TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
5N 157B Lookout Place

January 30, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

Your letter to W. F. Willis dated September 26, 1985 requested copies of investigation reports and related documents dealing with potentially safety-related employee concerns on TVA's nuclear plants. Copies of the requested information as outlined in TVA's October 7, 1985 letter are enclosed and cover the period of January 24, 1986 through January 30, 1986. TVA has previously submitted copies of the requested information through January 23, 1986. We are also enclosing computer summaries of the information which we have transmitted to date.

If you have questions concerning the material transmitted, please telephone R. F. Campbell at FTS 858-4892.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. L. Gridley
Manager of Licensing

Enclosures
cc (Enclosures):
Mr. James M. Taylor, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. J. Nelson Grace
Regional Administrator
U.S. Nuclear Regulatory Commission, Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30323

Mr. Braj K. Singh, Project Manager
Office of Nuclear Reactor Regulation
Phillips Building (MS-R-128)
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

AD - J. KNIGHT (ltr only)
FB (BALLARD)
EICSB (ROSA)
PSB (GAMMILL)
RSB (BERLINGER)
FOB (BENAROYA)

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TVA EMPLOYEE CONCERN PROGRAM
WATTS BAR NUCLEAR PLANT
NUCLEAR REGULATORY COMMISSION LISTING

QTC_NUMBER	SUBJECT	INVEST ORG	DATE REPORT	SUB?	DATE RESPONSE	ACC?	DATE INVEST CLOSED	KEY WORD	#
EX-85-003-003	UNAUTH CHNG TO WDREC	ERT	07/09/85	.T.	07/24/85	T	07/24/85	WELDING	1
EX-85-008-001	UNQUAL SUBJOURNEYMEN	ERT	09/28/85	.T.	/ /		/ /	CONSTRUCTI	1
EX-85-009-001	SUBSTN WK BY SUBJRMN	ERT	09/28/85	.T.	/ /		/ /	CONSTRUCTI	1
EX-85-010-002	UNQAUL SUBJOURNEYMEN	ERT	09/28/85	.T.	/ /		/ /	CONSTRUCTI	1
EX-85-012-001	UNQUALIFIED PERSONNE	ERT	09/28/85	.T.	/ /		/ /	CONSTRUCTI	1
EX-85-021-001	INADEQUAT ACCOUNTABI	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
EX-85-021-002	VERIFI PROCESS/WELD	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
EX-85-026-001	CRACKS IN CONTAIN WA	NSRS	01/07/86	.T.	/ /		01/10/86	CIVIL	1
EX-85-039-003	DESIGN DEFICIENCY	EG&G	11/07/85	.T.	01/14/86	T	01/17/86	WELDING	1
EX-85-042-003	WELDERS REQUALIFICAT	ERT	10/23/85	.T.	/ /		10/30/85	WELDING	1
EX-85-046-001	IMPRP FIRE DAMPERS	NSRS	12/17/85	.F.	/ /		12/17/85	MEHCANICAL	1
EX-85-049-001	NO SECURITY BARRIER	NSRS	10/17/85	.T.	11/26/85	T	12/10/85	SECURITY	1
EX-85-052-006	CONDUIT TORN OUT	NSRS	01/06/86	.F.	/ /		01/07/86	CONSTRUCTI	1
EX-85-059-002	INADQ INSTAL HANGERS	NSRS	12/18/85	.F.	/ /		12/24/85	HANGERS	1
HI-85-020-001	REP VIOL & REC DISPL	ERT	01/15/86	.F.	/ /		01/15/86	QA	1
HI-85-029-001	ADV JOB ACT FOR CONC	ERT	01/15/86	.F.	/ /		01/15/86	QA	1
HI-85-041-001	DISP FOR REPT VIOLAT	ERT	01/15/86	.F.	/ /		01/15/86	QA	1
HI-85-067-001	EMP AFRAID REP DAMAG	NSRS	01/15/86	.F.	/ /		01/15/86	QA	1
IN-85-001-002	WELD ROD CONTROL	ERT	07/10/85	.F.	/ /		07/06/85	WELDING	1
IN-85-001-003	WELDS UNDER WATER	ERT	07/10/85	.T.	09/23/85	T	09/23/85	WELDING	1
IN-85-001-005	"SHODDY WORKMANSHIP"	NSRS	12/10/85	.T.	/ /		12/12/85	WELDING	1
IN-85-007-003	VENDOR WELDS INSPECT	NSRS	12/10/85	.T.	/ /		12/12/85	WELDING	1
IN-85-008-002	IMPROP INSTAL INSULA	NSRS	01/06/86	.T.	/ /		/ /	CONSTRUCTI	1
IN-85-010-002	VIOLATION OF 050 NTS	NSRS	11/22/85	.T.	/ /		/ /	HANGERS	1
IN-85-010-004	FIRE PROT PIPNG DSN	ERT	09/16/85	.F.	/ /		09/24/85	DESIGN	1
IN-85-012-001	MAT MANF TO ASTM SPC	ERT	01/02/86	.T.	/ /		/ /	MATERIAL	1
IN-85-012-X02	TENSILE STRNG OF FIT	NSRS	08/05/85	.T.	/ /		08/05/85	MATERIAL	1
IN-85-016-001	BROKN CONCRE AT PLAT	NSRS/ERT	08/05/85	.F.	/ /		08/04/85	CIVIL	1
IN-85-016-003	TUBING NOT CLAMPED	NSRS	09/03/85	.T.	01/06/86		/ /	HANGERS	1
IN-85-018-004	SUPV NOT FOLLOW PROC	NSRS	11/14/85	.T.	/ /		11/20/85	ELECTRICAL	1
IN-85-020-001	IMPROP INSTAL REDHDS	NSRS/ERT	08/15/85	.T.	/ /		/ /	CIVIL	1
IN-85-021-001	TUBE BENDERS	ERT	07/27/85	.T.	10/22/85	T	10/30/85	CONSTRUCTI	1
IN-85-021-002	SYS77 DRAINS IN FLR	ERT	08/23/85	.T.	/ /		08/30/85	DESIGN	1
IN-85-021-003	BACKDATE CERTF CARDS	ERT	08/19/85	.T.	/ /		/ /	WELDING	1
IN-85-021-X05	WELDER CERTIF FALSIF	ERT/OGC	10/24/85	.T.	/ /		/ /	WELDING	1
IN-85-024-001	DRWNS & 050 NOTES	NSRS	07/03/85	.T.	01/10/86	F	/ /	HANGERS	1
IN-85-025-001	INCORE THERMO TEST	NSRS	07/03/85	.F.	/ /		/ /	TESTING	1
IN-85-026-001	FITUP INSPECTS	NSRS	12/31/85	.T.	/ /		01/07/86	WELDING	1
IN-85-027-002	COMPUTER ANALYSIS	ERT	08/01/85	.T.	10/08/85	T	10/08/85	DESIGN	1
IN-85-031-001	ENBD PLTS NOT CORREC	ERT	08/20/85	.T.	01/02/86	F	/ /	DESIGN	1
IN-85-032-001	PIPING CALCULATIONS	ERT	11/26/85	.F.	/ /		11/29/85	DESIGN	1
IN-85-033-001	EP 4.03	NSRS	01/02/86	.T.	/ /		/ /	DESIGN	1
IN-85-037-001	CONCRETE ANCHORS	ERT	07/09/85	.T.	01/07/86	F	/ /	CIVIL	1
IN-85-038-001	ANALYS OF LARGE PIPE	ERT	07/08/85	.T.	09/05/85	T	09/05/85	DESIGN	1
IN-85-039-001	THML STRS ON PIPING	ERT	07/09/85	.T.	09/05/85	T	09/05/85	DESIGN	1
IN-85-039-002	STRES&SUPPRT LD PROB	ERT	11/08/85	.T.	/ /		11/12/85	DESIGN	1
IN-85-052-001	DRWNGS & 050 NOTES	NSRS	07/03/85	.T.	01/14/86	F	/ /	HANGERS	1

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QTC_NUMBER	SUBJECT	INVEST ORG	DATE REPORT	SUB?	DATE RESPONSE	ACC?	DATE INVEST CLOSED	KEY WORD	#
IN-85-052-006	FIT-UP INSPECTIONS	NSRS	12/31/85	.T.	/ /		01/07/86	WELDING	1
IN-85-052-007	FITUP INSPECTIONS	NSRS	12/31/85	.T.	/ /		01/07/86	WELDING	1
IN-85-052-008	PROCED FOR WELD RODS	ERT	07/10/85	.T.	12/16/85	T	12/16/85	WELDING	1
IN-85-064-001	SPRAY ON SHUTDN BDS	NSRS	06/28/85	.T.	/ /		06/28/85	ELECTRICAL	1
IN-85-064-002	SHUTDN BDS TOP OPEN	NSRS	06/28/85	.T.	07/22/85	T	07/22/85	ELECTRICAL	1
IN-85-069-001	INADEQUATE INSPECTS	ERT	07/10/85	.T.	10/10/85	F	/ /	HANGERS	1
IN-85-078-001	UO/SAFTY RELATE SYST	NSRS	10/14/85	.F.	/ /		10/16/85	OPERATIONS	1
IN-85-086-001	STM GEN MATERIALS	ERT	07/10/85	.F.	/ /		07/10/85	MATERIAL	1
IN-85-088-001	VACUM TEST ON DOORS	ERT	07/09/85	.F.	/ /		07/09/85	TESTING	1
IN-85-091-001	LOST DOCUMENTATION	ERT	09/16/85	.T.	/ /		/ /	DOCUMENT	1
IN-85-091-X02	NO NCR FOR LOST DOCU	ERT	08/26/85	.T.	/ /		10/03/85	DOCUMENT	1
IN-85-103-001	IEB 79-02	NSRS	08/09/85	.T.	/ /		08/09/85	DESIGN	1
IN-85-106-001	MN STM LOADS SUPPORT	ERT	07/11/85	.F.	/ /		07/11/85	DESIGN	1
IN-85-108-001	SYS 68 PIPING	ERT	07/12/85	.F.	/ /		07/12/85	MATERIAL	1
IN-85-109-002	BOLTS REPLAC BY WELD	NSRS	11/07/85	.T.	01/08/86	T	01/22/86	WELDING	1
IN-85-113-003	WELDER CERTIFICATION	ERT	07/10/85	.T.	11/12/85	T	11/20/85	WELDING	1
IN-85-119-001	IMPROPER LINE INSTAL	ERT	09/18/85	.T.	10/22/85	T	10/30/85	INSTRUMENT	1
IN-85-130-001	UNQUILIFIED PERSONNE	ERT	09/28/85	.T.	12/26/85		/ /	CONSTRUCTI	1
IN-85-130-002	FIRE SEALS BREACHED	ERT	07/05/85	.T.	09/13/85	T	09/13/85	CONSTRUCTI	1
IN-85-134-001	CRIT NOT MET/IDSS WL	ERT	11/22/85	.F.	/ /		11/22/85	WELDING	1
IN-85-140-001	OPER WATCH VS PAPER	NSRS	08/30/85	.T.	10/16/85	T	10/16/85	OPERATIONS	1
IN-85-142-003	UNFOLLOWED WORK PLAN	NSRS	12/03/85	.T.	01/22/86	T	01/30/86	CONSTRUCTI	1
IN-85-160-001	UNREPORTED FIRE	NSRS	11/07/85	.F.	/ /		11/12/85	CONSTRUCTI	1
IN-85-160-002	UNQUALIFIED PERSONNE	NSRS	12/03/85	.F.	/		12/11/85	CONSTRUCTI	1
IN-85-169-001	SYS 62 VALVE CLASS	ERT	07/10/85	.T.	07/26/85	T	07/26/85	MATERIAL	1
IN-85-173-001	LEAK IN SPRINK SYS	ERT	08/13/85	.F.	/ /		08/13/85	MATERIAL	1
IN-85-186-002	INSL ON CONDT & CABL	ERT	07/10/85	.F.	09/24/85	T	10/10/85	ELECTRICAL	1
IN-85-186-004	BOARDS IN ELEC PANEL	ERT	07/05/85	.F.	09/23/85	T	09/23/85	ELECTRICAL	1
IN-85-189-002	ACCESS TO VALVES/#2	NSRS	10/04/85	.F.	/ /		10/04/85	DESIGN	1
IN-85-196-003	VALVE OPER INADEQ	ERT	08/24/85	.T.	11/25/85	T	12/10/85	OPERATIONS	1
IN-85-196-004	INPROP INSTAL PIPING	NSRS	10/11/85	.F.	/ /		10/16/85	MATERIAL	1
IN-85-198-001	UNCOVERED CABLE TRAY	NSRS	12/04/85	.T.	/ /		12/09/85	CONSTRUCTI	1
IN-85-202-001	CRACK IN WELD	ERT	07/10/85	.T.	/ /		07/09/85	WELDING	1
IN-85-207-002	USE OF FISH TAPE	NSRS	11/22/85	.T.	01/08/86		/ /	ELECTRICAL	1
IN-85-211-001	ERCW LINE LEAK	NSRS	06/27/85	.F.	/ /		06/27/85	MECHANICAL	1
IN-85-211-002	ERCW LINE NOT STAINL	NSRS	10/03/85	.F.	/ /		/ /	MECHANICAL	1
IN-85-212-001	INSP OF WELD SUPPORT	NSRS	01/07/86	.T.	/ /		/ /	WELDING	1
IN-85-216-001	WELDING SEQUENCE	ERT	07/10/85	.T.	08/05/85	F	/ /	WELDING	1
IN-85-217-001	CONDENS POTS, #1	ERT	07/15/85	.T.	/ /		07/14/85	DESIGN	1
IN-85-218-001	APPROVAL OF AS-BUILT	ERT	07/29/85	.T.	08/22/85	T	08/22/85	INSTRUMENT	1
IN-85-220-003	EXCESS NOS OF HGRS	NSRS	12/18/85	.F.	/ /		12/24/85	CIVIL	1
IN-85-221-001	IMPROPER VALVE OPER	ERT	07/05/85	.T.	09/23/85	T	09/23/85	OPERATIONS	1
IN-85-234-001	REQUIRE FOR WELD ROD	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-241-001	ANCHOR BOLT HOLES	NSRS	01/07/86	.T.	/ /		01/10/86	CIVIL	1
IN-85-246-001	INSUFFNT MOVEMT/NVR	NSRS	08/09/85	.F.	/ /		08/09/85	DESIGN	1
IN-85-246-003	INADQ INSTAL HANGERS	NSRS	01/08/86	.T.	/ /		01/10/86	CIVIL	1
IN-85-246-005	RUSTED WELDS/#2/RB	ERT	10/24/85	.T.	/ /		/ /	WELDING	1

