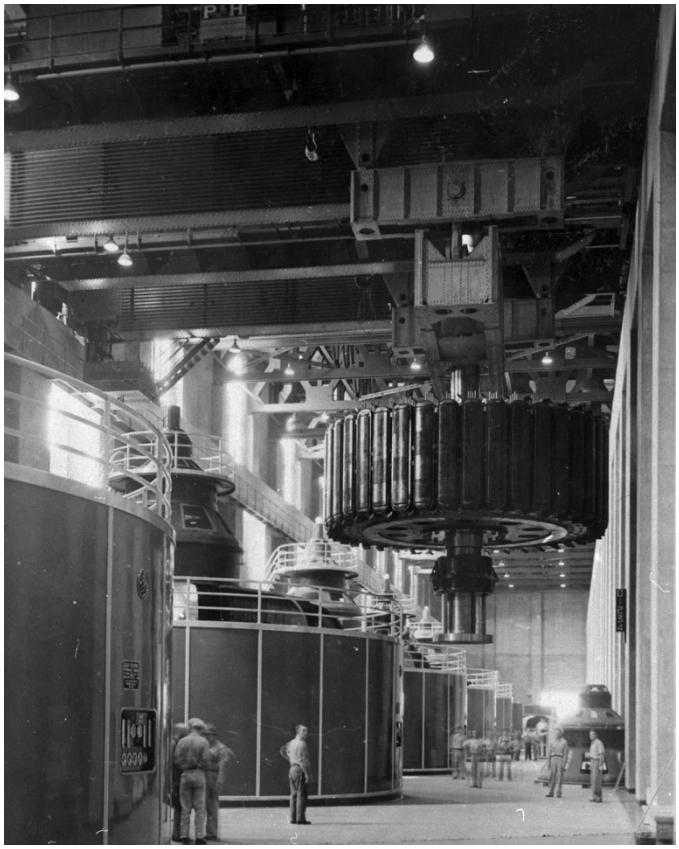
RECLAMATION

Managing Water in the West

Final Draft Report

Reclamation Job Hazard Analysis Process Improvements

Safety and Occupational Health Program Action Plan Team #9 Recommendations



Hoover Dam Powerplant - 1937

Hoover Dam Powerplant - 2014

U.S. Department of the Interior
Bureau of Reclamation

June 2015

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Reclamation Job Hazard Analysis Process Improvements

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Safety and Occupational Health Program Action Plan Team #9

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Acronyms

D&S	Directives & Standards
DASHO	Designated Agency Safety and Health Official
DOI	U.S. Department of the Interior
JHA	Job Hazard Analysis
RLT	Reclamation Leadership Team
RSHS	Reclamation Safety & Health Standards
SOH	Safety & Occupational Health
SSLE	Security, Safety & Law Enforcement

Definitions

High Risk

An activity that may result in hospitalization, chronic or irreversible illness, permanent disability, temporary total disability, significant property or resource damage, or immediate or imminent danger or death.

Job Hazard Analysis

A method for identifying and evaluating hazards associated with a particular job or task. It can also be called a "Job Safety Analysis."

Job Lead

An authorized employee directly in charge of leading the completion of the work activity. This term is not associated with the management or supervision of personnel.

Mitigate

The removal of a hazard by avoidance, elimination, substitution, engineering controls, administrative controls, and/or the use of personal protective equipment.

Newly Identified High Risk Hazard

A high risk activity/step that has not been previously identified in either a new or existing job.

Reviewing Official

The 1st Line Supervisor or Foreman I (only in the absence of the 1st Level Supervisor) who approves the JHA. A Job Lead will not be a Reviewing Official.

Safety Specialist/Professional

A job title/position that involves the management, administration, or operation of a safety and occupational health program or performance of administrative work concerned with safety and occupational health activities, and includes the development, implementation, and evaluation of related program functions. The program work requires application and knowledge of: (a) the principles, standards and techniques of safety and occupational health management; and (b) pertinent elements of engineering, physical science, ergonomics, psychology, industrial hygiene, physiology, sociology, and other scientific and technological fields which contribute to the achievement of comprehensive safety and occupational health objectives. This job title includes OPM job series 0018-Safety & Occupational Health Management, 0803-Safety Engineer, 0019-Safety Technician, and 0690, Industrial Hygienist. This job title does not include collateral duty safety officers.

Executive Summary

In 2012, the U.S. Department of the Interior's Office of Occupational Safety and Health (DOI) conducted a review of the entire Reclamation Safety and Occupational Health (SOH) Program and identified areas needing improvement. The report from this review identified that, *"A degree of cultural complacency exists that results in the acceptance of facility hazards and contributes to the presence of uncorrected facility hazards."*

Program Action Plan Teams were established to address the deficiencies noted in the review. Team #9 was tasked to evaluate the agency's Job Hazard Analysis (JHA) practices and procedures. The objective of this report is to provide suggestions to correct the deficiencies related to JHAs that were identified during the review. Additionally, consideration has been given to addressing the programmatic requirements of www.usbr.gov/recman/saf/saf-p01.pdf dated July 23, 2013.

Please note, although not a deliverable for Team #9, field reviews of this report identified the fact that a lack of adequately skilled Safety Professionals could be a major obstacle towards the implementation of the following recommendations.

The team recommends the Reclamation Leadership Team (RLT) take the following actions to improve the JHA process throughout Reclamation:

1. Evaluate the number, skillsets needed, and duty stations required for additional Safety Professionals needed to adequately implement and support the following proposed recommendations. SOH Action Plan Team 3 is working on the effective use of SOH staff.

2. Implement an electronic standard JHA format/template for Reclamation to identify the significant steps/major activities of a task, hazards associated with each step/activity, and the corrective actions for each identified hazard.

3. Revise *Reclamation Safety and Health Standards (RSHS)* Section 4 to reflect the new JHA format and procedures. The standards will also define categories of ordinary hazards that do not need to be

addressed in a JHA, including routine walking on standard stairs, infrequent lifting of light objects, i.e., 20 pounds or less, etc.; they will also define the appropriate levels of supervisors (or employees) who will prepare JHAs.

4. Create Electronic JHA Libraries that are shared locally (Area Offices/Regional Offices) via SharePoint, Google Drive, or some other electronic file sharing method.

These recommendations shall be implemented through the release of a new Reclamation Directive and Standard and the revised *RSHS* Section 4. The recommendations provide appropriate flexibility for offices and supervisors to respond to local needs in developing Job Hazard Analyses. Additionally, the recommendations advise that Reclamation manage its JHA program guided by the principles of employee engagement, information sharing across offices, and continuous improvement.

Background

In 2013, in response to an agency-wide review by the DOI Office of Occupational Safety and Health, several Reclamation-wide work groups were formed to identify organizational improvements. This effort resulted in the publication of the Reclamation-wide *Safety and Occupational Health Action Plans* (Draft, March 2014).

One of the conclusions (#3-1) in the DOI review summary report states: "Job Hazard Analyses (JHAs) are conducted for specific activities to identify, evaluate, and control the activity-specific hazards. Some of these JHAs are very well prepared, while others have very little content of value. Reclamation needs to better define JHA expectations and provide improved training and guidance in their preparation, including hazard recognition skills."

