I. Introduction


II. Problem analysis

Supervisors of radiological workers are often faced
with critical decisions.  Providing a model for strategic
decision making will ensure that these critical
decisions are made in an efficient, rational manner.

A.  Stating the mission

In making decisions, the organization's mission and resultant goals should always be considered. Decisions should be consistent with the stated mission of the organization. Prior to decision making, the organization's mission must be defined. This may be difficult if the organization's mission has not been defined or if there are conflicting goals within the organization.

B.  Assessing internal and external environments

Prior to making a decision or solving a problem, the problem must be identified and evaluated to ensure that all factors have been included in the problem statement.

1.  Problem diagnosis - Identify the problem.

2.  Problem specification - Clarify the specific nature of the problem.

3.  Problem framing - Frame the problem in a nonjudgmental way.

4.  Problem formulation and reformulation - Restructure the problem in a way that will make it easier to solve. This can be done by introducing accurate assumptions.

Notes

III.  Decision making

A.  Developing strategy

Once the problem has been identified, alternative solutions must be generated.  A general rule for decision making is as follows:  if an acceptable standard solution is available to a problem, then it should be used instead of spending time and resources reinventing a solution.  If a standard solution is not available, alternatives must be developed.

1.  Standard solutions involve using standard operating procedures as well as available alternatives.  Optimization techniques, which include cost-benefit analysis, are a fundamental part of work reviews and of radiological analyses for new designs and modifications.  For review of minor or routine activities with low associated doses, a cost-benefit evaluation may be an intrinsic part of the engineering or operations review process, so a detailed evaluation is usually not necessary.  For review and planning of major tasks involving higher collective dose expenditures, a detailed and documented evaluation should be performed.

2.   A simple optimization decision may be made by choosing a low-current-dose worker instead of a high-dose worker or by declining to spend a large sum to save only a few mrem.  Note that the writing of work planning documents (e..g., Radiological Work Permits, work packages, procedures, etc.) is also an optimization evaluation, in which the line supervisor must usually concur.

Although the supervisor may not have to perform detailed optimization Evaluation, that information may need to be provided to the person(s) who will do the evaluation.

Such information will often be based on past operating experience and may include costs of equipment, person-hours, number of people, amount of time spent in radiological areas, and even subjective judgments regarding the feasibility of alternatives.

B. Limits on decision making

1. When supervisors make decisions, they need to determine how much power they have in reaching a final decision and how much influence they have over the process. This is important information when considering the most appropriate alternatives.

2. The decision maker must also determine what the political impact of various decisions will be. There may be political reasons why the most rational solution is not feasible.

3. When selecting an alternative, it is important to consider the repercussions of not selecting various alternatives. If there is strong opposition to a selected alternative, the decision maker needs to be able to support the current decision and explain why the competing solution is less feasible or less desirable.

Notes

C.  Making the decision

The formal decision analysis will be as follows:

- Define alternative courses of action, determine the criteria to use in evaluating the alternatives, and identify key uncertainties in the decision.

- Assess the consequences of selecting each alternative.

- Assess the probabilities and preferences by looking at the uncertainties and utilities of each outcome.

- Evaluate alternatives in terms of the stated criteria.

- Analyze the optimal solutions for any adverse consequences.

- Select the most effective solution based on problem analysis.

D.  Implementation and controlling execution of strategy

Once a decision is made, the decision will be implemented and evaluated.  It is important to monitor events after implementation to ensure that the outcomes are as expected.  If not, it may be necessary to revise the original decision. Monitoring outcomes of decisions will also provide lessons learned for future decision making.

E.  Case studies

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Notes

I.  Introduction

II.  Motivation

The roles and responsibilities of a supervisor include motivating personnel to perform quality work.  There are many theories of motivation.  Some have been found to be effective and some have not.  It is important for supervisors to understand which theories of motivation are valid and which techniques will be most effective.