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QTC_NUMBER	SUBJECT	INVEST ORG	DATE REPORT	SUB?	DATE RESPONSE	ACC?	DATE INVEST CLOSED	KEY WORD	#
IN-85-250-001	INSP PERF W/O WK REL	NSRS	11/27/85	.T.	/ /		11/29/85	HANGERS	1
IN-85-251-002	MAINT WITHOUT NCR	NSRS	10/31/85	.F.	12/06/85	T	12/10/85	QA	1
IN-85-260-003	WELD DOCUMNTATION	ERT	10/07/85	.F.	11/29/85	T	12/10/85	WELDING	1
IN-85-271-001	GROUND DOWN WELDS	ERT	12/19/85	.T.	/ /		/ /	WELDING	1
IN-85-272-004	FIREPROOFING CABLES	NSRS	12/10/85	.T.	/ /		12/12/85	DESIGN	1
IN-85-277-001	INSTAL PIPE W/O DRWG	NSRS	11/27/85	.T.	/ /		11/29/85	CONSTRUCTI	1
IN-85-278-001	INADQ EMP FOR RECORD	NSRS	01/13/86	.F.	/ /		01/17/86	DOCUMENT	1
IN-85-278-002	INADQ DOCUMENT CONTR	NSRS	12/10/85	.F.	/ /		12/12/85	DOCUMENT	1
IN-85-278-003	INADQ QA RECORDS	NSRS	12/18/85	.F.	/ /		12/24/85	DOCUMENT	1
IN-85-279-002	FCR & NCR APPROVALS	NSRS	01/23/86	.T.	/ /		/ /	QA	1
IN-85-279-003	FCRS MISINCORP DRWGS	NSRS	01/23/86	.T.	/ /		/ /	DOCUMENT	1
IN-85-279-005	NO TRACKING SYSTEM	NSRS	11/13/85	.T.	/ /		11/15/85	DESIGN	1
IN-85-281-001	DIFFUSER FLOW	ERT	07/05/85	.T.	07/25/85	T	07/25/85	DESIGN	1
IN-85-281-003	TRNSM NOT READ SAME	NSRS	08/15/85	.T.	12/04/85	T	12/10/85	DESIGN	1
IN-85-282-002	PIPING WELDS	ERT	12/19/85	.T.	/ /		/ /	WELDING	1
IN-85-284-005	POOR PLANT CLEANLINE	NSRS	01/21/86	.F.	/ /		01/24/86	CONSTRUCT	1
IN-85-285-001	IMPROP INSTAL PLATES	NSRS	01/08/86	.T.	/ /		01/10/86	CIVIL	1
IN-85-285-002	PULL TEST NOT 100%	NSRS	01/16/86	.F.	/ /		/ /	CIVIL	1
IN-85-285-003	MGRS INT ONLY PRODUC	NSRS	01/08/86	.T.	/ /		01/10/86	QA	1
IN-85-289-001	ERRORS DURING TESTIN	NSRS	01/07/86	.T.	/ /		01/10/86	OPERATIONS	1
IN-85-289-002	DEFECT PIPING	NSRS	12/19/85	.T.	/ /		/ /	DESIGN	1
IN-85-289-006	VERMASCO APPL PREMAT	NSRS	11/27/85	.T.	/ /		11/29/85	ELECTRICAL	1
IN-85-293-001	NCR 4412	NSRS	12/18/85	.F.	/ /		12/18/85	DESIGN	1
IN-85-311-008	CR ENTRANCE FIREDOOR	ERT	08/19/85	.T.	09/24/85	T	10/10/85	OPERATIONS	1
IN-85-325-003	CYCLICAL STRESS FAIL	NSRS	01/21/86	.T.	/ /		01/22/86	DESIGN	1
IN-85-325-006	VALV CONT/OPER TRAN	NSRS	10/01/85	.F.	/ /		10/04/85	OPERATIONS	1
IN-85-337-001	ERCW LN W/CEMENT LIN	NSRS	10/03/85	.F.	/ /		/ /	MECHANICAL	1
IN-85-337-002	WELD ROD CONTROL	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-346-003	WELD CERTIFICATIONS	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-352-001	UPDATE WELD CERTIFIC	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-352-002	NO PORT WELD OVENS	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-373-001	DAMAGED CABLE	NSRS	06/28/85	.T.	07/25/85	T	07/25/85	ELECTRICAL	1
IN-85-388-003	UNLABELED MATERIALS	NSRS	01/24/86	.T.	/ /		/ /	MATERIAL	1
IN-85-388-006	HEAT CODE TRACEABILI	NSRS	07/03/85	.T.	07/26/85	T	07/26/85	MATERIAL	1
IN-85-393-003	FSAR REQ FOR SUPERV	NSRS	07/03/85	.T.	11/25/85	T	11/27/85	OPERATIONS	1
IN-85-406-001	UNAUTH CHNG TO WDREC	ERT	07/09/85	.T.	07/24/85	T	07/24/85	WELDING	1
IN-85-407-001	INACCURATE Q-LIST	NSRS	10/04/85	.T.	12/24/85	F	/ /	DESIGN	1
IN-85-410-003	EMBED PLATE "HOLLOW"	NSRS	01/07/86	.T.	/ /		01/10/86	CIVIL	1
IN-85-410-006	GRPS ADHERE PROCEDUR	NSRS	01/06/86	.T.	/ /		01/10/86	QA	1
IN-85-411-001	SAFTY HAZ ON PLATFRM	NSRS	07/23/85	.T.	08/09/85	T	09/08/85		1
IN-85-413-001	"OSG"NOTES	NSRS	08/09/85	.T.	/ /		08/09/85	HANGERS	1
IN-85-415-002	CONCRETE ERCW LINES	NSRS	07/11/85	.F.	/ /		07/11/85	MECHANICAL	1
IN-85-424-001	NO PORT OVENS	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-424-004	STMFIT PERFM WELDING	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-424-006	ACCOUNT OF WELD RODS	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-424-007	LACK OF WELD ROD CON	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-424-011	INADEQ UPDT WELD CER	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1

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IN-85-424-X13	FALSIF WELDER CERTIF	ERT/OGC	10/24/85	.T.	/ /		/ /	WELDING	1
IN-85-426-001	UNREQ PORT OVENS	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-426-002	INADEQ WELD CERTIFIC	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-439-002	"HOLLOW" EMBED PLATE	NSRS	01/07/86	.T.	/ /		01/10/86	CIVIL	1
IN-85-439-003	INADEQ CRAFT SUPV	NSRS	10/30/85	.F.	/ /		10/30/85	CONSTRUCTI	1
IN-85-439-006	SUBSTD WEAK CONCRETE	NSRS	11/07/85	.F.	/ /		/ /	CIVIL	1
IN-85-441-003	NO PORT WELD OVENS	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-442-X12	LINING LOSS IN PIPE	NSRS	10/03/85	.F.	/ /		/ /	MECHANICAL	1
IN-85-445-002	UNAUT ACCS TO WLD SY	ERT	08/27/85	.T.	/ /		08/27/85	WELDING	1
IN-85-445-004	INCORR INSPEC REQUIR	ERT	11/25/85	.T.	/ /		/ /	QA	1
IN-85-445-008	PROC DIFFICULT TO KN	NSRS	10/23/85	.F.	/ /		10/30/85	CRAFT	1
IN-85-445-010	EYE TEST INADEQUATE	NSRS	10/28/85	.T.	12/10/85	T	/ /	WELDING	1
IN-85-445-013	47-050 HARD TO USE	NSRS	10/10/85	.T.	/ /		10/16/85	HANGERS	1
IN-85-445-X15	INSP REQ FALSIFIED	ERT/OGC	11/25/85	.T.	/ /		/ /	QA	1
IN-85-453-007	INADEQ CERTF OF WELD	ERT	08/19/85	.T.	/ /		/ /	WELDING	1
IN-85-453-009	PASS OF WELD ROD	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-454-004	PASS OF WELD ROD	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-85-457-001	INADQ REVIEW BY PORC	NSRS	10/17/85	.T.	01/02/86		/ /	OPERATIONS	1
IN-85-457-002	NCRS FOR SPT FUL RCK	NSRS	01/22/86	.F.	/ /		/ /	QA	1
IN-85-458-007	CHNG OF WELD STATUS	ERT	08/27/85	.T.	/ /		08/27/85	WELDING	1
IN-85-460-003	GOUGE IN LINE, 1#	ERT	08/29/85	.T.	09/24/85	T	10/17/85	MECHANICAL	1
IN-85-460-X05	EXCAV ARC STRK SYS72	ERT	10/21/85	.T.	01/15/86	F	/ /	WELDING	1
IN-85-463-007	DELAY IN DOCUMT DRWS	NSRS	11/22/85	.F.	/ /		11/27/85	DOCUMENT	1
IN-85-465-001	LINES CLOSE TO HANGR	NSRS	07/30/85	.T.	08/09/85	T	09/08/85	MECHANICAL	1
IN-85-465-002	LOOSE CONDUIT	NSRS	09/09/85	.F.	11/14/85	T	11/20/85	HANGERS	1
IN-85-472-002	NO NCRS ON ERCW LINS	NSRS	10/03/85	.F.	/ /		/ /	QA	1
IN-85-481-001	NO QCP FOR CONC INSP	NSRS	01/09/86	.T.	/ /		/ /	QA	1
IN-85-485-X01	SOFT CONCRETE	NSRS	11/07/85	.F.	/ /		/ /	CIVIL	1
IN-85-493-004	INADEQ WELD CERTIFIC	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-496-002	LINER OF ERCW PIPING	NSPS	10/03/85	.F.	/ /		/ /	MECHANICAL	1
IN-85-501-001	UNUSED WLD RDS DISPO	ERT	09/03/85	.T.	/ /		/ /	WELDING	1
IN-85-514-001	CONTAM DURING CUTTIN	ERT	08/22/85	.T.	01/09/86	T	/ /	INSTRUMENT	1
IN-85-527-001	CABLE PULL W/O FUSE	NSRS	11/27/85	.T.	/ /		11/29/85	ELECTRICAL	1
IN-85-530-001	WLDS NOT ACCRD PROCD	NSRS	08/15/85	.F.	/ /		08/15/85	WELDING	1
IN-85-532-004	WELDER RECERTIFICATE	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-532-005	RECERT W/O VERIFICAT	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-532-006	OVERSIZED WELDS	NSRS	08/16/85	.T.	/ /		/ /	WELDING	1
IN-85-534-001	FIRE PROTECT SYSTEM	NSRS	10/08/85	.F.	12/20/85		/ /	DESIGN	1
IN-85-534-002	FIRE PROT LINES	NSRS	10/22/85	.F.	/ /		10/22/85	DESIGN	1
IN-85-534-005	FIRE PROTEC HYDRO TE	NSRS	10/02/85	.F.	01/02/86		/ /	TESTING	1
IN-85-540-001	INADE WELD CERTIFICA	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-541-001	REQ WELD ON 2 SIDES	NSRS	08/15/85	.F.	/ /		08/15/85	WELDING	1
IN-85-543-002	INADEQ WELD CERTIFIC	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-543-004	DETERORIATE STEEL	NSRS	07/29/85	.F.	09/26/85	T	11/29/85	CONSTRUCTI	1
IN-85-544-001	WORK W/O WORKPLAN	ERT	10/22/85	.F.	01/06/86	T	01/14/86	QA	1
IN-85-544-002	VIOLATION OF PROCEDU	ERT	10/23/85	.T.	12/16/85	T	12/23/85	QA	1
IN-85-554-001	INCOMP STAIN STEL LN	NSRS	09/03/85	.F.	/ /		09/03/85	CONSTRUCTI	1

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IN-85-556-001	SUBJ DOING JOUR WORK	ERT	09/28/85	.T.	/ /		/ /	WELDING	1
IN-85-579-001	INCOMPLETE WELD	ERT	12/03/85	.T.	/ /		/ /	WELDING	1
IN-85-581-002	WLDRS NOT QUAL ELEC	NSRS	10/17/85	.T.	/ /		10/17/85	CONSTRUCTI	1
IN-85-584-001	FIT-UP INSPECT REQUR	NSRS	12/31/85	.T.	/ /		01/07/86	WELDING	1
IN-85-589-001	LINER ON ERCW LINE	NSRS	10/03/85	.F.	/ /		/ /	MECHANICAL	1
IN-85-589-002	SUBJ DOING JOURN WRK	ERT	09/28/85	.T.	/ /		/ /	WELDING	1
IN-85-595-005	SEP OF CARBON/SS	NSRS	01/06/86	.F.	/ /		01/08/86	MATERIAL	1
IN-85-601-001	INADEQ SURVL INSTRUC	NSRS	10/09/85	.T.	/ /		10/09/85	QA	1
IN-85-612-006	INADEQ WELD CERTIFIC	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-612-X07	WELDER CERTIF FALSIF	ERT/OGC	10/24/85	.T.	/ /		/ /	WELDING	1
IN-85-615-001	OBSTRUCTED ACCESS	NSRS	10/04/85	.F.	/ /		10/04/85	DESIGN	1
IN-85-616-001	RO NOT AVAILABLE	NSRS	08/30/85	.T.	10/16/85	T	10/16/85	OPERATIONS	1
IN-85-618-004	DAMAGED INST TUBING	NSRS	08/12/85	.T.	12/20/85	T	12/27/85	CONSTRUCTI	1
IN-85-630-002	SEAL LEAKS INTO BLDG	NSRS	01/15/86	.T.	/ /		01/17/86	CIVIL	1
IN-85-630-003	ERCW LINE IMPROP INS	NSRS	11/19/85	.F.	/ /		/ /	MECHANICAL	1
IN-85-630-004	INADQ DOC FOR ERCW	NSRS	11/19/85	.F.	/ /		/ /	MECHANICAL	1
IN-85-671-001	FITUP INSPECTION	NSRS	12/31/85	.T.	/ /		01/07/86	WELDING	1
IN-85-671-002	NOT ISSUING IRN/WRN	NSRS	12/03/85	.T.	/ /		/ /	CIVIL	1
IN-85-671-004	WELDS NOT PROP INSPE	NSRS	10/22/85	.T.	/ /		10/22/85	WELDING	1
IN-85-676-001	DISAGREE W/TVA POLIC	NSRS	10/31/85	.T.	12/27/85	T	01/07/86	QA	1
IN-85-682-005	MGT ALLOW INSP HARAS	NSRS	11/27/85	.F.	01/16/85		/ /	QA	1
IN-85-684-001	DEFECTIVE TUBE STEEO	NSRS	09/16/85	.F.	/ /		09/16/85	MATERIAL	1
IN-85-688-002	INADEQUATE TVA PROCE	NSRS	12/18/85	.T.	/ /		12/24/85	QA	1
IN-85-688-003	VALIDITY OF CRIT SYS	NSRS	10/04/85	.T.	12/24/86	F	/ /	DESIGN	1
IN-85-688-004	PREVENT OF CORRECTIV	NSRS	12/09/85	.T.	/ /		/ /	QA	1
IN-85-705-001	UNQUALIFIED PERSONNE	ERT	09/28/85	.T.	/ /		/ /	CONSTRUCTI	1
IN-85-713-004	CONCRETE LIN IN PIPE	NSRS	10/03/85	.F.	/ /		/ /	MECHANICAL	1
IN-85-725-X14	INADQ RECERT PROG	ERT	11/05/85	.F.	12/16/85	T	12/26/85	WELDING	1
IN-85-725-X15	TEST PLATES INADQ	ERT	11/05/85	.F.	12/26/85	T	12/26/85	WELDING	1
IN-85-748-001	TIE-IN OF SEAL DRAIN	ERT	08/16/85	.F.	/ /		08/16/85	DESIGN	1
IN-85-754-001	INADQ PLATE & STEEL	NSRS	01/06/86	.F.	/ /		01/08/86	MATERIAL	1
IN-85-770-002	PROC FOR CER NOT PER	ERT	10/24/85	.T.	/ /		/ /	WELDING	1
IN-85-770-003	UNCERTIFIED WELDERS	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-770-X07	WELDERS CERT FALSIFI	ERT/OGC	10/24/85	.T.	/ /		/ /	WELDING	1
IN-85-778-001	WELDER CERTIFICATION	ERT	09/26/85	.T.	/ /		10/15/85	WELDING	1
IN-85-778-X07	WELDER CERT CARD FAL	ERT/OGC	10/24/85	.T.	/ /		/ /	WELDING	1
IN-85-795-001	COMPRESS FITTING	ERT	08/07/85	.T.	01/22/86		/ /	INSTRUMENT	1
IN-85-795-002	COMPRESS FITTING	ERT	08/07/85	.T.	01/22/86		/ /	INSTRUMENT	1
IN-85-802-001	TARGET ROCK VALVES	NSRS	10/25/85	.T.	12/20/85	T	12/27/85	DESIGN	1
IN-85-815-001	CERTIFICATI OF WELDR	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-824-002	UNAPPROV BEND PROCED	ERT	08/23/85	.T.	10/18/85	T	10/30/85	QA	1
IN-85-825-002	CLAIRTY IN PROCEDURE	NSRS	10/22/85	.F.	/ /		10/22/85	OPERATIONS	1
IN-85-835-002	WELDING CERTIFICATIO	ERT	09/26/85	.T.	/ /		10/03/85	WELDING	1
IN-85-839-001	ERCW MOTOR PROBLEM	NSRS	01/06/86	.F.	/ /		01/07/86	DESIGN	1
IN-85-845-001	SYS43 UNIS NOT ACHD	NSRS	12/04/85	.F.	/ /		/ /	CIVIL	1
IN-85-845-002	SYS43 HANGER DESIGN	NSRS	11/20/85	.T.	/ /		/ /	HANGERS	1
IN-85-845-003	IMPROP INST&MTL STOR	NSRS	01/22/86	.T.	/ /		/ /	MATERIAL	1