In January 2014, Reclamation's SOH Action Plan Team identified "Action Plan #9: Evaluate the JHA process for potential improvements."

The members of Program Action Plan Team #9 reviewed the current requirements for JHAs (contained in *Reclamation Safety and Health Standards* (*RSHS*) Section 4) to develop recommendations to more clearly describe when and how JHAs should be developed, communicated, and documented. The Team also suggests additional recommendations for process improvement.

This report documents this Action Plan Team's findings and recommendations to improve Reclamation's JHA procedures.

Deliverables/Recommendations

The Team was assigned to review the current JHA process and provide recommendations as listed in the following nine deliverables.

Deliverable #1: Provide recommendation on minimum contents of Reclamation JHAs.

The team recommends that a Reclamation JHA should contain at least the following elements (note: Highlighted items are NOT currently identified as requirements in the *RSHS*.):

a. Title to identify location and specify job.

b. Emergency Information including physical location of the job site and emergency phone numbers in order to contact first responders and guide them to the site.

c. Number: Used for local recording and indexing.

d. Date (to ensure procedure is current and to document date of use).

e. Description of work to be performed.

f. Equipment, tools, and facilities involved.

g. Employee knowledge, skills, physical ability, and certifications required.

h. Principal or significant steps/major activities of the operation in sequence; divide operations only into the number of significant steps/activities necessary to ensure adequate consideration of important items. It is suggested that whenever the JHA has more than 15 steps/activities that the scope of work be evaluated for separation into multiple JHAs. (Please note: A Job Plan may have more specificity and number of steps/activities than a Job Hazard Analysis.)

i. Classification of physical, chemical, and/or biological hazards.

j. Identification of risk hazards. One option for the evaluation of risk hazards is the use of the DOI Risk Assessment Matrix (Appendix D). (Note: The determination of risk is a subjective, qualitative process which considers the criticality of the task, process, or condition. A Risk Assessment Matrix uses a combination of severity [the most serious type of injury or illness that can reasonably be expected from exposure to a hazardous condition], and probability [the likelihood that a condition will occur] to provide a decision-maker with additional information in order to make more informed decisions concerning appropriate risk controls.)

k. Identification of hazard control measures.

l. Identification of all required training and confirmation of its currency with employee.

m. Identification of all required certifications and confirmation of their currency with employee.

n. Identification of all required licenses, permits, clearances, critical lift plans, entry permits, etc. and confirmation of their currency with employee.

o. Signatures of the Job Lead and Reviewing Official.

p. Review and signature of Safety Specialist when newly identified high risk hazards cannot be appropriately mitigated.

q. Review and signature of an Industrial Hygienist or Safety Specialist when newly identified high risk hazards or exposure to occupational health issues cannot be appropriately mitigated. If a local Industrial Hygienist or Safety Specialist is not on staff, consult with similar staff from other offices or Regions.

r. Post-Job review and signatures of Job Lead and Reviewing Official.

s. An appropriate level manager (i.e., Regional Office Division Chief, Area Manager, Facility Manager, or equivalent) must review the benchmark JHA which has been revised/updated by the Job Lead

within 14 days of any near miss, injury, or damage to equipment or facility.

Note that revising the minimum content of the JHA and implementing many of the recommendations within this report will also require a revision to *RSHS* Section 4. (See Appendix A: *RSHS* Section 4 Revisions [Draft].)

Deliverable #2: Provide a recommendation to use a single Reclamation-wide form, forms for particular activities (Construction, Power, O&M and Water & Natural Resources), or allow offices to use their own forms.

Program Action Plan Team #9 recommends that Reclamation use an electronic standard JHA form for all activities (See Appendix B: Revised, Standardized JHA Form [DRAFT] developed in an Excel format). However, an office can use any JHA software or CARMA Safety Module to develop a similar product if the JHA entries meet all minimum requirements of the Reclamation standard JHA form as listed in Deliverable #1, and if the printed format is similar to the Reclamation JHA form.

Potential advantages of having a single, standard Reclamation JHA form include:

a. Provides consistency throughout all Reclamation offices.

b. Is cost effective in the sense that each office/activity is not required to invest resources to create a local version.

c. Completed JHAs for standardized work processes could potentially be used as templates and shared among multiple facilities, Area Offices, Regions, etc., saving time and effort in completing this task requirement.

d. Employees would develop a familiarity with the form and process that can be put into practice in any Reclamation facility, Area Office, or Region.

e. The standard JHA could allow Reclamation to create an activity-based resource library of JHAs to help improve the JHA process with

minimum investment of time (see Deliverable #3).

Potential disadvantages of a single, standardized Reclamation JHA form include:

a. Less flexibility in dealing with local site or management preferences.

b. A standard form will likely require more paper and time for completion than is usually needed for limited, local activities due to the form's necessity to cover the breadth of Reclamation's work scope.

c. Because employees may already be familiar with a local JHA form, a new form will require a learning curve and time to adapt to the new standards.

Deliverable #3: Prepare an assessment of alternative methods for creating a library of JHAs that would be accessible to Supervisors to allow them to generate high quality JHAs with minimum investment of time.

The team discussed the implementation of a Reclamation-wide JHA library that would be accessible to employees across the Bureau. Such a library could house pre-job hazard checklists (Appendix C) and examples of JHAs that could be used to assist in developing new JHAs for similar jobs.

The team brainstormed and discussed pros and cons of this Reclamation-wide library, as well as the possibility of locating libraries at the Regional or Area Office levels. The team concluded that the benefits of establishing a Reclamation-wide library would not justify the dedication of resources that would be required to create and maintain such a comprehensive database. The team also felt that such a library would quickly become too large and cumbersome to navigate, and would not be used to the extent that a smaller, more localized library would.

The team recommends creating electronic JHA libraries at the local office level, i.e., at the Area Office level for respective Area and Field Office personnel, or at the Regional Office level for headquarters-based groups (e.g., Engineering, Information Technology, etc.). The local office(s) would be able to use discretion as to the mechanism used for creating and maintaining the electronic library, as well as the means to search the library contents for specific JHA elements. Maintaining the library at this level will require minimal resource investment, and would most likely result in a resource that would provide relevant examples of

JHAs for tasks specific to an office. SharePoint sites or shared-access drives with well-maintained electronic indexes are effective ways to establish accessible office-wide databases. Access to these databases could be shared among offices upon request to the local Safety Manager or representative. (Note: While it is not a requirement, communication among Regional Safety Managers could facilitate the sharing of JHAs throughout Reclamation.) Supervisors and/or designated individuals would have access to "write" to the local SharePoint site or shared drive. Area and Regional Office employees would have access to search and read/print their respective local library entries.

Deliverable #4: Recommendations on the approval process to ensure effectiveness and timeliness.

