Changes “Other Than Inconsequential” Require These Additional Reviews:

Radiological Controls:
Lee Livesey’s Organization

USQ # GCX-2

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<th>Rev-Mod</th>
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<td>H-7</td>
<td>02/13/2018</td>
<td>Inconsequential change</td>
<td>Inconsequential change to title of TFC-OPS-OPER-C-24 to &quot;Occurrence Reporting&quot; (Step 3.4.2).</td>
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<td>H-6</td>
<td>01/24/2018</td>
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<td>Deletion of duplicate page on the Duty Card</td>
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<td>H-5</td>
<td>01/23/2018</td>
<td>Operations Request</td>
<td>Page 4, Step 3.2.6 - Remove &quot;or verify parameters&quot; from the end of the paragraph. Page 5 - Add step 3.2.16 IF Vessel Vent is in Operation AND 242-A Evaporator in in SHUTDOWN MODE; EXIT TF-AOP-EVAP-004. Page 5 - Add stet 3.2.16.1 RESTRICT Access to Condenser room Except for Environmental Surveillances per RPP-16922 and Radiological Surveys as needed. Page 6 - Delete steps 3.3.1 and 3.3.4 in their entirety and renumber the remaining steps. Page 6, Current step 3.3.8 to be renumbered to 3.3.6 - Add, &quot;IF Required,&quot; to the front of the paragraph. Page 7 - Add step 4.1.2 Vessel Vent is in Operation AND 242-A Evaporator is in SHUTDOWN MODE; EXIT TF-AOP-EVAP-004. Page 9 - Delete &quot;MONITOR the running K1 exhaust fan&quot; block from the flow chart.</td>
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<td>H-4</td>
<td>01/22/2018</td>
<td>Operations Request</td>
<td>Modified NOTE in Section 3.1 in AOP/ERP to one consistent statement. &quot;Steps in this procedure may be performed simultaneously or in any logical order, depending on situational needs.&quot;</td>
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<td>H-3</td>
<td>12/07/2017</td>
<td>Operations Request</td>
<td>Added Step 3.2.3 and 3.2.12 to address recording step completion.</td>
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1.0 AFFECTED PERSONNEL, FACILITIES, EQUIPMENT, OR AREAS

This procedure applies to WRPS personnel operating the 242-A Evaporator K1 ventilation exhaust system and components in both modes.

NOTE - Abnormal Operating Procedures are not designed for, nor intended to be applied to, "expected" alarms generated by approved work activities or procedures.

2.0 ENTRY CONDITIONS

NOTE - As a result of field configuration changes K1-5-2 is no longer the K1 ventilation system “backup exhaust fan”. Instead both K1-5-2 and K1-5-3 are alternately operated as the system’s primary exhaust fan with the fan not in operation as the system “stand-by” exhaust fan.

2.1.1 Control Room Operator receives indication of unanticipated loss of 242-A Evaporator K1 ventilation system due to any of the following causes:
   • High beta/gamma radiation in the building exhaust, the initial alarm received in the 242-A Control Room signifying a loss of the K1 ventilation system will be RSH-1 HI RAD ALARM [G22, F44].
   • Low differential pressure across all “SIX” operating HEPA filters:
     • PDIT-K1-307 HEPA FILTER 1 DP K1-6-3 (G22, 43/2)
     • PDIT-K1-308 HEPA FILTER 2 DP K1-6-6 (G22, 43/3)
     • PDIT-K1-310 HEPA FILTER 1 DP K1-6-2 (G22, 43/4)
     • PDIT-K1-311 HEPA FILTER 2 DP K1-6-5 (G22, 43/5)
     • PDIT-K1-313 HEPA FILTER 1 DP K1-6-1 (G22, 43/6)
     • PDIT-K1-314 HEPA FILTER 2 DP K1-6-4 (G22, 43/7)
   • Loss of the K1 primary exhaust fan causes decreasing K1 building exhaust stack flow (G22, F43) displaying either YS-K1-5-2 OFF (in yellow) or YS-K1-5-3 OFF (in yellow). This may activate the exhaust stack's low flow alarm.

2.1.2 VCS HMI indicates loss of 242-A K1 Ventilation System due to:
   • PDAL-K1-304 (High Pump Room Pressure (Low Vacuum))
   • FAL-K1-1 (K1 System Low Exhaust Flow).
3.0 ACTIONS

NOTE - This is a guide to assist the operator and Shift Manager in placing the facility in a safe configuration.