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IN-85-845-004	IMPROPER WELDING	NSRS	10/10/85	.F.	/ /		10/16/85	WELDING	1
IN-85-846-002	GOUT LINER/SAFTY HAZ	NSRS	10/03/85	.F.	/ /		/ /	MECHANICAL	1
IN-85-847-006	CRFT SUP ALW UNAP PL	NSRS	10/29/85	.T.	01/22/86		/ /	QA	1
IN-85-850-002	QUANTITY VS. QUALITY	NSRS	11/07/85	.F.	/ /		11/12/85	QA	1
IN-85-850-004	WORK W/O OFFC APPROV	NSRS	12/19/85	.T.	/ /		12/24/85	QA	1
IN-85-852-001	VENDOR WELDS	NSRS	01/06/86	.F.	/ /		01/07/86	WELDING	1
IN-85-853-X02	VIOLAT TVA PROCEDURE	ERT	10/12/85	.F.	/ /		10/18/85	QA	1
IN-85-858-001	QUANTITY VS QUALITY	NSRS	12/09/85	.T.	01/15/86		/ /	QA	1
IN-85-864-002	MODIFI TO RHR MOTORS	NSRS	01/23/86	.T.	/ /		/ /	MECHANICAL	1
IN-85-877-001	LIN ACPT WITH DEFAUL	NSRS	12/12/85	.F.	/ /		12/12/85	QA	1
IN-85-897-001	INEXP CRAFTSMEN	NSRS	11/07/85	.T.	/ /		11/12/85	CRAFT	1
IN-85-913-001	ELECT JUNCTION BOXES	NSRS	11/26/85	.F.	01/22/86		/ /	ELECTRICAL	1
IN-85-913-002	ELECT JUNCTION BOXES	NSRS	11/26/85	.F.	01/22/86		/ /	ELECTRICAL	1
IN-85-913-004	CONSTRUCT VIOLATIONS	NSRS	11/26/85	.F.	01/22/86		/ /	QA	1
IN-85-915-002	DRAWING CONTROL	NSRS	10/17/85	.F.	/ /		10/17/85	DOCUMENT	1
IN-85-915-003	DRAWING CONTROL	NSRS	10/22/85	.T.	/ /		/ /	DOCUMENT	1
IN-85-915-X04	INVEST RESULTS FALSI	ERT/OGC	01/07/86	.T.	/ /		01/10/86	QA	1
IN-85-927-X01	STORAGE REQUIREMENTS	NSRS	01/22/86	.T.	/ /		/ /	CONSTRUCTI	1
IN-85-945-001	ELEC MANHOLES DISORG	NSRS	10/22/85	.T.	/ /		/ /	ELECTRICAL	1
IN-85-955-001	PWR LOST SYST INOPER	NSRS	12/09/85	.T.	/ /		12/12/85	DESIGN	1
IN-85-964-003	IMPROP MAT/EQIUP USE	NSRS	12/10/85	.F.	/ /		12/12/85	MATERIAL	1
IN-85-964-X06	USE OF "SUPERGLUE"	NSRS	12/04/85	.F.	/ /		12/11/85	CONSTRUCTI	1
IN-85-965-001	WELDOR CER BACKDATED	ERT	10/24/85	.T.	/ /		/ /	WELDING	1
IN-85-977-001	TAPE NOT REPL ON RCS	NSRS	10/10/85	.F.	01/14/86	F	/ /	QA	1
IN-85-977-002	DOCUMENT OF TCS/SIS	NSRS	10/03/85	.T.	01/22/86		/ /	DOCUMENT	1
IN-85-982-001	REBAR LOCATERS UNUSE	NSRS	01/08/86	.T.	/ /		01/10/86	CIVIL	1
IN-85-998-002	IRN PROG NEEDS IMPRO	NSRS	12/03/85	.T.	/ /		/ /	QA	1
IN-86-014-001	EXCESS SI ON EQUIPME	NSRS	12/17/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-055-002	LEAKING PIPE	NSRS	11/22/85	.F.	/ /		11/27/85	MAINTENANC	1
IN-86-055-003	HYDRAZINE SPILL	NSRS	10/17/85	.T.	12/26/85	T	01/07/86	OPERATIONS	1
IN-86-064-001	INAPT AIR FLOW SWITC	NSRS	12/18/85	.T.	/ /		12/18/85	EQUIPMENT	1
IN-86-068-002	RETUBIN OF HEAT EXCH	ERT	11/05/85	.T.	/ /		/ /	MAINTENANC	1
IN-86-081-001	INADEQ PLANT SYS STA	NSRS	11/19/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-083-003	PRODUCTION VS QUALIT	NSRS	12/05/85	.F.	12/31/85	T	01/13/86	TESTING	1
IN-86-087-002	EFFECT OF QA DEPT	NSRS	11/19/85	.F.	/ /		11/21/85	QA	1
IN-86-087-003	DELAY IN CARS/DRS	NSRS	12/09/85	.T.	/ /		/ /	QA	1
IN-86-087-004	DIFFERENCE IN Q-LIST	NSRS	10/04/85	.T.	12/24/85	F	/ /	QA	1
IN-86-090-001	DIFFERENCE IN Q-LIST	NSRS	10/04/85	.T.	12/24/85	F	/ /	QA	1
IN-86-090-002	DELAY IN CARS/DRS	NSRS	12/09/85	.T.	/ /		/ /	QA	1
IN-86-090-003	SIS APPROVAL W/O REV	NSRS	10/17/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-098-001	DELAY IN CAR/DR	NSRS	12/09/85	.T.	/ /		/ /	QA	1
IN-86-102-001	REQ FOR CONDUIT INSU	NSRS	10/11/85	.T.	12/26/85	T	01/07/86	HANGERS	1
IN-86-102-002	NO ATTACH D/CONDUIT	NSRS	10/14/85	.F.	/ /		10/16/85	CONSTRUCTI	1
IN-86-103-001	NO ATTACH D/CONDUIT	NSRS	10/11/85	.T.	12/23/85	T	01/07/86	ELECTRICAL	1
IN-86-103-002	REMOVAL OF INSULATIO	NSRS	11/13/85	.F.	/ /		11/15/85	CONSTRUCTI	1
IN-86-108-001	DRAWINGS NOT CURRENT	NSRS	11/01/85	.F.	/ /		11/04/85	DOCUMENT	1
IN-86-108-002	SQN/BFN/BLN DRWGS	NSRS	12/26/85	.T.	/ /		/ /	DOCUMENT	1

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IN-86-110-001	INADQ ICE LOADING	NSRS	10/25/85	.T.	/ /		10/30/85	DESIGN	1
IN-86-112-001	USE OF TOOLS NOT DOC	NSRS	12/12/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-119-001	INADEQUATE CONDUITS	NSRS	10/09/85	.T.	/ /		/ /	ELECTRICAL	1
IN-86-122-001	CRACKS IN WF 33 BEAM	NSRS	10/10/85	.T.	/ /		10/16/85	MATERIAL	1
IN-86-124-001	LOW GRADE STEEL	NSRS	01/13/86	.F.	/ /		01/15/86	MATERIAL	1
IN-86-134-001	PROECDURES/DRAWINGS	NSRS	01/06/85	.F.	/ /		01/08/86	DOCUMENT	1
IN-86-134-002	IRN POLICY	NSRS	12/03/85	.T.	/ /		/ /	QA	1
IN-86-135-003	LINES NOT INSPECTED	NSRS	12/09/85	.T.	/ /		/ /	HANGERS	1
IN-86-143-002	WELDER CERT BACKDATE	ERT	10/24/85	.T.	/ /		/ /	WELDING	1
IN-86-145-002	CONCRETE LINING APAR	NSRS	10/03/85	.F.	/ /		/ /	MECHANICAL	1
IN-86-150-001	TRACEABILITY NOT ATT	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-86-155-002	HANGER UNACCEP WELDS	NSRS	11/27/85	.F.	/ /		11/29/85	WELDING	1
IN-86-155-004	WELDS MAY NOT INSPEC	NSRS	10/22/85	.F.	/ /		10/22/85	WELDING	1
IN-86-158-005	CONDUITS NOT PLUGGED	NSRS	01/09/86	.T.	/ /		/ /	DESIGN	1
IN-86-158-007	CUTS CLOSE TO CONDUI	NSRS	01/09/86	.T.	/ /		/ /	WELDING	1
IN-86-167-001	NO TRACEABIL OF RODS	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
IN-86-167-005	WELDER REQUAL BACKDT	ERT	10/24/85	.T.	/ /		/ /	WELDING	1
IN-86-167-X06	WELDER CERT CARD FAL	ERT/OGC	10/24/85	.T.	/ /		/ /	WELDING	1
IN-86-169-001	CONDUIT HEAT DAMAGED	NSRS	11/26/85	.T.	01/21/86		/ /	ELECTRICAL	1
IN-86-173-001	DESIGN CALCULATIONS	NSRS	10/28/85	.T.	12/20/85		/ /	DESIGN	1
IN-86-183-001	BOLTS INSTAL STL CON	NSRS	01/09/86	.F.	/ /		01/13/86	MATERIAL	1
IN-86-184-002	CLASSIFICATION PIPIN	NSRS	12/18/85	.T.	/ /		12/24/85	MATERIAL	1
IN-86-184-004	PIPE SIZES	NSRS	12/18/85	.T.	/ /		12/24/85	WELDING	1
IN-86-190-003	ANCHOR NOT TEST INDI	ERT	10/24/85	.T.	/ /		10/30/85	CIVIL	1
IN-86-199-001	CAB PULL/REQ PER QCI	NSRS	10/31/85	.T.	/ /		11/04/85	ELECTRICAL	1
IN-86-200-003	SUPPORT NOT SAFE	NSRS	12/11/85	.F.	/ /		12/12/85	CIVIL	1
IN-86-201-001	CAB PULL LIMIT EXCEE	NSRS	10/31/85	.T.	/ /		11/04/85	ELECTRICAL	1
IN-86-205-001	ERCW UNSUITABLE	NSRS	12/03/85	.F.	/ /		12/11/85	MECHANICAL	1
IN-86-208-001	SI REQ TO MUCH TIME	NSRS	12/17/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-210-001	HEAT EXCH TUBES INAD	ERT	11/05/85	.T.	/ /		/ /	DESIGN	1
IN-86-221-001	RED HEADS NOT REMOVE	NSRS	12/09/85	.T.	/ /		12/12/85	CIVIL	1
IN-86-221-004	CLEANERS NOT APPVD	NSRS	10/10/85	.T.	12/06/85	T	12/12/85	MATERIAL	1
IN-86-226-001	HARAS FOR REP QC	NSRS	11/11/85	.T.	/ /		/ /	QA	1
IN-86-232-001	REPAIR ERCW VIOLAT	NSRS	10/03/85	.F.	/ /		/ /	MECHANICAL	1
IN-86-232-X03	FCRS NOT APPROVED	NSRS	01/23/86	.T.	/ /		/ /	CONSTRUCTI	1
IN-86-259-001	FAILURE USE FUSE LIN	NSRS	10/31/85	.T.	/ /		11/04/85	ELECTRICAL	1
IN-86-259-003	PVC CONDUITS BROKEN	NSRS	12/03/85	.F.	/ /		12/06/85	ELECTRICAL	1
IN-86-259-004	INADEQ CABLE PULL	NSRS	10/31/85	.T.	/ /		11/04/85	ELECTRICAL	1
IN-86-259-005	OVERFILLED CABLE TRA	NSRS	11/14/85	.T.	/ /		/ /	ELECTRICAL	1
IN-86-259-006	INADQ SEPAR OF CABLE	NSRS	11/01/85	.T.	01/06/86		/ /	ELECTRICAL	1
IN-86-259-X11	TVA PROC NO IEEE STD	NSRS	11/14/85	.F.	/ /		/ /	DESIGN	1
IN-86-259-X13	FOREIGN OBJS IN CONC	NSRS	01/06/86	.T.	/ /		/ /	CIVIL	1
IN-86-262-002	OVERCROWDING CABLES	NSRS	11/14/85	.T.	/ /		/ /	ELECTRICAL	1
IN-86-262-003	EXCEED MAX PULL TENS	NSRS	10/31/85	.T.	/ /		11/04/85	ELECTRICAL	1
IN-86-262-005	INADEQ BOLTS FOR TRA	NSRS	01/07/86	.T.	/ /		01/10/86	HANGERS	1
IN-86-266-X09	LACK OF COVERAGE	NSRS	10/31/85	.F.	/ /		11/04/85	ELECTRICAL	1
IN-86-268-003	IMPROPER INSTAL CABL	NSRS	11/01/85	.T.	01/06/86		/ /	ELECTRICAL	1

