

Draft
ORNL WORK PLAN
Operations, Maintenance and Services
Work Plan Name / Rev: MWP052471 / 0



WORK SCOPE/DESCRIPTION				
Requester (Name/Badge/Division):	Keever, Keith / 00903536 / X108			
Location of work (Bldg/Rm/Other):	3525 / /			
Work Plan Title:	Modify the 3525 Exhaust fan shaft guard/motor covers.			
Description of Service/Work Needed: This work plan will cover the Modification of the shaft guard/motor covers on K-20.				
Charge Number, if required:				
Work Plan Grade/Worktype:	1 / G			
Author (Name/Badge):	Keever, Keith / 00903536			
File Attachments:	Badge	Name	Attachment Desc	File Name
	00903536	Keever, Keith	Photo of K-20 fan	20190502_091737.jpg
	00903536	Keever, Keith	3525-BOPM-125	3525-BOPM-125 Modify Shaft Guards on K-8 K-14 K-18 K-20.pdf
	03045890	West, Rachel	QEA	MWP052471 Modify the 3525 Exhaust fan shaft guard motor covers..pdf
INSTRUCTIONS				
Prerequisites/Precautions:				
Directions:				
Post Work Testing:				
Closeout:				
JOB HAZARD EVALUATION				
HAZARDS	PERMITS / CONTROLS			
Deenergized Hazardous Energy Sources (LTV): Exhaust fans as the covers are being removed.	<ul style="list-style-type: none"> ┆ Perform Simple Lock/Tag/Verify - Work meets all criteria for Simple LTV <ul style="list-style-type: none"> ┆ No potential for stored, residual energy or re-accumulation of energy after shutdown ┆ For a single hazardous energy source that can be: Identified, isolated, and locked ┆ Isolation of single energy source completely de-energizes & deactivates equipment/system ┆ Energy source is isolated and locked out during service/maintenance ┆ Single lockout device will achieve a locked-out condition. ┆ Lockout is under personal control for each staff performing work ┆ Work creates no hazard for other staff ┆ Equipment/system has no known history of unexpected activation or re-energization during maintenance or servicing Otherwise: Perform Complex Lock/Tag/Verify 			
Lead: Possible lead paint	<ul style="list-style-type: none"> ┆ Approved HEPA Vacuum Cleaner: Or wet methods when drilling/sawing through painted metal ┆ Exposure Assessment: Enter or attach justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA), or requirement to conduct quantitative exposure monitoring (QEM) ┆ Paint will be chemically removed from grinding areas 			
Radiological Work	<ul style="list-style-type: none"> ┆ Respond to Abnormal Radiological Conditions and Alarms. Radiological alarms include: Continuous Air Monitor (CAM), Area Radiation Monitor (ARM), Electronic Pocket 			

	Dosimeter (EPD), Personnel Contamination Monitor (PCM).
Welding/burning/hot work: Grinding the welds on the guards.	<ul style="list-style-type: none"> Welding/Burning/Hot Work Permit Exposure Assessment: Enter or attach justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA), or requirement to conduct quantitative exposure monitoring (QEM)
Electrical Equipment and Tools	<ul style="list-style-type: none"> Listed by a nationally recognized testing laboratory (NRTL) Not NRTL listed <ul style="list-style-type: none"> Has Equipment Labels or Have made provision for Electrical Equipment Inspector (EEI) review and Electrical Safety Officer (ESO) approval or Equipment poses no or little hazard (see Exhibit)
Electrical Work	<ul style="list-style-type: none"> Minimum level of electrical worker qualification for the task (i.e. EW, QEW 1, 2, 3, 4, or 5): Specify. QEW 3 Verify and establish limited approach boundary and restricted approach boundary. See Table 1 for AC or Table 2 for DC: Specify. Minimum 42 inch Limited Approach Boundary Shock and Arc-Rated PPE to be used: Specify. Risk Cat 2 PPE for zero energy verification
Manual Material Handling: Tools and equipment	<ul style="list-style-type: none"> Apply Guideline: Assess Hazards Establish Controls (Guideline) [apply 30-50-30 criteria for a non-repetitive lifting task] <ul style="list-style-type: none"> Reduce weight Decrease load Design work area Facilitate access to material Optimum environment Reduce distance /Provide proper storage facilities Load storage Eliminate manual lifting/lowering Eliminate pushing/pulling – Use lifting aids Other instructions to staff Apply hierarchy of controls approach
Noise: Grinder	<ul style="list-style-type: none"> Exposure Assessment: Enter or attach justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA), or requirement to conduct quantitative exposure monitoring (QEM) Hearing protection (plugs or muffs): Selecting Hearing Protection: NRR of 26 or higher Hearing Conservation Program
Unguarded Equipment: Ventilation fans	<ul style="list-style-type: none"> Erect a physical boundary at least 6 feet away from equipment that will be operated without guards in place
Chemical/Rec ID 1: Ultra-Strip Ultimate Paint Removal/D5644	<ul style="list-style-type: none"> Exposure Assessment: Enter or attach justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA), or requirement to conduct quantitative exposure monitoring (QEM): See attached QEA; long sleeves are also required when working with chemical paint stripper. This is a skin hazard. Gloves: Specify. Butyl Rubber Safety glasses
Pinch points and sharp edges.	<ul style="list-style-type: none"> Watch where hands and feet are placed. Wear gloves as

