G-000-1105.5

73

FMPC RADIOLOGICAL AND CHEMICAL PROTECTION PROGRAMS

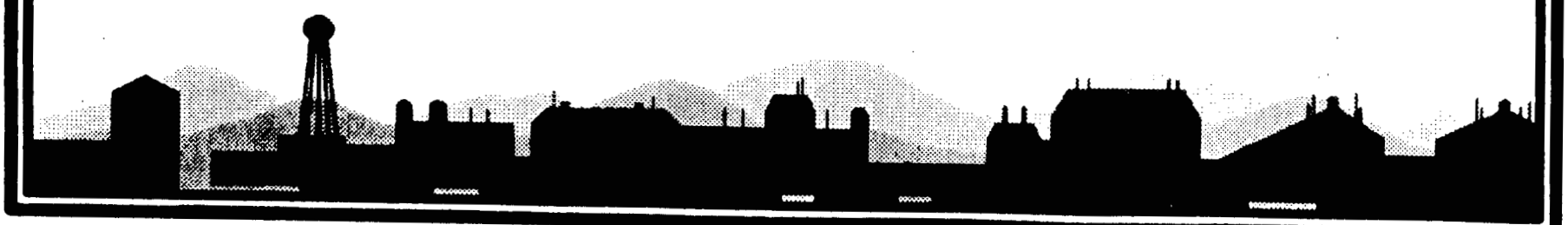
XX/XX/XX

WMCO/DOE
94
PRESENTATION

FMPC RADIOLOGICAL AND CHEMICAL PROTECTION PROGRAMS

WMCO

WESTINGHOUSE MATERIALS COMPANY OF OHIO
P.O.BOX 398704
CINCINNATI, OHIO 45239-8704



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Westinghouse Materials Company of Ohio

GF-000-0073

WMCO SAFETY POLICY

The Westinghouse Materials Company of Ohio places the safety of its employees and that of the general public first on its list of priorities. Official corporate policy on the subject is as follows:

> No task shall be considered so important or so urgent that employees need risk injury to themselves or others, risk damage to equipment, or risk disruption of operations in carrying out work assignments. Whenever other work objectives may conflict with safety, safety shall be given first consideration.

M.B. Boswell, President

0776.30

FACILITY SAFETY

FMPC

Compliance Requirements

- DOE Orders

Performance to Date

- WMCO Policy/Procedures
  - Established for System and Facility Safety Analysis
- Formal Safety Assessments
  - Required for All Proposed Projects
  - Safety Assessments Completed for New and Modified Facilities

    1986 - 66 Safety Assessments

    1987 - 149 Safety Assessments

    1988 - 151 Safety Assessments
- Work Order Review System

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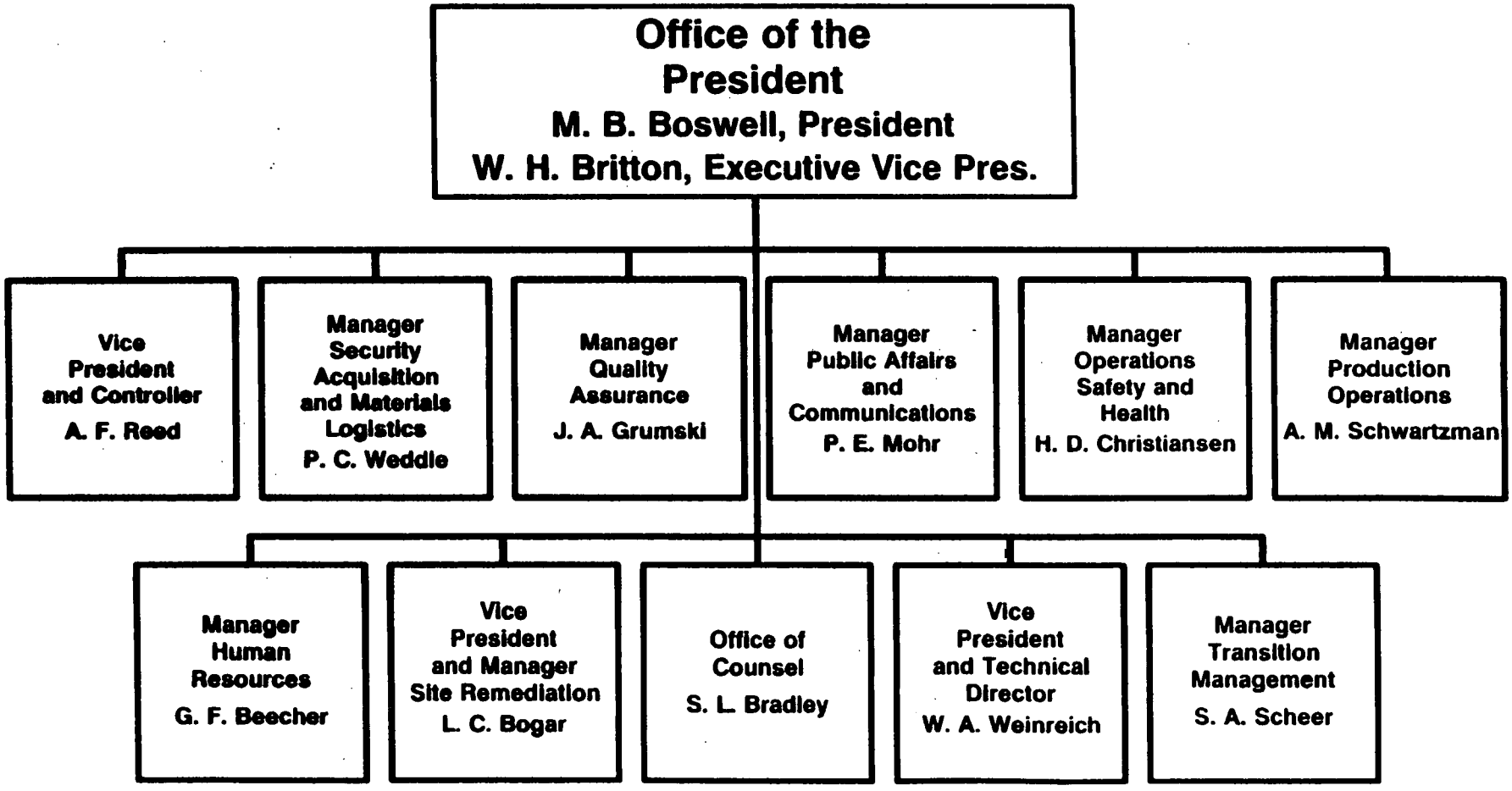
WESTINGHOUSE MATERIALS COMPANY OF OHIO



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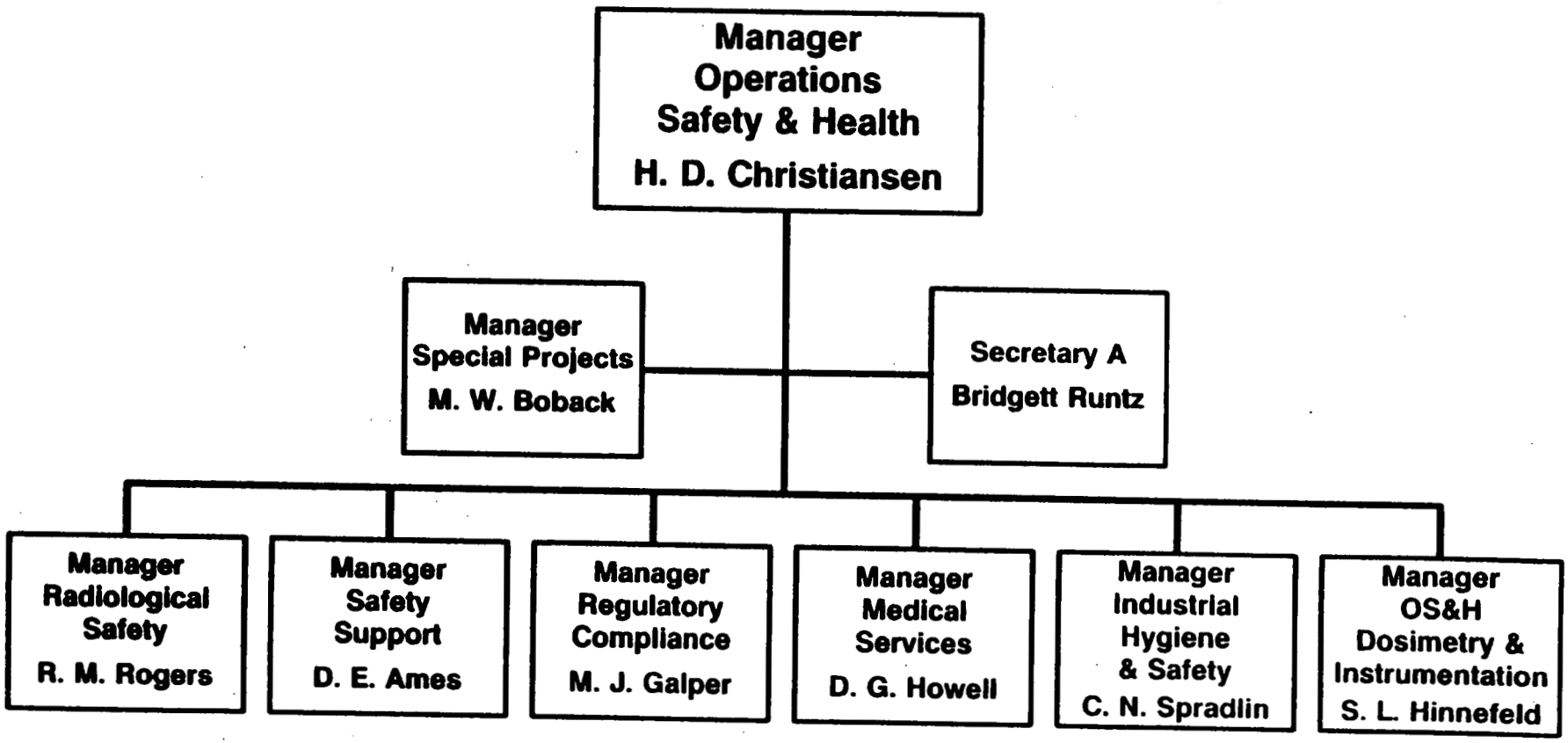
WMCO OPERATIONS SAFETY AND HEALTH



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OPERATIONS SAFETY AND HEALTH

Operations Safety & Health
Howard Christiansen

Radiological Safety R. M. Rogers	Safety Support D. E. Ames	Medical Services D. G. Howell
Rad Safety Policy	Dept Budget	WMCO Medical Policy
Rad ALARA Program	WMCO Patent Program	Physical Exams
Rad Worker Training	Dept Document Control	Emergency Response
Rad Tech Training	Dept Document Review	X ray Laboratory
Rad Compliance Audits	OS&H Internal Audits	Medical Laboratory
Contamination Control		
Technical Health Physics		
Construction Rad-Con Support		

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OPERATIONS SAFETY AND HEALTH (CONT.)

Operations Safety & Health
Howard Christiansen

Industrial Hygiene & Safety
C. N. Spradlin

Industrial Hygiene Program
Industrial Safety Program
SARA (Partial Responsibility)
Respirator Training
Hazards Communications
Asbestos Worker Training
Pres. Safety Council
Work Place Safety Meetings
Chemical Safety
Fire Safety/Response
Audit Construction
Emergency Response Team

OS&H Dosimetry & Inst.
S. L. Hinnefeld

Internal Dosimetry
External Dosimetry
OS&H Inst. Maint.
Urinalysis
In Vivo Facility
TLDs to Others

Regulatory Compliance
M. J. Galper

Solid Waste Compliance
Air/Water Permitting
Environmental Monitoring
Nuclear and System Safety

OPERATIONS SAFETY AND HEALTH

Regulatory Compliance
M. J. Galper, Mgr

Solid Waste Compliance
G. E. Baker, Mgr

RCRA Permitting
RCRA Implementation Plan
UST Management Plan
RCRA/TSCA Compliance
Soil/Constr. Rubble Anal.
Asbestos Reporting

Air/Water Permitting
L. Clausing, Mgr

New PTI/PTO Applications
Renewal PTO Applications
Emission Stack Tests
NESHAP Compliance
NPDES Permit Compliance
BMP Activities

Environmental Monitoring
M. J. Galper, Acting Mgr

Air Monitor Stations
Soil/Vegetation/Milk Sampling
Radon Monitoring
Annual Envir. Mon. Report
Environmental ALARA Council

Nuclear & System Safety
J. L. Click, Mgr

Nuclear Criticality Safety
Safety Assessments for New and Modified Facilities
Existing Site Safety Analysis
Safety Analysis Reports for Packaging (SARPs)

