

## S/G Nozzle Dam Removal Pre-job Brief

### 1. Introduction (Sr Manager – Jim Schweitzer)

#### a. Scope of Job

- Big Picture/ what we are doing and why  
Removing Nozzle Dams; plant in reduced inventory; IPTE/High Risk because it is an infrequently performed task with potential for high dose rates and personnel safety issues (confined space/engulfment).
- Management Expectations
  1. Conservative Operating Philosophy
  2. Procedure Adherence
- Procedures/Work plans in effect
  1. HPIP 4.58 Issuance of Respiratory Equipment.
  2. PBF 4234. Respirator Issue Record
  3. WO 0400042, 1HX-001A Nozzle Dam Removal
  4. WO 0400043, 1HX-001B Scientech Procedure 83A7564, Rev 6, Steam Generator Nozzle Dam Installation and Removal, Test, Operation and Maintenance Manual
  5. HPIP 4.51.3, Airline Respiratory Protection Equipment
  6. HP 2.5, Radiation Work Permits
  7. NP 8.4.9, Hose Control
  8. PBF 4107a, Bubble Hood Air Supply Pressure Record
  9. NP 1.2.6 Infrequently Performed Tests or Evolutions
  10. NP 1.1.7, Managing Work Activity Risk

#### b. Lessons Learned/OE

- Describe lessons learned from installation; brief over view of how this will be different (See #12 in OE package)

#### c. Remind everyone that if anyone during in the brief makes the statement: “*I think*” or “*I believe,*” we must challenge their assumptions. Their inaccurate mental model could create a problem on the job. Use Qualification, Validation, and Verification (QV&V) to eliminate assumptions.

### 2. Radiological Conditions/ Precautions - Carberry/Reiff/Peroutka

#### a. ALARA /Radwaste Considerations

- High Exposure job – minimize time in the bowl; helpers should minimize time in shine from bowl. Safety and correct removal are even more important than speed.
- Irradiated material is a possibility; don't pick up anything inside the channel head without RP permission. The object may be highly radioactive. Numerous industry over exposures have occurred in 10 to 30 seconds of handling irradiated components. (Information Notice 90-47)

#### b. RWP - Separate RP brief (PBF – 4194a)

### 3. Work Order/ Procedure Summary – Contract Liaison (Klesper)

- a. Initial Conditions
  - b. Proper Authorization to Begin Work
  - c. Current Revision Section is Signed on Procedures & Drawings
  - d. Cover Sheet
  - e. Text Detail Sheet
  - f. Work Plan
  - g. Hold Points
  - h. Self Checking
  - i. Independent Verification and Concurrent Checks
  - j. Difference between IPTE/evolution and normal operating procedures
  - k. Tech. Spec. limitations
  - l. Overall effect on plant/systems and expected major alarms
  - m. Abnormal Operating Procedures
  - n. Emergency Operating Procedures
  - o. Contingency plans
  - p. Termination Criteria
  - q. Post Maintenance Testing
  - r. Logistics (see attachment 1)
- 4. Energy Sources/ Danger Tagging Klesper**
- a. Energized equipment, de-energized equipment, pressurized, de-pressurized systems
  - b. Protected Worker Log
  - c. Boundaries
  - d. Walkdown
  - e. Notes & Cautions
- 5. Communications Protocol (Hennessy)**
- a. **Command and Control**
    - Contractor Liaison - prior to beginning work on the platform
    - RP Supervisor when workers are on the platform
    - Contractor liaison once workers have cleared the platforms

The SG Nozzle Dam Removal Project Lead will be located in training building room 141 with the remote access cameras. Responsibilities include coordination of communications from the 8ft Control Point, the OCC & WCC, handoffs for predecessor and successor activities, and completion of the FME closeout of the channel heads.

