#### Alaska District Employee Activity Hazard Analysis Briefing

Prepared by the Alaska District Safety and Occupational Health Office Phone (907) 753-2705/2896/5712 *Revised on 1-Nov-*2009



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# Activity Hazard Analysis (AHA)

### AHAs:

Risk Assessment Tool

- Defines the Activity or Work to be Performed
- Identifies Hazards
- Establishes Controls to Reduce the Hazard to an Acceptable Risk Level
- Living Document
  - Changes with Site Conditions or Operations
  - Changes of competent/qualified personnel



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# Contractor Required – AHA (New Format)

#### Activity Hazard Analysis (AHA)

Activity/Work Task: Project Location:			Overall Risk Assessment Code (RAC) (Use highest code) N							
			Risk Assessment Code (RAC) Matrix							
	Carr			F	Probabili	ty				
Date Prepared:		erity	Frequent	Likely	Occasiona	I Seldom	Unlikely			
	Catas	trophic	E	E	н	н	M			
			E	н	н	M	L			
			н	M	M	L	L			
	Neg	igible	M	L	L	L	L			
	Step 1: Review e	ach "Hazard" with	h identified safety '	'Controls" a	nd determine RA	C (See above)				
	"Probability" is t identified as: Free	he likelihood to ca quent, Likely, Occ	use an incident, n asional, Seldom cr	ear miss, or a Unlikely.	ccident and	RAC	Chart			
	"Severity" is the outcome/degree if an incident, near miss, or accident did E = Extr									
			Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for							
	"Hazard" on AHA	JHA.	L = Low Risk	RAC						
				Inspection	on Require	ements	1			
		Sev Catas Catas Cri Mar Neg Step 1: Review "Probability" is the occur and identify Step 2: Identify I "Hazards Training Requirements/Com	Risk A: Severity Catastrophic Critical Marginal Negligible Step 1: Review each "Hazard" with "Probability" is the likelihood to ca identified as: Frequence, Likely, Occ "Severity" is the outcome/degree occur and identified as: Catastroph Step 2: Identify the RAC (Probabil "Rezard" on AHA. Annotate the ov	Risk Assessmen           Severity         Frequent           Catastrophic         E           Critical         E           Marginal         H           Negligible         M           Step 1: Review each "Hazard" with Identified asfey           "Probability" is the likelihood to cause an incident, near occur and Identified as: Catastrophic, Critical, Marginal           "Step 1: Review each "Hazard" with Identified asfey           "Probability" is the likelihood to cause an incident, near occur and Identified as: Catastrophic, Critical, Margina           Step 2: Identify the RAC (Probability/Severity) as E, 1           Hazards         C	Risk Assessment Code           Severity           Frequent         Likely.           Catastrophic         E         E           Critical         E         H           Marginal         H         M           Negligible         M         L           Step 1: Review each "Hazard" with Identified safety "Controls" and "Probability" is the Relihood to cause an incident, near miss, or a identified as: Frequent, Likely, Occasional, Sedom or Unlikely.           "Severity" is the outcome/degree if an incident, near miss, or a cold occur and identified as: Catastrophic, Critical, Marginal, or Negrinal, Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for "Hazard" on AHA. Annotate the overall highest RAC at the top of A           Hazards         Controls	Risk Assessment Code (RAC) Mathematical Severity           Probability           Severity           Catastrophic         E         H           Marginal         H         M           Maginal         H         M           Marginal         M         Colspan="2">Colspan="2"           Marginal          Marginal	Risk Assessment Code (RAC) Matrix           Probability           Severity         Probability           Catastrophic         E         E         H         H           Critical         E         H         H         M           Marginal         H         M         M         L         L           Step 1: Review each "Hazard" with Identified safety "Controls" and determine RAC (See above)         "Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely. Occasional, Seldom or Unlikely.         RAC           "Severity" is the outcome/degree if an incident, near miss, or accident and identified as: Crequent, Likely. Occasional, Seldom or Unlikely.         RAC           "Severity" is the outcome/degree if an incident, near miss, or accident and identified as: Crequent, Likely. Occasional, Seldom or Unlikely.         RAC           "Severity" is the Outcome/degree if an Incident, near miss, or accident and identified as: Crequent, Likely. Cocasional, Seldom or Unlikely.         H= High Riak           Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each H= High Riak         H= High Riak           'Hazard's         Controls         L= Low Risk			

### **Contractor Required - AHA**

COE EM 385-1-1, para 01.A.13.a: AHAs shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.

