENTAL HEALTH AT MILA

Recommendations of the several divisions are attached. Consolidated personnel and space recommendations are as follows:

	Personnel	Space (Sq.Ft.) Lab	Office
Air Pollution and Industrial Hygiene	1 Industrial Hyg. Engr.(1) 1 Industrial Hygienist(1) 1 Technician		200
	1 Chemist(2) (gas chromatography, ultraviolet, visible and infrared spectrography)	800	200
	Instrument Laboratory	400	
	1 Chemist(2) (Solvent extraction methods, preparation, methods development)	800	
Environmental Engineering and Food Protection	1 Sanitarian	100	
	1 Microbiologist	288	
Radiological Health	1 Health Physicist 1 Technician 1 Secretary (½ time)	300	200
Water Supply & Pollution Control	1 Chemist(2) 1 Bacteriologist 1 Lab Aide	650	

Total Personnel		Total Space	
Professional	9	Laboratory	3338
Technical & Clerical	4	Office	600

If routine monitoring of air contaminants or physical agent requires additional personnel, the recommended staff may be increased by employment of physical science aides as necessary. Services of a micrometeorologist should be available on at least a consulting basis.

Note:

(1) At least one of these individuals should have knowledge and, preferably, experience with air pollution problems.

(2) The three chemists will each handle water and air samples in their particular specialty.

ENVIRONMENTAL HEALTH AT MILA

It is most important that the environmental health personnel have authority to inspect any and all operations of NASA, NASA contractors, and construction contractors on the MILA at any time. Such authority must include research operations, industrial operations, food preparation and serving operations, transport and storage operations and any other operations which may create potential health hazards. The Medical Director should have authority to order immediate cessation or correction of any condition which, in his judgment, poses an immediate hazard to health of personnel; he should be permitted to delegate such authority. Implementation of these recommendations required that the Medical Director report directly to the Director, Base Operations and be authorized to deal directly with the official in charge of each agency and contractor in the area as necessary.

In the interim period until a permanent facility can be constructed it is recommended that at least 200 square feet of laboratory space with at least one chemical fume hood be provided for an industrial hygienist, that direct reading instruments for evaluation of occupational hazards (including ionizing radiation) be purchased, and that a sanitarian likewise be furnished a temporary facility.

Consultation with either the Public Health Service and/or the State Board of Health is desirable to be implemented on a periodic basis, say, at least quarterly the first year and thereafter twice a year. Both the public health agencies and the operating environmental health program should gain from the experience and information exchanged.

ENVIRONMENTAL HEALTH AT MILA

INTRODUCTION

By a letter of September 23, 1964, Mr. John D. Young, Deputy Associate Administrator for Administration, NASA, requested assistance from Dr. Robert J. Anderson, Chief, Bureau of State Services, in evaluation of staff and facilities required to maintain an environmental health program for the Merritt Island Launch Area (MILA), NASA.

An exploratory site visit was made by Howard E. Ayer of the Division of Occupational Health, Public Health Service on October 6 and 7, 1964. The site was again visited on December 4, 1964, by the following individuals:

Howard E. Ayer, Chief, Engineering Section, Research and Technical Services Branch, Division of Occupational Health

Austin M. Heller, Deputy Chief, Technical Assistance Branch, Division of Air Pollution

Samuel W. Hoover, Milk and Food Consultant, Region IV, Division of Environmental Engineering and Food Protection

Salvatore J. Trombetta, Chief, Water Quality, Region IV, Division of Water Supply and Pollution Control

Andrew C. Wheeler, Senior Veterinarian, Southeast Radiological Health Laboratory, Division of Radiological Health

The above named group met with the following:

S.E. Carlson, Director, Base Operations, NASA, Kennedy Space Center

V.E. Christenson, Contract Manager, NASA, Kennedy Space Center

Earl Bisher, Sanitary Engineer, NASA, Kennedy Space Center

R.M. Marrazzo, Industrial Hygienist, NASA Headquarters, Washington, D.C.

John E. Boysen, M.D., Director, Medical Services, TWA, Base Support Services

W.J. Hindman, Director, Medical Administration, Occupational Health Unit (TWA)

James Langford, Sanitary Engineer, Occupational Health Unit (TWA)

ENVIRONMENTAL HEALTH AT MILA

Individual sections of this report were prepared by the individuals representing the Divisions of the Bureau of State Services, PHS, as listed above. Individual sections are:

Air Pollution
Environmental Sanitation
Health Physics
Industrial Hygiene
Water Quality Control

The personnel and laboratory recommendations are presented jointly for the Air Pollution and Industrial Hygiene Sections.

