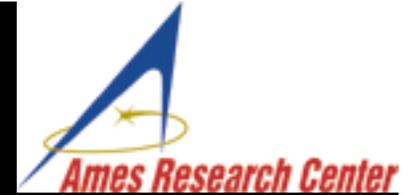
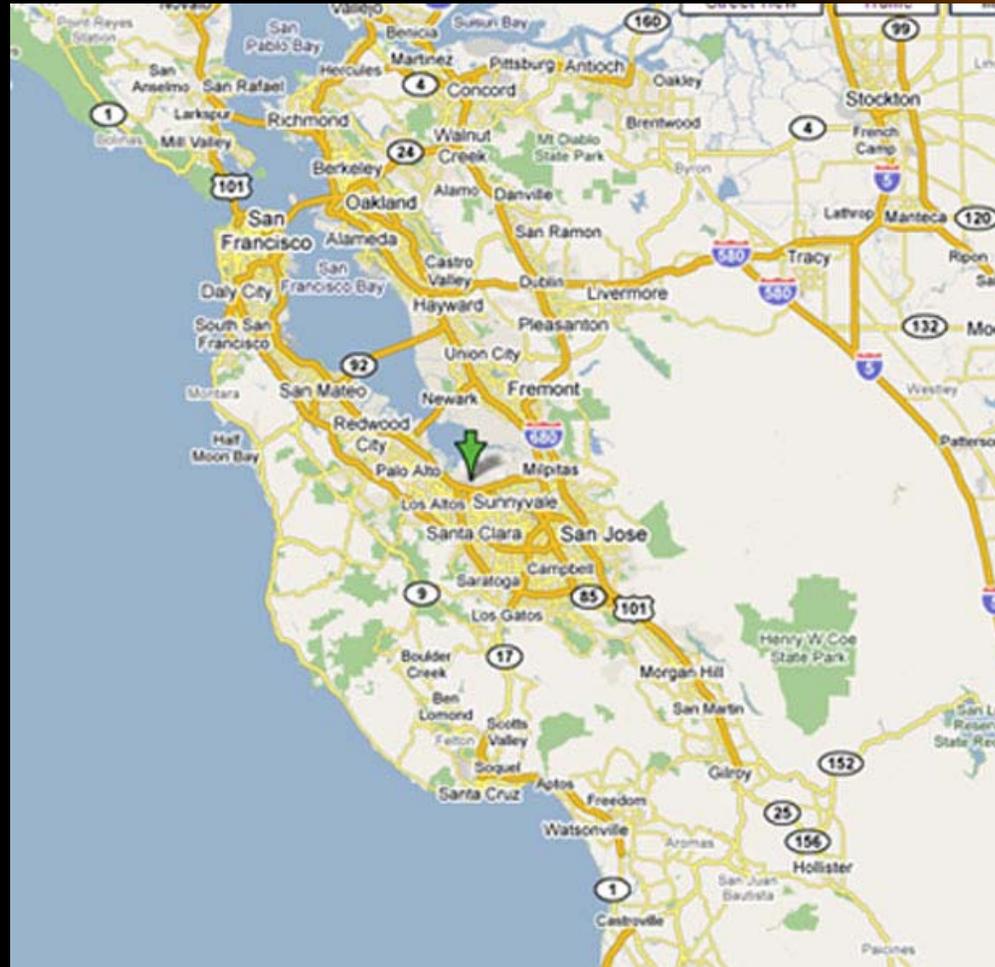


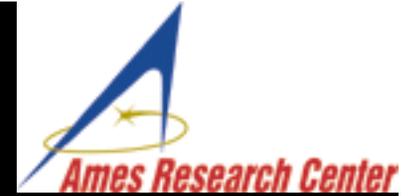
Radiography Operations at NASA Ames Research Center





Where is NASA Ames

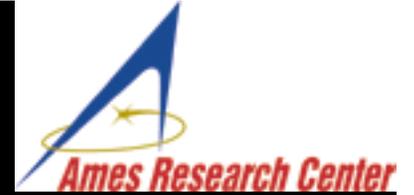




NASA Ames Research Center



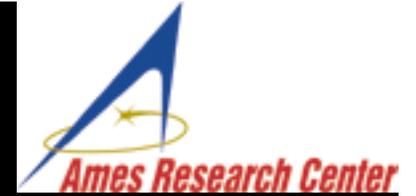
The Main Entrance



NASA Ames Research Center



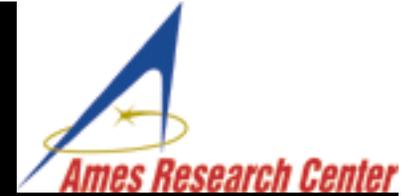
- The worlds biggest wind tunnel 80 x 120ft