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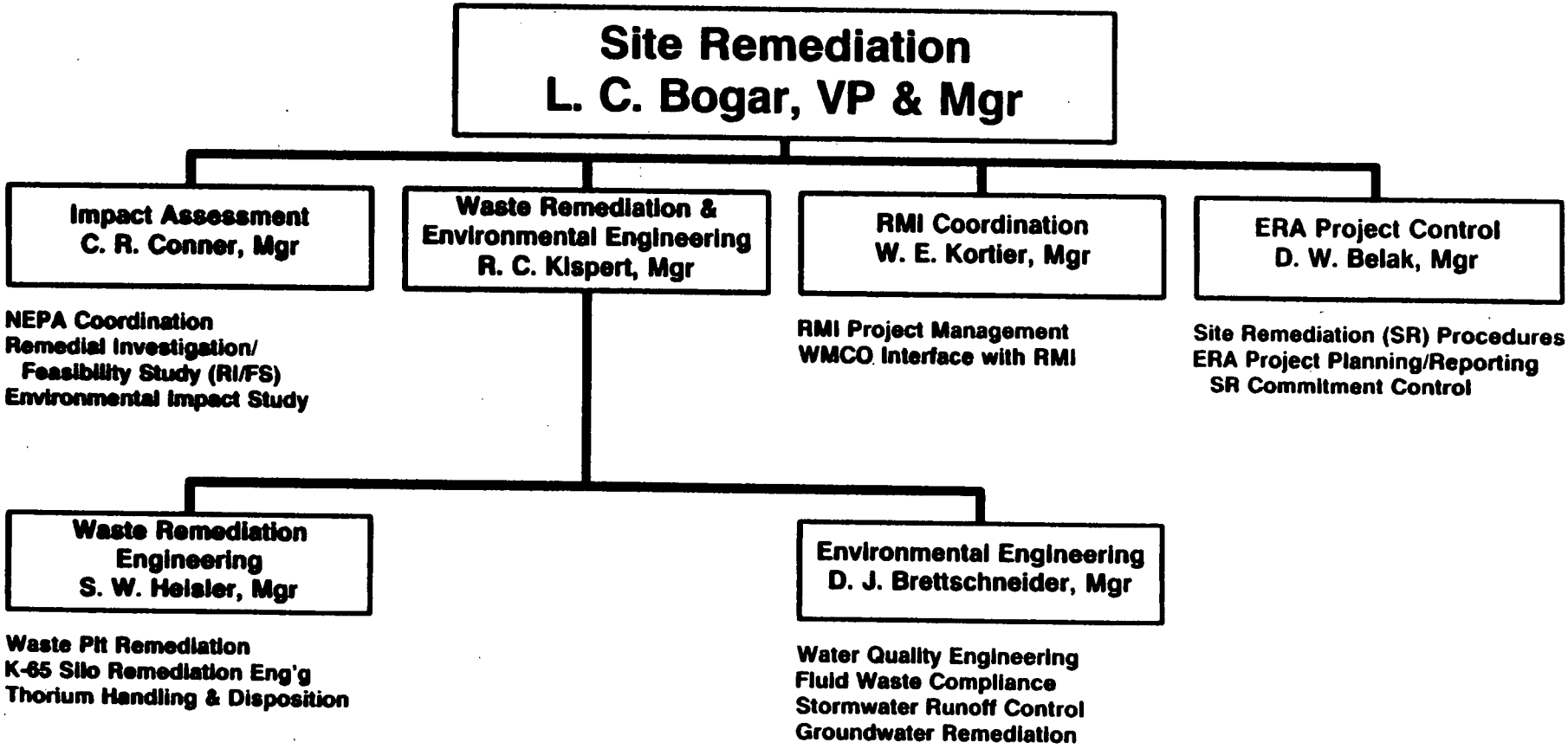
SITE REMEDIATION



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SYSTEM SAFETY PROGRAM

- Policy
  - Safety Analysis for All Site Projects and Operations
- Safety Documentation
  - Prepared Independent of Design and Operating Groups
  - Risks of Operations and Facilities Evaluated
- Review and Approval
  - Concerned Departments
- Higher Hazard Operations and Facilities
  - ISRC
  - DOE Site Office
  - Preoperational Readiness Review

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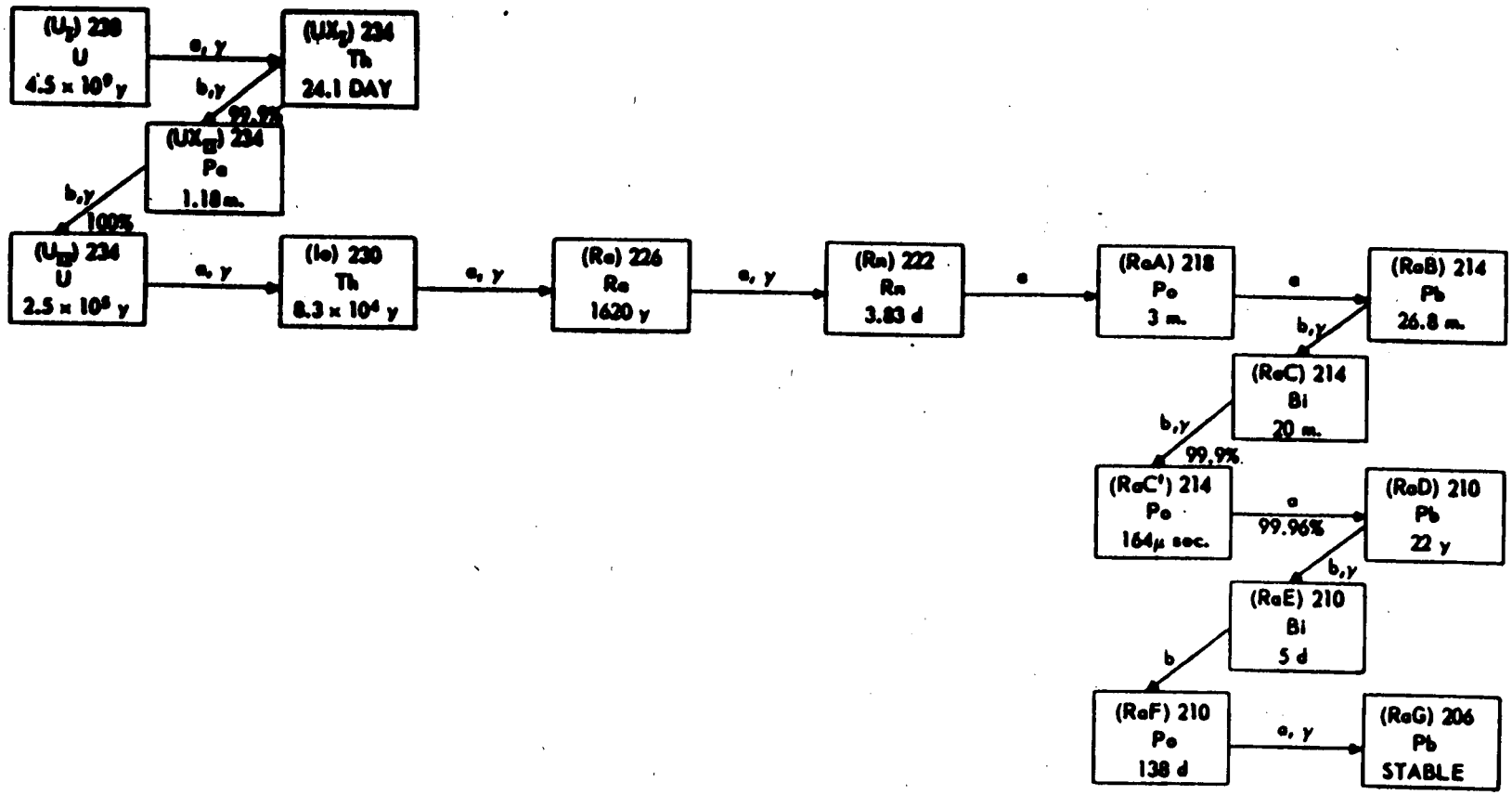
RADIOACTIVE MATERIALS AT FMPC

- Uranium and Decay Products
- Thorium and Decay Products
- Radon
- Radium
- Recycled Uranium Containing Radiological Impurities

0776.28

URANIUM SERIES



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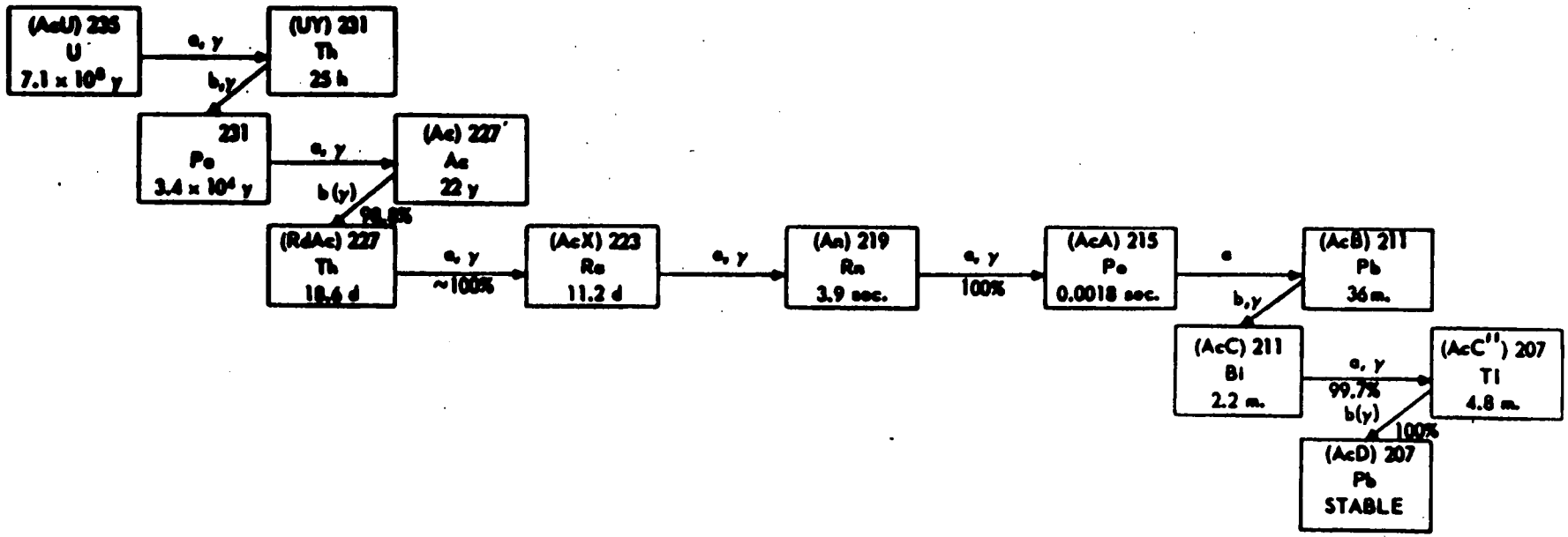
ACTINIUM SERIES



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URANIUM AND DECAY PRODUCTS

- Locations
  - All Uranium Processing Buildings; Most Radioactive Materials Ware-Houses and Storage Areas; Controlled Area of the Technical Laboratory.

URANIUM AND DECAY PRODUCTS (cont.)

- External Radiation
  - Beta Radiation From Decay Products Th - 234 and Pa - 234m

URANIUM AND DECAY PRODUCTS (cont.)

- External Radiation Controls
  - Routine Surveys, Portable Al Shields, Rubber Mats, Posting of "Radiation Areas" and "High Radiation Areas"

URANIUM AND DECAY PRODUCTS (cont.)

- Internal Radiation
  - Inhalation of Alpha-emitting, Naturally-occuring Uranium Isotopes, U - 238, U - 235, U - 234

0776.16

URANIUM AND DECAY PRODUCTS (cont.)

- Internal Radiation Controls
  - Routine Air Sampling, Ventilatied Work Stations, Posting of "Airborne Radioactivity Areas" at 10% of Derived Air Concentrations With Respiratory Protection Required

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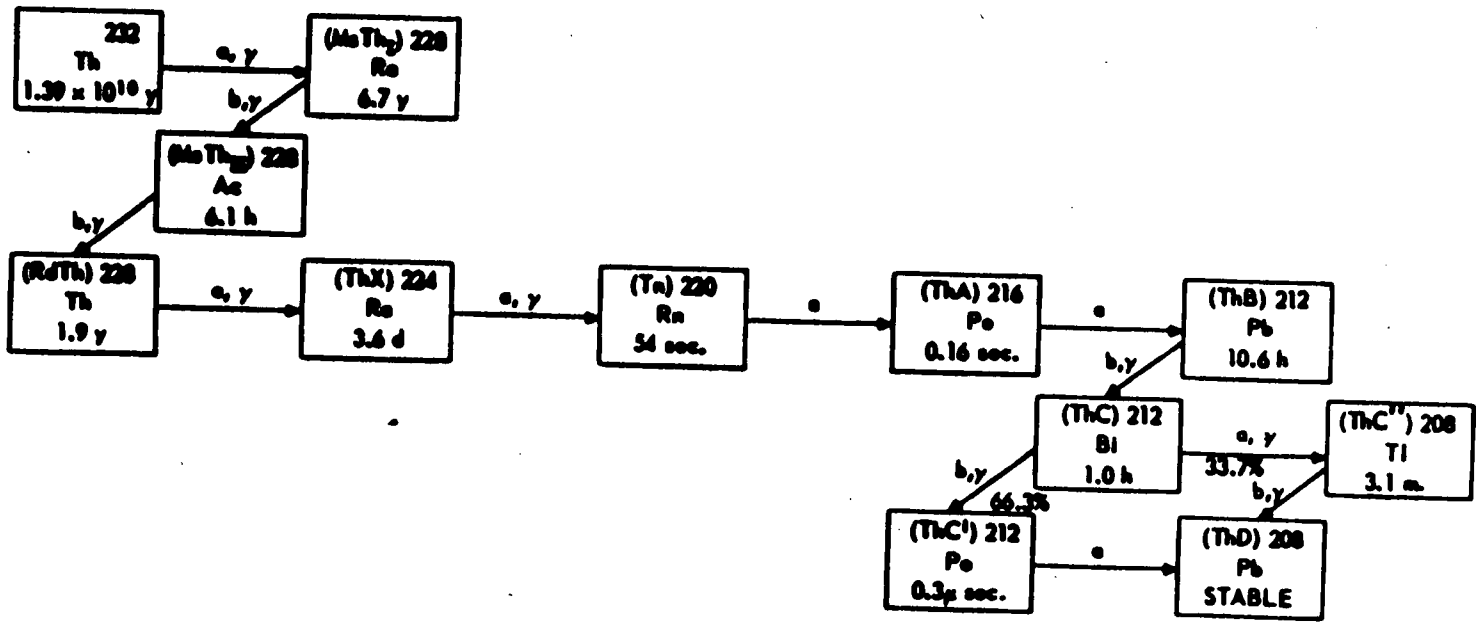
THORIUM SERIES



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THORIUM AND DECAY PRODUCTS

- Locations
  - Warehouses Near Plant 9, Pilot Plant, and On North Side of Process Area

THORIUM AND DECAY PRODUCTS (cont.)

- External Radiation
  - Gamma and Beta Radiation From Decay Products

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THORIUM AND DECAY PRODUCTS (cont.)

- External Radiation Controls
  - Access To Storage Areas Is Limited. Entry Is Controlled By Radiation Work Permit. "Radiation Areas" and "High Radiation Areas" Are Posted.

THORIUM AND DECAY PRODUCTS (cont.)

- Internal Radiation
  - Inhalation of Alpha-emitting Th - 232 and Decay Products

THORIUM AND DECAY PRODUCTS (cont.)