AIR POLLUTION

In attempting to assess the potential air pollution problems that may accrue to MILA it is essential that due cognizance be given to the following factors:

1. Quantity and type of propellants to be test fired and launched.
2. Frequency of static firing and the size of units to be tested.
3. Frequency of missile launching and the size of the lower rocket stages, and the nature and quantity of propellants used.
4. By-products of reactions expected from the "normal" test firing of rocket motors and the launching of missiles (lower stages, primarily).
5. The meteorological parameters involved during the "sudden" release (or puff) of contaminants into the ambient atmosphere, and the assessment of whether adequate meteorological information will be available.
6. Design of monitoring systems capable of evaluating the maximum ground level concentrations from either test firing of rocket motors or launching of missiles, and the accurate assessment of effects on man, animals, vegetation and things.
7. With respect to effects it is anticipated that the present joint ecological study, between the Air Force and the Public Health Service will provide sufficient information to assess the current ambient air quality and the "effect" of such items as the citrus groves, edible vegetable plots, etc. resident in the surrounding area.

ENVIRONMENTAL HEALTH AT MILA

8. Ambient air monitoring capability be so designed to handle unusual or unexpected release of contaminants to the atmosphere, including accidental spills.

9. Transportation, handling and storage of propellants and adjunct materials.

It is understood that in the next three years MILA will be using the following compounds in either static test firing of rocket motors or in the launching of missiles or both: pentaborane perchlorate, triethyl aluminum (TEA), trichloroethylene, unsymmetrical dimethyl hydrazine (UMDH), argon, ethyl alcohol, ethylene glycol, fluorine-oxygen (FLOX), helium, hydrazine, hydrogen, hydrogen peroxide, inhibited red fuming nitric acid (IRFNA), liquid air and liquid oxygen, RP-1 (kerosene), monomethyl hydrazine (MMH) and nitrogen tetroxide. These materials vary from completely inert and nontoxic to extremely toxic and hazardous. Some of the oxidation products of hydrocarbon with fluorine and oxygen, for example, are lethal to rats in a few minutes at the parts per million level.

If beryllium is also to be used as an additive either to the solid propellants or liquid bi-propellants, the air pollution problems may assume a much higher order of magnitude.

The environmental health laboratory must have the capability of assessing the potential of the air pollution problem prior to either the test firing of rocket motors or the launching of the missiles. Close coordination should be maintained with the meteorological staff on board to assist in prefiring calculations, location of sampling sites, and the selection of optimum firing times. This capability should also include the sophistication of automating offsite monitoring should the program so indicate. Further the capability of analyzing the propellant, per se, and the composition of the off gases immediately after firing should be a prerequisite of the laboratory staff.

The MILA contractor should become knowledgeable with respect to responsibility to the State Health Department of Florida, and the current Florida State Law with respect to Air Pollution Control, and the responsibility to the Public Health Service, Division of Air Pollution under the Clean Air Act enacted December 17, 1963. A copy of the "Clean Air Act" (Appendix 1) and Mr. V. G. MacKenzie's paper of June 1964 (Appendix 2) is attached.

The extent of MILA contractor support to monitor off site areas is not clear, at this time, but an agreement between the responsible agencies should be reached within six months.

ENVIRONMENTAL HEALTH AT MILA

The selection of methods of analysis and the ambient air collection equipment should be left to the personnel responsible in the laboratory. It would be desirable to have the techniques selected reviewed by the Division of Air Pollution, Public Health Service. Attached is a copy of suggested analytical methods for a number of common air pollutants which should serve as a guide (Appendix 3). Such major analytical instruments as infrared, visible and ultraviolet spectrophotometers, and gas chromatographs are to be part of the industrial hygiene requirements, and will be needed, from time to time, with respect to the air pollution program. The analysis for "exotic" chemical compounds may best be served by outside contracting if additional analytical instruments are required.

AIR POLLUTION AND INDUSTRIAL HYGIENE PERSONNEL, SPACE AND EQUIPMENT REQUIREMENTS

I. AIR POLLUTION AND INDUSTRIAL HYGIENE ENGINEERING PERSONNEL

1 - Engineer with graduate degree and/or extensive experience in industrial hygiene, preferably a Diplomate of the American Academy of Industrial Hygiene.

1 - Industrial Hygienist - Either this individual or the engineer should have extensive knowledge of and preferably experience with air pollution problems.

