20 7 tatalans	Vogtie Electric Gene NUCLEAR OPERATIONS	rating Plant	Procedure No. 93240-C Revision No.
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RE		BLY/DISASSEMBLY INSTRUCT	05-316-90
1.0	PURPOSE		
	This procedure pro and disassembly of requirements for w	vides instruction for the reactor vessel inclusion for an or fueling exercise.	
2.0	PRECAUTIONS AND LI		
2.1	GENERAL		
2.1.1	Exercise care when reactor.	handling equipment above	ve the
2.1.2	Comply with instru job and be aware o levels.	ctions identified on the f the potential for high	e RWP for this h radiation
2.1.3	Spotters and guide and moving large c	ropes should be used whompoments.	hile lifting
	to be do an Million to be the second of the	must be completed prior a contaminated or poter for possible issuance of	
	Housekeeping/Mater such as pens, badg or secured to the tethered. Tools a	rial accountability shalo ocedure 00254-C, "Plant ial Condition Program". es, binoculars, etc., person by lanyards and nd equipment used in one from the immediate area next operation.	Small items shall be taped tools shall be
	secup/preakdown ma	eaning operations or to y be accomplished at any prior to time needed.	ol y time as long
FO	R INFORMATIC	NONLY	ş
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2.2	INSTRUMENT	PORT CONOS!	EALS	
			*	
2.2.1	of loose su	irface conta		ave high quantities should be treated echnician.
2.2.2			particular can al integrity.	re to prevent damage
2.2.3	joint. As:	s is of the semble the or rubber g	joint using cl	ance in the conoseal ean white lint free
2.2.4			monitoring of orhe activity	the immediate area during this
2.3	REACTOR VE	SSEL STUDS		
2.3.1	Tisasuremen	ts during t	sed when takin he stud tensio ing correction	ning process to
2.3.2	temperatur to 0 psig. greater th "Incore Ir	e is below The metal an RT pr as radiation S	140°F and the temperature m	ssel water and metal pressure is reduced must be equal to or r Procedure 55023-C, less than 140°F oned.
• 2.3.3		puller bar		ers unless the stud engaged on the
2.3.4	numbered s	ets and sha		i be kept in matched ad in the appropriate
2.3.5	level in t inches (EI	the vessel a	should not be in the to the vessel it	l head, the water raised closer than 48 flange prior to
2.3.6				hanged or replaced have been recorded.
				and the Alexandra set of the

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The second secon			J 67 340 314/23	3 07 38
2.3.7	Maximum St not exceed	ud Tensioner 19500 psi unl	Hydraulic Bu ess approved	mp Pressure shall by the cognizant
	Maintenand	e Foreman.		
2.3.8	Constantly	exercise car	e throughout	all stops of thi ads and surfaces
		and component		ure cleanliness a
2.4	REACTOR VE	SSEL HEAD		
		CAUT	ION	
		Inadvertent c		
		isolation may of the Reacto	occur durin r Vessel hes	g the movement
		Reactor cavit or from the h	y to the hea	id stand
		cavity. Ensu	re Health Ph	ysics and
		operations in to prevent in		nsatory actions tuation.
2.4.1	Whenever r	aising or low	ering the he	ad, constantly
	monitor th		or changes w	hich would indica
2.4.2				to the undered is
2.4.2		r Vessel Head		to the underside possible.
2.4.3				cavity during th
	attached a	ind inventorie	d in and out	t have lanyards of the cavity as
	per Proced Condition	lura 00254-C, Program".	"Plant House	keeping/Material
2.4.4	The O-ring	a shall be re	placed with	the head on the
	storage pe		O-rings shou	ild be replaced
	installati	on. This wii	1 eliminate	possible O-ring
		ion from dust		
2.4.5				te, lint-free ng and handling o
	the O-ring		- wea wrenili	nenossing o
2.4.6				sel head, the safe
	Within the	defined safe	load path t	shall be followed. the specified load
	shall not		ater than fi	lve feat above the
2.4.7				ited equipment sha
		i with care, t components.	o prevent in	nadvertent contact

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	an a			4 02 70	
2.4.8	lowered the vessel, the speed to p Crane speed	he reactor vessel he e first and last foo e polar crane should reclude damage to cl d during other phase with safe moving pr	t onto the be controsely mat s of hand	a reactor olled at slow ing components ling shall be	
2.4.9		r vessel head shall bot to the refueling			
2.4.10	provide 1 be person on 1 lift. A be	ethod of voice commu etween the polar cra the refueling floor sckup method of voic ssel head lifts is h	ne operat directing e communi	or and the the vessel he cations during	
2.4.11	Do not twis during dis	st the knurled incor assembly or reassemb	e thermocoly.	ouple connecto	
2.5	INTERNALS/LIFT RIG				
2.5.1	Do not submerge the load cell at any time. If it is accidently submerged; thoroughly dry, check, and re-zero if necessary.				
2.5.2	During momement of the reactor vessel upper internals the safe load path as outlined in Figure 6 shall be followed. Within the defined safe load path the specified load shall not be lifted greater than 24.5 feet from its original position.				
2.5.3	provided by person on t lift. A bi	ethod of voice commu etween the polar crs the refueling floor ackup method of voic lifts is highly reco	ine operat directing ce communi	or and the the internals	
3.0	PREREQUISI	TES AND INITIAL CONT	DITIONS		
		NOTE			
		Unless otherwise por 3.1 applies to all i			
3.1	GENERAL PL ASSEMBLY/D	ANT CONDITIONS FOR H ISASSEMBLY	PERFORMING	VESSEL	
3.1.1	Procedure	sics has issued the 43007-C, "Issuance, Work Permits".			

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3.1.2	signed the procedure	, t a Quality Control (Q "Data Sheet" indicati for HOLD POINTS. If H QC should be notified	C) representative has ng QC review of OLD POINTS are		
3.2	The Polar Procedure	Crane has been checked 27305-C, "Reactor Pola	out in accordance wit r Crane Service Check"		
3.3	accordance	able equipment has bee with Procedure 93100- Preservice Inspection/	C, "Refueling Tools An		
3.4 */*	accordance	straps, and shackles with Procedure 20425- Lifting And Rigging Eq	C. "Control Of		
3.5	HEAD VENT	PIPING			
3.5.1	The reactor vessel water level is 6 inches (minimum) below the reactor vessel flange.				
3.5.2	The reactor 13005-1 or	r vessel head has been 13005-2, "Reactor Coo	vented, per Procedure lant System Draining".		
3.5.3	The reactor Procedure Evaluation	r vessel head venting 43002-C, "Airborne Rad ".	has been sampled per ioactivity Sampling An		
3.6	REACTOR VF	SSEL STUD TENSIONING/D	ETENSIONING		
3.6.1	that plant	conditions are in ord ven approval for stud	or (OSOS) has confirme ler for a mode change detensioning/		
3.6.2	washers ter	r vessel, vessel head, mperature is greater t ual to 140°F.	studs, nuts, and han RT _{NDT} , but less		
3.6.3	(minimum)/ any tension	r vessel water level i (Elev.190') below the ning and 24 inches (mi etensioning operations	vessel flange prior to nimum)/(Elev. 192)		
3.6.4	Plant air the stud t	(260 to 400 scfm at 10 ensioners is available	0 psi recommended) for		
3.6.5	The source and operat		: in Containment is on		

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			and the second second of the s	en el Barren en anno a marcanez a superior a consistencia en ana ana ana ana	
3.7 */*	REACTOR VES	SEL O-RING IN	STALLATION		
	New O-Rings the reactor	s have been st vessel head	ored in thei storage star	ir container around nd.	
4.0	INSTRUCTIONS				
4.1		access platf 220 feet) to		sperating floor shield.	
4.2	SEISMIC TIE	RODS			
* / *		NOTE			
	I	With proper ca cods may be di stored without the polar cran	sconnected a the aid of		
4.2.1		lon strap to le cavity wall		tie rod at a point	
4.2.2	tie rod, re connecting	move the cott	er pin from	the weight off the the tie rod In from the tie rod	
		NOTE			
	2	These rods may pivoted downwa horizontally t tavity walls p pward to enga supports on th	rd and o clear the rior to pivo ge with the	oting	
4.2.3		tie rod up int leld. Lock in		od support on the	
4.2.4	Replace the cotter pin	e previously r into the upri	emoved conne ghted tie ro	ecting pin and od clevis.	
4.2.5 */*	Repeat Step seismic ric	os 4.2.1 throu prods.	gh 4.2.4 for	r each of the 6	

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4.3 CABLE DISCONNECTS

NOTE

Subsection 4.3 may be accomplished now or any time prior to Step 4.15. If accomplished now, however, a 480V power cable will have to be connected to the receptacle at the bottom of the shroud to provide power to the radial arm hoists.

- 4.3.1 Ensure identification tags are on the cable connections for ease in reassembly.
- 4.3.2 Disconnect all cables at the outside of the connector place. Document on Data Sheet 4.
- 4.3.3 Store all cables in the racks on the tray.
- 4.3.4 Unlatch the tray restraints at the shroud.

CAUTION

Carefully monitor the flexing of the cabling so that no excessive binding occurs.

4.3.5

Using the reactor head electric cable tray winches, pivot the cable tray upward into the supports on the Steam Generator wall.

NOTE

Should the cable tray winches bacome disabled, other means to lift the cable truys may be used.

- 4.3.6
- Lock the cable tray in the stored position.
- 4.3.7 Repeat Steps 4.3.1 through 4.3.6 for the other */* cable tray.

4.3.8 Connect 480V power cable for the radial arm hoist if */* required.

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¥ 605 E	33240-0			16 40	0 01 30	
4.4	REMOVAL OF	REACTOR H	EAD INSULAT	ION		
			NOTE			
			4.4 may be any time pr 4.10.		lished	
4.4.1	Loosen and	store att	aching fast	eners.		
4.4.2					lly hand maneuver reactor vessel	
4.4.3	Remove the	section t	o a designa	ted lay	-down area.	
4.4.4 */*	Repeat Step insulation			3 for e	ach of the 9	
4.5 <u>*/*</u>	procedure level must inches bel	the Vessel be brough ow the rea have been	t to a mini ctor vessel	oolant mum of (RV) f	k in this System) water 24" (Elev. 192') lange and the RV to assure safe	
4.6	HEAD VENT	PIPING				
	Prerequisi	tes 3.1 en	d 3.5 apply	to thi	s suction.	
			NOTE			
		accomplish venting an	4.6 may be ed at any t d sampling mpleted pri 4.10.	ime aft occur b		
4.6.1		ent remova	ble spool p		nylon straps to cated between the	
4.6.2	Disconnect interiors		nd cover th	ne pipe	ends to ke.	
4.6.3 */*	Move the s	pool piece	to a desig	mated 1	ay-down area.	

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		NOTE	-	
	(The following completed prio		
4.6.4	Clean and o threads and Nickel Spec	bolt head un	he flange l/ dersides wit	2 inch nut and bol h Never-Seez Pure
4.6.5	the cavity Unit 1 or t	floor at appr	oximately th th for Unit	nt flange through e 328° azimuth for 2. Use the old
4.6.6	Torque the pattern to	1/2 inch bolt 300 foot pour	s in a three ds.	-step method cross
4.7	REACTOR VES	SEL LEVEL INS	TRUMENTATION	SYSTEM (RVLIS)
		NOTE		*
	4 7 0	Subsection 4.7 accomplished a venting and sa must be comple Step 4.10.15.	ny time afte mpling occur	but
4.7.1	sections fr	om the RV Hea	d to the sen	ttach the tube sors. Cover all r interiors clean.
4.7.2	Remove tubi	ing to a desig	nated lay-do	wn area.
4.8	SEAL TABLE	PREPARATION		
		NOTE		
	1	Subsection 4.8 accomplished a Step 4.5 has o be completed p Step 4.16.5.	ny time afte ccurred but	
4.8.1 */*	accordance	able system wi with Procedu And Reinserti	re 93280-C,	

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4.9 */*	INSTRUMENT	, PORT-CONOSEA	L DISASSEMBLY	
		NOT	E	
		Subsection 4. accomplished venting and subsection 4.	any time after ampling occur, bu eted prior to	t
4.9.1	necessary	tools and equ:	protective sleeve ipment to the rea rigging equiptent	ctor flange
4.9.2	Unlatch an (approxima	d open the app te azimuth 23	propriate doors c °, 67°, 147°, 247	on the suroud
		CAUT	ION	
			the knurled therm tors during assem	
4.9.3	Disconnect labeled fo Data Sheet	r ease in late	uple wiring makin ar reconnections.	g sure it is Document on
		NOTI	E	
•		Refer to Figur item numbers.	res 3 and 4 for	
4.9.4	Remove loc	k wire (Item)	13).	
4.9.5		six jack scre crews. (Item	ews and remove at 5).	least two of
4.9.6	Remove the (Item 3). jack screw	Remove the ren	(tem 4) and the j maining jack scre	ack screw plac ws from the
4.9.7	the bolt i	ne bolt and lo	embly (Item 8) by posening the rest g assembly after e.	deinstall
4.9.8	Carefully	remove male f	lange (Item 1).	
4.9.9	Remove and	discard upper	r conoseal gasket	: (Item 8).

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BALL MALLAN AND \$2.7 5 Along Factors for in	ner må et å mellem skal kom så for anter skrivet anter a sjona i possad		nar an d'una 2000 "an fait services an "many and an an estadout an an
4.9.10	Remove and d the removal	iscard lower conoseal gas tool (Item 16) if require	ket (Item 7) usin d.
4.9.11	Place approv flange to ke surface.	ved tape over top and botto eep interior clear and pro-	om of the male tect sealing
		NOTE	
	fo	oncseals must be labeled or their criginal location azimuth.	
4.9.12	Package, pro lay-down are through 4.9.	otect, label and store, in ea, all components removed .8.	a designated in Steps 4.9.4
4.9.13	Install O-ri assembly.	ing at the top of thermoco	uple column
		NOTE	
	Ve	colube \$ 1 or \$ 2 or GE ersilube 392 may be used the O-rings to enhance ealing capabilities.	
4.9.14	Install the	thermocouple protective a	leeve.
		CAUTION	
	to in pr in wi di	Step 4.9.13 it is possible install the spring correctly; 180° from its coper position. When proper istalled no part of the spi- ll protrude outside the lameter of the protective leave.	erly
4.9.15	Install the	protective sleeve holding	spring.
4.9.16	Repeat Steps four instrum	4.9.1 through 4.9.15 for ment ports.	each of the
4.9.17	Clean job ar	rea and remove all tools a	nd equipment.

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6.10	STUD DETEN	SIONING	1997 - 1997 -	
/			0 0 0 0 4 4 4 4	2 6 annin to this
	Prerequisi e crion.		2, 3.3, 3.4 and OTE	3.6 apply to this
		the stud te particular tensioner N to the hydr in the #45 The remaini	g and hooking u nsioners, pay attention that umber 1 is hook sulic pump for to \$54 stud are ng five tension angeable in pos	eປ ປຣຂ ຊ. ອາສ
	Sections 4		should be compl	eted prior to
4.10.1	the polar	crane auxil	ners into the r lary hoist and arm hoist asse	eactor cavity using transfer each to mbly.
4.10.2	i.e., tens	ioner #1 to	stud #46, #2 t	t secup position, o stud #37, #3 to #10, and #6 to
4.10.3	cavity usi station it	ng the pola in the sou	oump assembly in ar crane auxilia athwest (northea avation area.	ry boist, and
4.10.4	Lower the up as foll		nose sets into t	he cavity and hook
		1	OTE	
			and 2 may be use hose hookup.	ed as
4.10.4.1	pressure h couplings the coupli body half screw on t free fit a	ydraulic ho on either ng, remove and push the the collar and should	see between the side of the cyli the dust cap with he male tip into until it bottoms	inder. To connect nich protects the the body. Then s. The collar is a however, it must be
				· · ·

ų

4.10.4.2 Co pr th 4.10.4.3 Co ho co pl 4.10.4.4 Co ho co of 4.10.4.5 Co ho fi 4.10.4.5 Co be sau 4.10.4.7 Co be sau 4.10.5 Co th on co bo	ressure hydr ne tensioner he high pres onnect the h ouplings loc late. onnect the m ose (air sig ouplings loc the top pl onnect the m ose (air sig	raulic hos rs to the ssure coup black, 12- return) b cated on t red, 12-fo gnal) betw cated on t late. single 12-	e (bypass union adap lings. foot long, etween the he front p ot long, 1 een the te he top lef	valve sig ters loca 1/4-inch tensione ortion of /4-inch d nsioners	13 of 98 (er, low (nal) between (ted just above diameter, air (the top) (iameter, air to the
4.10.4.3 Co ho co pl 4.10.4.4 Co ho co of 4.10.4.5 Co ho fi 4.10.4.6 Re fi 4.10.4.7 Co be sau 4.10.5 Co th on co be	ressure hydr ne tensioner he high pres onnect the h ouplings loc late. onnect the m ose (air sig ouplings loc the top pl onnect the m ose (air sig	raulic hos rs to the ssure coup black, 12- return) b cated on t red, 12-fo gnal) betw cated on t late. single 12-	e (bypass union adap lings. foot long, etween the he front p ot long, 1 een the te he top lef	valve sig ters loca 1/4-inch tensione ortion of /4-inch d nsioners	nal) between ted just above diameter, air rs to the the too iameter, air to the
ho co pl 4.10.4.4 Co ho co of 4.10.4.5 Co ho #1 4.10.4.6 Re fi 4.10.4.7 Co be sau 4. 4.10.5 Co th on co ho	ose (piston puplings loc late. onnect the r ose (air sig puplings loc the top pl onnect the sig ose (air sig	return) b cated on t red, 12-fo gnal) betw cated on t late. single 12-	etween the he front p ot long, 1 een the te he top lef	tensione ortion of /4-inch d	rs to the the top iameter, air to the
ho co of 4.10.4.5 Co ho #1 4.10.4.6 Re fi 4.10.4.7 Co be sau 4. 4.10.5 Co th on co ho	ose (air sig ouplings loo the top pl onnect the so ose (air sig	gnal) betw cated on t late. single 12-	een the te he top lef	nsioners	to the
4.10.4.6 Re fi 4.10.4.7 Co be sau 4.10.5 Co th on co ho	se (air sig	single 12- gnal) berw			WE HEAVE GIVE
f1 4.10.4.7 Cor be sau 4. 4.10.5 Cor th on cor how			foot long, een tensio	1/4-inch oner ∦6 an	diameter, air d tensioner
4.10.5 Con th on con	peat Steps ve 12-foor	4.10.4.1 long hose	through 4, sets,	10.4.4 fo	r each of the
th on coi hoi	nnect each tween tensi me manner a 10.4.1 thro	ioner #1 a as the int	nd the pur erconnecti	ping asse	mbly in the
	the upper nnections u	two l-inch left hand may be use	female pi side of t d to provi	pe connec he pump. de an ade	ng assembly tions located One or both quate supply he other must
		WA	RNING		
	VAL UNI CON ARE FLA HOI SYS	LVE OR PUS LESS ALL T NNECTED AN E FULLY SE ANGE WITH IST ENOUGH STEM TO TH	THE PUMP H THE AIR ENSIONER H D THE TENS ATED ON TH THE WEIGHT TO LOCK T E STUD THE HE LIMIT S	VALVE OSES ARE IONERS E VESSEL OFF THE HE PULL RE-BY	

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7 59%2'a' 900-0000-00 инскластиональсти	7364.1.1	ст. надаления полосимации электров со своемовление алектров аналекторов. С. 9 / /	14 of 98
		NOTES -	
	a.	When lowering a tensi a stud, it is best to buddy system, i.e., o operating the hoist w other man guides the over the stud by use handles provided on t of the tensioner.	use the ne man hile the tensioner of the two
	b.	Table 2 may be cut ap taped securely to its respective tensioner as a sequence guide i detensioning operatio	to be used n the
4.10.6	Using the indi each tensioner sequence guide	lvidual radial arm hois rover des first stud a s (Table 2).	t assemblies, lowe s seen on the
4.10.7	Ensure that es flange and the stud.	sch tensioner is seated a tensioner pull system	flush on the head is locked to the
		NOTE	
	are tu l be s	adjustments to the tens needed to cause the te latch, these adjustment tade without generating itenance Work Order.	nsioner s may
		NOTE	
	with of 4 and A pa	ensioning is done in two an intermediate press 700 psi for the first 0 psi for the second p ass consists of nine se nine wets of six studs	ure pass Lss. 2-ups
4.10.8	Notify the OSC accordance wit	OS for approval to begi th Procedure 12007-C, "	n detensioning in Refueling Entry",
	Close the rele	ecse valve on the pumpi	ng assembly, then

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CAUTION

Maximum hydraulic pump pressure shall not exceed 9500 psi.

4.10.10 Continue pumping operation until all six spherical nuts can be moved. This can be accomplished by inserting the torque handle into one of the holes in the upper portion of the spherical nut and holding a slight pressure in the counter clockwise direction while pumping is in progress.

- 4.10.11 When all six nuts are loose, release the air valve, then back off at least one full turn (18 holes) on each nut.
- 4.10.12 Slowly open the release value and allow the hydraulic pressure to be reduced to the intermediate pressure. Close the release value.

NOTE

The torque handle is preset to deliver the required torque. It must be used in a vertical position with the marked pivot pin.

- 4.10.13 When the intermediate pressure has been obtained, insert the torque handle into each nut and turn clockwise until the nut bottoms, then apply force to the handle until an audible click is heard. This will seat the nut at the lower elongation value.
- 4.10.14 After all six nuts have been reseated, open the release valve and allow the hydraulic pressure to drop to zero.
- 4.10.15 Carefully raise the tensioners clear of the study using the individual radial arm hoists attached.

NOTE

Section 4.7 must be completed before proceeding.

4.10.16 When all six tensioners are clear of their respective stude, move them to their next set-up.

VEGP 4.10.17 4.10.18 */*	nine set-up If detension pase process psi for the nuts have b but reduce removal.	oning from a s), the int first pass een backed pressure to NC t is somet to back and ocked nut o letensioning	a normal oper termediate pr s. On the so off one ful o zero leavin OTE imes necessa release a s on a stud af	16 for eac rating cor ressure wi econd pass 1 turn, do ng the nut ry to tuck or	ndition (tw 111 be 4700 s, after th o not resea
4.10.10	nine set-up If detension pase process psi for the nuts have b but reduce removal.	oning from a s), the int first pass een backed pressure to NC t is somet to back and ocked nut o letensioning	pass. a normal oper termediate pr s. On the so off one ful o zero leavin OTE imes necessa release a so on a stud af	rating cor ressure wi econd pass l turn, do ng the nut ry to tuck or	ndition (tw 111 be 4700 s, after th o not resea
4.10.10	nine set-up If detension pase process psi for the nuts have b but reduce removal.	oning from a s), the int first pass een backed pressure to NC t is somet to back and ocked nut o letensioning	pass. a normal oper termediate pr s. On the so off one ful o zero leavin OTE imes necessa release a so on a stud af	rating cor ressure wi econd pass l turn, do ng the nut ry to tuck or	ndition (tw 111 be 4700 s, after th o not resea
	pase proces psi for the nuts have b but reduce removal.	s), the int first pass een backed pressure to N(t is somet: o back and ocked nut o letensioning	termediate p s. On the so off one ful o zero leavin OTE imes necessa release a s on a stud af	ressure wi econd pass 1 turn, do ng the nut ry to tuck or	111 be 4709 s, after th p not resea
		t is somet: to back and ocked nut of letensioning	imes necessa release a s on a stud af	tuck or -	
		o back and ocked nut o letensioning	release a s on a stud af	tuck or -	
	10 10 10 10 10 10 10 10 10 10 10 10 10 1	ensioners u to a stud be hydraulic prove accomplis to an alread or by hooking	g process is Remember tha must be lock efore raisin ressure. Th shed by lock dy detension ng up the ho y tensioners	ed g the is can ing on ed stud ses to	
4.10.19	detensionir all tensior	g process :	nuts are fr is complete. ent from the operation.	Unhook a	and remove
4.11	STUD REMOVA	L			
		N	OTE		
	t	be used, (s)	(1-6) of too pace and per or hand remo	sonnel	
		CA	UTION		
		or out of the use of a we device, crain capable of least 1/2 o	uld be threa he vessel wi ight compens ne scale, et a preload of f the stud w stud and ve	thout the ating c., at weight, to	

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NOTE

A chalk match mark on the vessel flange and stud may be used to detect stud rotation.

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- 4.11.1 Move the stud turnout tools into the reactor cavity and hook them to their individual radial arm holst.
- 4.11.2 Nook up a regulated air supply to the air compensator and adjust to approximately 55 psi.
- 4.11.3 Have available 51 stud hole plugs with handling fixture, 3 RV guide studs with sleeves, and the sleeve handling fixture.

NOTE

When ISI Vessel Inspection is required, 50 STUD Hole plugs and 4 RV guide stude with sleeves are needed.

- 4.11.4 If the stude are to be removed from the cavity separately from the head, then 6 stud storage racks should be available.
- 4.11.5 If the study are to be removed from the cavity with the head, then one storage rack and 51 stud collars should be available.
- 4.11.6 Lower the individual spin out tools over their respective stude.
- 4.11.7 Remove the top stud plug and thread the lubricated (N5000) eyebolt into the top of the stud until the lower nut bottoms.
- 4.11.8 Align the eyebolt locking cap with the stud and lower the cap over the top of the stud.
- 4.11.9 Using the radial arm hoist, raise the weight compensator until its cylinder arm is extended approximately 9 inches.

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		CAUTION Do not allow the cylinder arm to extend more than 10 inches. To maintain proper preload on the stud during removal, maintain cylinder arm between 8 to 10 inches by use of the radial arm hoist during stud
		removal.
4.11.10	REVERSE din	motor control switch on the tool to the rection and, using the Variac to control the hread the stid.
4.11.11	should slow adjust the	tu is fully unthreaded from the vessel it wly rise automatically. If it does not, air compensator regulator to increase If it moves upward too quickly reduce
4.11.12	then move of flange and	re to be removed separately from the head, each stud, nut and washer away from the place them into a storage rack (6 stud cks should be available).
4.11.13	temportrily the flange	re to be lifted with the head, then y move the stud, nut, and washer away from hole (one stud storage rack and 51 stud ould be available).
4.11.14	hole plug installati	stud hole has been cleared, attach a stud onto the stud hole plug fixture using the on adapter and insert the plug into the nge through the head for all stud holes 28, 44.
		NOTES
		a. When ISI for Vessel Inspection is being performed, hole 30 will be utilized for mini guide stud.
		b. Neolube \$1 or \$2 or GE Versilube 392 may be used on the stud hole plug O-rings to enhance sealing capabilities.
		승규는 것 같은 것 같아요. 그는 것 같은 것 같은 것 같아요. 것

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4.11.15	Remove the	, installation	adapter.	
				승규의 김종씨와
4.11.16	handle, tur compressing This will 1	the two pla ock the plug xture by the	tes together a against the h	the right, thereb the right, thereb and the O-ring out tale. When tight, adle off of the no
4.11.17	nut, and wa 44 and when Hole 3). I collar plac washer. Th	sher back ov ISI Vessel nstall into ed between t	er the flange Inspection is the head flang he flange and the stud bott	move the stud, (except 12, 28, being performed, e hole with a stu the stud nut and om threads up
4.11.18	stud by lif	ting the eye	an now be disc bolt locking c ding the eyebo	onnected from the ap above the top olt.
4.11.19 <u>*/*</u>	unthreaded 12, 28, 44 30) have be	from the ves and when ISI en installed	Vessel Inspec, and all stud	hole plugs (exception is required
4.11.20	performed H the studs,	ole 30, are	used for the R shers removed	ssel Inspection i V guide studs so from the holes
4.11.21	stu? sleeve	s have been		ure that the good ghtly lubricated ent.
4.11.22	through the	head and car	eeve tool inse refully thread d, back off l/	the sleeve into
		CAUT	ION	
	p W S	olar crane an hen threadin, tuds to prev	all between th nd guide stud g the guide ent sleeve or read damage.	1e

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4.11.23 <u>*/*</u>	After the sleeve is installed, the guide stud may be threaded into the sleeve using the polar crane auxiliary hook. Carefully lower the guide stud throug the opening provided in the upper portion of the Integrated Head package for each of the three guide studs.
4.11.24	Remove stud racks (as applicable) and all tools used i Subsection 4.11 from the reactor cavity.
4.12	REACTOR VESSEL STUD CLEANING AND LUBRICATION
	NOTE
	This section may be performed on a needed basis anytime after 4.11 but before Section 4.24.
	The studs may either be cleaned by hand using a nylon brush or the Baron and Associates Stud Cleaning Machine may be used. For the manual method, use Section 4.12.1, and for the machine method, use Section 4.12.2.
4.12.1	Manual Method
4.12.1.1	Remove a stud, nut and washer from the storage rack and/or head and move to the cleaning area.
4.12.1.2	Remove the bottom closing screw from the bottom of the stud and the stud lifting eyebolt from the top of the stud.
	NOTE
	Handle with extreme care to prevent thread damage.
4.12.1.3	Use a nylon brush to remove all significant rust or foreign matter from the stud, nut, washer, closing screw, and eyebolt. Stainless steel wire brushes may be used at the discretion of the cognizant Maintenance Foreman.
4.12.1.4	Using a nylon brush or lint-free rags and ethyl alcoho or acetone, thoroughly bathe and clean the threads on the stud, nut, and washer.

4.12.1.5	as necessary Lubricate th Fel-Pro N500 visible exce A sh lu th lu	r in ord he stud 00. Appl sss. properi hould be be shou he naked	ier to and n ly by NOTE ly lub s slip ild be	Repea ensu nut th brush pricat	reads ing an ed thr	s 4.12.2 and anliness. ver lightly d the wipin	with
4.1.2.1.6	as necessary Lubricate th Fel-Pro N500 visible exce A sh lu th lu	r in ord he stud 00. Appl sss. properi hould be be shou he naked	ier to and n ly by NOTE ly lub s slip ild be	o ensu out th brush cricat	reads ing an ed thr	anliness. ver lightly d the wipin ead	with
1	Fel-Pro N500 visible exce A sh lu th lu	properl bould be be should	NOTE NOTE ly lub slip ild be	brush	ing and	d the: wipin ead	with g off
	sh lu th lu	ibe shou te naked	ly lub slip ild be	ricat	ed thre	ead	
	sh lu th lu	ibe shou te naked	a slip ald be	pery	ed thr	ead	
	D1	ibricati .nding.	i eye. Lon wi	Ove	ble to		
8	stud and the	stud 1	liftin	R eye	bolt	the bottom in the top o with N5000.	f each
	Return the c storage rack the washer o	and/or	r head	ated 1. Th	stud a read t	nd nut to th he nut then	e place
4.12.1.9	Cover the st cleanliness.	ud asse	amblie	8 8 8	requir	ed to mainta	in
4.12.2 1	fachine Meth	bod					
c s t	clearer of a spread of ai	t least	conts	cfm c minat	apacit ion fr	d to a HEPA y to avoid t om the machi debria in c	he ne and
4.12.2.2	Thread the b cleaned and	all bea positic	aring on the	swive stud	l nook	into the st the machine.	ua to t
			CAUTI	ON			
	ve ca lo	ne machi assel st aution t bose clo cud.	tud un	nder p bid en	ower. tangl!	Use ng	

		EVISION	
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	wir the cov int o?	, s machine contains high spe- e brushes. Do not operate machine without the top er in place. Do not reach o, or work on the interior the machine without connecting the power lead.	eđ
4.12.2.3	Using the ROT rollers. Ver	ATE motor starter, start th ify that the red indicator	e power lamp is lit.
4.12.2.4	Adjust the ge rotate the su lock knob.	ar mocor adjusting lever to spended stud and lock the l	grip and ever with the
4.12.2.5	Using the BRU Verify that t	SH motor starter, start the he red indicator lamp is li	power brush.
		NOTE	
		the minimum brush pressure essary to clean the stud.	
4.12.2.6	Adjust the br power brush a with the lock	ush motor adjusting lever t gainst the stud surface and knob.	o bring the lock the lev
4.12.2.7	fpm), slowly the threads h stud out of t	w speed of the crane (appro- lower the stud into the mac ave been cleaned. Then slo he wachine. The brush moto justed to clean all of the	hine until al wly raise the r position ma
4.12.2.8	Stop the brus	h motor and the roller moto	r.
4.12.2.9	Clean the ins Steps 4.12.1.	ide of the stud using the g 3 and 4.12.1.4.	uidelines in
4.12.2.10	Return the st	ud to the appropriate stora	ge location.
4.12.2.11	Complete Step to be cleaned	s 4.12.2.2 through 4.12.2.1	0 for each st
4.13	REACTOR CAVIT	Y SEALING	
		NOTES	
	a.	This subsection may be completed in any order an prior to Subsection 4.15.	

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	b	After each opening is mechanically sealed, equivalent may be app backup seal.	732 RTV or
4.13.1	Emergency C	ontainment Spray Drain Li	nes
4.13.1.1	Spray Drain	strainers from the two En lines located in the ref . Store the strainers fo use.	ueling cavity
4.13.1.2	Clean and c 7/8 inch bo	oat the threads and head lts with Never-Seez Pure	underside of the Nickel Special.
4.13.1.3	Install two blind flang	3/16 inch thick full fac es over the drains.	ce EPDM gaskets, and
4.13.1.4 <u>*/*</u>	pattern unt	7/8 inch bolts in a multi il gasket compression is orque will be 400 ft-lbs.	achieved. Maximum
4.13.2	Reactor Cav	ity Ventilation Openings	
4.13.2.1	with new 3/ reactor cav	8 manufactured plates (a 16 inch thick full face B ity ventilation openings tially around the vessel.	PDM gaskets on the located
4.13.2.2	Clean and c thread and Special.	oat the 1/2 inch bolt (16 head underside with Never	5 each per plate) r-Seez Pure Nickel
4.13.2.3 */*	pattern wit	1/2 inch bolts in a two-s h 50 to 60 percent of the the first step. Final to mum.	final torque
4.13.3	ISI Ports		
4.13.3.1		8 ISI ports located circu vessel and remove the of	
4.13.3.2	thick EPDM the cover / gasket betw	old gasket material with gasket material. A full and the junction box, and ween the junction box and or each port.	face gasket betwee a 2 3/8 inch wide
4.13.3.3		/4 inch studs and nuts, i nut undersides with Neve	

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Canala, B. 1992 A state special strains & non-strained and	aktion da	81 7 3/211	
4.13.3.4 */*	method cro	and torque the 3/4 inch-nut ss pattern with 50 to 60 pe lied on the first step. Fi minimum.	ercent of the fina
4.13.4	Permanent	Cavity Seal Ring	
4.13.4.1 */*		heck the permanent cavity a her damage which could affe	
4.13.5 */*	Remove all cavity.	tools and equipment from t	the refueling
4.14	TRANSFER T	UBE BLIND FLANGE	
		NOTE	
		The transfer tube blind fla may be removed at any time prior to Subsection 4.15.	ange
4.14.1	accordance for Unit 2	"as found" Seal Integrity with Procedure 24960-1 for , "Containment Penetration Test", prior to removing the	r Unit 1 or 24960- No. 89 - Local
		CAUTION	
		Care must be exercised in removing the blind flange a water may have leaked into tube from the spent fuel pi	the
4.14.2	Remove and designated	store the 20 blind flange storage area.	bolts in a
4.14.3	Using the from the t	cavity arm, swing the blind ransfer tube tracks.	d flange up and aw
4.14.4	Remove and flange.	discard the two quad ring	seals on the blin
4.14.5	Install th the bolted	e two 1/16-inch brass plugs flange.	s on the face of

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		REVISION	100	PAGE NO.	and the second
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CAUTION

Ensure that all previous steps have been completed and appropriate sign offs made.

- 4.15.1 Disconnect the temporary 480V power cable (if used) from the Integrated Head Package.
- 4.15.2 Close and latch all shroud doors except 4 adjacent to the conoseals, on the Integrated Head.
- 4.15.3 Remove all tools, equipment and material from the */* cavity to ensure that it is ready for flooding.
- 4.16 HEAD REMOVAL AND CAVITY FLOODING */*

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CAUTION

Inadvertent containment ventilation isolation may occur during the movement of the Reactor Vessel head from the Reactor cavity to the head stand or from the head stand to the Reactor cavity. Ensure Health Physics and operations initiate compensatory actions to prevent inadvertent actuation.

NOTE

Prior to lifting the head ensure that a new set of head O-rings are in position around the head storage pad.

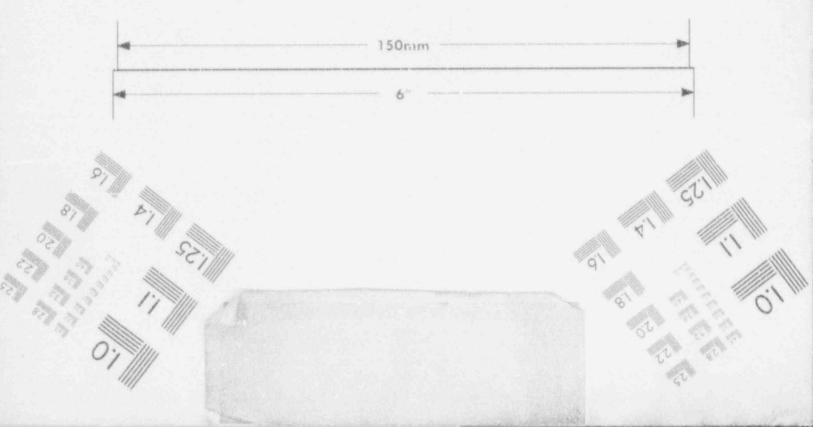
- 4.16.1 Attach the load cell to the polar crane main hook. The connecting pin should be a snug fit, however, no excessive force or metal to metal pounding is allowed.
- 4.16.2 Connect the load cell leads from the cell to the readout and place the readout at a convenient location for monitoring throughout the lift.