The team recommends that the JHA approval process be maintained at the lowest level (1st Line Supervisor), except in the case of newly identified, high risk work that cannot be appropriately mitigated before the job begins. For a newly identified, high risk project that cannot be appropriately mitigated, the JHA shall require review by a Safety Specialist or Industrial Hygienist. A JHA for a project that cannot be appropriately mitigated will require the approval of an appropriate level manager (i.e., Facility Manager and Area Manager, or Regional Office Division Chief, or equivalent), in accordance with the DOI Risk Assessment System Matrix (Appendix D) found in the DOI Operational Risk Management Plan (on-line at: www.doi.gov/archive/safetynet/information/program/docs/DOI_Operational_Risk_Management_Plan.docx).

All approvals indicated on the JHA form (except the Post-Job Review Section) shall be completed before job activities begin.

a. Pre-Job Meeting – All team members involved in the task must participate in a Pre-Job Meeting before the job starts. The Job Lead will present the JHA; all team members will participate in the discussion and revise the JHA if needed.

b. For construction/service contracts, the Contracting Officer's Representative (COR) only reviews and accepts the Contractors' JHAs. The COR does not approve or disapprove the Contractor's JHAs. The Contractors themselves are responsible for the contents of their individual JHAs. This Team also recommends that Reclamation's Contracting Officers and a Field Solicitor review and provide

proposed language to the updated *RSHS* Section 4 related to construction/service contracts.

Deliverable #5: Recommendation on Post-Job Review process to ensure effectiveness and timeliness.

The team recommends the following steps be included in the Post-Job Review:

a. Job Lead and team members review the JHA (either individually or as a group) to identify lessons learned and propose JHA revisions within seven days of work completion. The Reviewing Official reviews and approves the completion of the JHA within 14 days of completion of the work.

b. 2nd Level Supervisor concurs with the Post-Job Review in the event of a near miss, incident, and accident before the project/job close out.

c. Construction/Service Contractors are exempted from the Post-Job Review. However, CORs and contractors may choose to participate in the Review process if they find the results to be beneficial for lessons learned.

d. Lessons learned will be disseminated through Safety Committee members, as appropriate.

Deliverable #6: Recommendation on record keeping and retention requirements for JHAs.

The team recommends that all JHAs be filed electronically (via a shared drive or SharePoint Library, as annotated in Deliverable #3, if approved).

a. Revised JHAs (if needed based on the Post-Job Review process) should be uploaded to electronic library within 4 weeks after the work is complete.

b. Copies of completed and signed JHAs will be maintained (i.e., electronic or hard copy) in the central filing system at the respective Regional/Area/Facility Office.

Deliverable #7: Recommendation for incorporating the JHA process with accident, incident, and near-miss investigations.

The JHA process would include a Post-Job Review that involves all employees from the job and appropriate managers, as needed.

a. Corrections and/or modifications would be made to the JHA based on employee/team/management input during the Post-Job Review.

b. Lessons learned on near-misses, accidents, and incidents would be discussed in an open forum with team members, safety officers, and management to identify corrective actions to help avoid such circumstances in the future.

    i. A local/Area Office/Regional Safety Committee member will present the lessons learned to the respective Safety Committee.

    ii. The Post-Job Review should require that supervisors, Office Chiefs, and Facility Managers involved in the activity sign the Post-Job Review as required in *RSHS* Section 4.2.

Deliverable #8: Provide a project plan to complete all recommendations.

The team estimates that, after RLT approval, approximately six to nine months are needed to start implementation of the items listed below.

Activity	Estimated Completion Date	Responsible Parties
RLT Approval	June 12, 2015	Action Plan Team 9 and RLT
Update and publish new JHA Form and revised *RSHS* Section 4	December 18, 2015	Designated Agency Safety and Health Official (DASHO); Security, Safety & Law Enforcement (SSLE) Director; Policy & Administration Director; Reclamation Safety Council

Activity	Estimated Completion Date	Responsible Parties
Training Materials for updated JHA form and revised *RSHS* Section 4 developed	December 18, 2015	SSLE Director; Reclamation Safety Council
Temporary D&S developed and published	December 18, 2015	Denver Policy and Administration Office
Initiate Develop electronic libraries	March 31, 2016	Area Managers/ Regional Office Chiefs
Initiate Training on Reclamation-wide JHA form and process	March 31, 2016	Facility Managers and Safety Managers
Begin Implementation of new JHA form and process	2016	1st Line Supervisors
Evaluate the number, skillsets needed, and duty stations required for the hiring of additional Safety Professionals to adequately support the field and facilities work efforts.	Ongoing	RLT (with oversight by DASHO and SSLE Director)

Deliverable #9: Evaluate and recommend who will implement the recommendations of Team 9 and who will provide oversight of the implementation.

Team #9 recommends the following hierarchy for the implementation and oversight of JHA process improvement:

1. For implementation:
    a. Commissioner and RLT
    b. SSLE Safety Office
    c. Regional Directors – Regional Safety Managers
    d. Area Office, Regional Office Division Chiefs, and local Safety Managers
    e. Facility Managers
    f. 1st line supervisors

2. For oversight:
    a. 1st line supervisors
    b. 2nd line supervisors/Facility Managers
    c. Area Office, Regional Office Division Chiefs, and local Safety Managers
    d. Regional Office Safety Managers
    e. SSLE Safety Officer

Other Considerations

The Team also recommends these additional elements be considered in the development of the new JHA form/process:

a. Offices that use CARMA can develop a printable JHA form similar to Reclamation's standard form within the CARMA Safety Module.

b. Develop and provide required initial training on the JHA process, including development of a pre-JHA checklist and the completion of the new JHA form, for all affected employees (either face-to-face or on-line). Note: SOH Action Plan Team #17 (Employee Safety Training) and Team #18 (Supervisor Safety Training) will incorporate Team #9's recommendations on JHA process training in their programs.

c. Develop and provide required training on Job Hazard Recognition and Mitigation. Note: SOH Action Plan Team #17 (Employee Safety Training) and Team #18 (Supervisor Safety Training) will incorporate Team #9's recommendations on Job Hazard Recognition and Mitigation training in their training programs.

d. After one year's implementation, the Reclamation Safety Council develops a brief survey on new JHA process for employee feedback.

e. Every three years, the Reclamation Safety Council reviews *RSHS* Section 4.2 with a focus on JHA case studies as part of continual improvement of the JHA process.

f. Every three years, require training on *RSHS* Section 4 and a JHA process refresher. Note: SOH Action Plan Team #17 (Employee Safety Training) and Team #18 (Supervisor Safety Training) will

incorporate Team #9's recommendations *RSHS* training and JHA process refreshers in their training programs.

g. Local Safety Offices track the feedback on new JHA and *RSHS* Section 4 revisions.

h. Local Safety Committees will discuss near-misses, incidents, and accidents, and disseminate related information as appropriate.

Conclusion

Through the Reclamation-wide SOH Program Evaluation conducted by DOI, our agency is aware that there is presently inconsistent participation in safety practice implementation at many levels.

JHAs and the JHA process (Appendix E: JHA Process Flow Chart) are instrumental to confirm that safety practices are included in job plan development, to identify task-specific hazards, and to ensure employees are trained in the potential hazards associated with their assignments.