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QTC_NUMBER	SUBJECT	INVEST ORG	DATE REPORT	SUB?	DATE RESPONSE	ACC?	DATE INVEST CLOSED	KEY WORD	#
IN-86-290-001	IRNS NOT QUAL RECORD	NSRS	12/03/85	.T.	/ /		/ /	QA	1
IN-86-291-007	SECURITY CLEAR PERS	NSRS	12/03/85	.T.	01/10/86	T	01/17/86	OPERATIONS	1
IN-86-294-002	INADQ WELD BASE PLAT	NSRS	01/08/86	.T.	/ /		01/10/86	CIVIL	1
IN-86-303-002	HOUSEKEEP NEEDS IMPR	NSRS	01/21/86	.F.	/ /		01/21/86	CONSTRUCTI	1
IN-86-305-001	LACK OF CONCRETE BON	NSRS	01/13/86	.F.	/ /		01/15/86	CIVIL	1
IN-86-305-002	NO FIRE DAMPERS	NSRS	12/10/85	.F.	/ /		12/10/85	DESIGN	1
IN-86-314-004	INADQ CABLE SEPARATI	NSRS	11/27/85	.T.	/ /		11/29/85	ELECTRICAL	1
IN-86-316-002	INCOMPLETE WORK PKG	NSRS	12/18/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-316-003	WORK PKG VS MANUAL	NSRS	12/18/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-316-005	WORK PKG INCOMPLETE	NSRS	12/18/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-316-006	WORK PKGS INCOMPLETE	NSRS	12/18/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-316-007	ENG INCOMP WORK PKGS	NSRS	12/18/85	.T.	/ /		/ /	OPERATIONS	1
IN-86-316-X09	ENG DISREGARD MANUAL	NSRS	12/18/85	.T.	/ /		/ /	OPERATIONS	1
NS-85-001-001	INACCUR WELD INSPECT	ERT	08/13/85	.T.	09/27/85	F	/ /	WELDING	1
NS-85-002-001	BFN/SUPTS ON RHR SYS	ERT	10/12/85	.T.	/ /		/ /	OPERATIONS	1
NS-85-004-001	INADEQ ORIFICE PLATE	NSRS	12/17/85	.T.	/ /		/ /	DESIGN	1
PH-85-001-002	INST LNS SLOPE PROB	ERT	07/06/85	.T.	09/20/85	T	09/23/85	INSTRUMENT	1
PH-85-003-021	ENG EVAL NOT CONDUCT	NSRS	10/10/85	.T.	/ /		10/16/85	QA	1
PH-85-006-001	CHANGES TO 050 NOTES	NSRS	08/09/85	.F.	/ /		08/09/85	HANGERS	1
PH-85-012-001	INSPECT OF WELDS	ERT	07/19/85	.T.	/ /		07/19/85	WELDING	1
PH-85-014-002	INSPECT NOT PERFORMD	ERT/OGC	12/14/85	.F.	/ /		/ /	INSPECTION	1
PH-85-018-001	AUDIT FINDS WITHHELD	ERT	07/10/85	.F.	/ /		07/10/85	QA	1
PH-85-022-001	ORIFICE PLATES ERROR	NSRS	12/17/85	.T.	/ /		/ /	DESIGN	1
PH-85-038-001	OE PROCEDURE REVISIO	NSRS	12/17/85	.T.	/ /		12/17/85	DESIGN	1
PH-85-042-001	INADEQ USE OF BOLTS	NSRS	01/06/86	.F.	/ /		/ /	DESIGN	1
WI-85-003-001	FALSE WELD CERTF CRD	ERT	10/24/85	.T.	/ /		/ /	WELDING	1
WI-85-003-X02	WELDER CERT CARD FAL	ERT/OGC	10/24/85	.T.	/ /		/ /	WELDING	1
WI-85-013-003	INSPECT THRU PAINT	ERT	11/06/85	.T.	/ /		/ /	WELDING	1
WI-85-016-001	PROCEDURE VIOLATIONS	ERT	11/01/85	.F.	/ /		/ /	CIVIL	1
WI-85-035-007	UNCERTIFIED WELDER	ERT	01/24/86	.F.	/ /		01/24/86	WELDING	1
WI-85-040-001	VOID/WI-85-040-006	NSRS	11/19/85	.F.	/ /		/ /	MECHANICAL	1
WI-85-040-002	INADQ PROC/INSP PLAN	NSRS	11/19/85	.F.	/ /		/ /	MECHANICAL	1
WI-85-041-001	WELD MAT INADEQUATE	ERT	11/27/85	.T.	/ /		/ /	WELDING	1
WI-85-053-003	IMPORP WELDING DOCUM	NSRS	11/14/85	.T.	12/31/85		/ /	WELDING	1
WI-85-053-006	TEST DIR NOT QUAL	NSRS	10/25/85	.F.	12/20/85	T	12/27/85	CONSTRUCTI	1
WI-85-053-007	ORIG DOCUMENT LOST	NSRS	01/06/86	.F.	/ /		/ /	DOCUMENT	1
WI-85-054-003	DRAINS PLUGGED UP	NSRS	11/22/85	.F.	/ /		11/27/85	MECHANICAL	1
WI-85-055-001	WELDER RECERTIFICATI	ERT	09/24/85	.T.	/ /		10/02/85	WELDING	1
WI-85-056-001	NOT FOLLOW CODE REQU	ERT	09/24/85	.T.	/ /		10/02/85	WELDING	1
WI-85-065-001	INADQ INSTAL HANGERS	NSRS	01/08/86	.T.	/ /		01/10/86	HANGERS	1
WI-85-084-001	WELDER CERTIFICATION	ERT	11/12/85	.T.	01/17/86		/ /	WELDING	1
XX-85-001-001	SQN/D-G BATTERIES	NSRS	11/18/85	.T.	12/30/85		/ /	QA	1
XX-85-007-002	SQN/LEAK DUE TO MGMT	NSRS	12/13/85	.F.	/ /		12/13/85	OPERATIONS	1
XX-85-009-002	SQN/PERSONAL SAFETY	NSRS	12/20/85	.F.	/ /		12/27/85	OPERATIONS	1
XX-85-013-001	SQN/WRONG WELD ROD	ERT	08/22/85	.F.	/ /		08/27/85	WELDING	1
XX-85-019-001	BLN/AUDIT FINDINGS	ERT	07/10/85	.F.	/ /		07/10/85	QA	1
XX-85-020-001	SQN/ECNS APPLICABILI	NSRS	11/19/85	.F.	/ /		11/19/85	OPERATIONS	1

TVA EMPLOYEE CONCERN PROGRAM
WATTS BAR NUCLEAR PLANT
NUCLEAR REGULATORY COMMISSION LISTING

QTC_NUMBER	SUBJECT	INVEST ORG	DATE REPORT	SUB?	DATE RESPONSE	ACC?	DATE INVEST CLOSED	KEY WORD	#
XX-85-028-001	SQN/INCREASE IN RWP	ERT	11/22/85	.F.	01/21/86		/ /	OPERATIONS	1
XX-85-028-X02	SQN/FALSFIFED SIGNAT	NSRS	12/26/85	.T.	01/17/86	T	01/30/86	QA	1
XX-85-028-X03	SQN/RADIA WORK PERMI	NSRS	12/26/85	.T.	01/17/86	T	01/30/86	QA	1
XX-85-033-006	SQN/FOREMAN MATERIAL	NSRS	12/09/85	.F.	/ /		12/10/85	MATERIAL	1
XX-85-038-001	SQN/SEP OF CARBON/SS	ERT	10/10/85	.T.	01/17/86		/ /	MATERIAL	1
XX-85-041-001	SQN/WRONG TYPE ROD	NSRS	01/02/86	.F.	01/18/86		01/03/86	WELDING	1
XX-85-046-001	SQN/INST SENSING LIN	NSRS	12/24/85	.T.	/ /		/ /	INSTRUMENT	1
XX-85-051-001	SQN/RADIATION MONITO	NSRS	11/26/85	.T.	/ /		/ /	OPERATIONS	1
XX-85-052-001	SQN/INADQ DESIGN DOO	NSRS	11/26/85	.T.	/ /		/ /	DESIGN	1
XX-85-054-001	SQN/VIOLAT SIGN-OFFS	NSRS	11/26/85	.F.	/ /		11/29/85	WELDING	1
XX-85-062-002	BFN/BLN/INADQ FILING	NSRS	12/26/85	.T.	01/17/86		/ /	DOCUMENT	1
XX-85-065-001	SQN/IMPROPER INSPECT	NSRS	12/09/85	.F.	/ /		12/10/85	WELDING	1
XX-85-068-007	SQN/REPLAC SPOOL PIE	NSRS	12/09/85	.F.	/ /		12/10/85	QA	1
XX-85-070-007	SQN/DESIGN DRAWINGS	NSRS	12/20/85	.T.	/ /		12/24/85	HANGERS	1
XX-85-083-001	SQN/WELD INSPECTIONS	NSRS	12/12/85	.F.	/ /		12/13/85	WELDING	1
XX-85-086-003	SQN/DESIGN DEFICIENC	NSRS	11/29/85	.T.	01/27/86		/ /	WELDING	1
XX-85-087-001	SQN/CONTAINMENT COAT	NSRS	01/22/86	.T.	/ /		/ /	OPERATIONS	1
XX-85-093-001	SQN/INADQ TRAIN ENGI	NSRS	12/09/85	.F.	/ /		/ /	OPERATIONS	1
XX-85-093-003	BFN/INADQ TRAIN ENGI	NSRS	11/29/85	.F.	/ /		/ /	OPERATIONS	1
XX-85-096-005	SQN/MONITOR TUBE PRO	NSRS	11/26/85	.T.	/ /		11/29/85	OPERATIONS	1
XX-85-098-002	SQN/RADIATION AREAS	NSRS	12/09/85	.F.	/ /		12/10/85	OPERATIONS	1
XX-85-099-001	SQN/SECURITY AT PLAN	NSRS	12/09/85	.F.	/ /		12/10/85	OPERATIONS	1
XX-85-101-004	SQN/MIN. RADIAT EXPO	NSRS	12/27/85	.T.	01/17/86		/ /	OPERATIONS	1
XX-85-102-011	SQN/DEFECTS ID BY MA	NSRS	12/11/85	.F.	/ /		12/11/85	WELDING	1
XX-85-108-001	SQN/RMS NEVER INSP	NSRS	12/20/85	.F.	/ /		12/27/85	WELDING	1
XX-85-108-002	SQN/WELD INSP PROCES	NSRS	12/20/85	.F.	/ /		12/27/85	WELDING	1
XX-85-120-002	SQN/QA PROCEDURE	NSRS	01/02/86	.T.	/ /		01/03/86	MATERIAL	1
XX-85-122-020	SQN/NUREG 0700	NSRS	01/27/86	.T.	/ /		/ /	DESIGN	1
IN-85-316-006	PLANT UNCLEAN	NSRS	01/21/86	.F.			01/24/86	CONSTRUCTI	

TENNESSEE VALLEY AUTHORITY
WATTS BAR EMPLOYEE CONCERN PROGRAM
NUCLEAR REGULATORY COMMISSION
WEEKLY K-FORM LISTING

QTC NUMBER	SUBJECT	KEY WORD	KEY WORD	MAY 16 LETTER	#
BEP-5-001-001	BLN/REQUIRED INSPECT	INSPECTION	INSPECTORS	- -	1
BEP-5-001-003	BLN/INSPECTION RECOR	QA	DOCUMENT	- -	1
EX-85-057-002	SECURITY	SECURITY	BREACH	- -	1
EX-85-093-001	WELDING INSPECTORS	WELDING	INSPECTORS	- -	1
IN-85-008-004	IMP INSTAL CONDUIT	ELECTRICAL	CONDUIT	- -	1
IN-85-181-002	FIER BARRIER	ELECTRICAL	TRAYS	- -	1
IN-85-245-006	INCORP CHANGES	DESIGN	CONTROL	- -	1
IN-85-294-003	CONTRO SUBSTANCES	OPERATION	CONTROL	- -	1
IN-85-410-007	CRAFT WORK	CONSTRUCT	CONTROL	- -	1
IN-85-410-011	PATCH/CHIP CONCRETE	CONSTRUCT	CONTROL	- -	1
IN-85-545-X09	CODE REQUIREMENTS	WELDING	CODE	- -	1
IN-85-864-001	MINIMUM BEND RADIUS	ELECTRICAL	CABLES	- X -	1
IN-85-866-002	PIPING SYSTEM	WELDING	TESTING	- -	1
IN-85-868-001	CONTRACT ITEMS	WELDING	VENDOR	- X -	1
IN-85-868-002	WELD SAMPLE	WELDING	INSPECTION	- -	1
IN-85-868-003	MIXED CONNECTOR	MECHANICAL	PIPING	- -	1
IN-85-868-004	WEAKENED STRUCTURE	CIVIL	REBOR	- -	1
IN-85-887-001	WELD SAMPLING PROGRA	WELDING	INSPECTION	- -	1
IN-85-887-002	NCR DISPOSITION	QA	EFFECT	- -	1
IN-85-887-003	SURVELLIANCE PROGRAM	WELDING	INSPECTION	- -	1
IN-85-940-X02	PHYSICAL IMPAIRMENT	WELDING	WELDERS	- -	1
IN-85-940-X04	WELD CERTIFICATION	WELDING	WELDERS	- -	1
IN-85-947-005	WELD ROD BRANDS	WELDING	ROD	- X -	1
IN-85-962-001	DAMAGED INSTRUMENTS	CONSTRUCTI	CONTROL	- -	1
IN-85-962-002	INSTRUMENTS DOCUMENT	CONSTRUCTI	CONTROL	- -	1
IN-85-962-003	EQUIP CONNIBALIZED	CONSTRUCTI	CONTROL	- -	1
IN-85-993-001	QUALITY DOCU CLOS	QA	EFFECT	- -	1
IN-85-993-002	WRONG SIZE CRIMPING	ELECTRICAL	TERMINAL	- -	1
IN-85-993-005	INSP REQ ELE LUGS	ELECTRICAL	TERMINAL	- -	1
IN-85-993-006	ELE INSP SHEETS	ELECTRICAL	CABLES	- X -	1
IN-85-993-007	REVIEW DOCUMENTATION	QA	DOCUMENT	- X -	1
IN-85-993-X04	AS-BUILD DRAWINGS	DOCUMENT	CONTROL	- -	1
IN-86-261-002	FCR/ECN NOT BEING PE	CONSTRUCTI	CONTROL	- -	1
IN-86-266-001	CABLE PULLING	ELECTRICAL	CABLES	- X -	1
IN-86-266-002	FUSE LINKS	ELECTRICAL	CABLES	- X -	1
IN-86-266-003	OVERLOADED CONDUITS	ELECTRICAL	CABLES	- X -	1
IN-86-266-004	SPLICED CABLES	ELECTRICAL	INSTALL	- X -	1
IN-86-266-006	CABL PULL 90 DEG BEN	ELECTRICAL	CABLES	- X -	1
IN-86-288-001	PROGRAMMATIC PROBLEM	CONSTRUCTI	TESTING	- -	1
IN-86-288-002	PRESSURE TEST	CONSTRUCTI	TESTING	- -	1
IN-86-311-001	BELLOW INSTALLATION	QA	DOCUMENT	- -	1
IN-86-314-001	CABLE PULLING	ELECTRICAL	CABLES	- X -	1
IN-86-314-003	CABLE TERMINATION	CONSTRUCT	TESTING	- -	1
IN-86-314-005	CABLE SPLICING	ELECTRICAL	CABLES	- -	1
OW-85-001-001	BLACK/VEATCH REPORT	ELECTRICAL	CABLES	- X -	1
OW-85-001-002	DIFFER OPINION	DESIGN	CODES	- -	1
OW-85-001-003	LOGIC CONNECT WIRE	ELECTRICAL	INSTALL	- -	1
PH-85-035-005	G-PROCEDURE	CONSTRUCTI	CONTROL	- -	1

TENNESSEE VALLEY AUTHORITY
WATTS BAR EMPLOYEE CONCERN PROGRAM
NUCLEAR REGULATORY COMMISSION
WEEKLY K-FORM LISTING

QTC NUMBER	SUBJECT	KEY WORD	KEY WORD	MAY 16 LETTER	#
PH-85-035-006	QUALITY OF MATERIAL	MATERIAL	CONTROL	- -	1
SQM-6-002-001	SQN/CONT DOCU RET SY	QA	DOCUMENT	- -	1
SQM-6-002-002	SQN/QUALITY PROBLEM	QA	EFFECT	- X -	1
SQM-6-002-003	SQN/SCHEDULED ASSIGN	QA	EFFECT	- -	1
SQM-6-002-004	SQN/C/A	QA	EFFECT	- X -	1
SQM-6-002-005	SQN/CONTROLLED DOCUM	QA	DOCUMENTS	- X -	1
SQM-6-002-006	SQN/DOCUMENTATION	QA	DOCUMENT	- -	1
SQM-6-003-001	SQN/ISSUED DOCUMENTS	QA	DOCUMENTS	- -	1
SQM-6-003-002	SQN/CONFLICT DATA	QA	DOCUMENT	- -	1
SQM-6-003-003	SQN/DOCUMENTS ALTERE	QA	DOCUMENT	- -	1
SQM-6-003-004	SQN/FALSI DOCUMENTS	QA	DOCUMENTS	- -	1
SQM-6-003-005	SQN/CHANGE WORK	QA	EFFECT	- -	1
SQM-6-003-006	SQN/"COVERUP"	QA	EFFECT	- -	1
SQM-6-005-001	WELDING TEST	WELDING	WELDERS	- -	1
SQM-6-005-X02	WELD CERT TEST REC	WELDING	WELDERS	- -	1
SQP-5-004-002	SQN/CONFG ELE EQUIP	OPERATIONS	CONTROL	- -	1
SQP-5-004-003	SQN/SCRAP MATERIAL	MATERIAL	CONTROL	- X -	1
SQP-5-004-004	SQN/VIOLATION PROCD	QA	VIOLATION	- -	1
SQP-5-005-002	SQN/OLD HOLES	CIVIL	ANCHORS	- -	1
SQP-5-005-005	SQN/INST CONDT/CABL	CIVIL	ANCHORS	- -	1
SQP-6-003-001	SQN/RAD MONITOR CABL	ELECTRICAL	INSTALL	- X -	1
SQP-6-003-003	SQN/CONDUIT REROUTED	OPERATION	CONTROL	- -	1
WBM-6-002-001	PIPE SUPPORT	HANGER	DESIGN	- -	1
WBM-6-004-001	NPS/QC PERSONNEL	QA	EFFECT	- X -	1
WBM-6-004-002	NPS/QC PROGRAM	QA	EFFECT	- X -	1
WBM-6-004-004	PROGRAM/LETTER RELIE	QA	EFFECT	- X -	1
WBM-6-004-005	NPS/REPORT NRC	QA	EFFECT	- X -	1
WBM-6-004-007	NUC QUAL ASSU MANUAL	QA	EFFECT	- X -	1
WBM-6-004-X08	FALSIFICATION	WELDING	INSPECTION	- -	1
WI-85-040-006	NCR/CEMENT MORTAR	CIVIL	CONCRETE	- X -	1
WI-85-066-001	QUALITY OF WORK	QA	EFFECT	- -	1
WI-85-066-002	PROCEDUARAL REQUIREM	QA	EFFECT	- -	1
XX-85-049-001	SQN/WELDER CERTIFICA	WELDING	WELDERS	- -	1
XX-85-085-002	BLN/MANAGEMENT TECH	QA	EFFECT	- X -	1
XX-85-088-002	CORRECTION FLUID	QA	DOCUMENT	- -	1
XX-85-088-003	SQN/CORRECTION FLUID	WELDING	DOCUMENTS	- -	1
XX-85-095-001	BLN/INSPECTION REPOR	QA	DOCUMENT	- -	1
XX-85-097-001	BLN/SUPPORT HANGERS	CIVIL	EMBED	- -	1
XX-85-120-006	SQN/HANGER INSTALLAT	CONSTRUCTI	CONTROL	- -	1
*** Total ***					87

TVA 64 (05-9-85) (OP-WP-5-85)

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO: W. T. Cottle, Site Director, Watts Bar Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: JAN 30 1986

SUBJECT: CORRECTIVE ACTION RESPONSE EVALUATION

REPORT NO. : I-85-514-SQN

SUBJECT : RADIATION WORK PERMITS

CONCERN NO.: XX-85-028-X02; -X03

(X) ACCEPT ( ) REJECT

K. W. Whitt

DJH:JTH

cc (Attachment):

R. P. Denise, LP6N40A-C
R. J. Griffin, SQN E-18
G. B. Kirk, SQN
D. R. Nichols, E10A14C-K
QTC/ERT, CONST-WBN
H. S. Sanger, Jr., E11B33C-K
E. K. Siiger, LP6N48A
J. H. Sullivan, SQN

Principally prepared by D. J. Hornstra.

