

Environment, Safety, and Occupational Health

High Level Activity Model

“Perform Environment, Safety, and Occupational Health (ESOH) Operations”

June 17, 2004

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Environment, Safety and Occupational Health Operational Activity Model for the DoD Business Enterprise Architecture

AO Perform Environment, Safety, and Occupational Health (ESOH) Operations

Environment, Safety, and Occupational Health Operations refers to distinct business areas within DoD that address environmental quality, restoration, range sustainability, occupational health, and safety activities as well as fire and emergency services. While each program within these business areas operates in accordance with specific laws, regulations, DoD guidance, service-level guidance, and best practices, there are sets of common activities operating across these areas. Common activities include identifying and understanding the environment, safety, health, or readiness issue; risk assessment; developing solutions; implementing solutions; developing agreements; and the conduct of monitoring. Specific business areas addressed are:

- **Compliance:** The compliance business area of environmental management ensures effective and efficient compliance with existing Federal, host nation, state, and local environmental laws and regulations. This business area deals with the regulatory and base operations communities to ensure we remain in legal compliance with all laws—for example, there are legalities associated with clean water, clean air, safe drinking water, reporting community right to know chemical information, and many others. In addition to working with regulators, the compliance community also works with state, local, and foreign governments as well as local base operators to ensure compliance in base operations such as waste water treatment, well water, and solid waste disposal to name just a few. Part of the compliance effort is also directed to passing regulatory community inspections by ensuring the base operations group is aware of current regulations—Federal, host nation, state, and local.
- **Pollution Prevention (P2):** A successful P2 program avoids enforcement actions and reduces operations costs. A P2 approach to environmental management seeks to reduce pollution at its source and promote recycling. P2 programs are the preferred means of achieving environmental compliance; protecting human health and reducing the use of hazardous materials; and decreasing the volume of solid waste. P2 programs promote an environmental ethic that actively looks for opportunities to reduce the environmental impact of DoD activities through better product design, materials substitution, and lowering environmental lifecycle costs. Integrating cost-effective P2 practices into DoD operations and activities, while ensuring the performance of DoD's mission includes:
 - Affirmative Procurement (buy green)
 - Solid Waste Diversion and Recycling
 - Recycling
 - Prevention of Pollution from Ships
 - Source Reduction - reducing or eliminating the use of hazardous materials
 - Protecting the Ozone Layer
 - Hazardous Waste Reduction - reducing hazardous waste generation

- Alternative Fuels, Alternative Fueled Vehicles, and Fuel Efficiency
- **Conservation:** The conservation business area balances the responsibility of protecting cultural and natural resources with the requirements of military mission support. DoD must maintain healthy resources that offer maximum opportunities to carry out mission activities. First, conservation protects access to the land, sea, and airspace to support DoD requirements for realistic testing and training exercises. Next, for the benefit of current and future generations, conservation efforts protect the valuable natural and cultural resources of habitats of threatened or endangered species; areas likely to contain archeological sites; and developed areas likely to contain historical buildings, objects, or structures. Also, the conservation business area supports sustainable range use initiatives and manages range encroachment issues.
- **Clean-up/Restoration:** The Defense Environmental Restoration Program (DERP) has three program categories that focus on DoD's primary goals:
 - The identification; investigation; research and development; and cleanup of contamination from hazardous substances, pollutants, and contaminants
 - Correction of other environmental damage creating an imminent and substantial endangerment to the public health or welfare, or to the environment such as detection and disposal of unexploded ordnance (UXO)
 - Demolition or removal of unsafe buildings and structures, including buildings and structures at formerly used defense sites

DoD organized the DERP into three program categories:

1. Installation Restoration program (IRP)
2. Military Munitions Response program (MMRP)
3. Building demolition/debris removal (BD/DR)

Under the IRP DoD conducts response actions, similar to those required at old industrial sites and landfills. The purpose of these actions is to address the toxicological risks associated with the release of hazardous substances, pollutants, or contaminants. Munitions response activities, however, are unique to DoD and very complex as munitions present both potential explosive safety risks and potential toxicological risks from munitions constituents. Although some of the hazards associated with munitions were previously addressed under the IRP, the MMRP will more completely address the cleanup required at sites containing UXO, discarded military munitions, and the chemical constituents of munitions. DoD also addresses a small number of sites that require the demolition and removal of unsafe buildings or structures within the BD/DR category of DERP.

- **Range Sustainment:** The Readiness and Range Preservation Initiative (RRPI) focuses on maintaining and sustaining our military test and training ranges today and into the future. The RRPI is a tripartite program that is managed by the Senior Readiness Oversight Committee (SROC) through an Integrated Product Team (IPT) chaired by the Deputy Under Secretary of Readiness, with the Deputy Under

Secretary for Installations & Environment and the Director of Test and Evaluation as co-chairs. Day-to-day management of the program is by a Working IPT (WIPT).