III.  Why are people motivated?

A.  Needs fulfillment theories

Need fulfillment theories of motivation state that people are motivated by inherent needs and specifically by unmet needs.  Behavior is based on inherent needs.

1.  Maslow's hierarchy of needs

1.  Physiological
2.  Safety
3.  Belongingness
4.  Love
5.  Self-actualization

In an organization, one typically assumes that an individual's basic needs have been met (food, shelter, clothing). However, other needs may not have been met. Supervisors should be aware of employees' need for a safe and secure working environment. This is a critical issue for supervisors of radiological workers.

It is not the organization's responsibility to fulfill higher level needs (belongingness, love, self-actualization). However, supervisors should understand how these needs translate into motivation. If employees feel like they are part of a work team, they will be more loyal, and perhaps be motivated to work harder. The need for self-actualization can often be encouraged by providing employees with the authority to make decisions that are critical to their working environment.

2. Job enrichment theory

The job enrichment theory of motivation states that certain job dimensions will motivate employees to work more effectively.

Job dimensions include the following:

- Skill variety

- Task identity

- Task significance

- Autonomy

- Feedback

These job dimensions will provide meaning to the job, make an employee responsible for the job, and provide feedback concerning how the job is progressing.

Supervisors should evaluate the jobs of their workers to determine if these dimensions are part of the job.  If not, the need for job redesign may be indicated.

3.  Need for achievement theory

In this theory, it is believed that some employees have a need for achievement, while others do not.  If a person has a high need for achievement, he/she will do better in "achieving situations."  These situations may be characterized as follows:

- Personal responsibility is evident.  The individual will receive credit for a job well done.

- The task should be at an intermediate to average level of difficulty.  There should be a good chance of success.

- The individual needs to receive feedback.

- The individual needs to feel challenged.

- The situation should be ongoing, with consequences in the future.

Although a supervisor cannot change an individual's need for achievement, understanding this theory may explain what motivates some employees.

B.  Cognitive theories

Cognitive theories of motivation state that a person's behavior is based on a cognitive process.  People think before they act.

Notes

1. Equity (justice) theory

   This theory is based on the equity of input (work) and output (rewards).  Employees' output is based on their perceived level of their own input, as well as their perception of the input and output of others.

   If employees believe that their input is greater than that of others (or their output is less), they will try to balance the situation by doing the following:

   - Reducing their input (decreased productivity, absenteeism, tardiness)

   - Increasing their rewards (employee theft, i.e., supplies, phone calls, inflated expense statements)

   - Leaving the job in search of a more equitable situation

   Supervisors should be aware of this theory and assess whether there is equity in the workplace for each worker as well as across the team.  By understanding the equity theory, supervisors can understand behaviors stemming from real or perceived inequities.

2. Expectancy (choice) theory

   For the expectancy theory, the primary motivation is the attainment of goals. Behavior is based on a person's expectation that his or her effort will lead to a certain type of performance.  This in turn will lead to a certain level of reward (e.g., If I work hard, I will do a good job and get a good reward). Employees make clear choices about the level of effort they will exert based on these expectations.

For employees to be motivated, there must be a clearly defined relationship between performance and rewards (compensation system). There also has to be a link between effort and performance. The supervisor must be aware of an individual's effort and consequent performance.

The supervisor must provide feedback to the employee that will enable the link between effort and performance to be more direct.

C. Reinforcement theories

The basic tenet underlying reinforcement theories is that people are motivated by rewards for their behavior. People work because they are rewarded. A reward is considered something of value to the employee. The most basic is compensation (pay, benefits, leave time). Other rewards include recognition and job prerequisites. Following this theory, supervisors should assess the rewards and recognition given to their employees.

IV. Tools of motivation

A. Goal setting

Goal setting is one of the most researched areas of motivation, the basic conclusion is that goals motivate people. A goal is something that a person tries to attain, achieve, or accomplish. Once a goal is set, behavior is based on the attainment of that goal. Specific goal-setting techniques will be presented later.

Why do goals work?

- Goals give an employee direction.