Development of a standardized JHA form is just one step toward helping a participative safety culture evolve. The improvements suggested for the JHA process will also allow lessons-learned to be shared more easily, potentially preventing injuries and property losses in the future, and ensuring continual improvement in Reclamation SOH practices.

Additionally, the presence and involvement of Reclamation Safety Professionals in JHA process development and application could greatly enhance employee and management awareness of key safety practices and principles.

Employee involvement in the JHA development process, ongoing leadership support, and availability of resources and training opportunities will give all personnel an awareness and respect for the roles they have in the SOH Program, and for the rules that keep us all safe. Having fulfilled those roles, these individuals are likely to continue to encourage and guide others in compliance, furthering all-around safety awareness and mindfulness.

Appendix A:
RSHS Section 4 Revisions (DRAFT)

Recommended Reclamation RSHS Section 4 Revisions (Draft)

Note: Highlighted areas show suggested changes to existing RSHS Section 4.2

4.2 Requirements for Conducting a Job Hazard Analysis

4.2.1 Requirement. The responsible supervisor will review completed risk assessments and tasks associated with a job to determine if a JHA is required. (When developing the JHA, the Job Lead can use the *optional* Pre-Job Hazard Checklist [Appendix A(1)] and the JHA Process Flow Chart [Appendix A(2)] to guide the process.)

In making the assessment, the supervisor will consider mechanical, electrical, pressure, temperature, chemical, biological, radiation, sound, gravity or motion hazards that can result in death or serious bodily injury, such as:

a. Being struck by falling or flying objects

b. Getting pinched in or between, or caught in rotating machinery

c. Lifting excessive weight or lifting frequently

d. Repetitive motion

e. Electrical shock

f. Radiation from welding and other sources

g. Drowning

h. Significant exposure to toxic or hazardous substances, gases, fumes, and atmospheres

i. Falls from heights above 4 feet

If the supervisor determines a JHA is required, the supervisor or their designated employee will consult with the employees involved in the activity to develop a JHA; the local safety and health professional will be consulted, if necessary.

Before the Pre-Job meeting, the Job Lead will review and sign the JHA, and the Reviewing Official will approve the JHA to indicate all appropriate hazards are addressed.

The supervisor or their designated employee must review the JHA with employees at the Pre-Job meeting before performing the work. A copy of the JHA must be maintained at the work site.

4.2.2. Written Procedures. Written procedures or job plans may be attached to the JHA as additional documentation; however, step-by-step procedures will not be incorporated into the JHA.

4.2.3 Basic Elements of a JHA. Record developed written procedures using Reclamation's electronic standard JHA form. See form in "Job Hazard Analysis" (Appendix A).

At a minimum, the JHA must include the following basic elements:

a. Title identifying the project and specifying the operation.

b. Emergency information including the physical location of the job site and emergency phone number(s) in order to contact first responders and guide them to the site.

c. Number to be used for local recording and indexing.

d. Date to ensure procedure is current and to document date of use.

e. Description of work to be performed.

f. Equipment, tools, and facilities involved.

g. Employee knowledge, skills, physical ability, and certifications required.

h. Principal or significant steps/major activities of the operation. Supervisors should divide operations into only the number of steps/activities necessary to ensure adequate consideration of important items. It is suggested that whenever the JHA has more than 15 steps/activities, that the scope of work be evaluated for separation into multiple JHAs.

Significant steps/major activities are those that encompass major aspects of the work. When evaluating the hazards of each significant step/major activity, include all hazards associated with the entire step/activity, without becoming encumbered by the details. Comprehension of the related safety message is enhanced if the document contains only brief, succinct points versus lengthy, complex narratives.

Examples of significant steps/major activities include:

Remove head cover
Remove old gasket
Clean gasket surface
Replace gasket
Replace head cover

i. Identification of physical, chemical, and/or biological hazards.

j. Identification of risk hazards. One option for Supervisors or Safety Professionals to use to evaluate a risk hazard is the DOI Risk Assessment Matrix (Appendix A.3 and on-line at: http://www.doi.gov/archive/safetynet/information/program/docs/DOI_Operational_Risk_Management_Plan.docx), as appropriate. (Note: The determination of risk is a subjective, qualitative process which considers the criticality of the task, process, or condition. A Risk Assessment Matrix uses a combination of severity [the most serious type of injury or illness that can reasonably be expected from exposure to a hazardous condition], and probability [the likelihood that a condition will occur] to provide a decision-

maker with additional information in order to make more informed decisions concerning appropriate risk controls. Identification of the hazard as high risk and occupational health exposure as appropriate [see definition]).

k. Identification of hazard control measures using the hierarchy of controls:

1. Elimination of the Hazard
2. Substitution
3. Engineering controls
4. Administrative controls
5. Safety equipment and personal protective equipment. (The supervisor or foreman will provide employees with the specific safety equipment that is required. For example, instead of simply stating a respirator is required, the supervisor/foreman will provide employees with a full-face negative pressure respirator with combination HEPA and organic vapor cartridge.)

l. Identification of any required training, i.e., forklift training, Class 2 Asbestos training, etc. and confirmation of currency with employee.

m. Identification of required certifications, i.e., crane operator, and confirmation of currency with employee.

n. Identification of and confirmation of currency of all required licenses, permits, clearances, critical lift plans, entry permits, etc. with employee.

o. Signatures of the Job Lead and Reviewing Official.

p. Review and signature of a Safety Specialist when a newly identified high risk hazard cannot be appropriately mitigated.

q. Review and signature of an Industrial Hygienist or Safety Specialist when a newly identified high risk of exposure to occupational health issue cannot be appropriately mitigated. If a local Industrial Hygienist or Safety Specialist is not on staff, consult with similar staff from other offices or Regions.

r. Post-Job JHA review. A Post-Job Review must be performed by Job Lead and team members (either individually or as a group) to identify lessons learned and proposed JHA revisions within seven days of job completion. This can be an informal review conducted after the work is completed, with the exception of an activity that resulted in a near miss, injury, or damage to a facility. The JHA for a particular job/task will be updated to reflect lessons learned from the review including any incidents involving a near miss, injury, or damage to facility. The updated JHA must be approved by the appropriate Supervisor.

s. An appropriate level manager (i.e., Regional Office Division Chief, Area Manager, Facility Manager, or equivalent) must review the updated JHA within 14 days of any near miss, injury, or damage to equipment or facility.

4.2.4 As work is performed under a JHA, reassess the JHA to ensure that all significant hazards have been addressed and adequate hazard controls have been implemented. Job site monitoring and observation of work activities must be a basis for assessment and revision. All work must stop whenever the JHA is determined to be lacking in identification or mitigation of hazards, or whenever the scope of work has changed. Work cannot restart until either a revised JHA or a new JHA is developed, discussed with, and signed off by all affected employees and the Job Lead.

4.2.5 Elements/Activities Not Necessary in a JHA. It is not necessary to document every conceivable common hazard if the potential injury is not expected to require more than first aid treatment. Examples of such activities include common day-to-day hazards such as walking on level or slightly inclined surfaces, climbing standard staircases, lifting moderately light objects with little or no repetition, infrequent bending, operating a passenger vehicle, using common hand tools and equipment, etc.