0351U

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

TVA 64 (03-6-69)

UNITED STATES GOVERNMENT

Memorandum

XX-85-028-X02

TENNESSEE VALLEY AUTHORITY

TO : K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

FROM : H. L. Abercrombie, Site Director, NUC PR, Sequoyah Nuclear Plant

DATE : January 16, 1986

SUBJECT: NUCLEAR SAFETY REVIEW STAFF (NSRS) INVESTIGATION REPORT NO. I-85-514-SQN, "RADIATION WORK PERMITS"

Reference: Your memorandum to me dated December 27, 1985, "Nuclear Safety Review Staff Investigation Report Transmittal"

Attached is cur response to NSRS Report No. I-85-514-SQN.

H. L. Abercrombie

PRW:GBK:RCB:DR
Attachment
cc (Attachments):
Employee Concern Files, RES, Sequoyah

1/22/86--JTH
cc (Attachment):
D. J. Hornstra, SQN--For evaluation.

JAN 17

MAN

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

NUCLEAR SAFETY REVIEW STAFF
REPORT NO. I-85-514-SQN

NSRS Report No. I-85-514-SQN

A Nuclear Safety Review Staff (NSRS) investigation was conducted to determine the validity of two expressed concerns received by Quality Technology Company (QTC)/Employee Response Team (ERT). The concerns of record, as summarized on the Employee Concern Assignment Request Forms from QTC and identified as XX-85-028-X02 and XX-85-028-X03, stated the following:

XX-85-028-X02

"Sequoyah Radiation Work Permit 02-2-00214 (Sign-In Sheet) contains falsified signatures."

XX-85-028-X03

"Sequoyah Radiation Work Permits are not being completed per procedure requirements. Radiation Work Permit 02-2-00214 is an example."

Conclusions/Recommendations

A. Concern XX-85-028-X03 was substantiated in that all data entries on the first sign-in sheet of RWP 02-2-00214 Timesheet 0002 (1984) were apparently made by one individual (a transcription copy) without traceability to the original documentation. This transcription copy was found to be an improper correction of quality assurance records.

Concern XX-85-028-X02 was not substantiated. Since signatures of workers were not specifically required by HPSIL-7 (which stated should, not shall), the transfer of information between timesheets (including what appears to be a signature) was considered to be a transcription.

B. I-85-514-SQN-01 - Revision to HPSIL-7 to Define Worker Signature Transfer Requirements

The RWPs provide a unique opportunity for incorrect entries which may not be discovered until after the worker is no longer available to correct his documentation. Although the NQAM and AI-7 provide overall guidance on the correction of quality assurance records, HPSIL-7 provides no additional guidance on correction of RWP entries. Corrections have been made to the RWPs (see III.B.2,3) without any traceability to the original documentation. Thus, it cannot be conclusively demonstrated that the employees had made the data entries as required by HPSIL-7.

Recommendation

HPSIL-7 should be revised to clearly define the requirements for transcription of information between RWPs. (P2)

Sequoyah Nuclear Plant Response to I-85-514-SQN-01

Health Physics Section Instruction Letter (HPSIL)-7 will be revised to clearly define the requirements for transcription of information between RWPs. The revision will be completed by February 28, 1986.

TVA 64 (OS-9-65) (OP-WP-5-85)

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO: W. T. Cottle, Site Director, Watts Bar Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: JAN 30 1986

SUBJECT: CORRECTIVE ACTION RESPONSE EVALUATION

REPORT NO. : I-85-294-WBN

SUBJECT : WORKPLANS NOT FOLLOWED

CONCERN NO.: IN-85-142-003

(X) ACCEPT ( ) REJECT

K. W. Whitt

JBR:JTH
cc (Attachment):
R. P. Denise, LP6N40A-C
D. R. Nichols, E10A14C-K
QTC/ERT, CONST-WBN
E. K. Sliger, LP6N48A

Principally prepared by John B. Rollins.

350U

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

Response to Recommendation I-85-294-WBN-01

In response to recommendation to I-85-294-WBN-01, AI-8.5 will be revised to identify the proper sequence of steps by February 28, 1986. AI-8.8 was revised and Plant Operations Review Committee (PORC) approved on January 17, 1986, to read, "Unless Otherwise Specified, the sequence of steps shall be followed."

In addition the Instrument Maintenance Section has written WB-DR-86-5R to evaluate the work performed to ensure that quality was not compromised.

Principally prepared by R. R. Gibbs.

TVA 64 (OS-9-65) (OP-WP-5-85)

NRC

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO: H. L. Abercrombie, Site Director, Sequoyah Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: JAN 24 1986

SUBJECT: NUCLEAR SAFETY REVIEW STAFF INVESTIGATION REPORT TRANSMITTAL

Transmitted herein is NSRS Report No. I-85-812-SQN

Subject CONTAINMENT PROTECTIVE COATING REPAIR

Concern No. XX-85-087-001

and associated prioritized recommendations for your action/disposition.

It is requested that you respond to this report and the attached Priority 1 [P1] and 2 [P2] recommendation by February 21, 1986. The Priority 3 [P3] recommendations will be looked at for corrective action follow through by April 1, 1986. No response is required for [P3] items. Should you have any questions, please contact R. C. Sauer at telephone 2277.

Recommend Reportability Determination: Yes X No ___

Director, NSRS/Designee

RCS:JTH
Attachment
cc (Attachment):
R. P. Denise, LP6N35A-C
R. J. Griffin, SQN E-18
G. B. Kirk, SQN
D. R. Nichols, E10A14 C-K
QTC/ERT, Watts Bar Nuclear Plant
Eric Sliger, LP6N48A-C
J. H. Sullivan, SQN

312U

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TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

NSRS INVESTIGATION REPORT NO. I-85-812-SQN

EMPLOYEE CONCERN: XX-85-087-001

SUBJECT: CONTAINMENT PROTECTIVE COATING REPAIR

DATES OF INVESTIGATION: NOVEMBER 26 - DECEMBER 16, 1985

LEAD INVESTIGATOR: C. E. Chmielewski — C. E. CHMIELEWSKI — 1-16-86 DATE

INVESTIGATOR: L. E. Brock — L. E. BROCK — 1/16/86 DATE

REVIEWED BY: MW Alexander — M. W. ALEXANDER — 1/16/86 DATE

APPROVED BY: R.C. Sauer — R. C. SAUER — 1/22/86 DATE

I. BACKGROUND

A Nuclear Safety Review Staff (NSRS) investigation was conducted to determine the validity of an expressed employee concern as received by the Quality Technology Company (QTC)/Employee Response Team (ERT). The concern of record, as summarized on the Employee Concern Assignment Request Form from QTC and identified as XX-85-087-001, stated:

> Containment paint coatings (#295 and #305) are not properly maintained. The integrity of the coatings is being eroded and questionable. CI is concerned that the paint will curl and pop-up and clog the drains in case of a (LOCA) accident when the temperature and pressure builds up in the reactor. Paint specifications and standards are not followed, especially in recoating of #305. NUC POWER concern.

Further information was requested from the ERT follow-up group regarding the nature of the alleged deficiencies, their location, and the group(s) performing the work. QTC relayed that the concerned individual (CI) indicated the deficient work was related to coating repair, as opposed to initial installation or modification work. The CI also indicated that the improper work was done in coating repair of the containment main floor concrete at the 734' elevation near the crane rails and involved inadequate cleaning between the surfacer coat and the epoxy top coat.

During the early stages of the investigation, another concern related to containment coating was identified to the investigators. This concern was that the initial application of inorganic zinc primer coat on the containment liner (steel) was not applied properly and that excessive thickness of the primer is resulting in delamination of the phenoline top coat. This concern was relayed to NSRS management, and the investigators were instructed to include this concern within the scope of the investigation of XX-85-087-001.

II. SCOPE

A. The scope of the investigation of the concrete coating maintenance and repair is defined by the stated concern of record. This required a determination of the adequacy of coating repairs to concrete performed by the plant organization, evaluation of the safety significance of any deficiencies found, and determination of the adequacy of the plant program for coating system maintenance.

B. To investigate the concrete coating maintenance and repair concerns, the following actions were taken:

1. A document search of the maintenance request (MR) files was performed for work on system No. 364 (the coating system). MRs for coating work were retrieved and reviewed to determine any major coating repairs to concrete which have been performed inside containment of both units 1 and 2.

2. General inspections of the containment coating for both units were performed by a plant electrical maintenance engineer with the assistance of a mechanical engineer from the Chattanooga offices and/or certified coating specialists from the Office of Engineering in Knoxville. One or both investigators joined in during many of these inspections. Inspection results were discussed with the plant engineer and coating specialists from Chattanooga and Knoxville.

3. Periodic maintenance procedures, schedules, and plans were investigated and discussed with maintenance personnel.

4. Training and qualification activities for coating applicators (painters) and coating inspectors were discussed with personnel responsible to assure persons involved with coating work are aware of requirements.

5. Coating activities were discussed with several painters and inspectors chosen from MR records as those performing coating repair work in containment.

C. The scope of the investigation of the initial application of inorganic zinc primer to the steel containment liners included evaluation of actions taken to correct construction deficiencies reported in 1977, determination of the present condition of the liner coating, and evaluation of the present containment liner condition.

D. To investigate the concern regarding the initial application of inorganic zinc primer to the containment liners, the following actions were taken:

1. Disposition of Sequoyah construction NCR Nos. 298 and 299 (Ref. 17) was discussed with OC and OE personnel.

2. Construction records were reviewed to determine if further coating work and inspection took place after these nonconformances were written.

3. General inspections of the containment liner were performed in conjunction with those described under II.B.2 above. Results of these inspections were also discussed with the plant engineer and the coating specialists from Chattanooga and Knoxville.

SUMMARY OF FINDINGS

A. Requirements and Commitments

1. Sequoyah Final Safety Analysis Report, subsection 3.8.2.2.2 (Ref. 11), and Design Criteria SQN-DC-V-2.9, paragraph 3.3.2 (Ref. 5), require the coating inside containment to be able to withstand a design basis accident (DBA) without failure in the form of appreciable "delamination, peeling, flaking or other removal of coating materials from the substrate."

2. Construction specifications applicable to the initial coating system installation (Refs. 4, 6, 7, and 8) specify technical and quality requirements for coating work. These include:

   a. Carbozinc II primer dry film thickness 2.5 to 5.0 mils (Ref. 4, appendix A, sheet 1).

   b. Phenoline 305 second coat dry film thickness 4.0 to 6.0 mils for both concrete and steel (Ref. 4, appendix A, sheets 2 and 6).

   c. Adhesion tests at a rate of five dollies per 1000 ft^2 (Ref. 7, paragraph 5.4.2).

   d. Wet film gauge measurement of coatings other than inorganic zinc to help assure that the dry film thickness is satisfactory and dry film measurement with a "Tooke" gauge for nonferrous substrates or magnetic gauges for ferrous substrates (Ref. 7, paragraph 4.5).

3. The TVA response to NRC question 6.28 concerning the FSAR (Ref. 10) indicates surface coatings in containment "will meet the requirements of AEC Regulatory Guide 1.54." Additionally, FSAR subsection 6.2.1.6 indicates that TVA agrees with Regulatory Guide 1.54 except the endorsement of ANSI N101.4 but that "applicable provisions found in ANSI N101.4 have been incorporated into TVA surface preparation, coating application/inspection specifications, and coating QA procedures." It is further stated that "TVA's protective coating application program within the containment is in conformance with Appendix B to 10 CFR 50 and ANSI N45.2."

4. Regulatory Guide 1.33, Revision 2, endorses ANSI N18.7-1976 as an acceptable standard for meeting the quality assurance requirements of 10 CFR 50, Appendix B, during operations.

5. The TVA Quality Assurance Topical Report, TVA-TR75-1A, commits TVA to meet Regulatory Guide 1.33, Revision 2. As a result, ANSI N18.7-1976 is the principal standard TVA must meet in establishing administrative controls and quality assurance requirements for operations.

6. ANSI N18.7-1976, Section 5.2.7, requires that plant maintenance and modifications be conducted in a manner which ensure "quality at least equivalent to that specified in original design bases and requirements, materials specifications, and inspection requirements."

7. Design Criteria SQN-DC-V-2.9, Section 4.4, state that "it is not expected that coating systems and their component materials will be sufficiently durable as to require no maintenance during the life of the plant." Visual inspections during refueling or other outage periods and repair of localized damage or deterioration is required.

B. Findings

1. A search of maintenance request (MR) files and discussions with both line and QC personnel indicate few large-area coating repairs have been performed on concrete in containment since the Sequoyah units have been operational. The repairs found are associated with unit 2 and include the 734' elevation floor in 1982 (MR#A-025030), the wall near the equipment hatch in 1982 (MR#169261), and the 680' elevation raceway in 1985 (MR#A-547783).

2. General inspection of areas that have been repaired disclosed cracks in the coating near the unit 2 manipulator crane rails at the 734' elevation. A coating specialist indicated his opinion that these were caused by excessive coating thickness but that the coating had adequate adhesion to concrete and, considering the location and relatively small surface area involved, the cracking did not represent a significant safety concern. The investigators found that the design criteria (Ref. 5, section 3.2) indicate that minor failures and localized damage are expected to occur during plant life and are not of safety concern provided large areas of delamination, peeling, or flaking do not occur.

3. Review of records and discussion with personnel indicated that the film thicknesses of concrete coatings applied during maintenance or repair are not being measured neither with wet film gauges during application to enhance the chances for adequate dry film thickness, nor after curing to confirm dry film thickness. Additionally, adhesion tests are not being performed for repairs of large areas. The plant instruction (Ref. 9) for both coating application and inspection contains little detail regarding these inspections.

4. The general inspections of containment for both units indicated that the coatings on concrete were adhering well with a few exceptions but had been subject to mechanical damage and traffic wear in significant areas as follows:

   a. The floor coating inside the crane wall at the 680' elevation of unit 1 has numerous areas of damage and cracking of the floor coating with some water damage causing delamination in areas of the mechanical damage. The coating specialists and the Chattanooga mechanical engineer estimate as much as 80-90 percent or more of this floor area may require repair making complete recoating the practical repair method.

   b. Inside the crane wall at the 680' elevation of unit 2 has similar but less extensive floor coating damage than that of unit 1. The damaged areas are estimated to be as much as 20 percent of the floor area, and the coating specialists and mechanical engineer recommend spot repairs.

   c. The floor of unit 1 at the 734' elevation, particularly near the equipment hatch, has numerous areas of mechanical damage but no detected delamination. The same location on unit 2 has less damage than unit 1 but does, nonetheless, have similar damage.

   d. Some unit 1 wall areas between the 734' and 796' elevations have cracks, places where duct tape was coated over, and localized blistering. These were not large areas requiring extensive repair. Unit 2 did not exhibit similar problems.