There are five focus areas for this initiative:

1. **Legislation & Regulation** – In this focus area of the initiative, there is an eight part legislative package geared to assist in better management of our ranges. Five of the eight have been passed, with the remaining three still under consideration by Congress
2. **Leadership & Organization** – Management of the IPT process and encouraging the Services to maintain range organizations is the focus
3. **Programs** – One example is compatible land use programs to provide buffers for our ranges being worked with conservation Non-government Organizations (NGO), States, and other interested parties
4. **Policy** - A new Range Sustainments Policy, DoD Directive (DoDD) 3200.15 was signed in January 2003. There are five other policies and instructions being modified or written based on the new DoDD
5. **Outreach** – A multiple level outreach program is required to be put in place at the national, regional, and local levels concentrated on sustaining military test and training ranges

- **Safety:** The Safety business area ensures that the Warfighter and the supporting personnel work in an environment that is free from occupational hazards such as improper machine operation, faulty equipment, and other hazardous, safety related issues. The safety program focuses on all operational aspects of DoD operations such as aircraft safety, private vehicle operations, government-owned vehicle operations, and other critical areas such as explosives safety. The Safety program also has a keen focus on other areas such as:

- **Safety Enforcement** – Initiatives include auditing current operational policies to ensure compliance with all safety regulations (e.g., proper usage of equipment, proper storage of hazardous materials, etc)
- **Risk Mitigation** - These initiatives include methods by which activities work to provide a workplace that is free from occupational hazards
- **Incident Investigation** - These initiatives are used to determine the root causes of any occupational accidents
- **Incident Prevention** – These initiatives seek to create a workplace which is free from potential hazards that could create a safety or occupational health incident

- **Occupational and Environmental Health:** Occupational and Environmental Health ensures that the Warfighter, supporting personnel, and other stakeholders are protected from various health issues that can arise during normal DoD operations. The occupational health professionals work to ensure that activities such as paint shops, weapon ranges, and vehicle repair garages limit the risk of exposure to certain contaminants or other dangerous substances. Accordingly, they also work to examine current business practices to ensure that such activities do not have a detrimental effect to the Warfighter or other key stakeholders. These professionals leverage a wide skill set that includes the collection and laboratory analysis of samples plus the

examination of work processes to assist them to improve workplace conditions and mitigate risk. Critically, this group focuses on the areas of enforcement, investigation, and prevention of certain incidents as they relate to a particular activity.

- **Fire and Emergency Services.** The Fire and Emergency Services (FES) program ensures a capable emergency response to fire, hazardous material incidents (including Weapons of Mass Destruction (WMD)) and emergency medical situations. Additionally FES aggressively works to prevent emergencies, especially fire.

A1 Identify and Define Environment, Safety, and Occupational Health Aspect or Issue of Interest

This activity reflects the initial actions taken to identify the activities, locations, products, and services where environment, safety, and health concerns exist. This activity provides the initial check on the issue to ensure it falls within ESOH purview and collects enough information about the issue to proceed with the additional investigation. The result of this activity is the identification of aspects, issues, and locations of environment, range sustainability, FES, as well as safety and occupational health concerns. For example, this activity may identify issues of cultural or natural resource concern, an aspect of a work area with safety concerns, or a site of interest for restoration. Major activities in this area are: Identify the ESOH Aspect or Issue of Interest, Gather Information on the ESOH Issue, and Determine Environment, Safety and Occupational Health Investigation Need.

Program Context

**Conservation: Identification of sites for cultural, historical, and natural resource protection*

**Safety and Occupational Health: Identification of construction sites with safety concerns, accident sites, training ranges or identification of potential risks during operational planning*

**Range Sustainability: Identify impediments to test and training*

** Restoration/clean-up: Discovery and PA/SI phase of DERP*

A11 Identify ESOH Aspect or Issue of Interest

This activity reviews the initial event, request, or action and identifies both the physical and non-physical location of the aspect or issue of interest. An aspect as defined by the International Organization for Standardization (ISO) ISO 14001 is an “element of an organization’s activities, products or services that can interact with the environment”. The location may reference a site which requires inspection, site of an accident, spill, or may be the work area (e.g., paint shop) where ESOH concerns exist. Within the context of a cleanup program an aspect or issue of interest may be a site where suspected or actual environmental damage has occurred. An aspect or issue of interest within the context of a safety or occupational health program may be associated with a work area. Program requirements such as requirements for periodic inspection of various activities (e.g. paint shop) may also facilitate the activity of identifying an ESOH issue of interest.

Aspects or issues of interest are identified in several ways.

- One may receive notification from government regulatory agencies, DoD organizations, or public sources that potential for environmental concern exists at a location.
- Issues can be identified as a result of a routine inspection, an accident, an analysis, or a study that highlights ESOH concerns.