	needed.		
Debris in eyes	i Wear safety approved glasses with side shields.		
DOCUMENTATION REVIEW AUTHORIZATION (Approvals are certification of hazards assessment)			
Reviewer/Approver Roles	Signature	Date	
Accountable Management (Service Provider, Line, Equipment Owner, or Facility Management)	Keeton, Wesley		
Accountable Management (Service Provider, Line, Equipment Owner, or Facility Management)	Woody, Bryan		
IS/IH	Campbell, Dean		
IS/IH	West, Rachel		
Safety Basis Engineer	Bailey, Brian		
System Engineer, Accountable Equipment Owner, or Facility Engineer	Goranflo III, Henry		
Task Leader	Neal, Mark A		
Work Package Concurrence			
Facility Manager			
Operations Supervisor			
Facility Manager Approval To Start Work			
Facility Manager			
Work Start Authorization			
Task Leader			
Work Acknowledged Complete			
Task Leader			
Worker Feedback:			
WORK DETAILS - Prerequisites/Precautions			
Hazards	Permits/Controls	Resources	Dur
1) - Attend a pre-job briefing and sign the attendance sheet.			
		i Task Leader i Millwright i Sheet Metal Worker i Hot Cell Operator	0
2) - Notify the Facility Manager/designee prior to starting work.			
		i Task Leader	0
WORK DETAILS - Directions			
Hazards	Permits/Controls	Resources	Dur
1) - Contact the RCT prior to starting work and survey as needed.			
		i Task Leader i Radiation Control Technician i Millwright i Sheet Metal Worker	0
2) - If the scope of work exceeds this work plan, suspend work and notify Task Leader.			

		<ul style="list-style-type: none"> Millwright Sheet Metal Worker Hot Cell Operator 	0
3) - The Guards for K-20 can be fabricated at the fabrication shop.			
		<ul style="list-style-type: none"> Millwright Sheet Metal Worker 	0
<p>4) - When the guard is ready for installation on K-20.</p> <p>Notify Operations that K-20 will be shut off.</p> <p>Lock Out K20.8-1 disconnect located in MCC #4.</p> <p>Remove the existing guard and install the new guard.</p> <p>Ensure proper fit.</p> <p>This modification is being performed under 3525-BOPM-125.</p> <p>Remove the Lock Out and restore power to the K-20 fan.</p> <p>Notify Operations that the K-20 has been returned to service.</p>			
Deenergized Hazardous Energy Sources (LTV) (K20.8-1 disconnect located in MCC #4)	<ul style="list-style-type: none"> Perform Simple Lock/Tag/Verify - Work meets all criteria for Simple LTV <ul style="list-style-type: none"> No potential for stored, residual energy or re-accumulation of energy after shutdown For a single hazardous energy source that can be: Identified, isolated, and locked Isolation of single energy source completely de-energizes & deactivates equipment/system Energy source is isolated and locked out during service/maintenance Single lockout device will achieve a locked-out condition. Lockout is under personal control for each staff performing work Work creates no hazard for other staff Equipment/system has no known history of unexpected activation or re-energization during maintenance or servicing <p>Otherwise: Perform Complex Lock/Tag/Verify</p>	<ul style="list-style-type: none"> Millwright Sheet Metal Worker Hot Cell Operator 	0
Electrical Work	<ul style="list-style-type: none"> Minimum level of electrical worker qualification for the task (i.e. EW, QEW 1, 2, 3, 4, or 5): Specify. 		