5. The need for periodic maintenance of coating was recognized by the plant electrical maintenance organization before investigation of this concern was initiated. This is evidenced by the recoating of the unit 2 raceway floor and the development of preventive maintenance routines which are being drafted at present. However, until they are completed, no formalized periodic inspection and maintenance program for protective coating, including coating inside containment, exists.

6. Review of the nonconformance reports written in 1977 by the construction organization for the containment steel liner and polar crane coating (Ref. 17) determined that the original coating was too thin. OE and OC personnel indicated that this coating work was either redone or reinspected and found acceptable. Review of construction records resulted in identification of extensive carbozinc II coating between June 1977 and August 1979. This work took place after the nonconformance report was written indicating the contractor had completed work and left the site.

7. General inspections of the steel containment liner for both units indicated the following:

   a. Extensive delamination is occurring to the phenoline 305 top coat (Phenoline 295 is the base coat) at the 797' elevation of unit 1 above the ice condenser top deck doors. Similar delamination is not occurring on unit 2 except for a few small areas.

   b. Delamination of the top coat is occurring in the vicinity of the unit 2 equipment hatch.

   c. The coating specialists and mechanical engineer attribute the delamination to lack of cohesion in the zinc primer due to dry spray application and excessive primer coating film thickness. Soft spongy carbozinc with film thicknesses of 8 to 12 mils or more was found at the delamination sites. General measurements of total film thickness of the liner coating at other locations indicate a number of areas where total film thickness requirements are exceeded.

8. Review of construction records identified a large number of records of the carbozinc coating of the unit 1 liner above the 797' elevation. These records show a number of different painters and a number of different inspectors were involved in the work with acceptable film thickness documented.

9. Painters are being certified annually by performance of sample coating of a steel test panel with complex geometrics and a concrete test panel. The qualification program is not governed by any approved plant instructions but is being maintained.

10. The coating inspector qualification program relies heavily upon the job training and signoff of a large number of practical factors which was begun in October 1985. Training at the POTC for about four days is also available and has been provided to coating inspectors. The qualification program is procedurally controlled by the NQAM (Ref. 18) which is implemented directly without a plant level instruction.

11. During general inspections, small areas of damage to the corners of the containment sump screens at the 680' elevation of both units were found. Although the damage seems minor, it could allow particles larger than 1/4 inch to pass. Because of the critical nature of the particle size (Ref. 10), the investigators will initiate a plant maintenance request to have the screen repaired.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

1. The concern that concrete coating repairs inside containment have not been performed in accordance with required standards resulting in degradation of the coating with safety consequences could not be substantiated. Little repair of concrete coating in containment has taken place since the plant began operating. Deficiencies found in the coating repair do not appear to have resulted in loss of adhesion, and design documents indicate localized deterioration of the coating does not affect safety provided large areas of delamination, peeling, or flaking do not occur.

2. The concern that the coating inside containment is not being properly maintained and could result in safety consequences was substantiated. The need for maintenance has been recognized by the responsible plant maintenance personnel, and a preventive maintenance program was under development at the time this investigation began. However, the periodic maintenance program is not complete or formalized and some areas of extensive coating degradation exist inside the containments of both units. The damage of coating on concrete appears to be the result of traffic related mechanical wear and water seepage into these damaged areas.

3. Wet film in process checks and dry film thickness measurements of large-area coating repairs to concrete are not being performed by QC inspectors as required by standards and specifications. Adhesion tests of large-area coating repairs to concrete and the steel liner are not being performed. A lack of detail in Maintenance Instruction MI 10.14 appears to be contributing to these conditions.

4. The concern that the initial application of inorganic zinc primer to the containment liners was not applied properly was in part substantiated. Although construction records show that extensive rework of deficient areas was performed during construction, general inspection revealed that significant areas of excessive carbozinc II primer film thickness exist which have the phenoline 305 top coat delaminating. This is most severe in unit 1 above the ice condenser top deck doors and in unit 2 near the equipment hatch. The mechanical engineer and the coating specialists indicate this condition is caused by an excessive carbozinc primer thickness and apparent dry spray application. The exact cause of the excessive film thickness could not be determined since construction records show numerous inspections of the work with satisfactory results.

5. Qualification programs are in place for both painters and QC inspectors. The painter qualification program is not procedurally controlled by either plant instructions or higher-tier procedures.

B. Recommendations

1. I-85-812-SQN-01, Containment Coating Inspection and Repair

It is recommended that the site continue the efforts maintenance personnel have already begun to determine the condition of the coating system in containment and to repair damaged or deteriorated coating. Before reactor operation at power, the coating inside containment should either be restored to its specified state, or the damaged areas repaired with a modified coating system approved by OE, or safety evaluations are performed of the as-left state to verify no safety concern exists. The safety evaluations, if performed in lieu of repair, should address the effect on emergency core cooling system performance, updating, and taking into account the total existing coating previously identified as unqualified (Ref. 15) and also the effects of the deviation from FSAR commitments in terms of ALARA and accident recovery. The areas repaired or evaluated should include the following:

a. The lower containment floor inside the crane wall at the 680' elevation of both units.

b. The liner wall above the ice condenser top deck doors at the 797' elevation of unit 1 containment.

c. The liner wall in the vicinity of the equipment hatch above the 734' elevation of unit 2 containment.

d. The floor of both units at the 734' elevation.

e. Any other areas of significant size found to be damaged or subject to delamination as a result of further inspections or tests. [P1]

2. I-85-812-SQN-02, Adhesion Tests

It is recommended that the inspection of the liner coating presently underway in the containment of both units be expanded to include adhesion tests in locations found to have excessive total film thickness and in areas adjacent to delamination failures. [P1]

3. I-85-812-SQN-03, Preventive Maintenance Program

It is recommended that the plant maintenance staff continue development of a formalized preventive maintenance program for level I coating systems and that the program be given sufficient priority to assure it is in place before the next scheduled major outage of each unit following startup from the present shutdown. [P2]

4. I-85-812-SQN-04, Revision of MI-10.14

It is recommended that MI 10.14 be revised to:

a. Require wet film thickness measurements of all coating inside containment except carbozinc II as an in-process check.

b. Provide details of how and when dry film thickness measurements will be performed on nonferrous substrates consistent with reference 7.

c. Provide numerical guidelines for performance of adhesion tests at a rate consistent with reference 7.

d. Provide guidelines for masking adjacent areas to prevent overspray when large area repairs are being performed.

e. Provide guidelines for measurement of carbozinc primer film thickness and curing just prior to application of phenoline 305 top coat. [P2]

5. I-85-812-SQN-05, Coating Application Certification

It is recommended that the coating applicator certification program be formalized in an approved site instruction using appropriate standards for guidance. [P2]

6. I-85-812-SQN-06, Temporary Protection

It is suggested that the cost and feasibility of temporary protection of containment floors be investigated for areas of high traffic and likelihood of damage during refueling outages. [P3]

7. I-85-812-SQN-07, Use of Available Expertise

It is suggested that the plant maintenance and QC organizations make full use of the expertise available within Nuclear Services and QE to assure high quality workmanship, inspection, and procedures for the coating repairs inside containment. [P3]

DOCUMENTS REVIEWED IN INVESTIGATION I-85-812-SQN
AND REFERENCES

1. U.S. NRC Regulatory Guide 1.54, June 1973, "Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants"

2. ANSI N101.4-1972, "Quality Assurance for Protective Coatings Applied to Nuclear Facilities"

3. Sequoyah Nuclear Plant "Protective Coatings Maintenance and Repair Manual," no date, identification number, or revision number

4. Sequoyah Nuclear Plant Construction Specification No. N2A-931, "Special Protective Coating Systems Approved for Use in Coating Service Levels I and II and Corrosive Environments," Revision 1 dated August 28, 1984

5. Sequoyah Nuclear Plant Design Criteria SQN-DC-V-2.9, April 30, 1973, "Protective Coatings for the Interior of the Containment Vessel and Items Located Within the Containment Vessel"

6. TVA General Construction Specification G-14, Revision 3, dated August 29, 1984, "Selecting, Specifying, Applying, and Inspecting Paint and Coatings"

7. TVA General Construction Specification G-55, Revision 4, dated August 10, 1984, "Surface Preparation, Application, and Inspection of Special Protective Coatings for Nuclear Plants"

8. TVA General Construction Specification G-44, Revision 4, dated October 31, 1984, "Verification Testing of Paint and Coatings Products"

9. Sequoyah Nuclear Plant Maintenance Instruction MI-10.14, Revision 15, dated October 24, 1985, "Application Repair of Protective Coatings in the Reactor and Auxiliary Buildings"

10. Sequoyah Nuclear Plant Response to NRC Question 6.28 Concerning the FSAR dated January 31, 1975

11. Sequoyah Nuclear Plant Final Safety Analysis Report, updated May 1985, Subsections 3.8.2.2.2 and 6.2.1.6

12. U.S. NRC Regulatory Guide 1.33, Revision 2

13. ANSI N18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants"

14. American Society for Testing Materials Standard ASTM D4285-83, "Indicating Oil or Water in Compressed Air"

15. Office of Engineering Calculation titled "Guidelines for Control of Unqualified Coatings Inside Containment," Revision 1, RIMS No. 845 850508 221, dated May 7, 1985

16. Memorandum from T. A. Kontovich to J. B. Krell dated December 6, 1984, subject "Failure of Unit 2 Reactor Building Protective Coatings" (S53 841207 860)

17. Division of Construction Nonconformance Report Nos. 298 and 299 dated June 9, 1977 (SQN 790731 609 and SQN 790731 610)

18. TVA Nuclear Quality Assurance Manual, Part II, Section 5.3A, revised October 12, 1984, "Training and Certification Program for Quality Control Inspectors"

TVA 64 (OS-9-65) (OP-WP-5-85)

NTC

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO: S. Schum, QTC/ERT Program Manager, Watts Bar Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: JAN 24 1986

SUBJECT: TRANSMITTAL OF ACCEPTED FINAL REPORTS

The following final report has been reviewed and accepted by NSRS and is transmitted to you for preparation of employee responses.

I-85-774-WBN (IN-85-284-005)
(IN-86-303-002)
(IN-85-316-006)

for Bruce F. Sullen
K. W. Whitt

Please acknowledge receipt by signing below, copying and returning this form to J. T. Huffstetler, E3B37 C-K.

NAME _____ DATE _____

GDM
Attachments
cc (Attachments):
R. P. Denise, LP6N40A-C
W. T. Cottle, WBN
D. R. Nichols, E10A14C-K
Eric Sliger, LP6N48A-C

314U

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TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

NSRS INVESTIGATION REPORT NO. I-85-774-WBN

EMPLOYEE CONCERNS IN-85-284-005, IN-86-303-002, AND IN-85-316-006

MILESTONE 6

SUBJECT: PLANT CLEANLINESS

DATES OF INVESTIGATION: January 2-15, 1986

INVESTIGATOR: R. S. Cutshaw — Date: 1-21-86

REVIEWED BY: W. D. Stevens — Date: 1-21-86

APPROVED BY: M. A. Harrison — Date: 1-21-86

I. BACKGROUND

Three concerns were received by the Quality Technology Company (QTC) Employee Response Team that stated:

IN-85-284-005

Plant cleanliness is poor. Water is on the floors. Scaffolds are not cleaned off. dirt is on pipes & trash is not removed. This is a generic concern - Unit 1 & 2. Construction Dept. concern. CI has no further information.

IN-86-303-002

Housekeeping could be improved. There is very heavy dust in some areas. Construction Dept concern. CI has no additional information.

IN-85-316-006

Plant is filthy and has always been filthy. There are inadequate laborers on cleanup details. Laborers should vacuum. but instead use air hoses. This only blows the dust around. After the recent clean up effort while welders were furloughed. the plant was still dirty. and the laborers had blown a lot of dust into control panels and operational valves. CI has no further information. Const. Dept. concern.

II. SCOPE

A. Due to the similarity of the concerns of record (I above). it was determined that one investigation could adequately address the three concerns.

B. The scope of the investigative effort was defined by the concerns of record:

1. Determine if plant procedures adequately address the subject of plant cleanliness and housekeeping.

2. Perform a walkdown of the plant. and determine if cleanliness and housekeeping were of acceptable quality.

3. Interview cognizant maintenance personnel. and determine if dust or dirt had been a problem in regard to its effect on plant equipment.

III. SUMMARY OF FINDINGS

A. WBNP QCI-1.36, Revision 11, dated 9/27/85, did adequately address plant cleanliness and housekeeping of construction (nontransferred) areas.

B. WBNP Administrative Instruction 1.8, Revision 7, addresses adequately the responsibility, frequency, and documentation of housekeeping inspection: "The performance of housekeeping inspections may vary from section to section but shall not be less than twice a month."

C. Interviews of cognizant Mechanical Maintenance, Instrument Maintenance, Electrical Maintenance, and Power Systems Operations personnel revealed a concensus of opinion that:

1. Dust and dirt accumulations were not excessive for a construction/operations site.

2. Dust and dirt contamination had not recently affected critical or safety-related systems or instruments in a detrimental fashion. Previously identified problems had been addressed by routine or special cleaning (C.3. below).

3. As a standard practice, equipment and instruments were cleaned during maintenance and inspection activities or as a measure to specifically address dust contamination in some electrical systems..

D. A walkdown was performed of a random sample of Unit 1 and Unit 2 areas. Housekeeping and cleanliness were observed to be at an acceptable level.

IV. CONCLUSIONS AND RECOMMENDATIONS

<u>Conclusions</u>

The three similar concerns of record were not substantiated in that housekeeping and cleanliness in Units 1 and 2 were carried out in accordance with WBNP QCI-1.36 and met acceptable levels of cleanliness.

<u>Recommendations</u>

None.

TVA 64 (OS-9-65) (OP-WP-5-85)

NRC

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO: W. T. Cottle, Site Director, Watts Bar Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: JAN 24 1986

SUBJECT: NUCLEAR SAFETY REVIEW STAFF INVESTIGATION REPORT TRANSMITTAL

Transmitted herein is NSRS Report No. I-85-193-WBN

Subject HIGH-DENSITY SPENT FUEL STORAGE RACKS

Concern No. IN-85-457-002

and associated recommendations for your action/disposition.

It is requested that you respond to this report and the attached recommendations by February 21, 1986. Should you have any questions, please contact J. D. Gilbreath at telephone 3655-WBN.

Recommend Reportability Determination: Yes X No ____

Bruce A. Scalsin
for Director, NSRS/Designee

JDG:GDM
Attachment
cc (Attachment):
R. P. Denise, LP6N40A-C
D. R. Nichols, E10A14 C-K
QTC/ERT, Watts Bar Nuclear Plant
E. K. Sliger, LP6N48A-C

--Copy and Return--

To : K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

From: _____

Date: _____

I hereby acknowledge receipt of NSRS Report No. I-85-193-WBN
Subject HIGH-DENSITY SPENT FUEL STORAGE RACKS for action/disposition.

_____ Signature _____ Date

0315U

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TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

NSRS INVESTIGATION REPORT NO. I-85-193-WBN

EMPLOYEE CONCERN IN-85-457-002

MILESTONE 6

SUBJECT: HIGH-DENSITY SPENT FUEL STORAGE RACKS

DATES OF INVESTIGATION: October 4, 1985-January 3, 1986

INVESTIGATOR: J. D. Gilbreath — Date: 1-22-86

REVIEWED BY: W. D. Stevens — Date: 1-22-86

APPROVED BY: for M. A. Harrison — Date: 1-22-86

I. BACKGROUND

NSRS has investigated Employee Concern IN-85-457-002 which was communicated to the Quality Technology Company (QTC) in response to the Watts Bar Employee Concern Program. The specific concern was expressed to QTC as follows.