- Steps in this procedure may be performed simultaneously or in any logical order, depending on situational needs.

- The attached Duty Card is to be completed by the A-1 operator. Since not all procedural steps are included in the Duty Card, the Shift Manager will ensure that all procedural steps are reviewed and the necessary steps are performed.

3.1 Automatic Actions

3.1.1 If 2,000 cpm or higher beta-gamma is detected, relay K-K1-1 shuts down the operating exhaust fan (either K1-5-2 or K1-5-3) and prevents the stand-by exhaust fan from starting.

3.2 Immediate Actions

NOTE - Personnel protective actions are the first actions taken during any emergency.

Shift Manager/BED Actions

3.2.1 IF K1 system failure is due to exhaust stack High Beta-Gamma alarm, EXIT this procedure AND

GO TO alarm response procedure ARP-T-601-022.

3.2.2 IF K1 system failure is due to multiple High Beta-Gamma alarms, EXIT this procedure AND

GO TO emergency response procedure TF-ERP-EVAP-005.

3.2.3 WHEN performing Step 3.2.4, WRITE time of step completion on the laminated Duty Card AND

RECORD time of step completion in the A-1 or Shift Manager logbook.

3.2.4 IF continuing in this procedure, ENSURE Control Room operator starts required actions listed on Attachment 1 duty card.
3.2 Immediate Actions (Cont.)

NOTE - The Control Room Operator usually restricts access by stationing someone at the entrance airlock between personal areas and the Survey Room.

3.2.5 ENSURE all personnel evacuate from the following areas:
- Loadout Room
- Pump Room
- Hot Equipment Room
- Evaporator Room
- Condenser Room
- AMU Room
- HVAC Room
- Survey Room.

3.2.6 ONCE all personnel have been evacuated from those areas listed in Step 3.2.5 above, RESTRICT access to these areas to only essential personnel responding to alarms.

3.2.7 ENSURE all doors to contaminated areas are shut.

3.2.7.1 IF K2-5-1 supply fan is not operating, ENSURE doors to contaminated areas are taped shut to prevent air passage.

3.2.8 IF K1 and K2 ventilation systems are both shutdown, DIRECT all non-essential personnel to a holding area assigned by the Shift Manager/OE inside the facility until they can be surveyed and released to the designated staging area.

3.2.9 HPTs PERFORM the following:

3.2.9.1 ENSURE airborne radioactivity monitoring equipment is (Continuous Air Monitor [CAM] at vessel vent) operating and taking air samples.

3.2.9.2 ASSIST with personnel contamination surveys.

3.2.9.3 INSTALL temporary airborne radioactivity monitoring equipment.
3.2 Immediate Actions (Cont.)

3.2.10 **AFTER** non-essential personnel have been surveyed **IF** K1 and K2 ventilation systems are both shutdown **PERFORM** one of the following:

3.2.10.1 **IF** event conditions dictate, **EVACUATE** non-essential personnel to designated staging area(s) per TF-ERP-001 keeping any personnel who have been contaminated separated from non-contaminated personnel.

A **CONTACT** Radiological Control management to initiate additional surveys while the K1 system is down.

**Operator Actions**

3.2.11 **WHEN** performing Step 3.2.4, **WRITE** time of step completion on the laminated Duty Card AND **RECORD** time of step completion in the A-1 or Shift Manager logbook.

3.2.12 **PERFORM** Attachment 1 duty card.

3.2.13 **NOTIFY** Shift Manager of ventilation outage.

3.2.14 **IF** K1 ventilation system (normal and stand-by) cannot be returned to service, **SHUT DOWN** process operations per TO-600-060.

3.2.15 **IF** Vessel Vent is operating **AND** 242-A Evaporator is in SHUTDOWN MODE, **RESTRICT** access to condenser room except for Environmental surveillances per RPP-16922, Radiological Surveys, and any other activities authorized by the Shift Manager.
3.3 Follow-on Actions

3.3.1 CONDUCT surveys AND REPORT results.

3.3.2 ENSURE areas remain properly posted for any change in conditions.

3.3.3 WHEN K2-5-1 supply fan is operating and no radiation alarms are active in the AMU, HVAC, and Survey Rooms, ALLOW non-essential personnel to return to the facility.