4.2.6 Pre-Job Meeting. All team members involved in the task must participate in a Pre-Job Meeting before the job start. The Job Lead will review the pre-JHA checklist (optional) and discuss the JHA. All team members participate in the discussion of the JHA and revise the JHA if needed.

4.2.7 High Risk Task That Cannot Be Mitigated. A high risk activity/step (not previously identified in either a new or existing job) that cannot be appropriately mitigated requires the approval of the Safety Specialist and an appropriate level manager (i.e., Facility Manager and Area Manager, or Regional Office Division Chief, or equivalent) before the work can begin.

4.2.8 Emergency Call-out Situation That Must Be Addressed Immediately. The Job Lead shall complete a Pre-Job Hazard Checklist and JHA, even if a Supervisor is not available to sign the JHA. The Job Lead and the 1st Level Supervisor shall discuss the JHA with the 2nd Level Supervisor after the work is completed.

4.2.9 Approvals. All approvals indicated on the JHA form (except the Post-Job Review Section) shall be completed before activities begin.

Definitions (To Be Added to RSHS Appendix K)

High Risk

A high risk activity may result in hospitalization; chronic or irreversible illness, permanent disability, temporary total disability, significant property or resource damage, or immediate or imminent danger or death.

Job Hazard Analysis (Would replace existing definition)

A method for identifying and evaluating hazards associated with a particular job or task. It can also be called a “Job Safety Analysis”.

Job Lead

An authorized employee directly in charge of leading the completion of the work activity. This term is not associated with the management or supervision of personnel.

Job Plan

The detailed step-by-step description of a job or process to ensure complete and effective coverage of each step/activity of the entire job. It may include a significant number of details or minor steps/activities that would not necessarily be included as a significant step/activity in the JHA. Depending on the scope and required details, the length of the Job Plan may be one paragraph or many pages long. The completed Job Plan can be used to develop the JHA.

Mitigate

The removal of a hazard by avoidance, elimination, substitution, engineering controls, administrative controls, and/or the use of personal protective equipment.

Newly Identified High Risk Hazard

A high risk activity/step that has not been previously identified in either a new or existing job.

Reviewing Official

The 1st Line Supervisor or Foreman I (only in the absence of the 1st Level Supervisor) who approves the JHA. A Job Lead will not be a Reviewing Official.

Safety Specialist

A job title/position that involves the management, administration, or operation of a safety and occupational health program or performance of administrative work concerned with safety and occupational health activities, and includes the development, implementation, and evaluation of related program functions. The program work requires application and knowledge of: (a) the principles, standards and techniques of safety and occupational health management; and (b) pertinent elements of engineering, physical science, ergonomics, psychology, industrial hygiene, physiology, sociology, and other scientific and technological fields which contribute to the achievement of comprehensive safety and occupational health objectives.

Appendix B:
Revised, Standardized JHA Form (DRAFT)

Bureau of Reclamation Job Hazard Analysis Form

Emergency Information	Job Location	GPS Location	Emergency Phone	Nearest Hospital	Law Enforcement	Ambulance

Job/Project Title: _____ **Date:** _____ **JHA #** _____

Job Description: _____

Equipment/Tools/Facilities Involved: _____

Applicable Regulatory References: _____

	SIGNIFICANT STEPS/MAJOR ACTIVITIES IN SEQUENCE	HAZARDS (Physical, Chemical, Biological, Etc.)	HAZARD CONTROLS (Elimination, Substitution, Engineering, Administrative Control, Personal Protective Equipment)	HIGH RISK/EXPOSURE ASSESSMENT (Y/N)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Note: Divide operations only into the sequence of significant steps/major activities necessary to ensure adequate consideration of important items. It is suggested that when a JHA has more than 15 significant steps/major activities that the scope of work be evaluated for separation into multiple Job Hazard Analyses.

Required Training:	Required PPE:	Required Certifications, Licenses, Permits. Clearances, Critical Lift Plan, Entry Permits etc. (Confirm all are valid and current):

Additional information:

Job Hazard Analysis Review/Approval		
Was the optional Pre-Job Assessment form used to help identify potential hazards?	**Yes**	**No**
If new High Risk Hazards were identified, was the JHA reviewed by a safety professional and a risk assessment completed if necessary?	**Yes**	**No**
Was an exposure assessment accomplished by an industrial hygienist for activities with newly identified potential health hazards?	**Yes**	**No**

Job Lead	Supervisor Approval
Signature:	**Signature:**
Date:	**Date:**

Safety Specialist Review (Only Newly Identified High Risk Hazard/Exposure Assessments that cannot be appropriately mitigated)	Industrial Hygienist Review (Only Newly Identified High Risk Hazard/Exposure Assessments that cannot be appropriately mitigated)
Signature:	**Signature:**
Date:	**Date:**

Facility Manager Approval (High Risk Hazard that cannot be appropriately mitigated)	Area Manager, or Regional Office Chief, or Equivalent Approval (High Risk Hazard that cannot be appropriately mitigated)
Signature:	**Signature:**
Date:	**Date:**

The following individuals have reviewed, UNDERSTAND, and acknowledge their responsibility to comply with this JHA and all attached documentation.

Date	Print Name	Signature	Date	Print Name	Signature

Post-Job Review		
The contents of this Job Hazard Analysis was discussed with affected employees before they started assigned tasks.	**Yes**	**No**
An after action review was conducted with team members within 7 days of completion of all tasks associated with this job hazard analysis. Lessons learned were annotated below, and the JHA was updated within 30 calendar days.	**Yes**	**No**
Were there any incidents involving a near miss, injury, or damage to equipment or facility?	**Yes**	**No**
If yes, was the JHA reviewed by all team members and corrections made and reviewed by the Regional Office Division Chief/Facility Manager within 14 calendar days?	**Yes**	**No**

Lessons Learned (synopsis):

Job Lead	Supervisor Approval	Regional Office Division Chief/Facility Manager Review (JHA review required if an accident or near miss occurred)
Signature:	**Signature:**	**Signature:**
Date:	**Date:**	**Date:**

Appendix C:
Pre-JHA Checklists for O&M and Natural Resources Programs (DRAFTS)

PRE JOB HAZARD CHECKLIST (O&M ACTIVITIES)	
Prepared By:	Work Location:
Project:	Date:

This checklist is designed to help identify possible hazards and provide references to the RSHS. If hazards are present or likely to be present, then a JHA is required. This checklist will help communicate environmental, safety and health hazards, control measures, and requirements to employees.
This checklist contains information obtained during preliminary planning for this project and may not address all hazards, control measures, and/or requirements. The Job Lead must develop a written JHA if warranted by identified or potential hazards, and must continue to refer to this checklist and the JHA throughout the work to ensure hazards are identified and mitigated.

