DEPT OF NUCLEAR TECHNOLOGY

CHULALONGKORN UNIVERSITY

Presentation - 8

" QUALITY in OPERATIONS"

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OBJECTIVES OF PRESENTATION

This presentation will discuss the following topics:

- **Concept and application of Safety Culture**
- **Operational surveillance**
- **Management of operating activities**
- **Management of maintenance activities**

QUALITY CULTURE

- **Framework of practice**
  - Operating limits
  - Operating practices
  - Procedures
  - Supervision

- **Attitude of staff**
  - Individual awareness
  - Knowledge and competence
  - Commitment
  - Motivation
  - Accountability

ONTARIO HYDRO QUALITY PRINCIPLES

- Define Goals and Objectives
- Define Roles and Responsibilities
- Specify and communicate Expected Results
- Hold People accountable
- Ensure People are Trained
- Ensure Information is available
- Seek and use Relevant Experience
- Plan and control Work
- Use the right Materiel and Processes
- Verify work against Standards
- Identify and correct Deficiencies
- Control Documents
- Review and improve Management and Work Processes

UNDERSTANDING QUALITY CULTURE

All plant personnel :

- Know the expectations of their job
- Know why their job is important
- Are committed to professionalism
- Meet the performance standard
- *"RIGHT THE FIRST TIME "*
- Are proud of quality of their work
- Feel part of the plant "team"
- Freely give and receive communications
- Are committed to continuous improvement

KEY PRINCIPLE OF QUALITY

Each employee is responsible for

the quality of his performance "

Supervisors and managers

are responsible

for quality within their

area of control

TEN COMMANDMENTS OF NUCLEAR SAFETY

- Operate conservatively
- Do not relax rules in time of crisis
- Maintain defense in depth
- Verify actions affecting reactor safety
- If in doubt, stop and ask
- Ensure all actions can stand up to critical scrutiny
- Understand the implications of change
- Do not live with problems
- Determine and correct the underlying cause of problems
- Keep it simple

COMPONENTS OF MAINTENANCE SURVEILLANCE

- Call-up system for routine activities
- Equipment testing to ascertain condition
- Equipment calibration program
- Recording system for equipment history
- Review of maintenance documentation

CONDITIONS for OPERATIONAL CONTROL

- **Ability to operate equipment as required for process control and control system configuration**
- **Ability to monitor process parameters and system configuration,**
- **Have annunciation to indicate out of spec condition**

KEY ITEMS for OPERATIONAL QUALITY

- Authority for plant clearly established
- Control panels attended at all times
- Sufficient staff in control room and field
- Routine testing, call-ups, surveillance routinely carried out
- Nuisance and spurious alarms minimized
- Operating instructions and aids kept up to date
- Temporary instructions and modifications minimized and controlled
- Control of plant and equipment maintained
- Control room and field instruments monitored
- All equipment in the field identified
- "Safety culture" evident throughout

PROFESSIONALISM IN PLANT OPERATIONS

RELATES TO :

- *COMMUNICATION*
- *COORDINATION*
- *TEAM WORK*
- *PERFORMANCE*

- **Honesty in all duties and relationships**
- **Thorough preparation for excellent performance at work**
- **Assumption of responsibility for own activities : professional and others**
- **Professional appearance and demeanor**
- **Respect for dignity of co-workers**
- **Continuous expansion of technical and plant-related knowledge**

CONSERVATIVE DECISION MAKING

means:

- **All decisions at the plant are made in the direction of maintaining or improving the desired level of safety.**

- **Operational safety margins are not routinely and deliberately reduced**

WHY HOUSEKEEPING MATTERS ?