Inputs:

- ESOH Issue Communication
This is a communication to responsible authorities that an issue of actual or potential ESOH concern exists. The communication may describe an event such as an accident or spill or refer to a set of circumstances of interest to the ESOH community (e.g., paint fumes, archeological discovery). The communication may be from the public, regulatory notices from authorities, or be identified as a result of an internal study or inspection.
Example Attributes:
 - Time/date of Communication
 - Issue description
 - Name of Notifier
 - Issue area/location
- Business Unit Program Plan - The business unit course of action which identifies services, opportunities, and programs and their schedules for execution. (from the Strategic Planning and Budgeting (SPB) Domain of the Business Management Modernization Program)

Outputs:

- Identified Aspect or Issue of Interest – This is a short narrative that describes the identified aspect or issue of interest. In particular, it aggregates the high level information gathered during the activity and provides a general overview of the aspect or issue of interest. May also identify possible sources of further information such as persons to interview.
Example attributes include:
 - Issue Name
 - Issue Location
 - Issue description
 - Rationale for interest

Program Context:

** Conservation: This step may identify sites of potential cultural, historical, or natural resource interest*

** Restoration/clean-up: This is the discovery of sites prior to PA/SI*

**Range Sustainability: This is putting an issue from test and training ranges into the OIPT/WIPT process for resolution*

**Safety: Construction sites with high accident rates, installations that have a higher than normal rate of occupational accidents, installations that have a higher than normal rate of “sick” days (e.g. sick buildings)*

** Fire: This is the activation of emergency response*

A12 Gather Information on ESOH Aspect or Issue

This activity collects the information that will be used in determining which aspects, issues, and areas of interest have potential environment, safety, and occupational health concerns. The profile collects enough information to let the ESOH personnel determine whether the issue has merit and moves forward a more formal assessment. Typical actions may include a search of legal records; interviews with landowners and neighbors; and review of various environment records such as Environment Impact Statements.

The result of this activity is a profile of the aspects or issues of interest that will be considered for additional assessment.

Inputs:

- Identified Aspect or Issue of Interest (from A11)
- Legal Record – This is an existing record related to the issue of interest such as a deeds or a waste manifest
Example attributes:
 - Legal record name
 - Legal record type (Waste manifest, property record, deed)
- Installation Record – These are location specific external or internal records which are relevant to the issue of interest. Examples of installation records are inspection records and internal memos
- Research Source Material - These are documents such as news articles, academic journals that provide ESOH relevant information for the identified issue of interest. Typically, these example sources may include such diverse things as documents, studies, and photographs
- Interviewee Information – Landowners identity and contact information, neighbors, DoD personnel, or tip providers that may be interviewed to better understand the aspect or issue of interest
Example attributes:
 - Interviewee Name
 - Interviewee Contact Info
 - Association with the issue
- Activity Description – The ESOH professional can collect information about the exact activity that is occurring at the issue of interest. The activity description details the type of work that may be performed at the issue of interest
Example attributes:
 - Operational Activity Name (painting, paint stripping, fuel storage)
 - Land use (range, family housing, runway, landfill)

- Regulation or Governing Policy – Regulation or governing policy such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), NRC, or host nation requirements can provide context for the issue of interest
- Condition of Individual or Group. The physical and or psychological condition of an individual or group. For instance, this information may include individual medical records, the 72-hour history, epidemiological records, and other health-related information

Outputs:

- ESOH Issue Profile
This is a profile of the issue of interest outlining a description of the area of interest and the suspected aspect or the issue associated with a specified location, activity or service. The issue profile can be used to determine if an aspect or issue of interest requires further investigation or may be used as the basic information in beginning the detailed assessment of the issue.
Example attributes:
 - Area Name
 - Area Location
 - Activity Performed
 - Suspected Issue

A13 Determine ESOH Investigation Need

Based on information gathered, ESOH personnel determine whether there is a need for an investigation or inspection of the issue of interest. They may also distinguish areas that pose little or no threat to human health and the environment from areas that require further investigation. The result of this activity is to identify issues of interest that environment, safety, and occupational health authorities may investigate for potential action. This identification is based on a qualitative assessment of all available information.

Depending upon the specific purpose and focus of the program conducting the review, the determination of the need for further investigation or assessment may lead to the identification of a physical area that is designated as a location of ESOH interest.

Inputs:

- ESOH Issue Profile (from A12)

Outputs:

- ESOH Issue Requiring Investigation – This is the ESOH aspect or issue that has been determined to warrant further investigation based upon the specific purpose and focus of the program conducting the review
Example attributes:
 - Area Name
 - Area Location

Controls:

- Business Unit Resource Plan (from the SPB business domain) - The business unit resource plan includes all resource requirements, budgeted and unfunded, that is required to meet business unit goals. This is the parent of Business Unit Future Year Defense Program, Business Unit Planning and Budgeting Guidance, Performance Plan, Validated Unfunded Business Unit Requirement, and Business Unit Program and Budget

Program Context:

**Restoration/clean-up: Discovery phase inventory and Preliminary Assessment*
**Conservation: Site identification may occur for a cultural resource preservation, historical interest, or natural resource protection purpose, or to identify areas where environmental damage may have occurred*

A2 Assess Environment, Safety, and Occupational Health Aspect

This activity is the study or investigation of environment, safety, and occupational health aspects or issues to include the determination of the nature and extent of the issue. A series of steps are taken to conduct this activity and can include:

- Conduct Environment, Safety, and Occupational Health Inspection or Investigation
- Compare Analysis Result to Criteria
- Characterize Nature and Extent of ESOH Issue

This activity is where comprehensive data, sample collection, and analyses are conducted. The main output of this activity is the characterization of the ESOH issue and a determination of compliance.

