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Louisiana Energy Services, LLC
NRC Docket No. 70-3103

Subject: Proposed Operator Action Enhancements for Administrative IROFS (Items Relied On For Safety) 38, 42 and C6

Reference: Telecommunication between NRC Staff and LES, Re: IROFS 38, C6 and 42.Boundaries, April 20, 2010

Louisiana Energy Services (LES) has held a number of discussions with the Nuclear Regulator Commission (NRC) regarding the boundaries and supporting equipment for Administrative IROFS, and in particular IROFS 38, 42 and C6. As follow-up to the referenced communication, LES is proposing to expand proceduralized operator actions relied upon to implement IROFS 38, 42 and C6 to address your concerns. These new, additional, actions will be established in such a manner that reliance on the Plant Control System (PCS) to monitor process conditions necessary to decide when or how to take action, and the supporting equipment used to implement the action, will not be required.

In order to support an understanding of these proposed actions and their inclusion in the boundary for these IROFS, LES has prepared the attached matrix for review and consideration. This matrix depicts the significant defense in depth for these slow developing events afforded by the current design, quality requirements and application of Safety Management Programs (SMP) imposed on both actions and items inside and outside the Administrative IROFS boundary. Consistent with the development of other Administrative IROFS, such as vehicle barriers used for Administrative IROFS 50 recently approved by the NRC, support equipment is not Quality Level 1. However this support equipment is established as part of defense in depth with design, quality, and programmatic controls commensurate with their safety significance. Key elements of this matrix include:

- Clear definition of what is inside or outside the IROFS barrier;
- Identification of the multiple string of failures needed for each of these events to occur;
- The defense in depth mechanisms available to operators to both detect and correct or arrest a pending adverse condition. For each event, non-PCS paths are available;

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- The safety margin and slow developing nature for these events, including the multiple failures necessary to have these events go undetected prior to their prevention;
- Reaffirmation, based on URENCO operating history, that none of these events has occurred previously in over 30 years of operating history and over the course of tens of thousands of identical or related normal operating actions (such as cylinder fills);
- Design, quality and SMP application to support equipment currently imposed by LES in a graded approach (beyond regulatory requirements) for items not inside the Administrative IROFS boundaries. For example, the equipment from Europe meets ISO 9000 and 9001 which is equivalent to the LES Quality Level 2 program. Further, all equipment from Europe required Americanization to satisfy ASME B31.3 for UF6 containing components (such as valves and piping), and NFPA and NEC requirements for electrical equipment; and,
- Identification of the proposed additional non-PCS-based operator actions that LES would add into the boundary for each of these IROFS in the sprit of cooperation.

Specific to each of the subject Administrative IROFS, LES proposes the following:

- IROFS 38 – Require the operator to log and trend cylinder fill weights using the digital readout display that is locally mounted on each individual station. Operations may still log and trend the readout in the control room but the official point of action will be based on the non-PCS local display gathered during shift walkdowns. Due to the slow developing nature of an overfill condition, per shift verification is more than sufficient to identify and correct any pending overfill situation prior to exceeding any safety limit. If the operator detects a potential overfill condition, LES will confirm existing training and procedures clearly direct the operator to take non-PCS based actions should the PCS fail to terminate cylinder filling. These actions include the closure of at least one of multiple isolation valves available to terminate cylinder fill.
- IROFS 42 – For product cylinders, the operator will compare the calibrated WOHWA scale cylinder weight measurement to the cylinder weight measurement last obtained in the product station just prior to cylinder removal. These weights and their comparison will be documented. Both of these non-PCS measurements will need to be within a specific band and both will need to confirm a cylinder has not been overfilled prior to placing it in the autoclave.
- IROFS C6 – Using the Quality Level 1 CASCAL software program, the calculated flow and cylinder weight trends (feed cylinder weight loss, tails cylinder weight increase and product cylinder weight increase) will be determined for the specified enrichment campaign. This data will be used to establish cylinder weight trends that will verify acceptable enrichment percentage. The same local readout weight indication to be used for IROFS 38 will be used to perform this additional monitoring activity. LES will confirm existing training and procedures clearly direct the operator to take non-PCS based actions (such as manual valve closure to terminate feed flow) should the PCS fail to correct an incorrect enrichment condition. This monitoring and

action is separate and in addition to the PCS process values (pressures and flows) and on line mass spectrometer readings available to confirm enrichment level. This proposed action will be included as part of a new separate administrative IROFS.

These proposed additions are included in the attached table in the appropriate column for NRC consideration in context with the entire defense in depth approach.

In summary, we believe that these proposed additions into the Administrative IROFS boundaries address the NRC's concern that one method of operator response should have a non-PCS basis to determine if actions are required and to implement said actions.