WORK DETAILS - Post Work Testing			
Hazards	Permits/Controls	Resources	Dur
1) - Ensure proper fit on the modified guards.			
		<div><div></div>Millwright</div> <div><div></div>Sheet Metal Worker</div>	0
WORK DETAILS - Closeout			
Hazards	Permits/Controls	Resources	Dur
1) - Ensure that work area is clean and free of hazards prior to leaving work area.			
		<div><div></div>Electrician</div>	0
2) - Attend a post-job briefing and sign the attendance sheet.			
		<div><div></div>Electrician</div> <div><div></div>Task Leader</div>	0

Draft
ORNL WORK PLAN
Operations, Maintenance and Services
Work Plan Name / Rev: MWP052471 / 0



52471

PRE-JOB SAFETY REVIEW GUIDE

ID: 52471

Scope of Work: Review work package/plan to ensure all participants understand the work activity.

Hazards: Review the hazards identified in Job Hazard Evaluation (JHE) / work plan (IOP).

- € Since the work package / plan was written: 1) Have conditions changed? 2) Are there new hazards? Refer to Field Notes and Focus Areas.

Hazard Controls / Permits: Review:

- € Written permits for the work activity.
- € Precautions, step warnings, Hold Points ...
- € Personal Protective Equipment (PPE)

- € Work instructions for information - e.g., steps where hazards are introduced.
- € ORNL subject area requirements - e.g., non-permit hazard controls.

Performing Work:

- € Discuss group/individual responsibilities for safe & effective work.
- € Follow work instructions & safety procedures.
- € Availability/location of materials, tools, etc.
- € Any previous experiences / lessons learned?
- € Response if work cannot be performed as planned.
- € What is the worst thing that could happen?
- € Are there *Potential error traps* with the job? → →
- € Take a minute before: work start & leaving work area.
- € Work Hand-off / Turnover - workers & Task Leader

→ **Potential Error Traps:**

- € Time pressures
- € Distractive environment
- € High workload
- € First time evolution
- € First day back
- € Vague guidance
- € Over confidence
- € Imprecise communications
- € Work stress

Abnormal Situation Response:

- ┆ Stop Work: Observe an unsafe act, activity or condition that creates an imminent danger.
- ┆ Emergency Response: Discuss egress paths or other responses if problems are encountered.

Field Notes and Focus Areas: (Use this area as a work space to record notes related to new hazards identified in the field or changed conditions. Record feedback in work package/plan information systems.)

By signing below, I am indicating that I have been briefed on the potential hazards associated with completing this job.

Signature / Badge	Date	Signature / Badge	Date

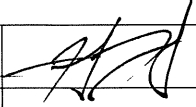
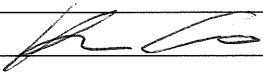
BOP Modification Form

SECTION 1: CHANGE ORIGATION / IDENTIFICATION			
Work Package No.	Facility 3525	Date 8/24/2016	Originator Name / uid H M Goranflo / hmg
Title of Change: Modifications to Fan Shaft Guards/Motor Covers for K-8/K-14/K-18/K-20			
Component / System Building 3525			
<p>Description of Change / Reason for Change (add attachments or redline drawings if needed)</p> <p>As part of the NNFD Predictive Maintenance (PdM) program, vibration data is collected on critical pieces of rotating equipment. The vibration collection procedure consists of a hand-held magnetic-tip accelerometer connected to a hand-held specialized computer running the vibration data software. Typically, the accelerometer is placed on the bearing caps of the fans to collect data in 3 different planes. Because the fan must be operating to collect vibration data, a conflict in personnel safety arises due to the fan shaft guard(s). The guards must be removed to take the data, and while they are not present, a risk to the personnel taking data exists.</p> <p>This BOP modification will install new perforated aluminum fan shaft guards on the K-8, K-18, and K-20 exhaust fans of building 3525. The new design consists of a permanently mounted guard covering the rotating shaft with exposed openings over the inboard and outboard bearings. The new guards will be bolted to the fan bearing pedestal using existing bolt holes.</p> <p>For the K-14 Exhaust Fan, the entire motor/bearing cover will be modified to allow the accelerometer and/or grease gun to be used while fan is operational. Exact details of the mod will be left to the craft performing the work.</p>			
Does this change impact other components/systems <input type="checkbox"/> Yes (list below) <input checked="" type="checkbox"/> No			