NOTE

Do not use feet or excessive force to crank the load cell connecting pin in or out. IMAGE EVALUATION TEST TARGET (MT-3)

1.25 1.4 1.8

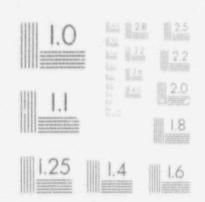


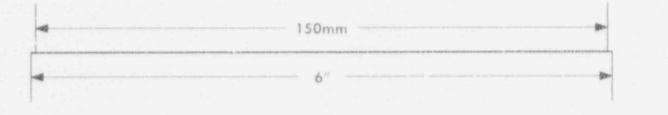




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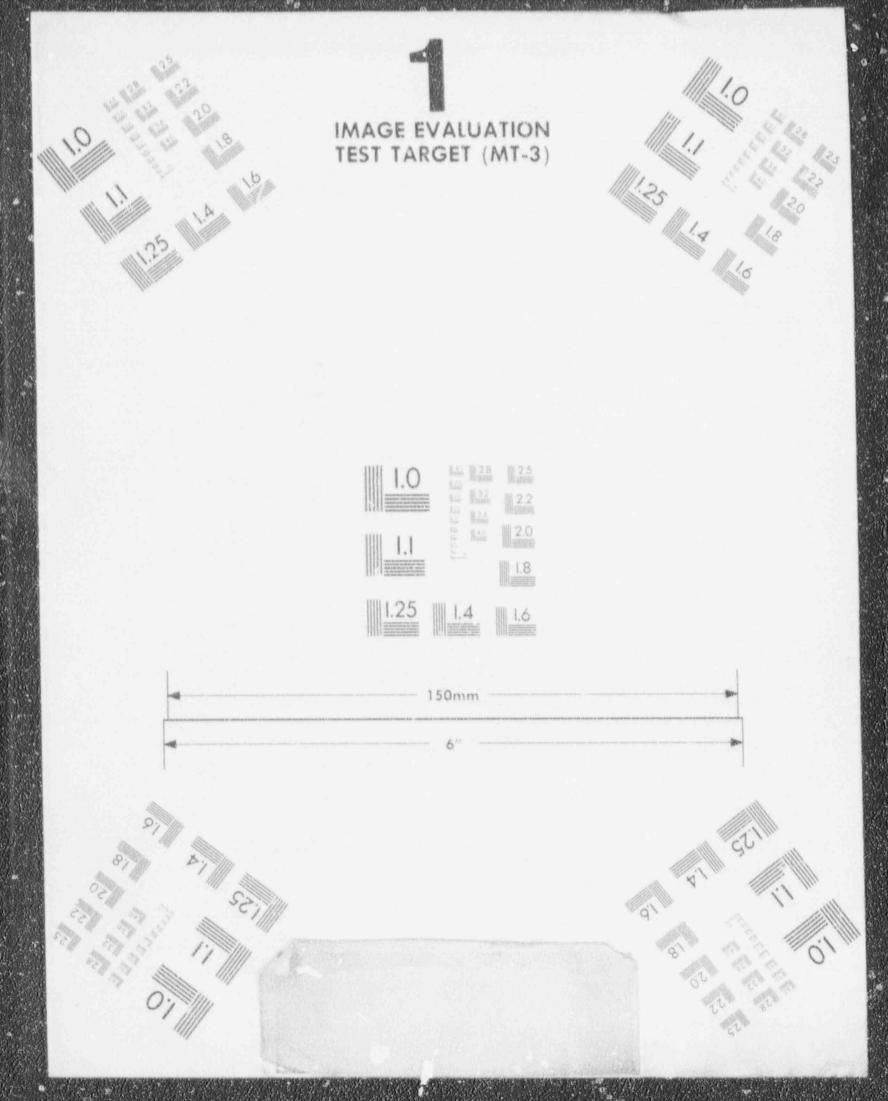
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VEGP	93240-C		75te Nea	26 of 98
4.16.3	rig and at	s turned in by	canking the co	o the head lift onnecting pin in.
4.16.4		t the head lift ed after polar		buckles are uched to the lift
		CAUTIC	N	
		No movement of be attempted with voice communication trane operator Hand signals and If voice communi- lost, suspend to head until the corrected.	thout continu- ation between and signal ma- re not allowed nications are novement of the	the in. i.
4.16.5		ttach at least d flange, appro		to the top of the apart.
		CAUTIO	N	
		Sections 4.2 th be completed be		
•		WARNI	NG	
		DURING STEPS 4 ONGOING RADIAT MUST BE TAKEN WORKING CONDIT	ION MEASUREMENTO ENSURE SAFT	NTS
4.16.6	levelness. the vessel made by mor head circu	and adjust.	or level, slow Small adjustme radial arm ho:	wly set it back of ents should be ists around the
4.16.7 */*	ten minute	s while visual	ly checking th	-inch position f he accessible ell connections.
4.16.8	Remove the	levels from t	he vessel hea	d.

4.16.9	Open applicable shroud doors and lift the head approximately 24 inches. Check with a flashlight to ensure that the instrument port column moves freely through the head and the head does not raise any RCCA drive shafts during the lift. When it is apparent that the head is not binding on th thermocouple protective sleeves or RCCA drive shafts, evacuate all personnel from the reactor cavity and not the weight reading on the load cell monitor.
4.16.10	thermocouple protective sleeves or RCCA drive shafts, evacuate all personnel from the reactor cavity and not
	NOTE
	The head may be lifted from a dry cavity or Operations may start flooding as desired.
	CAUTION
	Do not allow water to come in contact with the exterior surface of the head.
4.16.11	Continue lifting the head and if flooding the cavity maintain at least of 12 inches between head and water level. Constantly monitor the load cell readout for any sudden \pm 5% change in the previously noted load cell readout which would indicate binding or interference.
4.16.12	Lift the head out of the cavity and place it on the head storage pad.
4.16.13	Request Operations to start or continue filling the cavity to the normal refueling level (elevation 218 feet 6 inches).
4.16.14 */*	When the head is sitting on the head storage pads in a no load condition, reconnect the lift rig leg turnbuckles.
	NOTE
	Do not use feet or excessive force to crank the load cell connecting pin out.
4.16.15	Disconnect the load cell from the head lift rig by using the load cell and readout for determining the null load point for removing the connecting pin. Turn the crank by hand to the right (clockwise) to remove.

 4.16.16 Attach the underwater light fixtures to their respective holders on the walls of the cavity is CAUTION Do not energize underwater lights until they are submerged in water for cooling purposes. 4.17 UNLATCHING OF RCCA DRIVE SHAFTS */* NOTE At any time the reactor cavity is flooded, water purity and clarity should be controlled by the Spent Fuel Cooling and Clearing System and/or the Reactor Cavity Filtration System. The unlatching of the RCCA drive shafts shall be accomplished in accordance with Procedure 93140- "Control Rod Drive Shaft Unlatching Tool Operationstructions". 4.18 UPPER INTERNALS REMOVAL */* 4.18.1 At the discretion of the Outage Area Supervisor, machine to the top of the internals flange. Measurements should be taken in at least 3 place recorded on Data Shee 12. NOTES 8. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper internals storage stand.	VEGP	93240-C	REVISION	7	8/a/a.	PAGE NO	28 of 98
Lo not energize underwater lights until they are submerged in water for cooling purposes. 4.17 WINLATCHING OF RCCA DRIVE SHAFTS */* NOTE At any time the reactor cavity is flooded, water purity and clarity should be controlled by the Spent Fuel Cooling and Cleaning System and/or the Reactor Cavity Filtration System. The unlatching of the RCCA drive shafts shall be accomplished in accordance with Procedure 93140 "Control Rod Drive Shaft Unlatching Tool Operations". 4.18 UPPER INTERNALS REMOVAL */* 4.18.1 At the discretion of the Outage Area Supervisor, using a weighted tape measure, measure the distr from the top of the internals flange. Measurements should be taken in at least 3 place recorded on Data Sheet 2. NOTES a. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper	4 16.16	Attach the respective	holders on	the wa	fixtures lls of t	to thei the cavit	r y liner.
 / NOTE At any time the reactor cavity is flooded, water purity and clarity should be controlled by the Spent Fuel Cooling and Cleaning System and/or the Reactor Cavity Filtration System. The unlatching of the RCCA drive shafts shall be accomplished in accordance with Procedure 93140- "Control Rod Drive Shaft Unlatching Tool Operationstructions". 4.18 UPPER INTERNALS REMOVAL */* 4.18.1 At the discretion of the Outage Area Supervisor using a weighted tape measure, measure the discretion of the internals flange. Measurements should be taken in at least 3 place recorded on Data Sheet 2. NOTES 8. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper 		1	o not energights unti ubmerged in	gize un 1 they n water	are		
 NOTE At any time the reactor cavity is flooded, water purity and clarity should be controlled by the Spent Fuel Cooling and Cleaning System and/or the Reactor Cavity Filtration System. The unlatching of the NCCA drive shafts shall be accomplished in accordance with Procedure 931400 "Control Rod Drive Shaft Unlatching Tool Operationstructions". 4.18 UPPER INTERNALS REMOVAL */* 4.18.1 At the discretion of the Outage Area Supervisor, using a weighted tape measure, measure the distation the top of the hand rail on the SIGMA refusion machine to the top of the internals flange. Measurements should be taken in at least 3 place recorded on Data Sheet 2. NOTES a. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper 	and the second sec	UNLATCHING	OF RCCA DR	IVE SHA	FTS		
<pre>is flooded, water purity and clarity should be controlled by the Spent Fuel Cooling and Cleaning System and/or the Reactor Cavity Filtration System. The unlatching of the RCCA drive shafts shall be accomplished in accordence with Procedure 93140 "Control Rod Drive Shaft Unlatching Tool Operations". 4.18 UPPER INTERNALS REMOVAL */* 4.18.1 At the discretion of the Outage Area Supervisor, using a weighted tape measure, measure the discretion from the top of the hand rail on the SIGMA refut machine to the top of the internals flange. Measurements should be taken in at least 3 place recorded on Data Sheet 2. NOTES a. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper</pre>			N	OTE			
accomplished in accordance with Procedure 93140- "Control Rod Drive Shaft Unlatching Tool Operations". 4.18 */* 4.18.1 At the discretion of the Outage Area Supervisor, using a weighted tape measure, measure the distance from the top of the hand rail on the SIGMA refue machine to the top of the internals flange. Measurements should be taken in at least 3 place recorded on Data Sheet 2. NOTES a. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper		i c c C R	s flooded, larity sho he Spent F leaning Sy eactor Cav	water uld be uel Coo stem ar	purity a controll pling and id/or the	and led by d	
 / 4.18.1 At the discretion of the Outage Area Supervisor, using a weighted tape measure, measure the distance from the top of the hand rail on the SIGMA refue machine to the top of the internals flange. Measurements should be taken in at least 3 place recorded on Data Sheet 2. NOTES a. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper 		accomplishe "Control Ro	d in accor d Drive Sh	dance v	with Prod	cedure 93	3140-C,
/ using a weighted tape measure, measure the distation from the top of the hand rail on the SIGMA refuermation machine to the top of the internals flange. Measurements should be taken in at least 3 place recorded on Data Sheet 2. NOTES a. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper internals and the upper internals.	4.18 */*	UPPER INTER	NALS REMOV	AL			
a. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper	*/*	using a wei from the to machine to Measurement	ghted tape p of the h the top of s should b	measur and rat the in e taken	te, measu 11 on the nternals	ure the c e SIGMA : flange.	distar e refue ng
internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper			N	OTES			
		ê	intern machin easter for Un order the ve	als, the must n for it 2 ma to have ssel as	he SIGMA be move Unit 1 ost posi e access nd the u	Refueli: d to its or weste tion in to both pper	rn
b. Do not use feet or excessive force to crank the load cell connecting pin in.		b	force	to cra	nk the l		

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4.18.2	lift rig.	olar crane m Insert the c (counterclo	connecting pin	load cell to the by hand cranking
4.18.3	the lift ri guide studs	g until it i	ls at the elev ctor vessel.	ut, slowly raise ation to clear the Note the weight
4.18.4			the reactor v sel guide stu	essel and align it ds.
4.18.5	±5 percent which would	change in th indicate bi	ne previously Inding or inte	ut for any sudden noted load readout rferences, slowly seated on the upper
4.18.6	depress the clockwise f to the bott rotate it b	foot pedal, rom the lock om of the sl ack 60° cour Release the	lot in the ass nterclockwise	T" handle 60° ush the handle down embly housing and
4.18.7	Repeat Step assemblies.		the other two	roto-lock operator
		NOT	TES	
	a	internal without communic crane op signal m are not communic suspend movement	nent of the up ls shall be at continuous vo cation between berator and th nan. Hand sig allowed. If cations are lo all internals t until the si corrected.	tempted ice the e nals voice st,
		Definition		. 1

b. Refueling cavity water level must be raised to at least 218'6" elevation in accordance with Procedure 12007-C before lifting upper internals.

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		CAUTI		
	s 1 d s	hafts as upper ifted. The c rop slightly,	for control r ar internals irive shaft s indicating onger resting oider.	are hould the
4.18.8	strain on t	he polar crar	ne so that the	ut, slowly take a e entire weight o on the crane.
4.18.9 */*	checking al	l accessible	lift rig bol	hile visually ted and welded on the load cell
		CAUTI	ON	
	0 0 0	essel flange, eneath the ir nusual shadow	Internals cle visually monternals for s indicating andle or RCCA	nitor any a
4.18.10	until they clear of th load cell r the previou	clear the ves e guide studs eadout for an	seel and the At all ti y sudden ±5 ad readout wh	ut of the reactor guide bushing is mes monitor the percent change in ich would indicat
4.18.11	internals s	ft rig and ir torage stand stand guide	nternals over and align th studs.	the upper em with respect !
4.18.12 */*	While monit the upper i on the stor	nternals and	id cell reado lift rig unt	ut, slowly lower il they are seate
		NOT	2	
	Í		et or excessi the connect	
4.18.13	internals 1 determine r	ift rig. Use ull load poin	e the load ce nt to remove	cell from the ll readout to the connecting p (clockwise) to

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4.18.14	operations. lifts then removing th weight indi	If the the load he load ce loator to	and load comain hook i cell should all lift pin determine metal to meta	s to be us be discor , use the null load	sed for othe nnected. Wh polar crane point. No
4.19 */*	UPPER INTER	NALS INST			
			NOTES		
	8	inter machi easte for l order	to install mals, the S lne must be trn for Unit Unit 2 most to have ac vessel and i is.	IGMA refue moved to to l or west position cess to be	eling its tern in oth
	ł		et use feet to crank t in.		
4.19.1	attached to	pin by ha	ne main hook ernals lift and cranking	rig. Inst	ert the
		(CAUTION		
		internals without co communicat operator a Hand signa If voice o lost, susp	nt of the up shall be at ontinuous vo tion between and the sign als are not communicatio bend all int until the si crected.	tempted ice the crans al man. allowed. ns are ernals	•
4.19.2	on the pola	ar crane :	e load reado so that the rig is on th	entire we	
4.19.3 */*	checking al	11 access:	for 10 minu ible lift ri	g bolted	visually and welded the load ce

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4.19.4	Slowly lift the upper internals to an elevation that will clear the guide studs on the vessel. At all times monitor the load cell for any sudden ±5 percent change in the previously noted load readout which would indicate binding or interference.
4.19.5	Move the internals over the vessel and align them with respect to the vessel guide studs.
4.19.6 <u>*/*</u>	While monitoring the load cell readout for any sudden ±5 percent change in the previously noted load readout which would indicate binding or interference, slowly lower the internals down over the guide studs until they are seated in the vessel.
	NOTE
	At the discretion of the Outron Area Supervisor, Step 4.19.1 may be performed at this time. This may require performance of Step 4.19.11. When the measure- ments are complete, the polar crane will be reconnected to the lift rig in accordance with Steps 4.19.1 and 4.19.2.
4.19.7	To disengage the roto-locks from the internals, depres the foot pedal, hold down on the "T" handle, and rotat it 60° clockwise from the lock position. Slowly release the pressure on the "T" handle and allow it to move to the top of the slot in the assembly housing, then rotate it back 60° counterclockwise to the lock position. Release the "T" handle, then release the foot pedal.
4.19.8	Repeat Step 4.19.7 for the other two roto-lock operating assemblies.
4.19.9	While monitoring the load cell readout, slowly raise the lift rig and protective ring out of the vessel and clear of the vessel guide stude.
4.19.10 */*	Orient the lift rig with respect to the storage stand guide studs and lower it until it is seated on the storage stand.
	NOTE
	Do not use feet or excessive force to crank the connecting pin out.

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nantanga ing says a na antar kénangang ang	an an ann an Anna an Anna an Anna an Anna an Anna an Anna	- L		ann ann a bhanna ann	1	anne an the same of the state of the same of the same of the state of the same
4.19.11	Disconnect rig. Use point to re hand to the	the load c emove the	ell readou connecting	it to d	etermín Turn t	e null loa he crank b
4.19.12 <u>*/*</u>	At the dis- using a we from the to machine to the same lo applicable places and	ighted tap op of the the top o ocations a . Measure	e measure, hand rail f the inte s were use ments show	measu on the rnals d in S ild be	re the SIGMA flange. tep 4.1	distance refueling Try to u 8.1. if
4.19.13 <u>*/*</u>	If measures Outage Ares measuremen proper ins	a Supervis ts and sig	or shall e nify his c	valuat	e the ence wi	th the
4.20	RCCA DRIVE	SHAFT LAT	CHING			
/	The RCCA di with Proce Unlatching	dure 93140	-C, "Conti	ol Rod	Drive	cordance Shaft
4.21	HEAD AND O	-RING INST	ALLATION			
4.21.1	Coordinate	with Oper	ations to	begin	cavity	dewatering
		W	ARNING			
		AS THE WAT ENSURE THA LIGHTS ARE THE WATER LIGHTS.	T THE UNDE DE-ENERGI	RWATER	FORE	
4.21.2	Cleaning T	he Vessel	Flange			
			NOTE			
		Proper cle and O-ring a very imp making a l cleaning a sealing su circumfere with respe centerline scratches.	mating su ortant fac eak free s nd rubbing rfaces sho ntial, not ct to the to preven	rfaces tor in seal. g upon all be t radia vessel	is All the 1,	

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VEGP	93240-C		737	36/93	34 of 98
4.21.2.1	When the wa (Elev. 192' vessel O-ri) below t	he vessel	flange	um of 24 inches , cleaning of the rt.
4.21.2.2	Scotch brit	e ∦7447 a isopropyl	nd wiping alcohol	using	v polishing with lint-free rags one, followed by
4.21.2.3	The flange Vessel Flan				the Reactor achine.
4.21.2.3.1					hat the machine has (3M grade A-VFN)
4.21.2.3.2	inch tube of	n the fro fficient ine aroun	nt of the hose to a d the rea	machine llow co	cleaner to the 1-1/2 e. Verify that nvenient travel ssel flange
4.21.2.3.3	vessel flan stud hole.	ge, appro Place a ng up for	ximately clean pac	centere d under	chine on the reactor d over a capped the machine to the brush disks
4.21.2.3.4		e machine			n the slot in the clly hand down
4.21.2.3.		sel flang	e O-ring	seating	e machine is over the groove, and e.
4.12.2.3.6	Varify along the s				umpers and brush hoo
			NOTE		
	84 11 11	EFT and R iven on t acing the achine in eactor ve eating gr	he contro machine stalled : ssel flar	ol panel , with t in the	he
	s S c	he travel witch has TOP posit hanging d ausing at	a detent ion, which lirection	t in the ch preve without	nts

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and the second	and a second structure of a second star star statistical second	L	annen er se aler er et fan er er en er		
4.21.2.3	remote cont:	e switch an rol box. (el drive usin nd the TRAVEI Guide the con s the machine	. SPEED kn	hob on the
4.21.2.3	.8 Operate switch on th	e the brush he remote o	n disks with control box.	the BRUSH	H MOTOR toggle
		CAL	TION		
	Aj	pproach the o avoid dam	e guide studs nage to the p	s slowly machine.	
4.21.2.3	9 Using vessel flan, Adjust the b disk assemb	ge as requi brushing pr	red to clear ressure and/o	the flar	100
4.21.2.3.	dolly. Move	convenient the machi	section of t the guide s removal usi ne to the ne above proce	ituds, pos ing the in ext section	sition the
4.21.2.3.	guide studs.	. Inis are	not clean O- a must be cl ine in Step	esned mar	nge behind the mually
4.21.3	conditions a mating surfa scratches or with Scotch or an Arkans	, nicks, sc and visuall ace for tra blemishes brite ∉744 as hard st a deminera	ratches, or y chec: the ces of raise may be remo 7 and/ one followed lized water	other und vessel he d metal. ved by ha	lesirable ad flange Small and rubbing
4.21.4	Concurrently cleaning, he	with dewa ad O-ring	tering and/o replacement	r vessel may begin	flange 1.
		NO	TES		
	۵.	5/32 A1	r bolts required to the type wre sening and r	nch	
	ь.	may be the hea removal	ainer bolts totally remo d to ease 0- , but care m that they a	ved from ring rust be	

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VEGP	93240-C		-# 81 dila	36 of 98
		the O-	rsonnel in con rings shall we otton and/or r	ar lint
4.21.5	loosen the	sixteen (1	rings one at-a 6) O-ring reta etainer clips	
4.21.6	into sever	al pieces.	away from the Place the pie ealth Physics	head and cut it ces into approved dispose.
4.21.7	O-ring grou	oves using alcohol of	head flange se lint-free rags acetone. Rins	aling surfaces and and either e with
4.21.8	Visually cl 4.21.3.	heck the he	ad flange meti	ng surface as per
4.21.9	Replace the	e inner O-r	ing as follows	
4.21.9.1	equally spi bending.	aced around Each person s convenien	the ring to p should hold h	of four people revent kinking or is arms as far ffect there are 8
		N	OTE	
		of the O-ri by workmen holding the personnel s white, lint rubber glov	ing or cleanin ngs should be other than tho O-rings. All hall wear clea -free cotton a es for all cle g of the O-rin	dons se n, nd/or aning
4.21.9.2	acetone or	approved o	clean the new leaning solven eralized water	t and rinse
4.21.9.3			ring for clean indesirable con	liness, nicks, ditions.
4.21.9.4	groove and			of the O-ring with the retainer

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 of the retainer clips into the O-ring slots. Retighten or reinstall the retainer bolts through the eyes of the retainer clips. Tighten snugly with the Allen wrench. NOTE The O-ring retainer bolts shall be bottomed tightly on their shoulders to eliminate the possibility of the heads extending out beyond the mating surface and damaging the vessel mating surface upon contact. 4.21.10 Repeat Steps 4.21.9.1 through 4.21.9.5 for the outer O-ring. 4.21.11 Visually check the O-rings to ensure that they are more forces are clean. 4.21.12 Check the retainer bolts with a straight edge to ensure that they will not interfere with the mating surfaces. 4.21.13 Clean the job area and remove all tools. NOTE Do not use feet or excessive force to insert the connecting pin. 4.21.14 Align the polar crane and load cell to the head lift rig and attach by hand cranking the connecting pin. 4.21.15 Ensure that the head lift rig leg turnbuckles are disconnected after the polar crane is attached to the straight of the straight the straight connecting pin.	VEGP	93240-C		78.8	(m/40		37 of 9
The O-ring retainer bolts shall be bottomed tightly on their shoulders to eliminate the possibility of the heads extending out beyond the mating surface and damaging the vessel mating surface upon contact. 4.21.10 Repeat Steps 4.21.9.1 through 4.21.9.5 for the outer O-ring. 4.21.11 Visually check the O-rings to ensure that they are */* properly fitted in their grooves and that the surfaces are clean. 4.21.12 Check the retainer bolts with a straight edge to ensure that they will not interfere with the mating surfaces. 4.21.13 Clean the job area and remove all tools. NOTE Do not use feet or excessive force to insert the connecting pin. 4.21.14 Align the polar crane and load cell to the head lift rig and attach by hand cranking the connecting pin in. The pin is inserted by cranking left (counterclockwise). 4.21.15 Ensure that the head lift rig leg turnbuckles are disconnected after the polar crane is attached to t	4.21.9.5	of the ret Retighten eyes of th	ainer clips or reinstal e retainer	into the 1 the reta	O-ring iner bo	slots. bits thr	ough th
 be bottomed tightly on their shoulders to eliminate the possibility of the hesds extending out beyond the mating surface and damaging the vessel mating surface and damaging the vessel mating surface upon contact. 4.21.10 Repeat Steps 4.21.9.1 through 4.21.9.5 for the outer O-ring. 4.21.11 Visually check the O-rings to ensure that they are */* properly fitted in their grooves and that the surfaces are clean. 4.21.12 Check the retainer bolts with a straight edge to ensure that they will not interfere with the mating surfaces. 4.21.13 Clean the job area and remove all tools. NOTE Do not use feet or excessive force to insert the connecting pin. 4.21.14 Align the polar crane and load cell to the head lift rig and attach by hand cranking the connecting pin in. The pin is inserted by cranking left (counterclockwise). 4.21.15 Ensure that the head lift rig leg turnbuckles are disconnected after the polar crane is attached to the surface of the			N	OTE			
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NOTE Do not use feet or excessive force to insert the connecting pin. 4.21.14 Align the polar crane and load cell to the head life rig and attach by hand cranking the connecting pin in. The pin is inserted by cranking left (counterclockwise). 4.21.15 Ensure that the head lift rig leg turnbuckles are disconnected after the polar crane is attached to the	4.21.12	ensure tha	retainer bo t they will	lts with a not inter	strai; fere w:	ght edge ith the	to mating
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disconnected after the polar crane is attached to the	4.21.14	rig and at in. The p	tach by han in is inser	d cranking	the co	onnectin	ad lift g pin
	4.21.15	disconnect	t the head ed after th	lift rig l ¢ polar cr	eg turn ane is	nbuckles attache	are d to th

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		CAUTION No movement of the head s be attempted without cont	
		voice communication betwe crane operator and signal Hand signals are not allo If voice communications a lost, suspend movement of head until the situation corrected.	en the man. wed. re the
4.21.16	Securely a the vessel	ttach at least three leve head flange approximatel	ls to the top of y 120° apart.
4.21.17	approximat for leveln storage pa made by mo head circu	ain with the polar crane ely one inch off the stor ess. If not level, set i ds and adjust. Small adj vement of the radial arm mference prior to any maj the lift rig.	age pad. Check t back on the ustment should be hoists around the
4.21.18 */*	position faccessible	ead is level hold it at t or ten minutes while visu welded and bolted fift r s. Note the weight readi or.	ally checking the ig and load cell
4.21.19	Remove the	levels from the head.	
4.21.20	±5 percent readout, s	toring the load cell read change in the previously lowly lift the head to an all obstructions between r cavity.	noted load cell elevation that
4.21.21	12, 28, 44 Inspection of the wat	head over the vessel (gui and mini guide stud 30 w is performed) and lower er level, if the level is ead, or to the top of the	to within one foot to be lowered
		CAUTION	
		Do not allow the head to into contact with the wat	
4.21.22	any sudden load cell	tantly monitoring the los ±5 percent change in the readout which would indic ce, cortinue to lower the	e previously noted cate binding or

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4.21.23	Visually ch thermocoup funnels.	, neck to ensur le alignment	e proper drive as they enter	shaft and the head guide
		NOT	E	
		vill be requi level must be (Elev. 190')	with Operation red as the wat approximately below the vess seating the h	er 48" el
4.21.24 */*	Lower the vessel.	vessel head u	ntil it is sea	ted on the
4.21.25	Assemble th (elevation necessary.	ne access pla 220 feet) to	tform from the the missile s	operating floo hield if
4.21.26	Reconnect t	the lift rig	leg turnbuckle	s.
		NOT	E	
	1		et or excessiv k the connecti	
4.21.27	point, disc head lift r	connect the p	crank to the	ine null load d cell from the right (clockwis
4.21.28	The load ce and stored.	ell may now b	e de-energized	, disconnected,
4.21.29	Remove and completed of	store the un iuring deware	derwater light ring of the ca	s if not alread vity.
4.22	REFUELING (CAVITY DECONT	MINATION	
	cavity per		301-C, "Decont	the refueling amination Of

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	aller a se lif his proposition is a stranger and color		an anna marainn an anna an	2 ¹ Million Market Market (1990) and a second s
4.23	INSTALLAT	ION OF TRANSFI	ER TUBE BLIND FLAN	GE
		NOT	ΓE	
			y be accomplished between Step 4.22 on of this	
4.23.1	Remove th the bolte	e two l/16-ind d flange. St.	ch brass plugs from	m the face of e use.
4.23.2 */*	Clean and	Visually chec	ck the mating surf	aces.
4.23.3	Install t should be	wo new quad r: coated with (ing seals. These GE Versilube 392.	seal gaskets
4.23.4	Using the fuel tran	davit arm, sv sfer tracks an	wing the blind fla nd down into posit	nge over the ion.
4.23.5	Clean the threads a Nickel Sp	ind head under	lts. Lightly lubr side with Never-Se	icate the bolt ez Pure
4.23.6 */*	in a two- ft-lbs in	step method ci	hand tighten. Tor ross pattern to a ss and then to a f ft-lbs.	value of 45
		NO	re	
		during the ma surveillance accordance w: 24960-1 for 1 for Unit 2,	testing in ith Procedure Unit 1 or 24960-2 "Containment No. 39 - Local	
4.24	STUD INST	ALLATION		
/		CAU	TION	
		holes are may	washers, and stud tch-marked by ust always be used	

 NOTE At the discretion of the Outage Area Supervisor, a second head lift may be added at this time to ensure that cavity decontamination or stud hole cleaning did not force particles into the vessel O-ring sealing area. Section 4.24.1 governs activities to perform the second lift. If no second head lift is required, skip to Section 4.24.2. 4.24.1 Second Head Lift Prior To Stud Installation 4.24.1.1 Remove the stud hole plugs as follows: 4.24.1.1.1 Using the stud hole plug removal tool's lower handle, insert the tool into the plug. 4.24.1.1.2 While holding the upper "T" handle in a fixed position, turn the lower "T" handle to the le The two plates will be decompressed to unlock plug from the hole. 4.24.1.1.3 Attach the installation-removal adapter by sc the adapter onto the plug. 4.24.1.1.5 Repeat Steps 4.24.1.1.1 through 4.24.1.1.4 un all stud hole plugs have been removed. 4.24.1.2 After each stud hole plug is removed, the stu must be inspected and dewatered and/or cleane manually, using Section 4.24.1.2.1, or may be cleaned using Section 4.24.1.2.2. 4.24.1.2.1 Manual Cleaning Method 4.24.1.2.1 A power nylon brush may be used provided a protective sleeve is slipped through the head down to rest on the top threads. A stainless brush may be used at the discretion of the cognizent Maintennee Foreman. This will pre 	he Outage ond head his vity d hole particles sealing governs the cond skip ud Installation s follows: oval tool's lower "T" the plug. handle in a fixed handle to the left. pressed to unlock the	MOCEDURE NO.	40-C REVISION JET JATES 16/00 PAGE NO. 41 OF 98
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 At the discretion of the Outage Area Supervisor, a second head lift may be added at this time to ensure that cavity decontamination or stud hole cleaning did not force particles into the vessel 0-ring sealing area. Section 4.24.1 governs activities to perform the second lift. If no second head lift is required, skip to Section 4.24.2. 4.24.1 Second Head Lift Prior To Stud Installation 4.24.1.1 Remove the stud hole plugs as follows: 4.24.1.1.1 Weing the stud hole plug removal tool's lower handle, insert the tool into the plug. 4.24.1.1.2 While holding the upper "T" handle in a fixed position, turn the lower "T" handle in a fixed position, turn the lower "T" handle to the le The two plates will be decompressed to unlock plug from the hole. 4.24.1.1.3 Attach the installation-removal adapter by sc the adapter onto the plug. 4.24.1.1.4 Lift the lower "T" handle and remove the plug the hole. 4.24.1.1.5 Repeat Steps 4.24.1.1.1 through 4.24.1.1.4 un all stud hole plugs have been removed. 4.24.1.2 After each stud hole plug is removed, the stu must be inspected and dewatered and/or cleane necessary. The accessible holes may be clean manually, using Section 4.24.1.2.1, or may be cleaned using Section 4.24.1.2.2. 4.24.1.2.1 Manual Cleaning Method 4.24.1.2.1 A power nylon brush may be used provided a protective sleew is slipped through the head down to rest on the top threads. A stainless brush may be used at the discretion of the cognizant Maintenance Foreman. This will pre 	ond head his vity d hole particles sealing governs the cond skip ud Installation s follows: oval tool's lower "T" the plug. handle in a fixed handle to the left. pressed to unlock the val adapter by screwing d remove the plug from ugh 4.24.1.1.4 until n removed, the stud hole red and/or cleaned as oles may be cleaned .1.2.1, or may be power .2.2. sed provided a through the head tole ads. A stainless steel cretion of the n. This will prevent g debris onto the		2
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protective sleeve is slipped through the head down to rest on the top threads. A stainless brush may be used at the discretion of the cognizant Maintenance Foreman. This will pre	through the head tole ads. A stainless steel cretion of the n. This will prevent g debris onto the	4.24.1.2.1	Manual Cleaning Method
already cleaned O-ring and mating surfaces.		4.24.1.2.1.1	protective sleeve is slipped through the head tole down to rest on the top threads. A stainless steel brush may be used at the discretion of the cognizant Maintenance Foreman. This will prevent the power brush from slinging debris onto the

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4.24.1.2.1.2	agent but	ohol or acetone may be used do not attempt to lubrication the head as excess lubrication	te threads
4.24.1.2.2	Power Cle	aning Method	
		CAUTION	
	pow cle is	not attempt to operate the ver brush or the vacuum aner unless the machine firmly in place in a stud e because:	
	ā.	The power brush is not supported for unrestrain operation and damage to drive may result.	ed the
	b.	The power bruch is not equipped with a guard, and may endanger the operator.	
	` c.	The vacuum cleaner may discharge partially filtered radioactive particles, creating an airborne contamination hazard.	
		NOTE	
	cle wit the mac	e brush drive and vacuum eaner power are interlocked th a limit switch, so that ey are de-energized if the chine is not firmly seated a stud hole.	
	hav Use bru the	e cleaning machine should ve nylon brushes installed. e of the stainless steel ushes shall be approved by e cognizant Maintenance reman.	
			λ.

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4.24.1.2.2.1	Verify that at least 3/4 inch of bristle remains the strip brushes and that the setscrews holding the strip brushes are tight.
	CAUTION
	The stud hole to be cleaned must be free of water to avoid damage to the paper vacuum filter.
4.24.1.2.2.2	Remove the storage cap from the end of the machine
4.24.1.2.2.3	Place the machine in a stud hole in the reactor head flange. Verify that the gasket sleeve is seated firmly in the reactor vessel head stud ho Adjust the 3/8 inch hex head bolt support feet a required.
4.24.1.2.2.4	Verify that the junction box is positioned such that the limit switch on the bottom of the box opens when the machine is lifted 1/8 inch. Adju the position of the box on the mounting bracket required.
4.24.1.2.2.5	Using the control switches, verify operation of vacuum cleaner and the power brush.
	NOTE
	The brush drive motor power is interlocked with the vacuum cleaner pushbutton switch (RUN), so that the vacuum cleaner and the brush drive operate together.
4.24.1.2.2.6	Press down on the T-handle swivel joint to extent the brush assembly down into the stud hole.
4.24.1.2.2.7	Using the UP/DOWN switch and the RUN switch, run the brush up and down the stud hole threads as required to clean the stud hole.
4.24.1.2.2.8	After cleaning the stud hole, pull up on the T-handle swivel joint to fully withdraw the bru assembly up into the brush tube.
4.24.1.2.2.9	The machine may then be moved to the next hole be cleaned, and the cleaning performed per S and 4.24.1.2.2.9.

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		an a sea ann an a	8 3/6/90	44 OL 36
4.24.1.2.2.1		pletion of the scorage of	cleaning opera cap.	tions, firmly
4.24.1.3			stud hole plug o not lock the	s back into the plug in.
4.24.1.4 <u>*/*</u>	Lift the 4.16.9.	head by per:	forming Steps	4.16.1 through
4.24.1.5	the therm	ocouple prot	tective sleeve	is not binding s or RCCA drive the load cell
4.24.1.6	the Outag load cell the previ	e Area Supe: readout fo: ously noted	rvisor. Const c any sudden +	ght determined antly monitor t /~5% change in dout which woul
4.24.1.7	Inspect t surface f debris.	he vessel f or cleanling	lange, if nece	ng seating eign objects or
		NOTE		
	wil lev (El	1 be require el must be ev. 190') be	ith Operations ed as the wate approximately elow the vesse seating the he	r 48'' 1
4.24.1.8	studs, al in holes Vessel In lowering cell read previousl	ign the head 12, 28, 44 spections at the head. out for any y noted load	d over the ves and mini guide	change in the
4.24.1.9		ocouple ali		er drive shaft enter the head
4.24.1.10	Lower the vessel.	vessel hea	d until it is	seated on the

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4.24.1.11	Assembl floor (, e the acce elevation	ss platform fr 220 feet) to t	om the op he missil	erating e shield.
4.24.1.12	Reconne	ct the lif	t rig turnbuck	les.	
		N	OTE		
	£		feet or excess ank the connec		
4.24.1.13	load po from th	int, disco e head lif	ll readout to nnect the pola t rig. Turn th to remove the	r crane l he crank	oad cell to the
4.24.1.14	The loa disconn	d cell may ected, and	now be de-ene stored.	rgized,	
		N	OTE		
	p		fall between and the guide	the	
4.24.1.15	sling t	hrough the	rane auxiliary access hole in head, remove	n the upp	er portion
4.24.1.16 */*	Using t guide s	he guide s tud sleeve	tud sleeve too: s.	l, remove	the three
4.24.1.17	removed	from usin	les that the gr g one of the c .1 or 4.24.1.2	leaning m	s were ethods in
4.24.1.18 */*	Repove	all remain	ing stud hole p	plugs.	
		N	OTE		
	r		4.1 includes t s of 4.24.2. 4.24.3.	he	
4.24.2	Frepara	tion For S	tud Installatio	on	

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		NOTE	
	p	Use a chainfall between the olar crane and the guide studs.	
4.24.2.1	sling t	the polar crane auxiliary h through the access hole in integrated head, remove th	the upper portion
4.24.2.2 */*	Using t stud sl	the guide stud sleeve tool leeves.	remove the guide
		NOTE	
	ин рио внир рио внир	If the studs, nuts, and was vere stored in their storag macks, then all stud hole blugs should be removed at this time. If they were st on the vessel head, then ea stud hole plug must be remo individually after the stud been lifted for stud collar removal.	e ored ch ved has
4.24.2.3 */*		all stud hole plugs in acc teps 4.24.1.1.1 through 4.2	
4.24.2.4	Clean t 4.24.1.	the stud holes in accordanc .2.	a with Section
4.24.3	Install	lation Of The Studs	
4.24.3.1		ne fast stud turnout tools, able), and necessary access	
4.24.3.2	lowered	integrated head cable tray d and the connector plate of t a temporary 480V power so shroud for the radial arm	ables reconnected
4.24.3.3	Electri	ic Tool Operation	
		NOTE	
	-	Any number (1-6) of tools can be used, (space and personnel dependent) or hand installation is allowed.	