CONDITIONS AND PERMITS ANTICIPATED

- ❑ **Job Hazard Analysis** (RSHS 4)
- ❑ **HECP, Clearances** (JHA Required and may require EA, RSHS 15, FIST 1-1)
- ❑ **High Voltage Work Plan** (JHA required, RSHS 12)
- ❑ **Remote Location** (JHA Required, RSHS 4)
- ❑ **Permit Required Confined Space** (JHA required, RSHS 14)
- ❑ **Other** (specify)
- ❑ **Hot Work** (JHA required, EA required, RSHS 17)
- ❑ **Critical Lift** (JHA required, RSHS 19)
- ❑ **Special Work Permit** (JHA required, may require EA)
- ❑ **Fall Arrest** (Fall Arrest Rescue Plan Required, RSHS 16)
- ❑ **Emergency Rescue/Response Plan**

Activities that require Exposure Assessment and a JHA

- ❑ **Use hazardous materials or physical agents including, but not limited to, toxic, reactive, biohazard, corrosive, flammable or those that have radiological properties.** (routine and nominal use of citrus based chemicals, oils, greases, lubricants, penetrants, thread lock, thread release, cutting oils and coolants are not considered hazardous and do not require an exposure assessment if they are the only chemical agents in a process.) ***Note:*** *An exposure assessment is not required for consumer products when the products are used in the workplace in the same manner that a consumer would use them, i.e., where the durations and frequency of use (and therefore exposure) is not greater than what the typical consumer would experience. This exemption in OSHA's regulation is based, however, not upon the chemical manufacturer's intended use of his product, but upon how it actually is used in the workplace.*
- ❑ **Use PPE** (respirators, chemical-resistant clothing, and chemical resistant gloves)
- ❑ **Required grinding, crushing, cutting, blasting, or other abrasive processes.**
- ❑ **Involve tasks or operations that release metals** (e.g., welding, grinding, soldering, brazing, cutting, burning, gouging, plasma cutting, laser cutting)
- ❑ **Involve mixing, handling, storage, removal or application of paint related materials, e.g. thinners, catalyst, solvents, adhesives, epoxies, sealants, base coats, middle coats, top coats, fillers or resins.**
- ❑ **Involve mixing, handling, storage, and application of pesticides/herbicides.**

- ❑ **Involve work tasks, operations, or equipment that generate noise levels which equal or exceed 85 decibel A-weighted (dBA) as an 8-hour TWA.**
- ❑ **Involve entry into a confined space**
- ❑ **Involve a work-related medical surveillance program, or medical monitoring associated with work tasks, operations, regulatory task requirements, or unacceptable exposure.**
- ❑ **Involve handling, or working with or on equipment that handle bodily fluids or biological hazards.**
- ❑ **Involve batching, mixing, cutting, chipping, crushing, coring, or drilling concrete.**
- ❑ **Involve entry into an area, or conducting a work task or working on equipment, contaminated with rodent feces, dander, or nest.**

ANALYTICAL DATA: (example: previous asbestos, lead samples; noise level monitoring)

HAZARDS IDENTIFIED

- ❑ **Electrical** (RSHS 12)
- ❑ **Fall Hazards** (RSHS 13 & 16)
- ❑ **Eye Hazards-particles/contact exposure** (RSHS 8.3)
- ❑ **Excavation** (>4ft deep RSHS 22)
- ❑ **Ladders/Scaffolding** (RSHS 13)
- ❑ **Asbestos** (RSHS 7.17)
- ❑ **Confined Space Entry** (RSHS 14)
- ❑ **Around Water Activity** (RSHS 8.6 & 28)
- ❑ **Falls>6ft** (RSHS 16)
- ❑ **PCBs Present**
- ❑ **Bloodborne Pathogens** (RSHS 7.12)
- ❑ **Working Alone** (RSHS 4.4)
- ❑ **Chemical Use**
- ❑ **Hazardous Material Release** (RSHS 21)
- ❑ **High Traffic Area** (RSHS 9)
- ❑ **Lead** (RSHS 7.18)
- ❑ **Mobile Equipment** (RSHS 20)
- ❑ **Temp. Extremes** (hot/cold RSHS 7.13 & 7.14)
- ❑ **Noise** (RSHS 7.9)
- ❑ **Operating Rotating Equipment** (RSHS 20.13.1)
- ❑ **Overhead Cranes in Area** (RSHS 18 & 19)
- ❑ **Overhead Electrical Lines** (RSHS 12)
- ❑ **Roof Access** (RSHS 16)
- ❑ **Dust** (specify)
- ❑ **Arc Flash** (RSHS 12)
- ❑ **Other: _____**

ADDITIONAL PROTECTIVE DEVICES

- ❑ Safety Shoes (ASTM F2413)
- ❑ Goggles (RSHS 8 Table 8-1)
- ❑ Coveralls
- ❑ Hearing Protection (RSHS 8.4 & 7.9)
- ❑ Safety Glasses/Side Shields (ANSI Z87)
- ❑ Fire Extinguisher (RSHS 10.3.3)
- ❑ Gloves (RSHS 8.5.4)
- ❑ Tyvek Overalls
- ❑ Eyewash Stations (RSHS 7.11.8)
- ❑ EVAC Alarms(RSHS 10.3.2-if not available use remote device)
- ❑ Fire Resistant Clothing (NFPA 70E)
- ❑ Electrically Rated Gloves (Test before each use RSHS 8 Table 8-3)
- ❑ Evacuation routes clearly defined (RSHS 10.1.1)
- ❑ Equipment (Specify)
- ❑ Other (Specify)
- ❑ Hard Hat (ANSI Z89.1)
- ❑ Ground Spotter (RSHS 19.2)
- ❑ Local First-Aid Kits (RSHS 5)
- ❑ Lockout/Tagout (RSHS 15)
- ❑ SDSs (MSDS)
- ❑ Retrieval Tripod (RSHS 7.8.2.a.7.b.)
- ❑ Respirator (RSHS 7.8.2)
- ❑ SCBA (RSHS 7.8.2.a.7)
- ❑ Air Monitor (RSHS 14.4.e.)
- ❑ Barricades/Safety Cones (RSHS 9)
- ❑ Personal Grounds (RSHS 12.6)
- ❑ Communications (RSHS 4.4.1)
- ❑ Have lifting points been tested
- ❑ Are all protective devices operational and in the correct configuration.

TRAINING/CERTIFICATIONS

- ❑ Asbestos (RSHS 7.17.8-Specify Class; e.g. IV,III,II,I)
- ❑ Bloodborne Pathogen (RSHS 7.12.9)
- ❑ Ladder Use (RSHS 13)
- ❑ Lead (RSHS 7.18.8)
- ❑ HECP/LOTO (RSHS 15.2.9)
- ❑ PCBs (40 CFR 761)
- ❑ Confined Space (RSHS 14.5)
- ❑ Electrical (RSHS 12 Attachment 12-1)
- ❑ Crane Operator (RSHS 19)
- ❑ Fall Protection (Specify if Competent)
- ❑ Emergency Evacuation Procedure (RSHS 10.1.1 & RSHS 6)
- ❑ Respirator (RSHS 7.8.2)
- ❑ Scaffolding (RSHS 13)
- ❑ Other (Specify)

Specify environmental issues/permits. (Attach additional paper if needed)
List conditions particular to work site: (example: high wind hazards during catwalk work, other job site specific info. Attach additional paper if needed)

PRE JOB HAZARD CHECKLIST (NATURAL RESOURCES ACTIVITIES)	
Prepared By:	Date:
Project:	Work Location:

This checklist is designed to help identify possible hazards and provide references to the RSHS manual. If hazards are present or likely to be present, then a JHA is required. This checklist will help identify the environmental, safety and health hazards, control measures, and safety requirements associated with projects related to natural resource activities. This checklist contains information obtained during the preliminary planning for this work project and may not address all hazards, control measures, and/or safety requirements needed for this work project. This checklist is only a "safety starting point."