>COE EM 385-1-1, para 01.A.13.b: Work will not begin until the AHA for the work activity has been accepted by the Government Designated Authority (GDA) and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representative at preparatory and initial control phase meetings.

**COE EM 385-1-1, para 01.A.13.c:** Identify the names of the Competent/Qualified person(s) required for a particular activity as specified by OSHA and EM 385-1-1. (i.e., Excavation, Fall Protection, Scaffolding, etc.)

COE EM 385-1-1, para 01.A.13.d: AHAs shall be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified personnel. \*\*Living document\*\*



# How to Develop Site Specific AHAs Six Step Process

### Step 1:

- Identify: Definable Features of Work
  - Reference
    - Contractor Quality Control Plan
    - Contractor Project Schedule
      - Subcontractors and suppliers working on the project shall also contribute in developing an accurate "Project Schedule".
- Within each "Definable Features of Work" there may be other sub-phases of work required to complete the "Definable Features of Work" such as:
  - Set-up/Demobilization of office trailers
  - Staging of construction materials
  - Demolition of walls, HVAC systems, etc.
  - Asbestos/Lead abatement activities



### **Definable Features of Work**

Examples of "Definable Features of Work" from start to finish

Within each "Definable Features of Work" there may be other subphases of work to complete the "Definable Features of Work"

**Example: Mobilization** 

Sub-phases:

- Placement of project field office
- Utilities tie-in
- Erection of project fencing
- Establishing lay-down areas
- Environmental controls
- Erection of USACE project sign
- Etc.

							April				May					une				
D	Task Name	Start	Finish	3/12	3/19	3/26	4/2	4/9	4/16	4/23	4/30	5/7	5/14	5/21	5/28	6/4	6/11	6/18 6	<u>72</u>	
1	DO 0024	11/1/99	8/21/00																	
2	Drawings	2/21/00	4/14/00		ka yan															
3	Approve Submittals	11/1/99	3/31/00				7													
4	Precon	3/28/00	3/28/00																	
5	Pump delivery	4/3/00	7/21/00				1		and the second					1			A. 13			
6	Pipe/fitting delivery	4/14/00	4/14/00																	
7	Mobilize	4/10/00	4/12/00																	
8	DRAIN PUMP SYSTEM	4/11/00	5/19/00											•						
9	Rem. grating/steel and set up riggin	4/11/00	4/13/00						1.											
10	Rem pump motor and shaft	4/14/00	4/18/00																	
11	Rem pump and piping	4/17/00	4/20/00						H	I										
12	Demo/modify foundation	4/19/00	4/25/00						-											
13	Modify valve operators	4/19/00	4/25/00							ł										
14	Install drain pump	4/27/00	4/28/00								ļ									
15	Modify shaft	5/1/00	5/5/00 5/12/00									Ţ	_							
16 17	Install fittings and valves	5/8/00	5/12/00									杨浩	h.							
18	Testing & alignment	5/15/00	5/19/00											-						
19	SEWAGE PUMP SYSTEM	7/17/00	8/3/00										4							
20	Rem pump and piping	7/17/00	7/19/00	-																
21	Demo/modify foundation	7/20/00	7/24/00	1																
22	Install sewage pump	7/25/00	7/26/00																	
23	Install fittings & valves	7/27/00	7/31/00																	
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25	Painting	8/1/00	8/7/00										-							-
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### **Definable Features of Work**

List "Definable Features of Work" and sub-phases of work on AHAs under "Job Steps:

Example:

Mobilization;

