Operating Experience #	Brief Description	Group *	Actions Taken To Address
OE 31454	OE16368 - Airline Breathing Hood Fitting; Hope Creek event – worker in bubble hood lost air when fitting unexpectedly disconnected	RP	The CJEN fittings are double acting fittings approved by NIOSH per the manufacturer.
OE48685	OE13365 - Two Separate Incidents where Loss of Breathing Air to Air-supplied Respirator (one due do disconnect fitting; one due to accidental cutting of air hose	RP	The CJEN fittings are double acting fittings approved by NIOSH per the manufacturer. The previous incident at PBNP was due to utilizing a make-shift steps that cut into the hoses. The designed steps are in place for the job and do not pose a cutting issue. To be covered in the lesson plan.
OE 10321	OE16908 - Separation of Air Line Coupling on Supplied Air Hood A worker wearing a supplied air hood experienced a loss of air supply to the hood. The cause of the event was a quick-connect coupling in the worker's air supply line that became unthreaded. During the event, the maintenance technician had moved out of line-of-sight contact with the HP technician.	RP	The CJEN fittings are double acting fittings approved by NIOSH per the manufacturer. The RP technicians will be on the same channel as the workers (radios). RP will have a designated person

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	When he lost air, he attempted to contact the HP technician but was unable to do so. The maintenance technician returned to the step-off pad, where a second mnt. worker noticed his distress. The second worker attempted to contact HP via radio, but was not successful since maintenance radio communication frequencies were not compatible with those of HP.		responsible for standby-rescue. (removal of the bubble hood)
SER 20-82	Zion Unit 1 Failure to Remove Steam Generator Nozzle Cover Following Inspection Hinge parts were accidentally left in	Eng Prog	Klesper - Do we do an equipment audit after removing nozzle dams? We use an FME log. And log all pieces. We close out per SEN 7.11.11 Are there nozzle dam parts that could get left behind? All sub-parts are secured. Note that this SER left cover in and the startup forces blow the cover to pieces, only the SS hinge remained. Discussion of FME concerns specifically relating to this SER and the SER are listed in the lesson plan.
CAP 46796	OE11729 - Bubble Hood Airline Disconnect Vulnerability with Single Lock Air Connect	RP	The new connections (CJEN) are manufactured on the hoods. They are double acting connections to reduce the possibility of

			disconnection.
SEN 205	Recurring Event RCS Inadvertently Drained below Top of Hot Legs PI drained to install nozzle dams and drained too faro	Ops	Drain Down Procedure satisfactory? During this evolution this time (Draining the cavity down to mid loop) we don't use Nitrogen overpressure so this is not a concern. We could however push approximately 350 gals out of the vertical section of the cold leg due to nozzle dam air leak through. This is covered in Item 25
INPO OE 10197	San Onofre used a TOMCO disconnect which was not on the NIOSH approved list	IH&S	CJEN fittings are NIOSH approved, as per the manufacturer.
261-991004	Nose Cone of Block and Tackle used to install nozzle dams falls into S/G Hot Leg	Eng Prog	How do we control the equipment we use to remove nozzle dams from an FME perspective? Everything is logged in and out. People power is used to lift dam in. We do not use block and tackle.
SER 03-02 OE 51051 CAP 31288 CAP 31595	Workers Exit Site with detectible contamination – RP techs assumed frisker and portal alarms were caused by internal rather than external contamination	RP	This is not in the lesson plan since those that will be performing this step are not in the class.

OE 9576	Perry Plant – Intermixed MSA/Foster Hose lines with NPO/Schrader Hose lines causing bubble hood to not be NIOSH approved.	RP/IH S	As per the bubble hood manufacturer instructions included with the bubble hood the CJEN fitting is acceptable.
OE 9243	Vermont Yankee – Bubble hoods NIOSH Certified with Hanson fittings. Vendor claimed Foster fittings were an acceptable substitute. NIOSH said no only Hanson fittings.	RP/IH S	As per the bubble hood manufacturer instructions included with the bubble hood the CJEN fitting is acceptable.
CAP 55527	Individual experience low air pressure to bubble hood Individual air supply line disconnected while in SG Individual air line disconnected upon attempted bowl entry Individuals air supply line damaged/cut	RP/ Prog Eng	Discussed during Lesson Plan Corrective actions associated with the nozzle dam events: 1. Brought in an independent team of NMC folks (Don Schuelke, corp RP and Joe Hager, Pallisades) to review our procedures and processes for use of supplied air as breathing air. 2. Used their input to: a. Update applicable procedures (temp changes issued) (included manifold pressure vs hose section table) b. Recognize that it was unsat to have nitrogen backup bottles inconnected to

			the breathing air system via the nozzle dam control panels. We had the bottles changed out and replaced with certified Grade D Breathing air. c. Replaced all of our bubble hoods, airlines and fttings to new CEJN type fittings -- these fittings won't pop open, you have to push and pull them to open. 3. We also developed a Just in Time information sharing package to be used in conjunction with the prejob briefing for reator vessel head work. This included a review of our procedure requirements, bubble hood issueance requirement, and manifold pressure requirements. These items were completed and we used bubble hoods very successfully on Friday 4/23 to perform hydrolazing decon of the reactor vessel underhead. We have also conducted flow testing through the breathing air hoses to confirm design air flow versus manifold pressure.