> Inadequate Construction/Design QA program for determining root cause of the numerous NCR's written against the spent fuel pool racks (Unit #1) during vendor fabrication, receipt inspection, installation and NCR's written subsequent to installation. Problems associated with the racks are an NSRS open item with no resolution to date.

II. SCOPE

The scope of this investigation was directed toward reviewing the Design/Construction QA Programs as they relate to the initiation and dispositioning of NCRs and the progress being made in the resolution of the subject NSRS open item.

A. During the course of this investigation discussions were held with cognizant personnel in the Office of Engineering (OE), the Division of Purchasing, the Division of Nuclear Services, and both NUC PR and CONST site personnel.

B. In addition, the following documents were reviewed.

1. TVA contract 78K66-822189 and associated Spent Fuel Rack Specification 3344

2. Westinghouse Specification F-8, Revision 8, "Fuel Assembly, Storage and Refueling Equipment Design Interface Specification"

3. Westinghouse Specification F-8.1, Revision 2, "Fuel Assembly and Spent Fuel Storage Equipment Design Interface Specification"

4. EN DES EP-1.26, Revisions 1, 2, and 3, "Nonconformances - Reporting and Handling"

5. EN DES EP-5.44, Revisions 0 and 1, "Handling of Supplier Nonconformances"

6. QEB EP-24.57, Revisions 0 and 1, "Supplier Nonconformances - Handling"

7. WBNP-QCP-1.2, Revisions 6-9, "Control of Non-Conforming Items"

8. WBNP-QCI-1.2, Revisions 0, 1, and 2, "Control of Non-Conforming Items"

9. WBNP-QCI-1.30, Revision 5, "Control of Work on Transferred Systems, Equipment, and Architectural Features"

10. QCP-4.22-1, Revisions 0 and 1, "Spent Fuel Rack Lead-In Guide Modification"

11. Correspondence file related to implementation of contract

12. NCRs generated by Wachter, EN DES, and NUC PR; and ECN 4043

III. SUMMARY OF FINDINGS

Because of the complexity and nature of the events which occurred during the procurement and fabrication of the high-density spent fuel storage racks, a historical approach was taken in the presentation of the findings.

The contract for the high-density spent fuel storage racks for WBNP was signed in January 1978 with Wachter Associates, Incorporated (WAI). WAI performed the structural calculations for the racks and subcontracted criticality calculations to Pickard, Lowe, and Garrett; concrete calculations to D'appolona; and fabrication to U. S. Tool and Die. The contract required the fabrication of sixteen rack modules made up of individual rectangular stainless steel boxes which are about 14-feet long and have a neutron-absorbing material "sandwiched" between the box walls. The boxes are welded together with intermittent structural welds along the length of the box to form the rack module. Delivery of the racks to the plant site was scheduled for July 31, 1978.

Almost from the very beginning TVA began experiencing procedural and technical difficulties with WAI. Design drawings and shop fabrication procedures were late in being submitted for TVA approval. Technical submittals documenting the adequacy and acceptability of the mechanical and nuclear design of the racks required repeated interactions between TVA and WAI because of inaccuracies and inconsistencies in both the calculations and design methodologies. This situation raised questions concerning whether or not an independent review of the calculations was being performed prior to the submittal. Accordingly, the Civil Engineering Branch (CEB) requested the Quality Engineering Branch (QEB) to conduct a QA audit to determine if a problem existed. This audit resulted in the preparation of Nonconformance Report QEB 79-1 which describes a "complete breakdown" in the implementation of the WAI QA program. Of the 36 defined deficiencies, 4 were considered reportable to NRC by the audit team. It is important to note that all of the racks had been fabricated by this point in time (April 1979). All deficiencies were finally resolved by QEB in November 1979 through a combination of written WAI explanations, "walkthroughs" of the WAI facilities, and additional inspection holdpoints.

Shipment of the racks to the site began on March 25, 1979 (approximately 8 months past the contract performance date) and was completed on May 16, 1980 (about 22 months late). The problems associated with completion of the contract finally culminated with TVA assuming management control of the contract in April 1980. Final contract payments to WAI were withheld to cover the costs associated with TVA activities at the site. TVA performed verticality and levelness inspections and conducted drag tests on the racks, work which WAI was supposed to do. Approximately 40 percent of the 1,312 spent fuel rack cells did not meet the specification for either cell verticality, levelness, or drag resistance and required extensive evaluation and rework to establish adequacy. Westinghouse (W) was asked to evaluate all inspection results and recommend either rework or relaxed specifications. After numerous iterations and discussions, the following was achieved and documented in Technical Instruction 1.

A. Eighteen cells have been permanently plugged.

B. Five cells exist where only nonreinsertable fuel may be stored.

C. Twenty-three cells exist where fuel assemblies wrapped in plastic may not be stored (applies to new fuel storage while the pool is dry).

The significant reduction in the number of cells requiring administrative control is a direct result of Westinghouse relaxing the verticality requirements at the request of EN DES.

In all, during the course of the fabrication and installation of the racks (January 1978-June 1981), there were 106 NCRs written. Of the total, 39 were written by WAI, 63 by CONST, 3 by EN DES, and 1 by NUC PR. In addition, conditions adverse to quality were also noted in EN DES Audit 79V-9 and NRC-OIE Inspection Reports 390/80-30, 391/80-23, 390/81-09, and 390/81-08.

On August 11, 1981 a trend analysis report (QAS 810811 013) was issued by the Quality Assurance Branch to review and analyze the NCRs and above-mentioned reports in order to "describe the trend so that appropriate followup action can be determined and taken to prevent the repetition of these conditions adverse to quality at future plants." The report concluded that while no adverse safety condition exists, there was a quality problem associated with deviations to stringent dimensional tolerances for verticality, levelness, and drag force. The deviations were a result of the following generic difficulties.

A. The manufacture of large, complex, and less than fully rigid structures to exacting tolerances.

(Note: This primarily relates to the problems associated with welding thin-walled stainless steel to such tight-dimensional requirements.)

B. Proper handling during loading, transportation, unloading and final positioning.

C. The development and use of precise measurement equipment for use by field forces capable of reproducing the precise measurements made in the fabricator's shop.

D. Training of field personnel in the use of precision measuring equipment.

E. Accurate reporting of that data.

While final resolutions were being reached on the above problems, another problem surfaced during new fuel-handling operations. The lead-in guides and guide adaptors did not make a smooth transition with the cell walls. This condition caused a flat step inside the cell, violating both the TVA and W specifications and having the potential of damaging a fuel assembly during either insertion or withdrawal. Several meetings among NUC PR, EN DES, and CONST resulted in a rework procedure whereby the lead-in guides would be welded to the cell wall and then ground to provide a smooth surface. The criteria for the rework did

allow a .010-inch tolerance in the surface mating between the lead-in guide and cell wall. However, personnel contacted in NUC PR felt that the W specification should have been followed to preclude any possibility of fuel damage. The W specification did not allow any tolerance between the mating surfaces.

This issue, along with the general dissatisfaction concerning the spent fuel racks because of so many earlier problems, prompted NUC PR personnel (both the central office and the site) to support the concept of rack replacement. The rack replacement concept, however, appears to be only supportable from economic factors rather than safety considerations. When the final repairs were completed on the racks and the EN DES review of the preop test results finished and accepted by the site, the discussions between EN DES and NUC PR personnel regarding rack replacement ended. One of the principal considerations for rack replacement was to avoid spending additional monies for rack repair. Once the repair was completed, that driving force was lost.

The NSRS open item referenced in this concern stems from the operational readiness review conducted in 1984 wherein NUC PR was requested to obtain the justification for the 15 percent sample size for the conduct of neutron attenuation tests. NUC PR in turn requested EN DES to provide the documentation since EN DES handled the WAI contract. In their response to NSRS by memorandum dated April 8, 1985 (B45 850408 259), OE indicated that the 15 percent sample size, accepted by NRC, was discussed in WAI's licensing documentation. Discussions with the preparer of that memorandum indicated that such licensing documentation was not found in searches conducted of the CEB and QEB files in Knoxville as well as the records at U. S. Tool and Die. Additionally, phone conversations with personnel at the Waterford Nuclear Plant indicated that they had also attempted to find the referenced documentation but had been unable to do so. In order to satisfy their resident NRC inspector, Waterford chose to perform a 100 percent attenuation test instead of expending further time and resources in an effort to find the documents. A check of the NRC Public Document Room in Washington by this investigator also yielded no results.

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

A. The deviations from design specifications exhibited by the spent fuel racks were a direct result of the welding procedures employed by WAI during the fabrication process and the apparently overly stringent verticality requirement. Final inspections for concurrence with specifications were not performed until after all of the racks had been assembled. Therefore, inprocess changes to procedures were not possible. Once the problems were identified, the identification, evaluation, and resolutions were handled in accordance with QA program requirements. Further, the trend analysis required to identify root cause and establish corrective action was performed and issued in August 1981. Whether the early problems experienced by EN DES with WAI regarding the submission of technical documents and shop fabrication procedures or the eventual WAI QA program breakdown contributed to the significant number of deviations is, at best, indeterminate. The early identification of this problem (before fabrication began) would have been made based on engineering knowledge rather than QA program requirements. Accordingly, the concern regarding the adequacy of the Design/Construction QA Program is unsubstantiated.

B. Even though the safety issues regarding the racks have been resolved, there does appear to be sufficient evidence to support the performance of an economic evaluation of rack replacement based on the potential need for additional storage in the future. With the passage of the Nuclear Waste Policy Act in 1982 wherein the Department of Energy (DOE) was given responsibility for long-term storage of spent fuel, consideration should again be given to whether additional onsite storage is needed to provide storage capability until such time as DOE is prepared to begin accepting spent fuel from TVA. Replacement of the present racks with a higher-density design rack system is one option for providing additional storage.

C. Regarding NSRS open item referenced in the concern, the documentation to support the 15 percent sample size for neutron attenuation testing as referenced in the open item was not located. Concern now exists as to the actual existence of such documentation. Without the necessary documentation to support the 15 percent attenuation testing, the racks can be considered to be in an "unevaluated and indeterminate condition."

Recommendations

I-85-193-WBN-01 - Perform Economic Evaluation

Perform an economic evaluation of rack replacement to determine if TVA should replace the WAI racks. This evaluation should be performed before any additional monies are spent on the existing racks and should be completed early enough to allow rack replacement before the first refueling.

I-85-193-WBN-02 - Provide Documentation or Retest

Provide documentation to support the 15 percent sample size for neutron attenuation testing by either locating the WAI justification or by immediately reperforming the calculations. If the justification cannot be furnished then steps must be taken to perform attenuation testing on 100 percent of the cells, and an engineering evaluation should be immediately performed to determine what measures are necessary to ensure criticality control with the present fuel assembly placement in the racks.

TVA 64 (05-9-65) (OP-WP-5-85)

NRC

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO: W. T. Cottle, Site Director, Watts Bar Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: JAN 24 1986

SUBJECT: NUCLEAR SAFETY REVIEW STAFF INVESTIGATION REPORT TRANSMITTAL

Transmitted herein is NSRS Report No. I-85-480-WBN

Subject IMPROPER INSTRUMENTATION AND MATERIAL STORAGE

Concern No. IN-85-845-003 and IN-85-927-X01

and associated recommendations for your action/disposition.

It is requested that you respond to this report and the attached recommendations by February 21, 1986. Should you have any questions, please contact W. M. Berry at telephone 3695-WBN.

Recommend Reportability Determination: Yes X No ____

for Director, NSRS/Designee

WMB:GDM
Attachment
cc (Attachment):
R. P. Denise, LP6W40A-C
D. R. Nichols, E10A14 C-K
QTC/ERT, Watts Bar Nuclear Plant
E. K. Sliger, LP6W48A-C

--Copy and Return--

To : K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

From: _____

Date: _____

I hereby acknowledge receipt of NSRS Report No. I-85-480-WBN
Subject IMPROPER INSTRUMENTATION/MATERIAL STORAGE for action/disposition.

Signature _____ Date _____

9316U

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TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

NSRS INVESTIGATION REPORT NO. I-85-480-WBN

EMPLOYEE CONCERNS IN-85-845-003 AND IN-85-927-X01

MILESTONE 6

SUBJECT: IMPROPER INSTRUMENTATION AND MATERIAL STORAGE

DATES OF INVESTIGATION: October 2, 1985-January 9, 1986

INVESTIGATOR: for [signature] W. M. Berry — 1/22/86 Date

REVIEWED BY: W D Stevens W. D. Stevens — 1/22/86 Date

APPROVED BY: for W D Stevens M. A. Harrison — 1/22/86 Date

I. BACKGROUND

A Nuclear Safety Review Staff (NSRS) investigation was conducted to determine the validity of two similar expressed concerns as received by the Quality Technology Company (QTC) Employee Response Team. The concerns of record, as summarized on the employee concern assignment forms from QTC, were as follow.

IN-85-845-003

> Instrument storage, material control, and issuance is questionable. Instruments are being given to field personnel, stored in gang boxes for long periods of time, then installed. No specifics were given. However the concerned individual mentioned that Public Safety Office might have many instances of violation of instruments found in tool boxes.

IN-85-927-X01

> Instrument storage requirements not being maintained after it leaves the warehouse and before it is installed. A "Mini Warehouse" in the field is a holding facility and has no class of storage. Also, physical protection after instrument is installed is not always being provided.

II. SCOPE

To address significant nuclear-safety impact, the scope of this concern was narrowed to safety-related instrumentation.

Interviews were conducted with Construction Instrumentation Quality Control, Construction Instrument Engineering, Construction Public Safety, Construction Quality Assurance, instrument installation crafts, Operations Instrument Section, and Office of Engineering Environmental Qualifications Specialists. A review was made of the applicable storage and housekeeping requirements. An inspection was made of the Construction instrument installation craft's interim (between warehouse and installed) storage buildings (shacks). An inspection was made of the instrument gang box. A general assessment was made of the Unit 2 construction environment in various instrumentation areas.

III. SUMMARY OF FINDINGS

A. A vital extension to confirmation of the raw facts of these concerns was to assess what, if any, nuclear-safety impact could result. To this end an analysis was made as to the purpose of the various storage requirements and the impact of a deviation from any of the requirements. WBN-QCP-1.36, Revision 8, on storage and housekeeping makes the following relevant points.

1. QCP-1.36 requirements apply specifically to safety-related items.

2. An item is considered to be "in storage" from the time it is received on the WBN site until the system (and therefore its related instrumentation) is tentatively turned over to the operating organization. In other words, an instrument can be in its installed location in the plant for years yet still be considered "in storage."

3. Instrumentation generally is to be stored in level-B storage conditions, except for especially sensitive equipment, such as a computer, which requires storage level A.

4. Level-B storage requires temperatures between 40 to 140 degrees Fahrenheit, security against theft or vandalism, fire resistant, weather tight, well ventilated, and protected from flooding.

5. Although hut (warehouse) 13 and the safety-related permanent plant buildings are designated as level-B storage, the turbine generator building, the instrument shacks (instrument installation craft's interim storage buildings), and gang boxes are not defined as storage areas.

6. Monthly storage/housekeeping inspections are to be documented, in particular, the calibration status of any required recorders (such as temperature recorders if there are temperature limits).

B. Since ultimately an instrument which meets the performance requirements has been (for Unit 1) or will be (for Unit 2) put in place, then most of the storage requirements primarily serve the purpose of increasing the probability of this happening efficiently. A deviation from any of these storage requirements could have an economic impact. A possible exception to just an economic impact would be if storage deviations eroded the environmental qualified life of the instrument.

C. To allow an instrument vendor to establish a qualified life for equipment, it was necessary for the vendor to know the accident environment, the normal operating environment, and the storage environment. Of the various storage level-B requirements, the one that could subtly erode the qualified life is deviation from the allowable temperature range.