- Goals influence the intensity with which an individual works toward attainment of a goal.

- Goals influence the persistence with which an individual works toward attainment of a goal.

- Goals typically require individuals to develop a strategy for goal attainment.

For goals to be effective motivators, they must have the following characteristics:

1. Goal difficulty

   Employees become more committed to difficult goals. If a goal is too easy, employees will not seriously commit to goal attainment because there is no challenge.

   However, if the goal is too difficult, employees will not make a commitment because they don't believe they can accomplish the goal.

2. Goal specificity

   The more specific a goal, the easier it is to achieve. Specific goals provide more detailed direction toward attaining that goal.

3. Employee participation in goal setting

   An individual must internalize a given goal before it becomes a motivation. The best way to do this is for the individual to participate in setting the goal. When employees are involved in goal setting, they have a much better understanding of the goal, as well as how to achieve it.

4. Feedback

   An individual must know when he or she has achieved a set goal.  It is important to have progressive feedback on goal attainment.

B. Empowerment

   Employee empowerment is a philosophy of transferring power from management to employees.  By doing this, employees become more involved in their work and accept responsibility for their actions.  Employees will be more motivated to do quality work if they have been involved in critical decisions and have a sense of ownership in the job.

   Even though empowerment is a strategy that affects the entire organization, the basic empowering relationship is between a supervisor and subordinate.  It is the immediate supervisor who transfers power to an employee.

   The steps toward empowerment are listed below:

   1. Develop an operational definition of empowerment.  The definition should be very clear as to what empowerment means from both the manager's perspective and the employee's perspective.  The goals and objectives of empowerment should be stated clearly and be behaviorally based in order to evaluate the success of any intervention.

2. Assess strategies used to empower employees.  Identify techniques that would be appropriate for your group.  This list will be tentative and will be refined as more information is gathered.  Techniques include participative decision making, job enrichment, redesign of internal processes, etc.

3. Clarify and communicate organization/ division mission.  An underlying assumption in empowering employees is that their actions will support the company's goals and objectives.  To ensure that this happens, employees need to be very clear on the company's goals and objectives.  All employees should know what their mission is and how it fits into the overall mission of the organization.

   The goals and objectives of the division should be concrete and expressed as specific outcomes to be achieved.  Employees will need some guidelines for the decisions they will be asked to make.  The division goals and objectives provide global guidance.

4. Determine the boundaries and limitations of each strategy used.  Decisions can be classified into executive decisions and operational decisions.  Executive decisions involve the overall mission of the organization, the political climate, and the global strategy.  Operational decisions are day-to-day decisions made in developing the "product."  It is important to know which decisions employees will be able to make on their own.

There are also organizational and regulatory restrictions in decision making that must be clarified. These decisions include fiscal decisions, standard operating procedures within the organization, restrictions imposed by DOE, etc. Identifying decisions that are not appropriate for participative decision making will narrow down those decisions that are appropriate.

5. Assuming participative decision making is to be used, determine what decisions are appropriate to delegate. Once boundaries and limitations are defined, come up with a tentative outline for the types of decisions that are appropriate for sharing with employees and those that are not appropriate. This outline is tentative and requires input from other managers, employees, and the administration prior to being implemented.

6. Decide whether empowerment strategies will be required or voluntary. Will a manager or employee have a choice of whether he/she will participate? What degree of delegation/empowerment will be required?

7. Communicate the tentative plan to managers, supervisors, and the administration. Prior to getting input from employees, get initial input from managers, supervisors, and the administration. This information will help determine the feasibility of employee empowerment.

8. Get input from employees. Find out their concept of empowerment. Determine to what degree employees already feel empowered. This can be done through a survey (preferably anonymously). This step is risky because it can raise expectations. This should only be done if you have definite plans to proceed. However, it should be done prior to developing an elaborate strategy for empowering employees.

   If the goal of empowerment is motivational, you have to find out what the employees want. On the other hand, if the goal of empowerment is to reduce the work load of middle management, you have to get employee buy-in; otherwise, it will flop.