3.3.4 IF K1 ventilation system is not returned to service and the facility is in OPERATE MODE AND AS directed by Shift Manager, INITIATE shutdown of Evaporator process operations per TO-600-060.

3.3.5 WHEN failure of K1 ventilation system is resolved, RETURN K1 ventilation systems to normal operations in accordance with TO-620-020.

3.3.6 IF required, REMOVE tape from doors and entrances.
Response to 242-A Evaporator Loss of K1 Ventilation System

3.4 Administrative Actions

NOTE - Actual steps taken for restoration are dependent on specific situation and facility configuration at the time of event. The following steps are general guidance and may be performed concurrently, in any order or omitted at discretion of Shift Manager to fit situation.

3.4.1 ENSURE that the CSM is notified of AOP entry AND REQUEST CSM to make notifications per TFC-OPS-OPER-C-57.

3.4.2 EVALUATE conditions per TFC-OPS-OPER-C-24, Occurrence Reporting.

3.4.3 REQUEST Shift Manager to evaluate the need to notify Environmental per TF-REC-001 and TFC-ESHQ-ENV_FS-C-01.

3.4.4 INITIATE repairs or work requests to systems that may have caused unexpected condition.

4.0 EXIT CRITERIA

4.1 Exit Actions/Criteria

4.1.1 K1 ventilation system restored to normal operation.

4.1.2 Vessel Vent is operating AND 242-A Evaporator is in SHUTDOWN MODE, EXIT TF-AOP-EVAP-004.

4.1.3 K1 system failure is due to exhaust stack High Beta-Gamma alarm (This procedure is terminated and responses are per ARP-T-601-022).

4.1.4 K1 system failure is due to multiple High Beta-Gamma alarms (This procedure is terminated and responses are per TF-ERP-EVAP-005).

5.0 RECORDS

No records are generated during the performance of this procedure.
Attachment 1 – Loss of K1 Ventilation System

All K1 HEPA filters Low DP alarms activate
K1 exhaust stack Low Flow alarm activates
K1 exhaust fan shuts down or fails to start

IF K1 system failure is due to exhaust stack High Beta-Gamma alarm EXIT this Duty Card AND GO TO ARP-T-601-022.

DIRECT nonessential personnel to report to the lunch room.

DIRECT Operations and HPT personnel to report to Control Room.

SECURE radiation and adjacent areas.

NOTIFY Shift Manager of event and status.

ENSURE K1-5-1 supply fan is shutdown.

REQUEST SOE ENSURE breaker labeled “Supply Fan K2-5-1 VFD” in cubicle E - 3 in MCC - 1 is in ON position AND GO TO applicable Section of TO -620 -020 to start K2-5-1.

Is K2 supply fan running?

Yes

No

DIRECT all nonessential personnel to EXIT lunchroom AND REPORT to appropriate staging area.

RESTRICT access to radiation areas.
Attachment 1 – Loss of K1 Ventilation System (Cont.)

- NOTE -
A 2 minute time delay may occur prior to K1-5-2 starting

REQUEST SOE ENSURE the following breakers are ON:
K1-5-2 in cubicle A-2 on MCC-2
(labeled "Exhaust Fan K1-5-2 VFD")
K1-5-3 in cubicle E-1 on MCC-1
(labeled "Exhaust Fan K1-5-3 VFD")

REQUEST Shift Manager designate either K1-5-2 or K1-5-3 to be started AND GO TO the applicable section of TO-620-020 to start either K1-5-2 or K1-5-3 as designated.

K1 exhaust fan running?
Yes
PERFORM Radcon monitoring
NOTIFY Shift Manager of current status.
GO TO TF-AOP-EVAP-004 for Recovery Actions.

No
PERFORM Radcon monitoring
NOTIFY Shift Manager to terminate all transfers/water flushing/testing physically connected to 242-A Evaporator
IF process is running SHUTDOWN process per TO-600-060

Are any radiation alarms active?
Yes
IF only a single CAM/ARM alarm EXIT this duty card AND GO TO ARP-T-601-022.

No
IF multiple CAM/ARM alarms EXIT this duty card AND GO TO TF-ERP-EVAP-005.