CONDITIONS AND PERMITS ANTICIPATED

- ❑ **Job Hazard Analysis** (RSHS 4)
- ❑ **Remote Location** (JHA Required, RSHS 4)
- ❑ **Permit Required Confined Space** (JHA required, RSHS 14)
- ❑ **Other** (specify)
- ❑ **Rescue Plan** (Other than Fall Arrest**)**
- ❑ **Critical Lift** (JHA required, RSHS 19)
- ❑ **HECP, Clearances** (JHA Required and may require EA) (RSHS 15)
- ❑ **Emergency Rescue/Response Plan** (JHA Required, RSHS 4)
- ❑ **Other** (Specify) _____
- ❑ **Special Work Permit** (JHA required, and may require EA, RSHS 20)

Activities that require a JHA and may require an Exposure Assessment (EA) or Medical Surveillance
(The EA would be completed by a Safety Specialist or other qualified personnel.)

- ❑ **Use hazardous materials or physical agents including, but not limited to, toxic, reactive, biohazard, corrosive, flammable.** (routine and nominal use of citrus based chemical, oils, greases, lubricants, penetrants, thread lock/release, cutting oils and coolants are not considered hazardous and do not require an exposure easement if they are the only chemical agents in a process.) ***Note****: MSDA per OSHA Standard is not required for consumer products if the products are used in the workplace in the same manner that a consumer would use them, i.e., where the durations and frequency of use (and therefore exposure) is not greater than what the typical consumer would experience.*
- ❑ **Use Personal Protective Equipment PPE** *(Refer to PPE Table, i.e., Life vest or PFD, if/or when working on or around water.)*
- ❑ **Involve mixing, handling, storage, and application of pesticides/herbicides as well as handling, scalpels, syringes, needles, and fish anesthetics/pharmaceuticals.**
- ❑ **Involve work tasks, operations, or equipment that generates very loud noise levels which equal or exceed 85 decibels A-weighted (dBA) as an 8-hour TWA.**
- ❑ **Involve handling, or working with or on equipment that handle human or animal/fish bodily fluids or biological hazards.**
- ❑ **Involve extensive walking and/or hiking on rough and/or uneven terrain with/without carrying heavy loads and equipment.**

- ❑ **Involve working outdoors or in environments with extreme and variable weather conditions.** **(heat, cold, snow, sudden violent storms)**
- ❑ **Involve entry into an area, or conducting a work task or working on equipment, contaminated with rodent/bird feces, dander, or nests. Environments that are inhabited by insects, snakes, and predatory mammals that may cause physical harm should be evaluated for PPE and training requirements.**

ANALYTICAL DATA: (Example: Noise level sampling, etc.)

HAZARDS IDENTIFIED

- ❑ **Around Water Activity** (RSHS 8.6 & 28)
- ❑ **Blood borne Pathogens** (RSHS 7.12)
- ❑ **Chemical Use**
- ❑ **Dust (specify) _____**
- ❑ **Electrical** (RSHS 12)
- ❑ **Eye Hazards-particles/contact exposure** (RSHS 8.3)
- ❑ **Fall Hazards** (RSHS 13 & 16)
- ❑ **High Traffic Area** (RSHS 9)
- ❑ **Ladders/Scaffolding** (RSHS 13)
- ❑ **Mobile Equipment** (RSHS 20)
- ❑ **Noise** (RSHS 7.9)
- ❑ **Operating Rotating Equipment (RSHS 20.13.1)**
- ❑ **Other _____**
- ❑ **Temp. Extremes** (hot/cold RSHS 7.13 & 7.14)
- ❑ **Working Alone** (RSHS 4.4)

ADDITIONAL PROTECTIVE DEVICES

- ❑ Safety Shoes and/or appropriate for the job (hiking shoes, waders, etc)
- ❑ Hearing Protection (RSHS 8.4 & 7.9)
- ❑ Safety Glasses/Side Shields (ANSI Z87)
- ❑ Fire Extinguisher (RSHS 10.3.3)
- ❑ Gloves (RSHS 8.5.4)
- ❑ Eyewash Stations (RSHS 7.11.8)
- ❑ Evacuation routes clearly mapped out of remote locations.
- ❑ Equipment (Specify) _____
- ❑ Other (Specify) _____
- ❑ Ground Spotter (RSHS 19.2)
- ❑ Local First-Aid Kits (RSHS 5)
- ❑ Lockout/Tagout (RSHS 15)
- ❑ SDSs (MSDS)
- ❑ SCBA (RSHS 7.8.2.a.7)
- ❑ Communications (RSHS 4.4.1) (Spots, Satellite Phones, Radios)
- ❑ Are all protective devices operational and in the correct configuration.

TRAINING/CERTIFICATIONS

- ❑ Bloodborne Pathogen (RSHS 7.12.9)
- ❑ Ladder Use (RSHS 13)
- ❑ HECP/LOTO (RSHS 15.2.9)
- ❑ PCBs (40 CFR 761)
- ❑ Fall Protection (Specify if Competent)
- ❑ Emergency Evacuation Procedure (RSHS 10.1.1 & RSHS 6)
- ❑ Other (Specify)_____

Specify environmental issues/permits. (Attach additional paper if needed)

List conditions particular to work site: (example: high wind hazards during outdoor work, other job site specific info. Attach additional paper if needed)

Appendix D:
DOI Risk Assessment System Matrix

Operational Risk Management Tool

Principles of Operational Risk Management (ORM)

1. **Accept no unnecessary risk.**
2. **Make risk decisions at the appropriate level.**
3. **Accept risk only when benefits outweigh costs.**
4. **Integrate ORM into doctrine and planning.**

Calculate Risk Using SPE Model:
RISK = Severity x Probability x Exposure

Operational Risk Management Process - Used in Concert with the 5M Model Checklist

Step 1: Identify task, process, or operation. Risk Management Worksheet Block E

Step 2: Identify risks associated with the task, process, or operation. Block F

Step 3: Assess the level of risk (use probability, severity, and exposure drop-downs).

Estimate PROBABILITY

Rarely: Unlikely to occur.

Occasional: Possible to occur in time.

Likely: Probably will occur in time if not corrected.

Frequent: Imminent danger; occurs frequently or continuously.

Estimate SEVERITY

Minor: First aid or minor medical treatment.