A21 Conduct ESOH Inspection or Investigation

An inspection or investigation is a study or analysis of an environment, safety, or occupational health issue. An investigation is an action taken to qualify, quantify, assess, and otherwise understand an issue. An inspection is the review of a base activity to determine compliance with guidance and regulation. This activity includes the collection of ESOH investigation data or samples and the analysis of the collected data or samples.

Program Context:

Safety: An investigation of an accident to determine the root causes of the accident

Restoration/cleanup: A remedial investigation is a more comprehensive data collection at the site, such as the collection and analysis of soil and groundwater samples

Range Sustainability: Determine the encroachment impediments to test and training

Occupational Health: Inspect a paint shop

Compliance: Investigation to determine compliance with a permissible amount

Conservation: Investigation to characterize the effects of certain actions on natural resources

Fire: From a response standpoint this is the quick assessment of the situation

A211 Review ESOH Issue

Examine the issue to ensure one has a firm grasp of issue boundaries. Collect additional information as necessary to arrive at an understanding of the issue and that is needed to develop the assessment approach.

Inputs:

- ESOH Issue Profile (from A12)
- ESOH Issue Requiring Investigation (from A13)
- ESOH Issue Communication (from A11)
- Research Source Material (from A12)

Outputs:

- ESOH Issue Description
This is a narrative that details the problem, issue, or concern. Example components include: statement of understanding, process parameters, issue location, work function, identified hazard, and ESOH issue profile. This output also feeds the environmental inventory.

Controls:

- Completed Agreement (A53)

Program Context:

**Restoration/clean-up: This step corresponds to a step of a Preliminary assessment or site inspection*

**Conservation: First step in ICRM Plan development*

**Range Sustainability: Investigate the root causes of readiness degradation*

**Safety: Ensure the parameters of the investigation are within the scope of the accident footprint or working proactively to mitigate the possibility of a hazard negatively affecting the workforce*

A212 Select or Develop Assessment Approach

Select or develop the approach needed to investigate the issue. The approach developed or selected is dependent upon the issue to be solved. For example, the assessment for a compliance monitoring issue may include selection of field sampling protocols, laboratory sample preparation, and analysis protocols, as well as determining the frequency and duration of sampling. This activity may also outline the approach for conducting an inspection.

Inputs:

- ESOH Issue Description (from A211)
- Assessment Approach
These are approaches that may apply to particular conditions. Assessment approaches are the required data and data analysis procedures as well as the standards used to compare to results. This includes the sample or data collection plan and describes the what, where, how and when of sample collection necessary for issue investigation
Example attributes: Approach ID, approach name, equipment name, sample protocol ID
- Stakeholder Input (when necessary) – This is input from groups such as a community advisory board or other public groups as mandated by regulation
- Business Unit Program Plan - The business unit course of action which identifies services, opportunities, and programs and their schedules for execution

Outputs:

- Selected Assessment Approach
This is the approach identified to support issue investigation. It includes the required data and data analysis procedures as well as the standards used to compare to results. This includes the sample or data collection plan and describes the what, where, how and when of sample collection necessary for issue investigation.
Example attributes:
 - Sample media matrix name (e.g. soil, water, air)
 - Location (e.g. area, site, room, map guide)
 - Frequency of collection

Controls:

- Completed Agreement (A53)

Program Context:

**Restoration/clean-up: This is part of the Remedial Investigation*

** Conservation: (ICRM Plan) this solution approach is the approach for the development of a plan to protect the resource*

**Range Sustainability: Work within the WIPT process to determine methodology for improved reporting from ranges*

** Safety: Selection of an investigation methodology that is inline with all statutory requirements*

A213 Collect ESOH Data or Sample

Takes samples, surveys, measurements, observations or perform tests otherwise necessary to support empirical analysis based on the assessment approach. This activity collects samples in all mediums (e.g., air, water, soil, tissue); conducts surveys including statistical surveys; takes measurements (e.g., fish weighs 3lb. 2 oz); and makes observations about the environment (e.g., high potential for wildfire, ergonomics, etc). Data collection activities are in accordance with proper sample collection protocol. Sample collection is used across many ESOH programs to identify the nature and extent of an environment or health issue and may also be used to support compliance activities.

Inputs:

- Source – This is the point of origin from which the sample will be collected (e.g. the field from which a dirt sample will be taken)

Controls:

- Selected Assessment Approach (from A212)
 - Sample Collection Protocol (component of the Selected Assessment Approach which contains appropriate sample or data collection procedures)
- Completed Agreement (A53)

Outputs:

- Collected Sample
The result of a sample collection effort yielding the proper collection and portrayal of a physical sample
- Collected Investigation Data Item
The result of a test, measurement, or observation effort

A214 Analyze ESOH Data or Sample

Perform the lab tests, survey compilations or otherwise necessary treatment of the data or sample collected to enable analysis. Analysis is performed according to the selected assessment approach.