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		CA''	TION		
	i w c o p t w	nto or out ithout the ompensator, ther device reload of a he stud wei	Id be thread of the vesse use of a sign crane scale capable of t least 1/2 ght. This the stud an ids.	l ght or a	
4.24.3.3.		k them to t	nout tools in their individ	to the reac ual radial	tor cavity arm
4.24.3.3.	2 Hook up compens	a regulate ator and ad	ed air supply djust to appr	to the air oximately 5	5 psi.
4.24.3.3.	radial compens head ho then re	hoist with ator to a sole. Remove emove the st	stored on th the turnout stud and lift and store t tud hole plug through 4.24.	tool and we the stud of he stud col as instruc	light but of the llar and ted in
4.24.3.3.	then the to remain	here will be ove at this	stored in the no stud col time. A stu out of the st	lar or stud d, nut and	hole plug
		N	OTE		
		The convex (point up.	side of stud	washers	
4.24.3.3.	hole. flange is pos	Ensure the and the nu	vidual stud i washer is pl t. The nut, as to not int on.	aced between if left on	en the head the stud,
4.24.3.3.		hread the s m of three	tud into the complete turn	vessel fla ns.	nge a
4.24.3.3	height	until the	ial arm hois compensator ately one in	cylinder ar	adjust the m is
4.24.3.3			yebolt locki d on the top		

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		NOTE	•
		While threading the state the vessel maintain the cylinder arm extension 2 to 8 inches.	e
		CAUTION	
		Use slow speed or a jc motion as the stud alm bottoms. This will pr locking the stud to th vessel or damaging the threads.	ost eciude e
4.24.3.3	forwar	the motor control swit d direction and, using eed, thread the stud i	the Variac to contro
4.24.3.3	approx	he stud has bottomed, imately 1/2 turn. Thi studs after tensionin	s will help to precl
4.24.3.3	eyebol	nect the stud spinout t locking cap above th ading the eyebolt.	
4.24.3.3	tools,	ll studs have been ins racks, etc., from the ding to the next subse	cavity prior to
4.25	STUD T	ENSIONING	
4.25.1	that t	and store the 54 stud here is no foreign mat hich could fall into t	erial on top of the
4.25.2	Do not	l an elongation measur allow rods to drop in and inaccurate measur	to the hole as rod

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NY TING STATISTICS	ali nang dani kana manifesi sa sa pang a dasaranan.	3/6/4	0
		NOTE	
		The acceptance criteria	
		for stud tensioning is b stud elongation; 0.051 i	
		t.002. QC must verify e	
	1	reading taken for the in	itial
		and final (after adjustm condition as recorded in	
	(columns 1 and 4 of Data	Sheet 1.
		All other intermediate e data and/or tensioner pu	longation
		are for information to g	et to
		the required final elong	ation
4.25.3	After t	the temperature of the v is have stabilized and a	essel, head, studs,
and the second s	equal,	take and record in colu	mn 1 of Data Sheet
	the ini	ltial condition readings	for all 54 studs.
		NOTE	
		Then setting and hooking	
		the stud tensioners, pay particular attention that	
		censioner #1 is hooked t	0
	1	the hydraulic pump and u in the $#46$ to $#54$ stud a	sed
		The remaining five tensi	oners
		are interchangeable in p (see Figure 1.).	osition
4.25.4	Lower t	the stud tensioners into the polar crane auxiliar	the reactor cavity
	each to	o its associated radial	arm hoist assembly.
4.25.5		n each tensioner near it	
		on, i.e., Tensioner #1 t 3 to #28, #4 to #19, #5	
1.05.6			
4.25.6		the hydraulic pump assem using the polar crane a	
	station	n it in the southwest co	rner for Unit 1 or
	floor a	ast corner for Unit 2 of area.	the elevation 194
4.25.7	Lower	the tensioner hoses into	the cavity and ha
		follows:	the cavety and not
			1

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		,
	F	igures 1 and 2 may be used as n aid to hose hook up.
4.25.7.1	high pr tension cylinde cap whi tip int it bott almost	the two, 12-foot long, 3/8-inch diameter, essure hydraulic hoses between the ers to the couplings on both sides of the r. To connect the coupling, remove the dust ch protects the body half and push the male o the body. Then screw on the collar until oms. The collar is a free fit and should spin on, however, it must be bottomed for traulic fluid to flow freely.
4.25.7.2	pressur between	the 12-foot long, 1/4-inch diameter, low the hydraulic hose (bypass valve signal) the tensioners to the union adapters i just above the high pressure couplings.
4,25.7.3	air hos	the black, 12-foot long, 1/4-inch diameter (piston return) between the tensioners to plings located on the front portion of the ate.
4.25.7.4	air hos couplin	t the red, 12-foot long, 1/4-inch diameter, se (air signal) between the tensioners to th ags located on the top left and right hand f the top plate.
4.25.7.5	diamete	t the single, 12-foot long, 1/4-inch er, air hose (air signal) between tensioner tensioner \$1.
4.25.7.6	Repeat the fix	Steps 4.25.7.1 through 4.25.7.4 for each of ve 12-foot long hose sets.
4.25.7.7	set bet in the	t each one of the hoses in the 35-foot long tween tensioner #1 and the pumping assembly same manner as the interconnecting hoses in 4.25.7.1 through 4.25.7.4.
4.25.8	through locate One or adequa	t an air supply to the pumping assembly h the two 1-inch female pipe connections d on the upper left hand side of the pump. both connections may be used to provide an te supply however, if only one connector is the other one must be plugged.

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WARNING

DO NOT CLOSE THE PUMP RELEASE VALVE OR PUSH THE AIR VALVE UNLESS ALL TENSIONER HOSES ARE CONNECTED AND THE TENSIONERS ARE FULLY SEATED ON THE VESSEL FLANGE WITH THE WEIGHT OFF THE HOIST ENOUGH TO LOCK THE PULL SYSTEM TO THE STUD, THERE-BY ACTIVATING THE LIMIT SWITCH.

NOTES

- a. When lowering a tensioner onto a stud, it is best to use the buddy system, i.e., one man operating the hoist while the other man guides the tensioner over the stud by use of the two handles provided on the front of the tensioner.
- b. Table 2 may be cut apart and taped securely to its respective tensioner to be used as a sequence guide in the tensioning operation.

4.25.9

Using the 'ndividual radial arm hoist assemblies, lower each tensioner over its first stud as seen on the sequence guide (Table 2).

4.25.10 Ensure that each tensioner is seated flush on the head flange and that the tensioner pull system is locked to the stud.

NOTE

If adjustment of stud tensioners is required, adjustment may be performed without the need for a Maintenance Work Order.

4.25.11

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Close the release valve on the pumping assembly then depress and hold the air valve.

CAUTION

Maximum hydraulic pump pressure shall not exceed 9500 psi.

And and a second se		REVISION	PAGE NO.
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4.25.12		, e pumping operation un l) for that particular	
4.25.13	reached holes i	e appropriate pump pre , insert the torque ha n the upper portion of in the clockwise direc	ndle into one of the the spherical nut a
		NOTE	
	t v h	o torque, the pivot pi orque handle must be i ertical position. The andle is marked to ind his proper position.	n a torque
4.25.14	handle	e nut bottoms, apply f until an audible click e nut at a preset torg	t is heard. This wil
4.25.15		e release valve and al to zero.	llow the pressure to
		CAUTION	
	i i M r	ull system release of s activated by taking n the tensioner lift m ake sure pull system i eleased before continu f tensioner.	up slack mechanism. Is
4.25.16		ly raise the tensioner he individually attack	
4.25.17		l tensioners are clear ove all tensioners in	
4.25.18 <u>*/*</u>		e Steps 4.25.9 through d all passes (Table 1)	
4.25.19	six ten	e two passes have been sioners clear. Take a column 2 of Data Shee	and record elongation
4.25.20		ce the amount of reside	dual elongation (colu

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PROCEDURE NO. VEGP	93240-C	REVISION	4 -37	JAC AL	PAGE NO.	53 of 98
		, }	NOTES	-	and the second	
	æ.	adjust down t adjust with a	and nuts ment but ment pas chalk 1 tion of i ent.	used f s durin ses may ine to	or locki g be mari allow	
	b.	requir need r tensic connec stud b start locked need r and do spheri	adjustme red, then not apply oners hyd ted must before pr If a t i to a st readjustm own witho lcal nut ation wit	a set ; howev raulica be loc essuriz ensione ud whic ent, pu ut movi should	sequence ar, all lly ked to a ation ma r is h does n mping up ng the leave in	l ay not
	c	to be guide press. requit	4.25.21 used as Variat re or nu red to br ation int	a basic ion in t posit ing stu	adjust: pump ion may d	nent -/
4.25.21	elongati	st studs v Lon, pump s torque h	up to 70			
4.25.22	elongat: nut off	one full	up until turn (18	nuts a holes)	re free , then :	. Back the
		1	NOTE			
	a ti	hen adjust particula he elongat tuds.	ar stud i	t may a	ffect	
4.25.23 */*	and all Take and	54 guide	are with the final	in limi elongs	ts, con	een adjusted tact QC, adings in
					1	

1 FM 21 11		REVISION	PAG PAG	E NO
VEGP	93240-C		E 3/5/96	54 of 98
4.25.24	specifi	ed limits	ave been tensioned and rement from the cavity	emove all
4.25.25	Remove	and store	the elongation mean	suring rods.
4.25.26	Lightly with N5	lubricat	e the 54 stud top so nstall.	rew inserts
4.26	SEAL TA	BLE PREPA	RATION	
/			NOTE	
	a 4	.19 but m	4.26 may be ed any time after ust be completed ubsection 4.32.	
4.26.1	accorda	nce with	ill be prepared for Procedure 93280-C, ' einsertion For Refue	'Flux Thimble
4.27 */*	INSTRUM	ENT PORT	- CONOSEAL ASSEMBLY	
			NOTE	
*	8. 10	ny time a	may be accomplished fter Step 4.25 but mpleted prior to Ste	p
		C.	AUTION	
	C 1 C O V U a	leanlines mportance herefore, ontinuous peration erify tor se clean	embly of the conoses s is of the <u>utmost</u> in the seal joint; QC should ly monitor this for cleanliness and guing requirements. lint-free cotton ber gloves for this on.	1,
4.27.1	the the	rmocouple	ble shroud door. Re protective sleeve s e, and O-ring.	
4.27.2	Clean t gasket by demi	with acet	flange and new lowe one or isopropyl alo	er conoseal .

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PROCEDURE NO.		REVISION	1	PAGE N	O
VEGP	93240-C	an to develop a sub-stands and states to sub-state	+8 3/	140	55 of 98
4.27.3	Ensure mating scratch	areas are	asket and f clean and f	lange, esp ree of nic	ecially the ks or
4.27.4	Make si	points town	a apex of th	he cone fo	rmed by the
4.27.5	support with ac	the upper so t column and tetone or in ralized wate	d the new up sopropyl al	pper conso	thermocouple le gasket owed by
4.27.6	Ensure clean s	that the ga and free of	asket and so nicks or so	ealing sur cratches.	face are
4.27.7	Make su	points town	apex of th	he cone fo	t column. rmed by the Containment
4.27.8	acetone	the male fla or isoprop mineralized	yl alcohol	ld ring (i followed	f used) with by rinsing
4.27.9	Ensure areas a	that the matrice clean as	ale flange, nd free from	especiall nicks or	y the mating scratches.
. 4.27.10	and pla	the male fla	flange on	the femal on the low	emale flange, e flange er gasket.
4.27.11	the fla before the loc rotatin	the the load inges. The or after se king flange ig it approvious are in	ing device a loading dev stting on the of the load cimately 15	and slip i vice may b he conosea ading devi such tha	t down over e assembled 1. Engage ce by t the
4.27.12	of Neol interio	ube #1 or ; or contact ; or contact ;	2 to the bo	olt thread he clamp a	nd the

55A

Add Note between 4.27.10 and 4.27.11

NOTE

THE CLD STYLE HOLLOW LOADING RAM OR NEW STYLE VICHTWEIGHT LOADING RAM MAY BE USED TO ASSEMBLE CONOSEALS.

	a	asse in t resp Abou load the . When	embly be their pro bect to t at 1 inch ing devi	ce to be	bolts are ion with g device. bolt and allow the
		asse in t resp Abou load the . When	mbly be their pro bect to t it 1 inch ing devi ling devi	sure the per locat he loadin between ce should ce to be	bolts are ion with g device. bolt and allow the
	b		And the second second		
		appi thre for	oling bol roximatel se will p	ts, keep y even so rotrude f otter pin	ar enough
4.27.13	Install three b			RTTACH	MENT CAMELY
4.27.14	using t	he hand i is re	pump. A quired fo	h pressure or proper	hydraulic cylinder between 1275 to sealing. This d pump gage.
4.27.15	loading	device	, torque approxima	the three ately 25 t	375 psi on the bolts uniformly in to 30 ft-lbs until a is obtained.
4.27.16	pressur	re. Rot	is compleate the ion and	loading de	ase the hydraulic avice to the
			NOTE		
	(bled in	ce may be order to	
4.27.17		t the bo			bolts and bend o prevent bolt
4.27.18	thermo pre-in	couple d	prior to	Up to 4 j	w plate to the ackscrews may be nt to the

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4.27.14 SLOWLY PRESSURIZE THE HOLLOW CYLINDER LOADING RRN TO BETWEEN 1275 PSI AND 1375 PSI OR THE LIGHTWEIGHT LOADING RAM TO BETWEEN 5650 PSI AND 6100 PSI.

4.27.15 WHILE MAINTAINING THE CORRECT PRESSURE ON THE LOADING RAM, TORQUE THE THREE BOLTS UNIFORMLY IN INCREMENTS OF APPROXIMATELY 25 TO 30 FT-LBS UNTIL A FINAL TORQUE OF 50 TO 60 FT-LBS 15 OBTAINED.

EGP	93240-C	-	7 31 MP2/140	57 of 98
	Clean at	And the second se		
	Clean at		And a second	a ben binnen et und die Antonionen under weiter verstanden. In weiter under
.27.20		nd install the ouple support i	split ring to ring.	the
	the jack		n coat of Neolu install it thro	
4.27.21	pattern	in approximate	ws uniformly in ely 30 in-1bs in to 105 in-1bs i	ncrements until
4.27.22	Install	locking wire	to prevent scre	w rotation.
4.27.23 */*	Repeat	Steps 4.27.1 thent port conos	hrough 4.27.22 eals have been	until all four completed.
		CAUTIO	N	
	دا	o NOT twist the hermocouple con eassembly.	e knurled nnectors during	
4.27.24	connect: 144-180	ors, corque the inches-pounds	ipred with Cona e 1/2-inch comp while holding prevent rotati	ression cap to the connector
4.27.25	Connect	all thermocoup doors. Documen	ple connectors. nt on Data Shee	Close the t 4.
4.28	CAVITY	PREPARATION		
		NOTE		
	81 t:	tep 4.28 may be ny time after 3 ime prior to pr ompletion.	e accomplished Step 4.22 or an rocedure	у
4.28.1 <u>*/*</u>	emergen drain s studs an Never-S two-step torque	cy containment creens by clear nd nuts and un eez Pure Nicke p cross pattern	two blind flang spray returns. ning and coatin derside of the l Special. Tor n method with 5 first step. F imum.	Replace the g threads on nut with que nuts in a 0-60% of final

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VEGP	93240-C 787 14/0 58 of 98
4.28.2	Invert and reinstall the eight refueling cavity
4.28.2	ventilation opening cover plates (slotted plate
And inclusion	down) using the same EPDM gasket which was
	previously installed. Coat threads with Never-See
	Pure Nickel Special. Tighten the 1/2" bolts to a
	snug tight fit.
4.29	HEAD VENT PIPING
4.29.1	Remove and store the blank flange on the cavity
418311	floor penetration for the RV head vent line.
	avor penetration for the ny head vent sine.
4.29.2	Install the head vent lines using nev 25001b.
4.29.2 */*	spiral wound gaskets. Coat threads with Never-See
	spiral wound gaskets. Coat threads with Never-See Pure Nickel Special. The flange bolts, shall be
	torqued in a 3 pass cross pattern to a 300 ft-1bs
1 20	DELCTOR DECCES (FUEL INCOMING MICH CHAMPLE ON A STATE
4.30 */*	REACTOR VESSEL LEVEL INSTRUMENTATION SYSTEM (RVLIS
mana	
4.30.1	Install the RVLIS tubing. Swagelok fittings are
	tightened hand tight plus 1/4 turn.
4.31	INSTALLATION OF THE REACTOR HEAD INSULATION
	NOTE
	Head insulation may be installed
	anytime after Step 4.25.26.
4 23 3	Redes several as standay, had seen us
4.31.1	Using appropriate rigging, hand maneuver each
	section of the Reactor Vessel Head insulation into
	place. Start with the section designated for azimuth 0°.
	Beluden V .
4.31.2	Continue placing sections around the head until al
/	sections have been installed. Insert section
	fastener devices and tighten to a snug tight fit.
	N
4.32	RV FILL AND VENT
	NOTE
	Reactor vessel filling can
	start at any time after Slep
	4.30.
1 33 1	BV 64114ms and working and second tabled in
4.32.1	RV filling and venting are accomplished in
	accordance with Procedure 13001-1 or 13001-2, "Reactor Coolant System Filling and Venting", as
	applicable.
	abberrance.

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VEGP	93240-C	REVISION	767 HB/1/0	PAGE NO. 59 of 98
4.33	CABLE R	, ECONNECTION	n neuronau anno 1999	
		NOT	E	
	c o h a w	onnection of ccur any tim owever, due round the he ait until la	able trays ar all cables m e after Step to interferen ad it is best te in this start this wo	ney 4.22: nce to
4.33.1	Disconn from th	ect temporar e integrated	y 480V power head shroud.	cable (if used)
4.33.2	Unlatch	the cable t	ray from its	stored position.
4.33.3	pivot t restrai	he cable tra nts at the s may be used	y downward to hroud. Alter	cable tray winches, o the tray rnate lifting ble trays should the
4.33.4	Latch t	he shroud ca	ble tray res	
4.33.5	Repeat cable t	Steps 4.33.2 ray.	through 4.3	3.4 for the other
4.33.6 <u>*/*</u>	outside	of the connection on Dat	ector plate.	able tray to the Document cable
4.34	SEISMIC	TIE RODS		
4.34.1			from its sto vity wall lug	red position and
4.34.2	Remove tie roo	the cotter p i clevis and	maneuver the	cting pin from the clevis to the lug.
4.34.3	Instal	the connect	ting and cott	er pine.
4.34.4	Repeat six tie	Steps 4.34.3 rods.	l through 4.3	4.4 for each of the
4.35	Remove to the	the access p missile shi	platform from eld and all t	the operating floor cools and materials

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VEGP	93240-C	APPENDIN APPENDENC. 60 OF 98
4.36	Notify t re-assem	, the Shift Supervisor the reactor has been abled for operation.
5.0	REFERENC	ES
5.1	1X6AB02- Reactor	70 (2X6AB02-145), Instruction Manual, Vessel Unit 1/2)
5.2	X6AB02-2 Head Pac	31, Technical Manual, Four-Loop Integrated kage
5.3	X6AB02-1 Quick Ac	43, Operating and Maintenance Manual, ting Stud Tensioners Unit 1/2
5.4	X6AB02-2 Stud Rem	07, Instruction Manual, Reactor Vessel loval Tool Unit 1/2
5.5	X6AN09-6 Unit 1/2	3, Technical Manual, Fuel Transfer System
5.6	X6AQ02-1 Preopera	9, Westinghouse F Specification F-2 tion for Refueling Unit 1/2
5.7	X6AB06-8 Instrume	6, Westinghouse Assembly Specification, Intation Port Column Assembly Unit 1/2
5.8	X6AB02-1 Insulati	71, 190, Drawing, Reactor Tophead on Field Erection
5.9	X6AB02-1 System	53, 222, Technical Manual, 450A Load Cell
5.10	PROCEDUR	ES
5.10.1	00254-C,	"Plant Housekeeping/Material Condition Program"
5.10.2	12007-C,	"Refueling Entry"
5.10.3	13001-1,	"Reactor Coolant System Filling And Venting"
5.10.4	13001-2,	"Reactor Coolant System Filling And Venting"
5.10.5	13005-1,	"Reactor Coolant System Draining"
5.10.6	13005-2.	"Reactor Coolant System Draining"

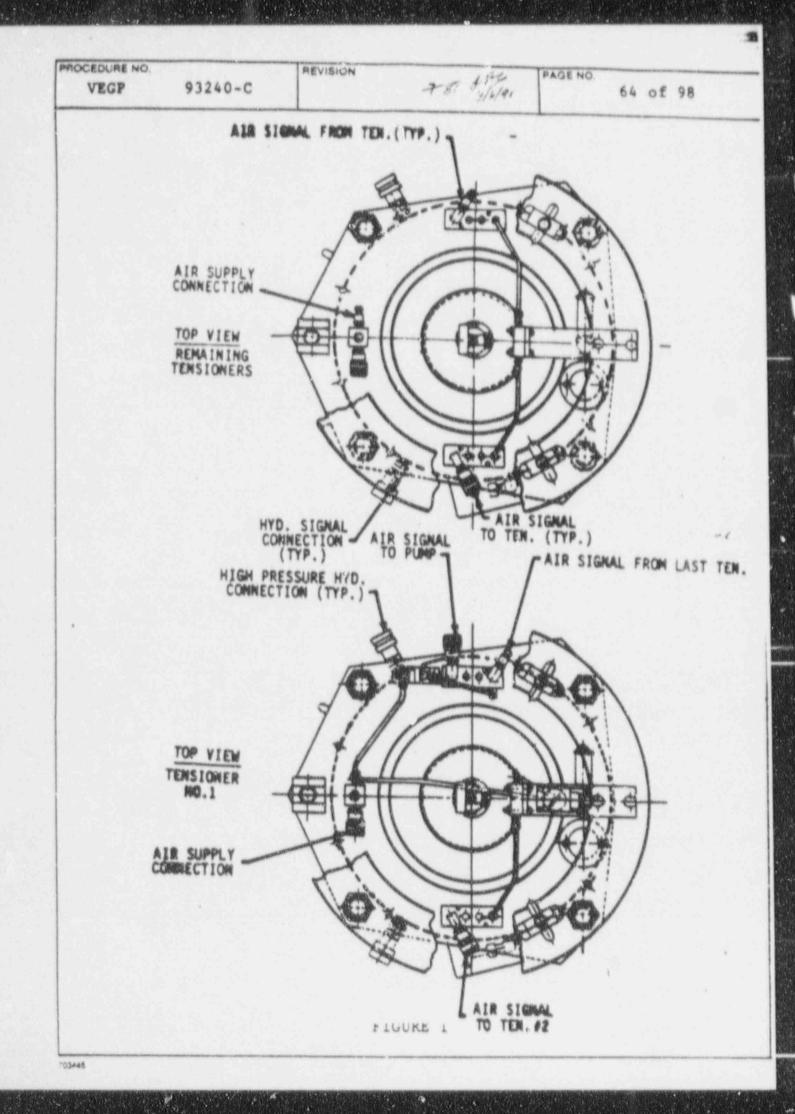
PROCEDURE NO. VEGP	93240-C	REVISION JAI State PAGE NO. 61 of 98
5.10.7	20425-C,	"Control Of Refueling Lifting And Rigging Equipment"
5.10.8	27305-C,	"Reactor Polar Crane Service Check"
5.10.9	27315-C,	"Spent Fuel Cask Monthly And Annual Check Out"
5.10.10	24960-1,	"Containment Penetration No. 89 - Local Leak Rate Test"
5.10.11	24960-2,	"Containment Penetration No. 89 - Local Leak Rate Test"
5.10.12	43002-C,	"Airborne Radioactive Sampling And Evaluation"
5.10.13	43007-C,	"Issuance, Use, And Control Of Radiation Work Permits"
5.10.14	43301-C,	"Decontamination Of Areas, Tools, And Equipment"
5.10.15	55023-C,	"Incore Irradiation Specimens"
5.10.16	93100-C,	"Refueling Tools And Equipment Preservice Inspection/Checkout"
5.10.17	93140-C,	"Control Rod Drive Shaft Unlatching Tool Operating Instructions"
5.10.18	93280-C,	"Flux Thimble Withdrawal And Reinsertion For Refueling"

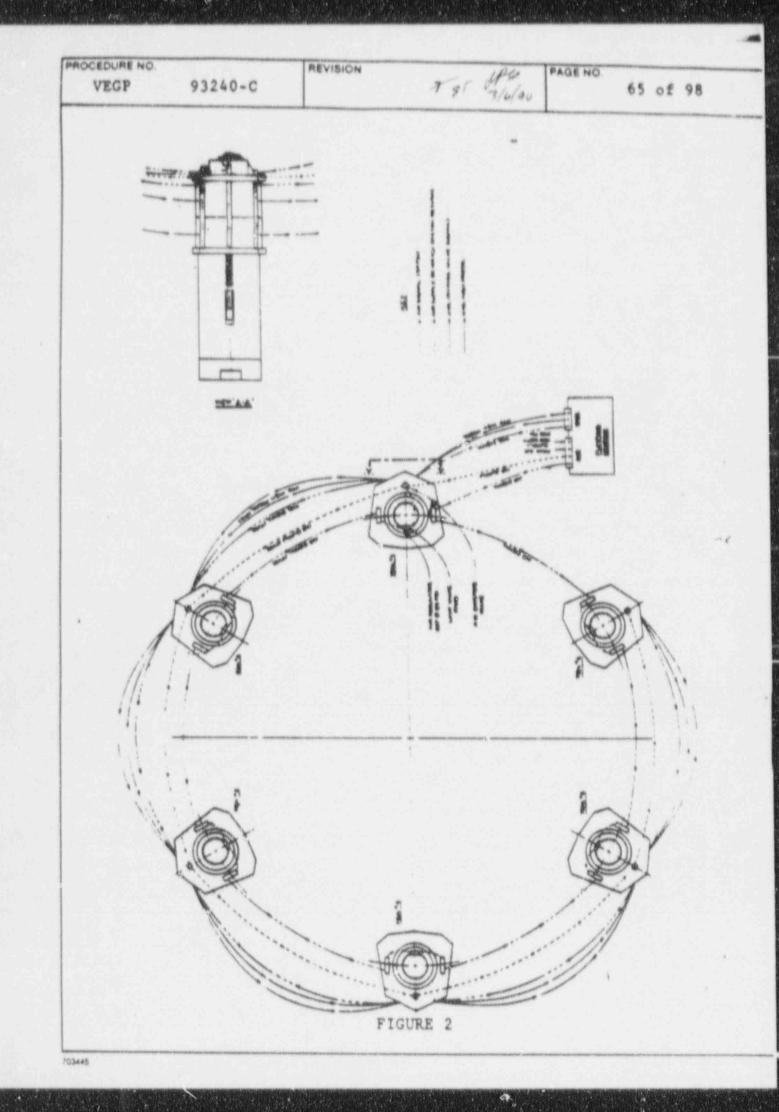
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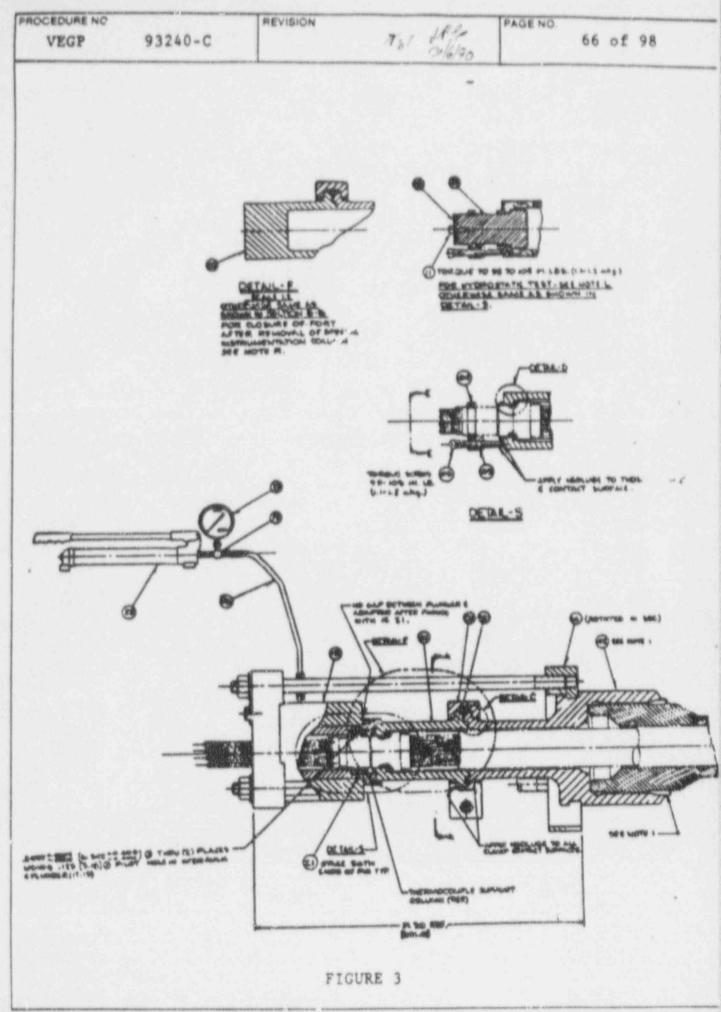
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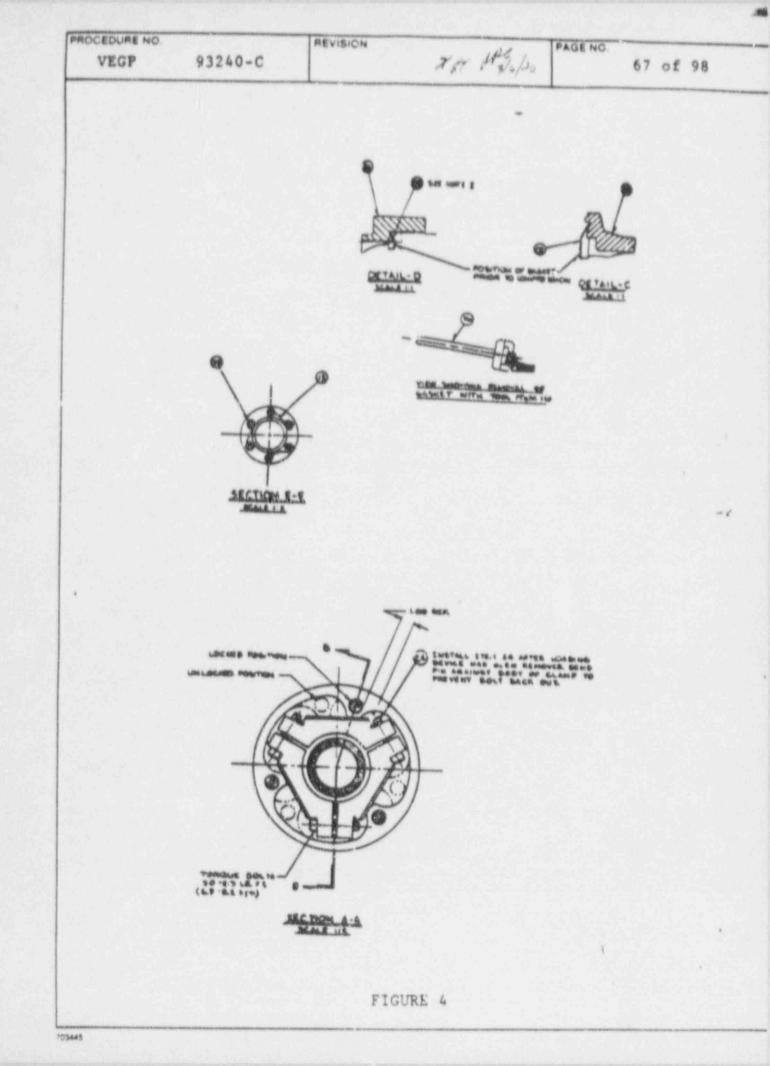
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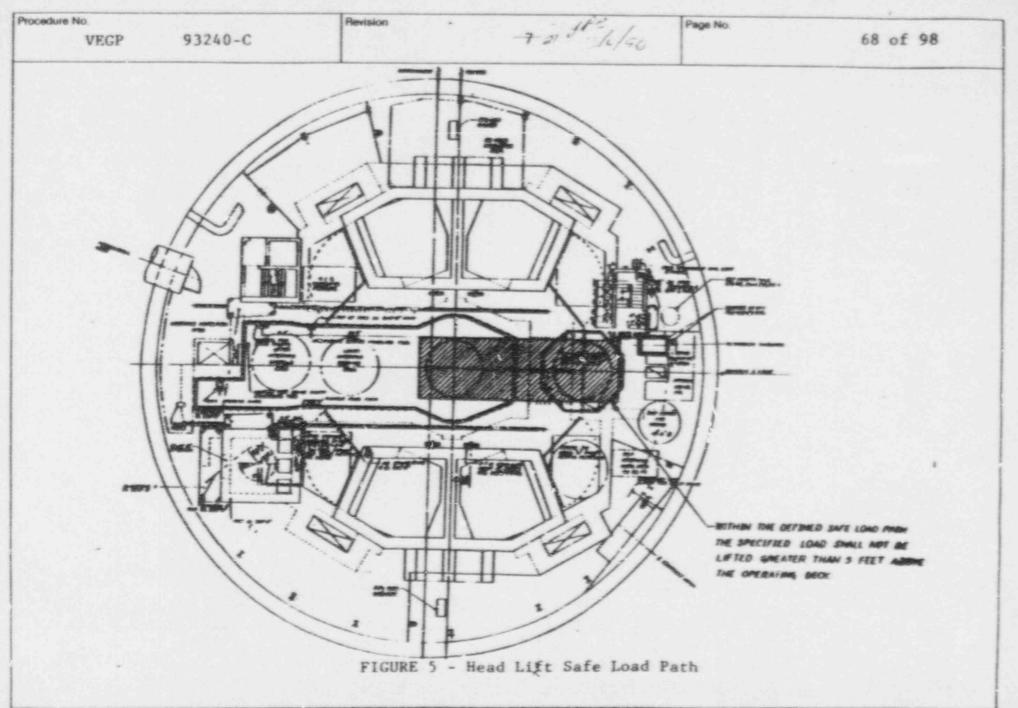




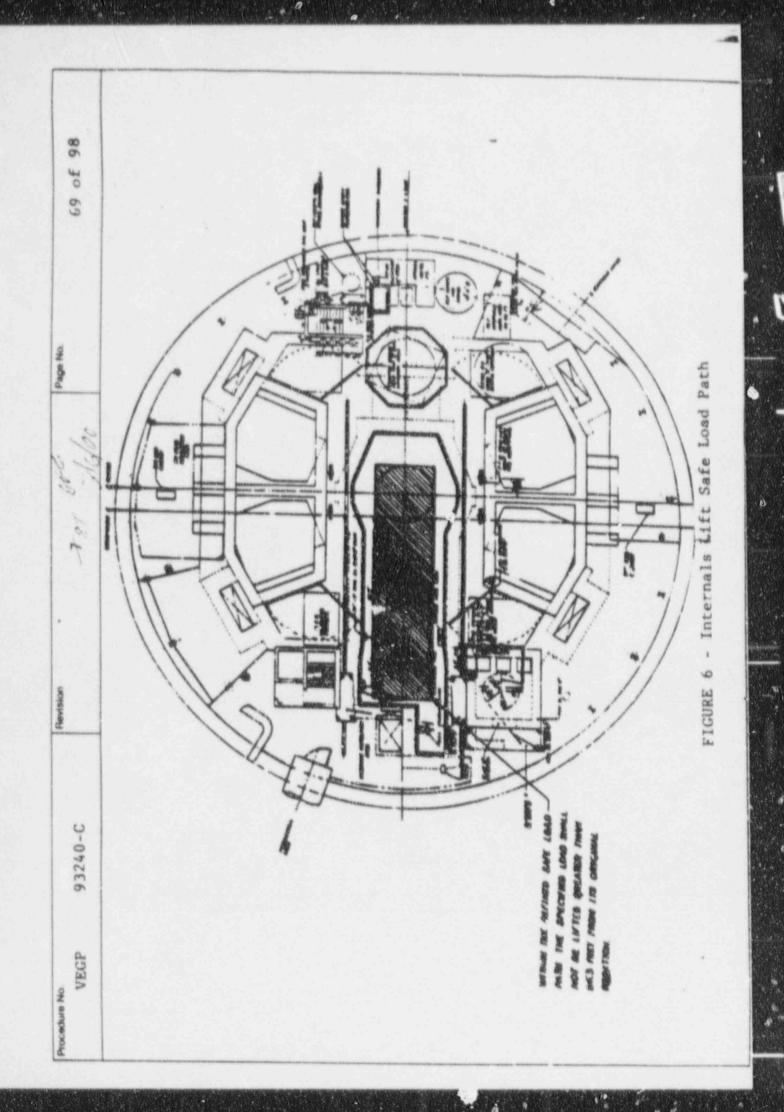
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21 22 23 24 25 26 27 28 29 30 31 32 33					
21 22 23 24 25 26 27 28 29 30 31 32					

distantia anna a	93240-0	:		×81 Hz	Cho PAGE		71 of 98
						Sheet	2 of 2
			DA	ATA SHEET 1			
NAMES OF STREET	ELON	CATIO	N DATA	SHEET FOR OPE	RATIONAL	LOAD	ter de destructur antenario de las
Stud No.	Initial Dial Indicator Reading	Dial Indi Read Afte 2nd	cator ing r	Amount of Residual Elongation After 2nd Pass (Column 2-1)	Dial Indicat Reading After Adj. Pa		Amount of Res. Elong After Adjustment (4-1)
36 37 38 39			rendenins, seren de an Rene (Ren desarte desard Rene (Rene desarte desarte Rene (Rene desarte desarte)		nan an		
40 41 42 43		nan da santa sa	anna an		rian anna ann ann ann ann anna 16, for tha anna an Connaiste 16 anna 16 an Anna an Annaiste 16 anna 16, de Annaiste an Annaiste	n a gall "gill and a sold". San March Inne fan Gers, maar ji March Inne fan Gers, die and Charl Para March Inne fan sonaal s	
44 45 46	generation promotion de la construction de		Management and the second s Management and second		n de la construction de la construction en de la construction de la construction francés de la construction de la construction de la construction de la construction de la construction	anna an ann an an an Stainig an an an t-sain	
47 48 49 50	nep caracteristication and region to the second and an and a Court of the second		en anna fachta an achar an a' thagaire dha thanna an		1976 (1997 (ari an	27
			Road and the second second			-	
51 52						an na maaalay ing amayaa	
51 52 53 54			an a			an de la companya de La companya de la comp	
51 52 53 54 Dial 1	ndicator use ation good u	id intil			Sum =		
51 52 53 54 Dial 1	ation good u	intil	ual Eld	ongation = Sum	and the diff of the second second second	01-10-11-11-11-11-11-11-11-11-11-11-11-1	
51 52 53 54 Dial 1	ation good u	intil	ual Eld	ongation = <u>Sum</u>	and the diff of the second second second	84.500 (1999) 1999 1999 1997	
51 52 53 54 Dial 1	ation good u	intil	ual Eld	ongation = Sum	and the diff of the second second second		
51 52 53 54 Dial 1	ation good u	intil	ual Eld	ongation = <u>Sum</u>	and the diff of the second second second		
51 52 53 54 Dial 1	ation good u	intil	ual Eld	ongation = Sum	and the diff of the second second second	8	
51 52 53 54 Dial 1	ation good u	intil	ual Eld	ongation = Sum	and the diff of the second second second		
51 52 53 54 Dial 1	ation good u	intil	ual Elo	ongation = <u>Sum</u>	and the diff of the second second second		
51 52 53 54 Dial 1	ation good u	intil	ual Eld	ongation = Sum	and the diff of the second second second	16 16 16 16	