NASA Ames Research Center



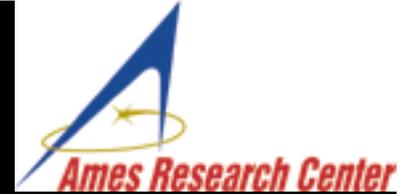
Right outside our office. 80x120ft
wind tunnel in the background



NASA Ames Research Center

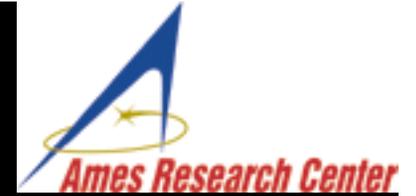


Lunar Science Institute with famous Hanger 1 in background



What we are going to cover

- Why Audit Radiography Operations???
- Common Radiography Violations
- Ames Procedures for Radiography



Why Audit Radiography Operations

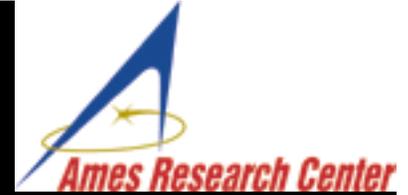




Why Audit Radiography Operations

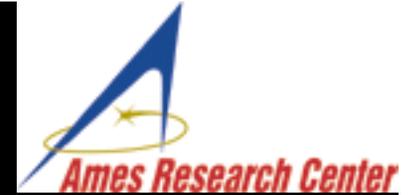
- The sources used are NRC Category 2 Sources which classifies them as a source of concern.
- Exposure to an unshielded radiography source can easily result in a dose at or over NRC limits.
- Companies differ widely as do their radiation safety practices. Some excellent and some inadequate.





Why Audit Radiography Operations

- Radiography is a competitive business, with an emphasis on productivity where safety can get lost in the pursuit of greater productivity.
- Some parties are pushing for radiography customers to be held accountable for radiography violations



Recent Radiography Violations

- **Universal Testing, LLC, UT**
On 2/23/07, a Notice of Violation and Proposed Imposition of Civil Penalty in the amount of \$6,500 was issued for a Severity Level III violation involving the failure to secure from unauthorized removal or access licensed material that was stored in an unrestricted area. Specifically, while transporting a radiography exposure device, a radiographer stopped for about 90 minutes leaving the device unattended and unsecured in the open bed of a pickup truck. Later that evening, the radiographer was involved in a traffic accident, resulting in his arrest and the impoundment of the pickup truck (with the unsecured radiography source in the bed of the truck) by the Wyoming State Police.
- **Alaska Industrial X-Ray, Inc.**
On 10/19/07, an Order Suspending Licensed Activities was issued to Alaska Industrial X-Ray, Inc. (AIX) based on the NRC's determination that all AIX radiographers, including AIX's Radiation Safety Officer, and assistants, violated 10 CFR 34.41(a) by performing industrial radiographic operations at a temporary job site with only one qualified individual present during operations. The evidence the NRC relied on indicates that these activities have occurred on numerous occasions, for a period of up to three years. Because the NRC issued a Notice of Violation on 4/25/01, for a willful violation of 10 CFR 34.41(a) at the same client facility location, serious concerns were raised regarding AIX's willingness to comply with the Commission's requirements and its ability to conduct licensed activities without undue risk to the public's health and safety, resulting in the issuance of this order suspending all radiographic operations authorized by AIX's license.



Recent Radiography Violations

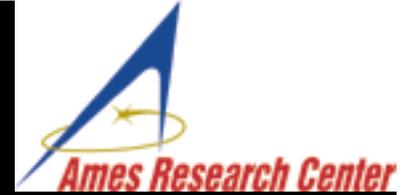
- **Western X-Ray Corporation**

On 2/15/08, a Notice of Violation was issued for two Severity Level III violations. The first violation involved a failure to certify an individual who acted as the radiographer of record while performing industrial radiography. The second violation involved a failure to wear an operating alarm ratemeter by an individual who acted as the radiographer's assistant during radiographic operations. Specifically, on April 23, 2007, the individual acting as the radiographer of record was not certified as a radiographer and the individual acting as the assistant radiographer of record was not wearing an operating ratemeter at all times during radiographic operations, while performing industrial radiography on an offshore platform in federal waters.