Placement of project field office

**Utilities tie-in** 

**Erection of project fencing** 

**Establishing lay-down areas** 

**Environmental controls** 

**Erection of USACE project sign** 

Activity/Work Task:		Overall Risk Assessment Code (RAC) (Use highest code) No							
Project Location:	Risk Assessment Code (RAC) Matrix								
Contract Number:		Bay			F	robabilit	у		
Date Prepared:		Sev	erity	Frequent	Likely	Occasional	Seldom	Unlikel	
Prepared by (Name/Title):			trophic	E	E	Н	Н	M	
			tical	E	M	H M	M	<u> </u>	
Reviewed by (Name/Title):			igible	<u>M</u>	L	N	L	L L	
Notes: (Field Notes, Review Comments, etc.)				h identified safety		nd determine RAC	_		
				ause an incident, n asional, Seidom or		coident and	RAC	Chart	
		occur and identified	ed as: Catastroph	if an incident, near ic, Critical, Margin	al, or Negligibi	e I	E = Extremely High R H = High Risk		
								derate Risk	
Job Steps	Hazards	"Hazard" on AHA. Annotate the overall highest RAC at the top of AHA. L = Low Risk Controls						RAC	
Equipment to be Used	Training Requireme Qualified Perso			-	Inspectio	on Require	ments		

Activity Hazard Analysis (AHA)



# Hazards

#### Step 2:

- Identify: Recognized or anticipated hazards for each definable and/or sub-phases of work.
  - Ask yourself the following to help identify hazards (not all inclusive):
    - Is there a danger of the employee being struck by something (falling objects, moving equipment, etc.) from above, side, behind or in front?
    - Can the employee slip, trip or fall?
    - Can the employee be caught in or between objects, machinery, collapsing walls, confined space, etc.?
    - Strains or sprains?
    - > Electrical shock?
    - Can the employee fall from same or different levels?
    - Can employee or equipment come into contact with overhead lines or underground utilities?
    - Can employee be exposed to hazardous environments or chemicals?
  - Utilize past experiences, Lessons Learned, After Action Reports, Accident Trends, common sense, etc. to help identify hazards



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### Hazards

List "Hazards" on the AHAs under "Hazards"

Examples of Hazards (not all inclusive): Struck By Struck by Falling Object **Struck Against** Fall on Same Level Fall on Different Level Slipped / Tripped (No fall) **Punctured By** Laceration Caught On **Caught By Caught Between** Lifted, Strained by (Single Action) Contacted by (Object was moving) **Electrical Shock** Impalement Drowning **Oxygen Deficient Atmosphere Exposed To** Stung By **Equipment Failure Equipment Rollover** Fire Cave-In

Activity/Work Task: Project Location:		Overall Risk Assessment Code (RAC) (Use highest code) Nor Risk Assessment Code (RAC) Matrix								
ate Prepared:		Seventy	Frequent	Likely	Occasional	Seldom	Unlikely			
repared by (Name/Title):		Catastrophic	E	E	н	н	M			
in the second		Critical	E	н	н	M	L			
eviewed by (Name/Title):		Marginal	н	M	M	L	L			
otes: (Field Notes, wiew Comments, etc.)		Negligible	M	L	L	L	<u> </u>			
		Step 1: Review each "Hazard" wi	th identified safety	"Controls" a	nd determine RAC	C (See above)				
		"Probability" is the likelihood to c identified as: Frequent, Likely, Oct	ause an incident, n casional, Seldom o	ear miss, or a r Unlikely.	coident and	RAC Chart				
		"Severity" is the outcome/degree occur and identified as: Catastrop	if an incident, near hic, Critical, Margin	miss, or acci al, or Negligit		E = Extremely High Risk H = High Risk				
		Step 2: Identify the RAC (Probabi	M = Moderate Risk							
Job Steps	Hazards	"Hazard" on AHA. Annotate the o			AHA. L	= Low Risk				
Job Steps	Hazards		U	ontrols			RAC			
Equipment to be Used		ements/Competent or ersonnel name(s)	-	Inspecti	on Require	ments				
Equipment to be Used				Inspecti	on Require	ments				

Activity Hazard Analysis (AHA)



# Controls

### Step 3:

- Identify: Site specific control measures to eliminate or reduce each hazard to an acceptable risk level
  - Ask yourself the following (not all inclusive):
    - > How can the working condition or process be changed?
    - > Can the hazard be eliminated with engineering controls?
    - ▷ What type of PPE can we use?
    - > Can the hazard be eliminated with administrative controls?
    - What can the employee do to prevent an accident or eliminate the hazard?
- Utilize past experiences, Lessons Learned, After Action Reports, Accident Trends, common sense, etc. to help formulate control measures.
- GOAL: Reduce Each Hazard to Acceptable Risk Level