We look forward to discussing this proposal further with members of your staff. Should you have any questions regarding the information provided in this letter, please contact me at 575.394.5206.

Sincerely,

Gregory ~~OD~~ Smith
Chief Operating Officer and Chief Nuclear Officer

Enclosure: Matrix of Administrative IROFS 38, 42 and C6

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Matrix of Administrative IROFS 38, 42 and C6

IROFS #	IROFS Description	Failures to Event	IROFS Boundary	Instrument Monitored	Action Taken	Component Operated	Margin (or time to conseq.)
38	**Limit Cylinder Fill Mass (Tails, Feed Purification & Product LTTS and Product Blending Receiver Station (TT2-2, UF2-2, PT2-4, PB2-4)**						
	Administratively limit the cylinder fill mass to ensure cylinder integrity. This is implemented at Tails Low Temperature Take-off Stations, Feed Purification Low Temperature Take-off Stations, Product Low Temperature Take-off Stations, and Product Blending Receiver Stations by verifying that cylinder weight is within specified trending limits once per shift during filling of the cylinder. Weight limit conservative with respect to assuring cylinder integrity. If the acceptance criterion is not met, then fill of the associated cylinder shall be terminated.	Conditions for overfill: (1) Weight overage must not be identified (2) Hi wt alarm must not work or go unnoticed (3) Hi pressure alarm must not work or go unnoticed (4) Hi Hi wt alarm must also not work or go unnoticed (5) HiHi pressure alarm must also not work or go unnoticed (6) A5 valve must fail or PCS must fail to send signal to close on high wt (auto weight trip) (7) Pressure trips must also fail or fail to receive signal from PCS (auto pressure trips) *Note: There are actually two weight trips. The first is operator adjustable and set at the desired net weight of UF6. The second trip is set at the gross weight of the cylinder with UF6 contents. Based on a cylinder's gross weight trip and maximum fill rate, the time to overfill is established (see time to consequence in "Margin" column).*	(1) Weight reading and trending through PCS and Control Room Display (2) Calibration of Load Cells and Stations **Proposed new action** (3) Weight reading and trending through load cells and local digital indication (non PCS). This would replace item #1.				Minimum fill time required for a 30B or 48Y cylinder to reach the safety limit is identified below. After reaching max. normal fill limit: Normal Ops: additional 107 hrs (30B) or 189 hrs (48Y) Worst Case: additional 36 hrs (30B) or 46 hrs (48Y) To potentially rupture the entire cylinder contents must also be at at least 120F. A minimum greater than 24 hours justifies the adequacy of IROFS38 (ref: CALC-S-00112)
	Support			Load Cells with PCS in Control Room	Suspend operation (stop filling cylinder)	Close inlet valve for: (1) A5 (or A25 for Feed Purif.) (2) A1 (manual station isolation) (3) A4 (cylinder valve) by: 1) PCS 2) Local Operations 3) Closing cylinder valve OR Isolate station from header via manual valve	
				Proposed New Instrument Load Cells with local digital display (non-PCS)	same as above	same as above	

FCOL - AC IROFS EQUIPMENT Matrix

IROFS #	PCS Support	Applicable Codes and Standards	URENCO Operating History	Quality Attributes	*Management Measures Program (MMP)							
					Config. Management	Maintenance	Training & Qualif.	Procedures	Audits & Assessmts	Incident Investigations	Records Management	Other QA Elements
38												
			Approx. 20,000 cylinder fills without exceeding the safety limit		X	X	X	OP-3-3300-01	X	X	X	X
Su												
	Weight Alarms (1) 2200 kg Hi alarm (2) 2203 kg HiHi alarm closes A5 valve (cyl. inlet), puts station to standby (3) 3280 kg H2, closes inlet valve A5, puts station off line 1MP1 Pressure Alarm on Inlet to Cylinder (1) x-mbar Hi alarm (2) x-mbar (above Hi alarm) closes inlet valve A5, trips station off	PCS UL Certified Station Load Cells: EN-1050, BS EN 1993 (Eurocode3), UL1004, UL1227, UL1449, AWS D1.1, ASTM C 411, ASHRAE 15, ANSI/ASME B16.34, ASME B31.5, IEEE-383, IEEE-1202, MSS-SP-58, NEMA ICS1,2,5,6, NEMA-250, MG-1, MG-2, WC70, WC55,NFPA-70, NFPA-90A, ASTM E84, ANSI N14.1, NMEC VG Valves and VAT Valves ASME B31.3 (2004) UL certified Welding and Welding Procedure Qualification-ASME Section IX ASME B31.3 UF6 containing components Cylinder Superior Valves ANSI N14.1		Croon – Plant Control System Quality Attributes: ISO -9001: Certificate on File Croon – QA Procedures VG Valves and VAT Valves ISO-9001:2000 Certificate on File Superior Valve ANSI N14.1 Metaflex Stations (includes load cells) ISO -9001 (2000) Certificate on File	X	Select Requirements	X	X		X	Select Requirements	ISO-9000/9001
	same as above	same as above		VG Valves and VAT Valves ISO-9001:2000 Certificate on File Superior Valve ANSI N14.1 Metaflex Stations (includes load cells) ISO -9001 (2000) Certificate on File	X	Select Requirements	X	X		X	Select Requirements	ISO-9000/9001
			*MMPs are applied to support items in a graded approach									