- **NDT Services, Inc. PR**

07/16/1996 Failure to retract source to the safety position during radiographic operations.

A Notice of Violation for a Severity Level I violation was issued on 10/17/00, based on multiple failures of two former Radiation Safety Officers (RSOs) to ensure that radiation safety activities were performed in accordance with approved procedures and regulatory requirements.



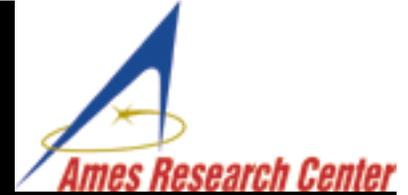
NASA Ames Procedures

Duties of the Construction Contractor

- Review Health & Safety Manual Ch. 7.14 Radiography
- Submit to the Radiation Safety Office for review copies of the Radiography Companies Materials License and Radiation Safety Manual
- Submit Notification of Radiography
- Post Notices of Radiography

Duties of the Health Physicist

- Audit of Radiographers
- Monitor Radiation Boundaries
- File Report documenting the radiography

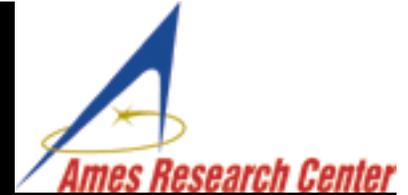


RSO Review of Radiographer

**(only if company has not previously worked
at Ames)**

- Review State or NRC License
- Review Company Radiation Safety Manual
- Evaluate company safety record
- Keep a copy on file in the radiation safety office

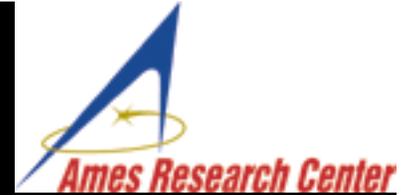




Notification Of Radiography

- Needs to be submitted to the radiation safety office at least 48 hours prior to the intended date of radiography
- Describes affected areas, scope of work radiography company, source, and strength





Notification Of Radiography

NOTIFICATION OF RADIOGRAPHY

WORK LOCATION: _____

RADIOGRAPHIC CONTRACTOR: _____

NASA CONTACT: _____ EXT: _____

DATES, FROM: _____ TO: _____

RADIOISOTOPE/kVp: _____ CURIES: _____

SCOPE OF WORK:

BUILDINGS AFFECTED:

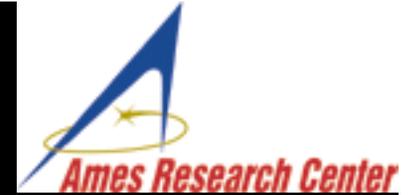
SAFETY PRECAUTION:

- 1) Follow Radiation Safety Program Procedure # AHB 1700-1, Chapter 7
- 2) Perform building walk thru and ensure that affected building(s) is evacuated.
- 3) Post affected component(s) or affected building(s) as a Radiation Area
- 4) Post watchers as necessary.

Additional Controls:

PROJECT COORDINATOR: _____ DATE: _____

RSO APPROVAL: _____ DATE: _____



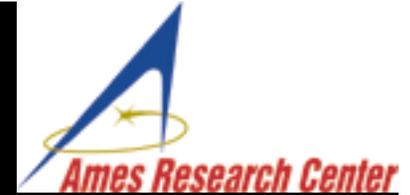
Notification Of Radiography

- Division Managers, Branch Chiefs, contractors, and other managers of any affected facility must be notified by the construction contractor to assure that any disruptions to their operations are understood.
- NASA Ames Security and Fire personnel shall also be notified



Security
Management

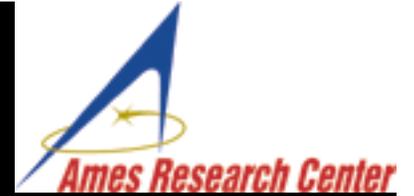




Posting of Notices

- The construction contractor Posts “Notices of Radiation Testing” prior to radiography
- Must be posted at all entrance/exits to affected facilities providing dates, times, and description of the areas that will be affected





Posting of Notices



NOTICE OF RADIATION TESTING

X-RAY EXAMINATIONS WILL BE PERFORMED ON PIPING
ADJACENT TO THIS BUILDING ON THE TIME AND DATE
INDICATED BELOW. DUE TO THE POTENTIAL RADIATION
HAZARD, PERSONNEL EVACUATION OF THIS BUILDING WILL BE
REQUIRED DURING THE TESTING.