SECTION 2: CHANGE DOCUMENTATION LIST existing and/or newly required documents (drawings, specifications, calculations, procedures etc.) N/A <input type="checkbox"/> if change is below documentation threshold.			
Document Number	Document Title	Rev # BEFORE Change	Required for Return to Service
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

ACTS entry made to revise High Priority or Electrical drawings ☐

SECTION 3: APPLICABLE CODES / STANDARDS				
SECTION 4: MODIFICATION EVALUATION				
<p>The guards are fabricated from unpainted aluminum, which should prevent corrosion.</p> <p>The guards are being installed on the K-8, K-14, K-18, and K-20 Exhaust Fans, which are credited as Defense-In-Depth SSCs for ventilation confinement of the building confinement structure. However, the guards are installed strictly for personnel protection and with regard to operation of the fan they are Not Critical to Function. Serving as personnel protection features, the modified guards are equivalent to the OEM guards and will not be any more likely than the originals to fail in such a way as to prevent the exhaust fan from performing its credited function</p>				
SAFETY AND TECHNICAL REVIEWS				
Discipline	N/A	Approval Signature	uid	Date
Facility Safety Basis Engineer OR				

USQD or USQDScreen Number (attach copy) <u>EU500D/3525/16-017</u>			3TB	8/24/16
Independent Design Reviewer				
Informed Training Group to evaluate training needs				
Design Authority (if multiple disciplines involved)				
Additional SME				
Additional SME				
Facility/System Engineer			hmg	8/25/16

Instructions:

General: All signatures should be accompanied by the signers' ORNL user ID (uid). If a uid is not available, the signer's badge number may be substituted.

Section 1, CHANGE ORIGATION / IDENTIFICATION: The Originator shall complete Section 1 and submit the BOP Modification Form (BOPM) to the System /Facility Engineer.

Description of Change: Describe the Change in enough detail to identify what components are being modified and the scope of the modification.

Impact: If the can change impacts other components or systems, check yes and list describe the impact.

Section 2, CHANGE DOCUMENTATION: The System /Facility Engineer lists all output documents that will be changed as a result of this modification including drawings, NCR's, procedures, etc. The "Rev # Before Change" column should be completed with the document/drawing revision number current when the modification begins.

If the change does not alter any existing documents, check N/A.

Those documents which are required to be completed in order for the item to be retuned to service shall have the "Required for Return to Service" box checked.

High Priority or electrical drawings shall be revised per NNFD-002, and an associated action shall be entered in ACTS.

Section 3, APPLICABLE CODES AND STANDARDS: The Facility/ System Engineer should complete this section. SBMS Area, Creating Engineering Designs, contains an exhibit: Design Codes and Standards, which includes the engineering design standards applicable at ORNL. Designs must incorporate engineering hazard controls to alleviate potential workplace hazards where feasible and appropriate. If a hazard is identified which cannot be alleviated through one of the codes/standards listed in the Work Smart Standard (WSS), a request should be made to add the code/standard to the WSS.

Section 4, MODIFICATION EVALUATION: The Facility/System Engineer should complete this section using a graded approach commiserate with the complexity and scope of the change. Information entered in Section 1 – Description of Change does not have to be repeated in this section. This section may include the following:

Modification Background / Description / Reason / Type: Describe the problem and the events leading to the change and include a description of how the system, equipment, or component operated before the proposed modification.

Design Basis & Functional Requirements / Justification: Describe the specific functions to be performed by the item affected by the design modification and the specific values or range of values that bound the design (e.g., pressure, temperature, flow, voltage input, voltage output, etc.). Provide explanation, analysis or calculation on why the proposed modification is within the boundaries of the cited design requirements.

Acceptance Criteria & Testing Requirements: Enter Acceptance Criteria/Testing Requirements that ensures the modification functions as expected.

Controls Required During Modifications: Describe any controls, (i.e. compensatory measures, TSR mode restrictions) required to be in place while this modifications is being installed and normal equipment may be out of service.

SAFETY AND TECHNICAL REVIEWS: The System/Facility Engineer initially determines which reviews are required by checking or initialing the "N/A" column for those reviews not required. In addition to the applicable System Engineer, review from the Design Authority is required if multiple engineering disciplines are involved. In this case, the Design Authority shall ensure all appropriate engineering input is obtained, and may list addition engineers for review. After the System/Facility Engineer has determined review applicability the BOPM form should be routed to all reviewers for approval and signature. After approvals, route the BOPM form to the Facility/System Engineer for final approval.