The contractor liaison is responsible for event execution by contract personnel (Scientism and Westinghouse) and will be located at the 8 ft containment elevation RP station observing jump teams. Contractor liaison for the jump teams will provide RP supervisor at 8 ft RP station work steps in sequence from the work plan.

RP supervisor will direct entry onto platforms in accordance with work plan steps.

Safety will be located at the 8 ft Control Point for general observation and as liaison for the Emergency Rescue Team. The Emergency Rescue team will be located at the 8 ft Control Point.

Setup of the platform and staging will occur as prerequisites in the work plan. The Prerequisites will be executed prior to the Pre-job brief and will include activities such as scanning the S/G bowls for FME for removal and staging the area for the nozzle dam removal. The communication lines will be checked and the manway lead shield doors will be removed. Access to the S/G platforms will occur as directed by the work plan. Each SG team is expected to consist of three Scientech personnel and one RP tech. Two RP techs will assist three Scientech jump members into bubble hood suits at the 8 ft Control Point area where one breathing manifold is located. When directed by the 8 ft control Point RP Supervisor, the first jump team consisting of 1 RP technician and three Scientech jumpers will access the first SG platform. Breathing air at the platform is provided prior to climbing the ladder to the primary manway platform.

Each jump will be preceded with an FME retrieval step if necessary starting with the hot leg nozzle dam first then the cold leg nozzle. Upon successful removal of both nozzle dams, two jumpers will leave the platform and one will remain during the closeout inspection. Westinghouse crew will access the platform to provide the video closeout.

Activities on both the "A" S/G and the "B" S/G platform are allowed to occur at the same time however only one entry into the channel head will be allowed at a time. This will allow focused attention on all channel head entries yet allow team positioning to continue for the critical jump.

**b. Importance of elevating concerns/problems to test coordinator**

- When any abnormal event has occurred.
- When any part of the evolution is delayed by 15 minutes and the reason why

**c. Critical Handoffs**

- Transfer from Control Room (drain down) to Nozzle Dam Team
- Transfer from OCC to Nozzle Dam Team
- Transfer of control from Contract Liaison to RP Supervisor
- Transfer for RP Supervisor back to Contract Liaison
- Transfer from Contract Liaison to Maintenance

**d. Communications with Outage Control Center**

The steam generator nozzle dam removal event will be communicated to the OCC by the Program Engineering General Supervisor stationed in the remote viewing location (training building). This will remove potential distraction from the 8 ft containment elevation coordination team. The Programs

Engineering General supervisor will monitor and communicate the following milestones of the event to the OCC:

- 1) When 1<sup>st</sup> team has been directed to access platform.
- 2) When 1<sup>st</sup> hot leg nozzle dam has been removed.
- 3) Prior to the 1<sup>st</sup> cold leg nozzle dam has been removed
- 4) After the 1<sup>st</sup> cold leg nozzle dam has been removed.
- 5) When 1<sup>st</sup> team has exited 1<sup>st</sup> platform.
- 6) When 2<sup>nd</sup> team has been directed to access platform.
- 7) When 2<sup>nd</sup> hot leg nozzle dam has been removed.
- 8) Prior to the 2<sup>nd</sup> cold leg nozzle dam has been removed
- 9) After the 2<sup>nd</sup> cold leg nozzle dam has been removed.
- 10) When 2<sup>nd</sup> team has exited 2<sup>nd</sup> platform.

Additionally, the following items shall be reported as occurs.

- 1) When any abnormal event has occurred.
- 2) When any part of the above evolutions exceeds the expected time to completion by 15 minutes and the reason why.

Use of three-way communication outside the Manway is required during directions or following the work plan. Informational communications need not be 3-way.

Upon receipt of a "GO" from the Outage Control Center, all removal communications will be completed using headsets.

The RP Supervisor the desk will be controlling the evolution once the workers on the platform.