AFFECTED BUILDINGS: _____

DATE(S): _____

TIME(S): _____

IF YOU HAVE ANY QUESTIONS, CONTACT: _____

EXT: _____

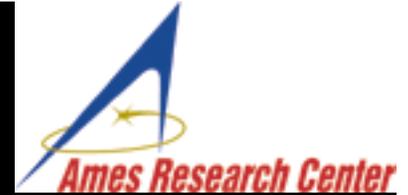
MAP



Health Physics Audit

- An audit of the radiographers is performed by a health physicist prior to commencing radiography operations





Health Physics Audit

Radiography Checklist

(To be completed for each day of radiography)

Date: _____ Time: _____

Radiography Location: _____

Radiography Contractor: _____ Phone: _____

Construction Contractor: _____ Phone: _____

NASA Contact: _____ Phone: _____

License Information

License (Circle One): State w/ Reciprocity NRC

License #: _____ Expiration: _____

Reciprocity Dates Scheduled (state only) From: ____/____/____ To: ____/____/____

Radiography Equipment

Camera Type (circle one): X-ray Gamma Source

Source Element: _____ Source Activity: _____

Approx. # of exposures _____ Approx. duration: _____

Pre-inspection Checks

Yes	No	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Facility Safety Representative Notified
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Entrances to all affected buildings are posted with "Notices of Radiation Testing" signs
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Affected Buildings are clear of people
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Affected area is roped off with radiation barrier rope
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Radiation barrier is sufficient to provide radiation protection that is less than 2 mrem in any one-hour period

Radiographer Equipment Checks

Certified Radiographer: _____

Yes	No	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Certification (JRRSP, ASNT Level II, III)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Self Reading Pocket Dosimeter has current calibration
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Alarming Dosimeter has current calibration
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TLD or film badge
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Survey Meter has current calibration

Radiographer Assistant: _____

Yes	No	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Self Reading Pocket Dosimeter has current calibration
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Alarming Dosimeter has current calibration
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TLD or film badge
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Survey Meter has current calibration

3rd Radiographer (if necessary): _____

Yes	No	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Self Reading Pocket Dosimeter has current calibration
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Alarming Dosimeter has current calibration
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TLD or film badge
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Survey Meter has current calibration

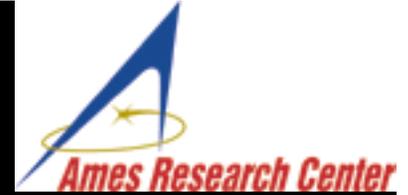
Health Physics Monitor(s)

Name(s): _____ Survey Meter: _____

Notes and comments

Inspector Signature

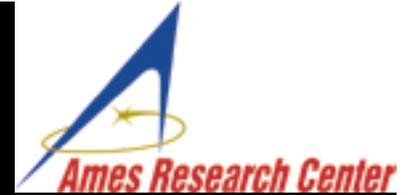
_____ Date: _____



Health Physics Audit

- Health Physics Staff will monitor the radiation exposure at the boundary ropes for a minimum of one source exposure





Health Physics Audit

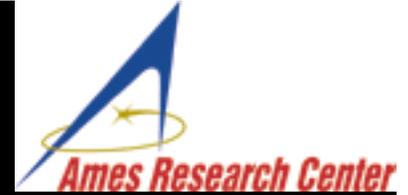
- The Health Physics staff will remain for the duration of the radiography if...
 - The radiographer is new to Ames
 - Nature of the radiography may cause undue risk of exposure to Ames personnel (e.g. high elevation exposures, long exposure times, radiographies conducted during normal working hours
 - Continuous monitoring is deemed necessary to ensure Ames personnel safety for any other reason.



Post Inspection Report

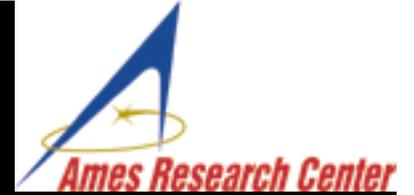
- Following the Inspection the health physicist writes a report documenting the audit of the radiography





Conclusions

- Radiography doesn't happen that often and warrants enough of a concern that auditing is worth while
- Not overly time consuming
- Ensures the Safety of NASA personnel



Questions?

Eric Packard
Health Physicist
Consolidated Safety Services
NASA Ames Research Center
Moffett Field CA, 94035
Eric.D.Packard@nasa.gov
(650) 604-4548