CAP 55682	During placement of robotic equipment in the steam generator channel heads a worker received a dose rate alarm on his electronic dosimetry. As the workers exited the work area it was discovered a 2nd worker had received a dose rate alarm.	RP	Similar to Sen 233, not specifically covering.
CAP 56147	Individual Exceeded Overtime Limits without proper approvals	All	Discuss during planning process Ask at pre-job brief
CAP 55537	NOS identified the posting of the Nozzle Dam Control Panels inside U-1 Containment was inadequate and that scaffold construction was occurring nearby.	Eng Prog	How do we limit work not to jeopardize air hoses? Protected equipment status. The the scaffolding in this CAP is 5' away. The OCC did permit work on it. What postings do we need to change? None. Ops is require to take down the Protected Equipment sign. A sign was hung on the equipment, but NOS asked for it to be moved to a cone infront of the panel.
CAP 55547	Procedure controls for nozzle dam installation are weak	Ops	Procedure changes were made to OP-4F per CE 013755.

CAP 55705	Nonpermit confined space analysis form not promptly posted	Work planner	Currently posted
CAP 55896	Unit 1 "A" Steam Generator Handhole Platform	Work planner	Setup access in work plan/schedule
CAP 55751	Service Air for Breathing Air – is it resolved?	IHS	Resolved
CAP 55645	Bubble Hoods not issued in accordance with HPIP 4.58. The procedure requires the issuance to be documented on PBF-4234 and this was not completed.	RP	Issuance of the bubble hood is covered in the lesson plan.
CAP 55560	NP 8.4.9 Hose Control requires yellow air hoses, some vendor hoses are red	Eng Prog	The Cap is to address vendor hoses. PBNP procedure states air hose will be yellow. This is not a universal standard. PBNP procedures don't' address vendor hoses well. The yellow tape is a compromise and should be incorporated in the procedure as recommended.
CAP 55825	In Unit 1 containment, there is an air hose connected to the "A" Steam Generator Nozzle Dam Control Panel that runs along the stairway and into the stairs.	Eng Prog	Will we add any new hoses? Do we need to add routing info? Will we add any new hoses? NO Do we need to add routing info? NO, not on removal.
CAP 49234 SEN 233	Recurring Event— Personnel Exposure Exceeds Electronic Dosimeter Alarm Setpoint On March	RP	Cover in lesson plan as operating experience.

	23, 2002, with Nine Mile Point Nuclear Station Unit 2 shutdown for refueling, contract personnel radiation dose exceeded the planned dose and the dosimetry alarm setpoint for a specific task. This was not recognized until they exited the work area. In addition, the TLD dose value for one worker was 359 mrem greater than the electronic dosimeter reading.		
CAP 55587/ OTH57189	S/G Nozzle Dam Installation Dose Exceeded Estimate/ Use Jump platform	Eng Prog	Do we have this properly planned? Is it a checkoff in the workplan? Yes the alara estimate is revised and there is a sign off for the steps. Is it a checkoff in the workplan? Yes for steps
CAP 45040	Potential Loss of RHR Cooling During Nozzle Dam Removal (Part 21) DURING REFUELING ACTIVITIES, NOZZLE DAMS ARE COMMONLY USED TO ISOLATE THE SGS IN ORDER TO PERFORM MAINTENANCE ACTIVITIES WHILE THE REACTOR IS BEING REFUELED. NOZZLE DAMS THAT UTILIZE INFLATABLE SEALS AS THE PRIMARY SEALING MECHANISM MAY CREATE A TRAPPED AIR COLUMN BEHIND THE COLD LEG NOZZLE DAM. THIS AIR COLUMN COULD BE CREATED BY UNDETECTABLE MINUTE LEAKS OF AIR THROUGH THE INFLATABLE SEALS WHICH ARE TYPICALLY PRESSURIZED TO 65 PSIG (ALMOST 5 TIMES THE HYDROSTATIC PRESSURE CAUSED BY THE REFUELING POOL WATER). CONTINUAL LEAKAGE OF AIR INTO THE COLD LEG WOULD EVENTUALLY EVACUATE THE VERTICAL PORTION OF THE COLD LEG LEADING TO THE RCS PUMP. THIS EVACUATION OF WATER COULD OCCUR WITHIN A 7-DAY PERIOD. HAVING AN AIR COLUMN IN PLACE OF WATER MEANS THERE IS LESS WATER AVAILABLE FOR COOLING DURING MID-LOOP CONDITIONS. REMOVAL OF THE COLD LEG NOZZLE DAM WOULD RELEASE THIS TRAPPED AIR COLUMN AND COULD CAUSE THE RCS INVENTORY TO	Ops	OE 45043 evaluated this as ok for PB. Is this eval still good? "If the nozzle dam wet seal leaks (even a small leak), air can fill up the vertical section of the cold leg replacing the water. This volume is about 47 cubic feet. This leak may or may not be detected by the periodic monitoring done by OPs using PBF-2021 depending on the size of the leak.\\If this occurs, air under a few PSI of pressure would be trapped and when the nozzle dams are depressurized and removed at 3/4 pipe, this air volume would be replaced by water from the RCS. A brief calculation was done and this volume of air being replaced would result in an RCS level decrease of about 2 inches from 3/4 pipe for one nozzle dam. This is not a significant safety concern with