VEGP	93240-C	REVISION	Aug He	PAGE NO.	72 of 98
		DAT	A SHEET 2	- She	et 1 of 5
	VESSE	L DISASSEN	BLY COMPLETI	ON SHEET	
			NOTE		
	sp ap re	pace for the plicable a	n the SIGN-OF nose sections and note in t tion the reas	not	
STEP	DESCRIPTION			SIGN-OFF	Q.C. VERIFICATIO
4.0	Prerequisite Conditions f (3.1. and 3. completed (s Item 5)	for the pro (4) have be	ocedure en		
4.2	Equipment fo (3.2) has be and is avail (see Attachm	able for u	i out 1se	/	
4.2.5	Seismic tie locked in th 45° azimuth 135° azimuth 225° azimuth 262° azimuth 278° azimuth 315° azimuth	ne upright			
4.3.7	Cables disco locked in st 0° azimuth 180° azimuth	ored posit	nd cable tray tion	<u> </u>	
4.3.8	Temporary ra cable connect	dial arm h ted if rec	noist power juired		
4,4,4	RV head insu stored	lation rep	noved and		
4.5	RV water lev below flange				
4.6.3	Head vent sp stored	ool piece	removed and		
4.6.6	Head vent se	al flance	installed	1	

PROCEDURE NO.		REVISION	PAGE NO.	
VEGP	93240-C	701 the 3/ 1/	40	73 of 98
		DATA SHEET 2	- She	et 2 of 5
	VESSE	L DISASSEMBLY COMPLETIO	ON SHEET	
STEP	DESCRIPTION		SIGN-OFF	Q.C. VERIFICATION
and the second s	Statistics and states a suggestion of the		DIGN-OFF	VERTFICATION
4.7.2	RVLIS interc and stored	onnect tubing removed		
4.8.1	refueling an been withdra	as been prepared for d the thimbles have wn 13 feet 8 inches or ches minimum (line out	/	
4.9	this section	ools and equipment for have been checked out lable for use (see , Item 2)	/	
4.9.16		ponents removed, d stored. Protective alled		- (
	Core Location	Approximate Azimuth		
	A-5 L-1 L-15 R-11	247° 147° 23° 67°		
4.10	Conditions (subsection h	s and Initial 3.6) for this ave been completed. ent 1, Item 2)		
4.10.18	Operational	Pass 1 2		

VEGP	93240-C	REVISION	r UB	PAGE NO	
VEGE	93240-0		Tor Ste	40	74 of 98
		DATA S	HEET 2	- She	eet 3 of 5
	VESSI	EL DISASSEMBL		ON SHEET	
STEP	DESCRIPTION			SIGN-OFF	Q.C. VERIFICATIO
4.11.19	vessel in ra all stud hol	s removed fro acks with the le plugs inst 28, 44 and 30	head and alled	/	
4.11.23		installed in 30 if applica	holes 12, ble.		
4.13.1.4	Emergency Co installed,	ontainment Sp North	oray drains	1	
		South		1	
4.13.2.3	Reactor cavi cover plates	ity ventilati installed	on opening		
	Approximate 22° 67° 112° 157° 202° 247° 292° 337°	Azimuth			
4.13.3.4	ISI Ports in	nstalled			
	Approximate 0* 45* 90* 135* 180* 225* 270* 315*	Azimuth			
4.13.4.1	Reactor Vess seal has bee	sel permanent en visually c	cavity hecked		
4.13.5	Reactor cavi	ty sealing c	omplete	1	

VEGP	93240-C	REVISION TET HE	PAGE NO.	
VEGF	93240-0	7 7 7/2/	\$13	75 of 98
		, DATA SHEET 2	- She	et 4 of 5
	VESSE	L DISASSEMBLY COMPLET	ION SHEET	
STEP	DESCRIPTION		SIGN-OFF	Q.C. VERIFICATIO
4.14.1	An "as found	" Seal Integrity Test		
4.14.5	has been per Transfer tub prepared for	e blind flange		
4.15.3	Preparation complete	for cavity flooding	/	
4.16	have been ch	.3) for this section ecked out and are r use (see Attachment	1	
4.16.7	Ten minute h of rigging c	old for visual checks ompleted	/	
4.16.14	Reactor Vess and stored	el Head is removed	/	
4.17	RCCA drive s	hafts unlatched	/	
4.18		.3) for this section h out and are available		
4.18.1	Optional int	ernals measurements.		
	Location Location	Value Value		
4.18.9	Ten minute h of rigging c	old for visual check ompleted		
4.18.12	Upper Intern	als removed and stored	1	

VEGP	93240-C	REVISIO	47	danga/as	PAGE NO.	76 of	98
Remarks:				k	Sheet	: 5 of	5
and the second second							
Water of a second second second second							
Amount for a set of the set of the set				an allegan and the investigation	ana akaosan makemb		
		nitraation in personal related	an to see the south and the south point which we are				
		an a	adenti o anantorianan provinsi terbarinten	for els general sub-come			
Casher or extension of the street	en oder gehannt gehante erne gehadet.		and the party of the party of the factor	national and the second second			
and an an and the state of the	na alter di san set di sa di sa set di						
	NAMES OF TAXABLE ADDRESS OF TAXABLE ADDRESS				analogo atazerri ^m enio crioria		
Charles and the particular second in 1940							
And							
			antana ang mang dag meningkan aka at antang s	ana ana amin' a			
			antenare destante de provincien de la substituir Al companya de la substituir de la substituir de la substituir				
The Reacto	or Vessel	is ready	for refueling		ions to	begin	
The Reacto	or Vessel	is ready	for refueling	operat		begin	1.
The Reacto	or Vessel	is ready		operat		begin	1.
The Reacto			for refueling	operat	N	begin /	DAT
The Reacto	or Vessel REVIEWED		for refueling	operat	N	begin /	DAT DAT
The Reacto			for refueling	operat	N	begin	DAT
The Reacto			for refueling	operat	N	begin	DAT
The Reacto			for refueling	operat	N	begin /	DAT
The Reacto			for refueling	operat	N	begin	DAT
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The Reacto			for refueling	operat	N	begin	DAT
The Reacto			for refueling	operat	N	begin	DAT

VEGP	93240-C	REVISION 77 d	to bo PAGEN	77 of 98
		DATA SHEET 3	~ S	heet 1 or 5
	VESS	EL ASSEMBLY COMPLETI	ON SHEET	
		NOTE		
	sp ap re	ace an N/A in the SI ace for those section plicable and note in marks section the re or the N/A.	the	
STEP	DESCRIPTION		SIGN-OF	Q.C. F VERIFICATIO
4.19	to commence,	s ready for nd work is ready (3.1, 3.2, 3.3 e (see Attachment	/	/
4.19.3		old for visual ging completed		
4.19.6	Upper Intern the RV	als installed in	/	_
4.19.10	The lift rig stand	is stored on		
4.19.12	Optional int	ernals measurements:		
	Location Location	value		-
4.19.13	Outage Area Evaluacion:	Supervisor		
	Acceptable/N	lot Acceptable		
4.20	RCCA drive a	hafts latched		_
4.21	have been ch	.7) for this section ecked out and are r use (see Attachmer		

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			SHEET 3 -	She	et 2 of 5
	VES		Y COMPLETION S	SHEET	
STEP	DESCRIPTION			SIGN-OFF	Q.C. VERIFICATION
4.21.11	Vessel O- head	rings are i	nstalle≁ in	/	
4.21.18		e hold for rigging com			
4.21.24	Head is s	eated on ve	ssel .		
4.23.2	Transfer checked f	tube mating for cleanlin	surfaces ess.		/
4.23.6	Transfer installed	tube blind	flange		/
	Torque Wr	rench M&TE N	0		
	Calibrati	on good unt	11 ·····		
4.24	(4.1°) fo been chec available	te tools and or this sect ked out and for use (s it 1, Item 3	ion have are ee	/	
4.24.1.4	From Step hold for completed	4.16.7: T visual chec	en minute ks of rigging	1	
4.24.1.16 or 4.24.2.2	Guide stu	ids and slee	ves removed .	/	
4.24.1.18 or 4.24.2.3	All stud removed	hole plugs	have been		
4.24.3.4.1	2 All studs in the ve	s have been essel	installed .		

OCEDURE NO.		REVISION		PAGE NO.	the fact wait on the west property of the fact the second second second second second
VEGP	93240-C		Tor May	15	79 of 98
		DATA S	SHEET 3 -	She	et 3 of 5
	VESS	EL ASSEMBLY	COMPLETION	SHEET	
STEP	DESCRIPTION			SIGN-OFF	Q.C. VERIFICATION
4.25	equipment (3.6) have and are av	able tools a for this sec been checke ailable for	ction ed out use		
		chment 1, Ite			/
4.25.3	Initial stud measurements recorded	i elongation have been		/	
4.25.18	Stud Tension 1st pass 2nd pass 3rd pass (hy		complete		
4.25.23	All studs ha the required				/
4.26	The seal tab for system f			/	
4.27	(3.8) have t	nt for this been checked le for use (section out and	/	

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PROCEDURE NO. VEGP	93240-C	REVISION	A & the	PAGE NO.	80 of 98
		, DATA	SHEET 3	She	et 4 of 5
	100			OUPPT	
	VES	SEL ASSEMBL	Y COMPLETION	SHEET	
STEP	DESCRIPTION			SIGN-OFF	Q.C. VERIFICATION
4.27.23	Instrument passembled	port conose	als		
	Core Location	Approxi Azimuth			
	A-5 L-1 L-15 R-11	247° 147° 23° 67°		4	
	Torque wren	ch			
	ft-1bs M&TE	No.	_ Calib. goo	d until	
	in-1bs M&TE	No.	_ Calib. goo	d until _	Internet database
	Pump Gauge M&TE No.	etter tallet and set a react on a second	Calib. goo	d until _	-
4.28.1	blank flang	containment ses removed aced in dra	spray drain and stored. Hig		
		North			
		South		/	-
4.28.2	All eight a plates inst position.	ceactor vest talled in th	sel vent he vent		
4.29.2	RV head ver	nt spool pi	ece installed	1 /	
4.30	RVLIS inter	rconnect in	stalled	/	
4.31.2	Reactor He	ad insulati	on installed		
4.33.6	Cable tray cable recor	latch down nnected	and all		
4.34	for this s checked ou	tools and ection have t and are a ee Attachme	been		_

12.5. VIRCHORD MODEL BOTH ADDRESS. CONTRACT ADDRESS OF THE			7.91	PT (2)	1/40	°. 81	of 98
	levid - we have		n man di kalan na ang katang	ing names of states and set	Sł	neet 5	of 5
		DATA S	SHEET 3				
VESSE	LAS	SEMBLY	COMPLET	TION	SHEET		
DESCRIPTION					SIGN-OFF	VERI	.C. FICATIO
Seismic Tie R	ods	install	led				
45° Azimuth 135° Azimuth 225° Azimuth 262° Azimuth 278° Azimuth 315° Azimuth					4		
Shift Supervi completed and	sor	notifie system	ed work status	is			
	and the set of the set						
	an averand a sec mentional a sec Colors an averan						1993 (1993) - 1994 (1994) - 1994) 1994 (1995) - 1994 (1994) - 1994 1995 (1995) - 1994 (1994) - 1994 1995 (1995) - 1994 (1994) - 1994 1995 (1995) - 1994 (1994) - 1994 (1994) - 1994 1995 (1995) - 1994 (1994) - 1994 (1994) - 1994
or Vessel is a (cross out o	sseu ne)	abled and to begin	nd read	y fo1	testing	g/plant	
or Vessel is a (cross out o	sseu ne)	to beg:	in.			g/plant	1
)r Vessel is a) (cross out o	ssen ne)	to beg:	nd ready in.			g/plant	DAT
	DESCRIPTION Seismic Tie R 45° Azimuth 135° Azimuth 225° Azimuth 262° Azimuth 278° Azimuth 315° Azimuth 315° Azimuth	DESCRIPTION Seismic Tie Rods 45° Azimuth 135° Azimuth 225° Azimuth 262° Azimuth 278° Azimuth 315° Azimuth 315° Azimuth	DESCRIPTION Seismic Tie Rods install 45° Azimuth 135° Azimuth 225° Azimuth 262° Azimuth 278° Azimuth 315° Azimuth Shift Supervisor notifie	DESCRIPTION Seismic Tie Rods installed 45° Azimuth 135° Azimuth 225° Azimuth 262° Azimuth 278° Azimuth 315° Azimuth	DESCRIPTION Seismic Tie Rods installed 45° Azimuth 135° Azimuth 225° Azimuth 262° Azimuth 315° Azimuth 315° Azimuth Shift Supervisor notified work is	Seismic Tie Rods installed 45° Azimuth 135° Azimuth 225° Azimuth 262° Azimuth 315° Azimuth 315° Azimuth Shift Supervisor notified work is	DESCRIPTION SIGN-OFF VERI Seismic Tie Rods installed 45° Azimuth 135° Azimuth 225° Azimuth 262° Azimuth 278° Azimuth 315° Azimuth Shift Supervisor notified work is

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		DATA SHEET 4	Sheet 1 of 14	
	POWER AND	SIGNAL CABLE REMOVAL/REL	PLACEMENT	
		NOTES		
a.	Ensure that e identified w:	Ensure that each cable/wire is marked so it can be uniquely identified with its termination point.		
b.	Original Data Sheet 5 should be included with the vessel disas embly package. A copy of the original will be used to sign off reconnects and be included in the assembly package.			
с.	Independent Verification is only required on Safety-Relate equipment. Place N/A in that column for Non-Safety relate equipment.			
d.	Panel Azimuth Unit 1: A-0 Unit 2: A-18			
	OUTC EL M-TO	00 0-0		
PANEL			VERIFICATI RECONNECT INDEPENDEN	
PANEL		ENTIFICATION REMOVED		
PANEL	TYPE IDE CRDM C-E	ENTIFICATION REMOVED	RECONNECT INDEPENDEN	
PANEL	TYPE IDE CRDM C-F C-F	ENTIFICATION REMOVED	RECONNECT INDEPENDEN N/A	
PANEL	TYPE IDE CRDM C-F C-F	ENTIFICATION REMOVED 1 K6 K10 M12	RECONNECT INDEPENDEN N/A	
PANEL	TYPE IDE CRDM C-F C-F D-F D-F C-F	ENTIFICATION REMOVED 1 K6 K10 M12 M4	RECONNECT INDEPENDEN N/A N/A N/A	
PANEL	TYPE IDE CRDM C-F C-F D-F D-F	ENTIFICATION REMOVED 1 K6 K10 M12 M4 P8 It 1 Unit 2	RECONNECT INDEPENDEN N/A N/A N/A N/A	
PANEL	TYPE IDE CRDM C-F C-F D-N D-N C-F UN C-F	ENTIFICATION REMOVED 1 K6 K10 M12 M4 P8 It 1 Unit 2	RECONNECT INDEPENDEN N/A N/A N/A N/A N/A	
PANEL	TYPE IDE CRDM C-F C-F D-P D-P C-F C-F SB-	ENTIFICATION REMOVED 1 K6 K10 M12 M4 P8 It 1 Unit 2 H2 C-H14	RECONNECT INDEPENDEN N/A N/A N/A N/A N/A N/A N/A	
PANEL	TYPE IDE CRDM C-F C-F D-F D-F C-F Uni C-F SB- SB- SB-	ENTIFICATION REMOVED 1 K6 K10 M12 M4 P8 It 1 Unit 2 H2 C-H14 -N9	<u>RECONNECT INDEPENDEN</u> N/A N/A N/A N/A N/A N/A N/A N/A	
PANEL	TYPE IDE CRDM C-F C-F D-F D-F C-F Uni C-F SB- SB- SB-	ENTIFICATION REMOVED 1 K6 K10 M12 M4 P8 It 1 Unit 2 H2 C-H14 -N9 -N7 K14 K2	RECONNECT INDEPENDEN N/A N/A N/A N/A	

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			7/3/20		
		DATA S	HEET 4 -	Sheet	2 of 14
	POWER	AND SIGNAL CABL	E REMOVAL/RE	PLACEMENT	
PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATIO
A	CRDM	Unit I Unit 2 SB-G3 SB-G13		n den men gefor gen in einen den seken den seken vor	N/A
	Name of the state	SE-M8		an deren bisensteren herte, e. an er	N/A
		Unit 1 Unit 2 SE-H4 SE-H12		-	N/A
	angen van se ster de salter e proponsadet. Als syst	B-F10	anter e un alte ser alternet e ner alte a ner alternet e dessa	an a sur come al regimentation of the state of	N/A
	annan 1916 (Million ann 1996).	B-P6	ann - Thailan a su an		N/A
And the second second second	THE PROPERTY DESIGNATION OF THE PROPERTY OF	SA-M14	e un altre anna altres an anna anna anna anna anna anna		N/A
	angan Companya anganan angana angana angana angana angana ang	SA-M2	An incompanying of the second decount of the second second	-	N/A
		SD-N11			N/A
-		SD-L3	NEW YORK AND A DESIGN OF THE ADDRESS OF THE SAME	and a second	N/A
-		A-K8 Unit 1 Unit 1		ngdigar sangli kabar sangli managali	N/A
-		A-H6 A-H10	6 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 1999: 19	an out work an an an an instance of	N/A
-	Mittanian's difficience ad a transmission and a	SA-P12	S. 188-194-1 Spaint, Philippine in the Southeast	national and the second of reading and an	N/A
	Lar you any one of the second designed and	SA-P4	ned Plant and many conference in the second second second	ange - R and a Baumrend, of S and An Property	N/A
Republic transmistration and	a for the second se	SC-L13			N/A
and and the second statements of	an a contrast de la constante d	SC-N5	an a		N/A
-	DPRI	D-H8-B		ning administration as a sub-alternation of	N/A
K. M. B. Construction of the American Construction of the	DMIMS	Unit 1 Unit MIM-1 MIM-3			N/A
and the state of a clear solution to share	DPRI	SE-D8-B	artinite any Carteshina top: non-topic and without any or	Maxim:Profile.Mot Serversationsation	N/A
A definition president metalower	and the subscription of the state of the state of	SE-M8-B			N/A
And a state of the	All spectra structure structure and a sec	SE-H12-B	an an the states of a state of an an an an and a state of a state of a	af y all and a collected at the last of the second per-	N/A
		SE - H4 - B		alternation and an end of the second	N/A
		D-D12-B			N/A

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in an or a	and the second s		12 36 00		84 of 98
		DATA S	UPPT / -	Sheet	3 of 14
	POWER	AND SIGNAL CABL	E REMOVAL/RE	PLACEMENT	
PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATIO
A	DFRI	D-D4-B	na dina dina mina kana di kana kana kana kana kana kana kana kan		N/A
Manufold, even in second 4 a magnetic con-		C-F10-B	A meter contraction of the state of the stat	an an ann an an an An Ar An ann a' ann an ann an Anna an an Anna an Anna an Anna an Anna an Anna an Anna an An	N/A
TRACE STREET, TRUCK SHOWS IN THE	A P. T. S. P. Collinson and S. S. Santa and S. Santa	C-F6-B	terminen and the Strength American Color and the sector of the	en de la companya de	N/A
Research and the straight straight the	NATURAL CONTRACTOR OF A DECIMAL CONTRACTOR	C-K10-B		an a	N/A
Onto the dependence of the Area	anda e utana c ara kana kana kana kana	C-K6-B	annar markalankark tils mit sama sin seksarkar dis samaya aya	-	N/A
SERVICE STREET, STORE STREET, STORE	ne montre manufacture à montre comp	SD-E13-B	na mananana mina manana ana an		N/A
NG COMPANY CONTINUES OF STREET, SPICE		SD-N11-B	ter metrical of constraint in calling constraints and an allow	Constanting over a standard and the standard standard	N/A
Manager and the state of the st		SB-G13-B	nan constant and an or an and and		N/A
Charlen an analysis and a second	NAMES OF THE OWNER ADDRESS OF THE OWNER OF THE	SB-G3-B	na an ann an		N/A
		SB-N9-B	Ramition & assumer Propose and Surveyor Statements and surveyor		N/A
19.500 (19.50) (19.50) (19.50)		SB-N7-B	na ana ana ana ana ana ana ana ana ana	NAL: Another And Contractor	N/A
anggan balan sama masanggar ne basan pa	ele Seconte est maintair a Vertificada e estimata q	D-M12-B	analan kanakan da kana kana kana kana kana k	1000 100 100 100 100 100 100 100 100 10	N/A
	an 1014 martine that I the feature that the	D-M4-B	ne name too katolean en c'heene raak and marke e		N/A
SCH BRITS According to Summing Scherosons		C-H14-B	er of by could be device by the or Astron optimality of	n kurster kölde kile de de sekere	N/A
NAME DE LE LINNE SON DE L'ANNE DE LA SUM	autovat vajikljanska komolovatek	C-H2-B	mentioned for an inclusion and a second		N/A
And diver for some size of mouse was developed	and the state of the	C-P8-B	and the second		N/A
and the court of the summary of	Parlandin's Parly Toronomy an estate play	C-88-8	n an	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	N/A
mpediate annual annual metrodage	n aller af allerfa and a to reach a started	SD-L3-B	Sonder Selections & Science & Science and Additional Science and and		N/A
N. BARRING AND IN THIS KNOWN CONTRACTOR	nandenes constance entreactes actuacy	SD-C5-B	is alternative gave culture discontinue approvable agree some and	the filling of the section of the section of the	N/A
-	n an	SB-J13-B			N/A
		SB-J3-B			N/A

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	POWER A	, DATA SE ND SIGNAL CABLE			4 of 14
PANEL		IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATIO
A	DPRI	SB-C9-B	and and a state of the state of		N/A
		SB-C7-B	and the first of the second	to St. office and a Million of Lange statements and the second	N/A
AMP Brown is a technic of least state of states		A-H10-B		national and an advantation	N/A
NUMBER OF A DESCRIPTION OF A DESCRIPTION OF	for the data and set of the second second second	A-H6-B	a de tra constitució de l'Antibil de constitució de secondo de const	un anter de la competencia de la compet	N/A
-		5-F14-B	e tanan antar sa Gara A V Asarahan ar ar		N/A
-	anna actanatio at cala di ano calanga anta ar	B-F2-B	NATIONAL AND AND A DESCRIPTION OF A DESC	and an other states and the states and the states and the	N/A
ANALOS FRANCISCO COMPANY AND GALLED	nen automate est a redacador como ana da cade sea	B-P10-B	and the set of the set		N/A
-	n statuted on the try we will be on a decision of	B-P6-B	an a		N/A
	ant o, surveyer, and other other of the	SC-L13-B	and the second states in the second states are the second state	a periodi dalla concerna appropriate di successo ana	N/A
-		SC-Cll-B	ne na se anna an Anna a	MATERIA CONTRACTOR OF CRETCOLOGIC AND	N/A
-	entities Catorinas attractor on the editor class, epocation	SA-D14-B	andres is some a sin a redar some soften verse av ander some	a street franker is suite and started, respectively	N/A
-	-	SA-D2-B	and the second	and it is the rest of the second s	N/A
-	ana na mana ana ana ana ana ana ana ana	SA-P12-B	ana ar af a de anta a constructo a const	tala est non addres processioners as as	N/A
		SA-P4-B	THE REPORT OF COMPANY OF COMPANY OF COMPANY OF COMPANY OF COMPANY		N/A
-		A-K8-B	Charlen a magnitude the second second of	And out " Submittee all out a Longenting of the state	N/A
-	na Manual and Anna Malana and Anna A	A-F8-E	ungenangang mengendar mari apat merupakan di	Contraction and the second second	N/A
		B-K14-B	an an and a state of the product of the state of the stat	NY TRUTT OF TRUCK ON ADDRESS IN ADDRESS	N/A
-	REALITY CONTRACTOR OF CALLER CONTRACTOR	B-K2-B	examples dependent of the second second second		N/A
-	NUMBER OF COMPANY OF A SUPPORT OF SUPPORT	<u>B-B6-</u> <u>B</u>	-		N/A
Constitution, their without and	-	B-B10-B	ne forgane internet souther can also be also associate	an a	N/A
	un ip officiel of a second second second second	SC-E3-B	n sense and a manufacture source and the descent of the method of the sense of the	Name and a state of the state o	N/A
		SC-N5-B			N/A,

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		' DATA SHI			5 of 14
	POWER A	AND SIGNAL CABLE	REMOVAL/RI	EPLACEMENT	THEFTENSEN
PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
A	DPRI	SA-M14-8	aga na ƙwallon ƙasar ƙwallon ƙwallon ƙasar ƙ		N/A
		SA-M2-B	-	enderste der sterne ander ster der ster	N/A
		SA-B12-B	Name and the state of the state of the	and a second state of the second	N/A
		SA-B4-B		an ang katalang sa katalan kana kana	N/A
Section Contracting in the Assessed	CRDM	C-F6	Manufacture of the State of the State of States		N/A
	adalah wakang sa mata ka malakina at	C-F10	Loui devan ed fan oan en de a Annañ an e	anne a stational anna an an an a	N/A
		D-D12		ng er namen marke skeafter killer i server	N/A
		D-D4	amount management management and managements	No. 1997 IN CONTRACT, SIZE AND INCOMENDATION OF ADDRESS OF ADDRESS OF ADDRESS OF ADDRESS OF ADDRESS OF ADDRESS	N/A
		C-B8		And the state of the last subscript, 2	N/A
		Unit 1 Unit 2 C-H14 C-H2			N/A
-		SB-C9		andara yankaya Sandagada waka sayamariyo nadione masundar	N/A
	enalistad naarinaanse men herrinde of one of the	SB-C7	concernence of the second s		N/A
		D-H8		ananakanan, "atarina amagarancinanan paring a	N/A
	ed an operational case seat was watered	B-F14		and the second	N/A
		B-F2			N/A
	an an and a second of the second s	Unit 1 Unit 2 SB-J13 SB-J3			N/A
		Unit 1 Unit 2 SB-G13 SB-G3			N/A
		Unit 1 Unit 2 SE-H12 SE-H4		and the second secon	N/A
		SE-D8		and a statement register screening of white work therein	N/A
		B-B10			N/A
Restriction of the local division of the loc		B-B6			N/A

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		DATA SHEET		Sheet 6 of 14
	POWER	AND SIGNAL CABLE REM	OVAL/REFLACE	MENT
PANEL	TYPE	IDENTIFICATION RE	EMOVED RECON	INDEPENDENT NECT VERIFICATIO
A	CRDM	SA-D14		新/A
-		SA-D2	na man da se ante at un regio alte seu care de ser en	N/A
		SD-E13	en belaf her de stimuete in makingen om en deradoretere	N/A
-		SD-C5 Unit 1 Unit 2	na dharan y tha she angun yak yar she ghe ya sa sa s	N/A
		A-H10 A-H6		N/A
Madaget, Material Contractor & Annual Con-		A-F8	nore reality as a constant only an available and	N/A
-		SA-B12	an all we defined the set of the	N/A
-		SA-B4	ner in staat staat best sets and position to	N/A
		SC-Cll	and the second	N/A
-		SC-E3	and the second	N/A
NAME AND INCOMES AND ADDRESS OF ADDRESS	Aux Pwr	Aux Pwr	ner et elege subscribe statutes and a subscription and	N/A
5.0000	Cooling Fan Pwr	CF-4		N/A
-		CF-3	an a constant de constant de constant de constant	N/A
		CF-2		N/A
-	Thermo	CF-1	an an the second second stands of the second second	N/A
	Couples	T-1-78A	-	
-	ng separata da da pagan pantan na	T-27-78A	and we as a state of the second s	
		T-4-78A		
		T-29-78A	and a model and a second strategy of a strategy of the	
	NUMBER OF COMPANY OF STREET, ST	T-31-78A		
		T-32-78A		
		T-41-75A		i i

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		, DATA :	SHEET 4	COMPACT AND INCOMENTS AND INCOMENTS AND INCOMENTS	t 7 of 14
	POWER	AND SIGNAL CAB	LE REMOVAL/F	REPLACEMENT	
PANEL	TYPE	IDENTIFICATIO	REMOVED	RECONNECT	INDEPENDENT VERIFICATIO
A	Thermo Couples	T-45-75A			
		T-20-76A			
	and descent second second second	T-44-76A			
		T-43-76A			
		T-47-76A			
		T-48-76A		and the second second second second	
And the second second second second second	an Angelen (and a sum and a sum of the state and	T-49-76A		and the second second second second	
-		T-5-75A	and the second second second second second second		and the second second second
		T-33-75A			
		T-30-75A			
		T-38-75A			
		T-7-77A	and a strength of the strength		
mak King Komplete on addition met bergan		T-15-77A	and the second second second second second		
regular and a community of the designation		T-13-77A			
Long and the second distances		T-35-77A			
-	ter inter (128 family of a straight and a	T-39-77A			
-		T-42-77A	an an alterna carrante anti actor un classes		The survey construction and
		T-46-77A			

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		DATA SHEET 4 -	Sheet 8 of 14
	POWER A	ND SIGNAL CABLE REMOVAL/REPLAC	EMENT
		NOTES	
a.	Ensure that each cable/wire is marked so it can be uniquely identified with its termination point.		
Ъ.	Original Data Sheet 4 should be included with the vessel disassembly package. A copy of the original will be used to sign off reconnects and be included in the assembly package.		
c.	Independent Verification is only required on Safety- Related equipment. Place N/A in that column for Non- Safety related equipment.		
d.	Unit 1:	imuth are as follows: A-0° B-180° A-180° B-0°	
PANEL	TYPE	IDENTIFICATION REMOVED RE	INDEPEND
	PROPERTY AND INCOMENTATION AND A DESCRIPTION OF A DESCRIP		CONNECT VERIFICA
В	DMIMS	MIM-1 (Unit 2 ONLY)	N/A
В	DMIMS		Filmen and a standard and the standard standard and the standard standard standard standard standard standard s
	DMIMS	MIM-1 (Unit 2 ONLY)	N/A
B		MIM-1 (Unit 2 ONLY) MIM-2	N/A N/A
B	DMIMS Thermo couples	MIM-1 (Unit 2 ONLY) MIM-2 MIM-3 (Unit 2 ONLY)	N/A N/A N/A
B	Thermo	MIM-1 (Unit 2 ONLY) MIM-2 MIM-3 (Unit 2 ONLY) Ground	N/A N/A N/A
	Thermo	MIM-1 (Unit 2 ONLY) MIM-2 MIM-3 (Unit 2 ONLY) Ground T-2-78B	N/A N/A N/A
	Thermo	MIM-1 (Unit 2 ONLY) MIM-2 MIM-3 (Unit 2 ONLY) Ground T-2-78B T-6-78B	N/A N/A N/A
	Thermo	MIM-1 (Unit 2 ONLY) MIM-2 MIM-3 (Unit 2 ONLY) Ground T-2-78B T-6-78B T-3-78B	N/A N/A N/A
	Thermo	MIM-1 (Unit 2 ONLY) MIM-2 MIM-3 (Unit 2 ONLY) Ground T-2-78B T-6-78B T-3-78B T-8-78B	N/A N/A N/A
	Thermo	MIM-1 (Unit 2 ONLY) MIM-2 MIM-3 (Unit 2 ONLY) Ground T-2-78B T-6-78B T-3-78B T-8-78B T-8-78B T-26-78B	N/A N/A N/A

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		DAT	A SHEET 4 -	Sheet	9 of 14
	DOUTR		ABLE REMOVAL/R	EDI ACEMENT	
	L OH WIS	Allo bestitio -	PLEASE TRACTOTICALLY IN	DE LING OF LINE	INDEPENDEN
PANEL	TYPE	IDENTIFICAT	ION REMOVED	RECONNECT	VERIFICATI
В	Couples	T-18-76B	and an	and days i fan die erste affantie in fan ei stader ander	
	tere a freetration for the second	T-22-76B	annan managalanan ay su ak ana ana ana panahanan	Registration of Constanting States and	and the second
-		T-19-76B	ali ne sente e della constanti se sentena da dago		
Radianesses. At other strengthese start	te dan a te transfer there also also also	T-23-76B			alin an a baallar die Gaader van Franzisaan
	(with a date of the Oliver Disc Direction and it where the set	T-24-76B			
California da construcción de la		T-25-76B			
CONTRACTOR OF SPRINGER	teatr ar sector the first sector and an area	T-50-76B			1625-11-1 - 11-11-11-11-11-11-11-11-11-11-11
		T-10-77B		and south a subscription of the first state spin state.	
-		T-16-77B	and the second second second second second second		
	***	T-14-77B			and the second
		T-21-77B			an and a second s
	and the distance of the state of the	T-9-75B			
No. By The set of a first state of a set of the second	neretani atroposti agi sudi si dapoti ada te	T-12-758	for the Corport of the State of		and a first digeneration of a second state plane and a second
State in state of the state in the state of the		T-11-75B			
		T-17-75B	NY 147552 - Martin Martin Martin Constant State		and which the set of the
NY MARKAN MARKAN A THE PARTY AND A	Manufact and investmental and an and an and a state	T-36-75B		THE REPORT OF A DESCRIPTION OF A DESCRIP	
		T-37-75B		NUMBER AND INCOMENTATION OF THE PARTY	
	Cooling Fans				
	Fans	CFH-1		an an an an an an an an	N/A
dada yan anan marke waxayan e saw 1	en an ei Leon Van an de de Andre Brance	CFH-2		File file allegan ar sciencifications of a skin	N/A
Render will and a strategic destruction	and the second state of the second state state and	CFH-3			N/A
		CFH-4		construction and an advantage of the state	N/A
With Tables of a suffrage disease and a suffrage		CFI-1 (Unit	2 ONLY)	an to the state of	N/A
		CFI-2 (Unit	2 ONLY)		N/A
		CFI-3 (Unit	2 ONLY)		N/A

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		, Shee DATA SHEET 4 -	t 10 of 14
	POWER	AND SIGNAL CABLE REMOVAL/REPLACEMEN	r
PANEL	TYPE	IDENTIFICATION REMOVED RECONNEC	INDEPENDEN T VERIFICATI
3	COOLING FANS	CFI-4 (Unit 2 ONLY)	N/A
	DPRI	D-H8-A	N/A
-		SE-D8-A	N/A
		SE-M8-A	N/A
		SE-H12-A	N/A
-		SE-H4-A	N/A
discussion and set of a local sector		D-D12-A	N/A
Made conversion in the second state		D-D4-A	N/A
6.415, Landson and State		C-F10-A	N/A ^{- c}
and the first state of the second states	area, monoral according to an opposite state and	C-F6-A	N/A
-		C-K10-A	N/A
-		C-K6-A	N/A
		SD-E13-A	N/A
-		SD-N11-A	N/A
No. of Concession, Name		SB-G13-A	N/A
New York of the set of the set		SB-G3-A	N/A
any plat plane derivatives any first delivation		SB-N9-A	N/A
		SB-N7-A	N/A

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	POWER	, DATA AND SIGNAL CAB	SHEET 4 BLE REMOVAL/RE		11 of 14
PANEL	TYPE	IDENTIFICATIO	ON REMOVED	RECONNECT	INDEPENDENT VERIFICATIO
В	DPRI	D-M12-A		and the first state in the second state	N/A
		D-M4-A	an a martine de la deste carros de carros de la deste de la deste		N/A
Realized Conference and a second		C-H14-A	er v soder i en sam sånge och förstadstad på samanna av	ann malaana amaan amaan a	N/A
		C-H2-A			N/A
		C-P8-A	Analisad selected and selected and selected and	and call an also are been as a second	N/A
Assessments		C-88-A	and an extension of the second second second second	Traditionality, 4 Traditional Information of	N/A
		SD-L3-A	Name and the set of the second se		N/A
New York Construction and Providence		SD-C5-A	ger sine to on without all period and address all second		N/A
		SB-J13-A		a	N/A
		SB-J3-A			N/A
		SB-C9-A	-	1000.000.000.000.000.000.000.000	N/A
-		SB-C7-A	-	-	N/A
-	anderse a survey been article up for inc.	A-H10-A	alanat A management and a source and the state of the	and the produce of the second in the second	N/A
		A-H6-A	State of Arts and States		N/A
		B-F14-A	enneng pantmanana na pantana en anticitadad		N/A
		B-F2-A			N/A
	Painting and colline of a financial colline and	B-P10-A			N/A
	ant motorismut o stand-hover makes	B-P6-A	ener um calerenario operar en anternario en anternario		N/A
And the Design of the Owner of States	Non-All I was been a grant and a second	SC-L13-A	Aller and all and a state of the		N/A
		SC-C11-A	angge ta anna di anteriori etti di de constitue di tarena		N/A
		SA-D14-A			N/A

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		DATA SHEET 4	Sheet 12 of 14
	POWER	AND SIGNAL CABLE REMOVAL	L/REPLACEMENT
PANEL	TYPE	IDENTIFICATION REMOVE	ED RECONNECT VERIFICAT
В	DPRI	SA-D2-A	N/A
deside also also al un anno all'e dei a		SA-P12-A	N/A
Automotive and an and		SA-P4-A	N/A
-		A-K8-A	N/A
		A-F8-A	N/A
-		B-K14-A	N/A
		B-K2-A	N/A
		B-86-A	N/A
		B-B10-A	N/Á
		SC-E3-A	N/A
-		SC-N5-A	N/A
-	Manual International Statement State	SA-M14-A	N/A
		SA-M2-A	N/A
-		SA-B12-A	N/A
		SA-B4-A	N/A
Thermocour Column	Thermo	T F 354 (0.10)	
L-15	Couple	T-5-75A (C-12)	an annaisean an an ann an an ann an an ann an ann an a
		T-9-758 (E-14)	Response of a section of the
-	an tarahar tarang ang ang ang ang ang ang ang ang ang	T-11-75B (G-8)	An an and the second
***********		T-12-75B (G-12)	
-		T-17-75B (J-14)	namorana ana amin'ny faritr'o amin' dia amin'ny faritr'o amin'ny faritr'o amin'ny faritr'o amin'ny faritr'o amin