The approved BOPM form shall be included with the Maintenance Work Package

EXPERT UNREVIEWED SAFETY QUESTION DETERMINATION (USQD) WORKSHEET

COPY

Part I – Introduction

1. EUSQD Number: EUSQD/3525/16-017

Revision Number: 0

Facility/Activity: Building 3525

2. Subject of evaluation: Revision 1 of NNFD-3525-MP-600, *Loop Cask Inspection, Testing, and Maintenance*

3. Description of the change:

This USQD evaluates issuing Revision 1 (Rev. 1) of NNFD-3525-MP-600, *Loop Cask Inspection, Testing, and Maintenance*. The procedure provides instructions for performing Loop Cask pre-load inspection, pressure decay testing, post-load inspection, and maintenance. The changes made as part of Rev. 1 of the procedure are detailed below:

Section/ Step	Description of Change
All	Updated format and content per NNFD-001 and NNFD-DC-775. Revision bars not included for these changes.
1.2	Added “Annual Inspection and Preventive Maintenance” and added primary user statement.
2	Added 2.1 and 2.8. Revised 2.2 due to NNFD re-organization.
4	Added Step 4.1. Added title of NNFD-3525-OP-101 in Step 4.4. Added Step 4.4.1. Added Step 4.5. Split Step 4.4 from previous revision into Steps 4.6 – 4.8 and added requirement to record information on Appendix B.
5.1	Deleted note prior to Section 5.1. Corrected Appendix B title in Step 5.1.1. Deleted “Operations” in Step 5.1.2.5.
5.2	Corrected Appendix B title in Note and Step 5.2.1.
5.3	Revised steps to correct errors in the bolts and nuts referenced to secure the plug end sleeve and top hat subassembly in Steps 5.3.5.3 – 5.3.4.4.6. Deleted “Operations” in Steps 5.3.5.3 and 5.3.6.1.
5.4	Deleted “Operations” in Step 5.4.10.
5.5	Revised steps to correct errors in the bolts and nuts referenced to secure the plug end sleeve and top hat subassembly in Steps 5.5.1, 5.5.2, and 5.5.11-5.5.17. Deleted “Operations” in Step 5.5.9.
5.6	Added new Section 5.6.
6.1	Corrected title of NNFD-001. Added NNFD-DC-775.
6.2	Corrected title of NNFD-003. Added NNFD-018, NNFD-3525-OP-101, N3E020566A284, and SBMS Subject Area, <i>Suspect/Counterfeit Items and Defective Items</i> .
7	Corrected title of NNFD-003 and Appendix B. Added Appendix D.
8	Corrected title of Appendix B. Added Appendix D and Appendix E.
App B	Corrected step format per NNFD-DC-775. Changed “Operations Supervisor” to Supervisor” throughout.
App C	Updated Loop Cask Illustrations per the current approved drawings. Revision bars not included for these changes.
App D	Added new Appendix D for the Loop Cask Annual Inspection.
App E	Added new appendix for the Job Hazard Evaluation.

DSA Change?

☐ Yes ☒ No

4. Primary safety basis documents:

- 1) ORNL/3525/SAR, Rev. 5, *Safety Analysis Report Irradiated Fuels Examination Laboratory Building 3525*
- 2) ORNL/3525/SAR, Rev. 6A, *Safety Analysis Report Irradiated Fuels Examination Laboratory Building 3525* (submitted but not approved)
- 3) ORNL/3525/SAR, Rev. 7, *Safety Analysis Report Irradiated Fuels Examination Laboratory Building 3525* (submitted but not approved)

EXPERT UNREVIEWED SAFETY QUESTION DETERMINATION (USQD) WORKSHEET

not approved)

- 4) ORNL/3525/TSR, Rev. 8A, *Technical Safety Requirements Irradiated Fuels Examination Laboratory Building 3525*
- 5) ORNL/3525/TSR, Rev. 9B, *Technical Safety Requirements Irradiated Fuels Examination Laboratory Building 3525* (submitted but not approved)
- 6) ORNL/3525/TSR, Rev. 10, *Technical Safety Requirements Irradiated Fuels Examination Laboratory Building 3525* (submitted but not approved)
- 7) ORNL/NNFD/SSAR, Rev. 12, *Oak Ridge National Laboratory Standardized Safety Analysis Report*
- 8) ORNL/NNFD/SSAR, Rev. 13, *Oak Ridge National Laboratory Standardized Safety Analysis Report* (submitted but not approved)

Part II – Expert Determination

1. Relative to the documented safety analysis (DSA), is it readily apparent, based on expert knowledge, training, and experience, that the proposed change **does not**:

- a. Increase the probability or consequences of an accident described in the DSA?
- b. Directly or indirectly increase the probability of failure or consequences of a malfunction of equipment important to safety described in the DSA?
- c. Create the possibility of an accident of a different type than previously evaluated in the DSA?
- d. Create the possibility of a malfunction of equipment important to safety of a different type than previously considered in the DSA?
- e. Decrease a Margin of Safety?