# Controls

Job Steps	Hazards	Controls	RAC
Mobilization:			
Project field office placement	Struck by moving equipment	Wear reflective vests. Establish "No Zone" with flagging or barrier tape. Authorized personnel only! Back up alarms. Operators maintain eye contact with spotters at all times.	
Utilities tie-in	Fall from elevated heights	Provide ladder for safe access to roof. Personnel shall wear full body harness with lanyard attached to anchor. Install manufacturer approved anchor point at least 6 ft (1.8 m) from the roof line. 100 percent tie-off at all times.	



# **Competent/Qualified Personnel**

### Step 4:

- Identify: Names of the Competent or Qualified Personnel required for the activity or job step
  - Reference
    - ⊳ EM 385-1-1
    - $\triangleright$  OSHA
  - Proof of competency/qualification shall be submitted to the GDA for acceptance prior to start of work
  - Attach competency/qualification documentation to AHA
  - Examples of Competent/Qualified Personnel
    - ▷ Excavation
    - ▷ Scaffolding
    - ▷ First Aid/CPR
    - Electrical
    - Confined Space



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### **Competent/Qualified Personnel**

- Names of the Competent and/or Qualified Personnel required for the activity or job step
- Reference
  - EM 385-1-1 OSHA
- Attach competency/qualification documentation to AHA

Activity/Work Task:	Overall Risk Assessment Code (RAC) (Use highest code)								
Project Location:	Risk Assessment Code (RAC) Matrix								
Contract Number:		Cours		Probability					
Date Prepared:		Seve	rity	Frequent	Likely.	Occasion	al Seldom	Unlikely	
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Reviewed by (Name/Title):		Margi	nai	н	M	M	L	L	
Reviewed by (Name/Tibe):		Neglig		M	L	L	L	1 L	
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each		th identified safety	"Controls" a	nd datermine R	AC (See above)		
		"Probability" is the identified as: Freque	RAC	Chart					
		"Severity" is the ou	tcome/degree	if an incident, near	miss, or acci		E = Extremely High Ris		
		occur and identified as: Catastrophic, Critical, Marginal, or Negligible					H = High Risk		
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.					M = Moderate Risk			
Job Steps	Hazards	"Hazard" on AHA. A	unnotate the or		ontrols	L = Low Risk	RAC		
						×			
Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)			Inspection Requirements					

Activity Hazard Analysis (AHA)



#### Step 5:

- Identify: Risk Assessment Code (RAC)
- Review each "Hazard" for "Probability" and "Severity" per Risk Assessment Code Matrix chart
  - **Probability:** Likelihood of the hazard to cause an incident, near miss, or accident
    - Frequent Occurs very often, known to happen regularly
    - b Likely Occurs several times, a common occurrence
    - > Occasional Occurs sporadically, but is not uncommon
    - Seldom Remotely possible, could occur at some time
    - > Unlikely Can assume will not occur, but not impossible



#### Step 5 con't:

- Severity: Outcome/degree of the incident, near miss, or accident
  - Catastrophic Death or permanent total disability; Major property damage
  - Critical Permanent partial disability or temporary total disability; Extensive damage to equipment or systems
  - Marginal Lost workdays due to injury or illness; Minor damage to equipment or systems, property, or the environment
  - Negligible First aid or minor medical treatment; Slight equipment or system damage, but fully functional or serviceable; Little or no property or environmental damage



#### Step 5 con't:

- Ask yourself: How often (probability) will this hazard result in an incident, near miss, or accident?
  - For Example:
    - Employee falling from roof or elevated heights (Hazard)
    - Probability: Occasional
- Ask yourself: What will be the outcome or degree (severity) of injury or property damage if the incident, near miss, or accident did occur on site?
  - For Example:
    - ▷ Broken arm or leg with lost time (outcome or degree)
    - Severity: Marginal
- Review "Risk Assessment Code (RAC) Matrix" chart to determine Risk Assessment Code (RAC) as E, H, M, or L
- RAC: M (Moderate Risk)