9. Determine skills necessary for empowerment. It cannot be assumed that managers and employees have the skills necessary to transfer power. The first step is to determine what skills are necessary for shifting power. Managers will need the skills necessary to determine what decisions are appropriate for staff to make.

   Employees must know how to make decisions, how to prioritize, when <u>not</u> to make decisions, what the boundaries are, etc. Once the skills have been identified, it is important to know who has the requisite skills and who doesn't. Some type of assessment is necessary.

Notes

10. Communicate plan to employees and provide a mechanism for feedback.  Introduction to the plan should be low-key and not raise expectations. Consider having each program, or supervisor, communicate the plan as opposed to an announcement from the division office.  This will help keep the focus on the program.

11. Provide training if needed.  Based on the assessment of skills, training may be necessary for those managers and employees lacking requisite skills.

C. What other tools could be used to motivate employees?

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I.  Introduction

II. Leadership

A supervisor is more than just a person who sees that a job is conducted and a task completed in accord with directions; he/she is also a leader.  The more an organization rewards it's effective leaders, the fewer employee problems they will have.

A.  Definition of leadership

Leadership is a process that includes influencing:

- The objectives and strategies of a group or organization

- People in the organization to implement the strategies and achieve the objectives

- Group maintenance and identification

- The culture of the organization.

B.  Characteristics of good leadership

The characteristics of good leadership can be placed in the following categories:

- Leadership traits

- Motives of leaders

- Leadership skills

**Notes**

1. Leadership traits

   - High energy level

   - Stress tolerance

   - Integrity

   - Emotional maturity

   - Self-confidence

2. Motives of leaders

   - Need for power

   - Need for achievement

   - Need for affiliation

3. Effective leadership skills

   - Planning and organizing

   - Problem solving

   - Clarifying and monitoring

   - Informing

   - Motivating and consulting

   - Recognizing and supporting

   - Team building, networking, and delegating

   - Developing and mentoring

   - Rewarding

Notes

C. Power/influence

 1. Types of power

   • Legitimate power - Supervisors have legitimate power based on their position in the organization.

   • Coercive power - Supervisors have coercive power based on their control (real or perceived) over punishment.

   • Reward power - Supervisors have reward power based on their control (real or perceived) over rewards.

   • Expert power - Supervisors have expert power based on their level of technical expertise.

 2. Influence tactics include the following:

   • Rational persuasion

   • Inspirational appeals

   • Consultation

   • Ingratiating

   • Personal appeals

   • Upward appeals

III. Tools of leadership

A. Providing vision

A good leader provides vision for the work unit. The vision is a clear, concise view of what the work unit is striving to accomplish. The vision for the work unit should be consistent with the vision of the organization.

Ideally, the vision for the work unit will be developed with input by the work unit.

If a vision is clearly stated and accepted by the work unit, it becomes a goal of each member of the unit.

B. Coaching/mentoring

One of the roles of a leader is to develop his or her workers. Leaders are in the best position to see individual efforts and how they help to achieve or hinder goals. By coaching or mentoring, a leader can guide a worker toward goal attainment.

Coaching and mentoring include the following:

- Help each worker set goals and identify barriers to overcome.

- Solicit ideas and assistance from workers in solving problems that arise in the organization.

- Know the deficiencies of employees and develop a plan for them to acquire the knowledge and skill needed. Feedback and training will facilitate development of employee knowledge and skills.

**Notes**

- Reinforce positive behavior changes that increase productivity.

C. Delegating

Part of a leader's role is to delegate tasks and decisions to employees. The level of delegation typically depends on one's style of leadership. Some leaders feel comfortable in delegating responsibility along with the delegated tasks, while others feel more comfortable delegating only the task.

Prior to delegating, a leader must consider the following:

- Is the employee capable of completing the assigned task?

- Does the employee have the necessary resources to complete the task (human resources, financial resources, training)?