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	an fan de seren af fere alle ser en an			5/19/90		: 13 of 14
		, L	DATA SHE	EET 4 -	SHEEL	12 OT 14
	POWER	AND SIGNAL	CABLE	REMOVAL / RE	PLACEMENT	
						INDEPENDEN
PANEL Thermocou	TYPE	IDENTIFIC	ATION	REMOVED	RECONNECT	VERIFICATI
Column L-15	Thermo Couple	T-30-75A	(C-14)			
and some the second	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	T-33-75A	(E-12)	4 and instance of the second state from the second s second second se	for an a constant second second second	and addresses a balancement on an distribution of a departure
Contraction of the second	ana ta di karana ta kana a kana a	T-36-75B	(G-10)	en de la conferencia de la Constantina		arrent of the Banks of Landson is in the same of
		T-37-75B	(G-14)	Kork mit Belding States and States and States in Second States and States and States and States and States and	an only design of surface of the states	
Complete rest rates and an early rest of		T-38-75A		BACK OF STREET, ST		a a sub marca subscription and a subscription of the subscription
	nan ta an ta a		(H-15)	A REAL PROPERTY OF A REAL PROPERTY OF A REAL OF	North and Contraction in Contractory action	
1000 (10) este la serie de	NALA MERCHANNEL COMMUNICATION AND AND	T-41-75A	(J-12)	and a second	and the second se	
		T-45-75A	(L-14)	1		-
<u>R-11</u>		T-18-76B	(L-4)	n na de Manufert de la constructión de las de Manufert de la		
Alternative statement of a second statement		T-19-76B	(L-8)			
	manual summaries and mark removed	T-20-76A	(L-12))	Annual state state state of the number of the state	
ALLE THERE ARE THE THE REPORT AND		T-22-76B	(N-6)			And the design of the second
	ar water a decision of a constraint state, it is a second	T-23-76B	(N-10)	>		
WEX2080 NO VE COMMON COMPANY	and the other sectors are not a balanced reading	T-24-76B	(N-14)	>		
-		T-25-76B	(R-8)			
statistic control state and second	An amount game and congress because a supplice	T-43-76A	(L-6)			
1212 20 201 201 201 201 201 201 201 201	NUMBER OF STREET, OR OTHER DESIGNATION OF STREET, DOG	T-44-76A	(L-10)	,	Particular and a second string product of the	
and the second		T-47-76A	(N-8)			
-		T-48-76A	(N-12))	and the second se	
SPCEND OF THE OWNER OF THE OWNER		T-49-76A	(R-6)		and defined the disease of the second of the second	
		T-50-76B	(R-10)		an an a saint a ra a casha an an an	
L-1		T-7-77A	(E+6)		and the first of the second	er af fe brener, server i free i recherent herein riter is ear
NUMBER OF CONTRACTOR OF CONTRACTOR	Name and a set of the set	T-10-77B	(G-4)	and the manifestering of the set of the set of the set	and a state of the	ng barne a sa an

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		D	DATA SHE	LET 4 -		
	POWER A	ND SIGNAL	CABLE	REMOVAL/RI	EPLACEMENT	
PANEL Thermocoup	TYPE	IDENTIFIC	ATION	REMOVED	RECONNECT	INDEPENDEN VERIFICATI
Column L-1	Thermo	T-13-77A	(H-1)			
		T-14-77B	(J-2)			
		T-15-77A	(3-6)			
		T-16-77B	(J-10)			
Real Constant of Constant States of Con-	an and a superior of the second s	T-21-77B	(N-2)	nani on'ny ana amin'ny taona dia mampiasa.		
	Contraction (Reported States and States and States)	T-34-77B	(G-2)			
	A 12 Product of California Static Lines, Manager, and	T-35-77A	(G-6)			
		T-39-77A	(J-4)			
		T-40-77B	(J-8)			
N. M. Martine, etc. 9 Name and Address of Strategy	Northe states into a state framework with some survey	T-42-77A	(L-2)			- ()
	AND THE SHOP THE SHOP IN THE SHOP INTERS AND INTERS	T-46-77A	(N-4)			
<u>A-5</u>		T-1-78A	(A-6)			
		T-2-78B	(A-10)			
	annen an an Araban aleman ar san ann air an Ara	T-3-78B	(C-4)			
		T-4-78A	(C-8)		an Andrew Constant of Constant of Constant	
	Paulineteritoren antigen, ernenengergernere	T-6-78B	(E-2)			
an all and the second second second second	e e de la companya de	T-8-78B	(E-10)			and the second desired on a state of the second
		T-26-78B	(A-8)			
-	an a subscription of the second s	T-27-78A	(C-2)		And contraction of the second s	penantang arang beng bang bang bang bang bang bang bang ba
		T-28-78B	(C-S)			Konstantin al Landardon (Landardon (Landardo
	an a gal an ann a fha an ann an an an an an an ann an an an	T-29-78A	(C-10)			gen allen het engenn, och hann varme parter finken konstregat
		T-31-78A	(E-4)			
	Sec. Balling	T-32-78A	(E-8)		an a	promy a column y burning them a boundaries of the state o

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		ATTACH	MENT 1 -				
	· ···· T	OOLS AND EQ	UIPMENT LIST				
			d equipment si clean and rea	hould be available, dy to use.			
1.	SEISMIC TIE RODS, HEAT VENT PIPING, AND UPPER INTERNALS						
	a. Nylon	Straps, one	-ton capacity				
	b. Polar	Crane or ap	propriate Lif	ting Device			
	c. Approv	ed Duct Tap	e				
2.	INSTRUMENT	PORT-CONOSE	AL				
	a. Instru	ment Column	Protective S	leeves (4)			
	b. Instru	ment Column	Protective S	leeve O-rings (4)			
	c. Protec	tive Sleeve	Holding Spri	ngs (4)			
	d. Instru	ment Column	Upper Conose	al Gaskets (4)			
	e. Instru	ment Column	Lower Concee	al Gaskets (4)			
	f. Conose	al Gasket F	emoval Tool				
	g. 0-150	Inch-Pound	Torque Wrench	(3/8" Drive)			
	h. 5/8" A	llen - Sock	et Wrench				
	1. 0-150	Foot-Pounds	Torque Wrenc	h (1/2" Drive)			
	j. 5/16"	Allen - Soc	ket Wrench				
	k. Supply	of Neolube	(Nuclear Gra	de)			
	1. Axial	Loading Ran	Assembly				
	m. Hydrau	lic Pump wi	th Cylinder				
	n. 0-2,00	0 psi (mini	.mum) calibrat	ed gauge			
	o. Cotter	Pins					
	p. Safety	Wire					

VEGP	93240-C	REVISION T & HICA	PAGE NO. 97 OF 98			
		ATTACHMENT 1 (CONT'D.)				
3.	REACTOR VES	SSEL STUD				
	a. Align	ment Guide Pins (3)				
	b. Eye-bo	olts (3)				
	c. Guide	Stud Turning Bar				
	d. Scud 1	Lifting Eyes (54)				
	e. Measur	ring Rods (54)				
	f. Depth equive	Dial Indicator (Starrett alent)	#644J or			
	g. Nut Wi	rench Assembly				
	h. Stud W	Wrench				
	1. Stud H	Hole Plugs (51)				
	j. Protes	ctive Sleeves (12)				
	k. Chalk					
	1. Stud 1	Tensioners (6)				
	m. Five sets of 12' Tensioner Hose (5 hoses per set)					
	n. One set of 35' Tensioner Hose (5 hoses per set)					
	o. One -	six foot Air Signal Hose				
	p. Pyrom	Ater (IMC type or equivale	nt)			
	q. Polar	Crate				
	r. Stud I	Racks (6)				
	s. 50's	ections of 1" Air Hose (3	minimum)			
	t. RV St	ud Removal Tools (6)				
	u. Chain	Fall, 1 ton capacity mini	.mum.			
4.	Reactor Ve	ssel Head				
	a. Load	Cell				
	b. Polar	Crane				

	. Bubble	ATTACHMENT	1 (0000010)	
	a Bubble		I (COAL D_1)	
	· · · · · · · · · · · · · · · · · · ·	e Levels (3)		
	d. Metal	O-Ring (outer	•)	
	e. Metal	O-Ring (inner	•)	
	f. Allen	type wrench s	et	
	g. Bolt (Cutters		
5.	GENERAL USA	AGE		
	a. Lint-	free rags		
	b. Isopro	pyl Alcohol (stainless steel a	surfaces)
	c. Ethyl	Alcohol (carb	oon steel surfaces	5)
	d. Acetor	ne (carbon and	i stainless surfac	ces)
	e. Approv	ved Bags for n	material collection	on and dispose
	f. Nucles	ar grade Neolu	ibe, #1 or # 2	
	g. Fel-Pr	ro N5000		
	h. GE Ver	reilube 392.		
•	i. Never-	-Seez pure nic	kel special	

05-311-4 SECTION XXI REPAIR / REPLACEMENT TRAVELER Page 1 of 5 Traveler: 90117 Rev. VReplacement Repair ----- Component Associated Documents 18905286 Code Class: ASME-MWO : Tag. No: 6-1208-46-036 DC: Description: Chock Value DCP: Serial No: COCLESSIONISTICS Other: WORK DESCRIPTION: Baplace eight studs and nuts. ----- Examination / Test Requirements ------VT-1 VT-2 VT-3 VT-4 Other Nominal Operating Pressure Pneumatic Hydrostatic noneofteral Temperature: Hold Time: UTNOP + NOT Pressure Evaluation of Suitability (IWA 7220) Design/Construction Code Reconciliation Repair / Replacement Organization GPC MOINTENOUCE ---- INITIAL REVIEW Hold Points Date Yes None Maintenance Engineering Yes None Quality Control 1.31 Low by HHDai None Yes ANII FINAL Date Signature Maintenance Engineering ISI Quality Control ANII Remarks:

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Trevelor 90117 MHO 18905286 Page 3 of 3 ASME SECTION XI BILL OF MATERIALS							
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ORIGINAL ASME TEST VERIFICATION FORM X/A MHO No. 18905286 Traveler No. TVF NO. 90017 1-1208-46-036 Tag/ Weld No. _ checkvolve with seal cap Item Deecription: 3 Dissassemble and assemble Deecription of Work: class one value, weld on seel cop. ANIL Initia! Heview QC Initial Review 3/19/20 3119120 a Malladanco ANII Q.C. Required NDE/Testing W/H A/R REPORT # A/A ENTRY/ACCEPTABLE TEST CRITERIA ASME VT-1 VT-1, 2, 3, 4 A NIN 1242 SURFACE EXAM. × 48+117/90 4 VT. PT. MT (1121) 3-19-90 VOLUMETRIC EXAM. NIA UT, AT OTHER NA REMARKS: * SEE TRAVELER 90.119 FUR THIS INSPECTICA Strange Haintenance Engineering Franciatoria Date 4118190 Dute _____ ANII

SECTION XI REPAIR / REPLACEMENT TRAVELER Page 1 of 3 Travelor: _____ Rev. Repair Replacement 10 : 1 ---- Associated Documents ---------- Component ------1 122.7712 All They 13162484 Code Class: // gold col MWO : LA J b1 1 . La Barra Maria Sanda Tag. No: 00: 1 1000 T DCP: Description: star -ALC: Y Other: 122-Seriel No: 1 Martin _____ h à VT-1 VT-2 VT-3 VT-6 Other Nominal Operating Pressure Preumatic Hydrostatic Pressure Temperature: Hold Time: Evaluation of Sultability (IWA 7220) Design/Construction Code Reconciliation Repair / Replacement Organization And In Alart /01 ----- INITIAL REVIEW ---------Signature Date Hold Points Sugart C2/22/190-Maintenance Engineering Yes | None Tes ... Marcin Of Koste Quality Control None 3/28/.22. -- Yes None -322-90 ANII ---- FINAL REVIEW -----Signaçore A Oate 4-18-90 Maincenance Engineering the Mail Labort ISI Quality Control Aller Stattan - 4/12/90--ANII Remarks:

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Quality Control Inspection Report

Page 1 of 2

Georgia Power

VOGILE GENERATING PLANT-UNITS 1 & 2

MWO/ODR/DR No. /890 5286	Building	Procedure/Spec. No/Rev. 2.6621-C. 12/1
Room No/Level No.	Sys./Start-Up Designator インことと	Tag No. 1-1208-46-036
Drawing No/Rey.	Vendor Manual Log No.	Other all

- Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.
- Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.
- 3. Upon completion of the inspection activity, enter results below and sign and date.

Remarks VISUALLY VORIEY PROCODURE STEPS 4.3.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2F, 4.4.3, 4.4.12 - INTERNAL VALUE INSAFETTIONS & STUD AND ROMETT FORGUE, VERIERD & REPLACEMENT STUDS & GASKET MATCHIAL BOTH ON MER # 5017, THESE STEMS ARE ACCEPTABLE, VISUAL EXAM ON BODY EXTERNAL SURFACE @ SEAL WELD REMOVAL AREA REVEALED A GRINDING GROOVE APPROX. 3/32" TO 1/2 IN DOFTH APPROX 200° AMOUND BUBY, WIDTH OF GROUND APPROX 1/8; Sketch Inspection Results NY Las C. QUNSAT-ODR/DR NO.151: 1890 5286 CI SAT Inspector andres & Non Date 706516A \$2,35191 3/22/90 PINK-Inspector WHITE-Work Package CANARY-Q.C. Supy.

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N# 1708

Liquid Penetrant Inspection Report

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Liquid Penetrant Inspection Report	8905286	
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Nuclear Plant Maintenance Work Order Continuation Sheet MPL Na / 120846036 MWO Na 18905286 Work Description RLOCK 27 CONTINAED Unlue 1-1208-46-036 torgato whited one hour and RE-torgales At 120 Ft. 165. TORGEE WRENCH UP 3-2075 CAL DUE DATE 7/3/90. Q.C. INVECTOR Jh 3/22/90 Renard Seal Cap & warehouse from MER 90-05016. Unie 3/26/90

Vogtle Electric Generating Plant Nuclear Plant Maintenance Work Order Continuation Sheet MPL NO. MWO No. 18905286 1-1208-06-036 Work Description Black # 27 Can't Blender out use on value 1128-06-036 for T. RETER WRITHER. P.T. WAS sold inseld ande en WAS .. body of value usag EB 3084 19 Ht P0443 D WELLED AREA WAS PREPARED FOR 3/22/90 Maintaines acre III Housekuping

Nuclear Plant Maintenance Work Order Continuation Sheet MWO No. 18905286 MPLNa_1/20806036 Work Description Black 27 CONTINGED ALL tools weeded to disassemble value 1-1208-46-036 ARE ON ARtform directly in front of UNIVE. The backside of value went to concrete wall has been ground out on bottom side the front side bottom hast AND CENTER WELD ARE left to seind. Scatted in front reeded to be modified and compenters have completed this FIRE Extinguisher is place on platform, George BROWN is there for A hands on then over class at clearliness 20NE TO HOUSE Keeping Temmostand / 19/90 Block 27 CONTINUES CRINDED out front of Uple 1-1208-46-036 aleo inside CAP ON UNIVE REMOVED CAP begged and took to Dercow, Took manguaget or bongett wat 196#, HAD About A guart of water and CAP. Left All tool & Fire Exfinancher and work area on platform class II clapsliness Zone II Housekeeping Peten Ciccio 3/20/8 05+76 MC2536

DESEDAR BLADO what we did that they as gradi 1 Pliels TH Betweenthe Daldarasme work of 11,62 tod Brugsab Gasd sand transl gals suidson tal to sally stat live tranged to fice at sular Alice yat Gul machining 44100 Transporger . Good at travad Bappat i Psycood rp0. 001+ 1 4.390. 560. " 160. 0 MERS LEAD MILLERS ×. 360 State: 05-1-11 Hubbas Messes and salve deale deale where uses solve andre where today - a worder cterra wierra bad LE Dolá apliels 05-06+61-8 Oworry & county 68 140000 48 4007 -06 8-01 - 6616 8 -01 33317857410 0357 Ob-E-6 - 8388 8-30 HON38M 310324 0357 TUNOWIN ITTING CINAPSEIN INAIN SONTS 4 20 SWM H40 433 CHAT RALLUN COSCARS SOLADA HA ONG 744 a79 3H+ 18 +H912H IP BAGS ON THE VALUE, THE UALUE HAS DEFN CLEARED AL JY V CARE ON XHE PLATEDAN. FLANGE AND STHE PART 2115070 +709 344 12 PULLED HOLD STAR STAR SHE HELD OF SHERE DIVINERO & SBRARL SATAS SET 24 50743 011 KALGED FROM 1950 - 90-8081 J WOXF EDMORES ONE OFTOBELING SETU ESTU 15 Work Description 772757 STANDING OND JUD ODIDINGY IMAD 68 Suce 8 aby 5 22 5 CA 8 37+ 4 5 750-99-808/-/ ON 1dm NWO NO 286606 81 コーノアクラアールズチ Nuclear Plent Mentanan ... Nork Cross Continuation Sheet

Nuclear Plant Maintenance Work Order Continuation Sheet 19905116 MPLNO LIJT MWO No. 3/2,14. Work Description 6/ock H26 When UNIDE WAS DISPASSEDBIED, WE RAW A FIBERSCOPE IN Then UAIDE OB6 \$ TO SEE THE INTERNELS OF UNDE"035 PISC WAS IN TACK & INTERNALS LOOKED good. 3-20-90 Verified Disc was intake only 1. Hargne R. Jones 3-2040 2. Ruchar W. Spian 3-20-90 3. Clim Cucci 5-20-30 706478 MC538

Nuclear Plant Maintenance Work Order Continuation Sheet MPL NO. 11208-06-036 MWO NO. 18905286 Work Description Black 27. Measured value Burnet Cap, Befure marking 1.500, SET UP CAPIN Lathe machined TO 250 cms Finish Thickness After machining 1.498 Cox 3-22.1 O.D. mic 1:2" UP3-2456 CalDuc Date 8-280 A mainstand 2000 The Housekeeping Carl Lev CEM used done dial indicator (0 - 300) VP-3-2874 to CFM 3-22-90 setup bonnet cap in bothe prior to machining. Inthe started GEATS MCESS

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	SECROIA POWER COMPANY VEGP QUALITY CONTROL QC HOLD / WITNESS POINTS						85	5010-C AGE 2	610. 1
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REASSEMBLY Nuclear Plant Maintenance Work Order Continuation Sheet DA 3.22.90 MPL Na 1-1208-46-036 18905286 MWO No. Work Description BLOCK 27 Corto. Reassantelled 8 new stude and nuts and gaalse Justalled. He study was done per procedure 26621.C was done per alertenshouse Nia Calipper. neith GAGLET estinghe Cal Apte 10- 3. 90, all measurmenter were une 6P 14763 Dav 3 - Stud - tolerances and procedure 3.2866 15 cal date 5-1-90 hust terane - 25 ditte 1-3.90 marther the Ludedrag UP-3-2075 UL MER unt. step after a for study auto + gast & maintained ZONE TH Housekeeping Danny J. Williams 3-22-90

GEORGIA FOWER COMPANY 85050-C FIG 5 VEGP QUALITY CONTROL VISUAL WELD INSPECTION REPORT PAGE LOF 2. INSP PROCEDURE # 1. MWO/OTHER # REV # 3. DRAWING # REV # 2 18905286 85050-C NIA 4. TAG/EQUIP # 5.SYS. DESIGNATOR 6.BUILDING ROOM/LEVEL 1120846 036 12.08 CIMT C 7.WELD # 8. MATERIAL TYPE/HEAT # 900868 P8 to P8 9. TIME OF EXAMINATION: IN PROCESS T FINAL INSP W INSERVICE FIT UP INSP Note: Enter weld inspection attributes accepted or rejected with reasons for rejection. 10. REMARKS : VISUALLY INSPECTED THE BLENDED OUT GRINDING GROOVE PRIDE TO WELD OUT NO DISCREPANCES NOTED VISUALLY INSPECTED THE WELD REPAIR AREA FER CATEGORY 'D' REQUIREMENTS OF 85050-C R/2. No DISCREPANCES NOTED 11. SKETCH: 13. INSPECTOR histophe C. J. 12. DC/ODR # LEVEL" DATE3.22.90 LEVEL DATE ACCEPT REJECT N/A 0 14. EVALUATOR P

12 of 13

VEGP

COMPLETION SHEET

Precedure	No.	Revision	Carlo Provincia de la Arresta de Carlos de Carlos de Carlos	Sheet	
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4.4.8	Nuts Torqued to	o (Level 2)	4. 4. 13 20 40	1	Jul
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PROCEDURE NO PAGENO REVISION 1 13 of 13 26621-C Sheet 2 of 2 HOLD MAINT. OC PROCEDURE INIT/DATE (Yes/No) DESCRIPTION INIT/DATE STEP 4.4.9 Nuts Torqued to Jul 14/21/19 No 160 ft. 1bs (Level 3) 44 ft 15 22 90 Final Torque on flange Nuts /2/ ft.lbs <u>HIEIS290 Willform Abd. Wicks</u> 4.4.12 Notify Shift Supervisor deglarge No 10/31 00 4.4.13 Comments/additional hold points: QC has reviewed this procedure for hold points he for the signature DISAPPROVED DATE COMPLETED BY APPROVED TVS FOREMAN DATE Juny Buchard 1200 Hayne R. Jones 3 2290

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NOCEDURE NO.		REVISION	and a	PAGE N	5
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18905286 FACE TOFS

IM-0004 Page 4 of 8

TASK 4 RECOMMENDATIONS

4.1 Disassembly and Inspection

Disassemble the check valves in accordance with the requirements covered in the Maintenance and Instruction Book 5710-99. PROCEDURE 20021-0

Record the breakout torque values of the nuts.

Remove the cap.

Measure the height of the studs above the body flange. If the stud height above the flange is less than 2.32 inches, the studs are fully engaged in the valve body. If the stud height above the valve body flange is more than 2.32 inches, the stud is not fully engaged in the valve body.

Since the valve has been leaking, it is necessary to clean the study before reassembly. To do so, it is recommended that all study be removed from the body and cleaned to remove any boron deposits.

HOLD POINT

If the stud height is more than 2.32 inches, remove the stud and use a bottoming tap (5/8 -11) to tap the stud holes to .96 to 1.00 inch. The holes are predrilled to 1.10 inches (see attached sketch). Clean the the tapped holes and the studs, and lubricate the studs is accordance instructions in the Instruction Book using Fel-Pro N-5000 or equivalent.

HOLD POINT

Dimensionally inspect the valve bonnet/cap to make sure there is no dishing or warping of the cap. If the cap is dished or warped, it must be evaluated before it is reused. Inspect the seating surface of the cap to make sure there is no scratch MOINT marks or wear marks at the gasket seating area. If it is scratched or worn, take a skin cu of the surface (.001 inch to .003 inch) with a surface finish of 125-250 RMS.

Clean the gasket groove with acetone or suitable cleaning fluid making sure not to scratch the surface.

4.2 Installation

Install the stude in the valve body in accordance with Instruction Book

MOLD POINT Measure the stud heights above the badge flange and confirm that the heights are less than 2.32 inches above the body flange face.

HOLD POINT before installation. The gasket dimensions shall be:

0.D	4.49	+	.000/-	.047	inches
1.0	3.78	+	.016/-	.016	inches
Thickness	.125	+	.010/-	.000	inch

IM-0004 Page 6 of 8

Install the cap and tighten the stud nuts in accordance with Instruction 200214 Book paragraph 6.2.11 (Table 6-2B) as modified below . The torquing sequence shall be:

Torque Level 1 25 ft -1b

Torque Level 2 60 ft -1b

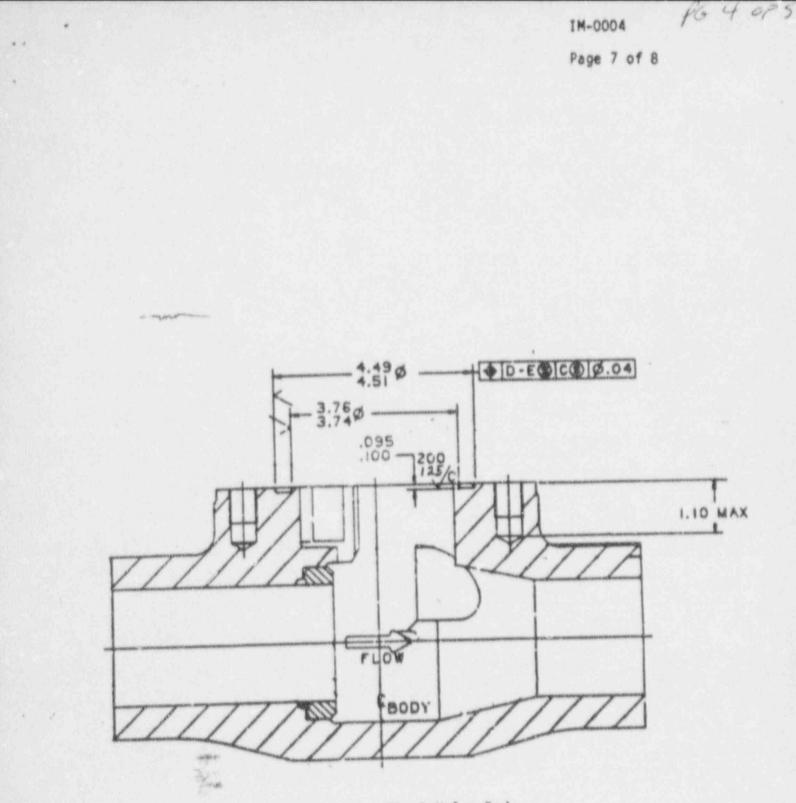
Torque Level 3 150 ft -1b

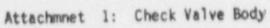
Torque Level 4 170 ft -1b

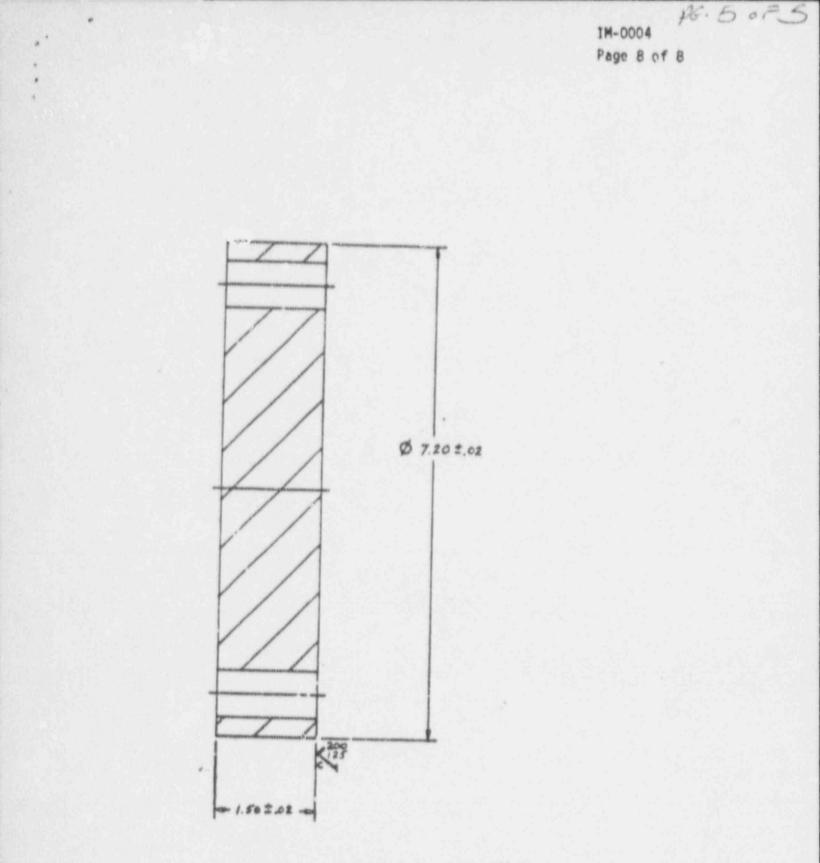
HOLD POINT After completing the torquing sequence, repeat the sequence one more time at 170 ft-1b to assure that all the study are well torqued.

***** NOTE *****

WAIT FOR 1 HOUR AFTER TORQUING ALL NUTS TO LEVEL 4 (SECOND TIME) TO ALLOW THE HOLD PODMORQUES TO STABILIZE. RECHECK TORQUE LEVEL 4 FOR ALL STUD NUTS AND RETORQUE AS NECESSARY TO 170 FT-LBS. THIS WILL BE THE THIRD CYCLE AT 170 FT-LBS.







Attachment 2: Check Valve Bonnet/Cap

NUCLEAR PLANT MAINTENANCE WORK ORDER (CONTINUED)

(2 OF 2)

CONTROL NO. 18905286 02

MPL/TAG NO.	SYSTEM EQ	P CLS	DESCRIPTION	LOCATION
1120806035	1208 11		VALVE 3.0,C88,1500	
1120806036	1208 11	1 CHECK	VALVE 3.0,C88,1500) 1RB184-SG1-4N3E19

Block 26 E.m. 3 Route 3/19/90

	PACKAGING INSTRUCTIONS
222.	TOOLS. N/A
<u> </u>	100201 171
00:	CAUTION: MID-LOOP AND NO RHR FLOW IS REQUIRED.
	ERECT SCAFFOLDING.
	REMOVE SHEETMETAL COVER AND INSULATION.
	GRIND OUT WELD ON SEAL CAPS.
	DISASSEMBLE VALVE.
	INSPECT INTERNALS FOR ABNORMAL WEAR AND FULL SWING ON
	DISC ARM. IF ANY DEFECTS ARE FOUND NOTIFY SYSTEM
	ENG./MAINT. ENG. FOR INSPECI 1. **
	DO NOT REPLACE ANY PRESSURE BOUNDARY PARTS THAT'S NOT
-7-	ON A SECTION XI TRAVELER. SECT. XI TRAVELER # 90117
	REASSEMBLE VALVE PER 26621-C.
	MAINTAIN CLEANLINESS CLASS - B.
-24	WELD ON NEW SEAL CAP PER WPCS (SEE MWO)
- (PT BODY & BONNET WHERE SEAL CAP WELD WAS REMOVED.)
-	QC/ANII TO PERFORM A VT-II AT N.O.P./T.
-	REINSTALL INSULATION/SHEETMETAL LAGGING.
1 **	WHEN VALVE IS DISASSEMBLED, INSERT A BOROSCOPE INTO TH
	LINE AND INSPECT THE INTERNALS OF THE OTHER CHECK VALV

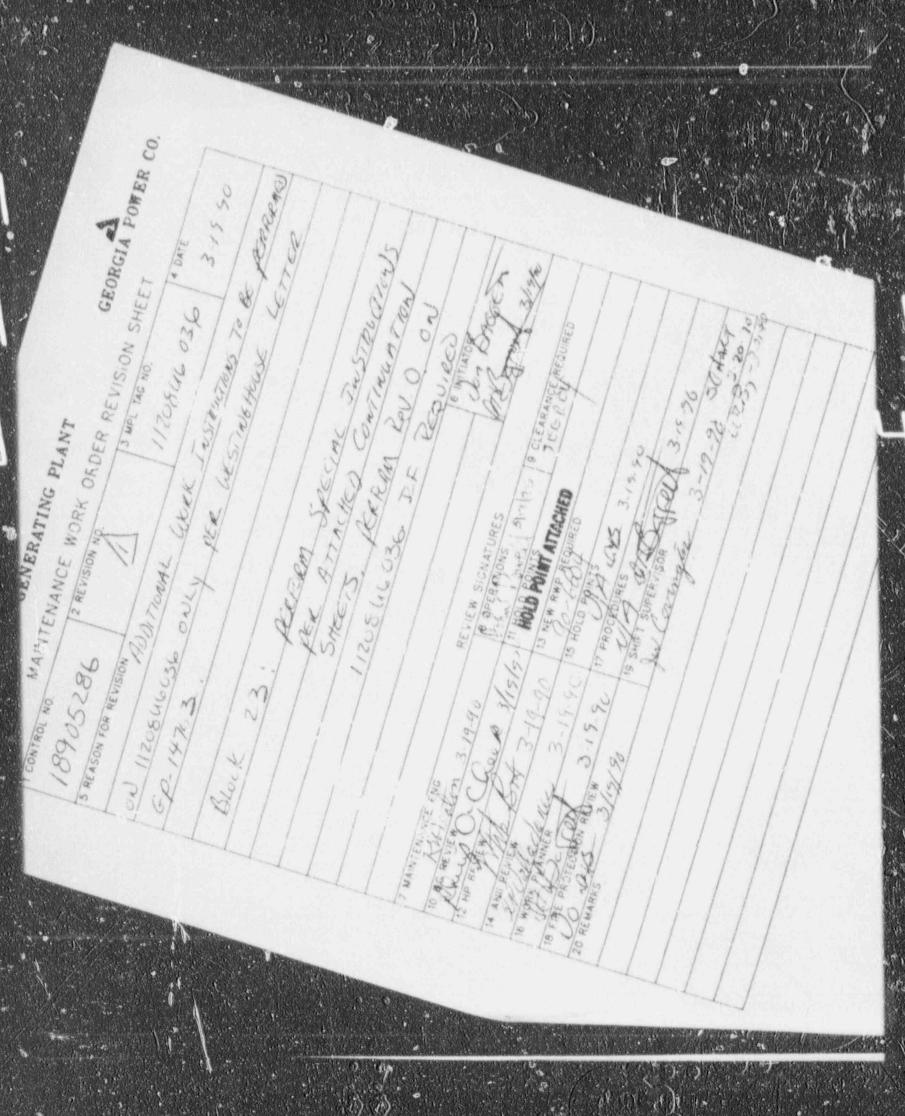
DATE 03/14/90 VOGTLE ELECTRIC GENERATING PLANT PAGE 5 NUCLEAR PLANT MANAGEMENT INFORMATION SYSTEM MAINTENANCE WALKDOWN INPUT FORM MWO #: 18905286 RCN #: MEPM TAG #: 11208U6036 PACKAGING INSTRUCTIONS TO THE EXTEND POSSIBLE. THE OTHER VALVE NOT TO BE DISASSEMBLE WITHOUT A SEPERATE MWO AND SYSTEM ENGINEERING APPROVAL. E:EST MAN/HRS. 60 MEOP D:DUR. 30 HRS. DATA SHEETS FOR 1-1205 116015 REMOVED AND PM CHECKLICIS SILLIC 49" IS MULED AS THEY ARE NOT APPLICABLE CAC 3/15/10

10-NUMBER 1405286	TENANCE CHECKLIST CHECKLIST CLASS FREQUENCY SCL00497 C N/A	PAGE 1 OF 1
AG NUMBER 1-1208-06-036	REFERENCE MATERIAL 26621-C	
	MAINTENANCE REQUIREMENTS AND SPECIAL INSTRUCTIONS	SKILL AND INITIALS
ESTINGHOUSE S	TYLE B CHECK VALVE INSPECTION	
(COMMITMEN	r # 16052) (RER 89-0278)	
. DISASSEMBL PROCEDURE	E AND INSPECT CHECK VALVE PER 26621-C.	6.161300 S
CORROSION, ABNORMALIT VALVE COMP PINS, ANTI DEVICES, S	R INDICATIONS OF WEAR, LEAKAGE, EROSION, DEFORMATIONS, MISSING PARTS OR OTHER IES. PAY PARTICULAR ATTENTION TO INTERNAL ONENTS SUCH AS DISCS, DISC ARMS, HINGE -ROTATION LUGS, PISTONS, SPRINGS, LOCKING EATING/SEALING SURFACES, ETC., AS . DOCUMENT ANY FINDINGS.	4 <u>178 13425</u>
AINTENANCE EN	GINTER/SUPV. APPROVAL H R VAUGHT LAST MINOR CHANGE DATE 00/00/00	REV. 01 01/09/90

VOGTLE ELECTRIC GENERATING PLANT GEORGIA POWER CO.

MAINTENANCE WORK ORDER REVISION SHEET

2 REVISION NO. 3 MPL TAC NO. 4 DATE I CONTROL NO. 3/22/9. 1-1208-16 36 18905036 2 5 REASON FOR REVISION The backy Register will replice where the seal cap was welled 311 edd : Work per Sort XI Taxala 90119 now payme superior for P.T. Blenk not - PT. Area REPARE AREA by Willing WPLS # 900868 Black weld Supp. 1 6 INITIATOR weld popula 6 JERUME JACKE . - PT The amerity REVIEW SIGNATUPES 7 MAINTENANCE ENG 1 Paton 3 2290 WHOLD POINTS HOLD POINT ATTACHED 00 le 3/22/90 12 HP REVIE -22-11 15 HOLD FOINTS MA Sur Sect XI 17 PROCEDURES 14 ANII REVIEW 143/2/49 Tantel Mary l. 18 FIRE PROLECTION REVIEW 19 SHI ~ 20 REMARKS il ... his

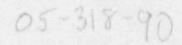


FOGTLE ELECTRIC GENERATING PLANT GEORGIA POWER CO.

MAINTENANCE WORK ORDER REVISION SHEET 3 MPL TAG NO. 4 DATE 2 REVISION TO. I CONTROL NO. 1120846 036 3.19.50 18905286 S REASON FOR REVISION ADDITIONAL GREEK INSTRUCTIONS TO BE PERREMED ON 1120846036 ONLY PER LESTINGHOUSE LETTER GP-14763. Block 23: ACEFORM SPECIAL TUSTRUCTIONS PER ATTACHED CONTINUENTION SHEETS, REFEREN REV. O. ON 1120846036 DF REQUIRED 6 INTIATOR Ikn DAGEN Spert 3/19/50 REVIEW SIGNATURES POPERATIONS SIMILAU & CLEARANCE REQUIRED 7 MAINTENANCE ENG HOLO EQINIS Kitleaton 3-19-90 10 0,6 95 200 R 3/19/92 HOLD POINT ATTACHED 13 NEW RWP REQUIRED 15 1 15 HOLD POINTS LORS 3.19.90 3-19-90 3-19.90 17 PROCEDURES 3-15-96 3-19-90 SCHART 18 FIR Jul Corington 3-19-98 1 3.20 10 (12B) - 3 21-80 - 3/19/90 20 REMARKS

H T I VOGTLE ELECTRIC GENERATING PLANT GEORGIA FOWER CO. MAINTENANCE WORK ORDER REVISION SHEET 3 MPL TAG NO .. I CONTROL NO. 2 REVISION NO. A DATE 1120846 036 31990 18905286 E REASON FOR REVISION ADDITIONAL WORK INSTRUCTIONS TO BE PERFORMED DER WESTINGHOUSE LETTER ON 1120546036 ONLY + in GP-14763 BLOCK 23 PERFORM SPECIAL TUSTRUCTIONS ATTACHED CONTINUENTION Red 144 14 SHEETS, DERFORM REV. O. ON 1120546036 IF REQUIRED 6 INITIATOR Ikn FASSER gren 1/2/20 REVIEW SIGNATURES 9 CLEARANCE/REQUIRED B DPERANONS (SINCINO 7 MAINTENANCE ENG 11 HOLD POINTS Kit laton 3-1990 10 QE REVIEW Leek 3/19/9 X Recent (S NEW RWP REQUIRED 12 HP REMEW 10.6004 15 HOLD POINTS 14 ANII REVIEW DB. 16 WORK PLANNER 319.90 3-19.91 17 PROCEDURES 18.90 3-19.90 UP ST ant 18 FILE PROTECTION REVIEW SCHART 19 SH 7-20-90 20 REMARKS 3/19/90

VOGTLE ELECTRIC GENERATING PLANT GEORGIA POWER CO. MAINTENANCE WORK ORDER REVISION SHEET I CONTROL NO. 2 REVISION NO. 3 MPL TAG NO .. A DATE 18905286 1110546 036 31990 5 REASON FOR REVISION ADDITIONAL LIXER INS CUTIONS IS BE PERFORMED PER IL INSTITUTE LETER ON HINSHUUSG ONLY 62-14763 Thurk 23 PERIORM SPECIAL THESTRUCTIONS RER AMANCO CONTINUMERON SHEETS, JERICAN REV O. ON 11208 UL UBE IF ECQUIRCE 6 INITIATOR ika RAGEC 23 217 3he REVIEW SIGNATURES 9 CLEARANCE REQUIRED & OPERATIONS (SIGILY 7 MAINTENANCE ENG 1 TI HOLD POINTS 3 19 90 som. 10 QG REVIEW, 200 B 3/17 paris (13 NEW RWP REQUIRED 12 HP REMEW - 1874 14 ANUI REVIEW 15 HOLD POINTS 205 3-19-20 11/21 16 WORK PLANNER 17 PROCEDURES 31996 15 76 1111 0 18 FIRE PROTECTION REVIEW 19 SHIFT (MAILY 20 REMARKS 1-20-90 117/90 233.30.80



MAYLE SCI

матониев эслемтно вончноев а бузтене дасци Мау 2, 1990

Reference No. 17133B-006

Georgia Povor Company 40 Inverness Center Parkway P. O. Box 1295 Birmingham, Alabama 35201

Attention: Kenneth S. Burr

1)

2)

Subject: Reliability Evaluation Testing of Calcon Model A3500-W3 Temperature Sensors

References:

Georgia Power Company Purchase Order No. 60031-1 Wyle Laboratories' Test Procedure 17133

Dear Mr. Burr:

Two new Calcon Model A3500-W3 Temperature Sensors (Serial Nos. OC3011 and OC3002 designated as Temperature Sensor b and 1, respectively) were subjected to the Reliability Evaluation Test Program described in Wyle Laboratories' Test Procedure was performed prior to removal of the sensors from their thermowells and inspection of when the sensors were removed from their thermowells and inspection of when the sensors were performed with loose spacer-tubes with the sensors removed from their thermowells and inserted directly in the form their thermowells and inserted directly in the form their thermowells and inserted directly in the model for Test Series 3). In addition, it was determined prior to the test that the model number specified in the test procedure (A3501-W3) was taken from an incorrect document, and A3500-W3 is the correct model number.