☒ Yes ☐ No

2. If the conclusion is Yes, provide a brief rationale why the change is not a USQ. Otherwise, prepare a standard USQD.

Rev.1 of the MP-600 procedure makes many changes to the document. However, these changes can be categorized into a few categories. The list of tasks performed by the procedure user was amended. Many of the changes correct or update the titles of referenced documents or procedure sections. The list of performance documents listed in Section 6.2 was revised. Drawings were updated. Other changes are editorial which involve the format of the procedure. Previous steps were split into numerous steps for clarity. Requirements for recording information in Appendix B were added. Some notes on procedural steps were deleted. Words in steps were deleted for clarity. A primary user statement was added. These are “non-intent” changes and do not require further evaluation.

Other changes stem from the recent re-organization of the Nonreactor Nuclear Facilities Division (NNFD). Certain position titles were changed, added, or dropped as needed. These changes do not alter the responsibility or functionality of the group or position but merely changes the title assigned to those duties. All of these changes are considered “administrative” changes and do not require further evaluation.

New Step 2.1 was added which notes that the procedure is a “routine checklist”. This merely categorizes the procedure as an “in-hand” document during performance of the procedural activities. This is an administrative change.

New Step 2.8 was added which includes a reference to new Appendix D, *Job Hazard Evaluation*. Again, this is an administrative change to meet content stipulations from other NNFD procedures.

New Step 4.1 was added instructing the user to coordinate the completion of a liquid penetrant inspection if the annual inspection and preventive maintenance is being completed. This is an administrative reminder to save resources and effort and does not impact the intent of the procedure.

Step 4.4.1 was added to remind the user to obtain copies of applicable appendices of NNFD-3525-OP-101 if used. Step 4.4 was added to remind the user to conduct a pre-job brief per NNFD-018. Again, these are administrative changes that do not require

EXPERT UNREVIEWED SAFETY QUESTION DETERMINATION (USQD) WORKSHEET

further evaluation.

Some steps were revised to correct errors in the bolts and nuts referenced. A drawing in Appendix C was updated per the current approved drawing. These are editorial changes and do not require further evaluation.

A new section, Section 5.6, *Annual Inspection and Preventive Maintenance*, was added as part of the revision. This section addresses the annual inspection of the Loop cask. The steps involve establishing a work area, performing a radiological survey, maintaining a 36" egress perimeter around the cask, moving the Loop cask per NNFD-3525-OP-101, and completing and documenting a visual inspection. While these activities are new to the procedure, they are activities already identified, evaluated, and performed in the facility. Likewise, the equipment used to complete these Section 5.6 tasks are also already included in the current SAR.

Appendix D, *Loop Cask Annual Inspection*, and Appendix E, *Job Hazard Evaluation*, were added to meet the content requirements for NNFD procedures specified in other documents. This is an administrative change and does not require further evaluation.

Conclusion

There are no changes to the type, form, or quantity of hazardous materials or energy sources evaluated in the current safety basis associated with this change. There are no changes to preventive controls, material airborne source terms, material release paths, mitigative controls, or safety related equipment associated with this change. The underlying safety management programs (SMPs) are not affected by the change. The change does not affect proposed accident scenarios. No new accidents will result from the implemented changes. There are no changes to existing accident frequencies, consequences, or potential equipment failure modes, and no new types of accidents are possible. All proposed hazards are bounded by events already evaluated in the current SAR. As a result, there is no adverse impact on safety due to this change.

Part III – Conclusion and Approval

Based on this determination, the proposed change does Not represent a USQ.



Brian Bailey
Expert USQD Preparer

Aug 26, 2016
Date



David Clark
Bethel Valley Nuclear Facility Manager

8/26/16
Date

Qualitative Exposure Assessment – Multiple Hazard Form

Project Information

☐ No QEA is required based upon a review of the type(s) of hazard(s) associated with the activity/task

☐ QEA could not be conducted at the time the RSS/Work Plan was reviewed/approved due to inadequate information provided by the PI, Work Planner/Package author on some or all agent(s)/hazard(s). List the agent(s) for which a QEA could not be conducted: ☐ All Agents (see below) ☐ Specific Agent(s) that could not be assessed: . Discuss controls incorporated into *Work Control* to assure EA is conducted in the future:

Process/Job/Task:

(SEG/SET Name) Modify the 3525 Exhaust fan shaft guard/motor covers.