- What are the consequences of failure? The supervisor will have to assess the level of risk in the task and determine whether the organization can assume the risk of error.

- What type of supervision is necessary? The supervisor should decide how closely he or she should be involved. This will be contingent on the competency of the employee, the level of risk associated with the task, and the leadership style of the supervisor.

Notes

D.  Team building

An effective way of leading a group of individuals is to allow them to lead themselves.  The use of self-managed work teams can be an effective way to motivate employees to work more efficiently and to work together.

The concept of self-managed work teams focuses on the team member as the expert.  By allowing the team to make and implement decisions, decisions are being made by those individuals with the most knowledge and experience.

The following organizational context factors will increase the likelihood of success for teams:

- Management support

- Mission clarity

- Autonomy

- Rewards for the team

- Team training

- Feedback on performance

- Organization culture conducive to teamwork

- Appropriate physical facility

**Notes**

The following team development factors will increase the likelihood of success:

- Communication

- Cohesion

- Developed norms

- Role clarity

- Cooperation

- Participation

- Conflict resolution

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# Radiological Control Training for Supervisors
# DOE-HDBK-1143-2001

# Handouts



# Office of Environment, Safety & Health
# U.S. Department of Energy

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## Choosing the Correct Workers

Your site has an administrative control level (ACL) of 700 mrem.  There are seven workers in your group who are qualified to do a hot job requiring three individuals (one job leader and two workers).  You have the information below.

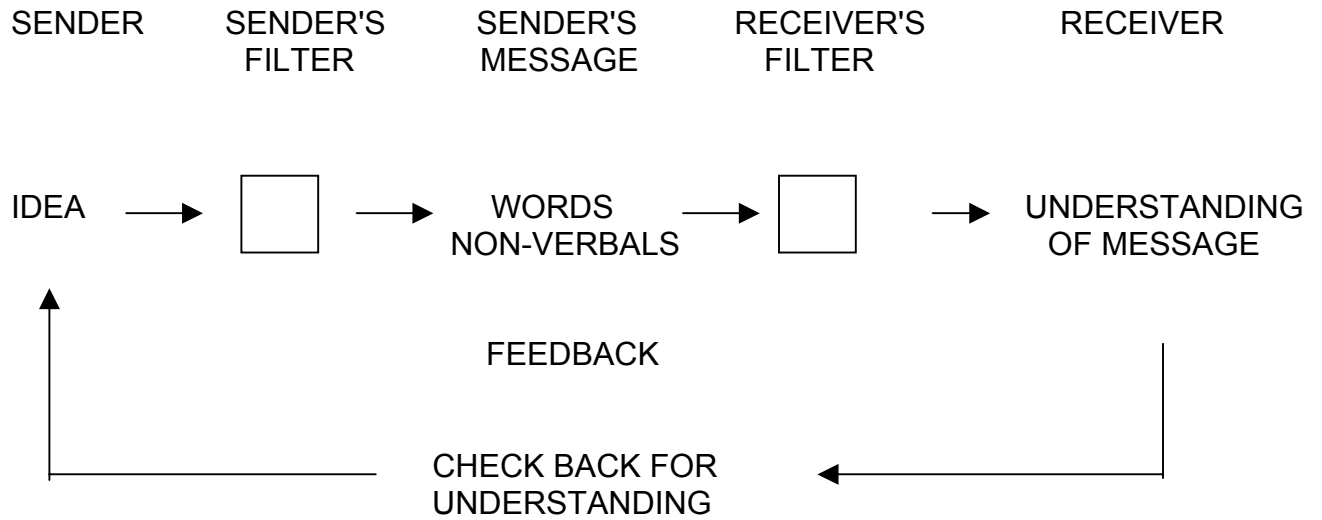|  | AGE | Lifetime Dose-to-Date Rem | Current Annual Dose-to-Date mrem |
|---|---|---|---|
| Barbie | 25 | .7 | 150 |
| Cleo | 40 | 2.5 | 250 |
| Egmont | 50 | 55.0 | 100 |
| Harpo | 65 | 31.0 | 250 |
| Julius | 35 | 6.5 | 400 |
| Tito | 30 | 24.5 | 300 |
| Selda | 55 | 17.0 | 300 |

It's Tuesday and the job is to be done Friday.  The job leader will get 200 mrem and the other two will get between 300 and 400 mrem.  It's near the end of the year, so it looks as though there will be no work involving any significant dose after this job until well into next year.