Inputs:

- Collected Sample (from A213)
- Collected Investigation Data Item (From A213)

Outputs:

- Sample Analysis Result
This is the result of the lab or other analysis performed on the collected sample
- Data Study Result
This is the result of synthesizing data collected to analyze the issue at hand

Controls:

- Selected Assessment Approach (from A212)
 - Analytic Protocol (component of Selected Assessment Approach)
A method used to conduct analysis on a sample
Example Attributes: analysis protocol ID, analysis protocol name, analysis protocol description
- Completed Agreement (A53)

Program Context:

**Conservation: Within the context of the Cultural resource protection, the “environmental data” analyzed may refer to the interior, exterior, and foundation building integrity*

**Safety: Analyze the data collected during the course of the accident investigation*

**Occupational Health: Analyze exposure data (e.g. exposure to high level noise)*

**Range Sustainment: Analyze readiness data to determine need for legislative, regulatory, organizational, compatible land use, or outreach solutions*

**Restoration/Cleanup, Conservation in reference to Sample Analysis: In programs such as RCRA, DERP, and various compliance programs the activity, Analyze ESOH Data/Sample, takes a water sample and identifies its physical and chemical properties. Physical properties may include temperature and turbidity. Chemical properties of the water sample may include chemical “X” at some concentration level*

A22 Compare Analysis Result to Criteria

Compare the analysis result to compliance requirements or program objectives and criteria. The value obtained from the sample or data analysis is compared to compliance requirements, program objectives, or other criteria. This comparison result is an important component in characterizing the ESOH issue.

Inputs:

- Sample Analysis Result (from A214)
- Data Study Result (from A214)

Controls:

- Selected Assessment Approach (from A212)
- Completed Agreement (A53)

Outputs:

- Comparison Result
The result outlining the difference between compliance requirements, program objectives, other criteria, and the value obtained. An interpretation of this result could result in a finding of a possible violation.

A23 Characterize Nature and Extent of ESOH Issue

Analyze the totality of available information to characterize the nature and extent of the ESOH issue. Analyze all the available sample comparison results, risk information regarding the exposed receptors, and information about the affected area to characterize the extent and nature of the issue. This activity also includes developing conclusions regarding the ESOH issue.

Inputs:

- Comparison Result (from A22)
- ESOH Issue Description (from A211)
- Risk Characterization (from A35)

Outputs:

- Characterized ESOH Issue
This is an aspect, issue, problem, or concern that is reviewed, scoped, analyzed, or studied so that the nature and extent of the issue is properly characterized and understood. For example, a characterized ESOH issue within the context of a clean-up program may define the speed, direction, and contaminant content of a ground water plume. Within the context of a safety program effort, a characterized ESOH issue may define the hazards to be addressed. (Note: This output also incorporates the ESOH Issue Description from A211.)
- Compliance Determination
This is a determination of program compliance based on the findings of fact.

A3 Assess Environment, Safety, and Occupational Health Risk or Impact

This activity assesses the health, safety, ecological, or cultural risk posed by the ESOH aspect under consideration. Risk is defined as the possibility of a hazard causing harm or loss. This activity takes the identified ESOH aspect or issue (e.g., ground water plume, paint shop operations, sound exposure) and determines the level of associated risk with the hazard. The risk finding is based on factors such as severity, probability, and availability of pathways, containments, or receptors. An example of an occupational health risk assessment is the determination of the risk to a human from exposure to the contaminants present in a typical paint shop operation. In the case of DoD restoration

and clean-up activities, the assessment may focus on risk associated with exposure to contaminated top soil.

A31 Select Risk Assessment Approach

Select or if not available, develop an approach to determine risk associated with the ESOH issue. The appropriate risk assessment approaches may include predefined models such as a plume dispersion model or perhaps a one-time study. These approaches and tools are typically industry and governmental developed methodologies (e.g. DoDI 6055.11, ACGIH) for use in the determination of risk levels. Depending on approach, a pathway or receptor analysis can also be a key component in the risk assessment approach.

Inputs:

- Valid Risk Model – A valid risk model is a model that has been accepted by DoD or Industry as a commonly accepted way by which to measure risk
- ESOH Issue Profile (from A12)
- Sample Analysis Result (from A214)
- Identified Risk Standard (from A32)
- ESOH Issue Description (from A211)
- Data Study Result (from A214)

Outputs:

- Selected Risk Assessment Methodology – The selected risk methodology details the method of performing the risk assessment. An example of a selected methodology could be chapter 2 of FM 100-14 which details the Army process by which risk should be assessed. This methodology could include which types of protocols to use for the collection of data, protocols for the analysis (METTS), and the process by which information is distributed.

A32 Select Standards Associated with Risk Determination

This activity seeks to select the standards of comparison used in the risk determination process. These standards are typically developed and managed either by legislative methods (e.g. OSHA) or widely accepted industry standards (ACGIH). These standards are used in the risk characterization to compare the finding of the identified ESOH issue to the standard to assist in the characterization of the risk of the ESOH issue.