- Creates visible indication of standards at the plant
- Good housekeeping contributes to safe working environment
- Ensures that the plant is in good state of repair and therefore less likely to suffer from unplanned outages
- It's either getting better or worse.
  If there is no program to improve, then conditions will deteriorate

EXAMPLE OF GOOD HOUSEKEEPING

STANDARD

- Cleanliness and order evident
- Portable equipment properly stored
- Work areas tidy
- Equipment free from accumulations of dust and grime
- Access to equipment not impeded
- Trash containers available and not overflowing
- Parts and materials not lying about in work areas
- Pools of water or oil are not evident on the floor

WARNING SIGNS of POOR QUALITY

(Operating Problems Coming)

- Close calls, ie. undesirable safety or operations events barely avoided
- Excessive operating errors
- Routines / tests not carried out
- Equipment in neglected condition
- Instruments out of service or not calibrated
- Poor housekeeping
- Logs poorly written
- Equipment line-up not routinely confirmed
- Training / re-qualifications delayed
- Excessive use of consumables

MAINTENANCE POLICY

Preventive : Actions taken on routine basis to prevent equipment breakdown.

- **on-condition (predictive) - measurement of conditions to analyze and predict equipment performance, so that action can be taken in advance of breakdown.**
- **periodic - action taken on routine basis to prevent breakdown.**
- **planned - maintenance done prior to equipment failure.**

  Can be initiated by:

  * **Predictive maintenance findings**
  * **Periodic maintenance findings**
  * **Experience**
  * **Suppliers recommendation**

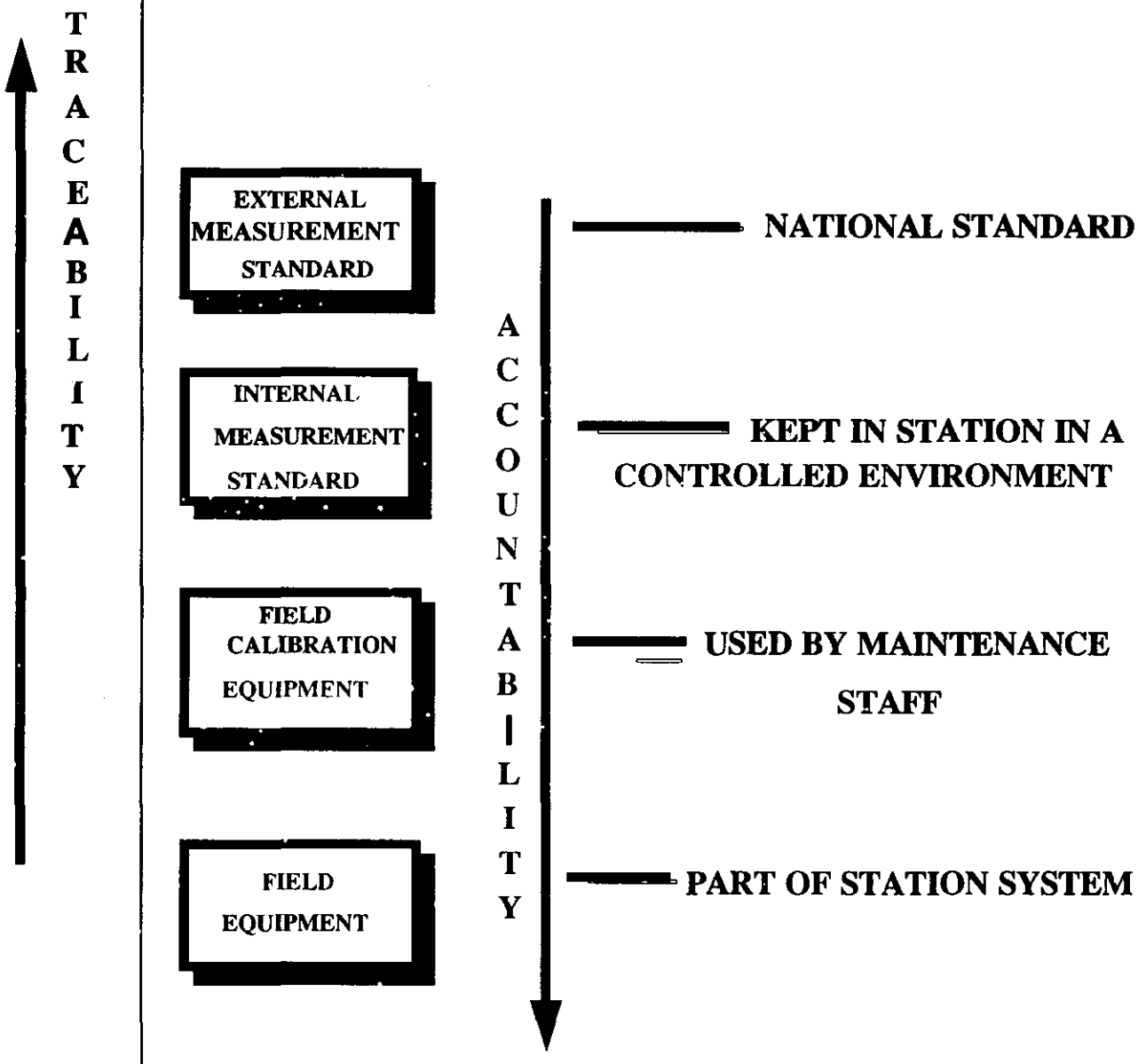
Corrective : Repair or replacement of equipment which has failed in service.