- Internal Radiation Controls
  - Posting of "Airborne Radioactivity Areas" at 10% of Derived Air Concentrations, With Respiratory Protection Required.

RADON

- **Locations**
  - Rn - 222 Near K-65 Silos. Rn - 220 (Thoron) In Thorium Storage Buildings Plus West Part Of Pilot Plant (West Side), Plus "Clarifier Room" in Plant 6.

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RADON (cont.)

- External Radiation
  - Not Significant

RADON (cont.)

- External Radiation Control
  - None Required

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RADON (cont.)

- Internal Radiation
  - Inhalation of Alpha-emitting Radon Decay Products

RADON (cont.)

- Internal Radiation Controls
  - Routine Monitoring, Posting As "Airborne Radioactivity Area" at 10% of Derived Air Concentration With Respirator Protection Required.

RADIUM

- Location
  - K-65 Silos

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RADIUM

- External Radiation
  - Gamma Radiation from Ra-226 and Decay Products

RADIUM

- External Radiation Controls
  - Access is Limited. Entry is Controlled by Radiation Work Permit. "Radiation Areas" are Posted.

RADIUM

- Internal Radiation
  - Not Significant Since Radium is Contained Within Silos

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RADIUM

- Internal Radiation Controls
  - None Required

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RECYCLE URANIUM CONTAINING RADIOLOGICAL IMPURITIES

- Location
  - Uranium Storage Areas and Processing Buildings, Especially Chemicals Plants (Plants 1, 2/3, 4, 8)

RECYCLE URNAIUM CONTAINING RADIOLOGICAL IMPURITIES

- External Radiation
  - Beta Radiation from Decay Products Th-234 and Pa-234m

RECYCLE URANIUM CONTAINING RADIOLOGICAL IMPURITIES

- External Radiation Controls
  - Routine Surveys, Portable A1 Shields, Rubber Mats, Posting of "Radiation Areas"

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RECYCLE URANIUM CONTAINING RADIOLOGICAL IMPURITIES

- Internal Radiation
  - Inhalation of Alpha-Emitting, Naturally Occurring Uranium Isotopes, U-238, U-235, U-234, and Alpha-Emitting Impurities Plutonium and Neptunium

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RECYCLE URANIUM CONTAINING RADIOLOGICAL IMPURITIES

- Internal Radiation Controls
  - Routine Air Sampling, Ventilated Work Stations, Posting of "Airborne Radioactivity Areas" at 10% of Derived Air Concentration, with Respiratory Protection Required.

0776.10

TYPES OF MATERIALS STORED AT THE FMPC

- Uranium Product Metal and Compounds
- Thorium Compounds
- Process Chemicals
- Miscellaneous Chemicals (Maintenance, Laboratory, etc.)
- Process Residues Containing Recoverable Uranium
- Waste Materials

FMPC SARA 312 CHEMICAL MATERIALS, 1988

Extremely Hazardous Substances	Quantity (x 1000 Lbs.)
Ammonia	100 - 999
Chlorine	1 - 9
Hydrogen Fluoride (Dilute)	10 - 99
Sulfuric Acid	10 - 99
Uranium Hexafluoride	100,000 - 499,999

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KEY INDUSTRIAL HYGIENE AND SAFETY PROGRAM CONTROLS AT THE FMPC

- Professional Staff of Industrial Hygienists, Safety Engineers, Fire Protection Engineers, Industrial Hygiene Technicians and Fire and Safety Inspectors
- Programmatic Control Over Chemical Facilities, Equipment and Purchases
- State of the Art Monitoring Equipment
- Personal Protective Equipment
- Training

CONTROL OF CHEMICALS AT THE FMPC

- Chemical Facilities and Equipment are Designed to Comply with all Applicable Regulations and FMPC Design Criteria
- Handling and Use of Chemicals are Controlled by Procedures
- Employees are Trained in the Hazards of Chemicals and Their Proper Handling
- Chemical Storage Tanks are Identified with the Name of the Chemical and the Hazard Rating Using the NFPA Label System
- Drums are Identified as to Contents
- Material Safety Data Sheets are Available Covering Both Commercially Purchased and Site Products
- Chemical Purchases are Reviewed to Control Procurement of Hazardous Chemicals

MONITORING ADEQUACY OF CHEMICAL CONTROLS

- Routine Surveillance by Plant Personnel
- Walk-Through Surveys by OS&H Personnel
- Routine Checks for Proper Operation of Local Exhaust Ventilation and Lab Hoods
- Permits, Including Air Monitoring, Required for Confined Space Entry
- Workplace Air Sampling for Chemical Exposure Evaluation

0776.14

INDUSTRIAL HYGIENE MONITORING CAPABILITIES

Air Monitoring/Sampling

- Portable Real-Time Monitoring Equipment for Gases and Vapors
- Portable Equipment for Sampling to Evaluate Personal Exposures and Area Concentrations of Particulates, Gases and Vapors
- Sample Analysis are Performed by NIOSH Methods

Noise Monitoring

- Sound Level Measurement Equipment
- Noise Dosimetry Equipment

Heat Stress Monitoring Equipment

Microwave Monitoring Equipment

0776.24

ASBESTOS CONTROLS

1. Eliminated Procurement of Asbestos Items to the Extent Practical

2. Asbestos Work Permit System in Place in Conformance with OSHA and DOE Requirements

3. Training Required for Work with Asbestos

4. Asbestos Hazard Evaluations Performed

ASBESTOS WORK PERFORMED BY TRAINED PERSONNEL

- Involved Employees are Trained as Required by OSHA for Asbestos Work Including Health Hazards and Proper Work Practices and Requirements
- Subcontract Asbestos Removal Jobs Performed by Trained and Qualified Personnel Only
- All Personnel Must Comply with WMCO Respirator Program Requirements for Medical Evaluation, and Respirator Training and Fitting

COMPREHENSIVE RESPIRATORY PROTECTION PROGRAM

- Described in FMPC Respiratory Protection Manual
- Complies with ANSI Z88.2
- NIOSH Certified Equipment Used: Air Purifying, Air Supplied, SCBA
- Training and Medical Evaluation are Required
- Quantitative Fit-Testing Performed
- All Respirator Users at FMPC Must Comply with the Program

0776.17

EMERGENCY PREPAREDNESS PROGRAM

- Trained Responders
- Emergency Equipment
- Communications
- Integrated Plans
- Drills
- Evaluation

0776.43

EMERGENCY PLANNING

- Validated Emergency Planning
  - Facility Plan
  - County Plans (Butler and Hamilton)
  - State Annex Under Development
- Mutual Aid Agreements
  - Colerain Township Fire and Life Squad
  - Crosby Township Fire and Life Squad
  - Ross Township Fire and Life Squad
- Letters of Understanding
  - Mercy Hospital
  - University Hospital
  - Providence Hospital

WARNING SYSTEMS

- Plantwide Alarm System - Alerting Signal
- Plant Emergency Message System - Verbal Messages
- Radio Network with Multiple Frequencies
- Offsite (2 Mile Immediate Action Zone) Warning System

0776.11

EMERGENCY RESPONSE

- Emergency Response Team
- Modern Response Equipment
- 24 Hour Staffing

EMERGENCY RESPONSE TEAM

- Fire Fighters
  - Ohio State Certified
- Emergency Medical Technicians
  - Ohio State Registered
- Medical Staff
  - Qualified Physicians
  - ACLS Certified Registered Nurses
- Technicians
  - Radiological Safety
  - Industrial Hygiene
- Security Officers
- On-Call Management Support Staff (EOC)

0776.41

RESPONSE EQUIPMENT

- Fire Apparatus
  - Two 1,000 gpm Pumpers
- Ambulances
  - Two New Units Meeting All Federal Specifications
- Spill Response Vehicle
  - Patch, Containment, Clean-up and Sampling Equipment
- Water Tanker
  - 3,000 Gallon Capacity
- Personal Protection
  - Full Protection Bunker Equipment
  - Encapsulating Suits
  - SCBA Respirators
  - Anti Contamination Suits

FMPC VISITOR HEALTH AND SAFETY PROGRAM

- Highlights of Health and Safety Program Upgrades
- Key WMCO Safety Rules
- Visitor Bioassay Requirements
- FMPC Plant Alarm Signals
- FMPC Rally Points
- Safety Rules for Driving on Site
- Visitor Training Requirements
- FMPC Respiratory Protection Requirements

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HIGHLIGHTS OF WMCO HEALTH AND SAFETY PROGRAM UPGRADES

- Contamination Control Program Three Zone Concept
- FMPC Plant Alarm System Changes
- Visitor Bioassay Program
- Locker Room Upgrades and Temporary Locations
- Visitor Orientation Program Customized for Specific Types of Visitor Activity
- Several Ongoing Major Construction Projects for Environmental, Health and Safety Improvements

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KEY WMCO SAFETY RULES

- *Safety Glasses* shall be worn in the Process Area (PA) and designated areas of the Technical Laboratory (TL), except in enclosed vehicles or in break areas, offices or rest rooms.
- *Hearing Protection/Hard Hats/Goggles* shall be used in posted areas.
- *Clothing* - Company-issued clothing, buttoned or zipped closed, with sleeves rolled down, shall be worn in the PA. Company-issued shoes or shoe covers are required in the PA.
- *Dosimeters/Monitoring Devices* - A personnel dosimeter shall always be worn in the PA, designated parts of the TL, in posted radiation areas, and stored in the racks provided when not in use. Monitoring devices and extremity dosimeters shall be worn as specified by OS&H.
- *Respiratory Protection* shall be worn in accordance with work requirements, properly cared for and stored when not in use.
- *Seat Belts* - Seat belts shall be worn by all occupants in vehicles with standard seat belts whenever personnel are on company business.

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KEY WMCO SAFETY RULES (cont.)

- ***Radiological Monitoring*** - Personnel shall wash hands and use friskers to monitor before entering break rooms. Personnel leaving the PA and restricted areas of the TL shall use personnel monitoring devices. Hand carried items, such as hats, must be monitored before proceding into clean areas.
- ***Smoking*** shall only be permitted in designated smoking areas.
- ***Other Tobacco Product Use*** is permitted only in the non-process areas and non-restricted areas of the TL and in the PA and restricted areas of the TL as designated by OS&H.
- ***Eating*** is permitted only in the non-process areas and non-restricted areas of the TL or as designated by OS&H.
- ***Beverages*** shall only be consumed in the non-process areas and non-restricted areas of the TL or as designated by OS&H. Beverages are limited to supplied water, coffee and tea brewed in approved areas. Soft drinks shall be consumed only in the rooms where the dispensers are located.
- ***Instructions/Postings/Signs*** - Personnel shall comply with all safety barriers and posted instructions, such as signs, tags, barriers, permits and procedures.

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VISITOR BIOASSAY REQUIREMENTS

- Visitors to the FMPC are Required to Submit a Urine Sample Prior to Getting a Visitor TLD Badge.

- Additionally a Urine Sample is Required to be Submitted Upon Leaving the Site. If a Continued Stay is Scheduled, Samples are to be Submitted Prior to Leaving the Site on a Calendar Week Basis.

0776.38

FMPC PLANT ALARM SIGNALS

Signals Transmitted Via Alarm Horns and Bells (Report Any Emergency On Extension 6511)

2-2, 2-2 Ambulance, Fire, Security Event

- Radio Message to ERT. EMS Message Follows With General Information.

3-3, 3-3 Supervisor Alert

- EMS and Radio Message Follows, May Include Weather Information, All-Clear, Evacuation, Test (Every Monday at 2PM), or Other Announcements.

4-1, 4-1 CO Alert

- Discontinue Use of Airline Respirators.

FMPC VISITORS - SITE SAFETY RULES

1. **Wear a white smock, rubber shoe covers with no green markings, and safety glasses when beyond the second gate. The smock must be buttoned closed. Obtain these items at the blue shed to your right upon entering the facility.**

CAUTION

You Must Wear Clothing Listed Above When You Drive Into The Process Area!

2. **Smoking, chewing, dipping, etc. is permitted only in posted designated areas of the facility.**

3. **Hard hats are required in construction areas.**

4. **Pedestrian traffic and in-plant vehicles have the right-of-way.**

5. **Site speed limit is 20 mph. Slow down at blind corners. Be alert for in-plant vehicles.**

6. **Stay on established roadways.**

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FMPC VISITORS - SITE SAFETY RULES (cont.)

7. Do not park on a roadway and/or leave your vehicle unattended; Emergency Vehicles may need the roadway.

8. Do not park in such a manner as to obstruct any fire hydrant or designated fire lane.

9. Upon activation of any plant-wide alarm (see opposite side) take action as indicated.

10. Read and heed all posted signs, as they relate directly to your safety.

11. Before exiting, stop and have vehicle monitored at the Rad Tech Trailer near the gate.

12. Return all items listed in Number 1 to proper receptacles upon leaving this facility.

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SAFETY AND HEALTH TRAINING REQUIREMENTS

- **Radiological Safety, 5 Hours**
  - This Training is Required Prior to Working in the FMPC Process Area
- **Safety Reorientation, 1 Hour**
  - This Training is Required Prior to Working at the FMPC
- **Respirator Training/Fit Test/Medical Certification, 4 Hours**
  - This Training or an FMPC Accepted Alternate Program is Required Prior to any Work Requiring the Use of Respiratory Protection

RESPIRATORY PROTECTION PROGRAM REQUIREMENTS FOR SUBCONTRACTORS, VENDORS AND VISITORS

Subcontractors, Vendors and Visitors Must be Medically Certified, Trained and Fit Tested Before They Will Be Permitted to Use Respiratory Protection Equipment at the FMPC.

Minimal Acceptable Records for Respirator Use at FMPC

- **Medical Records Must Contain:**
  - Conclusions of a Physician Regarding an Evaluation of the Potential User and Whether the User is Medically Able to Use Respiratory Protection Equipment.
- **Training Records:**
  - Training Records Must Document that the Potential User Recieved Respirator Training Within One Year.

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RESPIRATORY PROTECTION PROGRAM REQUIREMENTS FOR SUBCONTRACTORS, VENDORS AND VISITORS (cont.)

