WELCOME TO THE LECTURE ON OPERATIONS

R.B. TAYLOR

OPERATIONS

AREAS TO BE DISCUSSED

- OPERATIONS ORGANIZATION & ADMINISTRATION
- SHIFT ROUTINES & OPERATING PRACTICES
- CONTROL ROOM ACTIVITIES
- TRAINING
- CONTROL OF EQUIPMENT AND SYSTEM STATUS
- RECORD KEEPING & EVENT REPORTING
- OPERATING & TESTING PROCEDURES

OPERATIONS

AREAS TO BE DISCUSSED (cont.)

- OPERATOR AIDS
- EQUIPMENT LABELING
- DEFENSE IN DEPTH
- SUBSTANCE ABUSE
- PROBABILISTIC SAFETY ANALYSIS
- PERFORMANCE MONITORING

SETTING AND ACHIEVING GOALS

- SUPPORT STRATEGY
- ARE MEASURABLE
- ACTION PLAN DEVELOPED
- FREQUENT MEASUREMENT
- CORRECTIVE ACTION
- BUY IN
- COHERENT
- FOCUSED

TYPICAL OPERATIONS GOALS

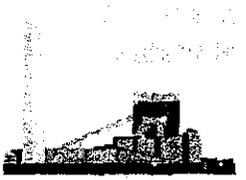
- REACTOR TRIPS
- OPERATING ERRORS
- CAPACITY FACTOR
- BUDGET
- INJURIES
- TRAINING STATUS
- LIT ANNUNCIATORS
- TEMPORARY OPERATING INSTRUCTIONS