Egmont, your most experienced worker, is restricted to 200 mrem per year because of an incident several years ago which put his lifetime (committed) dose over his age in Rem.  Harpo is going in for an outpatient radioactive test Thursday.  Julius is new, so you are reluctant to choose him to be the leader, and Barbie and Selda don't have experiences to be the leader.  (All the others do)

Cleo has just quietly told you she is pregnant.  She will get the declaration form signed Monday, when your group secretary gets back from vacation and can type up the form as management requires.  Barbie was saying only last month that she and her husband Chancy are "trying" and she hopes she gets pregnant right away.  You have no idea if she has succeeded.  Tito used to be a "jumper" in the nuclear power industry but has gotten married and settled down.  He says he and his wife want a family "real soon."

Which workers should you choose?  Why?

SENDER　　SENDER'S FILTER　　SENDER'S MESSAGE　　RECEIVER'S FILTER　　RECEIVER

IDEA →　☐　→ WORDS NON-VERBALS → ☐ → UNDERSTANDING OF MESSAGE

FEEDBACK

CHECK BACK FOR UNDERSTANDING

## Internal Exposure and Contamination During Pump Removal

A work crew was assigned to rebuild a small pump in a non-radioactive system located in an uncontaminated radiation area.  In accordance with good ALARA practices, the work plan called for removal of the pump to a shop area for the repairs.  The work supervisor and the Radiological Control Technician (RCT) inspected and surveyed the pump area together to discuss the radiological conditions and radiological controls necessary for the job.  The small pump was bolted to a metal mounting plate which was in turn bolted to anchors on a concrete ledge.  The plan was to remove the piping, unbolt the pump from the mounting plate, have it surveyed for release, and carry it out to the shop.  Since the system was not radioactive, any contamination would be external.  The RCT surveyed all accessible areas of the pump and found no removable contamination.  He also used cotton swabs to check the area between the bottom of the pump and the base plate.  Again no removable contamination was found.  He allowed the job to proceed with no protective clothing on a routine radiation area maintenance Radiation Work Permit.

When the crew tried to unbolt the pump from the base plate they found that some of the bolts were rusty and could not be removed.  They contacted the supervisor and were given the okay to try the anchor bolts holding the base plate to the concrete ledge.  They removed the pump and base plate and exited the area.  Upon frisking out of the building, two of the workers were contaminated at various locations on both skin and clothing.  One worker had positive nasal smears and the pump was contaminated.  The highest levels of contamination were on the underside of the base plate.

The room where the pump was located had been flooded with highly contaminated water in an incident several years ago.  All accessible areas of the room were subsequently decontaminated to undetectable levels and routine access without protective equipment had been restored.

## Fire in a Contaminated Cutting Facility

An area was set aside in a decontamination facility to be used to reduce the size of metal contaminated waste by cutting large pieces into smaller pieces for easier handling and disposal.  Since some of the cutting operations employed oxygen-acetylene cutting torches, the area had to be approved in accordance with the plant fire protection program.

The plant fire protection engineer inspected the facility and developed a procedure to control the use of cutting torches in the facility.  The procedure required:

1.      A metal enclosure that would prevent the passing of slag and sparks to surrounding areas had to be constructed and equipped with a portable ventilation unit.

2.      Two fully charged fire extinguishers and a fire watch must be present in the area at all times while torch cutting is in progress.