D. From interviews conducted it appeared that 1979 was the year that something like the present instrument shack was first put into use. Prior to that time there were five gang boxes in the turbine generator building which served to hold bulk material such as tube fittings. The few interviewees that claim to know the way work was conducted prior to 1979 said that it was possible that safety-related environmentally qualified instruments were held briefly (a few days) in these gang boxes. Just which instruments and for how long would be difficult, if not impossible, to establish. However, the following tend to limit the degree of concern.

1. Only individual small instruments, such as transmitters or temperature sensors, could be stored in a gang box.

2. Most of the safety-related instruments were shipped as part of a larger assembly (instrument rack or cabinet) which would not fit in a gang box.

3. In the timeframe that the earliest safety-related instruments could have been installed, the turbine generator building was being maintained to within the storage level-B temperature range.

4. At various times any instruments covered by the QC program were purged from the gang boxes.

E. Interviews indicated that, although the size of the instrument shack has increased from its inception in 1979, the as-found environmental conditions of the instrument shacks were essentially the same as those that existed over its lifetime. The following tend to limit the degree of concern.

1. Electronic instruments, as opposed to bulk materials and mechanical accessories, are held in the normally occupied section of the instrument shack.

2. Because it is occupied, the instrument shack temperature would normally be controlled to a more conservative range than required by level-B storage even though it is not recorded.

F. One interviewee stated that there was an earlier time period when the overriding emphasis was on keeping the instrument installation crafts busy. This provided the rationale to draw instruments from the warehouse earlier than strictly necessary for installation. Indeed, the construction sequence being used in Unit 2 at the time of this investigation was such that heavy and dirty construction work was going on in areas where delicate electronic instrumentation was already installed. Instrumentation personnel had sheetmetal rack covers fabricated in an attempt to provide some level of protection. However, some rack covers and individual instrument closures are missing, and they are ineffective against airborne dirt. Since the instruments are inspected and cleaned as necessary during initial calibration, the impact is likely to be economic rather than nuclear safety.

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The concern was substantiated that instruments were previously stored in gang boxes although this practice is no longer used. The concern was substantiated that a "mini-warehouse" (instrument shack) exists which was not a designated storage area. The concern was substantiated that physical protection of installed instruments was not always maintained.

The establishment and method of operation of the instrument shacks was an evolutionary change in response to a perceived need to improve the way instrument installation was performed. The documentation of when a specific instrument was received, where stored, and when given to an installer by the instrument shack is informal and fractured; i.e., the form TVA 575, Storeroom Requisition, shows when an instrument left the warehouse, and an informal instrument shack log shows the tag number of an instrument received and where stored and subsequently when and to whom the instrument was given for installation.

The intent was that the instrument shack serve as an intermediate staging area and, as such, would only hold an instrument for a few days. However, there have been occasions when instruments were held much longer. Designating the instrument shack as level-B storage would eliminate concerns on the length of time an instrument was held there.

Recommendations

I-85-480-WBN-01 - Instrument Shack Transaction Documentation Formalization

Determine the information needed for a formal (documented) instrument transaction method for construction instrumentation crafts, and implement the method.

I-85-480-WBN-02 - Level-B Storage in Instrument Shack

Upgrade storage conditions as necessary to designate the instrument shack as a level-B storage area.

TVA 64 (OS-9-65) (OP-WP-5-85)

NKC

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO: W. T. Cottle, Site Director, Watts Bar Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: JAN 28 1986

SUBJECT: NUCLEAR SAFETY REVIEW STAFF INVESTIGATION REPORT TRANSMITTAL

Transmitted herein is NSRS Report No. I-85-657-WBN

Subject IMPROPER INSPECTION AND TESTING OF EXPANSION SHELL ANCHORS

Concern No. IN-85-285-002

and associated recommendations for your action/disposition.

It is requested that you respond to this report and the attached recommendations by February 24, 1986. Should you have any questions, please contact D. R. Bradley at telephone 3639-WBN.

Recommend Reportability Determination: Yes X No ____

Director, NSRS/Designee

DRB:GDM
Attachment
cc (Attachment):
R. P. Denise, LP6N40A-C
D. R. Nichols, E10A14 C-K
QTC/ERT, Watts Bar Nuclear Plant
E. K. Sliger, LP6N48A-C

--Copy and Return--

To : K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

From: _____

Date: _____

I hereby acknowledge receipt of NSRS Report No. I-85-657-WBN
Subject IMPROPER INSPECTION/TESTING OF EXPANSION SHELL ANCHORS for action/disposition.

Signature _____ Date _____

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TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

NSRS INVESTIGATION REPORT NO. I-85-657-WBN

EMPLOYEE CONCERN IN-85-285-002

MILESTONE 1

SUBJECT: IMPROPER INSPECTION AND TESTING OF EXPANSION SHELL ANCHORS

DATES OF INVESTIGATION: November 19, 1985-January 8, 1986

INVESTIGATOR: D. R. Bradley — Date: 01/14/86

REVIEWED BY: P. R. Washer — Date: 1/14/86

APPROVED BY: for M. A. Harrison — Date: 1-16-86

I. BACKGROUND

NSRS has investigated Employee Concern IN-85-285-002 which the Quality Technology Company (QTC) identified during the Watts Bar Employee Concern Program. The concern is worded:

> TVA inspected and pull tested redheads improperly: pull testing was not 100%. Base plate or hanger was bolted in place. Even redheads that were loose could have passed by bearing against the back of the plate. Because the holes were not inspected before redheads were set, QC could not tell if rebar had been cut.

II. SCOPE

The scope of the investigation was determined from the stated concern to be that there was inadequate inspection of expansion shell anchors after attachment installation.

Inspection activities relating to WBN-QCP-1.14 and NCR 3747R were reviewed by NSRS in order to evaluate the stated concern as listed below.

A. Interview of QC personnel concerning techniques for testing anchors with the attachment installed.

B. Review of TVA commitments and site procedures including:

1. TVA General Construction Specification G-32, "Bolt Anchors Set in Hardened Concrete"

2. WBN-QCP-1.14, R17, "Inspection and Testing of Bolt Anchors Set in Hardened Concrete and Control of Attachments to Embedded Features"

3. Nonconforming Condition Report (NCR) 3747R

4. IE Bulletin No. 79-02

C. Review of inspection documentation.

III. SUMMARY OF FINDINGS

Based upon the activities of this investigation, NSRS has not substantiated the concern as stated. The concern was divided into three parts: pull testing not 100 percent; redheads (expansion shell anchors) bearing against the back of the attachment during pull testing; and, no inspections to determine if rebar has been cut during installation of shell anchors.

Two problem areas were identified which relate to this concern: failure of QC to implement the requirements of NCR 3747R; and, failure of WBN-QCP-1.14 to incorporate the requirements of NCR 3747R. These are described in detail in Sections III.D. and III.E. of this report.

A. Pull Testing Not 100 Percent

Pull testing is not required for 100 percent of the expansion anchors. TVA General Construction Specification G-32 and WBN-QCP-1.14 require a minimum of 5 percent of the anchors to be proof tested. Additional anchors are to be tested if the original anchors do not meet measurement or testing requirements. Review of WBN-QCP-1.14. Attachment Bs. "Expansion Shell Anchor Proof Test Summary," provided evidence that this requirement was being met.

Even though the 5 percent minimum testing specified in TVA General Specification G-32 is being met. this requirement is not consistent with the requirements of IE Bulletin No. 79-02. Two sampling methods are discussed in IE Bulletin No. 79-02.

a. Test one bolt on each plate as originally recommended in Bulletin No. 79-02. If the test fails. all other bolts on that base plate should be similarly tested. A high failure rate should be the basis for increased testing.

b. Randomly select and test a statistical sample of the bolts to provide a 95 percent confidence level that less than 5 percent defective anchors are installed in any one seismic Category I system. The sampling program should be done on a system by system basis.

TVA General Specification G-32 does not require sampling on a system-by-system basis. IE Bulletin No. 79-02 does allow other sampling programs if they can be justified.

B. Pull Testing Through an Attachment

NSRS found that WBN-QCP-1.14. "Inspection and Testing of Bolt Anchors Set in Hardened Concrete and Control of Attachments to Embedded Features." allowed inspection and testing of shell anchors after installation of the attachment. NCR 3747R was initiated on October 30. 1981 to address those anchors for supports which had been previously installed without pull tests being performed on the expansion anchors. Interviews were conducted with personnel in the various QC inspection groups. Each inspector interviewed was familiar with the testing methods described in NCR 3747R.

The Recommended Disposition of NCR 3747R stated in part:

* * *

5. Reactions from tripod legs (if used) that support hydraulic jack may be delivered as close to the anchor as desired except that if the support is removed to proof test. the normal requirements of G-32 apply.

6. If the support is not removed to perform pull testing. support plates must be shimmed adequately to assure the anchor shell does not contact the baseplate while pull testing.

* * *

The main point brought out during the interviews was the need for a gap between the plate and the anchor to be tested to ensure the anchor shell was not in contact with the baseplate. That gap could result from any of the following.

1. Anchor recessed in the concrete.

2. Gap between the concrete and attachment due to surface irregularities.

3. Gap achieved by shimming.

4. Baseplate hole larger than the anchor.

By ensuring a gap between the anchor and the plate as indicated by QC personnel, reliable results should have been obtained during pull testing.

C. Damaged/Cut Rebar

WBN-QCP-1.14 does not require an inspection for damaged rebar unless the anchor shell was cut. However, personnel installing the anchors were instructed by TVA General Construction Specification G-32 to relocate an anchor where a reinforcing bar is hit during drilling. If relocation of an anchor was impractical, permission from Office of Engineering (OE) was to be obtained to drill through the reinforcing bar. OE has performed an evaluation of the effects of cut rebar which was described in NSRS Investigation Report No. I-85-384-WBN. The conclusion reached during that investigation was that the effects of cut rebar have been mitigated due to OE's past evaluation and the present FCR/NCR process.

D. Failure of QC to Implement NCR 3747R

An additional inspection requirement was added to WBN-QCP-1.14 as a result of NCR 3747R. The plug depth and recess was to be measured for a minimum of 25 percent of the anchors on each plate. This requirement applied to supports which had been previously installed without pull tests being performed. Measurement and test results (WBN-QCP-1.14, Attachment E) were reviewed for those expansion shell anchors inspected in accordance with the requirements of NCR 3747R. Problems were identified with two of the QC inspection groups. Of 24 electrical anchor lots reviewed, the requirement to measure 25 percent of the anchors per attachment was not met for 10 lots. Of 13 instrumentation anchor lots reviewed, this requirement was not met for 12 lots. The particular lot numbers are listed below. No problems were identified during the review of civil and hanger documentation.

Electrical	Instrumentation
E-1057	I-5256
E-1073	I-5257
E-1085	I-5261
E-1088	I-5262
E-1099	I-5290
E-1106	I-5293
E-1111	I-5299
E-1112	I-5308
E-1115	I-5310
E-1123	I-5311
	I-5324
	I-5325

E. Failure to Incorporate the Requirements of NCR 3747R

To close NCR 3747R, WBN-QCP-1.14 was revised to incorporate the recommended disposition as stated on the NCR. NCR 3747R, which was initiated October 30, 1981, states in part:

Recommended Disposition

Revise WBNP-QCP-1.14 as follows:

A. Lots containing only anchors for supports which have been previously installed without pull tests being performed.

1. The lot is defined as in section 1.5 of G-32 except that installation time frame, identification of the responsible foreman, or limiting the lot to the work of one foreman are not required.

2. Make and document the measurements specified in Section 4.3.3 of G-32 for a minimum of 25% of the bolts on each plate. Do this prior to proof load testing.

3. If any anchor on a specific plate fails to meet the acceptance criteria of section 4.3.3 of G-32, then all anchors on that plate will be measured per section 4.3.3. Any anchor not meeting the acceptance criteria will be proof load tested and reset or replaced if necessary.

4. Select a quantity of anchors in accordance with section 4.7 of G-32 to be proof load tested as specified in section 4.3.4 of G-32. The tested anchors shall have had the measurements taken referred to in number 2 above. If proof loading does not meet the acceptance criteria of section 4.3.4 of G-32, corrective action in accordance with section 4.3.5 of G-32 shall be taken.

5. Reactions from tripod legs (if used) that support hydraulic jack may be delivered as close to the anchor as desired except that if the support is removed to proof test, the normal requirements of G-32 apply.

6. If the support is not removed to perform pull testing, support plates must be shimmed adequately to assure the anchor shell does not contact the baseplate while pull testing.

7. The results of the proof load tests and inspections for plug depth shall be maintained and evaluated in accordance with section 4.3.6 of G-32 revision 6. If more than 3 anchors from each successive group of 50 anchors that were either proof tested or included in the original 25% to be inspected fail proof test, all remaining anchors in the lots representing the combination of 50 tests and inspections will be inspected for plug depth and those found outside criteria will be proof tested. Additional anchors that were inspected due to excessive plug depth variation or proof tests that resulted from failed anchors shall not be included in the evaluation. An anchor shall be considered unacceptable if it fails proof testing.

B. Lots containing new support installations as well as those previously installed prior to proof load testing.

1. These may be handled as in A. above.

2. If the lot contains only new support installations the current requirements of G-32 apply.

The following areas were identified in which WBN-QCP-1.14 failed to adequately incorporate the recommended disposition of NCR 3747R.

1. The altered definition of a lot was not included in WBN-QCP-1.14.

2. Paragraph 6.3.18 of WBN-QCP-1.14 indicated that the recommended disposition of the NCR was optional rather than required.

3. WBN-QCP-1.14 did not make it clear that proof load testing (5 percent minimum) was required.

4. WBN-QCP-1.14 did not describe an adequate method for proof load testing of anchors with the attachment installed.

5. WBN-QCP-1.14 did not require additional inspection and testing if more than 3 anchors from a group of 50 anchors failed the proof test.

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

NSRS has not substantiated the concern as stated. The investigation did reveal that the number of anchor measurements per attachment was insufficient as NCR 3747R required a minimum of 25 percent for each plate. The two groups involved were Electrical and Instrumentation QC as detailed in Section III.D. of this report. In addition, WBN-QCP-1.14 did not adequately incorporate the recommended disposition of NCR 3747R as detailed in Section III.E. of this report. TVA General Construction Specification G-32 does not require sampling for testing purposes on a system-by-system basis as specified in IE Bulletin No. 79-02.

Recommendations

I-85-657-WBN-01 - Revise WBN-QCP-1.14

Revise WBN-QCP-1.14 to incorporate the recommended disposition of NCR 3747R. In addition, describe the technique to ensure that proof load testing of anchors after support installation is acceptable.

I-85-657-WBN-02 - Initiate NCRs

Review electrical and instrumentation inspection documentation to determine the extent of supports that received an insufficient number of anchor measurements (a minimum of 25 percent per plate). Initiate NCRs as required, and perform the necessary measurements to satisfy the requirements of NCR 3747R relating to attachments installed prior to inspection of expansion shell anchors.

Initiate NCR to determine if inspection inadequacies exist due to the failure to incorporate the recommended disposition of NCR 3747R into WBN-QCP-1.14.

I-85-657-WBN-03 - Justify Sampling Program

Provide justification that the definition of a lot (for testing purposes) in TVA General Construction Specification G-32 and a minimum of 5 percent testing is adequate in view of the requirements in IE Bulletin No. 79-02. This justification should show equivalence to one of the methods defined in IE Bulletin No. 79-02.

NRC

TVA 64 (OS-9-65) (OP-WP-5-85)

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO: S. Schum, QTC/ERT Program Manager, Watts Bar Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: JAN 23 1986

SUBJECT: TRANSMITTAL OF ACCEPTED FINAL REPORTS

The following final report has been reviewed and accepted by NSRS and is transmitted to you for preparation of employee response.

WI-85-035-007

for K. W. Whitt

Please acknowledge receipt by signing below, copying and returning this form to J. T. Huffstetler, E3B37 C-K.

NAME DATE

JTH
Attachments
cc (Attachments):
R. P. Denise, LP6N40A-C
W. T. Cottle, WBN
D. R. Nichols, E10A14C-K
Eric Sliger, LP6N48A-C

0322U