GOALS ARE A
MANAGEMENT TOOL

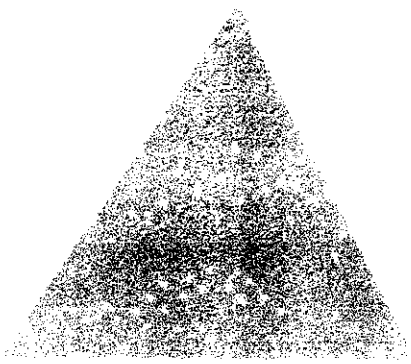
NOT

AN END IN THEMSELVES

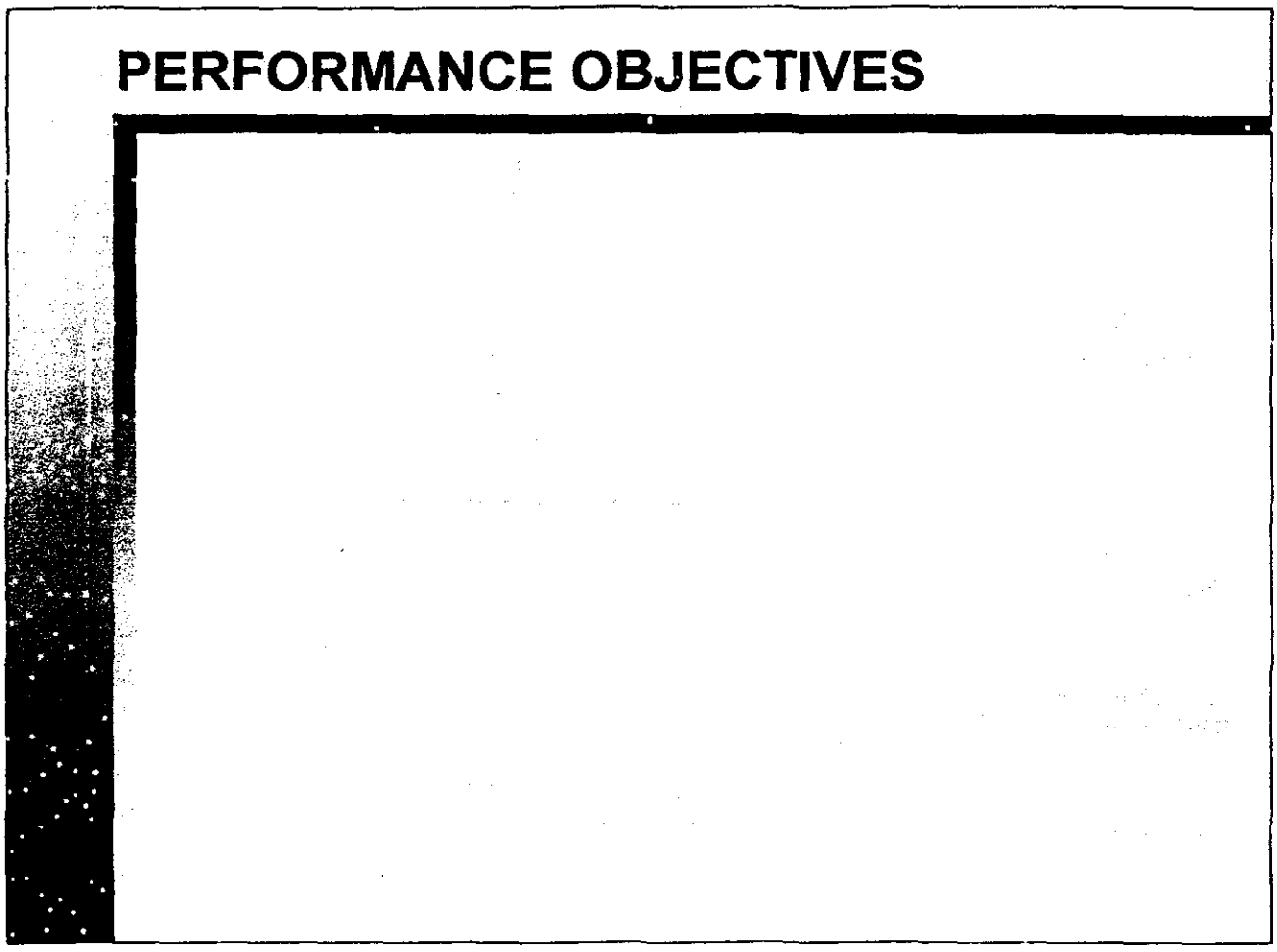
PERFORMANCE OBJECTIVES

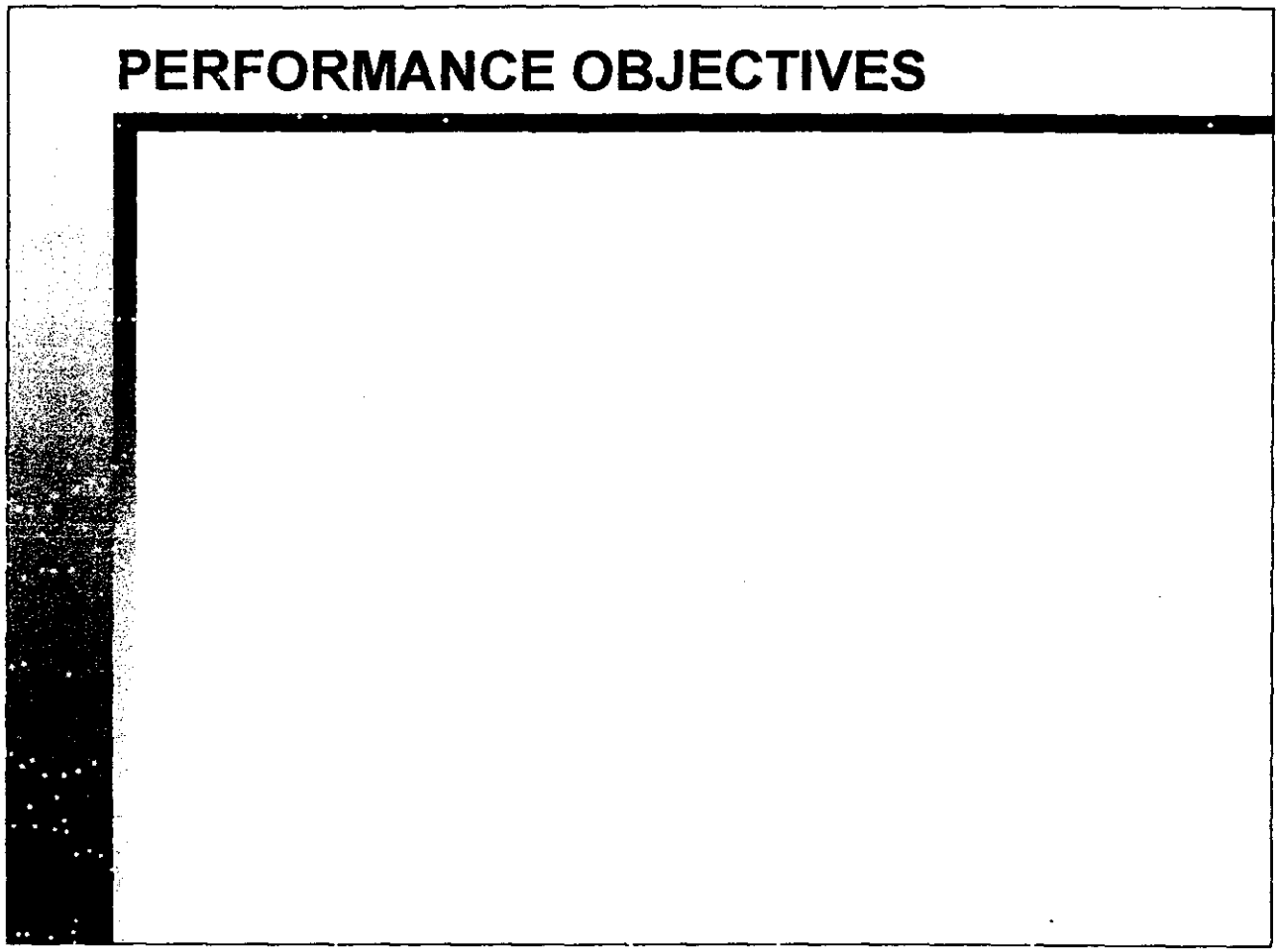


PERFORMANCE OBJECTIVES



PERFORMANCE OBJECTIVES




PERFORMANCE OBJECTIVES

OPERATING POLICIES

- SET FRAMEWORK FOR ACHIEVEMENT OF GOALS
- ENSURE COHERENT CONDUCT OF OPERATIONS
- TYPICAL EXAMPLES

SHIFT ROUTINES AND PRACTICES

- DELINEATION OF AUTHORITY
- REDUCTION OF ADMIN TASKS
- PROMPT NOTIFICATION OF ABNORMALITIES
- IDENTIFICATION OF DEFICIENCIES
  - ELIMINATE
  - CONTROL
  - CONTAIN
- FIELD TOUR DISCIPLINE
- COMMUNICATIONS

CONTROL ROOM ACTIVITIES

- ESTABLISH ENVIRONMENT
- ESTABLISH EXPECTATIONS
- LIMITS OF AUTHORITY
- COMMUNICATIONS
- PROCEDURAL COMPLIANCE
- KNOWLEDGE OF FIELD STATUS
- CONDUCT OF TESTING

TRAINING AND QUALIFICATION

- INTEGRAL PART OF JOB
- MUST RESPOND TO SITUATIONS
- OPS MANAGEMENT INVOLVEMENT
- SIMULATOR DISCIPLINE

INDEPENDENT VERIFICATION

- USED WHEN PLANT UPSET CAN BE CAUSED BY THE MISTAKE OF ONE INDIVIDUAL
- COMPLIMENTARY TO SELF CHECKING
- SIGNIFICANTLY REDUCES THE POSSIBILITY OF ERROR
- VERIFICATION MUST TAKE PLACE BEFORE THE ACTIVITY IS CARRIED OUT
- HELPS PREVENT ERRORS DUE TO:
  - **WRONG UNIT**
  - **WRONG SYSTEM**
  - **WRONG COMPONENT**
  - **WRONG ISOLATION**
  - **WRONG PROCEDURE**