Work Description:

This work plan will cover the Modification of the shaft guard/motor covers on K-20.

Facility #:

3525

Organization:

NNFD

Room/Lab/Shop #:

K-20 Fan System

RSS/Work Plan #:

MWP052471

Agents and Control Information

	Process/Job/Task	Rec ID	Agent	Quantity or Magnitude	¹ Potential Routes of Entry	Primary Exposure Forms	Frequency of Exposure	Duration of Exposure per Exposure Event	² Engineering and Administrative Controls	*OEL	Health Severity Rating 1-4	Exposure Rating 1-4	Certainty Rating 1-3	³ QEA Rating 1-24	⁴ Exposure Decision
1	Lead Paint Removal using Back To Nature Ultra Strip Ultimate Paint Remover	D5644	Formic Acid, 2%	<12 oz.	Inh, Ing, S	Liquid	Variable	1/2 - 2 hours	T, P, GV	5 ppm, 10 ppm STEL	3	2	1	5	Acceptable (2 - 7)
2	Grinding metal	N/A	Noise	~ 106 dBA	Other	Other	Variable	1/2 - 2 hours	T, P, MS	85 dBA	4	4	1	8	Uncertain (8-15)
3	Grinding metal	N/A	Metal particulates	Limited	Inh, Ing	Particulate	Variable	1/2 - 2 hours	GV, T, P	Varies	3	2	1	5	Acceptable (2 - 7)
4	Removal of lead-based paint	N/A	Lead	Limited	Inh, Ing	Particulate	Variable	< 1/2 hour	GV, T, P, W, HEPA	0.05 mg/m3	4	2	1	6	Acceptable (2 - 7)
5	Kneeling and bending	N/A	Ergonomics	Unknown	Other	Other	Variable	< 1/2 hour	T, P	N/A	3	2	1	5	Acceptable (2 - 7)
6	Prolonged use of power tools	N/A	Ergonomics	Unknown	Other	Other	Variable	Variable	T, P	N/A	3	2	1	5	Acceptable (2 - 7)
7	Handling of tools and equipment	N/A	Manual Material Handling	Unknown	Other	Other	Variable	Variable	T, P	N/A	3	2	1	5	Acceptable (2 - 7)
8															
9															
10															

1. Routes of entry codes: Inh – Inhalation, P – Penetration, Ing – Ingestion, S – Splash; A – Absorption **2. Engineering Control codes:** GB – Glovebox, GV – General Ventilation, Hood – Other LEV Hood, I/E – Isolate or Enclose Hazard, LH - Lab Hood S – Shielding, W – Wet Methods; **Administrative Control Codes:** T –Training, L/P – Labeling or Postings, P – Written procedure/plan; LT – Limited Stay Time; W/R – Modified Work/Rest Cycle, BEI – Biological Monitoring, MS – Medical Surveillance; **3. QEA Rating = (Health Severity Rating + Exposure Rating) x Certainty Rating;** **4. Exposure Decision:** Acceptable (2-7), Uncertain (8-15), Unacceptable (16-24) * Optional field

Exposure Decision and Follow-up

Acceptable Exposure (LOW RISK)		Uncertain and Unacceptable Exposures			
Was Agent Hazard Acceptable (Low Risk)?	If yes, describe justification for classification as acceptable	Follow-up Priority	Follow-up Schedule	Is Quantitative Monitoring Required?	Recommendations/Comments
1 YES	Hazardous constituent (Formic Acid) is present at low concentration. SDS indicates chemical has very slow evaporation rate and exposure via inhalation is unlikely. Material is corrosive to skin; workers will apply over a small area at a time, and will wear butyl rubber or neoprene gloves during use. Company issued long sleeve clothing is also required.			NO	
2 NO				NO	Use hearing protection with a noise reduction rating (NRR) of at least 28 dB. Double hearing protection must be utilized if grinding for more than 30 minutes in an 8 hour day. IH monitoring is not "required" but it is recommended to obtain data that will be useful when planning similar work in the future.
3 YES	Limited grinding is expected to be performed. If performed, all paint will be removed at lest 3 inches from area to be grinded and all grinding will be outdoors.				
4 YES	Lead-base paint will be removed using a chemical stripper or using wet method of manual scrapping.				