The test program was performed in the following sequence:

Specimen identification and external visual inspection.

o As-Received Setpoint Determination Test

Sensor removal from thermowells and inspection of and marking location of

Calibration of specimens.

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Setpoint Repeatability Tests to determine the effects of varying rates of temperature change, varying input air pressure, vibration, varying ambient air temperature, thermowell setscrew tightness, spacer-sube looseness, etc. The attached table contains a list of all tests performed including test conditions and results. The tests demonstrated that input air pressure variations of 5 psi or less, a rapid water temperature decrease (approximately 10°F/minute) from just below the setpoint, vibration typical of in-service vibration (excluding long-term effects), ambient air temperature variations of 20°F or less, and slightly noticeable bowing of the Viton O-ring/disk assembly have no significant effect on Temperature Sensor operation and calibration. The following paragraph; describe parameters that were shown to have a significant effect on the operation and/or calibration of the Temperature Sensors.

Insufficient Temperature Stabilization Period Prior to Calibration

Consecutive calibration checks indicated a slight upward shift in the setpoint apparently due to the failure to completely stabilize the temperature of all components of the specimens prior to the initial calibration. It was concluded that a minimum two-hour soak period at approximately 200°F prior to calibration (180°F for setpoint checks) is necessary to ensure consistent performance.

Contaminants on the Temperature Sensor

Tests performed with the Sensors removed from their thermowells and inserted directly in the water bath caused a downward shift of approximately 10°F in the setpoint of both specimens apparently due to mineral residue on the Viton O-ring/disk assembly istandard facility water and not demineralized water was used in the water bath). The Viton O-ring/disk assemblies were cleaned with Dow Corning 200 Fluid (silicone oil) and allowed to dry overnight. The specimens were then recalibrated and remained in calibration for the remainder of the tests prior to the intentional loosening of the spacertubes. It was concluded that the Sensors should not be immersed directly in water. All calibrations and tests should be performed with the Sensors installed in their thermowells.

Setpoint Reference Temperature

All tests were performed with a thermocouple used to monitor the internal temperature of a reference thermowell in the water bath along with the specimens. The temperature of the water was also monitored with a thermocouple. It was detentined that due to the temperature indication lag of the thermowell thermocouple caused by the thermocouple not displacing as much air as the Sensors, the thermocouple not being as close to the thermowell wall as the Sensors, and the time constant of the thermocouple in still air, the water bath temperature is a more realistic reference for calibration and testing. The lag time for the thermocouple in the circulating water bath was insignificant.

Water Bath Heatup Rate

A slow water bath heatup rate (approximately 1°F per minute) was shown to allow the thermowell internal temperature to more closely follow the water bath temperature. A slow heatup rate causes the specimens to trip at a higher temperature (as measured in the thermowell) than a fast heatup rate. It should be noted that a slow heatup rate causes the specimens to trip at a lower water temperature than a fast heatup rate.

(2)

Thermowell Setscrew Tightness

The tests with the thermowell setscrews loose demonstrated that a loose setscrew causes an increase of approximately 2°F in the setpoint when measured with a heatup rate of 1°F per minute. This setpoint shift is apparently due to the loss of contact between the Sensor and the wall of the thermowell. All calibrations and testing should be performed with the thermowell setscrew tight.

Spacer-Tube Position

The tests performed with the spacer-tube loose demonstrated that the selpoint decreases approximately 80°F for each full turn. A thread-locking compound is recommended to ensure that the spacer-tube remains in its tightened position for all calibrations, tests, and in-service use.

A test report to be issued at a later date shall contain details of the inspections and tests, test results, photographs, equipment calibration data, etc.

Should you have any questions or require additional information, please contact the undersigned.

Sincerely,

WYLE LABORATORIES Eastern Operations

Don Smith Senior Engineer Nuclear Favironmental Qualification

dan

Flavous R. Johnson, P.E. Department Manager Nuclear Environmental Qualification

DS/DKB/grd

Attachment

Dawn K.

6)

Dawn K. Bates Senior Contracts Administrator

G. W. Hight Manager, Quality Assurance

ATTACHMENT

* *

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AS-RECEIVED TEST. CALIBRATION. AND RELIABILITY EVALUATION TEST SUMMARY

9.00

10

Alex and

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NOTES: 1. ALL TESTS WERE PERFORMED WITH SUBPLY AJR PRESSIME AT APPRON. 60 PSIG. UTH TEMPERATURE SEMSORS INSTALLED IN TREPROMARLIS, AND WITE VATE TEMPERATURE INCREASED AND DECREASED AT THE RATE OF 1"F PER NIMITE.

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* 180°F FOR 5 MINS., 200°F FOR 33 MINS., THEN 1°F INCREASE EVERY 15 MINUTES

DATE

- ** TEMPERATURE WAS STABLIZED AT APPROXIMATELY 1*F BELOW SETPOINT AND WAS THEN DECREASED AT APPROXIMATELY 10*F PER SINUTE.
 - NOTES: 1. ALL TESTS WERE PERFORMED WITH SUPPLY AIR PRESSURE AT APPROX. 60 PSIG EXCEPT TEST RIAH 13 (55 PSIG) AND TEST RUN 14 (65 PSIG).
 - 2. AN EXCESSIVE AMOUNT OF DOLD WATER APPARENTLY CAUSED A SHARP DECREASE IN WATER TEMPERATURE (FROM 179.2 to 155.5°F IN ONE HIRSTE). TWO MIN-UTES LATER THE TEMPERATURE HAD INCREASED TO 179.4°F AT A RATE OF APPROXIMATELY 10°F FER MINUTE. TS-O TRIPPED AND IS-1 PRESSURE DROP-PED AS LOW AS 48.5 PSIG. TEMPERATURE WAS HELD AT APPROXIMATELY 180°F FOR 86 MINUTES FRIOR TO TEST 3A.
 - 3. UNIFORM WATER TEMPERATURE WAS NOT MAINTAINED DURING TEST RUN 15, ESPECIALLY DURING THE DOWN RAMP, SINCE THE WATER WAS NOT BEING CIRCURATED DURING THE TEST.
 - 5. DURING PREVIOUS TESTING, THE AMBIENT TEMPERATURE IN THE AREA AROUND THE TEMPERATURE SENSOR HOUSINGS WAS MEASURED WITH THE WATER BATH AT 200°F AND WAS APPROXIMATELY 87°F. AN ENVIRONMENTAL ENCLOSURE WAS PLACED OVER THE SCHSOR HOUSINGS AND THE AMBIENT TEMPERATURE WAS CON-SPOLLED TO 107°F (ORIGINAL AMBIENT TEMPERATURE + 20°F) FOR TEST RUM 16 AND TO 67°F (ORIGINAL AMBIENT TEMPERATURE - 20°F) FOR TEST RUM 17.
 - TEST RUNS 18A AND 18B WERE PERFORMED TO VEREFY THAT THE SELPOINT CHANGES THAT OCCURRED DURING TEST RUNS 7 TRROUGH 12 WERE NOT CAUSED BY A RAPID TEMPERATURE CHANGE.

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05-319-1-90

SSINS No. 6835 IN E2-20

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, D.C. 20555

June 28, 1982

IE INFORMATION NOTICE NO. 82-20: CHECK VALVE PROBLEMS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or construction permit (CP).

Purpose:

This information notice is provided as a notification of potentially significant problems pertaining to check valves. It is expected that recipients will review the information for applicability to their facilities. No specific action or response is required at this time.

Description of Circumstances:

A number of problems were recently reported involving swing check valves supplied by two manufacturers. Palisades Nuclear Plant, which is an operating plant, reported severe damage to the internals of 6-inch Alloy Steel Products Company (ALOYCO) swing check valves used in the low-pressure safety injection system (LPSI).

Susquehanna Steam Electric Station, which is under construction, reported three separate problems with Pacific Company swing check valves that range in size from 6 inches to 20 inches installed in the residual heat removal (RKR), reactor core isolation cooling (RCIC), and core spray systems.

The valves are similar in design and service to numerous other swing check valves, manufactured by other companies, that have had similar problems in the past. (Ref. LER 50-298/77-18, 50-255/81-37; AO 50-331/75-23; IE Information Notices 80-41, 81-30 and 81-35)

Internal Damage to ALOYCO Valves:

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During required modifications of the LPSI system at the Palisades Nuclear Plant, Consumers Power Co. of Michigan reported that two of the four LPSI swing check valves were found to have internal damage. In both valves the disc nut washer and the disc nut pin were missing and the valve body, clapper arm, disc clapper arm shaft, and clapper arm support were severely worn. The discs were still attached to their clapper arms; however, valve seat and disc sealing surfaces were damaged and leaks from the valves could have been excessive.

IN 82-20 June 28, 1982 Page 2 of 3

It was subsequently discovered that the remaining two LPSI check valves had similar internal damage. The four LPSI check valves at Palisades were manufactured by ALOYCC about 1968. They are 6-inch swing-type check valves with weld ends for attachment to Schedule 120 piping. All four valves were mounted vertically with the flow direction upward.

The swing check valves have an inline configuration with a ballooned or expanding area in the valve body for movement of the flapper-type disc. The disc is substantially larger than the nominal inside diameter of the pipe or valve. If the disc should become separated from the clapper arm, it would be trapped within the expanded portion of the valve body. This could lead to reduced LPSI flow or (with some small probability) the complete blockage of the line.

Operation of the swing check valve in the direction of flow (normal operation) causes the threaded shaft on the back of the valve disc to strike the valve body as it opens to the full-flow position. (The valve body is the ultimate limiter of disc opening.) During full-flow operation, there apparently is sufficient turbulence to cause the disc to chatter against the valve body. The valves at Palisades, which are used for extended periods during shutdown cooling, exhibited about 1/2 inch of wear of the threaded portion of the disc shaft (greater than the height of the disc nut). Although the disc nuts had been worn away, none of the discs had separated from its clapper arm because of the peening of the shafts to a larger diameter.

The ALOYCO check valves form the boundary between the LPSI and high-pressure safety injection (HPSI) systems at Palisades. The abnormal wear of the check valves was discovered during modifications of the LPSI piping to add leak." testing capability as required by NRC order, dated April 20, 1981, for Event V valve configurations. This order required the licensee to perform periodic leak-testing of check valves that form the interface between a high-pressure system connected to the reactor coolant system (RCS) and a low pressure system whose piping leads outside containment. Event V is defined as the failure of two in-series check valves to function as a pressure isolation barrier between a high-pressure system connected to the RCS and a lower pressure system extending beyond containment. This failure could cause an overpressurization and rupture of the low-pressure system, which would result in a LOCA that bypasses containment and simultaneously render inoperable some of the equipment needed to mitigate a LOCA.

Problems With Pacific Valves :

During start-up testing at the Susquehanna Steam Electric Station Unit 1, Pennsylvania Power and Light reported three problems with Pacific check valves: (1) disc assembly to body interference and excessive packing friction, (2) excessive wear at hinge arm/disc stud interface, and (3) disc stud breakage. The Pacific check valves are used in many non-safety systems as well as the residual heat removal, reactor core isolation cooling, and core spray systems.

IN 82-20 June 28, 1981 Page 3 of 3

1. Disc Assembly to Body Interference and Excessive Packing Friction

The interference problem was attributed to tolerance buildup by the valve manufacturer. Undetected, a deficiency of this type could render the valve unable to perform its safety function. The valves were subsequently reworked at Susquehanna. The packing friction problem was solved by changing packing type.

2. Excessive Wear at Hinge Arm/Disc Stud Interface

The excessive wear at the hinge arm/disc stud interface was identified on non-safety related valves. The hinges and discs involved in the excessive wear problem have been replaced in the safety related valves. The licensee will re-inspect the safety related valves to confirm that the modifications have been effective in reducing wear. These inspections will be performed after the valves have operated for a sufficient time period that wear might be expected.

3. Disc Stud Breakage

The problem with the fractured stud, which is an integral part of the disc/stud casting, appears to be similar to a earlier failure of an Anchor/Darling valve (50-298/77-18). Although these failures were similar, the cause of the Susquehanna failures appears to be a metallurgical problem that is limited to the facific valves in this case. In the safety related valves, the licensee is replacing the CA15 discs with discs manufactured from A516 Grade 70 plate with a stud fabricated from the same material threaded and welded to the disc. In the RCIC and HPCI exhaust systems, the swing check valve is being replaced by a lift check valve. The inherent damping action of this type valve is believed by the licensee to make it more able to withstand the erratic steam flow conditions.

If you have any questions regarding this matter, please contact the Regional Administrator of the appropriate NRC Regional Office, or this office.

Sordan, Director

Division of Engineering and Quality Assurance

Technical Contact: M. S. Wegner 301-492-4511

Attachment: List of Recently Issued IE Information Notices

Attachment IN 82-20 June 28, 1982

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

	Date of	
Subject	Issue	Issued to
Loss of High Head Safety Injection Emergency Boration and Reactor Coolant Makeup Capability	6/18/82	All power reactor facilities holding an OL or CP
Assessment of Intakes of Radioactive Material by Workers	6/11/82	All power reactor facilities holding an OL or CP, other specified licenses
Overpressurization of Reactor Coolant System	6/10/82	All power reactor facilities holding an OL or CP
HPCI/RCIC High Steam Flow Setpoints	5/28/82	All power reactor facilities holding an OL or CP
Notification of the Nuclear Regulatory Commission (NRC)	5/28/82	All NRC licensees and all power reactor facilities holding a CP
TMI-1 Steam Generator/Reactor Coolant System Chemistry/ Corrosion Problem	5/12/82	All power reactor facilities holding an OL or CP
Failures of General Electric Type HFA Relays	5/10/82	All power reactor facilities holding an OL or CP
Surveillance of Hydraulic Snubbers	4/21/82	All power reactor facilities holding an OL or CP
Potential Inaccuracies in Wide Range Pressure Instru- ments used in Westinghouse Designed Plants	04/09/82	All power reactor facilities holding an OL or CP
	Loss of High Head Safety Injection Emergency Boration and Reactor Coolant Makeup Capability Assessment of Intakes of Radioactive Material by Workers Overpressurization of Reactor Coolant System HPCI/RCIC High Steam Flow Setpoints Notification of the Nuclear Regulatory Commission (NRC) TMI-1 Steam Generator/Reactor Coolant System Chemistry/ Corrosion Problem Failures of General Electric Type HFA Relays Surveillance of Hydraulic Snubbers Potential Inaccuracies in Wide Range Pressure Instru- ments used in Westinghouse	SubjectIssueLoss of High Head Safety Injection Emergency Boration and Reactor Coolant Makeup Capability6/18/82Assessment of Intakes of Radioactive Material by Workers6/11/82Overpressurization of Reactor Coolant System6/10/82HPCI/RCIC High Steam Flow Setpoints5/28/82Notification of the Nuclear Regulatory Commission (NRC)5/28/82TMI-1 Steam Generator/Reactor Corrosion Problem5/12/82Failures of General Electric Snubbers5/10/82Surveillance of Hydraulic Wide Range Pressure Instruments used in Westinghouse04/09/82

OL = Operating License CP = Construction Permit

05-319-2-90

SSINS No.: 6835 IN 86-09

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, D.C. 20555

February 3, 1986

IE INFORMATION NOTICE NO. 86-09: FAILURE OF CHECK AND STOP CHECK VALVES SUBJECTED TO LOW FLOW CONDITIONS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This notice is provided to alert recipients of a potentially significant safety problem pertaining to check and stop check valves failing under low flow conditions. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Between late November 1985 and early January 1986, Florida Power and Light's Turkey Point facility experienced numerous failures of the 12 stop check valves in the steam supply system to the auxiliary feedwater pumps. The stop check valves are located upstream and downstream of a motor-operated valve (MOV) that opens when required to initiate auxiliary feedwater flow. The stop check valves are normally open and thus allow steam flow to the pumps while at the same time preventing backflow through the steam line in the event of a steam line break.

The mode of failure of the valve was degradation of the disc and disc nut assembly (see attached sketch) due to low steam flow conditions caused by slight leakage past the normally closed MOV. The low steam flow rate was not sufficient to keep the disc open and the disc assembly then vibrated and chattered causing excessive wear and damage to the valve internals, in particular, the disc assembly. In many cases (three in Hovember and four in January), the disc guide stud had broken off from the disc. This allowed the disc to become cocked in the valve and prevented full closure (thus defeating both the check and stop features of the valve) and full opening (thus restricting steam flow). In addition, the broken disc guide stud was free to travel downstream with steam flow and could have caused damage to equipment and components in the flow path.

IN 86-09 February 3, 1986 Page 2 of 2

The licensee performed a failure analysis of the disc assembly to verify the acceptability of a higher strength material being used in a redesigned disc guide. In addition, the licensee committed to a program of regular radiographic examination of the valves on Unit 3 for the remainder of the refueling cycle. However, the licensee considers this to be an interim repair pending the completion of the study underway by its AFW Enhancement Task Force.

A related series of events was discussed in IE Information Notice 82-26, "RCIC and HPCI Turbine Exhaust Check Valve Failures." In this case the low steam flow rates were the result of testing the RCIC and HPCI turbines at less than rated load. The corrective actions consisted of changes to test procedures, changes to the exhaust system design, and changing to a different check valve style.

The information herein is being provided as an early notification of a possibly significant matter that is still under review by the NRC staff. Recipients should review the information for possible applicability to their facilities. If NRC evaluation so indicates, further licensee actions may be requested.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

Edward K Jordan, Director Division of Emergency Preparedness

and Engineering Response Office of Inspection and Enforcement

Technical Contacts: George A. Schnebli, RII

(404)331-4875

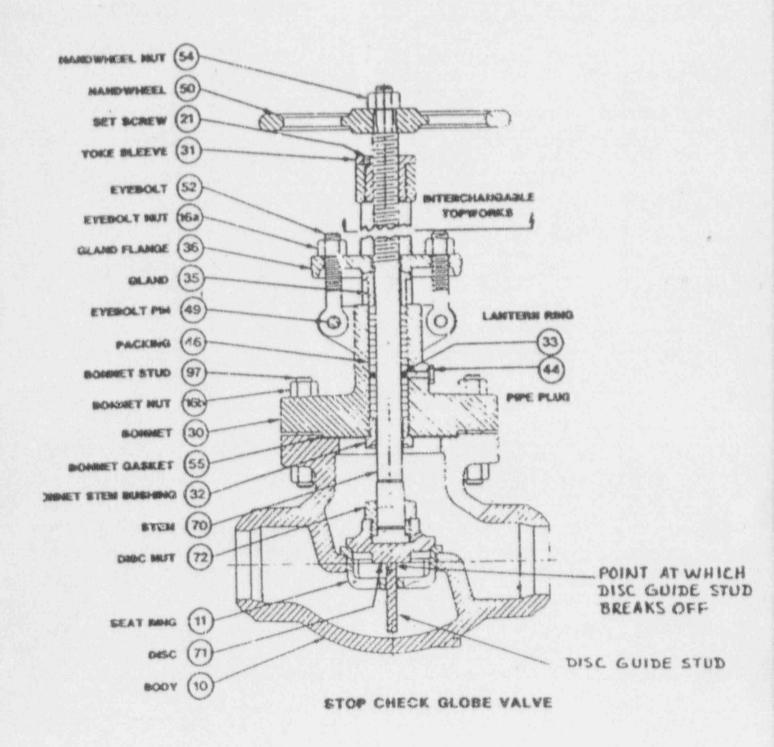
Richard J. Kiessel, IE (301)492-8119

Attachments:

1. Sketch of Stop Check Globe Valve

2. List of Recently Issued IE Information Notices

Attachment 1 IN 86-09 February 3, 1986



Attachment 2 IN 86-09 February 3, 1986

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	lssued to
86-08	Licensee Event Report (LER) Format Modification	2/3/86	All power reactor facilities holding an OL or CP
86~07	Lack Of Detailed Instruction And Inadequate Observance Of Precautions During Maintenance And Testing Of Diesel Generate Woodward Governors	e	All power reactor facilities holding an OL or CP
86~05	Failure Of Lifting Rig Attachment While Lifting The Upper Guide Structure At St. Lucie Unit 1	2/3/86	l power reactor facilities holding an OL or CP
86~05	Main Steam Safety Valve Test Failures And Ring Setting Adjustments	1/31/86	All PWR facilities holding an OL or CP
85-04	Transient Due To Loss Of Power To Integrated Control System At A Pressurized Water Reactor Designed By Babcock & Wilcox	1/31/86	All power reactor facilities holding an OL or CP
86-03	Potential Deficiencies In Environmental Qualification Of Limitorque Motor Valve Operator Wiring	1/14/86	All power reactor facilities holding an OL or CP
86-02	Failure Of Valve Operator Motor During Environmental Qualification Testing	1/6/96	All power reactor facilities holding an OL or CP
86-01	Failure Of Main Feedwater Check Valve Causes Loss Of Feedwater Sy. a Integrity And Water-Hamm. Damage	1/6/86	All power reactor facilities holding an OL or CP

OL = Operating License CP = Construction Permit

05-319-3-90

SSINS No.: 6835 IN 83-17

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, DC 20555

March 31, 1983

INFORMATION NOTICE NO. 83-17: ELECTRICAL CONTROL LOGIC PROBLEM RESULTING IN INOPERABLE AUTO-START OF EMERGENCY DIESEL GENERATOR UNITS

Addressees:

All nuclear power reactor facilities holding an operating licensee (OL) or construction permit (CP).

Purpose:

This information notice is provided as a notification of a potential problem in the control logic circuitry which could adversely affect the auto-start feature provided for diesel generators at nuclear facilities. It is expected that recipients will review the information for applicability to their facilities. No specific action or reference is required.

Description of Circumstances:

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Recently the licensee performed a loss of offsite power test at the North Anna Unit 2 Station. The test is conducted periodically and is a technical specification requirement. Specifically, this test is performed to verify the capability of the emergency diesel generators (EMDs) to load-shed and reload the essential emergency busses following loss of an EMD when offsite power is unavailable.

Briefly, the selected emergency bus was "set up" to simultaneously receive electrical power from the offsite power source and the associated EMD. A safety injection test signal was then initiated and the diesel generator unit was manually shut down. These actions were followed by opening the offsite power supply feeder breaker to the selected emergency bus. Given these conditions, the associated EMD did not respond to an auto-start call upon resetting its shutdown relay.

When the licensee investigated the event, he found that the periodic test procedure used to conduct this test did not specifically address a 60-second time delay feature in the diese! generator's restart circuitry. The purpose of this time delay is to allow the diesel generator to come to a complete stop before attempting a restart. This time delay prevents fuel from being supplied to the diesel generator for 60 seconds after the shutdown relay has been manually reset by a emote pushbutton located in the control room.

further review of this event determined that when the shutdown relay was manually reset (because of the presence of the safety injection signal mentioned above), the compressed starting air was admitted to start the diesel even though no fuel was admitted during the 60-second delay period. At the end of this delay,

IN 83-17 March 31, 1983 Page 2 of 2

fuel was admitted but the supply of compressed air used to rotate the engine for a restart attempt had been consumed. Thus, the diesel unit effectively became inoperable until the air storage tanks were repressurized.

This licensee's action taken to preclude this event from recurring included modifying the test procedures so as to require the control selector switch for the diesel generator being tested to be placed in the "local" position before the shutdown relay is reset. This action, in effect, blocks the auto-start diesel signal from activating the air start solenoid for the diesel generator being tested. Following this action, the shutdown relay may be manually reset and the time delay permitted to run out. Subsequently, the control selector switch may be returned to its normal "remote" position at which time the diesel generator unit being tested should auto-start and reload its associated emergency busses in accordance with design requirements.

During an in-depth study of the control logic circuitry for the diesel generator units at Hatch Unit 1 Station, a potential control logic problem was identified which is identical to the problem at North Anna Unit 2 Station. Subsequently, the licensee implemented a design change which now allows fuel to be supplied into the diesel unit concurrent with the logic signal calling for diesel generator "re-start."

Since North Anna Unit 2 is a pressurized water reactor power plant and Hatch Unit 1 is a boiling water reactor power plant, the control logic problem, as discussed, has strong generic implications and may affect many of the addressees of this information notice. Licensees should be aware that since the local/ remote control switch is located in the control room and is placed in the "remote" position during normal plant operation, it will require direct immediate operator corrective action to preclude failure of the diesel generator to re-start under the set of conditions discussed above. On this basis, we suggest these addressees review this information for applicability to the control logic rircuitry of diesel generator units in use at their plant.

No written response to this notice is required. If you have questions regarding this matter, please contact the Regional Administrator of the appropriate NRC Regional Office, or this office.

William P. Millson

Edward L. Jordan, Director Division of Emergency Preparedness and Engineering Response Office of Inspection and Enforcement

CONTACT: V. D. Thomas 301-492-4755

Attachment: List of Recently Issued Information Notices

Attachment IN 83-17 March 31, 1983

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
83-16	Contamination of the Auburn Steel Property with Cobalt-60	03/30/83	All Material licensees
83-15	Falsified Pre-Employment Screening Records	03/25/83	All power reactor facilities holding an OL or CP
83-14	Dewatered Spent Ion Exchange Resin Susceptibility to Exothermal Chemical Reaction	03/21/83	All power reactor facilities holding an OL or CP
33-13	Design Misapplication of Bergen-Paterson Standard Strut Restraint Clamp	03/21/83	All power reactor facilities holding an OL or CP
33-12	Incorrect Boron Standards	03/18/83	All power reactor facilities holding an OL or CP
33-11	Possible Seismic Vulner- ability of Old Lead Storage Batteries	03/14/83	All power reactor facilities holding an OL or CP
33-10	Clarification of Several Aspects Relating to Use of NRC-Certified Transport Packages	03/11/83	All NRC-licensed facilities and registered users of NRC-Certified transport packages
83-09	Safety and Security of Irradiators	03/09/83	All power reactor facilities holding an OL cr CP
33-08	Component Failures Caused by Elevated DC Control Voltage	03/09/83	All power reactor facilities holding an OL or CP
33-07	Nonconformities with Materials Supplied by Tube Line Corporation	03/07/83	All power reactor facilities holding an OL or CP

OL = Operating License CP = Construction Permit

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20555

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OFFICIAL BUSINESS PENALTY FOR PRIVATE USE \$300 FIRST CLASS MAIL FOSTAGE & FEES PAID USN RC NASH D C PERMIT NO <u>C.51</u>

05-319-4-90

SSINS No.: 6835 IN 83-51

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, D.C. 20555

August 5, 1983

IE INFORMATION NOTICE NO. 83-51: DIESEL GENERATOR EVENTS

Addressees:

All nuclear power facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This information notice is provided to bring to the attention of licensees and construction permit holders some events and experience of generic diesel generator problems and corrective action taken. It is expected that recipients will review the information for applicability to their facilities. No other action or response is required.

Description of Circumstances:

In its continuing review of licensee event reports (LERs), NRC has identified during the past five months more than 100 LERs pertaining to diesel generator problems. Most of these appear to be material, equipment, or component failures. No single common trend can be identified.

NRC is concerned about the large number of diesel generator events. During discussions with diesel manufacturers and licensees, it appears that many of these events could have been eliminated or prevented by implementation of a conscientious maintenance and inspection program as well as monitoring equipment through a plant's trend program. Some licensees have instituted such a program to determine the underlying cause of the failures (see IE Information Notice 82-10) and to prevent their recurrence. Components or materials that have experienced failures are monitored or inspected more frequently. Many affected items are repaired or replaced before actual breakdown. For example, cooling water heat exchangers that were found to be ineffective after a certain period of time because of tube fouling were replaced. Cooling jacket circulating water pump bearings are inspected for wear and replaced in certain intervals. Pressure switches and timers have been found with drifting setpoints and were recalibrated or replaced frequently.

Lecause of the large number of diesel generator events it is not feasible to describe all the events reported. However, Attachment 1 to this information notice gives several representative examples and corrective actions taken.

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IN 83-51 August 5, 1983 Paga 2 of 2

If there are an/ questions regarding this matter, please contact the Regional Administrator of the appropriate NRC Regional Office, or this office.

Edward L. Jordan, Director Division of Emergency Preparedness and Engineering Response Office of Inspection and Enforcement

Technical Contact: Wolfgang Laudan, IE 301-492-9759

Attachments:

1. Selected Examples of Licensee Event Reports

Related to Emergency Diesel Generators

2. List of Recently Issued IE Information Notices

Attachment 1 IN 83-51 August 5, 1933 Page 1 of 4

SELECTED EXAMPLES OF LICENSEE EVENT REPORTS AND VENDOR REPORTS RELATED TO EMERGENCY DIESEL GENERATORS

QUAD-CITIES 2. OCTOBER 6, 1982

During the monthly preventive maint nance testing of Unit 2 diesel generator, the diesel tripped on high trmperature 10 minutes after loading. The cause was determined to be fouling in the cooling water heat exchanger. The heat exchanger was replaced and the diesel testing was satisfactorily completed. The licensee placed the heat exchanger on a preventive maintenance schedule for cleaning.

SEQUOYAH 2, OCTOBER 20, 1982

During a performance test of diesel generator 28-8, the cooling jacket circulating water pump on the diesel generator was found to be inoperable as a result of a ball bearing failure in the pump. The bearing was replaced and the diesel generator was returned to service.

SUSQUEHANNA, OCTOBER 27, 1982

During a performance test of a diesel generator, the diesel generator tripped on high vibration. It was postulated that a vibration switch and a pressure regulator were both involved in the trip. Both were repaired and the diesel generator was returned to service. The equipment will be monitored through the plant's trend program.

BRUNSWICK 1, NOVEMBER 5, 1932

During a quick start testing program of diesel generator No. 4, the diesel generator tripped on "low lube oil pressure." The same problem occurred 2 days later on the same unit. Both events resulted from intermittent failures of the "low lube oil pressure start time relay" (STR). The relay imed out before actual pressure was above the low trip setpoint. The relay was replaced and the diesel testing was satisfactorily completed.

DRESDEN 3, NOVEMBER 9, 1982

During a Unit 3 diesel generator surveillance test, the diesel generator tripped on low cooling water pressure. A defective low cooling water pressure switch caused this event. The switch was replaced and the testing was satisfactorily completed.

RANCHO SECO, MAY 25, 1983

During startup testing, the diesel generator would not reach full operating speed. The Woodward governor speed adjustment on the unit stopped at about 650 rpm. It was found that the pointer disk was hanging up behind the dial plate. The manufacturer recommended filing about 1/16-inch off the pointer disk to allow free movement. After that the diesel achieved proper speed.

Attachment 1 IN 83-51 August 5, 1983 Page 2 of 4

CALVERT CLIFFS, APRIL 7, 1983

Curing a routine inspection of the intake air check valve of No. 11 diesel generator, the licensee found a check valve holding pin sheared and the check valve loose. The sare valve on two other diesel generators at Calvert Cliffs had been found to be cracked when inspected during 1982. The disk of one of these valves was found broken in two pieces. The engines in question are Fairbanks Morse Model 38TD81/8.

Because these failures did not render the diesel generators inoperable, as evidenced by successful completion of weekly operational tests, no LER was issued. The licensee pointed out that there were internal baffles between the check valves and the diesel turbocharger which made it unlikely to have a piece of the check valve enter the diesel's turbocharger. The check valve in question diverts air between the diesel turbocharger and integral air-blower. Failure of the check valve would result in air being available through the turbocharger at low loads and would affect the load control.

SHOREHAM, OCTOBER 15, 1982; APRIL 15, 1983; APRIL 20, 1983; MAY 4, 1983

During preoper lional testing of Shoreham's three Transamerica Delaval, Inc. emergency diesel generators, the following mechanical problems were identified in the past 9 months and reported by the licensee under 10 CFR 50.55 (e):

October 15, 1982 - The jacket waterpump shaft failed. April 15, 1983 - The engine head cracked. April 20, 1983 - The fuel injection line failed. May 4, 1983 - The rocker arm bolt failed.

Approximately 2 years before these problems occurred, the licensee discovered the following:

- 1. Loose hardware in cam gears during initial onsite inspection.
- Multiple broken cylinder head exhaust bolts resulting from insufficient pipe guide clearances in the exhaust manifold.
- 3. Cracks in the fuel oil ejector that connects to the fuel oil drip line.
- Absence of a drilled passageway for the relief valve on one lube oil pump line as required by design.
- Leaky lube oil cooler tubes resulting from improper rolling in the tube sheet.
- 6. Cracks in rocker arm push rod socket (or cup).
- 7. Cam gear fitted bolts not installed at the factory as required.

The problems were corrected under the surveillance of vendor representatives. Nuclear sites with Transamerica Delaval diesel generators are listed on page 4 of this attachment.

Attachment 1 IN 83-51 August 5, 1983 Page 3 of 4

LOUIS ALLIS REPORTED TWO DIFFERENT POTENTIAL PROBLEMS, MAY 20, 1983

(Louis Allis is the successor to Belouit Power Systems, Inc., and to Colt-Fairbanks Engine Division)

- At the diesel generator in the Clinton Nuclear Plant, a three-phase rectifier assembly in the exciter was not connected in parallel, which could cause field winding insulation to deteriorate. Louis Allis field service took corrective action by making the necessary connections.
- 2. Detroit Edison experienced high vibration on its diesel generator. The cause was loose pole wedges. Louis Allis performed a detailed engineering evaluation of this problem and found that in 1976 a material change from HRS 1020 steel to 1045 steel was made. This means that diesel generators manufactured before this change may experience the same loose pole wedge problem. The affected plants are Fermi, Millstone Unit 2, and Hatch. These plants were notified by copy of the Part 21 report dated May 20, 1983.

TRANSAMERICA DELAVAL - 1981 TO 1983

The manufacturer reported the following turbocharger thrust bearing lubrication problem:

The design of the lubricating oil system permits the oil flow to the turbocharger bearing only when the diesel generator is running. When the diesel generator is in the standby mode, the turbocharger bearing lube oil system is bypassed to prevent a possible fire hazard should pressurized oil leak around the bearing seals onto hot impellers. Therefore, during startup, a sufficient amount of oil would not be available to adequately lubricate the turbocharger bearing. Because diesels are started once a month and run for a short length of time, premature bearing wear was experienced because of insufficient lubrication.

At San Onofre, the wear rate for this condition after 100 hours of operation was equivalent to 15,000 to 20,000 hours of continuous operation.

To ensure proper lubrication during startup, a design modification in the form of a lubrication oil drip system causing the lubricating oil to drip on the bearings through an orifice at a given rate was proposed, installed, and tested. An alternate method to this design modification is a change in the operating procedure. Before a monthly start, an operator would manually run the auxiliary lube oil pump for 30 to 60 seconds and confirm lube oil pressure. In the event of an emergency start, the bearings will function until oil pressure is developed.

Attachment 1 IN 83-51 August 5, 1983 Page 4 of 4

Transamerica Delaval reported that the following nuclear sites were affected:

Shoreham	Perry	WPPSS 4
Grand Gulf	Bellefonte	Midland 1 & 2
Catawba	WPPSS 1	Hartsville
San Onofre	Comanche Peak 1 & 2	Phipps Bend

The licensees of the above plants were notified by copy of Transamerica Delaval Part 21 report dated September 19, 1980.

Attachment 2 IN 83-51 August 5, 1983

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LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
83-50	Failure of Class 1E Safety- Related Switchgear Circuit Breakers to Close on Demand	8/1/83	All power reactor facilities holding an OL cr CP
83-49	Sampling and Prevention of Intrusion of Organic Chemi- cals into Reactor Coolant Systems	07/25/83	All power reactor facilities holding an OL or CP
83-48	Gaseous Effluent Releases of Radioactive lodine-125 and lodine-131 in Excess of NRC Limits	07/14/83	NRC licensed bypro- product material licensees, including medical and academic institutions, radio- pharmaceutical sup- pliers, and indus- trial research
83-47	Failure of Hydraulic Snubbers as a Result of Contaminated Hydraulic Fluid	07/12/83	All power reactor facilities holding an OL or CP
83-46	Common-Mode Valve Failures Degrade Surry's Recirculation Spray Subsystem	07/11/83	All power reactor facilities holding an OL or CP
83-45	Environmental Qualification Test Of General Electric Company "CR-2940" Position Selector Control Switch	07/01/83	All power reactor facilities holding an GL or CP
83-44	Potential Damage to Redundant Safety Equipment as a Result of Backflow Through the Equipment	07/01/83	All power reactor facilities holding an OL or CP
83-43	Improper Settings of Inter- mediate Range (IR) High Flux Trip Setpoints	06/24/83	All power reactor facilities holding an OL or CP
83-42	Reactor Mode Switch Modi- fications	06/23/83	All BWR facilities holding an OL or CP

OL = Operating License CP = Construction Permit

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05-319-5-90

SSINS No.: 6835 IN 85-28

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, DC 20555

April 9, 1985

IE INFORMATION NOTICE NO. 85-28: PARTIAL LOSS OF AC POWER AND DIESEL GENERATOR DEGRADATION

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This notice is provided to inform recipients of a potential problem with diesel generator voltage regulation that might prevent the diesel generators from loading on to their safety buses. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On January 31, 1985, WNP 2 was at 100 percent power when a lockout relay, used in the offsite power supply fast transfer logic, spuriously tripped. This was an abnormal partial actuation that caused the 500 kV generator output breaker to open and the circuit breakers from the startup transformer to close on the plant buses even though the normal auxiliary transformers were not disconnected from the same plant buses. The opening of the 500 kV output breaker initiated the digital-electrohydraulic control system overspeed protection circuit which closed the turbine control valves. The turbine control valve fast closure caused a reactor scram as designed.