Significant: Hospitalized minor injury; reversible illness.

Critical: Permanent partial disability, temporary total disability; significant property damage.

Catastrophic: Immediate or imminent danger or death, permanent disability, chronic or irreversible illness; major property or resource damage.

Risk Control: Protective devices, engineering controls, and personal protective equipment are used to control Severity.

Estimate EXPOSURE

The amount of time, number of cycles, number of people and/or amount of equipment involved. Exposure can vary from 0 to 4.

0 = No exposure
1 = Below average
2 = Average
3 = Above average
4 = Great

Risk Control: Exposure is usually controlled by reducing the number of people involved, the number of events, cycles, evolutions, etc.

Risk Management Worksheet Block G

Assess overall level of risk (automatic calculation or use SPE Model tab to calculate numerical values)

- Very High Risk
- High Risk
- Moderate Risk
- Low Risk
- Minor Risk

Risk Management Worksheet Block H

Step 4: Determine mitigation controls to reduce the level of risk. Determine potential residual risk.

- Types of controls
  - Education
  - Physical
  - Avoidance
- Criteria for controls
  - Suitability
  - Feasibility
  - Acceptability

Step 4: Implement controls.

Step 5: Track and monitor to determine effectiveness of controls.

Operational Risk Management Assessment

A. Mission or Task:	B. Approved by:	C. Date Prepared:
Fireworks Display at XXXX	John Doe	June 3, 2011

D. Prepared by: (Name and Duty Position)

This is the representative conducting the ORM. Information provided below is just an example to follow, please delete the information and add in your own.

E. Task / Process / Activity	F. Identify Risk	Probability (P)	Severity (S)	Exposure (E)	Risk Calculation (P x S x E)	G. Risk Level	H. Risk Mitigation Controls	I. Estimate Residual Risk
Fireworks Display	Wildland fire	Likely (4)	Catastrophic (4)	Significant (4)	64.00	**Very High(RAC 1)**	Determine what risk reduction controls can be implemented to reduce the risk level.	**Moderate (RAC 3)**
Fireworks Display	Structural fire (significant resource damage/loss - consider irreplaceable historic structures and/or collections)	Occasional (3)	Catastrophic (4)	Significant (4)	48.00	**High(RAC 2)**		**Moderate (RAC 3)**
Fireworks Display	Employee/visitor burns	Occasional (3)	Critical (3)	Above Avg (3)	27.00	**Moderate(RAC 3)**		**Low (RAC 4)**
Fireworks Display	What other hazards can you think of?	Likely (4)	Minor (1)	None (0)	0.00	**Minor(RAC 5)**		**Minor (RAC 5)**
Fireworks Display	What other hazards can you think of?	Rarely (2)	Minor (1)	Significant (4)	8.00	**Minor(RAC 5)**		**Minor (RAC 5)**
Fireworks Display	What other hazards can you think of?	Frequent (5)	Catastrophic (4)	Significant (4)	80.00	**Very High(RAC 1)**		**Minor (RAC 5)**

J. Determine overall risk level after controls are implemented.

Low	**Approving Official Signature:**	

Risk Assessment Matrix

Severity - **P**robability - **E**xposure (SPE) Model

Calculate Risk: RISK = Severity x Probability x Exposure

Estimate SEVERITY		
1	**Minor (IV)** – Little or no adverse impact on mission capability. First aid or minor medical treatment (accident risk). Presents minimal threat to human safety and health. Slight property damage, but fully functional and serviceable. Little or no environmental damage. Or a violation of a standard.	**1**
2	**Significant (III)** – Marginally degraded mission capability. Hospitalized minor injury, reversible illness, period of disability 3 months or less, loss or restricted workday accident, compensable injury or illness. Minor property, resource, and/or environmental damage.	**2**
3	**Critical (II)** – Significantly degraded mission capability. Permanent partial disability, temporary total disability exceeding 3 months time (accident risk). Significant property, resource, and/or environmental damage.	**3**
4	**Catastrophic (I)** – Loss of ability to accomplish mission, task, or process. Immediate and imminent danger of death or permanent total disability. Chronic or irreversible illness. Major property or resource damage (e.g., facility, equipment, systems, etc.). Severe environmental damage.	**4**

Estimate PROBABILITY		
2	**Rarely (D)** -- Unlikely to occur.	**2**
3	**Occasional (C)** -- Possible to occur in time.	**3**
4	**Likely (B)** -- Probably will occur in time or will occur once or more times in the life of the system or cycle.	**4**
5	**Frequent (A)** -- Occurs frequently or continuously. Immediate danger to personnel and resources.	**5**

Estimate EXPOSURE		
0	**No exposure to personnel or resources.**	**0**
1	**Below average.**	**1**
2	**Average.**	**2**
3	**Above average.**	**3**
4	**Significant.**	**4**

EXAMPLE: Calculate risk from numerical values: **Severity** (1, 2, 3, 4, or 5,) X **Probability** (2, 3, 4, or 5,) X **Exposure** (0, 1, 2, 3, or 4)

RISK Level: S (4) x P (5) x E (4) = 4 x 5 x 4 =8 0 = Very High Risk

Calculated Level of Risk		
Values	**Risk Level**	**Action**
61-80	**Very High**	Discontinue, stop the process, task, or operation. Level of risk is NOT acceptable to continue.
41-60	**High**	Immediate correction needed before proceeding. Senior manager may accept risk only if all viable mitigation control options have been considered and implemented. Continuous oversight & re-evaluation is required. Risk controls must reduce the level of risk to one that is lower than initially calculated.
21-40	**Moderate**	Correction and/or risk mitigation is required before continuing. Deputy Superintendent or Division Chief level may accept risk level only after mitigation controls have been implemented. Risk controls must reduce the level of risk to one that is lower than was initially calculated.
11-20	**Low**	Acceptable. Some attention needed. Implement risk reduction controls to further reduce the level of risk as appropriate.
0-10	**Minor**	Acceptable.

Severity	Risk Assessment Code			
Catastrophic (I)	1	1	2	3
Critical (II)	1	2	3	4
Significant (III)	2	3	4	5
Minor (IV)	3	4	5	5
Probability	**Frequent (A)**	**Likely (B)**	**Occasional (C)**	**Rarely (D)**

RAC Code	Description
1	**RAC-1** represents an **immediate** danger to life, health or property and requires emergency correction or hazard controlled to a lower level of risk as soon as possible within that work shift.
2	**RAC-2** represents a **high** level of threat to life, health or property and requires hazard correction or hazard controlled to a lower level of risk as soon as possible, but no later than 15 calendar days.
3	**RAC-3** represents a **medium** level risk to life, health or property, with correction planned and completed, or hazard controlled to a lower level of risk within 12 months.
4	**RAC-4** represents a **low** level risk, with correction planned and completed, or hazard controlled to a lower level of risk within a 2-year period.
5	**RAC-5** represents the lowest level risk and is considered **minor**. The correction of these risks can be planned in the out-years of a five-year plan.

Appendix E:
JHA Process Flow Chart

JHA PROCESS FLOW CHART