IROFS #	IROFS Description	Failures to Event	IROFS Boundary	Instrument Monitored	Action Taken	Component Operated	Margin (or time to conseq.)	PCS Support	Applicable Codes and Standards	URENCO Operating History
42	**Limit Cylinder Fill Mass - Autoclave (PB4-4)**									
	Administratively limit the cylinder fill mass to ensure cylinder integrity. This is implemented by determining the weight of product cylinders before placement and heating in the Product Liquid Sampling Autoclave. Weight limit conservative with respect to assuring cylinder integrity. If the acceptance criterion is not met, then the associated product cylinder shall not be heated.	(1) Overfilled cylinder (2) Weight measurement not taken or error in reading weight (3) Alarms not noticed or failed (4) Pressure trips fails (auto trip) (5) Autoclave integrity failure	(1) Administrative function-weight measurement (2) Calibration of WOHWA <u>Proposed new</u>: (1) Second weight measurement (2) Calibration of Station load cells (3) Comparison of WOHWA to station weights		Suspend operation PB4-4 Action: Prod. cyl. shall not be heated					Approx. 20,000 cylinder fills without exceeding the safety limit
Support				(1) WOHWA scale (non-PCS) (2) WOHWA indicator (non-PCS) (3) Alarms **<u>Proposed New</u>** (3) Station load cell (non-PCS) (4) Station load cell indicator (non-PCS)				(1) Two pressure transducers on sample manifold (pressure indicators and alarms) (2) Trip autoclave heaters at high pressure	WOWHA: NEMA-250, ICS1, 2,5,6, MG-1, MG-2, WC70, WC55, UL1004, UL1277, UL1449, NMEC, IEEE-383, IEEE-1202 Station Load Cells: EN-1050, BS EN 1993 (Eurocode3), UL1004, UL1227, UL1449, AWS D1.1, ASTM C 411, ASHRAE 15, ANSI/ASME B16.34, ASME B31.5, IEEE-383, IEEE-1202, MSS-SP-58, NEMA ICS1,2,5,6, NEMA-250, MG-1, MG-2, WC70, WC55,NFPA-70, NFPA-90A, ASTM E84, ANSI N14.1, NMEC PCS (for Alarms) UL Certified	

IROFS #	IROFS Description	Failures to Event	Quality Attributes	Management Measures Program (MMP) Attributes: Config. Management	Maintenance	Training & Qualif.	Procedures	Audits & Assessmts	Incident Investigations	Records Management	Other QA Elements
42	**Limit Cylinder Fill Mass - Autoclave (PB4-4)**										
	Administratively limit the cylinder fill mass to ensure cylinder integrity. This is implemented by determining the weight of product cylinders before placement and heating in the Product Liquid Sampling Autoclave. Weight limit conservative with respect to assuring cylinder integrity. If the acceptance criterion is not met, then the associated product cylinder shall not be heated.	(1) Overfilled cylinder (2) Weight measurement not taken or error in reading weight (3) Alarms not noticed or failed (4) Pressure trips fails (auto trip) (5) Autoclave integrity failure		X	X	X	OP-3-0470-01	X	X	X	X
Support			WOHWA: Procedure/Program approved by ETC Metaflex Stations (includes load cells) ISO -9001 (2000) Certificate on File	X	Select Requirements	X	X		X	Select Requirements	ISO-9000/9001