- **Proper Fit Test Records:**

  - The Fit Test Records Must Document that the Potential User Was Fit Tested by a Competent Tester. The Records Must Document the Following:

    1. Specific make, size and model respirator tested.
    2. Name of person tested.
    3. Name of person giving test.
    4. Date of test (must be within one year of intented use).
    5. Result (fit test factor or percent leakage) for the respirator fitted.

  Industrial Hygiene Must Approve Such Records Before They Will Be Considered Valid

0776.36

WMCO IS RESPONSIBLE AND ACCOUNTABLE FOR YOUR SAFETY

It is important that you as a visitor to our site make arrangements for your visit as early as possible to prevent unnecessary time delays and training schedule problems.

You are requested to notify the FMPC of your intended visit and the type of activities you expect to be involved in and to prearrange WMCO approval for any safety equipment you expect to bring onsite.

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RADIOLOGICAL SAFETY

FMPC

Performance to Date

- Radiation Control Manual
- Radiation Worker Training
- Contamination Control Zones
  - Three Zone Concept
  - ALARA
  - In Agreement with DOE/ORO Radioactive Contamination Control Policy - March 1988

9673.84

RADIATION CONTROL MANUAL

- **Purpose:**
  - Sitewide Radiological Policy for Radiological Health
- **Standards of Compliance:**
  - DOE Orders
  - ANSI
  - NCRP
  - Nuclear Industry Good Practices

0776.6

RADIATION TRAINING

DOE Order 5480.11

- Orientation in Radiation Safety
  - All Employees
- Radiation Protection and ALARA
  - Radiation Workers
- Radiation Safety
  - Radiation Protection Technicians

Jod Specific Training

- Safety Meeting
- Special Projects
- Contamination Control

0776.8

RADIOLOGICAL SAFETY INSTRUMENTATION

Radiation Detection / Measurement

- Survey Meters
  - Dose Rate, Particle Detectors
- Counters
  - Scintillation, Proportional

Air Sampling

- CAM - Alpha, Beta
- Breathing Zone, General Area
- Impactors
- Working Level Monitors

Personnel

- TLD
- Pocket Dosimeters

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CONTAMINATION CONTROL ZONES

- Zone III
  - Isolation of Contaminated Sources
- Zone II
  - Radiological Areas With Limited Potential for Contamination
- Zone I
  - Clean Areas

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RADIOLOGICAL SAFETY

Performance to Date

- Contamination Control Zones
  - Zone III — Isolation of Contamination Sources
  - Zone II — Radiological Areas with Limited Potential for Contamination
  - Zone I — Clean Areas
- Status of Zone Contamination Control
  - Zone III Areas

    Identified 50+
  - Training Programs Launched

    Work Area

    Classroom

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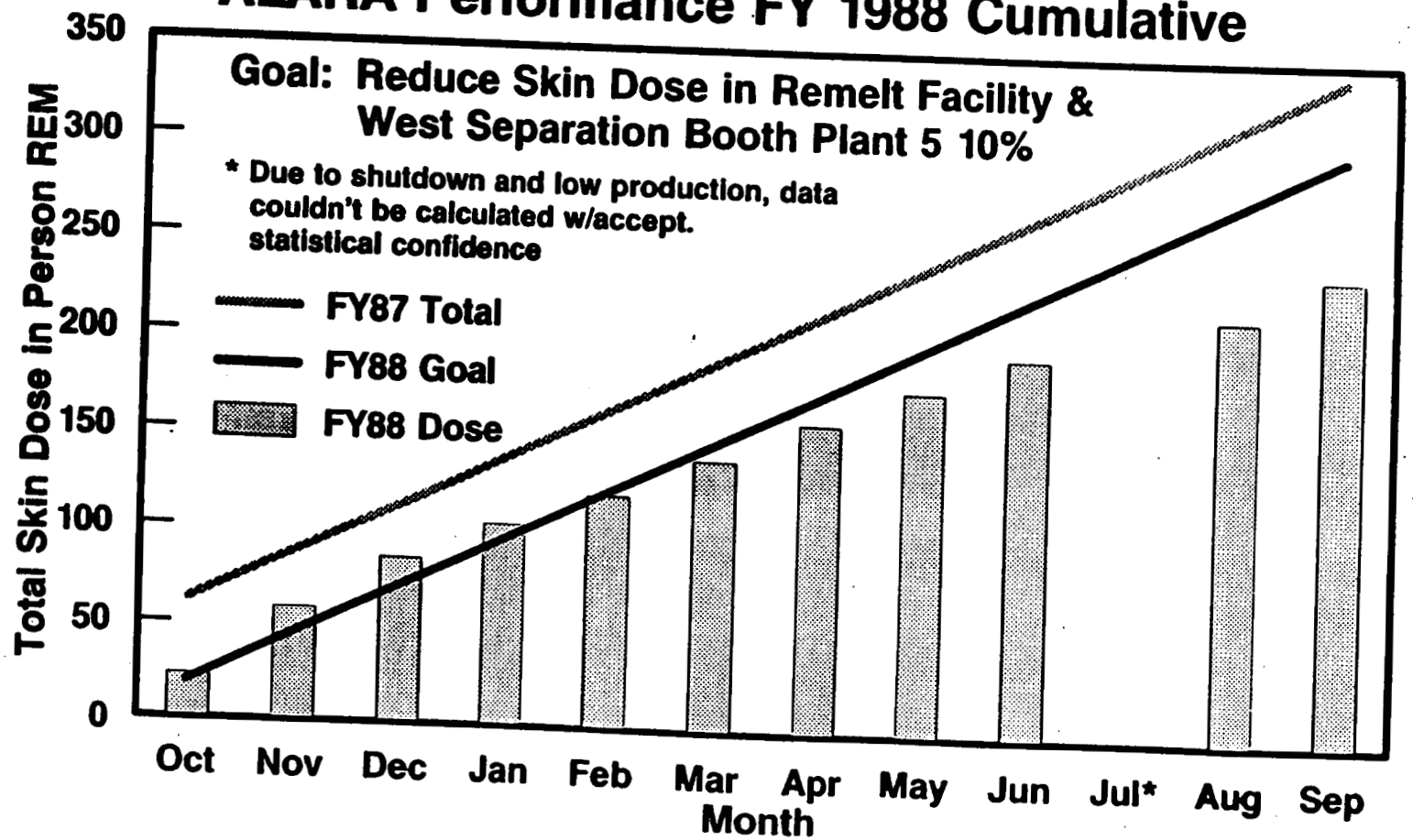
RADIOLOGICAL SAFETY

FMPC

Performance to Date

- ALARA Performance FY 1988 Cumulative



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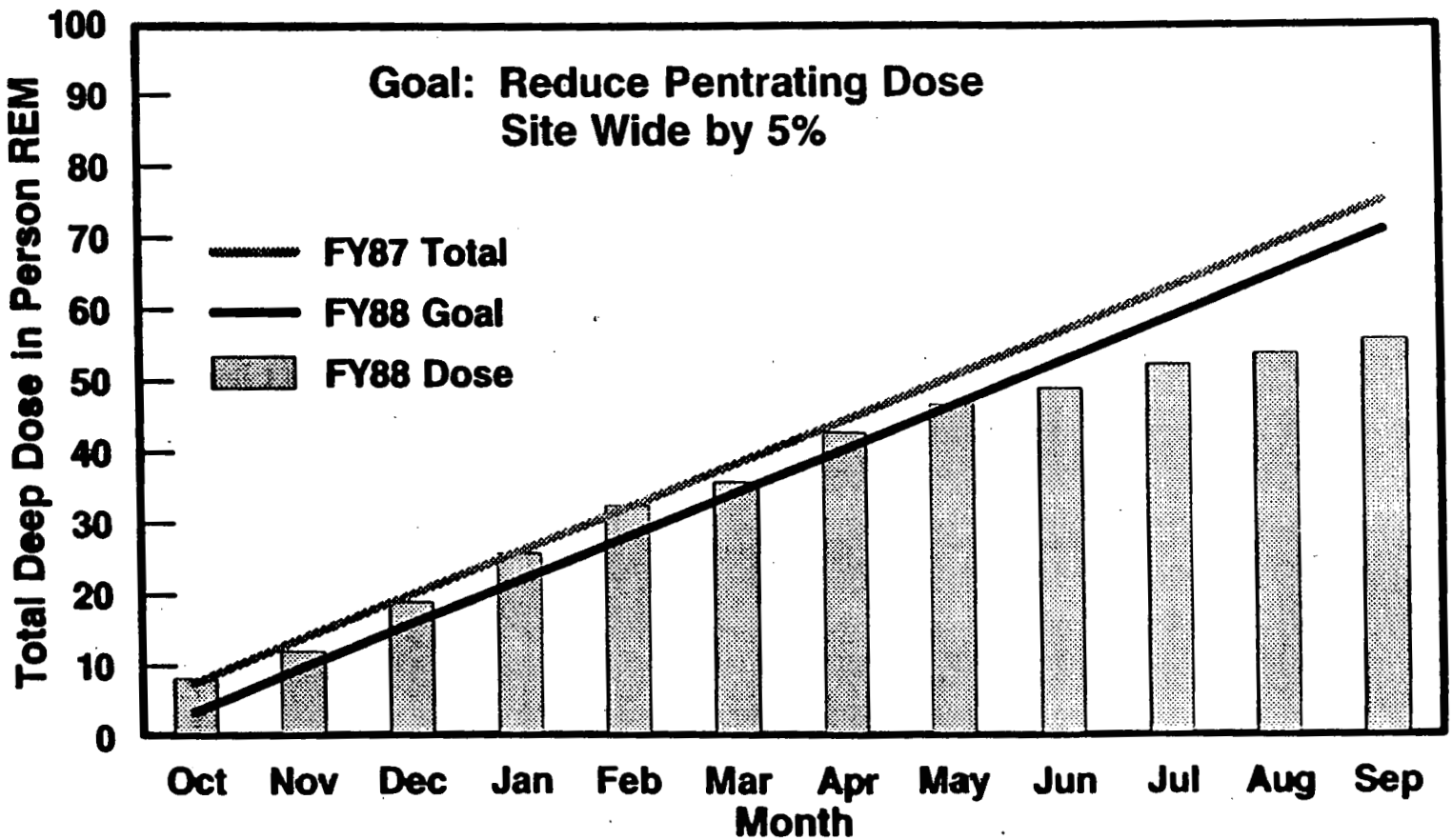
RADIOLOGICAL SAFETY

FMPC

Performance to Date

- ALARA Performance FY 1988 Cumulative



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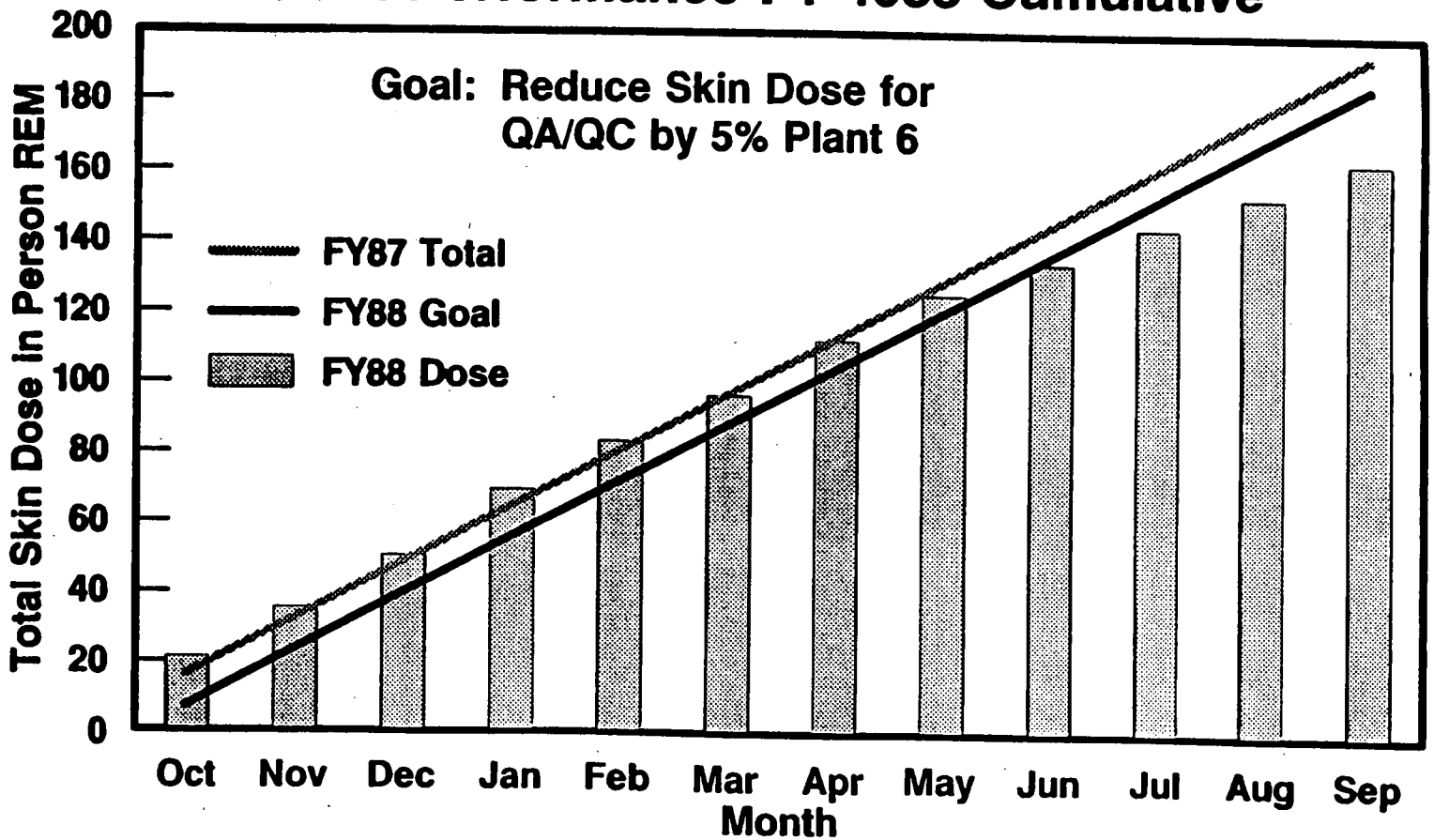
FEED MATERIALS PRODUCTION CENTER

RADIOLOGICAL SAFETY

FMPC

Performance to Date

- ALARA Performance FY 1988 Cumulative



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FEED MATERIALS PRODUCTION CENTER

ALARA TASK TEAM GOALS FY1989

1. Reduce sitewide penetrating dose by 5% normalized to man-hours worked, exclusive of dose incurred in the Thorium project.