The only personnel that should be speaking on the headsets are the RP at the desk, the jumpers, the helper on the platform, the RP on the platform and the individual providing direction to the jumpers. All others can be listening (as desired) but should not interrupt the evolution. Communications are for the workers removing the nozzle dams. Don't be afraid to ask questions or give feedback.

Do not be afraid to interrupt non-essential conversations.

Clear and concise commands are required.

The microphones on the headsets are always active. DO NOT say anything that does not contribute to the nozzle dam removal.

If you must talk to someone next to you and you are on a headset, cover the microphone with your hand. Just moving the microphone to the side won't prevent everything from being broadcast.

If you lose communications while in the steam generator, GET OUT.

To stop the job, it is imperative that the words "STOP, STOP, STOP" be used. In the case of the personnel in the channel heads should be told to "GET OUT".

#### 6. Safety/Hazards/Permits Hennessy

- Plant operation, power generation, nuclear safety, trip avoidance
  - The Hot Leg nozzle dam SHALL be removed first. If the Cold Leg nozzle dam is removed first and a loss of decay heat removal accident occurs, pressure in the reactor could increase to the point that water would be forced out of the reactor and out through the steam generator Cold Leg. The reactor core could be rapidly uncovered without operator action.

○ While conducting training on reduced inventory, it was recognized that a loss of RHR cooling during reduced inventory conditions may result in a condition that cannot be recovered using existing procedures.

If the RCS is open via S/G manway(s) and RHR cooling is lost, the RCS will begin to heat up. If the RCS reaches boiling (potentially within ~30 minutes), it will not be possible to re-establish RHR cooling using the directions of SEP 1 and SEP 1.1.

These procedures direct refilling of the RHR piping with subcooled water from another source. This will be successful in permitting an RHR pump to be restarted. However there is a siphon in the RHR suction piping (sometimes erroneously referred to as a "loop seal") that draws water up above the level of the S/G manways. Once the RHR pump is started and begins to draw saturated water up this siphon, the water will flash and the siphon will be broken. The RHR pump will again lose NPSH and will cease to pump water.

In this condition, the RCS must first be subcooled before RHR can be re-established. Subcooling must be adequate to keep the water in the siphon from flashing, and it is estimated this would be achieved at temperatures of ~200 deg F or less. The key element to include in the pre-job briefs is that, during the current plant conditions, there are approximately 90 minutes available to restore RCS integrity (vis-à-vis the SG primary side) following a complete loss of RHR cooling, prior to the point at which the RCS would reach the problem temperature. Therefore, during the period when SG primary integrity is not available, all involved personnel should be aware of the need to restore integrity (either by continuing installation

of the manway(s) or be reinstalling the nozzle dam(s)), should RHR cooling be lost. We need be aware of the need for prompt communication in the event of RHR cooling being lost and of the time available for integrity restoration, so that the proper direction can be taken.

- When removing the Cold Leg nozzle dam, it is possible to have a decrease of approximately 2 inches (for only one cold leg nozzle dam wet seal leaking) in the RCS level because of a sudden release of an air pocket. The air pocket could form if the wet seal had an undetected air leak. (CAP 45040)
  
- The removal will be staged as follows:
  - A hot leg nozzle dam;
  - A cold leg nozzle dam
  - B hot leg nozzle dam.
  - B cold leg nozzle dam
  
- Asbestos (N/A)
- Lead paint(N/A)
- Hazardous materials
- Permits/Checklists
  - Ignition Control (N/A) PBF-0068
  - Transient Combustibles(N/A) PBF-1911a
  - Scaffold Final Inspection Checklist(N/A) PBF-9114
  - Confined Space PBF-0038
  - Fire Barrier Penetration (N/A) PBF-0034
  - Person Lift Utilizing Working Platform and Overhead Crane (N/A) PBF-9108
  - Check Electrical Equipment to be De-energized, or Use Energized Electrical Safety Checklist PBF-9044
- Personnel / PPE (Sipiorski)
  - Review confined space procedure; responsibilities
  - Confirm everyone legal for safety related work (16/24, 2/48, 72 consecutive)
  - Verify that the light is lit prior to entering the channel head. If light goes out, have the spare sent in. If the spare does not work or can't be found, GET OUT.
  - If you are not comfortable with the status of your breathing air, do not continue. If the breathing air supply is interrupted, GET OUT.
  - If you lose communications, GET OUT.
  - Be aware of the symptoms of heat stress. If you think you are suffering from heat stress, GET OUT.
  - The nozzle dam sections are heavy. Remember to use proper lifting techniques (as allowable by the space configuration.).