FCOL - AC IROFS EQUIPMENT Matrix

IROFS #	Description	Failures to Event	IROFS Boundary	Instrument Monitored	Action Taken	Component Operated	Margin (or time to conseq.)	Support Equip	PCS Support
C6	**Enrichment Control (EC3-1)**								
	Administratively calculate and set the cascade enrichment control device in accordance with the calculation to ensure 235U enrichment < 5 w/0 to ensure subcriticality within the designed process and analyzed activities. This is implemented by ensuring the calculation performed accurately, and the associated cascade enrichment control device setting is implemented in accordance with the calculation. The 5 w/0 limit is based on the NEF Materials License limit and consistent with the Nuclear Criticality Safety Analyses to ensure subcriticality within the designed process and analyzed activities. If the acceptance criterion is not met and the cascade enrichment control device setting has not been changed, then the cascade enrichment control device setting shall not be changed. If the acceptance criterion is not met and the cascade enrichment control device setting has been changed, then the associated cascade shall be isolated such that no additional UF6 can enter or exit the cascade.	Operator errors: (1) at change of enrichment, product valve setting must be calculated incorrectly (2) independent checks on product valve setting calc must fail to identify the error	(1) Administrative function-settings (2) Calculation (CASCAL) (3) Calibration of load cells		EC3-1 Actions: Suspend operations (Do not make changes) OR (post-settings) Isolate affected cascade Initiate NCS Anomalous Condition		Various NCS calcs		
C22	**Enrichment Control (EC3-1) - New Proposed**								
	Administratively verify enrichment settings by performing mass balance using cylinder weight	Additional conditions for enrichment high enough to compromise critical geometries and moderation controls with IROFSC6 operable: (1) mechanical stop on each cascade product control valve must be broken, not fitted, or not fitted properly, (2) software limit on each cascade product control valve controller must be set incorrectly or not working (3) cascade and assay samples must not recognize high enrichment (assay samples are analyzed using on-line mass spec producing representative results in minutes) (4) a leak must exist in the product system to cause breakdown build-up in an otherwise safe by geometry component or allow moderator into a product cylinder (5) The above errors must exist for a significant period of time to allow a significant buildup of breakdown and/or moderator	(1) Calculation (CASCAL) (2) Periodic cyl weight trending (3) Calibration of load cells		EC3-1 Actions (proposed): (post-setting) Isolate affected cascade Initiate NCS Anomalous Condition		Monitoring Frequency TBD		

IROFS #	Description	Failures to Event	IROFS Boundary	Instrument Monitored	Action Taken	Component Operated	Margin (or time to conseq.)	Support Equip	PCS Support
Support (C6)				(1) PCS (2) Mass Spec **(3) Station local cylinder weight indicators (new proposed non-PCS)** (4) Initial installation & replacement of critical component(s) (5) Cascade and Assay Samples (6) software limit (7) alarms (8) automatic valve sequencing		Close cascade inlet and outlet valves, open internal recirc valves by: (1) PCS (preferred - remote from NCS area) (2) Terminate feed (i.e., valves) (3) Manual isolation valves (4) Mechanical stop (passive)			(1) Alarm on Product Valve to detect outside calculated position (2) Software limit to ensure valve cannot close below enrichment limit
Defense-in-Depth (C6)	The risk of EC3-1 sequence, if uncontrolled, is minimized by high vacuum standard of the plant and monitoring of the number of product vents which indicates minor air leaks								

FCOL - AC IROFS EQUIPMENT Matrix

IROFS #	Applicable Codes and Standards	URENCO Operating History	Quality Attributes	Management Measures Program (MMP) Attributes							
				Config. Management	Maintenance	Training & Qualif.	Procedures	Audits & Assessmts	Incident Investigations	Records Management	Other QA Elements
C6											
		No criticality events in URENCO operating history		X	X	X	OP-3-0450-01	X	X	X	X
C22											
		No criticality events in URENCO operating history		X	X	X	OP-3-0450-01	X	X	X	X

IROFS #	Applicable Codes and Standards	URENCO Operating History	Quality Attributes	Management Measures Program (MMP) Attributes: Config. Management	Maintenance	Training & Qualif.	Procedures	Audits & Assessmts	Incident Investigations	Records Management	Other QA Elements
Sup											
	PCS UL Certified IPI-On-line Mass Spec ASME B31.3, ASME Section IX, MSS-SP58, ANSI C119.6, NFPA-70 **Station Load Cells (proposed):** EN-1050, BS EN 1993 (Eurocode3), UL1004, UL1227, UL1449, AWS D1.1, ASTM C 411, ASHRAE 15, ANSI/ASME B16.34, ASME B31.5, IEEE-383, IEEE-1202, MSS-SP-58, NEMA ICS1,2,5,6, NEMA-250, MG-1, MG-2, WC70, WC55,NFPA-70, NFPA-90A, ASTM E84, ANSI N14.1, NMEC VG Valves and VAT Valves ASME B31.3 (2004) UL certified Welding and Welding Procedure Qualification-ASME Section IX ASME B31.3 UF6 containing components		Croon – Plant Control System Quality Attributes: ISO -9001: Certificate on File Croon – QA Procedures IPI-On-Line Mass Spec, ISO-9001:2000, Cerfificate on file VG Valves and VAT Valves ISO-9001: 2000 Certificate on File Mechanical stop flow test	X	Select Requirements	X	X		X	Select Requirements	ISO-9000/9001
Defe											