2. Install the plant 5 west separation booth.

3. Make an ALARA Goal a Performance Management System (PMS) item for every 1st line supervisor.

   The goal is to require some type of ALARA goal for the supervisor which could be chosen to meet the outstanding problems of the supervisor's area. For example, consistently covering ingots with rubber matting in one's area was selected as a worthy goal.

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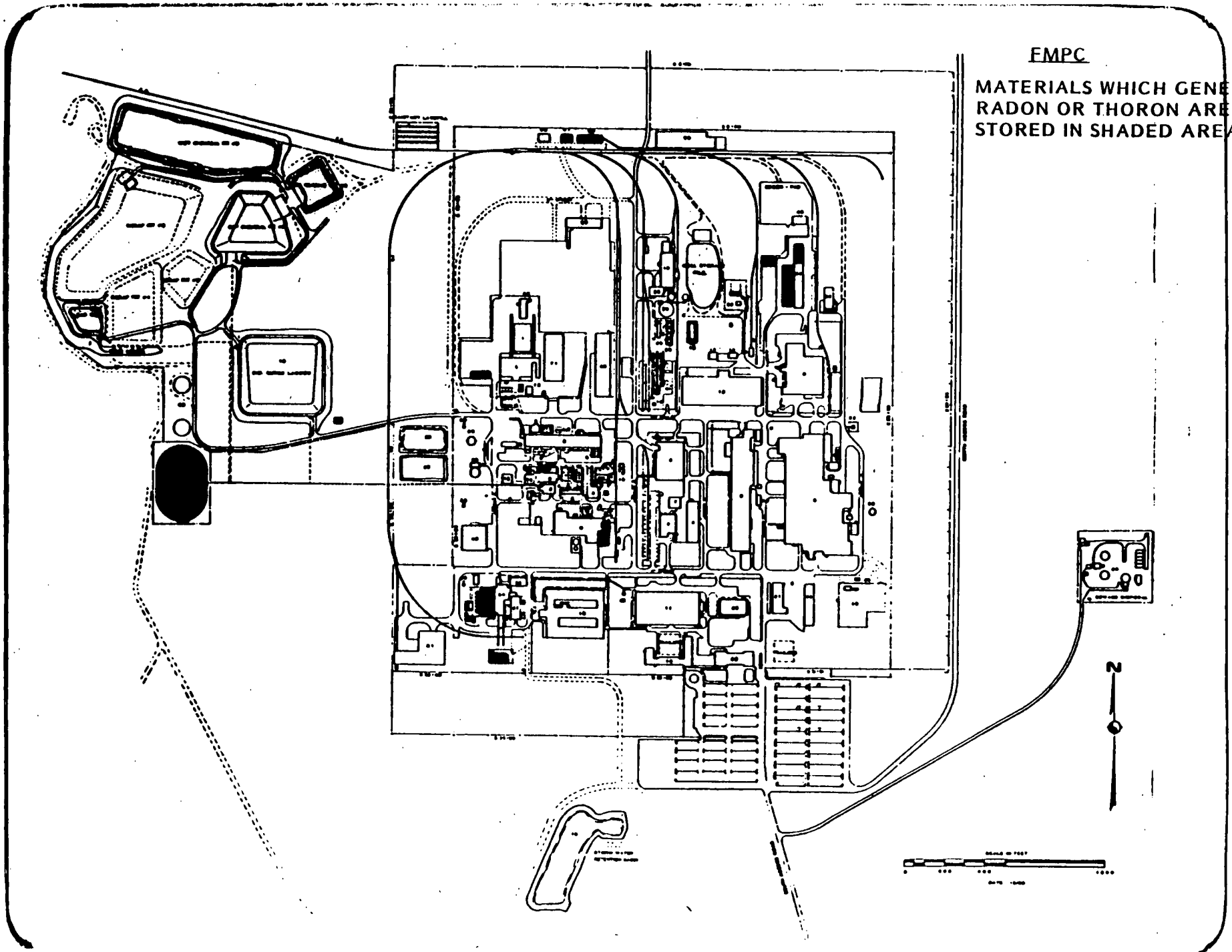
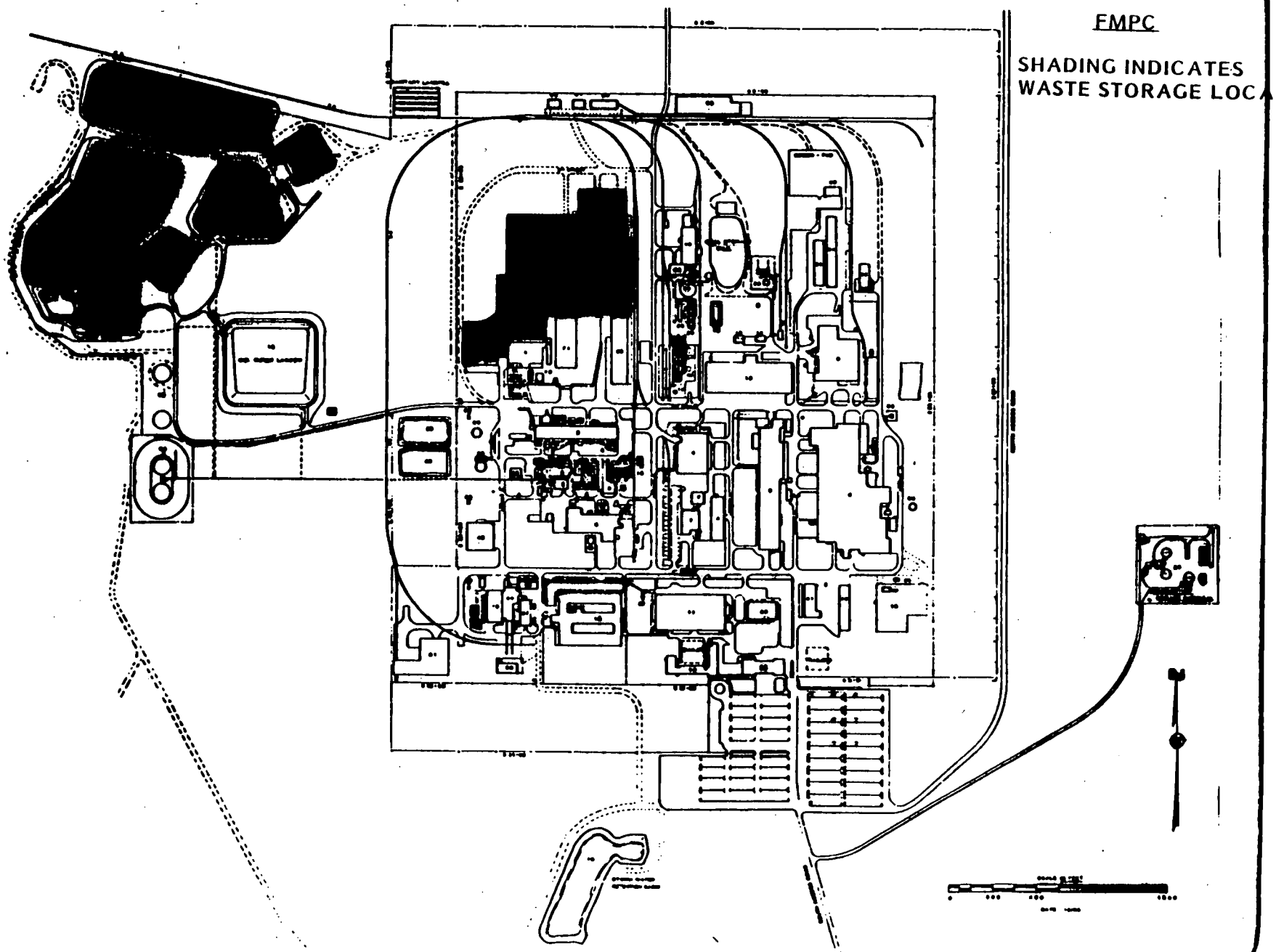
ALARA TASK TEAM GOALS FY1989 (Cont.)

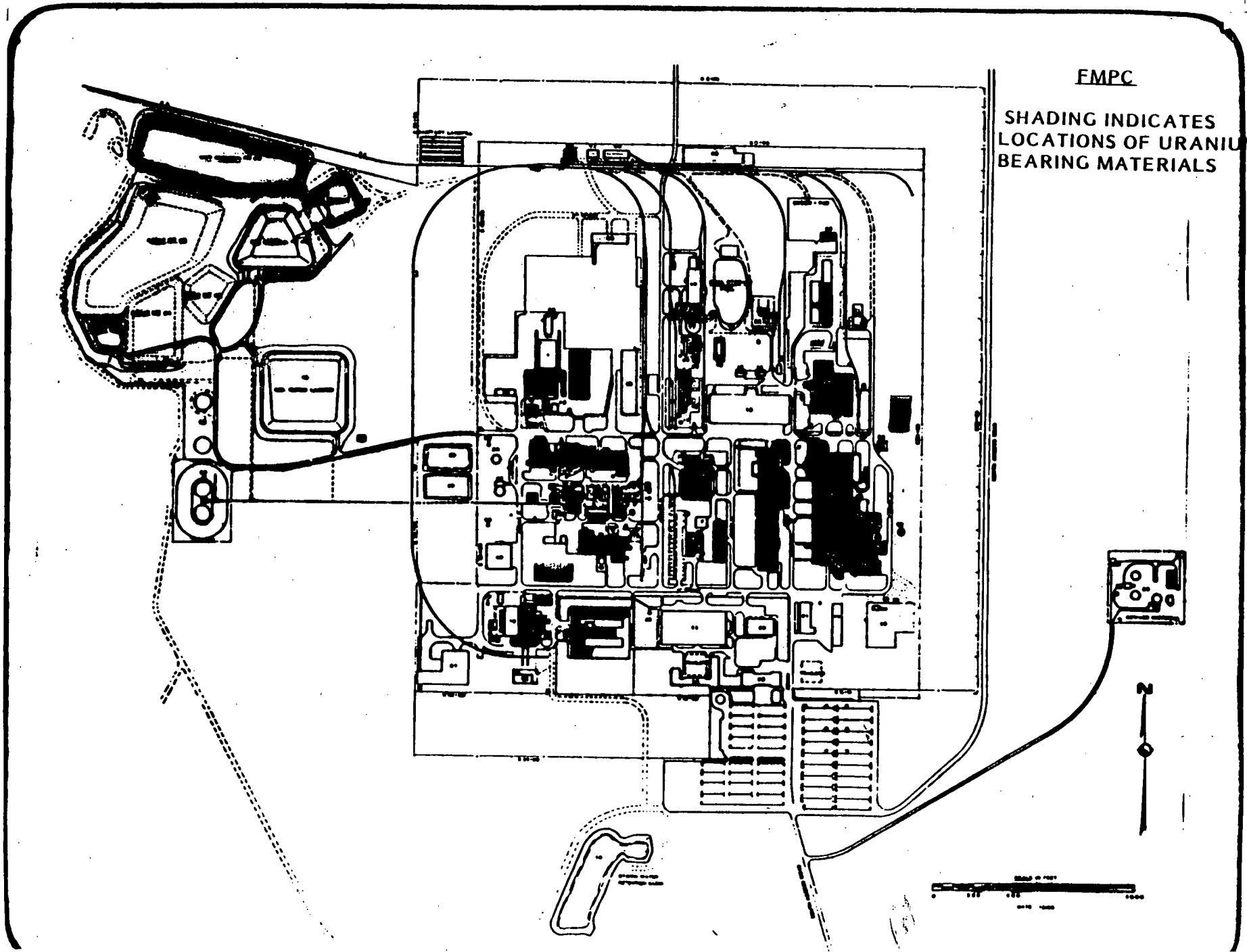
4. Implement an "ALARA Awareness" program. This would require area supervisor's to select and implement ALARA goals that would increase worker consciousness of radiological concerns.