Failure to detect and vent a trapped air column behind an installed cold leg nozzle dam will make removal difficult and may cause injury to the technicians removing cold leg nozzle dams.

If shut down cooling is lost or Reactor Vessel Level changes unexpectedly, the control room will inform the Program Engineering General Supervisor who will stop the job. If personnel are in the bowls, they will exit the bowls immediately.

If a worker inside the steam generator is unable to get out on his or her own, immediately notify x2911. The outside worker should enter the steam generator to help remove the individual. Once inside the S/G carefully cut the workers bubble hood (a "V" shape in front of their face.) Place the individual in a sitting position, feet first out of the manway. Carefully, pull the worker from the S/G and lay them on the platform away from the shine.

- Nuclear / Potential Impact on Plant Equipment
- High Energy Safety Requirements (N/A)
- Potential Trip-Sensitive Equipment in Area (consider posting or barricading) (N/A)
- Working Conditions
- Post Area for Hazards as Needed
- Chemical Contaminant and Control Requirements CHES Sheet in Work Package (N/A)

**7. Identify Critical Steps/ Error Likely Situations/Defense Barriers (Hennessy)**

- a. Describe how we will do procedure use and adherence
- b. Mark Critical Steps with "Double Check"
- c. Identify performance mode/Tool for each critical step
- d. Identify Error likely situation(s)
  - Task demands (Time pressure)
  - Individual capabilities/ Human Nature
  - First time evolution
  - Distractive or poor environment
  - Work stoppage (termination) Criteria

**8. Other (Hennessy)**

- a. Foreign Material Exclusion
  - VERY HIGH level of FME control is required. Any loss of foreign material (tools, parts, etc.) SHALL be reported immediately to the Contract Liaison
    1. Direct Path to Reactor
    2. Even a staple-sized object can cause damage
    3. Everything in and out is recorded on the FME log.
    4. Notify Contract Liaison immediately if anything falls into the Hot or Cold Leg.
- b. Housekeeping
- c. Review OE Included in Work Package

- OE Air
  - OE Dosimetry
  - OE FME
- d. Individual Responsibilities & Qualifications
- Ensure all had JIT Training
    1. Scientech – responsible for removal of nozzle dams
      - a. Tech A – removal technician
      - b. Tech B (2) – platform support technicians
      - c. Tech C – located at control console
    2. RP – prepares SG channel head for entry
    3. Confined Space Attendant – when nozzle dams are removed; Channel head becomes a permit required confined space. RP Tech on 8 ft level will serve as Attendant
    4. RP Supervisor – controls evolution while workers on platform
    5. Contract Liaison – Responsible for event execution.
    6. Operations – controls water level in the RCS
    7. Rescue Team - located at 8ft; responsible for executing confined space rescue if required
    8. Operations – responsible for removing tags, protected equipment, handoffs for evolution
    9. Westinghouse – provides communication and video equipment/operators
    10. Maintenance – responsible for reinstalling manways
  - e. Security Notification (N/A)
  - f. Control Room / Watchstander Notification
  - g. Equipment and Plant Responses to be Expected While Performing Work
  - h. Special Tools / Instruments
  - i. Post-Job Debrief Schedule (PBF-9218) \_\_\_\_\_  
(fill in time and location prior to brief)
  - j. Address Concerns/Questions – Specify