1 - Technician - for assistance in field sampling, laboratory analyses and instrument maintenance.

- Services of a micro-meterologist should be available on, at least, a consulting basis.

II. ANALYTICAL CHEMISTRY PERSONNEL

1 - Chemist for gas chromatography

1 - Chemist for infrared, visible and ultraviolet spectrophotometry

1 - Chemist for silica and metal analyses by means of spectrographic and solvent extraction methods, instrument and methods development.

ENVIRONMENTAL HEALTH AT MILA

NOTE: The summary recommendations include only two chemists - it is assumed that samples from the water pollution section will be divided among these two chemists and the chemist recommended by Water Quality based on type of analysis desired. Air and biological samples would likewise be so distributed.

III. LABORATORY SPACE

1 - Preparation laboratory, approximately 800 sq. ft. including 2 five foot sections of laboratory fume hoods for hot plates and muffle furnaces.

1 - Field instrument maintenance and methods development laboratory, approximately 800 sq. ft. with 2 six foot sections of laboratory fume hood, preferably with removable center section.

1 - Analytical instruments lab, approximately 400 sq. ft. for infrared and ultraviolet spectrophotometers, gas chromatograph and other physical instruments.

IV. INDUSTRIAL HYGIENE FIELD EQUIPMENT BY TYPE OF HAZARD

Gas and Vapor

Indicating tube devices - CO, CO_2, H_2S, SO_2, $CHCl_3$, UDMH, etc.
Bubblers
Gas bottles, plastic bags, etc.
Oxygen meter
Halide meter
Flame ionization meter
Combustible gas indicator with 10X scale
Mercury vapor detector

Dust, Mists, Fumes and Smokes

Filter holders
Membrane, glass fiber and cellulose filters
Midget impingers
Cascade impactor
Personal samplers (MSA, Unico or Casella)
Portable respiratory mass sampling device
Phase contrast microscope with research quality illuminator and accessories (may use biologist's)
Hivol samplers
Electrostatic precipitator
Portable sampling pumps, AC, battery and gas powered
Sequential sampler

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Physical Hazards (excluding ionizing radiation)

Sound survey meter
Sound level meter
Octave band analyzer
Foot-candle meter
UV meter
RF meter
Psychrometer
Globe thermometer

Ventilation Measuring Equipment

Velometer with accessories
Pitot tube with inclined and vertical manometers
Thermoanemometer
Velometer, Jr.
Tachometer
Magnehelic gauges, 1", 4", 24"

Preparation of known concentrations and sampling volume measurements

2 Wet test meters - small and medium size
2 Laboratory rotameter sets
40 liter carboy
Water filter for membrane filtration of distilled water

V. AIR POLLUTION FIELD EQUIPMENT

Gas and Vapor

1. Automatic sampling, analyzing, and recording instrument for*:

   Nitrogen Oxides
   HF, (Hydrogen fluoride)
   Hydrocarbons
   Oxidants
   Others

   *These instruments are available should the need arise.

2. Automatic sequential gas samplers for automatic collection of consecutive air samples for specific gases.*

   *Also suggested to meet Industrial Hygiene needs.

3. Manual multiple gas sampling kit for simultaneous collection of several gases. Short-term samples (about 30 minutes). (Note Appendix 4 by F. A. Bell, Jr.)

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4. Miscellaneous air sampling apparatus such as bubblers, flowmeters, air pumps, dynamic and static dilution systems for instrument calibration, personal air monitors, detector tube samplers, etc. (provided in part for Industrial Hygiene requirements).

Particulates

1. Hi-volume air samplers

2. Membrane filter samplers

3. Sequential filter tape samplers

4. Impactors, electrostatic precipitators, thermal depositors

5. Automatic sampling, analyzing and recording instruments for total dust loading and specific metals such as Be (depending on need).

6. Miscellaneous apparatus such as wet and dry test meters, positive displacement pump, spirometer, thermal anemometer for instrument calibrations, air pumps, orifice flowmeters, etc. (Similar to Industrial Hygiene requirements).

Meteorological Measurements

1. Wind systems (wind speed and direction)

2. Hygrothermographs

3. Selective sector samplers to control air sampling instruments

4. Tether-sonde to determine low-level temperature gradients. (This aspect needs to be coordinated with over-all meteorological operations at both Cape Kennedy and MILA).