Qualitative Exposure Assessment – Multiple Hazard Form

		Wet methods and/or a HEPA vacuum will be used during clean-up.				
5	YES	Workers may be required to kneel during work; kneepads or foam padding will be used when kneeling.	_____	_____	____	
6	YES	Antivibration gloves are recommended when workers are required to use power tools (grinders, sawzalls) for prolonged periods (>1 hour). Workers are encouraged to rest if numbness or tingling sensation is experienced.	_____	_____	____	
7	YES	Incidental non-repetitive lifting of tools and equipment. Workers will apply 30-50-30 guidelines and employ team lifting techniques for lifts >50lbs.	_____	_____	____	
8	_____		_____	_____	____	
9	_____		_____	_____	____	
10	_____		_____	_____	____	

Qualified H&S Professional:

Rachel West

Date:

5/22/2019

Qualitative Exposure Assessment – Multiple Hazard Form

QEA Rating Tables

Table 1: Health Severity Rating

Rating		Criteria
HSR		Effects from Over Exposure
1	Negligible	Negligible or reversible effects of little concern Note: This applies to chemical agents classified as a *Relatively Harmless Hazard.
2	Minor	Minor or reversible health concern Note: This applies to chemical agents classified as a *Slight Health Hazard. Examples for using this rating for physical agents include: heat fatigue, discomfort from repetitive stress tasks, minor skin burn not requiring medical treatment, etc.
3	Medium	Medium to severe, reversible health concern. Note: This applies to chemical agents classified as a *Moderate Health Hazard. Examples for using this rating for physical agents includes temporary threshold shift in hearing, heat exhaustion, reversible repetitive stress disorders requiring medical intervention, temporary or transient sight impairment, minor skin burns (UV or IR) requiring medical treatment, etc.
4	Major	Major or irreversible health concern. Includes unknown health effects Note: This applies to chemical agents classified as a *High Health Hazard or *Extreme Health Hazard. Examples for using this rating for physical agents include: standard threshold shift in hearing, heat stroke, permanent peripheral nerve or tendon damage, ruptured disc, permanent (total or partial) loss of sight, formation of cataracts, neurological effects, sterility, etc.

*From the [Hazard Classification Guide](#), Appendix C, of ORNL Chemical Hygiene Plan

Table 2: Exposure Rating

Rating		Criteria
1	Negligible/Remote	<ul style="list-style-type: none">• Little to no exceedance of 10% of the OEL (i.e., 95th percentile exposure estimate is virtually always less than 10% of the OEL)• No signs or symptoms of exposure• There is sufficient quantitative exposure data to judge exposure• Very little skin contact with Agent is expected• Engineering and administrative controls are in place and functioning• Only diluted chemicals are used in the process• Very low intensity of energy source• Short exposure duration• The phase of the chemical does not allow for route of exposure
2	Low/Occasional	<ul style="list-style-type: none">• Exposure >5% exceedance of 10% of the OEL (i.e., 95th percentile exposure estimate lies between 10% of the OEL and 50% of the OEL)• No specific signs or symptoms of exposure• Qualitative monitoring indicates insignificant levels of hazard• Only incidental skin contact with Agent• There is exposure potential• Engineering and administrative controls are available but effectiveness is questionable
3	Medium/Probable	<ul style="list-style-type: none">• Exposure >5% exceedance of 50% of the OEL (i.e., 95th percentile exposure estimate lies between 50% the OEL and the OEL)• Air concentrations may exceed established action levels• Routine skin contact with chemical is expected
4	High/Likely	<ul style="list-style-type: none">• Exposure >5% exceedance of the OEL (i.e., 95th percentile exposure estimate > OEL)• Signs and symptoms are evident• High generation of airborne particles or vapors

Table 3: Certainty Rating

Rating		Criteria
1	Certain	The environmental agent’s exposure profile and health effects are well-understood. The industrial hygienist has high confidence in the acceptability judgment.
2	Uncertain	There is enough information to make a judgment, but further information gathering is warranted to verify the exposure assessment.
3	Highly Uncertain	The acceptability judgment was made in the absence of significant information on the exposure profile and/or health effects.

Qualitative Exposure Rating

QEA Rating = (Health Severity Rating + Exposure Rating) X Certainty Rating