5. Move Plant 5 break room to a lower dose rate area.

6. Upgrade the system for controlling dosimeters.


EMPC
MATERIALS WHICH GENERATE RADON OR THORON ARE STORED IN SHADED AREAS
N


FMPC
SHADING INDICATES
WASTE STORAGE LOCATIONS

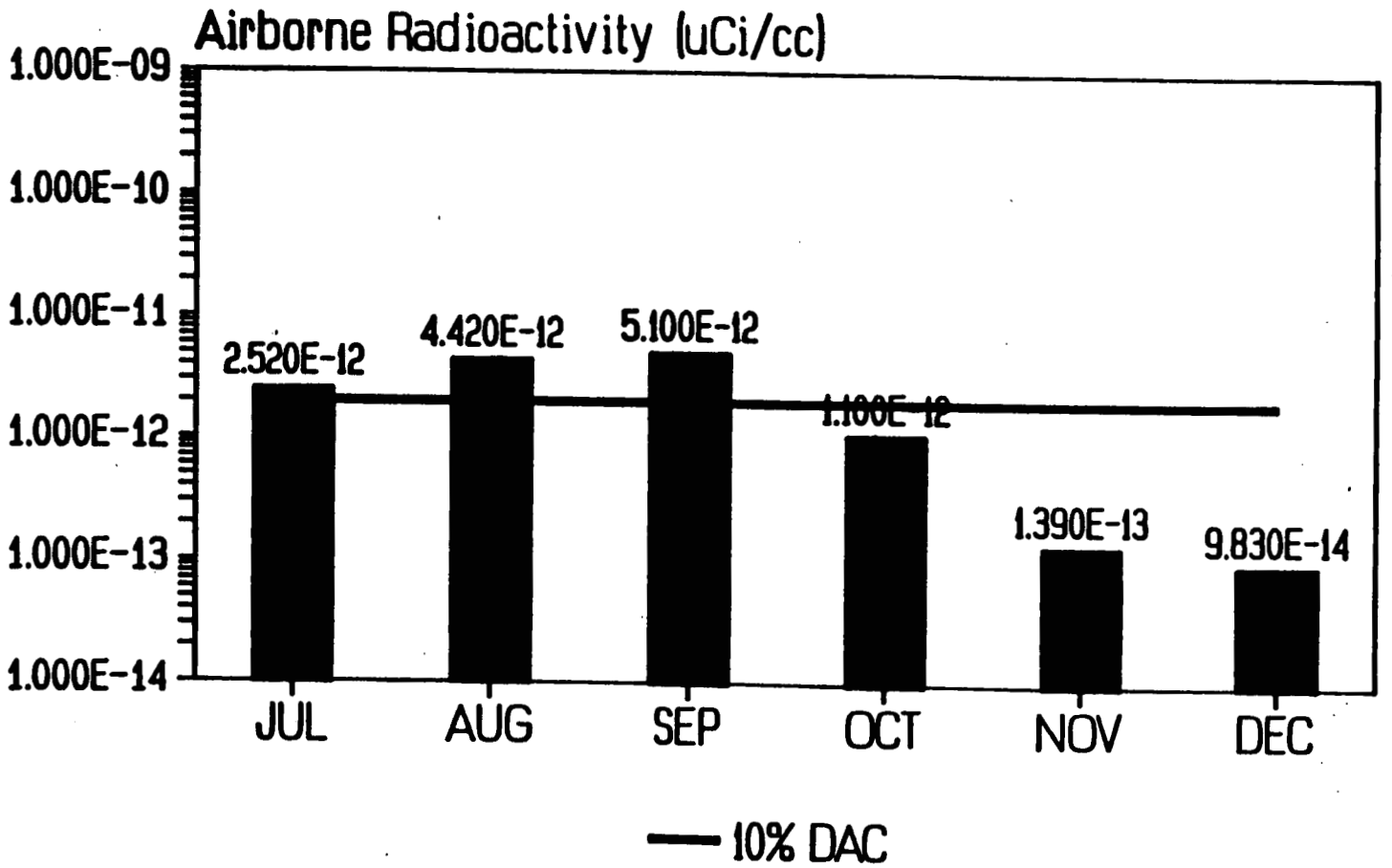

FMPC
SHADING INDICATES
LOCATIONS OF URANIUM-
BEARING MATERIALS
N

RADIOLOGICAL CONTROL MONITORING

- Air Sampling
  - Area
  - Breathing Zone
- Contamination Monitoring
  - Area
  - Personnel

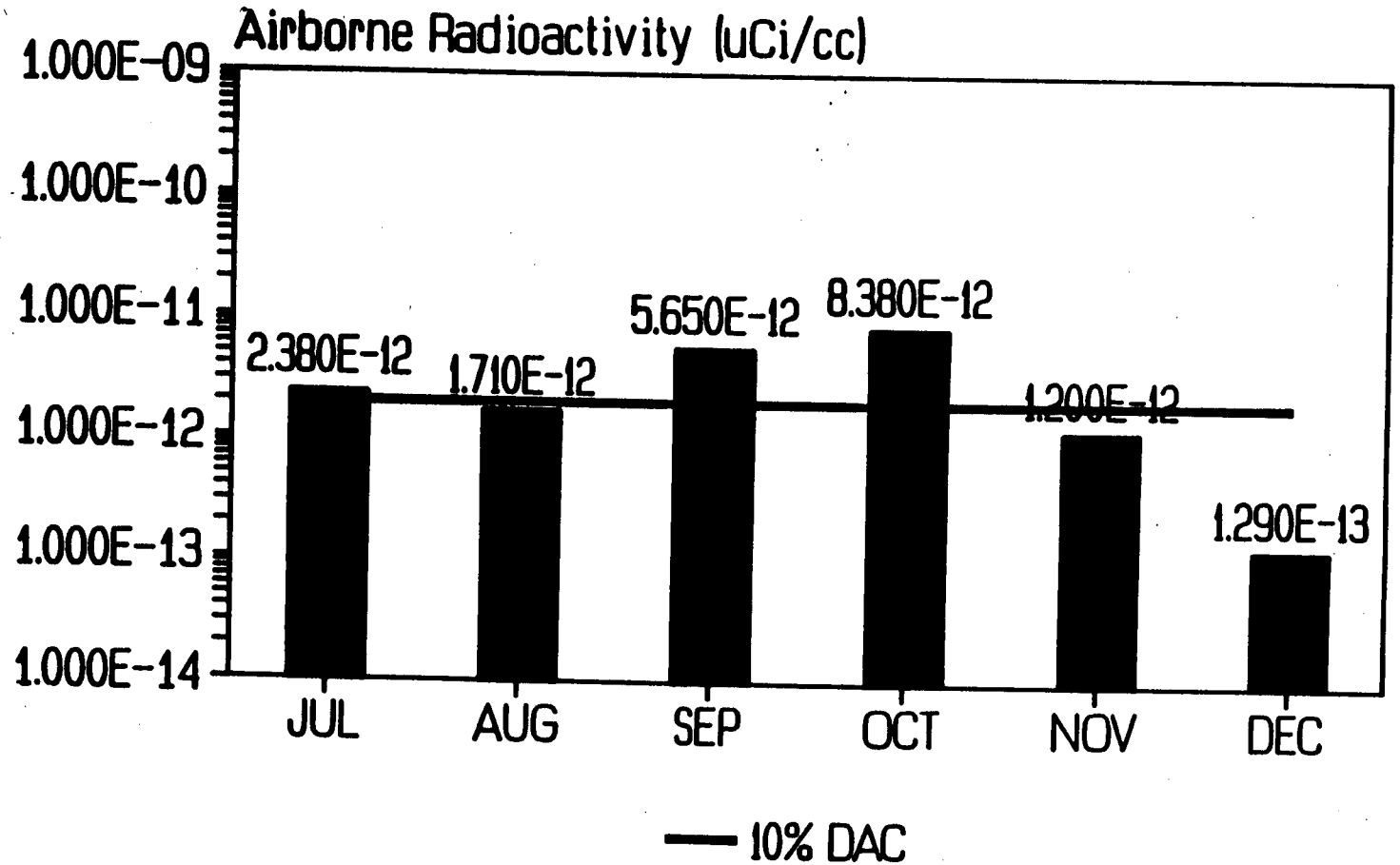
0776.15

PLANT 5 E. BURNOUT PLATFORM
Airborne Radioactivity



General Area Sampler - 1988

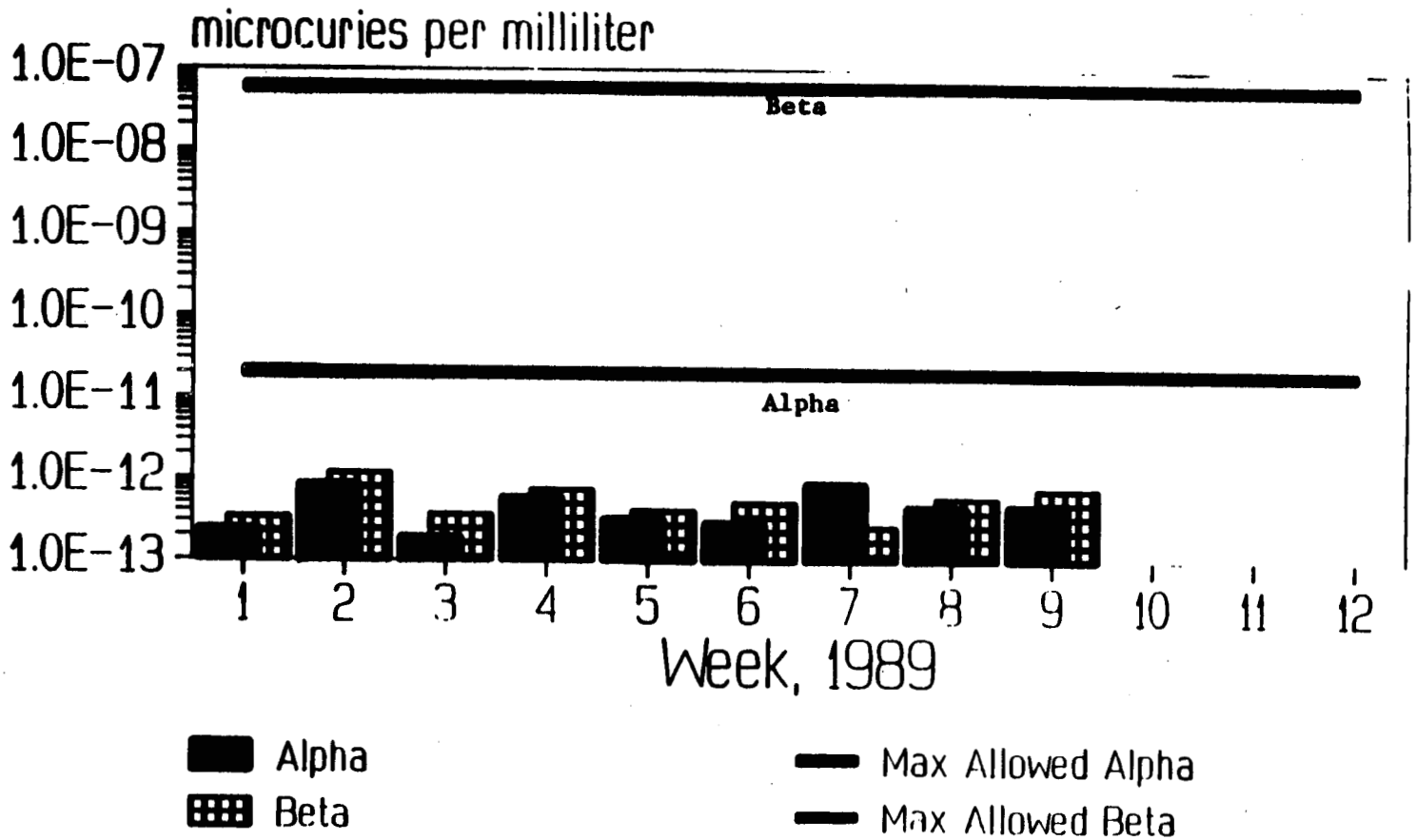
PLANT 5 CHARGE STATION
Airborne Radioactivity



General Area Sampler - 1988

Plant 2/3 Air Activity Monitoring

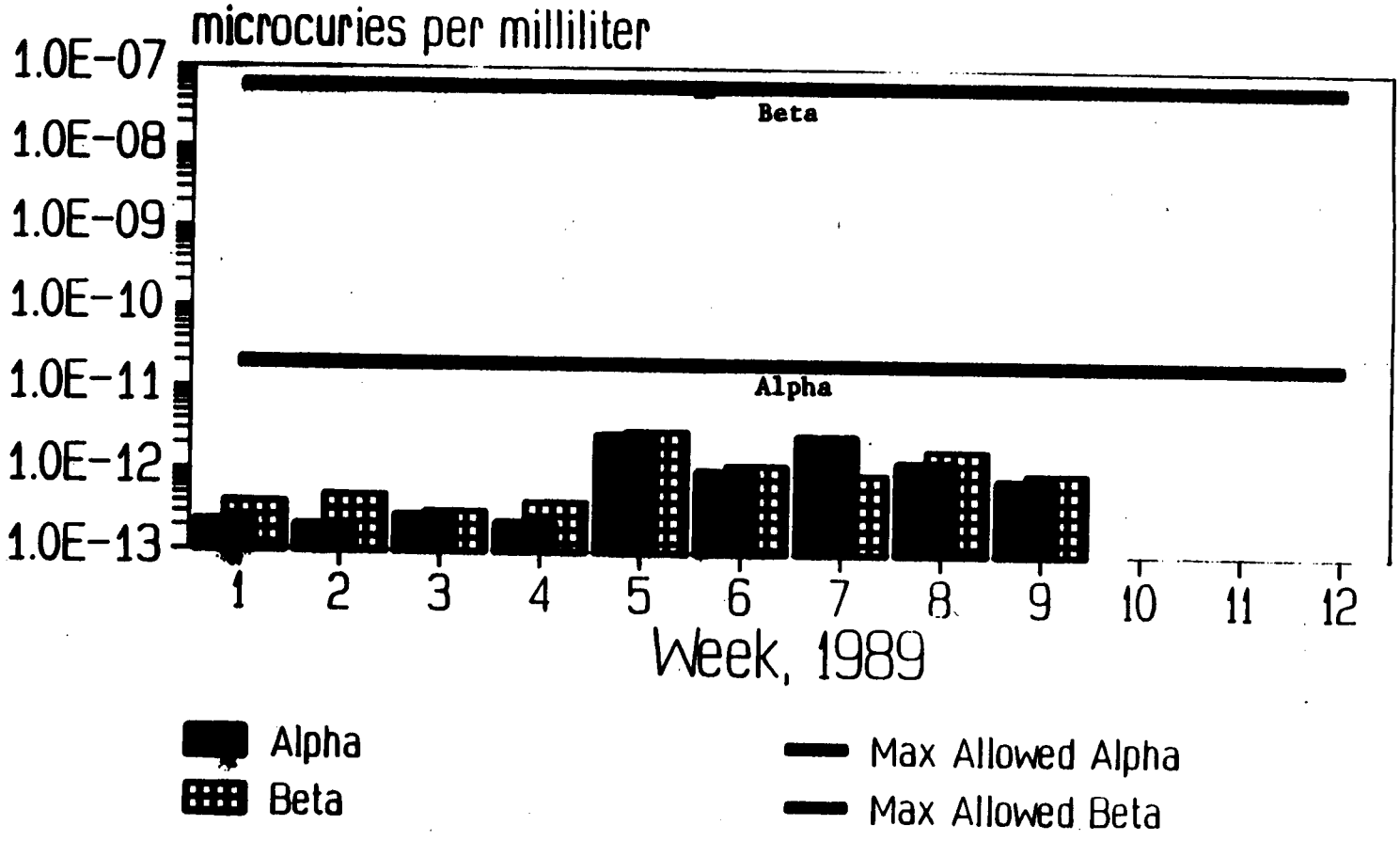
Long-Lived Activity, Time-Weighted Avgs



Samples include respirator areas.