ENVIRONMENTAL HEALTH AT MILA

ENVIRONMENTAL ENGINEERING AND FOOD PROTECTION

GENERAL

This report will be limited to those areas of sanitation which the Division of Environmental Engineering and Food Protection has regional program responsibility for; namely, water, solid waste disposal, insect and rodent control, milk and food sanitation.

The situational considerations for the environmental health facilities at MILA are as follows:

I. Man Power Load Per Working Day

A. The man power load on MILA during a working day is now approximately 16,000, and will be maintained at this level through 1965.

B. Projected approximations of this work day load through 1969:

1966	15,500
1967	15,000
1968	14,500
1969	13,000

II. Staff

A. The bio-environmental engineering organization for the MILA facility proposes the following staff.

1. Engineers (3)
   a. Sanitary
   b. Industrial
   c. Chemical

2. Microbiologist (1)

3. Health Physicist (1)

4. Technicians (9)
   a. Chemical laboratory technicians (4)
   b. Electronic technicians for equipment maintenance (5)

5. Administrative - Clerical (2)

ENVIRONMENTAL HEALTH AT MILA

III. Environmental Sanitation Program Responsibilities

A. Food service sanitation for these facilities which are completed or to be completed:

1. Six cafeterias of which one will serve as a central catering facility supplying five satellite cafeterias.

2. Four restaurants housed in trailer complexes.

3. Ten catering trucks used to provide food service for personnel on various job sites.

4. A considerable but undetermined number of vending machines dispensing sandwiches, hot soups, milk and ice cream.

5. A large food warehouse presently situated in Courtenay, Florida, a small community on the Island, will be moved to MILA.

B. Milk Sanitation. Insofar as is applicable for a community whose entire supply is shipped into it from outside.

C. Water. Potable water is obtained from the municipal supply at Cocoa, Florida, via a main conduit and supply system.

D. Solid Waste Disposal. Solid wastes composed largely of construction waste materials at this time are disposed of in a central sanitary landfill on MILA. The operation is somewhat complicated by the water table which rises to within three feet of the ground surface.

E. Insect and Rodent Control.

1. Space spraying program employing pesticides.

2. Elimination of breeding areas insofar as is practical.

RECOMMENDATIONS

In the recommendations which follow, we wish to qualify them to the degree that they are based on anticipated environmental sanitation which we perceive at this time, but which as the program develops may require modification.

ENVIRONMENTAL HEALTH AT MILA

I. Staff

Based on the information outlined in the prologue and our observations, we feel that the environmental sanitation facilities for MILA should be commensurate with those of a municipal health department for a city of 15,000. The highly specialized staff proposed for the bio-environmental engineering organization will be primarily concerned with the working environment and its unique problems in the Saturn program. They will in part be concerned with the sanitation activities of support -- water, food, solid waste disposal, insect and rodent control -- but these programs within the MILA "community" will require a degree of surveillance, if effectively implemented, that is not now permitted within the organization proposed. We would, therefore, recommend that the staff be enlarged by two positions to include a sanitarian and a microbiologist.

A. The sanitarian should be educationally qualified to the Master's degree level, and should possess a minimum background of three years' work experience in local milk and food sanitationprograms.

B. The microbiologist should be well qualified and familiar with the Standard Methods recommended by the American Public Health Association for the laboratory analyses of water, food and milk.

II. Environmental Sanitation Program Scope

A. Food

1. A routine program of food service sanitation based on the recommendations contained in the Food Service Sanitation Manual--1962 Recommendations of the Public Health Service and the latest edition of the Sanitation Ordinance and Code for The Vending of Foods and Beverages.

   a. Enforcement can be effected by the penalty clause approach in the contract with caterers.

2. An adjunctive laboratory program for the analyses of food samples and utensil swab samples.

3. A program of instruction for the training of food service personnel in food service sanitation should be implemented for the supervisory level of food service personnel.

   a. Resources are available through this office for initiating this program.

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B. Milk

1. A routine program of milk sanitation based on those portions of the Milk Ordinance and Code -- 1953 Recommendations of the Public Health Service, that would be applicable for a community whose entire supply is shipped into it from outside.

   a. The Interstate Milk Shippers List could serve as a guide with reference to the compliance of supplies with the sanitation requirements of the Milk Ordinance and Code. (The Veterans Administration has just recently adopted a policy of requiring their contract suppliers of Grade "A" fluid milk to be listed as an interstate milk shipper).

2. An adjunctive laboratory program for the analyses of fluid milk and frozen dessert samples.

C. Water

1. A routine program of sampling and analysis.

2. A surveillance program for cross-connections should be instituted. The nature of the working environment and potential for back-siphonage situations at MILA would indicate that this is of prime public health significance.