CONTROL OF EQUIPMENT STATUS

- ANALYZED STATE
- AUTHORIZATION OF CHANGE
- SYSTEM AND EQUIPMENT CONFIGURATION
- DEFICIENCY IDENTIFICATION
- ALARM STATUS
- POST MAINTENANCE TESTING
- INDEPENDENT VERIFICATION

SELF ASSESSMENT - THE PROCESS

SELF CHECKING

- **STOP**. PAUSE BEFORE ACTING, FOCUS ATTENTION, REVIEW DETAILS. WHEN IN DOUBT, ASK
- **THINK**. WHAT IS TO BE DONE BEFORE ACTING. IDENTIFY EQUIPMENT, CONSIDER CURRENT INDICATIONS AND EXPECTED RESPONSE.
- **ACT**. MAINTAIN EYE CONTACT WITH EQUIPMENT, PHYSICALLY TOUCH EQUIPMENT, CONFIRM CORRECT EQUIPMENT IS BEING WORKED ON.
- **REVIEW**. VERIFY EXPECTED RESPONSE. IF AN UNEXPECTED RESPONSE OCCURS, TAKE APPROPRIATE CONSERVATIVE ACTION.

RECORD KEEPING & EVENT REPORTING

- LOGS
- SHIFT TURNOVER
- EVENT REPORTING

OPERATING & TESTING PROCEDURES

- KEY FACTOR IN OPERATING PERFORMANCE
- POOR PROCEDURES
- UNCLEAR POLICY
- SEQUENCE
- HUMAN FACTORS
- TEMPORARY PROCEDURES

IDEAL SITUATION

- OPERATORS INTELLIGENTLY COMPLYING
- WELL WRITTEN
- ACCURATE
- CURRENT
- VERIFIED AND AUTHORIZED
- HUMAN FACTORS
- AVAILABLE
- CONTROLLED

OPERATOR AIDS

- WHAT ARE THEY
- NEED
- CONTROL

EQUIPMENT LABELING

- INITIAL DESIGN IMPORTANT
- IMPACT OF MAINTENANCE
- LEGIBILITY
- POLICY ON MISSING LABELS
- QUICKLY BECOMES A LARGE PROBLEM