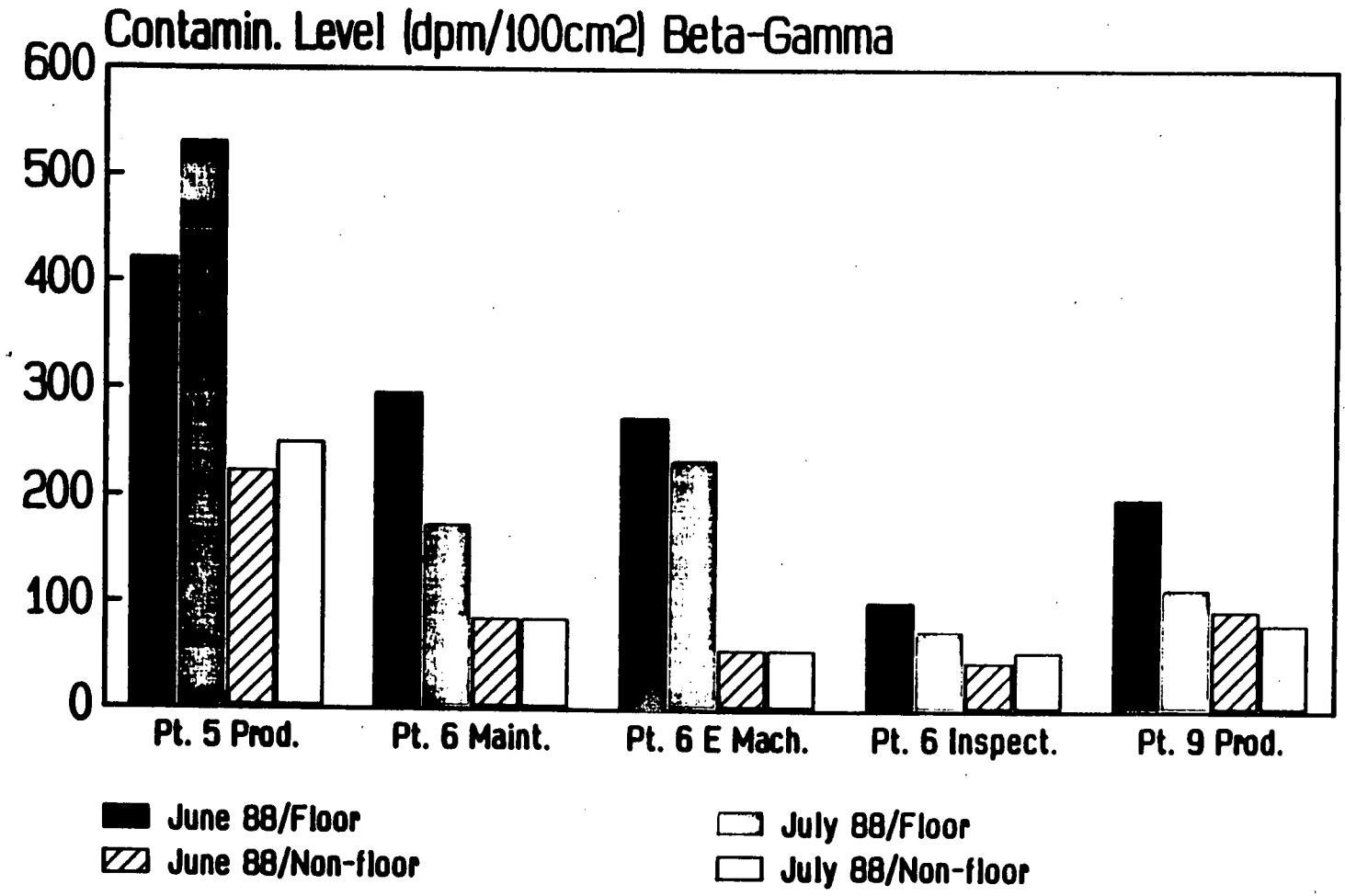
Plant 4 Air Activity Monitoring

Long-Lived Activity, Time-Weighted Avgs

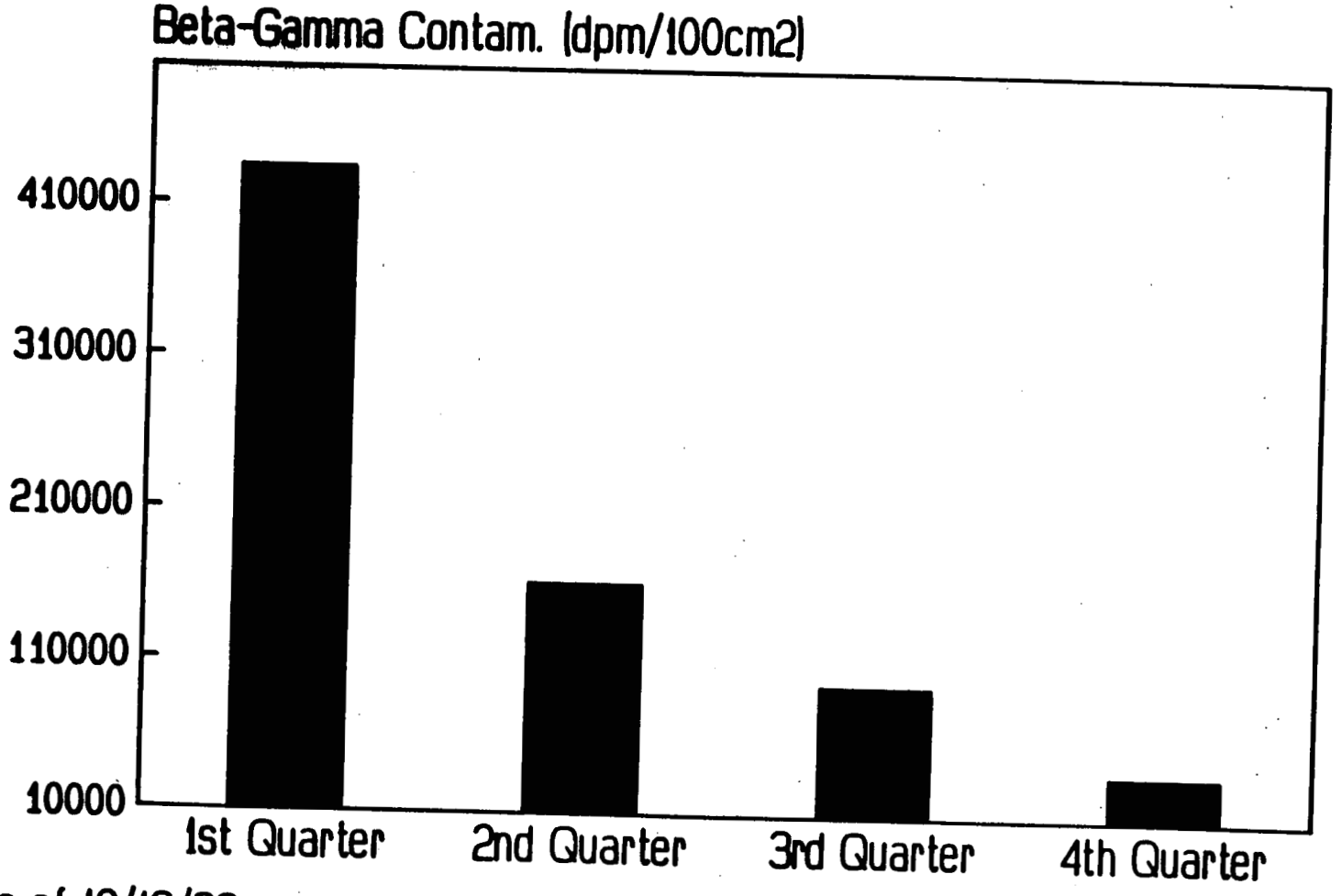


Samples include respirator areas.