Inputs:

- Selected Risk Assessment Methodology (A31)
- Risk Standard (external)
These are existing standards for risk determination from sources such as EPA, OSHA, DOD Instructions 6055.12, 6055.5, and others
- Sample Analysis Result (from A214)
- Data Study Result (from A214)

Outputs:

- Identified Risk Standard – This standard will identify the levels of the potential data source (air sample, water sample, historical data) and can aggregate this data to provide common industry acceptable levels for safe operations.

A33 Characterize Risk

This activity aggregates the components of risk assessment (such as probability and severity) to determine the overall risk of the ESOH issue. This process is both quantitative and qualitative, as it requires the risk assessor to examine the ESOH issue in its totality and take in consideration issues that cannot be quantified. The risk assessor can take into consideration information such as:

- Probability of a hazard occurring
- Severity of the hazard should the hazardous event occur
- Other risk characterization methods (e.g. receptors, human factors, etc)

An example of this activity would be when a risk assessor assigns a Risk Assessment Code (RAC) to a particular ESOH issue. Or, it could be an instance where a risk assessor determines the potential and ramifications of a chemical contamination. Another risk assessment could be to determine the risk of an operation (e.g. range operations) to a particular wildlife species.

Inputs:

- Data Study Results (from A214)
- Sample Analysis Result (from A214)
- ESOH Issue Profile (from A12)
- ESOH Issue Description (from A211)
- Stakeholder Input – Input from various stakeholders that will assist in the conduct of this activity or influence the outcome

Outputs:

- Risk Characterization – This is a narrative that describes the type of risk the identified hazard could have upon the Warfighter or other stakeholders. This narrative can contain details such as the professional judgment of the risk assessor, a RAC, other statistical information, or other analyses (as defined by the methodology).

Controls

- Selected Risk Assessment Methodology (from A31)

A4 Develop and Implement Environment, Safety, and Occupational Health Solution

This activity develops and implements the ESOH solution for the identified aspect or issue of interest. This activity seeks to develop solution alternatives for the identified aspect or issue of interest and takes into consideration other information components such as the risk assessment, characterized ESOH issue, or sample analysis results and

develops, tests, and implements a solution that will meet requirements (e.g. effectiveness, cost, socio-economic). These solution alternatives are evaluated by a selected methodology which can examine several factors such as effectiveness, cost, and socio-economic impact. An example of this activity would be the design and or construction of a new ventilation system to properly circulate and capture harmful fumes in a paint shop.

The activity is composed of several sub-activities such as:

- Develop ESOH Solution Alternative
- Determine ESOH Solution Evaluation Methodology
- Evaluate ESOH Solution Alternative
- Select ESOH Solution
- Design ESOH Solution
- Implement ESOH Solution
- Assess Action Taken

A41 Develop, Evaluate, Select ESOH Alternative

Alternatives are useful to help one understand the various approaches or remedies that may be implemented to mitigate an ESOH issue. Alternatives can also include preventive measures for ESOH issues. In the context of pollution prevention an alternative may include a change to an industrial process, the identification of alternate materials, or recycling of materials. Within the context of the safety domain, an alternative could be the modification of standard operating procedures to incorporate new safety design schemes. Within the context of the DERP program, a feasibility study identifies alternative solutions for remediation which satisfy the constraints of appropriate or relevant and appropriate requirements. Within the context of a remediation, alternatives analysis help define various actions that are consistent with and support a permanent remedy. This activity develops, evaluates, and selects alternatives for the ESOH aspect under consideration. Components in this activity include:

- Develop ESOH Solution Alternative
- Determine ESOH Solution Evaluation Methodology
- Evaluate ESOH Solution Alternative
- Select ESOH Solution

A411 Develop ESOH Solution Alternative

This activity creates or otherwise identifies a solution to the ESOH issue consistent with issue constraints and boundaries. These solutions are developed based on the empirical data, professional judgment of the ESOH professional, risk analysis, and other critical components. Solutions alternatives in this activity can range from sophisticated remediations that require significant construction to straightforward additions of chlorine to solve a drinking water issue

Inputs:

- Data Study Result (from A214)
- Sample Analysis Result (from A214)

- Risk Characterization (from A35)
- Characterized ESOH Issue (from A23)
- Research Source Material (from A12)
- Compliance Determination (from A23)
- Deployed ESOH Solution (from A423)
- ESOH Solution Deficiency (from A423)
- Evaluated ESOH Solution Alternative (from A413)

Outputs:

- ESOH Solution Alternative – A narrative that describes the solution, which will be considered as an alternative for addressing the ESOH issue.