FITNESS FOR DUTY ELEMENTS

- DRUG ABUSE
- ALCOHOL ABUSE
- MEDICAL TREATMENT
- MENTAL STATE
- TIREDNESS
- ALCOHOL AVAILABILITY ON SITE

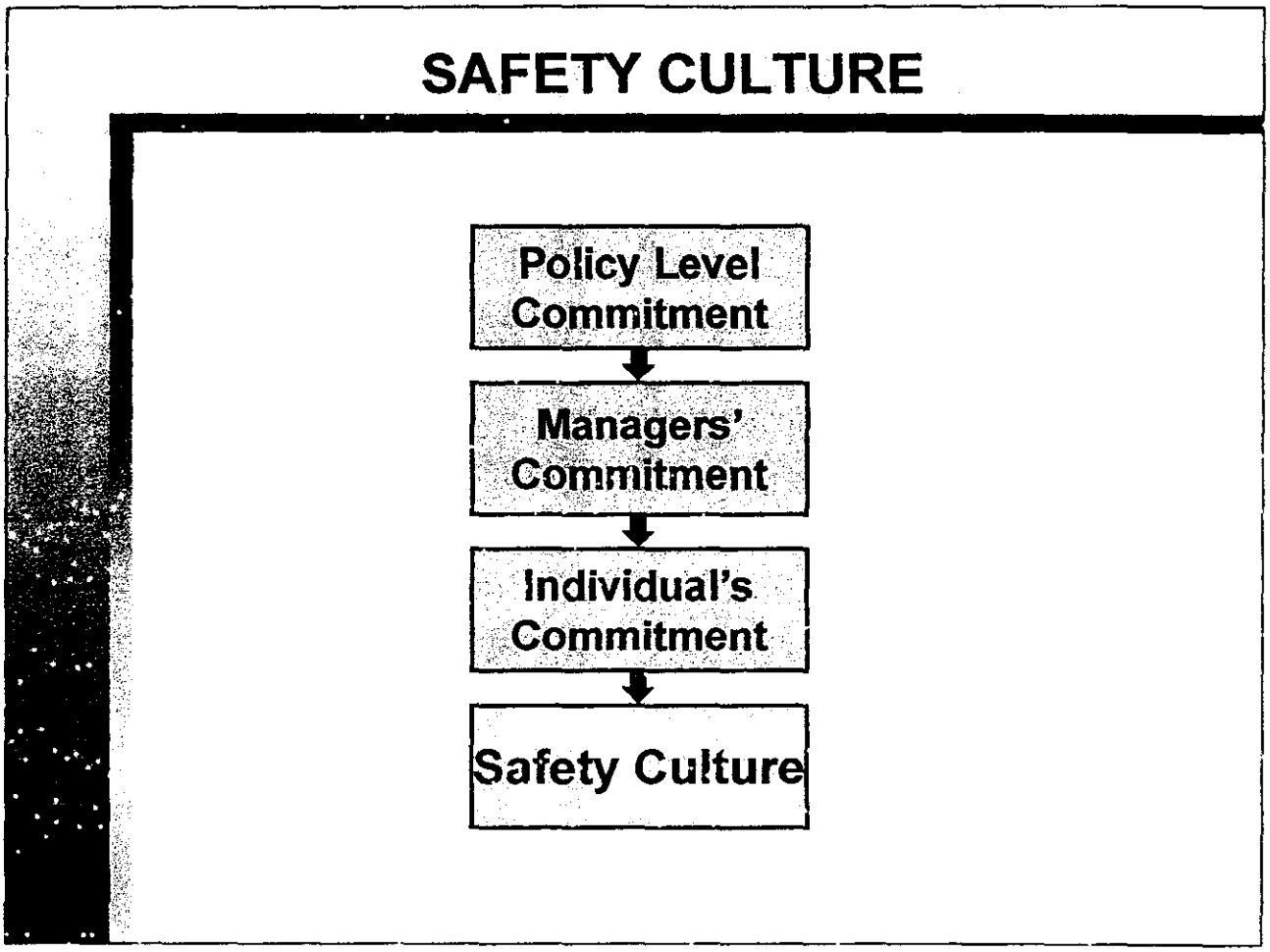
PROBABILISTIC SAFETY ANALYSIS

- DEVELOPED TO UNDERSTAND VULNERABILITIES TO CORE DAMAGE
- CAPABILITY TO ENHANCE OPERATION
  - TRAINING
  - PRIORITIZE MODIFICATIONS
  - OUTAGE TIMES FOR SAFETY RELATED EQUIPMENT
  - EMERGENCY OPERATING PROCEDURES
  - OUTAGE VULNERABILITIES

SAFETY CULTURE - CONCEPTS

- TERM DERIVED BY INTERNATIONAL NUCLEAR SAFETY ADVISORY GROUP (INSAG)
- EXPLAINED IN IAEA SAFETY SERIES NO. 75-INSAG-4, ***SAFETY CULTURE***
- AN IMPORTANT ELEMENT OF OPERATIONAL SAFETY AND OSART MISSIONS
- DEFINED AS:

  THAT ASSEMBLY OF CHARACTERISTICS AND ATTITUDES IN ORGANIZATIONS WHICH ESTABLISHES THAT AS AN OVERRIDING PRIORITY, NUCLEAR PLANT SAFETY ISSUES RECEIVE THE ATTENTION WARRANTED BY THEIR SIGNIFICANCE