3. Unless already accomplished, there should be a joint Public Health Service-Florida State Board of Health survey of the water system.

D. Solid Waste Disposal

1. A routine program whereby pick-up is scheduled and the landfill operation is supervised.

   a. The disposal of organic wastes under water and surface fill may create a methane gas problem.

2. Unless already accomplished, a joint survey of the solid waste disposal program involving representatives of the Public Health Service, NASA, and TWA.

E. Insect and Rodent Control

1. A surveillance and eradication program based on sound pest control principles. Space spraying should be limited insofar as possible and based on need rather than on a contract schedule.

2. A program for the elimination of breeding areas insofar as practical; i.e., noxious weeds, the use of larvacides in stagnant waters, etc.

ENVIRONMENTAL HEALTH AT MILA

III. Facilities and Equipment

A. Facilities

Minimum space requirements for these program recommendations will approximate 388 square feet -- 100 square feet for the sanitarian and 288 square feet of laboratory space for the microbiologist.

B. Equipment

The following equipment is considered basic to a milk and food laboratory; however, we would suggest that certain consolidations can be effected with other laboratory activities, and that the microbiologist retained be consulted in this regard.

1) Counter space, two 12' X 3' counters -- one counter in each room.
2) Two incubators -- one for 32°C. and the other for 35°C.
3) One cryoscope, disc or advance instrument.
4) Gerber milk fat test equipment.
5) One mettler balance.
6) Waring blender and jars.
7) One pH meter.
8) One steam generated holding bath for media.
9) Two microscopes.
10) One autoclave.
11) One refrigerator of at least 15 cubic feet capacity.
12) One under counter freezer.
13) Quebec colony counter.
14) Two hand tally counters.
15) Sample bottles, dilution blanks, glass petri dishes for pour plates, etc.
16) Two insulated containers for sample collection.

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INDUSTRIAL HYGIENE

The industrial hygiene program should be designed to prevent occupational illness or non-traumatic injury to personnel employed on MILA by NASA, NASA contractors and sub-contractors, andconstruction contractors, including those supervised by the Corps of Engineers. Potential hazards will include propellant materials as listed in the section on air pollution. Also included are materials used orformed in construction research and industrial operations. Typical problems in such an installation may include:

Gases: carbon monoxide, ozone, nitrogen dioxide and hydrogen cyanide.

Solvent vapors: petroleum naphtha, perchloroethylene, trichloroethylene, methyl chloroform, benzene, toluene, xylene, methyl ethyl ketone

Metal fumes, dusts or vapors: mercury, lead, cadmium, chromium.

Mineral dusts: quartz, asbestos.

Physical hazards: microwave, ultraviolet, visible and infrared radiation; noise and vibration.

The industrial hygienist will be required to evaluate the above or similar hazards and recommend controls. Typical recommendations may call for one or more of the following: substitution of materials, isolation, shielding, enclosure, local exhaust ventilation, dilution ventilation, use of personal protective devices (respirators, goggles, gloves, suits, etc.).

Recommendations for personnel, space and equipment for the final unit, combined with air pollution, are attached to the air pollution section. Appendix 5 is a list of laboratory and field equipment previously recommended for a small but comprehensive industrial hygiene unit.

It is strongly recommended that an industrial hygienist be given space immediately, including a fume hood, and direct reading equipment for common hazards. During the interim period, until a complete facility can be constructed, he should be able to send samples for analysis to a suitable laboratory on a fee-for-service basis.

ENVIRONMENTAL HEALTH AT MILA

RADIOLOGICAL HEALTH

After checking with various health physicists, it was suggested that the following list be a minimal requirement for an Environmental Health Laboratory, Health Physics Section. The instruments listed are all shelf items, but one must consider the personal selection by the physicist who is to use these instruments and may prefer other manufactured or comparable instruments.

a. Personnel:

(1) 1 Health Physicist
(2) 1 Technician
(3) 1 Secretary (½ time)

b. The costs of the following instruments are estimates and have been intentionally raised from the probable costs at this date:

(1) 3 Survey Meters, Eberline Model PAC-1S, with headset and gamma probe at $900 each
(2) 2 Beta Gamma AN/PDR 27-J at $600 each
(3) 1 Alpha-Beta Gas Proportional Counter at $14,000
(4) 10 Air Samplers, Staplex Hi-Vol at $150 each
(5) 10 Air Samplers, Gast, Low-Vol at $100 each
(6) 2 Survey Meters, Technical Associates, "Cutie Pie," Model CP-3 at $300 each
(7) 1 Minometer Charger-Reader, Victoreen at $400 each
(8) 20 Pocket Chamber, Victoreen at $10 each
(9) 10 Dosimeters, Victoreen Model 541/A at $40 each

c. Add film badge service.

d. Add items for lab-hood, ovens, routine lab equipment, etc.

e. Square foot requirements:

(1) Lab - 300 square feet
(2) Administration - 200 square feet

f. More sophisticated requirements such as gamma scan, for the time being, or at least until a real need is established, should be farmed out on contract to Air Force or Public Health Service laboratories.