As a result of this abnormal condition, the generator remained connected to the 230 kV grid via the auxiliary and startup transformers. (See attached simplified diagram illustrating abnormal breaker alignment during the first seconds of this transient.) After 4 seconds, a breaker in the 230 kV line to the startup transformer opened, leaving the plant without non-safety-related power. Two of the buses without power, SM-1 and SM-3, ordinarily feed safety-related buses SM-7 and SM-8. As a result of losing power to two safety-related buses, the backup transformer, which is powered by a 115 kV line, was automatically connected to the safety-related buses and the diesel generators for these buses started, but were not required to assume load.



IN 85-28 April 9, 1985 Page 2 of 3

In the control room, there were false cations such as high containment pressure and valid indications of vess ow level (level 2, -50 inches). The high pressure core spray (HPCS) and reactor core isolation cooling system (RCIC) started on the low level signal.

Eventually, the main generator's protective circuits actuated the balance of the fust transfer logic, causing the auxiliary transformer to separate from the plant buses.

Discussion:

After the event, it was found that the output voltage had been set incorrectly on diesel generators DG-1 and DG-2. If the backup transformer or its supply had failed, the diesel generators would not have loaded on the safety buses because the voltage regulators were set at their lowest voltage set point. The safety buses have protective relaying that prevents the diesel generators from loading on the safety-related buses if their output voltage deviates too much from nominal. There was no control room alarm indicating the diesel generator output voltage was too low to permit loading diesel generators on their safetyrelated buses.

The condition was caused during troubleshooting of the voltage regulators for DG-1 and DG-2. These voltage regulators have a manual "raise/lower" handle in the control room which permitted their output voltage to be adjusted even though the diesel was not running. If the diesels were not running, as was the case during the troubleshooting, there was no indication of the generator output voltage and, thus, no indication of the voltage setting of the voltage regulator. The type of voltage regulator used on DG-1 and DG-2 allowed for inadvertent degradation without indication or alarm in the control room. This situation did not exist on DG-3, which is dedicated solely for the HPCS and has an automatic voltage set point reset upon start of the diesel generator.

A number of corrective measures have been or will be taken as a result of this event. The licensee has modified the voltage regulators for DG-1 and DG-2 so that the output voltage of the diesel generators can be adjusted only while the diesels are running. The licensee is pursuing an automatic voltage set point reset feature for these diesel generators. The licensee will evaluate the efficacy of control room annunciation for high/low diesel generator output voltage. The licensee also has modified the offsite power supply fast transfer logic so that if a partial spurious actuation occurs agair, then the balance of the logic will actuate. The licensee has modified proced res and training to reflect the lessons learned from this event.

IN 85-28 April 9, 1985 Page 3 of 3

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate NRC regional office or this office.

Bedward L. Jordan, Director

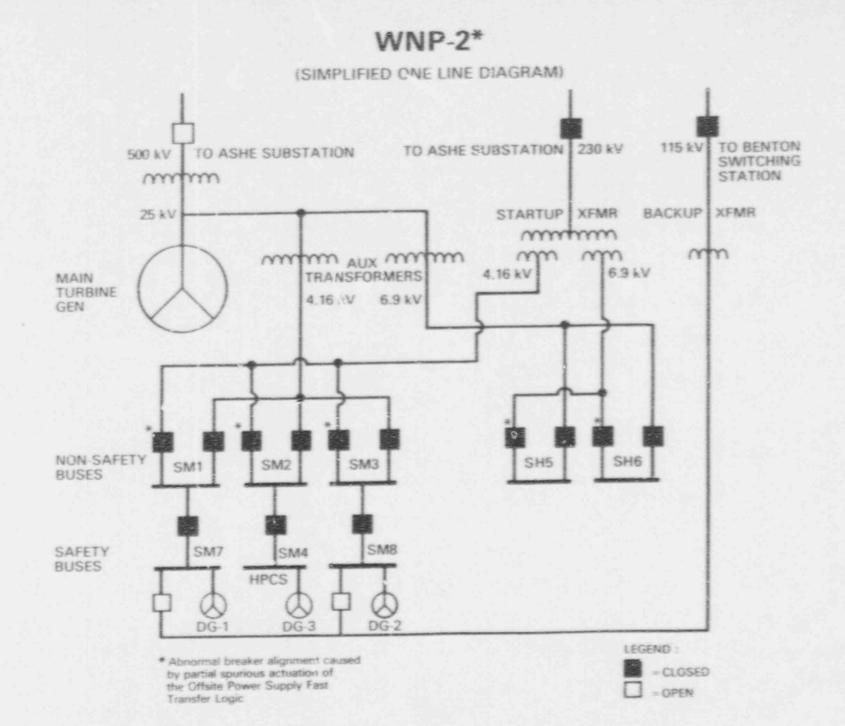
Division of Emergency Preparedness and Engineering Response Office of Inspection and Enforcement

Technical Contact: Eric W. Weiss, IE (301) 492-9005

Attachments:

1. Simplified Diagram Illustrating Abnormal Breaker Alignment

2. List of Recently Issued IE Information Notices



Attachment 1 IN 85-28 April 9, 1985

Attachment 2 IN 85-28 April 9, 1985

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-27	Notifications To The NRC Operations Center And Reporting Events In Licensee Event Reports	4/3/85	All power reactor facilities holding an OL or CP
85+26	Vacuum Relief System For Boiling Water Reactor Mark I And Mark II Containments	4/2/85	All BWR facilities having a Mark I or Mark II containment and holding an OL or CP
85-25	Consideration Of Thermal Conditions In The Design And Installation Of Supports For Diesel Generator Exhaust Silencers	4/2/85	All power reactor facilities holding an OL or CP
85-24	Failures Of Protective Coatings In Pipes And Heat Exchangers	3/26/85	All power reactor facilities holding an OL or CP
85-23	Inadequate Surveillance And Postmaintenance And Post- modification System Testing	3/22/85	All power reactor facilities holding an OL or CP
85-22	Failure Of Limitorque Motor- Operated Valves Resulting From Incorrect Installation Of Pinon Gear	3/21/85	All power reactor facilities holding an OL or CP
85-21	Main Steam Isolation Valve Closure Logic	3/18/85	All PWR facilities holding an OL or CP
85-20	Motor-Operated Valve Failures Due To Hammering Effect	3/12/85	All power reactor facilities holding an OL or CP
85-19	Alleged Falsification Of Certifications And Alteration Of Markings On Piping, Valves And Fittings		All power reactor facilities holding an OL or CP

OL = Operating License CP = Construction Permit

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05-319-6-90

SSINS No.: 6835 IN 85-73

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, D.C. 20555

August 23, 1985

IE INFORMATION NOTICE NO. 85-73: EMERGENCY DIESEL GENERATOR CONTROL CIRCUIT LOGIC DESIGN ERROR

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This information notice is to alert recipients of a potentially significant emergency diesel generator (EDG) control logic error that could prevent transfer to the emergency bus while the EDG is in the "maintenance shutdown" mode. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description Of Circumstances:

According to the design, the EDGs at Rancho Seco Nuclear Power Generating Station enter the maintenance shutdown control mode whenever they are normally shut down from the control room or the remote EDG control panel. On June 1, 1985, the plant was shut down for refueling, an EDG was in the maintenance shutdown control mode after being secured from an operational condition (idling at 600 rpm with the output breaker open), when an emergency bus was de-energized for planned work on a parallel bus. This created an undervoltage condition equivalent to a loss of offsite power (LOOP) on the emergency bus. The diesel generator sped up to the design speed but the EDG output breaker continuously cycled open and closed, thereby rendering the EDG set inoperable.

Investigation by the licensee indicates that the cycling of the EDG output breaker was the result of a design error in the EDG control circuit logic. According to the licensee, the design deficiency affects proper response of the EDG set when it is operating in the maintenance shutdown control mode. Normal surveillance testing would not discover the control circuit design error because surveillance is not done in the maintenance shutdown control mode. The June 1, 1985 event at Rancho Seco represents the first time in the life of the plant that an undervoltage signal occurred with an EDG in the maintenance shutdown control mode.

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1N 85-73 August 23, 1985 Page 2 of 2

When an EDG is secured from operation, the control circuit logic places it in the maintenance shutdown control mode. In this mode, the control logic opens its output breaker and reduces its speed from 900 to 600 rpm. The EDG then idles at 600 rpm for 15 minutes before coasting down to rest.

If a LOOP should occur while an EDG is in the maintenance shutdown control mode, the undervoltage signal causes it to speed back up to 900 rpm and to close its output breaker. This would cause the undervoltage signal to drop out. However, the maintenance shutdown control mode does not drop out for 30 seconds after the receipt of the undervoltage signal because of the control circuit design error. Thus, the maintenance shutdown control logic senses that the EDG output breaker is closed, opens the breaker, and resets the 15-minute timer for the maintenance shutdown control mode. As soon as the EDG output breaker opens, the undervoltage signal recurs and the EDG output breaker closes in response to the LOOP. The EDG output breaker continues to cycle open and closed as this process repeats itself. At Rancho Seco, this control circuit logic design error has been corrected by installing a relay to demangize the maintenance shutdown control logic immediately upon receipt of an undervoltage signal.

The Rancho Seco plant utilizes General Motors (GM) Model 20-465-E4 diesel generators with a 2750 kw nameplate rating. According to the licensee, the design error was in the interface provided by the Architect-Engineer (Bechtel) to the shutdown control logic provided by GM. Bechtel has advised the NRC that the Rancho Seco diesel generator control logic is unique and other plants designed by them are not affected.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

Edward L. Jordan, Director

Edward L. Jordan, Director Division of Emergency Preparedness and Engineering Response Office of Inspection and Enforcement

Technical Contact: W. Swenson, NRR (301) 492-7876

(301) 492-7876

R. Singh, IE (301) 492-8985

Attachment: List of Recently Issued Information Notices

Attachment 1 1N 85-73 August 23, 1985

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-72	Uncontrolled Leakage Of Reactor Coolant Outside Containment	8/22/85	All power reactor facilities holding an OL or CP
85~71	Containment Integrated Leak Rate Tests	8/22/85	All power reactor facilities holding an DL or CP
85-70	Teletherapy Unit Full Calibration And Qualified Expert Requirements (10 CFR 35.23 And 10 CFR 35.24)	8/15/85	All material licensees
85-69	Recent Felony Conviction For Cheating On Reactor Operator Requalification Tests	8/15/85	All power reactor facilities holding an OL or CP
85-68	Diesel Generator Failure At Calvert Cliffs Nuclear Station Unit 1	8/14/85	All power reactor facilities holding an OL or CP
85-42 Rev. l	Loose Phosphor In Panasonic 800 Series Badge Thermo- luminescent Dosimeter (TLD) Elements	8/12/85	Materials and fuel cycle licensees
35-67	Valve-Shaft-To-Actuator Key May Fall Out Of Place When Mounted Below Horizontal Axis	8/8/85	All power reactor facilities holding an OL or CP
35-66	Discrepancies Between As-Built Construction Drawings And Equipment Installations	8/7/85	All power reactor facilities holding an OL or CP
35-65	Crack Growth In Steam Generator Girth Welds	7/31/85	All PWR facilities holding an OL or CP

OL = Operating License CP = Construction Permit

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UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20565

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05-319-7-90

SSINS No.: 6835 IN 85-91

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, D.C. 20555

November 27, 1985

IE INFORMATION NOTICE NO. 85-91: LOAD SEQUENCERS FOR EMERGENCY DIESEL GENERATORS

Addressees:

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All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This information notice is provided to advise licensees and applicants of potential design deficiencies that could bypass load sequencers, thereby causing loss of redundant emergency diesel generators (EDGs). Recipients are expected to review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On August 22, 1985, the licensee for the Duane Arnold nuclear plant discovered that an accident signal and the loss of the standby transformer (a source of offsite electric power) would cause engineered safety feature (ESF) loads to be applied as a single block load onto the EDGs (the sources of onsite electric power), which would likely cause loss of both EDGs.

Pending replacement of the unit auxiliary transformer (lost in a transformer fire in October 1984), the licensee was operating the plant with the nonsafety-related loads on the station startup transformer and the safety-related loads on the station standby transformer. The plant design objective was to sequence the ESF loads onto the EDGs if offsite power to the ESF buses should be lost and an accident signal was present. The licensee's training staff realized that the logic and sensors used to determine the availability of offsite power were such that the offsite power feeder breakers to the ESF buses could be tripped, but offsite power would be indicated as being still available. Under these conditions the design would cause the ESF diesel generator load sequencers to be bypassed.

To justify continued safe operation, the licensee has temporarily placed certain sequencer test switches in the test position, which forces the sequencers to function even though offsite power is sensed as being available.

For the longer term, the licensee is developing a permanent design change which is to be reviewed by the NRC.

Discussion:

The design of the electric power system at the Duane Arnold nuclear plant includes features to sequence ESF loads onto the EDGs, but not to sequence loads onto offsite power. In a sense, these design objectives are in conflict; that is, one is for sequencing and the other is for not sequencing. When design objectives are potentially conflicting, careful analysis is necessary to ensure that failures of various types do not result in implementation of the improper objective. In this case, the logic was designed so that if any source of offsite power is "available" (such as at either the standby transformer or the startup transformer) the ESF load sequencers would be bypassed. Thus, if the standby transformer were lost, causing a loss of power to the safety-related loads, the logic would still indicate offsite power as available. This design was provided by Bechte! Corporation.

The result was the potential for an interaction between the offsite electric power system and the onsite electric power system that could have caused the loss of redundant sources of onsite power. Such an interaction is incompatible with the requirements of 10 CFR 50, Appendix A, General Design Criterion No. 17. "Electric Power Systems." The Duane Arnold original design was such that the availability of offsite electric power was determined indirectly; that is, by an upstream measurement rather than directly at the ESF buses. This deficiency existed in the original plant design and was not discovered when the design was reviewed again by the licensee after the loss of the unit auxil ary transformer in October 1984.

No specific action or written response is required by this information notice. If you have questions about this matter, please contact the Regional Administrator of the appropriate NRC regional office or this office.

Edward L Dordan, Director Division of Emergency Preparedness and Ekgineering Response Office of Inspection and Enforcement

Technical Contacts:

J. T. Beard, NRR (301) 492-7465

Eric Weiss, IE (301) 492-9005

Attachment: List of Recently Issued IE Information Notices

Attachment 1 IN 85-91 November 27, 1985

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-58 Sup. 1	Failue Of A General Electric Type AK-2-25 Reactor Trip Breaker	11/19/85	All power reactor facilities designed by B&W and CE holding an OL or CP
85-90	Use Of Sealing Compounds In An Operating System	11/19/85	All power reactor facilities holding an OL or CP
85~89	Potential Loss Of Solid-State Instrumentation Following Failure Of Control Room Cooling	11/19/85	All power reactor facilities holding an OL or CP
85-88	Licensee Control Of Contracted Services Providing Training	11/18/85	All power reactor facilities holding an OL or CP
85-87	Hazards Of Inerting Atmospheres	11/18/85	All power reactor facilities holding an OL or CP; and fuel facilities
85-86	Lightning Strikes At Nuclear Power Generating Stations	11/5/85	All power reactor facilities holding an OL or CP
85-85	Systems Interaction Event Resulting In Reactor System Safety Relief Valve Opening Following A Fire-Protection Deluge System Malfunction	10/31/85	All power reactor facilities holding an OL or CP
85-84	Inadequate Inservice Testing Of Main Steam Isolation Valve		All power reactor facilities holding an OL or CP
85-83	Potential Failures Of General Electric PK-2 Test Blocks	10/30/85	All power reactor facilities holding an OL or CP

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SSINS No.: 6835 IN 84-69

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, D.C. 20555

August 29, 1984

IE INFORMATION NOTICE NO. 84-69: OPERATION OF EMERGENCY DIESEL GENERATORS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or construction permit (CP).

Purpose:

This notice is provided to alert recipients of potentially significant safety problems that can arise when one or more emergency diesel generators (EDGs) are operated in modes (.uch as in parallel with the offsite power sources) other than the prescribed standby service mode. Experience has shown that such a practice can lead to a complete loss of ac power to safety buses. It is expected that recipients will review this information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems occurring at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On May 17, 1983, at Fort St. Vrain Unit 1, with the reactor in a shutdown condition and one of the two EDGs out of service for maintenance, the offsite power system started experiencing problems as a result of high winds and snow. As a precautionary measure, the available EDG was started and tied to the associated safety bus in parallel with the offsite power source. Approximately half an hour later, all offsite power to the plant was lost and the output breaker of the operating EDG tripped, apparently on overload. As a result, the plant was without all ac power, except for the inverter ac power off the dc power system, for approximately half an hour until the EDG was restored. The offsite power was restored after another hour.

Grand Gulf Nuclear Station Unit 1 was in a startup mode on May 7, 1984, when a partial loss of offsite power occurred as a result of heavy winds and rain. This caused automatic starting and loading of the Division III EDG. While paralleling the EDG with the offsite power grid in order to restore normal power lineup, the EDG tripped on reverse power. Later, the site entered a tornado watch and all three EDGs were started and loaded on their respective buses in parallel with the offsite power grid. An hour and a half later, the Division II EDG tripped on reverse power, apparently as a result of the grid voltage fluctuations during the storm and a low reverse power trip set point.

IN 84-69 August 29, 1984 Page 2 of 3

Discussion

The EDGs are provided as sources of standby onsite electric power in the event that offsite power is lost. Regulatory requirements have long been to minimize the probability of losing the onsite sources when power from the offsite transmission network (grid) is disturbed or lost. More specifically, the NRC Standard Review Plan prohibits the use of EDGs for purposes other than supplying standby power, when needed, and permits interconnection of the onsite and offsite sources only for short periods of time for the purpose of EDG load testing. During such testing, only one of the redundant EDGs is to be paral-leled at any one time, leaving the other EDG(s) available in standby service.

Although operators may be tempted to start the EDGs when offsite power is threatened or undergoing disturbances, running the EDGs is likely to be more o a hindrance than a help. If an EDG is paralleled with the offsite power system, it is vulnerable to loss from any of the normal protective features such as overload or reverse power, especially at the moment that offsite power is interrupted. Such a practice is contrary to the intent of General Design Criterion 17. To serve as a dependable backup power source, the DGs must be kept separate from the offsite source.

One scheme suggested was to start the EDGs in anticipation of the loss of offsite power. If dummy loads are not included in the plant design, the operator is forced either to load the EDG or leave it at no-load idle. Operating experience reported some years ago in NUREG/CR-0660, "Enhancement of Onsite Diesel Generator Reliability," indicates that running an EDG at no-load or light loads may cause other EDG problems.

Another scheme suggested was to run the EDGs on the safety buses but to isolate these buses from the offsite power system. While this appears, on the surface, to achieve the desired independence, licensees need to consider other aspects of the situation. In most plant designs, safety loads (needed for either an accident situation or safe shutdown without an accident) will not be automatically sequenced onto the EDG if the bus is isolated and the EDG is providing power to the bus.

Applicants and licensees are expected to review this information for applicability to the onsite power system at their facilities and to initiate appropriate actions such as management directives and training to preclude similar problems from occurring at their facilities.

IN 84-69 August 29, 1984 Page 3 of 3 .

If $\gamma_{\rm eq}$ have any questions regarding this matter, please contact the Regional Administrator of the appropriate regional office, or this office.

Edward L Dordan, Director Division of Emergency Preparedness and Engineering Response Office of Inspection and Enforcement

Technical Contacts: J. T. Beard, NRR (301) 492-7465

> R. N. Singh, IE (301) 492-0868

Attachment: List of Recently Issued IE Information Notices

Attachment IN 84-69 August 29, 1984

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Şubject	Date of Issue	Issued to
84~68	Potential Deficiency in Improperly Rated Field Wiring to Solenoid Valves	08/21/84	All power reactor facilities holding an OL or CP.
84-67	Recent Snubber Inservice Testing with High Failure Rates	08/17/84	All power reactor facilities holding an OL or CP.
84-66	Undetected Unavailability of the Turbine-Driven Auxiliary Feedwater Train	08/17/84	All power reactor facilities holding an OL or CP.
84-65	Undernated Fuses Which May Adversely Affect Operation of Essential Electrical Equipment	08/16/84	All power reactor facilities holding an OL or CP.
84-64	BWR High-Pressure Coolant Injection (HPCI) Initiation Seal-In and Indication	08/15/84	All BWR licensees and applicants for an OL.
84-63	Defective RHR Replacement Piping	08/13/84	All power reactor facilities holding an OL or CP.
84-62	Therapy Misadministrations To Patients Undergoing Cobalt-60 Teletherapy Treatments	08/10/84	All NRC licensees authorized to possess and use sealed sources in teletherapy units.
84-61	Overexposure of Diver in Pressurized Water Reactor (PWR) Refueling Cavity	08/08/84	All power reactor facilities holding and OL or CP.
84-60	Failure of Air-Purifying Respirator Filters To Meet Efficiency Requirement	08/06/84	All power reactor facilities holding an OL or CP.
84-59	Deliberate Circumventing of Station Health Physics Procedures	08/06/84	All power reactor facilities holding an OL or CP.

OL = Operating License CP = Construction Permit

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON D.C. 20555

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SSINS No.: 6835 IN 84-69, Supplement 1

05-319-9-90

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, DC 20555

February 24, 1986

IE INFORMATION NOTICE NO. 84-69, SUPPLEMENT 1: OPERATION OF EMERGENCY DIESEL GENERATORS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

Information Notice 84-69, issued on August 29, 1984, was provided to alert recipients of potentially significant safety problems that can arise when one or more emergency diesel generators (EDGs) are operated in modes other than the prescribed standby service mode, such as loaded on non-emergency buses parallel with offsite power sources. The purpose of this supplement is to reemphasize the need for licensees to review the information provided in IN 84-69, in addition to the information contained herein, for applicability to their facilities and consider actions, if appropriate, to preclude similar problems at their facilities. However, suggestions contained in this supplement do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Following a 10 CFR 50.72 report made to the NRC Headquarters Operations Center on August 12, 1985, it was discovered that Crystal River Unit 3 was continuously running the one operable EDG loaded in parallel with the grid while the other EDG was declared inoperable. Crystal River Technical Specifications require fast starting of the operable EDG (i.e., verifying that the diesel starts from ambient conditions and accelerates to the required speed within a required period of time) within 1 hour after the declaration of an inoperable EDG and every 8 hours thereafter. Because of a concern about increased EDG wear and reduced overall EDG reliability, the licensee chose to keep the EDG running loaded parall; the offsite grid rather than fast starting the EDG every 8 hours.

The licensee believed that continuous running was an acceptable alternative to the test starts required by the Technical Specifications and that the EDG was operable per Technical Specifications while running in parallel with the offsite power system. The licensee indicated also that it was aware of IN 84-69 and had implemented procedures that prohibited operating the EDG parallel to the grid during inclement weather (e.g., lightning, heavy winds)

IN 84-69, Supplement 1 February 24, 1986 Page 2 of 3

Discussion:

When an EDG is operated connected to offsite or nonvital loads, the emergency power system is not independent of disturbances on the nonvital and offsite power systems that can adversely affect emergency power availability. The situation is of particular concern when the onsite emergency power system is already in a degraded condition due to an EDG being inoperable and the operable EDG is loaded on non-emergency loads. In this condition, a disturbance in the non-emergency power system could result in both a loss of offsite power and a disabling of the remaining emergency power source. Although the events described in IN 84-69 occurred due to weather conditions, the concerns of the IN apply to parallel operation of EDGs with non-emergency loads at all times.

If a fault develops while the EDG is connected to non-emergency buses, EDG availability for subsequent emergency demands may be affected. In some design configurations, the EDG would trip as a result of overcurrent or reverse power, actuate a lockout device, and require local operator action to reset the lockout. In such cases, the EDG is recoverable, but the timeliness of its availability is not comparable to that of having the EDG in its normal standby service.

In other design configurations the EDG may not trip, but the operation of the load sequencer may be adversely affected. The load sequencer timers are often linked with the closing of the EDG output breaker or with detection of loss of voltage on the bus. If the EDG does not trip, conditions are not proper for the designed operation of the load sequencers. Consequently, the EDG cannot perform automatically in a manner comparable to that of having the EDG in its normal standby mode.

Another potential concern deals with the vulnerability of the EDG to trip signals which are bypassed for emergency demands but are operable for manual starts and during running for test purposes. The EDG would be more vulnerable to such trips.

The licensee's concern regarding excessive test starts is valid. In this particular case, the licensee was encouraged to address that concern more directly by submitting changes to the plant Technical Specifications. Such changes were approved for North Anna Unit 2 on April 25, 1985.

IN 84-69, Supplement 1 February 24, 1986 Page 3 of 3

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

Edward L. Dordan, Director Division of Emergency Preparedness and Engineering Response Office of Inspection and Enforcement

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Technical Contacts: Joseph G. Giitter, IE (301) 492-9001

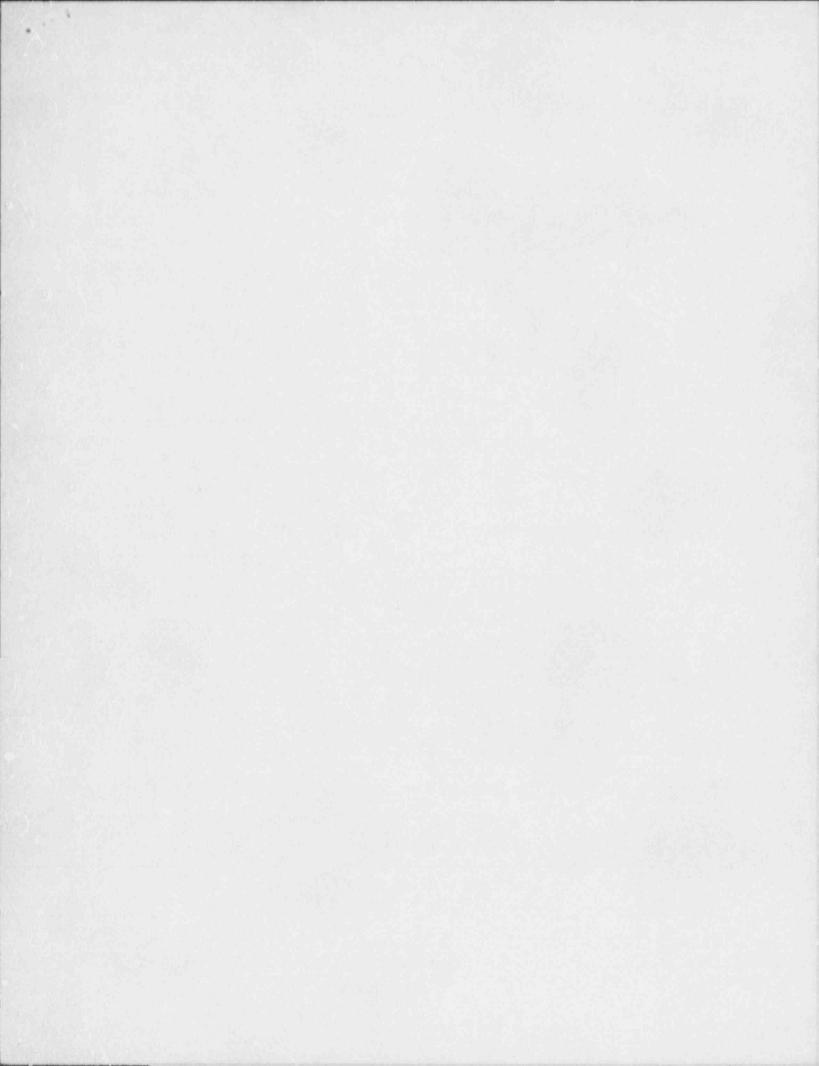
> J. T. Beard, NRR (301) 492-7465

Attachment: List of Recently Issued Information Notices

Attachment 1 IN 84-69, Supplement 1 February 24, 1986

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subjer:	Date of Issue	Issued to
86-10	Safety Parameter Display System Malfunctions	2/13/86	All power reactor facilities holding an OL or CP
86-09	Failure Of Check And Stop Check Valves Subjected To Low Flow Conditions	2/3/86	All power reactor facilities holding an OL or CP
86-08	Licensee Event Report (LER) Format Modification	2/3/86	All power reactor facilities holding an OL or CP
86-07	Lack Of Detailed Instruction And Inadequate Observance Of Precautions During Maintenance And Testing Of Diesel Generate Woodward Governors	e	All power reactor facilities holding an OL or CP
86~06	Failure Of Lifting Rig Attachment While Lifting The Upper Guide Structure At St. Lucie Unit 1	2/3/86	Ail power reactor facilities holding an OL or CP
86-05	Main Steam Safety Valve Test Failures And Ring Setting Adjustments	1/31/86	All PWR facilities holding an OL or CP
86-04	Transient Due To Loss Of Power To Integrated Control System At A Pressurized Water Reactor Designed By Babcock & Wilcox	1/31/86	All power reactor facilities holding an OL or CP
86-03	Potential Deficiencies In Environmental Qualification Of Limitorque Motor Valve Operator Wiring	1/14/86	All power reactor facilities holding an OL or CP
86-02	Failure Of Valve Operator Motor During Environmental Qualification Testing	1/6/86	All power reactor facilities holding an OL or CP



UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON D. C. 20666

> OFFICIAL BUSINESS PENALTY FOR PRIVATE USE 1300

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05-319-10-90

SSINS No.: 6835 IN 86-73

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, D.C. 20555

August 20, 1986

IE INFORMATION NOTICE NO. 86-73: RECENT EMERGENCY DIFEEL GENERATOR FOR EMS

Addressees:

All nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is to alert addressees to vibration-induced fuel line wear and of a deficiency in the design of the field flash circuitry on nuclear plant emergency diesel generators. Recipients are expected to review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Nine Mile Point Unit 2

While conducting diesel generator testing in early May 1986, it was discovered that diesel fuel lines had experienced extensive wear and fuel leaks in the area of the clamps that mount the fuel lines to the diesel engine. The diesels are Cooper-Bessemer model KSV-16-T, 600 rpm, 4 stroke, 16 cylinder units with low total operating hours.

Fuel line damage was caused by vibration from the diesel engine and fuel system pulsation induced by rapid, repeated cycling of a fuel system relief valve. This valve relieves from the low pressure fuel system via a cooler to the fuel day tank to control low pressure fuel system pressure. The manufacturer proposes to correct the problem by inserting plastic sleeves between the fuel line and its hold down clamps and installing a dashpot on the relief valve to dampen its operation.

Watts Bar Units 1 and 2

In April 1986 a deficiency was identified which affects all five standby diesel generators (DGs) at Watts Bar Nuclear Plant and could prevent the DGs from developing a voltage output when required in an emergency. The affected DGs are tandem 16-645 E4 units supplied by Morrison-Knudson Co. The normal shutdown cycle of the DG includes a 10-minute cooldown run at about 450 rpm. If during

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IN 86-73 August 20, 1986 Page 2 of 2

this idle period an emergency start signal were received, the DG would accelerate to the normal 900 rpm operating speed, but the generator field would not be flashed and an output voltage therefore would not be developed.

This problem has also been determined to exist on the HPCS DG at Grand Gulf Nuclear Station. This unit was supplied by General Motors Corporation.

The root cause of this deficiency has been found to be a design error by the manufacturer. During a normal or emergency start, as the DG accelerates past 475 rpm, logic is completed to flash the generator field. When output voltage has built up, the field flash circuitry is automatically disabled. The logic design is such that engine speed must go below 200 rpm to re-enable the field flash circuitry, thus no field flash will occur if an emergency start signal is received during the 450 rpm cooldown period. Field flash would be needed under these circumstances because the self-exc.cation path is interrupted early in the shutdown sequence.

The corrective action proposed by the DG manufacturer is to modify the control circuitry to eliminate the speed dependence of field flash reset.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

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Edward L. Jordan, Director Division of Emergency Preparedness and Engineering Response Office of Inspection and Enforcement

Technical Contact: Kevin Wolley, IE (301) 492-8373

Attachment: List of Recently Issued IE Information Notices

Attachment 1 IN 86-73 August 20, 1986

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of	
a designed on the second state of the second s	and a second s	Issue	Issued to
86-72	Failure 17-7 PH Stainless Steel Springs In Valcor Valves Due to Hydrogen Embrittlement	8/19/86	All power reactor facilities holding an OL or CP
86~71	Recent Identified Problems With Limitorque Motor Operators	8/19/86	All power reactor facilities holding an OL or CP
86-70	Spurious System Isolation Caused By The Panalarm Model 86 Thermocouple Monitor	8/18/86	All GE BWR facilities holding an OL or CP
86~69	Scram Solenoid Pilot Valve (SSPV) Rebuild Kit Problems	8/18/86	All BWR facilities holding an OL or CP
86-68	Stuck Control Rod	8/15/86	All BWR facilities holding an OL or CP
86-67	Portable Moisture/Density Gauges: Recent Incidents And Common Violations Of Require- ments For Use, Transportation And Storage		All NRC licensees authorized to possess, use, transport, and store sealed sources
36-66	Potential For Failure Of Replacement AC Coils Supplied By The Westinghouse Electric Corporation For Use In Class IE Motor Starters And Contractors	8/15/86	All power reactor facilities holding an OL or CP
36~65	Malfunctions Of ITT Barton Model 580 Series Switches During Requalification Testing	8/14/86	All power reactor facilities holding an OL or CP
36~64	Deficiencies In Upgrade Programs For Plant Emergency Operating Procedures	8/14/86	All power reactor facilities holding an OL or CP

05-319-11-90

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF NUCLEAR REACTOR REGULATION WASHINGTON, D.C. 20555

September 16, 1988

NRC INFORMATION NOTICE NO. 88-75: DISABLING OF DIESEL GENERATOR OUTPUT CIRCUIT BREAKERS BY ANTI-PUMP CIRCUITRY

Addressees:

Ail holders of operating licenses or construction cermits for nuclear power reactors.

Purpose:

This information notice is being provided to alert addressees to potential problems where the capability to either automatically or manually close diesel generator circuit breakers from the control room may be leat. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On June 5, 1988, operators at Browns Ferry Unit 3 were unable to reclose the diesel generator output breakers to the 4-kV shutdown boards from the control room during a loss-of-power/loss-of-coolant-accident (LOP/LOCA) test. During the test, the output breakers connected the diesel generators to their respective 4-kV shutdown boards after the LOP signal was generated; however, the breakers tripped and remained open after receiving the LOCA signal. Operators diagnosed the output breaker lockout problem using system electrical configuration drawings. An operator was sent to the 4-kV shutdown board to manually transfer output breaker control power to its alternate source. This momentarily removed power, enabling the breaker to close when the power was restored.

On October 14, 1987, an operator at Wolf Creek Generating Station manually tripped the output circuit breaker of the emergency diesel generator (EDG) from the control room. At the time, the EDG was supplying a vital bus. When the operators tried to reenergize the vital bus from the still-operating EDG, they found that they could not close the EDG output breaker from the control room. The vital bus was finally reenergized from the offsite power supply. Through examination of the breaker control schematics the licensee later found that the EDG circuit breaker could be closed by cycling the EDG mode switch at the EDG local control station.

IN 88-75 September 16, 1988 Page 2 of 3

Discussion:

The anti-pump circuit configuratic, will protect large breakers from rapid cycling and, under certain circumstances, will prevent breaker closure. At Browns Ferry Unit 3, a unique sequence of events, a LOP signal followed within 6 seconds by a LOCA signal, led to the discovery of a design deficiency of this circuit configuration. Contacts from the undervoltage relay will seal in the breaker anti-pump relay until the undervoltage condition on the 4-kV boards clears.

The circuit is designed such that following a LOP, the undervoltage condition must exist for at least 5 seconds and the diesel must reach rated speed before the diesel generator output breaker will close on the bus. Once the breaker has closed, the closure spring recharge motor and the breaker anti-pump relay will be energized. A fully discharged closure spring requires 2 seconds for the spring to be fully recharged. During this 2 second window the anti-pump coil will remain energized via contacts sensing spring position, and if an undervoltage condition exists on the 4-kV bus it will seal in and lock open the breaker.

During the Browns Ferry event, the EDG output breaker closed 5 seconds after the LOP signal, the undervoltage condition was eliminated, and the undervoltage relay began its 5 second cycle to reset from the undervoltage condition. About 1.5 seconds later, the LOCA signal retripped the breaker and created another undervoltage condition on the 4-kV bus. At this point, because the undervoltage relay had not completed its reset cycle, the undervoltage relay remained in its undervoltage state. Therefore, the undervoltage relay sealed in the stillenergized anti-pump relay because the undervoltage condition occurred before the breaker charging spring was fully charged. Thus, the breaker could not be closed from the control room either manually or automatically until control power was removed, which deenergized the anti-pump relay.

The Browns Ferry licensee modified the breaker control logic to prevent the antipump relay from sealing in during a LOCA condition by adding a time-delay relay in the breaker trip coil circuitry. This relay will be energized by a LOCA signal and its contact in the anti-pump coil seal-in path will open after a 2-to 5-second delay to prevent anti-pump coil seal-in and breaker lockout.

The Wolf Creek EDG output circuit breaker has automatic closing logic to close the circuit breaker when the following five permissives are satisfied:

- (1) Both offsite circuit breakers are open.
- (2) The EDG mode switch is in the automatic mode.
- (3) Lockout relays are deenergized.
- (4) A 3-second time delay has elapsed.
- (5) The EDG has reached operating speed and voltage.

This logic sends a constant close signal to the circuit breaker that keeps the breaker's internal anti-pump relay energized as long as the logic permissives are satisfied. The anti-pump relay prevents the circuit breaker from cycling if attempts are made to hold the breaker closed against a valid trip signal.

IN 88-75 September 16, 1988 Page 3 of 3

When the Wolf Creek operator manually tripped the EDG output breaker, the automatic closing logic permissives remained satisfied. Therefore, the anti-pump relay remained energized, preventing reclosure of the circuit breaker. Cycling the EDG mode control switch at the local control station allowed the circuit breaker to reclose by momentarily interrupting the automatic close signal, thereby resetting the anti-pump logic. When the mode switch contact was reclosed by returning the switch to the "auto" position, the circuit breaker's automatic closing logic closed the breaker.

The Wolf Creek licensec modified the EDG breaker control switch located in the control room to enable the operator to reclose the EDG circuit breaker from the control room. This switch was originally intended only as a means of paralleling the EDG with the offsite power supply. With the current modification, the switch can be used to reset the anti-pump logic and allow the automatic circuit to reclose the breaker. The modification added a contact that is closed in the "normal" position and open in the "trip" and "pull to lock" positions of the control switch. When operators manually trip the EDG circuit breaker from this control switch, the contacts open to interrupt the close circuit and reset the circuit breaker anti-pump relay. If the operator wishes to keep the breaker open, he must put the switch in the "pull to lock position. Returning the switch to the "normal" position completes the automatic clrse circuit and the breaker recloses.

It should be noted that although the above discussion has dealt only with EDG output circuit breakers, anti-pump circuit problems could also apply to other breakers that use automatic closing logic, such as load-sequencing breakers and offsite supply breakers to the emergency buses.

The information herein is being provided as an early notification of a potentially significant matter that is still under consideration by the NRC staff. If NRC evaluation so indicates, specific licensee actions may be requested.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact one of the technical contacts listed below or the Regional Administrator of the appropriate regional office.