3.      Removal of all loose combustible materials from the facility before torch cutting operations begin.

4.      Protection of any fixed combustible materials with fire retardant materials.

5.      No storage of combustible materials within forty feet of the cutting enclosure.

A welder and a fire watch were assigned to cut up several large pieces of steel in the facility.  When operation had been underway for several minutes, the fire watch noticed flames in the corner of the facility.  He notified the welder to stop cutting operations and picked up one of the two fire extinguishers only to find it empty.  He then took the second fire extinguisher and put the fire out.

The investigation determined that the fire had started in a pile of paper towels in the corner and would soon have spread to the unprotected combustible ventilation trunk which had been moved from its original protected location several weeks earlier for better smoke control.

Interviews with the workers involved and other workers who were periodically assigned to work in the facility revealed that they were not satisfied with the safety conditions in the facility in general and one had mentioned it to the supervisor.  Since work force cut-backs and lay-offs were expected, no one wanted to "make waves."

## Fire in a Contaminated Cutting Facility (continued)

The supervisor of the area was tasked by management to "...bring the facility into full compliance with the fire protection program and procedures before resuming torch cutting operations."

All loose combustible materials in the facility were removed and all fixed combustible materials were protected.

Two days after resumption of torch cutting operations, a passing technician noticed a fire in some bags of trash stored outside the facility metal wall. He found the nearest fire extinguisher and put out the fire.

Follow-up investigation found that the seam where the metal wall met the floor had been separated by visible damage allowing the passage of sparks outside the wall. Further inspection of the area found numerous instances of combustible materials stored within the forty foot limit.

None of the workers in the facility during the two occurrences were aware of the procedural requirements specific to that facility.

**Supervisor's Responsibilities**

I.  Radiological Control Documents

A.  10 CFR 835

- Codified DOE radiation protection requirements

- Applies to all persons (§835.3)

- Forms basis for potential civil and criminal penalties under the Price-Anderson Amendments Act

- Requires a DOE-approved Radiation Protection Program for all DOE radiological activities

B.  Radiological Control Standard

- Establishes DOE's views on the proper course of action in radiological control

- Includes best-practices guidance

- Includes use of Site-Specific Radiological Control Manual

II.  Supervisor Involvement and Accountability

A.  Review work in advance

- Participate in review of nonroutine or complex work activities exceeding site trigger levels requiring reviews.  These trigger levels are in the site-specific Radiological Control Manual.

- Approve the Radiological Work Permit (RWP) with the Radiological Control Supervisor.

- Conduct pre-job briefing prior to work exceeding the trigger levels.

B.  Walk your space

- As part of their normal work review, supervisors should periodically review ongoing jobs to ensure prescribed radiological controls are being implemented, and good work practices followed.

## Supervisor's Responsibilities (continued)

- Periodically monitor the work areas.

- Conditions that could lead to or promote spread of contamination, or unsafe work, should be corrected on a priority basis.


III. Conduct a safe operation

A. Abnormal conditions

- Although the organization is established and operates to assure worker protection, it is not infallible.

- The line supervisor is the last line of defense for the worker should the system fail or should a deficiency occur in the workplace, such as with ventilation controls, air monitors, instrumentation, fire control systems, etc.

- Act upon abnormal situations or signals immediately, whether from your own observation or brought to you by workers.

- Assure that your workers know the alarms for abnormal conditions, and know their appropriate response.

B. Assure adequate training

- Although training in most cases is provided by the training organization, the responsibility for quality and effectiveness rests with line management.

- Assure workers have the training required for entry.  If the training requirement is not in the posting or in the RWP.


IV. Control the spread of contamination

- Assure that material is not removed to uncontrolled areas without survey.

- Assure cleanliness and good housekeeping in the work area.

- Reduce materials entering radiological areas to minimize waste generation and potential for fire.

**Supervisor's Responsibilities (continued)**

V.  Reduce worker exposure

A.  Administrative dose limits

- Your workers should not be allowed to go above the facility Administrative Control Level for dose without the prior approval of the contractor senior site executive.

- Approval by the appropriate Secretarial Officer or designee should be obtained prior to allowing a person to exceed 2,000 mrem.