	SUDDENLY DECREASE TO A LEVEL BELOW THE RHR SUCTION LINE CAUSING A RISK OF VORTEXING/CAVITATION OF THE RHR PUMPS AND SUBSEQUENT LOSS OF RHR COOLING		regard to the possibility of losing RHR due to loss of suction, but it is something that the operators should be aware of and anticipate the possibility when nozzle dams are being removed. Precaution and Limitation 3.1 of OI-11 "Steam Generator Nozzle Dam Operation Guide" discusses this possibility and what could occur on drain down. PBF 2021 Nozzle Dam Log also records air flow to the nozzles. A small leak could air load the pipe but would not impact RHR operations. A larger air leak would not go undetected. A caution has been placed in OP-4F to alert the operator of the possibility of losing some vessel level (approx 350 gals) upon removing each of the cold leg nozzle dams.
OE 12483	Steam Generator Nozzle Dam Diaphragm Bolt Hole Misalignment The first two of eight installations took over three times the anticipated time to install successfully. Installer observations were that the bolts that secure the nozzle dams to the retaining ring were difficult to engage and required more time to tighten.	Eng Prog	Do we have Scientech NES Type WR Steam Generator (SG) Nozzle Dams (ND)? Do we have Scientech NES Type WR Steam Generator (SG) Nozzle Dams (ND)? Yes, we also have new diaphragms. Doe not apply

			to removal. Note this is similar to the problem we had with installation. We had a bad bolt hole. To ensure this will not happen in the future, we have a picture of the orientation that worked.

*Group responsible to review and implement the operating experience.

Important Considerations Prior to S/G Nozzle Dam/Cover Installation and Removal (Lessons Learned)

Workers and Supervisors

- ☐ What methods do we use to document items brought into the steam generator? What level of detail is recorded?
- ☐ Prior to installing nozzle dams or nozzle covers, what methods are used to prevent items from falling into the reactor coolant loop (e.g., lanyard, adhesive tape, and container for small items)?
- ☐ Which reactor coolant leg should the first nozzle dam be installed and under what condition is this applicable? What is the reason? (If the reactor vessel head is installed, the cold leg nozzle dam should be installed first and the hot leg should remain open to provide an adequate vent path to reduce the possibility of developing a pressure differential sufficient to eject reactor coolant from the steam generator cold leg opening.)

- ☐ What methods and equipment do we use to monitor reactor coolant leakage from nozzle dams? Who is responsible for monitoring? How often are the dams monitored for leakage?
- ☐ How have we verified the main and backup air systems are functioning properly? Who is responsible for testing and monitoring the air systems? How often are the air systems monitored?
- ☐ What contingency plans have we developed if a nozzle dam leaks?
- ☐ How do we verify that all nozzle dam equipment and tools are removed from the steam generator? Who is responsible for performing an independent verification? How is the verification performed?
- ☐ How do we verify that contractors installing nozzle covers or dams understand the station's requirements on foreign material exclusion?
- ☐ How do we verify that contractors have been informed of in-house and industry-related operating experience on nozzle dam work activities? How is the information communicated to contractors?

Engineering

What redundancy have we designed into systems that support the operation of nozzle dams and reduced the likelihood of deflating the seals? Protected equipment on Service Air Supply, backup compressed air, check valves at dams, passive seal

How have we verified that the size of the vent path is adequate to prevent overpressurizing the nozzle dams when the reactor vessel head is installed? See SCR 2003-329

What are the nozzle dam design limitations with respect to pressure differential? Which direction is more limiting (water side or air side)? Test pressure 34.2 psi, over pressure 65 psi refer to Scientech document 83A7564 page 14. Air side in not applicable.

What methods do we use to prevent bayonet insert pins from migrating into the reactor coolant system (if inserts are used)? What methods do we use to verify the insert pins have not degraded? How often and when are the verifications performed? We do not use bayonet connector with any SG

Radiological Protection and Industrial Safety

- ☐ How have we verified that the air line fitting to the bubble hood air supply tubing we are using meet National Institute for Occupational Safety and Health requirements? How have we trained our personnel to be knowledgeable of this type of air line fitting?
- ☐ How have we verified that the workers are proficient installing nozzle dams and nozzle covers? Have we considered using a mock up?.
- ☐ How have low dose radiation areas been identified or posted for this job?