#### **Probability:** Occasional

- Identify (M) as RAC for the hazard on AHA
- Repeat RAC process for each hazard



Job Steps	Hazards	Controls	RAC
Mobilization: Project field office placement	Struck by moving equipment	Wear reflective vests. Establish "No Zone" with flagging or barrier tape. Authorized personnel only! Back up alarms. Operators maintain eye contact with spotters at all times.	L
	Fall from elevated heights	Provide ladder for safe access to roof. Personnel shall wear full body harness with lanyard attached to anchor. Install manufacture approved anchor point at least 6 ft (1.8 m) from the roof line. 100 percent tie-off at all times.	М

Most RACs will be (M) or (L) after safety controls have been identified, but some RACs may be classified as (H) or (E) after safety controls have been identified. See next slide.



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#### Step 5 con't

- RACs that are E (Extremely High Risk) or H (High Risk) after safety controls
  - Contact QA, PE, or RE to include CEPOA-SO for assistance
  - Potential E or H activities or job steps
    - Contractor diving operations
    - Entry into Permit Required Confined Spaces
    - > Hot Work on or around fuel systems
    - ▷ Critical lift crane ops
  - Review and approval from Construction Chief, AE, E&C Chief, PPMD Chief, AE, SO Chief, DD, or DE (when necessary)



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Job Steps	Hazards	Controls	RAC
Job Steps Mechanical Works Installation of new 200 ton HVAC cooling tower	Hazards Loss of load during crane lift	Controls Develop critical lift plan IAW EM 385-1-1, para 16.H. Submit critical lift plan to GDA for acceptance and review plan with all involved before the lift.	RAC H
		Inspect rigging plan. Detail rigging plan. Verify wind speed prior to lift. Inspect crane prior to use. Load test crane.	

RACs classified as (H) or (E) after identifying safety controls may require additional review and acceptance from Field Office, SO, or Command group leaders. Seek guidance or instruction from GDA before start of work.



# Equipment, Training, and Inspection

#### Step 6:

- Identify: Equipment to be Used, Training Requirements, and Inspection Requirements
  - Reference:
    - ⊳ EM 385-1-1
    - ▷ OSHA 29 CFR 1926
    - Manufacturer Instructions/Recommendations (Operator Manual)
    - Industry Practices
  - Utilize past experiences, Lessons Learned, After Action Reports, Accident Trends, common sense, etc.
  - Communicate with subcontractors, suppliers, etc.



# Equipment, Training, and Inspection

Equipment to be Used	Training Requirements	Inspection Requirement		
Excavator	30 Hour OSHA Construction Safety	SSHO/QC Daily Site Inspections		
Generator	Indoctrination Training	Scaffolding		
Scaffolding (Frame or Tube Clamp?)	First Aid/CPR	Shoring Systems for Excavation		
Full body Harness with Lanyard	Fall Protection	Monthly First Aid Kits		
Portable Toilets	Daily Tool Box Meetings (Alaska)	Fall Protection PPE and Anchors		
5 Ma GFCI	Weekly/Monthly Safety Training	All Heavy Equipment		
Power Cord Sets	Respirator	Power Cord Sets (Daily)		
Crane	Emergency Response Procedures	GFCIs (at least Monthly)		
First Aid Kit	Fire Extinguisher	Grounding (Monthly)		
Safety Shoes	Qualified Crane Operator	First Aid Kits (Monthly)		
Safety Glasses	Qualified Heavy Equipment Operator	Fire Extinguishers (Monthly)		
Hardhat	Qualified Electricians			
Respiratory Protection	Qualified Scaffold Erectors			



## Conclusion

- Construction work is inherently dangerous.
- AHAs are a risk management tool to help identify hazards or risks and formulate controls to reduce the hazard to an acceptable risk level.
- Communicate with subcontractors, suppliers, USACE field office personnel, etc. when developing AHAs.
- AHAs shall be reviewed and modified as necessary to address changing site conditions, operations, or changes of competent/qualifed personnel.
- Contact POA Safety Office for assistance.
- Safety requires a TEAM EFFORT!



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