Jailes E. Rossi, Director

Division of Operational Events Assessment Office of Nuclear Reactor Regulation

Technical Contacts: James Lazevnick, NRR (301) 492-0814

> Carl Schulten, NRR (301) 492-1192

Fred Burrows, NRR (301) 492-0783

Attachment: List of Recently Issued NRC Information Notices

Attachment 14 88-75 September 16, 1988 Page 1 of 1

LIST OF RECENTLY ISSUED NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	lasued to
88-74	Potentially Inedequate Performance of ECCS in PWPs During Recirculation Operation following a LDCA	9/14/88	All holders of OLS or CPs for W and B&W-designed nuclear power reactors.
88-73	Diruction-Dependent Leak Characteristics of Containment Purge Valves	9/8/88	All holders of OLS or CPs for nuclear power reactors.
88-72	Inadequacies in the Dusign of dc Motor-Operated Valves	9/2/88	All holders of DLs or CPs for nuclear power reactors.
88-71	Possible Environmental Effect of the Reentry of COSMOS 1900 and Request for Collection of Licensee Radioactivity Measurements Attributed to That Event	9/1/88	All holders of OLs or CPs for nuclear power reactors, fuel cycle lizensees, and Priority 1 Material licensees.
88-70	Check Yalve Inservice Testing Program Deficiencies	8/29/88	All holders of OLS or CPS for nuclear power reactors.
88-69	Movable Contact Finger Binding in NFA Relays Manufactured by General Electric (GE)	8/19/88	All holders of OLS or CPS for nuclear power reactors.
88-48, Supplement 1	Licensee Report of Defective Refurbished Valves	6/24/88	All holders of OLs or CPs for nuclear power reactors.
88~68	Setpoint Testing of Pres- surizer Safety Valves with Filled Loop Seals Using Hydraulic Assist Devices	8/22/88	All holders of OLS or CPs for nuclear power reactors.
88~67	PWR Auxiliary Feedwater Pump Turbine Overspeed Trip Fallure	8/22/88	All holders of OLs or CPs for nuclear power reactors.

OL * Operating License CP * Construction Permit

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20555

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05-319-12-90

UNITED STATES NUCLEAR REGULATORY COMMISSION OFFICE OF NUCLEAR REACTOR REGULATION WASHINGTON, D.C. 20555

December 19, 1989

NRC INFORMATION NOTICE NO. 89-87: DISABLING OF EMERGENCY DIESEL GENERATORS BY THEIR NEUTRAL GROUND-FAULT PROTECTION CIRCUITRY

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This information notice is intended to alert addressees to possible unconsidered failure modes in which emergency diesel generators could be rendered inoperable as a result of their neutral ground-fault protection circuitry. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or writter response is required.

Description of Circumstances:

On May 25, 1989, a plant engineering design review at Perry Unit 1 revealed a design anomaly whereby ground faults on emergency diesel generator loads coincident with loss of offsite power during a seismic event or fire could lead to the inoperability of more than one emergency diesel generator. As a result, the Perry staff declared several of the emergency diesel generators inoperable until temporary modifications could be made to disable the neutral ground-fault relay contacts that were designed to trip the emergency diesel generators.

Discussion:

At Perry Unit 1, each emergency diesel generator was designed with a neutral ground circuit consisting of a high impedance path from the neutral to ground. which limits ground-fault current to no more than 2 amperes (see typical network in Figure 1). The purpose of providing this grounding path (in lieu of an ungrounded system) is to limit the buildup of high voltage stress during certain ground-fault conditions that could ultimately result in the breakdown of the insulation of such components as motors and cables. It also provides a convenient means of detecting a ground in the system so that a search can be made to eliminate the ground before a second ground occurs and causes a phase-to-phase fault.

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IN 89-87 December 19, 1989 Page 2 of 2

Ground faults are detected by sensing the voltage that is developed in the emergency diesel generator grounding circuit whenever a ground fault exists in the electrical distribution system supplied by the emergency diesel generator. In the Perry design, a voltage sensing relay would initiate a trip of the corresponding emergency diesel generator whenever this voltage exceeded the relay's pickup value. This relay's contacts are bypassed by the automatic response to a loss-of-coolant accident. For non-LOCA events, however, a ground fault in any component, including non-Class 1E components, would have the undesirable result of shutting down the emergency diesel generator. This raises the concern that a seismic event or fire could have resulted in simultaneous ground faults in non-safety components supplied by all of the redundant emergency diesel generators. Action by the protection circuitry at Perry could then have shut down all of the emergency diesel generators, preventing them from performing their intended safety functions.

The Perry staff has temporarily disabled the neutral ground-fault relays to prevent them from shutting down the emergency diesel generators. Permanent modifications are planned to replace the ground-fault emergency diesel generator trip function with ground-fault alarms in the control room. These modifications will be supported by alarm response procedures requiring that the operators determine the location and safety significance of ground faults and take appropriate action.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

Charles E. Rossi, Director Division of Operational Events Assessment Office of Nuclear Reactor Regulation

Technical Contact: F. Burrows, NRR (301) 492-0833

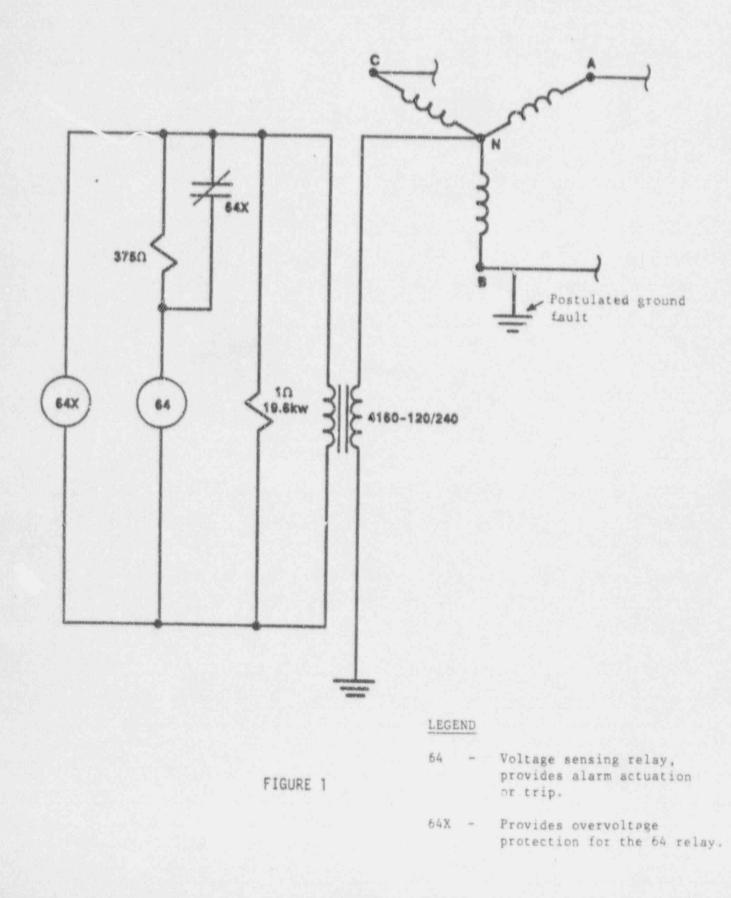
Attachments:

1. Figure 1

2. List of Recently Issued NRC Information Notices

Attachment | IN 89-87 December 19, 1929 Page | of |

TYPICAL HIGH RESISTANCE NEUTRAL GROUNDING SYSTEM



Attachment 2 IN 89-87 December 19, 1989 Page 1 of 1

LIST OF RECENTLY 154UED NRC INFORMATION NUTLES

Information Notice No.	Subject	Date of Issuance	Issued to
89-45. Supp. 2	Metalclad, Low-Yoltage Power Circuit Breakers Refurbished with Substandard Parts	17/15/89	All holders of DLs or CPs for nuclear power reactors.
89 -86	Type HK Circuit Breakers Missing Close Latch Anti- Shock Springs,	12/15/89	All holders of Dis or CPs for nuclear power reactors.
89-85	EPA's interim Final Rule on Medical Waste Tracking and Management	12/15/89	All medical, academic, industrial, waste broker, and waste disposal site licensee
89-84	Failure of Incersoll Rand Air Start Motors as a Result of Pinion Gear Asiembly Fitting Problems	12/12/89	All holders of ULS or CPS for nuclear power reactors.
89-63	Sustained Degraded Voltage on the Offsite Electrical Grid and Loss of Other Generating Stations as a Result of a Plant Trip	12/11/89	All holders of OLS or CPS for nuclear power reactors.
89-82	Recent Safety-Related Incidents at Large Irradiators	12/7/89	All NRC licensess authorized to possess and use sealed sources at large irradiators.
89-59. Supp. 1	Suppliers of Potentially Misrepresented Fasteners	12/6/89	All holders of OLS or CPs for nuclear power reactors.
89-81	inadequate Control of Temporary Modifications to Safaty-Related Systems	12/6/89	All holders of OLS or CPs for nuclear power reactors.

OL = Operating License CP = Construction Permit

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20555

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NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, D. C. 20555

> IE BULLETIN 77-01 Date: April 29, 1977 Page 1 of 3

05-320-97

PNEUMATIC TIME DELAY RELAY SETPOINT DRIFT

DESCRIPTION OF CIRCUMSTANCES:

Milletone Unit 2 and North Anne Unit 1 facilities experienced repeated diesel-generator starting failures several of which investigation revealed were caused by setpoint drift on the pneumatic time delay relays used in the control circuitry for the diesel-generator. The relays involved are identified as ITE Imperial, Catalog Nos. J20T3/J13P20 and J20T3/J13P30. The affected diesel-generators are Fairbanks Morse Units by Colt Industries.

These types of time delay relays are used in several different applications in the control circuitry for the diesel-generator. One of these relays is used to bypass the normal low cil pressure shutdown functions during diesel-generator startup. At Millstone Unit 2 the relay had drifted approximately 10 seconds from the required 20 second delay which allowed the low oil pressure trip circuit to shut down the diesel-generator before the oil pressure had time to build up. At North Anna Unit 1, excessive drift of similar ITE time delay relays was also observed during preoperational testing of the diesel-generators.

ITE Imperial has identified the time delay relays involved at Millstone Unit 2 as coming from the 1972 and 1973 production runs. The catalog specification for this vintage of relays requires a trip-point setting repeat accuracy of ± 15 percent. Units manufactured in 1974 or later have demonstrated a repeat accuracy of ± 3 to 4 percent, well within the catalog specification of ± 15 percent.

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IE Bulletin 77-01 Date: April 29, 1977 Page 2 of 3

Month and year of production for the time delay relays in question can be determined by the six or seven digit bold white number on the timer head. The first two or three digits indicate the month and year or production. (The last four digits provide other coded information.) For example: 124056 indicates a production date of January 1972; 1234056 indicates a production date of December 1973.

According to the time delay relay manufacturers, the potential for setpoint drift is a common characteristic of most pneumatic relays, irrespective of manufacturer. The magnitude of setpoint drift is related to the repeat accuracy specified for the device and the mode in which it will operate, that is, energized or de-energized. In most cases emergized units tend to be susceptible to greater deviations from setpoint because of the temperature effects on the internal parts of the unit.

ACTION TO BE TAKEN BY LICENSEES AND PERMIT HOLDERS:

For all power reactor facilities with an operating license or construction permit:

- If you have been notified of the potential problem, describe the actions taken regarding corrective measures to identify and resolve any setpoint drift problems with the ITE time delay relays.
- 2. In addition to Item 1 above, pneumatic time delay relays intended for use in safety related systems and specifying a repeat accuracy range of ± 15 percent or greater should be demonstrated to provide satisfactory operation. You are requested to provide your basis for concluding that existing pneumatic time delay relays are functioning as required, or provide your plans to assure satisfactory operation.

Reports for facilities with operating licenses should be submitted within 30 days after receipt of this Bullatin, and reports for facilities with construction permits should be submitted within 60 days after receipt of this Bullatin. Your report should include the date when the above actions were or will be completed.

IE Bullerin 77-01 Date: April 29, 1977 Page 3 of 3

Reports should be submitted to the Director of the NRC Regional Office and a copy should be forwarded to the NRC Office of Inspection and Enforcement, Division of Reactor Inspection Programs, Washington, D. C. 20555.

Approval of NRC requirements for reports concerning possible generic problems has been obtained under 44 U.S.C 3152 from the U.S. General Accounting Office. (GAO Approval B-180255 (R0072), expires 7/31/77)

05-321-90

NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT WASHINGTON, D.C. 20555

December 9, 1977

IE Circular 77-16

EMERGENCY DIESEL GENERATOR ELECTRICAL TRIP LOCK-OUT FEATURES Description of Circumstances:

On June 15, 1977, Duquesne Light Company (Beaver Valley 1) reported that during the performance of a test of the diesel-generator (D/G) trip lock-out features in the emergency mode of operation, the D/G output circuit breaker opened when the field voltage trip interlock was tested. This is contrary to a requirement for this facility that, in the emergency mode, all D/G output breaker trips except generator differential and overcurrent be automatically disabled. The engine overspeed trip, which shuts down the diesel engine (but does not affect breaker operation) is also expected to be operable during the emergency mode of operation.

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An investigation conducted by the licensee disclosed that the unexpected opening of the output preaker was due to deenergizing a field voltage sensing relay which was supplied by the vendor but had not been disconnected during the on-site acceptance testing of the D/G nor disabled by the protection circuitry logic. A redundant field voltage relay which was supplied by the licensee is correctly by-passed during fast start conditions and emergency operation.

1 of 3

IE Circular 77-16

December 9, 1977

A design change was initiated by the licensee which removed the field voltage trip feature. This was accomplished by disconnecting the set of relay contacts to the trip circuitry of the D/G output breaker. Subsequent testing of the D/G was performed by the licensee which demonstrated satisfactory operation.

This is an example of an event which resulted from inadequate test procedure performance. The procedures as performed had not previously identified the type of deficiency described in this circular.

The safety significance of this situation is that the premodified protection circuitry would have opened the circuit breaker if a loss of field voltage occurred while running in the emergency mode of operation.

The D/G Units for the above facility were supplied by the Electro Motive Division (EMD) of General Motors. The model numbers for the . D/G Units are:

Engine Model No. 20-045-E4 Generator Model No. A-20-C2 Control anel Hodel . 999-20

2 of 3

IE Circular 77-16

December 9, 1977

All holders of operating licenses or construction permits should assure that the appropriate D/G protection trip circuits are provided with automatic by-pass features that prevent them from negating automatic starting or tripping of D/Gs during fast start or emergency operations. It is recommended that the following be considered in your reviews of this matter:

- Facility procedures should specifically determine whether the protection circuitry that trips the D/G set or the associated output breaker is in accordance with the facility Technical Specifications.
- 2. Test procedures for your D/G sets (e.g. acceptance preoperational and surveillance tests) should be reviewed to assure that D/G system performance is demonstrated by these tests to be in accordance with related operational requirements specified in the facility Technical Specifications.
- Strengthening of management controls should be reviewed as necessary to assure adherence to D/G test procedures by plant personnel.

No written response to this circular is required. If you require additional information regarding this matter, contact the Director of the appropriate NRC Regional Office.

3 of 3

IE Circular No. 77

December 9, 1977

LISTING OF IE CIRCULARS ISSUED IN 1977

CIRCULAR NO.	SUBJECT	FIRST DATE OF ISSUE	ISSUED TO
77-01	Malfunctions of Limitorque Valve Operators	1-4-77	All holders of OLs or CPs
77-02	Potential Heavy Spring Flooding	2-15-77	All affected holders of OLs
77-02A	Potential Heavy Spring Flooding	2-16-77	All affected holders of CPs
77-03	Fire Inside a Motor Control Center	2-28-77	All holders of OLs and CPs
77-04	Inadequate Lock Assemblies	3-17-77	Safeguard Group I, II, IV, V, Licensees
77-05	Liquid Entrapment in Valve Bonnets	3-24-77	All holders of OLs and CPs
77-06	Effects of Hydraulic Fluid on Electrical Cable	4-1-77	All holders of OL's and CPs
77-07	Short Period During Reactor Startup	4-12-77	Holders of BWR OLS
77-08	Failure of Feedwater Sample Probe	4-13-77	All holders of OLs
77-09	Improper Fuse Coordination In BWR Standby Liquid Control System Control Circuit	5-25-77	All holders of BWR OLs or CPs
77-10	Vacuum Conditions Resulting in Damage to Liquid Process Tanks	7-15-77	All holders of Ols

Enclosure 2 Page 1 of 2 IE Circular No. 77-16

1

December 9, 1977

LISTING OF IE CIRCULARS ISSUED IN 1977 (Continued)

CIRCULAR NO.	SUBJECT	FIRST DATE OF ISSUE	ISSUED TO
77-11	Leakage of Con- tainment Isolation Valves with Resilient Seats		All holders of OLs and CPs
77-12	Dropped Fuel Assem- blies at BWR Facili- ties	9-15-77	All holders of BWR OLs or CPs
77-13	Reactor Safety Signal Negated During Testic	s 9-22-77 9	All holders of OLs and CPs
77-14	Separation of Contaminated Water Systems From Noncontaminated Plant Systems	11-22-77	All Power and Test Reactor. Fuel Cycle, and major By-product material processor facilities with OLs or CPs
77-15	Degradation of Fuel Oil Flow to the Emergency Diesel Generators	12/1/77	All holders of OLs and CPs

Enclosure 2 Page 2 of 2

0.24 350-C ALO Muclear Plant Maintenance Work Order Georgia Power Control No. 11/17/98 NPL/Tag No. 2 Date 88 8316 3. Unit 05-32 4. System/Component 1204/MOV IHV8908D -6. Problem/Work Requested SUBJECT VALVE HAS BEEN REPORTED AS LEAKING BY THE SEAT. MOVATE TEST DATA OBTAINED UNDER MWO ISBORISH INDICATES A DEFORMATION DURING VALVE SEATTING AND CONFIRMS REPORTED SERTING CONCERNS Renton Bldy. Level C. (5 Right OF Cd. 15 + 20 Ft IN Whad AT Ce. 15/16. Cont. 7. Initiator Revend L X-4/60 9. Classification (Safety) gener gan & Supervisor SEVEN L. 11/17/88 KALA NEODI -460 10. Unif Status Required 11. Figs Protection System Mode thes. 12. DCR 13. NORDA No. No 14. Type Maintenance 15. Duration of Maintenance Plant 3 Facility [] 200 7015218 16. Est/Act Man Hours Summary 17. Clearance Required M 440 ETD LIPS 18. Permits Required Mech Elect. 180/ Other 40-6600 24 Hrs. DA. 16 NI 19. Q.C. Hold Pts. Rof 2/17/90 + Q.C. Reviewed By Daway Exp Date 11/25 Progedure No. 20 Aller 1 21. Priority 22. E3 659.C 23. Work Instruction 15036 LCO [] de la T.S. 3.8.4. the second Standarde BEWORK ALPIN AS NECESSARY TO ENSURE PROPER THLUE REQUIRES MEDLOOP OPERATION 25. Special Review Required OR INSTALL ATTOM RLS WITH ACCOMULATOR 24. Initiation Review? SEE CONTS 0.5% Data MNT-Date 57 28 MWO Relate For Work 0.0 50 ENG Date Signatury 17-88 11-2-25-90 25.R 27. Actual Work Performed ork#27 determed # at Valve 1HV-88085 CRS 100 109.5 an. See the Valve SLR. 7- 25,90 Mainta men ZONF-H dean lineas EBE 2-25-90 History Summary 1-190 28. Material Required 29. Person Performing Svork (Lisede) Cont. Antonance Formag 31. Inspection Performed Ba OPER Groy dans. 0% 3023 monault it 32 Method of Functional Test The AVIT TO mertox V7.12 1 (P3/24/90 36. Date / 24/90 Procedure No. 33. 34. Aurthimed By 1 xogal CP VI. 36. Proves Operability Yes D' Nos C . 37. Method Used To Prove Operability* Δ AN CHARMEN 38. 38. If Upsalastactory Corrective Action Taken Satisfactory D Unsatisfactory 89 NGL Muga sant laake 40. Unit Status A Plante Fallare 41. Type of Failure N N N 43. Cause of Failure 44. Detection By 46. Effect on System N A K 48. Effect on Plant 48. Effect on Plant Content N 47. March Bus Corte MY CA QUE Code 48. Cause Description 14 40. Corrective Action Code N A 52 DSOS Approval New MID 1710 P CO MA 53. Special Review Completed Min Date Arth 411 190 + ATCINCO Charles Sa. Meeting Number Data 56. Close-out Approval By QC 17/30 consis 580 708 190 MC2 101

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" " Led To TAZ					F 32190	RB 3-21-90	Bay 3/2/90
" " WAT TO TA 3					F 3:490	RB 3-21-90	12/2/3/2/90
RED TO PR#2 Com Sel 30					F 3-21-90	PB 3-21-90	RR43/2/91
B/BK FAT #3 (Com D) 28	ir l				F321.90	RB 3-21-90	12243/2/20
CANTO TERM. STAYO PT. 21			$\gamma \in \mathcal{P}^{(1)}$		F 321.90	RB 3-21-90	RR43/21/90
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VEGP 25	036-C		8				ŝ	21 of 26
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FOR USE WITH CONTROL NO. 18808316

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VEGP 2503	36-C		8				21 of 26
	POWER	AND SIGNA	L REMOVAL/RE	PLACEMEN	T DATA SHE		l of l
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COMPLETIC: SHEET

PROCEDURE	ОИ :	REVISION	oy 60, 600 - Dan Rosenie Conserva, Rosenie an arton	SHEET
25036-0 TAG NO.		DESCRIPTIO	Personal construction of the second se	1 of S
enteres della a	808D	DESCRIPTIO	N	
SERIAL NO		MANUFACTUR	E	MODEL.
IEST EQUI	PMENT USED	METER I Sa	fety kelatæd n-Safety Rel	QC hold points ated
PROCEDURE	DESCRIPTIO	N	INIT/DATE P	HOLD OC OINT INIT/DATE
1.5	Special indicat [] Applies (Pos [] Does not app	t test ássigni		10 Mai 17/3
.1.1	Prerequisites a Initial Conditi verified			
.1.2	Shift Superviso	r Notified		1
.1.3	Clearance and T Verified	agging .		
.1.5	effect With L.fted/Document and Signal Remo Data" Sheet or Required.	any Jumpers on "Power val/Replacement	ne	
.1.6	Record MSWO NO	NUMBER OF STREET, STRE		
	VALVE TAG NO	Manual Analis. A materic analysis of the		
.2.1	Visual Check of Complete with an recorded as Com	ny Abnormalit:	Les	
	[] SATISFACTOR	Y		Y and
	[] UNSATISFACT	ORY	1 1	10 8th 17/2
			1	

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			Sheet	2.of 5
	COMPLETION S	HEET (cont'd)	
PROCEDURE	T DESCRIPTION	MAINT. INIT/DATE	HOLD POINT (Yes/No)	QC INIT/DAT
4.2.2	Visual Check of Stem Comp with Any Abnormalities Recorded as Comments.			
	() SATISFACTORY			. /
	[] UNSATISFACTORY	NIA	NO	And 17/2
4.2.3	Check for Cleanliness			11
4.3.2	PACKING SIZE PACKING TYPE(S)			
	SUPPORTING DOCUMENT AND PAGE NUMBERS IF VENDOR REQUIREMENTS DIFFER FROM THIS PROCEDURE.			
4.3.6	Packing Configuration	energian de la CAL Sermana	Monoportuni de la parcia de La	na manuna leva an ana
	top Material Type Ring Type			
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VEGP	25036-C	8	24 of	26
			Sheet 3 of	5
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	COMPLETION SHE	ET (cont'd)		
PROCEDURE	DESCRIPTION	MAINT INIT/DATE	HOLD POINT (Yes/No)	C / DATE
4.3.8	NAME OF PERSON CONTACTED DECONTAMINATION.	FOR		
	DECON FOREMAN	DATE	TIME	
5.1.1	Verify operations concurrence	NIA	<u>10 MM</u>	1:////81
5.1.2	Check valve operation		NO	1
5.3	If Running Current Can N Be Reduced Below Thresho Limits Of 1302 of Rated Nameplate Current, Name Maint. Engineer Contacte	of		
	(Name Of Person Notified	D Date	(Time)	
		1	NO	/
5.4	Phase to Phase Line Volt	age		
	Volts A to B			
	Volts B to C			
	Volts A to C			
	Lowest Steady State Runn Current	ing		
	Amps Opening a	12	Location	
	Amps closing a	C	Location	
	Messured Valve Stroke Ti	mes		
	Actual Stroke Times			
	Open seconds			1
	Close seconds			V
	[] Satisfactory			11
	[] Unsatisfactory		10 8-10	1 2/2/

VEGP	25036-C		8		25 of 26
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	COM	LETION SHE	ET (cont'	d)	
PROCEDU RE STEP	DESCRIPTI	ON	MAI INIT/DA	NT. HOLD TE POINT (Yes/No	QC INIT/DATE
5.5	Stroke Air Ope several closs operat a stope	to assure	es valve //A	10	Rad 1/12/184
5.5.1	AOV STROKE	TIME	1		
	REQUIRED	ACTUAL			
	OPEN CLOSE	an a second and a second se			
5.7	Slide Wire Pot Reconnected/Re As Required.		1		
	Any Required T Jumpers Verifi or Temp. Mod. Ensure Replace	ed Reinsta. In Force To	lled		
	() Jumper Rem	oval N/A			
	[] Jumpers Re Required	installed (6.8		
	[] Temp. Mod. in force t Reinstalla		mpers.		
			/		/
.9	Shift Supervis that required complete.	or Notified Maintenance	d is /	ie	lite states

VEGP 25036-C 3 26 of 26 Sheet 5 of 5 COMPLETION SHEET (cont'd) Comments/Additional Holdpoints: during Used for lifted lead sheet only F3-21-90 SEE IR # 34061 REM 3/21 90 Q.C. has reviewed this procedure for holdpoints AFPROVED DISAPPROVED COMPLETED BY 4 11. DATE DATE 3/21/50 FOREMAN AIRES 3-21-90 3445

FOR USE WITH CONTROL NO 1810 8 376

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VEGP 2661	0 - C		3			1	8 of 20
	POWER AND SI	GNAL REMO	VAL/REPLACEM	ENT DATA	SHEET	Sheet	lofl
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COMPLETION SHEET

Revision Sheet Procedure No. 26610-C 1 of 2 Tag No. Description 1 HY 8303D Westinghouse Gate Valves Manufacturer Serial No. Model Westinghouse [X] Safety Related/OC Hold Points MATE Test Equipment Used 6.11.90 JOLGUE N. VP. 3. 2272 Non-Safety Related DUC HOLD MAINT. PROCEDURE OC INIT/DATE INLT/DATE POINT DESCRIPTION STEP (Tes/No) 3.17.90 Verify Prerequisites NO em 1 2/12/10 4.1.1 4.1.2 Notify Shift 3-19-90 Supervisor NO RAT 1 717/90 4.1.3 Verify Clearance 13-19-90 and Tagging NO 0C 4.2.1 Visually Check HOLD POINT 36 13-19-90 Sealing Surfaces 90 WRI 4.2.2 Check Sealing 0C 19-19-20 HOLD POINT Surface of Disc Check Sealing 4.2.3 OC' 3-19-90 Surface of Seat HOLD POW DO h 20/90 340 NOLD MS Check Stem Pin 4.2.4 20/90 Check Stem Head and 4.2.5 HOLD PO Bearing Blocks 3/20/80 YOUD MONEY Lock Pins Welded 4.3.4 HOLD POINT 120190 Check Cleanliness 4.3.10 4.3.12 Torqued Yoke-Bonnet OC: 114 HOLD POINT Nucs To 969 0 ft. 1bs Torqued Operator CKC. 12 Capscrews To HOLD POINT ft.1bs. romment

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PAGENO REVISION PROCEDURE NO 20 of 20 VEGP 26610-C 3 Sheet 2 of 2 MAINT. HOLD 0C PROCEDURE INIT/DATE INIT/DATE POINT DESCRIPTION STEP (Yes/No) 4.3.37 Locating pins and HOLD POINT guide slots aligned Torqued Main Flange 4.3.42 ac Bolts To AKRB/21/10 HOLD POINT 2100 ft.1bs Torqued Packing Nuts 4.3.44 To ft.1bs RA4 14/17/90 10 NO Notify Shift 4.3.46 KAF AAX 12/17/90 Supervisor Comments/additional hold points: 18 33273, WRP, 3/20/90 SEE 25036-C FOR LIFTED LEads (103/2/90 ONLY MAIN FLANGE REGULLES TORGUE, VALVE WAS DISASSEMBLED AT MAIN FLANGE NO REPACK REGURED. AGC 3.21.90 5- lakes 2/12/90 QC has reviewed this procedure for hold points Signature DATE COMPLETED BY AFFROVED () DISAFPROVED FOREMAN DATE 20 95 13 3-20 8 103445

VECTP 2	0427-C	REVISION .	2 87 8,69	PAGE NO. 31 of 31	1
Maintenance Maintenance	Work Ord Cleanlin Cleanlin	er No. 188	SS AND HOUSEK 8083/6 ekeeping Stand D tring cleaning	Date <u>3-/7-9</u> ard Required (Circle one)	0
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VEGP 204	27-C		7		31 of 31
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Maintenance W	ork Orde	r No. 188	808316	Date	2-22-90
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NUCLEAR OPERATIONS QUALITY CONTROL HOLD POINT SHEET

MWO NO: 188 08 316

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WHEN THE WORK HAS REACHED THE INDICATED HOLD POINT(S) NOTIFY NUCLEAR OPERATIONS QUALITY CONTROL FOR VERIFICATION OF THE HOLD POINT ACTIVITY DO NOT WORK PAST THE HOLD POINT WITHOUT OC APPROVAL

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VOGTLE GENERATING PLANT-UNITS 1 & 2

Procedure/Spec. No./Rev. MWO/ODR/DR NG Building 25036C 8 18 1880831 DUTAINATEL Sys./Start-Up Designator TAU NO. Room Na/Level Na 3080 1204 Other Drawing No. Rev. Vendor Manual Log No. NA a the

- 1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.
- Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.
- 3. Upon completion of the inspection activity, enter results below and sign and date.

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VOGTLE GENERATING PLANT--UNITS 1 & 2

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Procedure/Spec. No/Hev Building 26610-1 UNITI CATMIT Sys./Start-Up Designator Tag No. 1204 0% Other Vendor Manual Log No.

1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.

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tiple narrative type report procedure. Reference all applicable drawing numbers, specifications, special 2. Ur. structions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.

3. Upon completion of the inspection activity, enter results below and sign and date.

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Georgia Power Page ____

VOGTLE GENERATING PLANT-UNITS 1 & 2

Procedure/Spec. No./Rev. MWO/ODR/DH NG Building NI Marint 18808316 Sys./Start-Up Designator THO NO. Room No./Level No. 1204 080 Cal Room Other Vendor Manual Log No. Drewing No./Rev. NIA NIA

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1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.

2. Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.

3. Upon completion of the inspection activity, enter results below and sign and date.

Using The visual method, verified torque using VP-3-2656 Remarks torque Wrinche Cich Due Lote 8/1 multiplier UTR-#2-018 At/16= 969.0 At/11 Calibratio UP-3-2774 lorque arenet max Um Ske'ch N/m Inspection Gasults UNSAT-ODR/DR NO.(8) DE SAT. Daite 706516A MC819 Inspector Forcellia. a. PINE-Inspector

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Georgia Power

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VOGTLE GENERATING PLANT-UNITS 1 & 2

33823

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Procedure/Spec. No./Rev. MWO/ODR/OR No. Building NA MAINT. 18808316 Sys./Start-Up Designator Teo No. Room No./Level No. 1-HV-8808 13 1204 CAL ROOM Vendor Manual Log No. Other Drewing No./Rev. NA 14

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 Use simple nativity type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.

3. Upon completion of the inspection activity, enter results below and sign and date.

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Inspection	Results	and we have a second of the second
A ISA		Date 3/20/10

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VOGTLE GENERATING PLANT-UNITS 1 & 2

Procedure/Spec. No./Fiev. Building MWO/ODR/DR No. 12.3 CTMT 6-6-10-6 1880 83110 Teg No. Sys./Start-Up Designator Room No./Level No. 88080 1204 171 Other Wundor Manual Log No. Drawing No./Rev. NA NIS in la

- 1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.
- Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.
- 3. Upon completion of the inspection activity, enter results below and sign and date.

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MHO NO:	18	808316 PROCEDURE & REV NOI	26	610-C I	levision	3		
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		DO NOT BYPASS OC HOLD OF						
STEP	7.	HOLD POINT / WITNESS POINT DESCRIPTION	ASSIG INIT	NED BY	NO1 INIT	IED DATE	OC AC	TION 1-N-N/I
	н	Prior to reassembly notify QC to					ana ang pang pang pang pang pang pang pa	
		inspect the following:						
			1.				1.00	and the second second
4.2.1	Н	Sealing surfaces of body to bonnet	alful	2-8-90	WRP	3/20/90	1.	
4.2.2	Н	Sealing surfaces of disc		+			WRP HURP	
4.2.3	Н	Sealing surfaces of seat rings	+	+-+				
4.2.4	H	Stem and disc pin for smothness	1	+-+			WRP	NIM
4.2.5	H	Stem head and bearing blocks for	++	++			WRP	NA
		smothness	1-					
4.3.4	H	Weld on lock pins at both ends	1-1-				LRP	N/A
		(308 ss wire)	1	+			<u><u> </u></u>	-
4.3.10	Н	Valve body and accessible piping for	++-		WRP	3/20/20	WRP	L
		cleanliness	1		ļ			ferminin statement
4.3.12	H	Witness torque of yoke-bonnet nuts on	1		N	A		-
		final pass						
4.3.15	н	Witness torque of operator cap screws			N	A		-
		on final pass						-
4.3.37	н	Locating pin to ensure it is inserted			N	A		
		into its hold and the disc is						
		properly positioned with the guide			1			
		slots				1		
4.3.42	н	Witness tormake of mainflange bolts on			AKR	Philo	AKR	T
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		POINTS ASSIGNED	TO PROCEDURE 26822-C	-					
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.6.6	H	Thermal overloa	d reinstalled	1pt	8.8.89				
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		and a second					-	8	
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SEORGIA POWER COMPANY VEGP QUALITY CONTROL	VISUAL INS	PECTION REPO	RT	85051-C ₽ PAGE 2 0	
100/OTHER * 1880 8316	INSP PROCEDURI 85051-C	e * REV * R/O	DRAWING	* 4-123-02	REV *
AG * 1-HV. 8808 D		INSPECTION VT	METHOD:	VT-3 X	
TYPE OF COMPONENT: BOLTS STUDS PUMP VALVE FLANGES: ASSEMBLED ATTACHMENT WELDS: REACTOR INTERNALS:	INTERNAL	NUTS BLED EXTERNAL OMPONENTS	FLANGES		
OMPONENT CONDITION:				TAZMI TASAT	N/A
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d. Corrosion			and the second		
e. Erosion f. Gouges				Anna anna an an anna an an an an an an an	nie dissective Galeria nale Galeria Galeria
g. Bending, twisting	, or deformed	- 14 I I I I I I I I I I I I I I I I I I			
h. Fractured				angeneration in the second	
i. Evidence ofleakag j. Missing or loose	fasteners				- Er-
k. Displacement/alig	inment of comp	onents			an finter
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OGTLE ELECTRIC GENERATING PLANT

Q pg. 2 22 40

COPY 2

Department/Contractor	OP			D	esign Ct	onge No.			Date 5	30-89	Stores Re	gistar No. Str (11)	318	ſ
	Stock	Location		Quantity		PO	MIR	Maint. Work	Unit	Account Num		-	Anly. Cade	
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GP 29402-C	VEVISION	9	PAGE NO 26 OF 39
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	EQ EVALUATIO	ON CHECKLIST	
FOR USE ON PROJECT CLASSES	Q111. Q212.		MNO NO. 1880 836
Q313, Q013, Q015, Q11E, Q1		Section 2 Section 2	MWO NO.
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	FIG	URE 3	
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SHEET 2 OF 2

EQ EVALUATION CHECKLIST FOR BULK MATERIAL

MNO NO 1840 9316

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REMARKSI

FIGURE 3 (CONT'D.)

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10 of 10 VEGP 92026-C VEGP FIRE PROTECTION CHECKLIST . WILL THE WORK INSTALL, IMPAIR, MODIFY, ISOLATE, DEFEAT, OR REMOVE ANY OF THE FOLLOWING? IF THE ANSWER IS "YES" CHECK THE BOX, AND INDICATE APPROPRIATE DETAILS.) SPRINKLER SYSTEM) INTERIOR HOSE STATION () HALON SYSTEM () DETECTION SYSTEM () EMERGENCY LIGHTING SYSTEM () PERMANENT COMBUSTIBLES (CABLE, WOOD, PLASTIC, ETC.)) STRUCTURAL STEEL, OR RACEWAY FIREPROOFING () FIRE SUPPRESSION SUPPLY SYSTEM (PUMPS, TANKS, ETC.) () FIRE SUPPRESSION SUPPLY SYSTEM (FUMPS, TANKS, ETC.) () CONDUIT SEALS OR EQUIPMENT ENCLOSURE (CABINET HOUSING) () FIRE EXTINGUISHER () COMMUNICATIONS SYSTEM () RCP OIL COLLECTION SYSTEM () SEISMIC STANDPIPE SYSTEM 5. WILL THE WORK DEFEAT, MODIFY OR IMPAIR ANY OF THE FOLLOWING FIRE SEPARATION FEATURES? IF THE ANSWER IS "YES" CHECK THE BOX, AND INDICATE APPROPRIATE DETAILS. () A. FIRE AREA BOUNDARY (WALL, ETC.) () B. PASSIVE AREA BOUNDARY PENETRATION SEAL ASSEMBLY. PENETRATION SEAL WALL BLOCKOUT FLOOR PLUG OR HATCH CABLE TRAY OR CONDULT UTAF RADIANT ENERGY SHIELD () C. ACTIVE FIRE AREA BOUNDARY PENETRATION SEAL. FIRE DOOR FIRE DAMPER 6. IF ALL THE ANSWERS IN BLOCKS 4 and 5 ARE "NO", STOP THE EVALUATION HERE, AND ENTER "NO" IN BLOCE 11 OF THE MUNO FORM. IF ANY QUESTIONS WERE ANSWEAD "YES", ENTER "TES" IN BLOCK 11 OF THE AMARIA DATE 2/17/90 MWO FORM. EVALUATOR POST WORK REVIEW (COMPLETE "A. B. OR C" BELOW) (A) THE CONDITION INPACTING THE FIRE PROTECTION COMPONENTS LISTL . BOVE HAS BEEF BEROVED. FPE DATE (B) THE FIRE PROTECTION CONFOWENT IS STILL EMPAIRED. FPE DATE (C) RESTORATION OF THE IMPAIRMENT HAS BEEN TRANSFERRED (Ref: AND THE FILE PROTECTION LCO LOG HAS BEEN CHARGED TO REFERENCE THE NEW NWO FOR THIS INFAIRMENT. FPE DATE