B.  Use the RWP

- Verify that entry points to radiological work areas and radiation areas are posted to state basic entry requirements, such as dosimetry, Radiological Work Permits (RWP) and respiratory equipment required.  The dose rate and contamination level or range of each should be included in the posting.

- Ensure that your workers have read, understood and will comply with the RWP.

- Assure that workers use the dosimetry, personal protective equipment and clothing prescribed in the RWP.

C.  Assure good work practices

- Assure that your workers follow good radiological control practices, such as when frisking and removing protective clothing.

- Stop work and obtain guidance if during the use of procedures, a written requirement cannot be responsibly followed.

- Recognize that any worker through their supervisor has the authority and responsibility to stop radiological work activities for any of the following reasons:
  – Inadequate radiological control
  – Radiological controls not being implemented
  – Radiological Control Hold Point not satisfied

## Supervisor's Responsibilities (continued)

VI. Supervisory Training Requirements

Supervisory skills training include the following (or equivalent):

- Leadership

- Interpersonal communication

- Responsibilities and authority

- Motivation of personnel

- Problem analysis and decision making

- Fitness for duty procedures

- Administrative policies and procedures (These will generally be site-specific.)

## Choosing the Correct Workers

## Suggested Answer Key

<u>Whom to Choose?</u>

Answer: One reasonable choice would be Barbie (400 mrem), Tito (200 mrem), and Selda (300 mrem), with Tito as the leader. At the end of the year the final doses would look like this:

|        | Age | Lifetime Dose-to-Date Rem | Current Annual Dose-to-Date mrem |
|--------|-----|---------------------------|----------------------------------|
| Barbie | 25  | 1.1                       | 550                              |
| Cleo   | 40  | 2.5                       | 250                              |
| Egmont | 50  | 55.0                      | 100                              |
| Harpo  | 65  | 31.0                      | 250                              |
| Julius | 35  | 6.5                       | 400                              |
| Tito   | 30  | 24.7                      | 500                              |
| Selda  | 55  | 17.3                      | 600                              |

| Workers | Explanation |
|---------|-------------|
| Egmont | He is restricted to 200 mrem/yr and he already has 100 mrem. |
| Harpo | He is scheduled to have a medical procedure involving a radioactive isotope. The RadCon Standard recommends special consideration be given to keeping down the occupational doses of those receiving additional doses for medical purposes.  If he ingested a radioactive isotope during the medical procedure on Thursday, during monitoring for contamination on Friday the frisker may not be able to identify whether the dose was from an internal or external source. |
| Julius | He can't be the leader.  He also can't receive the 300 to 400 mrem dose unless you get special permission to exceed the ACL of 700 mrem per year. NOTE:  If he does not participate, he will still end up the year as the median person of the group in terms of dose, so by not choosing him you are not favoring him. |
| Barbie | The genetic risk effects due to irradiation of sperm and unfertilized eggs at these dose levels are considered to be extremely low.  The important risk is to a developing embryo-fetus. |
| Cleo | Technically she has not declared her pregnancy in written form, however, management should not put unreasonable obstacles in the way of a woman being able to declare her pregnancy.  The best route to take is to get her to write in the information on the form until the secretary returns. |

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**CONCLUDING MATERIAL**

**Review Activity:**                                              **Preparing Activity:**

DOE     Field Offices    DOE-EH-52

DP       RF       ***Peter V. O'Connell, CHP,*** 301 903 5641

EH       ID       **Project Number:**

EM       SR       TRNG-0017

NE       OH

SC       RL

GC

IA

RW

NN

National Laboratories  Operations Offices

  BNL      AL

  LLNL     NV

  LANL     OAK

  PNL      OR

  Sandia     CH

  ANL

  New Brunswick

  ORNL

Area Offices

Amarillo Area Office

Kirtland Area Office

Princeton Area Office

Fernald Area Office

Kansas City Area Office

Miamisburg Area Office