EQUIPMENT CONDITION

Examples of items to look at:

- **Cleanliness**
- **Equipment Surroundings**
- **Lubrication**
- **Vibration**
- **Leaks**
- **Temperature**
- **Protection from environment**
- **Seals and rubber parts**
- **Condition of electrical contacts**
- **Nuts tightened**
- **Erosion and corrosion**
- **Use of consumable items**
- **Observed abnormal condition or operation**
- **Non-destructive examination**

CALIBRATION PROGRAM



WARNING SIGNS of POOR QUALITY
(Maintenance Problems coming)

- Time estimates routinely exceeded
- Too much rework
- Excessive use of materials
- Tools damaged
- Low volume of work
- Poor housekeeping
- Close calls (Accidents)
- Poor reporting (Feedback)
- Training postponed
- Preventive maintenance postponed
- Incompetent people assigned
- Poor pre-job briefing

Supervision

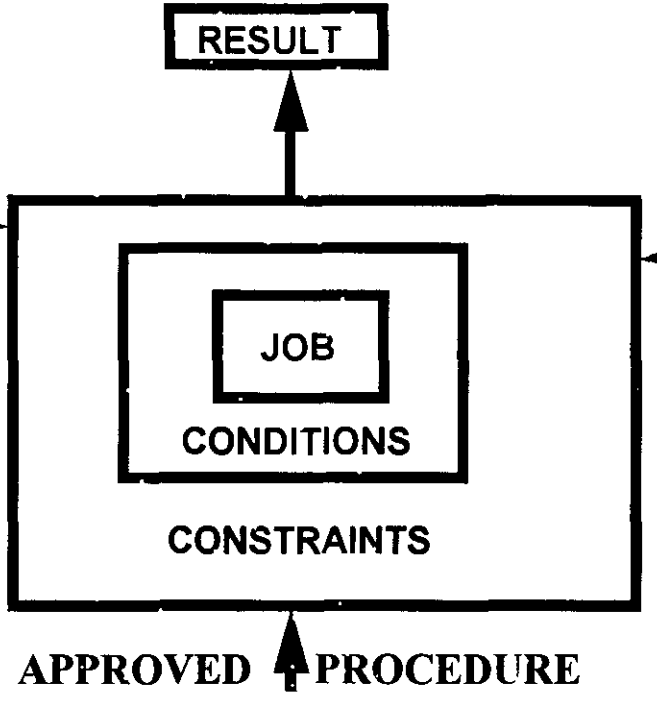
JUDGEMENT

CONTROL

QUALITY

EFFECT OF SUCCESS,
FAILURE OR ERROR ON :

- Employee Safety
- Reliability
- Citizenship
- Product Cost
- Conservation



MANPOWER

- Experience
- Training
- Work Record
- Safety Record
- Behavioural Record

TOOLS AND MATERIAL

- Tool Box
- Tool Crib
- Stores, Material
- Special Tools and Material
- Safety Equipment

APPROVED PROCEDURE

- Written Procedure
- Written Work Plan
- Verbally Agreed Procedure
- Basic Work