A412 Determine ESOH Solution Evaluation Methodology

This activity determines the approach or methodology to be used in evaluating the merits of solution alternatives. The type of methodologies selected can vary based upon the identified ESOH aspect or issue. In certain circumstances, conducting pilot testing or bench testing can be part of this evaluation methodology. Other situations may merit such methodologies such as a detailed empirical review of data, analysis of historical data, etc. The evaluation methodology will help the ESOH professional address such factors as:

- Effectiveness of the solution alternative
- Potential cost of the solution alternative
- Potential socio-economic/cultural impact of the solution

Inputs:

- ESOH Solution Alternative (from A411)
- Effectiveness Criteria – This is the criteria that will be used to compare potential output of a solution alternative to an expected value (i.e. the criteria)
- Valuation Method - These are cost models, actuarial techniques, professional judgments, engineering cost estimations or decision analysis techniques

Outputs:

- ESOH Evaluation Methodology - This is the determined method for evaluating the solution alternative to ensure its effectiveness, potential costs, and potential socio-economic impacts

Controls:

- Law (e.g. CERCLA, OSHA, Sikes Act)

A413 Evaluate ESOH Solution Alternative

This activity examines the merits of the proposed ESOH solution alternative. It applies the selected methodologies (i.e. effectiveness

evaluation method, cost model, actuarial techniques, professional judgment, engineering cost estimation, decision analysis techniques) to determine the effectiveness of the solution alternative and estimate the cost of the alternative.

Inputs:

- ESOH Evaluation Methodology (from A412)
- ESOH Solution Alternative (from A411)
- Stakeholder Input (External defined in A33)
- Comparison Result (from A22)

Outputs:

- Evaluated ESOH Solution Alternative - This is an alternative that has had the evaluation methodology rigorously applied to it to determine effectiveness, potential costs, and other socio-economic conditions.

Controls:

- Law (e.g. CERCLA, OSHA)

A414 Select ESOH Solution

This activity compares the available ESOH action alternatives and selects the alternative to implement. The output of this activity can include the following:

- The selection of the alternative and a thorough documentation of the method used to make estimates, especially when the method used is a computer model not validated per DoDI, such as an engineering study or estimate
- The development of a plan that meets the statutory and regulatory requirements such as NEPA, EPA regulations, etc.

Inputs:

- Evaluated ESOH Solution Alternative (from A413)

Outputs:

- Selected ESOH Solution (e.g. Record of Decision (ROD), ICRM) – This is the solution that has been evaluated and has been determined as a course of action to pursue by the ESOH professional.

Program Context:

DERP: The ROD is used to document the selection of the alternative

A42 Design and Implement ESOH Solution

This activity encompasses the design and implementation of the selected ESOH solution. An ESOH solution may include:

- Taking a corrective action to return a compliance condition
- Implementing a long term clean-up and restoration project

- Implementing a cultural, historical, or natural resource protection plan
- Taking action to eliminate or reduce a health or safety condition
- Changing an industrial process or material to prevent pollution

Some solution alternatives may require detailed design of the chosen solution and others may be straightforward actions.

A421 Design ESOH Solution

This activity takes the selected ESOH solution as input and designs the actual solution that will be implemented. For instance, this activity can develop such tangible products such as construction parameters, equipment specifications, or new policies and procedures.

Inputs:

- Selected ESOH Solution (from 414)
- ESOH Solution Deficiency (from A423)

Outputs:

- ESOH Solution Design – The ESOH solution design contains the specific design parameters of the ESOH solution. It can detail such items as construction parameters, equipment specifications, etc for the solution to be implemented.

Program Context:

DERP- Design the remedial action to be taken

Safety – Develop new processes to reduce risk

Range Sustainability – Develop legislation, regulation, or compatible land use project to reduce risk to readiness

A422 Implement ESOH Solution

This activity takes the solution and is responsible for the actual implementation. Actions within this activity may include construction, operational changes, environmental source removal, and process change.

Inputs:

- ESOH Solution Design (from 421)
- ESOH Solution Deficiency (from A423)
- Selected ESOH Solution (from A414)

Outputs:

- ESOH Solution Status - This information addresses the status of the solution implemented
Example attributes: Completion expected date, changes to design in implementation etc.

A423 Assess Action Taken

This activity evaluates the effectiveness the action taken or makes the determination of whether the action taken requires maintenance. The action assessment monitors progress and takes steps necessary to ensure conformance with the planned remedy.

Inputs:

- ESOH Solution Status (from A422)
- ESOH Solution Design (from A421)

Outputs:

- ESOH Solution Deficiency
This result of the assessment action outlines any difference between the objectives of the remedy and the outcome.
- Deployed ESOH Solution – This result of the assessment action outlines the actual solution that has been implemented. This may include any details of variances in the actual implementation from the planned implementation.