BREAKROOM SURVEY RESULTS-METALS AREA
JUNE 1988 AND JULY 1988

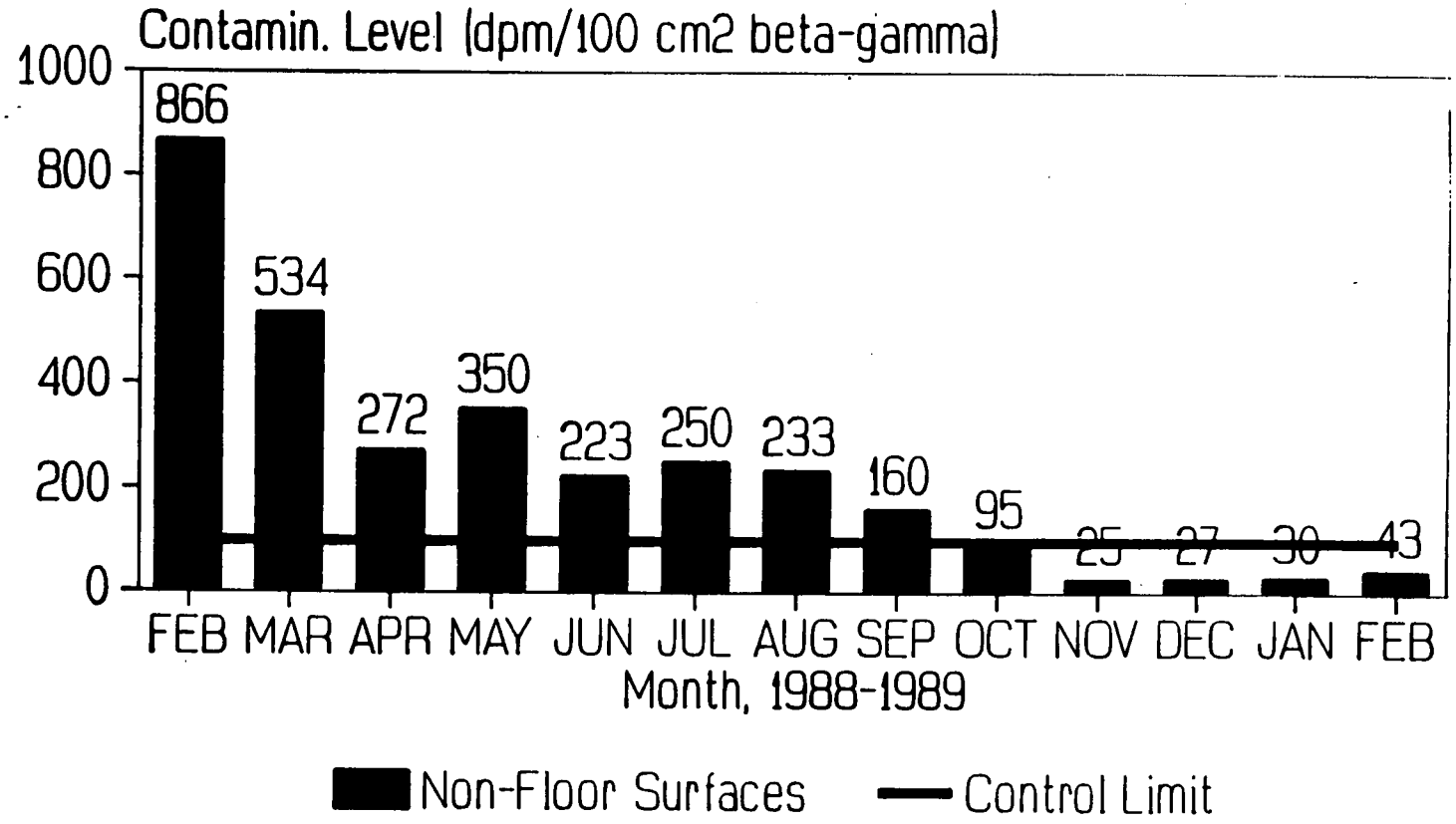


PLANT 5 BURNOUT DRUMMING STATION
Average Contamination Level 1988

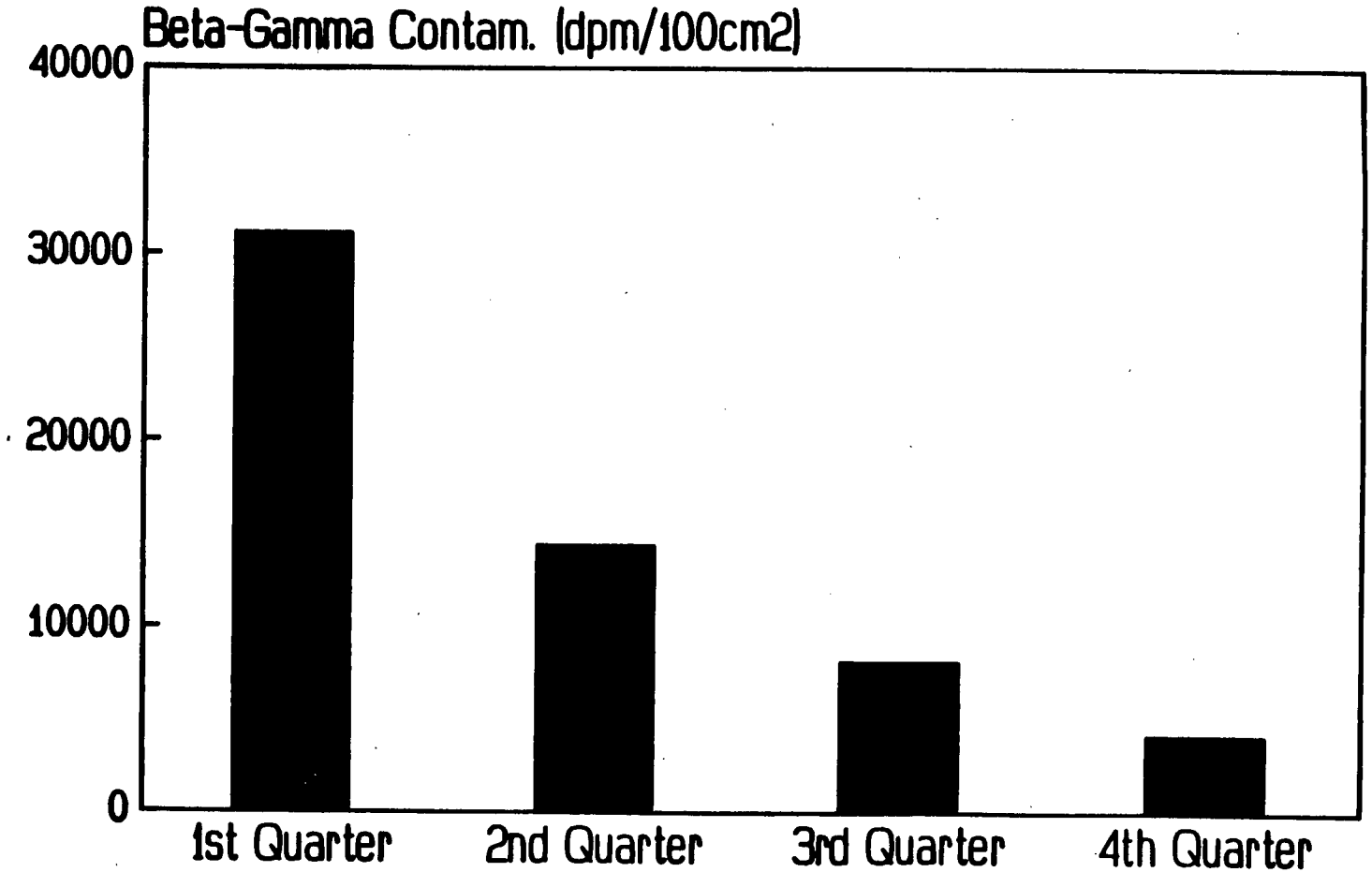


* As of 12/13/88

PLANT 5 BREAKROOM
NON-FLOOR SURFACES
Feb88-Feb89



PLANT 5 CHARGE STATION AREA
Average Contamination Level 1988



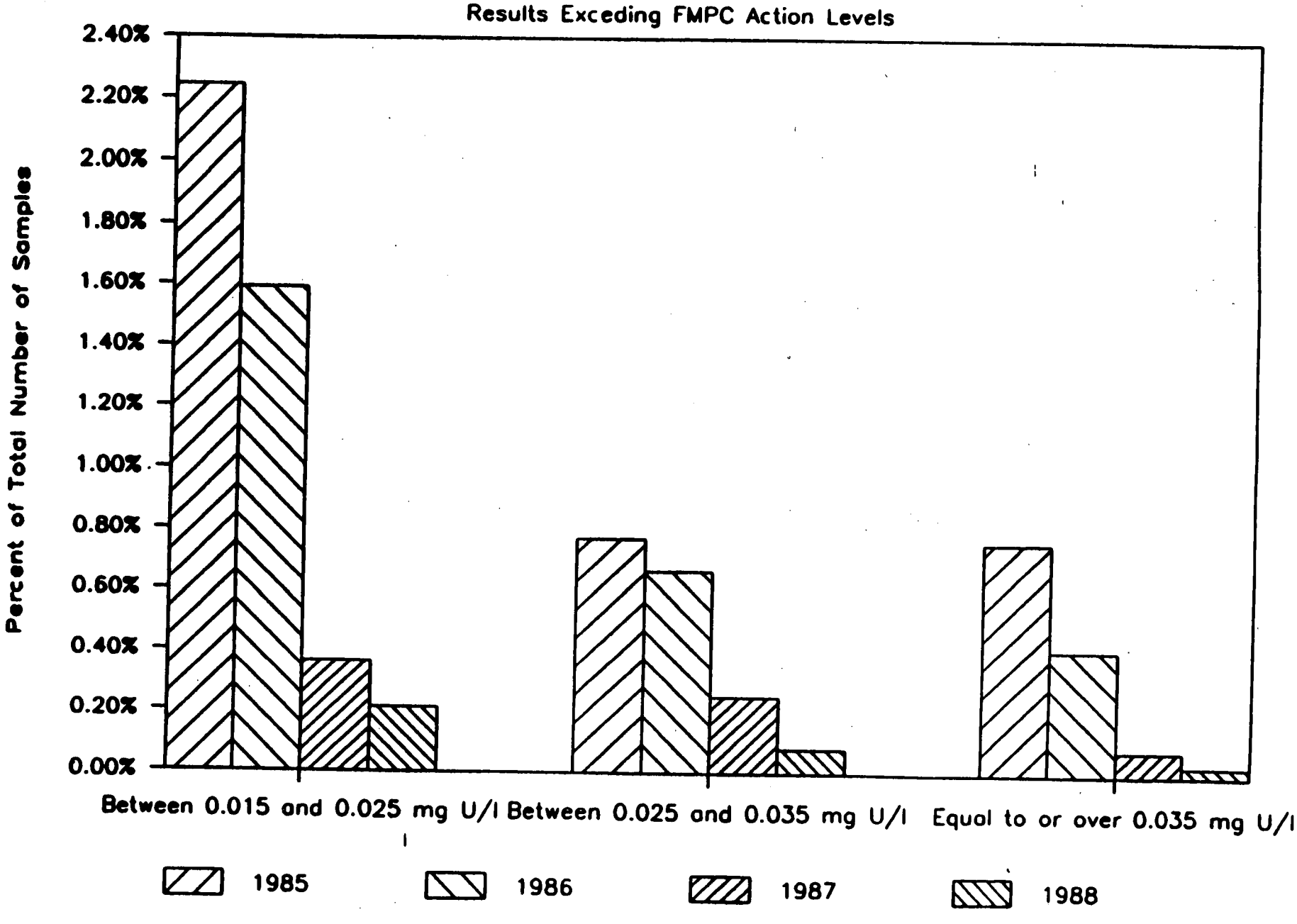
* As of 12/13/88

DERIVED AIR CONCENTRATIONS FOR SELECTED RADIONUCLIDES (uCi/mL)

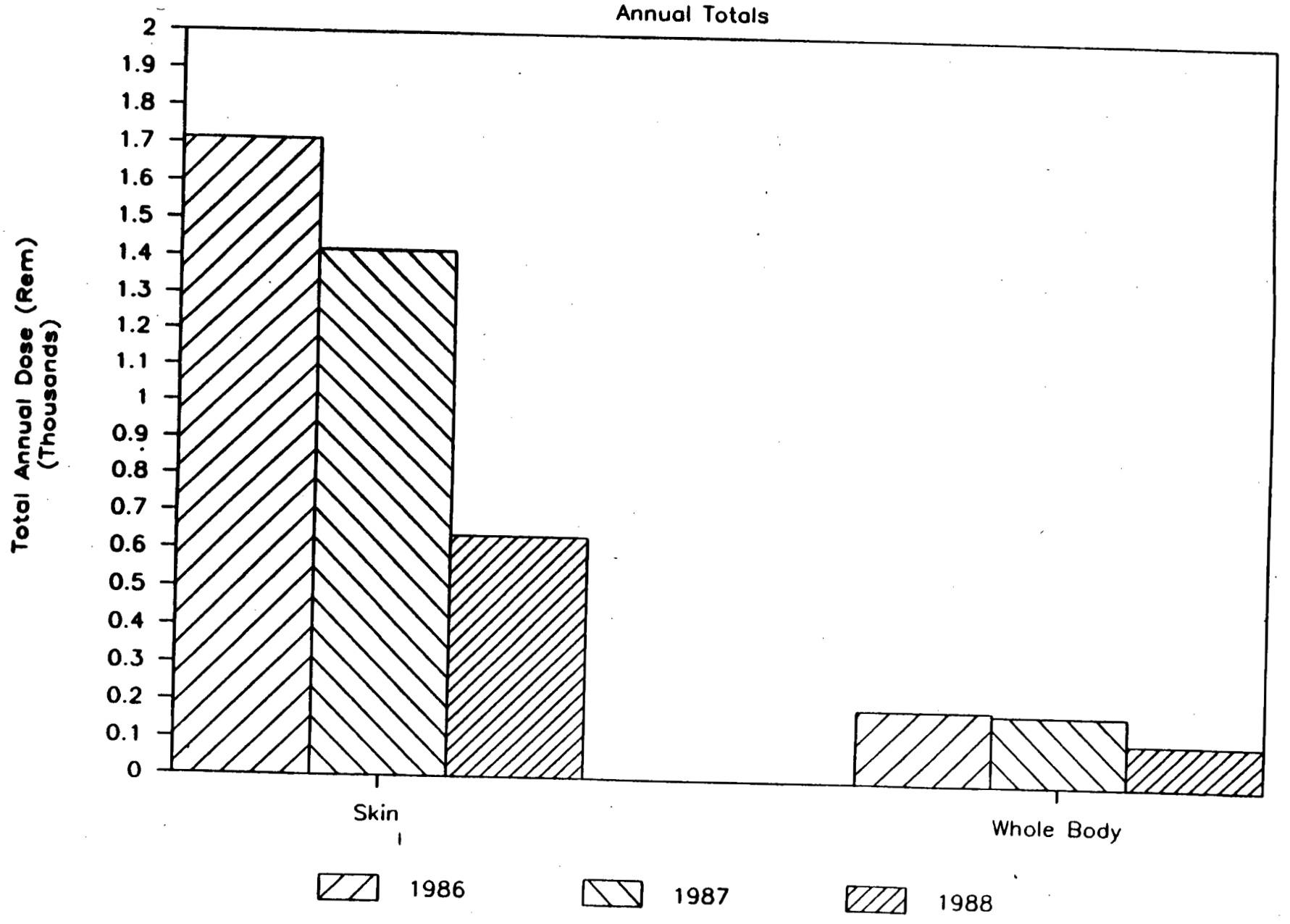
Nuclide	Solubility Class		
	Class D	Class W	Class Y
U-238	6 E - 10	3 E - 10	2 E - 11
U-235	6 E - 10	3 E - 10	2 E - 11
U-234	5 E - 10	3 E - 10	2 E - 11
Th-230	-	3 E - 12	7 E - 12
Th-232	-	5 E - 13	1 E - 12
Th-228	-	4 E - 12	7 E - 12
Rn-222	3 E - 08 (0.3 WL)	-	-
Rn-220	8 E - 09 (1.0 WL)	-	-
Pu-239	-	2 E - 12	6 E - 12
Pu-238	-	3 E - 12	7 E - 12
Np-237	-	2 E - 12	-

0776.29

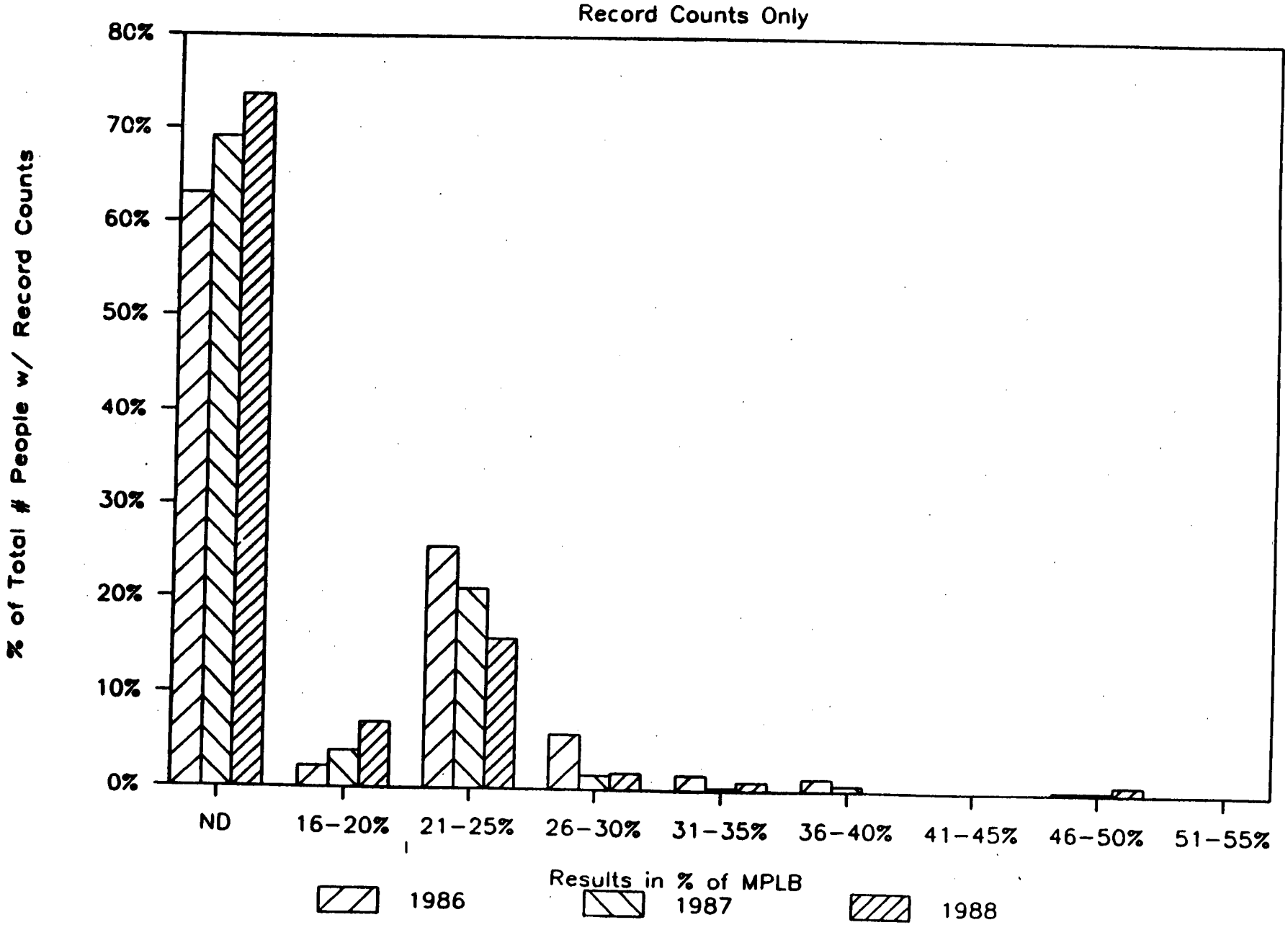
FMPC URINALYSIS DATA SUMMARY



FMPC EXTERNAL EXPOSURES



FMPC IN VIVO MONITORING SUMMARY



FMPC RADIOLOGICAL AND CHEMICAL PROTECTION PROGRAMS

NOISH Reports of FMPC Health Studies

- July 1987 - Report of Medical Study of 146 Long Term FMPC Employees
- March 1988 - Report of Evaluation of Environmental and Radiological Conditions
- June 1988 - Report of Analysis of Renal Function Tests