SAFETY CULTURE
Policy Level Commitment
Managers' Commitment
Individual's Commitment
Safety Culture

REVIEWING SAFETY CULTURE

- INDIVIDUAL QUALITIES ARE BEST ASSESSED IN DISCUSSION AND BY OBSERVATION OF WORK ACTIVITIES
- TEAM MEMBERS SHOULD BE ABLE TO ANSWER THE SELF ASSESSMENT QUESTIONS IN INSAG-4, BUT SHOULD NOT ASK THEM DIRECTLY. THESE QUESTIONS ARE INCLUDED IN *OSART GUIDELINES*, PP 15-18
- MANAGERIAL ASPECTS CAN BE ASSESSED, IN PART, BY PROGRAMMATIC REVIEW

A STRONG SAFETY CULTURE

A SOUND TECHNICAL BASIS EXISTS FOR ACTIONS WHERE:

- PROCEDURES ARE UP-TO-DATE
- DESIGN BASIS IS UP-TO-DATE
- TECHNICAL DOCUMENTATION IS DEVELOPED FOR PLANT CHANGES
- LIMITS OF SAFETY ANALYSES ARE OBSERVED, AND
- RISKS ARE ASSESSED AND UNDERSTOOD

A STRONG SAFETY CULTURE (cont..)

A DISCIPLINED APPROACH TO OPERATIONS BY STAFF WHO ARE:

- HIGHLY TRAINED AND QUALIFIED
- CONFIDENT BUT NOT COMPLACENT
- COMMITTED TO FOLLOWING PROCEDURES - INTELLIGENT COMPLIANCE
- COMMITTED TO GOOD TEAMWORK AND COMMUNICATIONS
- SUPPORTED BY MANAGEMENT AND ADEQUATE RESOURCES

A STRONG SAFETY CULTURE (cont..)

A PREVAILING STATE OF MIND FOCUSED ON SAFETY AND CHARACTERIZED BY:

- CONTINUING SEARCH FOR WAYS TO IMPROVE
- CONSTANT AWARENESS OF WHAT CAN GO WRONG
- FEELINGS OF PERSONAL ACCOUNTABILITY FOR SAFE OPERATIONS
- FEELINGS OF PRIDE AND OWNERSHIP OF THE PLANT

A STRONG SAFETY CULTURE (cont..)

RIGOROUS SELF ASSESSMENTS ARE PERFORMED AND:

- PLANT AND INDUSTRY EXPERIENCE ARE ACTED UPON
- INTERNAL AND INDEPENDENT AUDITS ARE CONDUCTED
- FACTS ARE FACED
- BAD NEWS ACCEPTED
- PROBLEMS ARE DEALT WITH PROMPTLY, OPENLY AND OBJECTIVELY

DEFENSE IN DEPTH OBJECTIVES

- COMPENSATE FOR HUMAN ERROR
- MAINTAIN EFFECTIVENESS OF BARRIERS
- PROTECT PUBLIC FROM HARM IF BARRIER NOT FULLY EFFECTIVE

DEFENSE IN DEPTH STRATEGY

- PREVENT ACCIDENTS
- LIMIT CONSEQUENCES IF THEY HAPPEN

DEFENSE IN DEPTH STRUCTURE

- PREVENTION OF ABNORMAL OPERATION AND SYSTEM FAILURES
- CONTROL IF THEY HAPPEN
- ACTIVATION OF SPECIAL SAFETY SYSTEMS
- LIMITATION OF ACCIDENT PROGRESSION
- MITIGATION OF CONSEQUENCES OF A RELEASE

DEFENSE IN DEPTH

SOME KEY OPERATIONAL REQUIREMENTS

- EFFECTIVE SURVEILLANCE
- GOOD MATERIAL CONDITION
- PROCEDURAL COMPLIANCE
- TRAINING
- SAFETY CULTURE
- HUMAN FACTORS