ENVIRONMENTAL HEALTH AT MILA

WATER QUALITY CONTROL

In order to better define the requirements, we are transmitting copies of the proposed water quality policy directives. It is apparent that in order to determine laboratory and surveillance needs that the degree of waste treatment must be established. The official guidelines will be released by the Secretary in the near future but the final version is not anticipated to materially depart from these. (See Appendix 6).

GENERAL

At the discussion held at the meeting on December 4, some considerable concern was expressed as to the effect of the spread of pollution through the watercourses adjacent to MILA. The course of action indicated in the attached guideline would have the effect of eliminating or reducing to a minimum pollution before it reaches the watercourses. If the proper control in collection and treatment or disposal is maintained, the monitoring program can be handled adequately with a rather nominal staff. The recommendations are based on our review of the proposed test and launching facilities as described during our meeting on December 4, as supplemented by the article, "Footprints on the Moon" printed in the National Geographic Magazine dated March 1964.

In the event that the situation changes materially from the present concept, additional services can be obtained by contract modifications.

We would like to make clear that the recommendation contained herein applies to the water supply and pollution control phase of the project. Some of the equipment listed can very well be utilized by other considerations, i.e., air pollution.

LABORATORY PERSONNEL AND SPACE REQUIREMENTS FOR WATER SUPPLY AND POLLUTION CONTROL FOR MERRITT ISLAND LAUNCH AREA, KENNEDY SPACE FLIGHT CENTER

a. It is anticipated that a chemist, a bacteriologist, and one laboratory aide, if complemented by the periodic services of a biologist as indicated herein, should provide the necessary staff for this installation.

b. Some of the activities in space exploration tend to release materials which are harmful to life if present in high concentrations, e.g., fluorides. When such materials are present in nature, plants and animals tend to concentrate them in their tissues.

As a result these organisms become excellent indices for the presence of these undesirable materials. By analyzing segments of such populations periodically, it is possible to determine if and how much of the undesirable material is present. Because of the location of this site and the nature of the problem (both terrestrial and aquatic plants and animals) it would be extremely difficult to locate one individual who could fill the position. In addition, one man would be hard pressed to adequately sample populations in such an area. As a result, a contract with a team from a local college might prove to be more desirable. Such a team could adequately sample the aquatic population and could be diverse enough to be knowledgeable in the terrestrial flora, too.

c. A laboratory for water quality monitoring of the potable water system, waste disposal facilities, and water pollution surveillance system should contain approximately 650 square feet. This area should be divided so that approximately one-half can be used for chemical analyses and the other half for bacteriological tests. In addition to the standard laboratory equipment, benches, and supplies, the following major equipment should be provided.

1. Water still
2. pH meter
3. Refrigerator
4. BOD incubator
5. Oven (drying)
6. Spectrophotometer
7. Hood
8. Gas Chromatograph
9. Autoclave
10. Incubator (bacteriological)
11. Muffle furnace

Some of the above equipment, such as the gas chromatograph and spectrophotometer, may be available in another nearby laboratory; if so, there will be no need for duplication. The numbers of tests of this type should not be too numerous.

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16. Abstract (Limit: 200 words)

The environmental health program at the Merritt Island Launch Area of the National Aeronautics and Space Administration was assessed by the United States Public Health Service on December 4, 1964. Air pollution, hygiene, laboratory space, equipment, and personnel requirements were assessed. Engineering, analytical chemistry, food and water conditions, pollution, and radiological health needs were assessed. Comprehensive recommendations and requirements necessary to ensure an effective environmental health service program are listed. The authors conclude that consultation with the U.S. Public Health Service twice a year is desirable.

17. Document Analysis a. Descriptors
Aerospace-safety, Aerospace-medicine, Industrial-health-programs, Occupational-medicine, Industrial-hygiene, Environmental-hazards, Health-protection, Health-surveys

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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