Program Context:

Within the context of the DERP program this refers to long-term monitoring

A5 Conduct Environment, Safety, and Occupational Health Consultation and Develop Agreement Instrument

Within the context of this model, an agreement is broadly defined as an instrument with agreed upon terms and conditions that govern the operational behavior, design, technology, and reporting requirements of the subject operation or facility. An agreement may be a permit, license, exemption, or an operating agreement. Consultation is the process of conferring with regulating or permitting authorities as well as with the public and other external stakeholders. A common example of an agreement is when a facility is issued a permit to discharge a pollutant in a prescribed amount over a specified time period. Permits may also authorize facilities to process, incinerate, and conduct landfill activities. The terms and conditions of the permit specify how the subject facility, operation, or organization must perform. Further, the terms and conditions may specify facility design, detail operation and maintenance requirements, define standard operating procedures, lay out safety requirements, prescribe monitoring and reporting requirements, or specify other activities that must be performed to conform to the agreement. Agreements may also take other forms such as a license, exemption, or operating agreement. For example, in the safety area, the agreement could take the form of a set of agreed upon operating conditions that specifies use of protective gear and limit the time a worker can be exposed to a hazard. Overall the term ‘agreement’ is broadly construed to represent the various types and forms of agreement that govern an activity ranging from an exemption from the Cultural or Natural Resource Implementation Plan to a wastewater treatment operating license.

Key steps in developing an ESOH agreement are: Determine Need for Agreement Instrument and Consultation Type; Develop Agreement Instrument or Complete Application; and Review Input from Regulating or Permitting Authority, the Public, and other External Stakeholders.

A51 Determine Need for Agreement Instrument and Consultation Type

This activity determines the need for an instrument of agreement and determines the type of consultation required. Within the context of this model, an agreement is broadly defined as an instrument with agreed upon terms and conditions that govern the operational behavior, design, technology, and reporting requirements of the subject operation or facility. An agreement may be a permit, license, exemption, or an operating agreement. A common example of an agreement is when a facility or other permitted agent has a permit to discharge a maximum amount of pollutant or a cumulative amount over a specified time period. Permits may also authorize facilities to process, incinerate, and conduct landfill activities. The terms and conditions of an agreement specify how the subject facility, operation, or organization must perform. The terms and conditions may specify facility design, operation and maintenance requirements, define standard operating procedures, lay out safety requirements, prescribe monitoring and reporting requirements and specify other activities that must be performed to conform to the agreement.

The output of this activity is a determination as to the need for an agreement and the type of consultation required. It reviews the appropriate laws, rules, regulations and governing documents to confirm that some agreement among participants is necessary (e.g., a permit is required).

Inputs:

- Characterized ESOH Issue (from A23)

Outputs:

- Agreement Requirement
Identifies the facility or subject of the agreement, the reason the agreement is necessary and the type of agreement and consultation required (e.g., NPDES permit, operating permit, letter of authorization, incidental take statement, exemption).

A52 Develop Agreement Instrument or Complete Application

This activity gathers all the necessary information then develops the agreement and consultation instrument. For agreements where permit applications exist this activity is where the application is completed. In many cases, comments from internal or external governing bodies and the public are key considerations that affect the terms and conditions of the agreement. The permit, license, operational conditions or exemptions process outlines terms and conditions that may address:

- How the facility will be designed, constructed, maintained, and operated to be protective of public health and the environment
- Biological Assessments to show proposed actions will not jeopardize the continued existence of listed species
- How any emergencies and spills will be handled, should they occur
- How the facility will clean up and finance any environmental contamination
- How the facility will close and clean up once it is no longer operating

Example activities in the development of an agreement include, deriving appropriate effluent limitations based on applicable technology and water quality standards for a National Pollutant Discharge Elimination System (NPDES) permit. Example activities in the case of conservation may be the identification of potentially affected species in a Biological Assessment of the effects of proposed actions.

Inputs:

- Agreement Requirement (from A51)
- Permit Application (external)
The set of terms and conditions that must be met before a permittee can proceed with the permitted activity. Also includes the necessary administrative information needed to identify the permitted parties and the covered facilities or operation. A permit application or form that must be completed by the permittee
- Research Source Material (from A12)
- Characterized ESOH Issue (from A23)
- Selected ESOH Solution (from 414)
- Agreement Deficiencies (from A53)
This is the objections, limitations, or deficiencies that must be addressed before a completed agreement is reached. This may take the form of notice of deficiency from a permitting authority

Outputs:

- Completed Application or Agreement Instrument. The application or agreement instrument outlining the set of terms and conditions, which the respective stakeholders are asked to consider for agreement

A53 *Review Input from Regulatory or Permitting Authority, the Public, and other External Stakeholders*

This activity reviews input from regulatory and permitting authorities as well as the public and identifies any deficiencies in the agreement. If there are no deficiencies, this activity results in the completed agreement. However, if deficiencies are identified the permittee or agreement requestor responds to the deficiency by further developing the agreement until a set of terms and conditions are accepted and approved. Given the complex and technical nature of some submittals, the review and revision process may take several years.

Inputs:

- Reviewed Application or Agreement Instrument

An agreement instrument or permit application that has been reviewed by the regulatory and permitting authority. A reviewed application or agreement instrument may contain deficiencies or the final set of operating terms of conditions to which the parties agree. It also contains any input from the public regarding the agreement.

Outputs:

- Completed Agreement. An agreement which has undergone review and consultation by all parties and has been accepted and approved. Types of completed agreements include; an accepted permit, a biological opinion and a letter of authorization
- Agreement Deficiencies (defined in A52)