

TO: Dwight D. Chamberlain

THRU: T. F. Stetka

FROM: L. E. Ellershaw

SUBJECT: DRS ACTION ITEM 92-20 - CHECK VALVE INSPECTION PROGRAM (TI 2515-110)

DRS Action Item 92-20 requested the following: (1) Perform a review of inspection results from initial inspections, (2) Evaluate TI 2515-110 inspection methodology, (3) Canvas other regions on approach/results to date, and (4) Propose alternate approaches if appropriate.

TI 2515-110, issued November 19, 1991, was intended to provide an evaluation of licensee check valve activities. The inspection elements are based on regulatory requirements and good practice, and consist of attributes which, if implemented by the licensee in an integrated, programmatic fashion, should provide reasonable assurance of the operability and reliability of check valves in safety-related systems. The inspection elements include: testing; maintenance (corrective, preventive, and predictive, including non-intrusive testing); corrective action; trending; design application review; training, and use of industry information.

The following information was developed during discussions with cognizant individuals (lead inspectors and section chiefs) from other regions and from review of all inspection reports generated as a result of check valve program inspections.

Region I

Region I performed one check valve program inspection (TMI) during 1992. The inspection was structured to follow the guidance of the TI; however, the Region noted that there was very little regulatory basis (except in the areas of IST and maintenance) and subsequently determined that their approach should be changed in order to focus more on IST and maintenance activities.

The region is currently planning on performing one check valve inspection during the 1993 calendar year, with Calvert Cliffs being the selected site. The region is planning on integrating the inspection guidance of TI 2515-114 (IST) into TI-2515-110, with most of the emphasis being placed on inservice testing of check valves.

TMI-1 (92-04)

The licensee's check valve program was a two part program. One part consisted of the industry initiated check valve program and the other part consisted of the IST program. It was found that neither part was developed as a consolidated and controlled program document and each part was considered an unresolved item pending the licensee's actions to establish a controlled program document. In addition, an unresolved item was identified regarding the lack of any documented justification for the exclusion of three class

2/A

boundary valves from the IST program. Maintenance program records showed the efforts of a continuing process to improve or maintain good check valve performance, and the use of non-intrusive testing was found to be proactive and effective. Trending was not an extensively used mechanism as evidenced by the issuance of just one trend report pertaining to check valves in the past several years. The corrective action program was considered effective as evidenced by a strong performance in finding problems, considering generic implications, and correcting them. While a design application review was performed, the calculations of valve critical velocity had not received a formal documented review. These calculations were used in determining if a valve required increased testing or preventive maintenance. This was identified as an unresolved item pending the licensee's actions to formally document these calculations. The review of industry information pertaining to check valves was considered to be effectively implemented. The training program was considered to be effective as evidenced by the low rework rates experienced by the plant. All levels of management have been involved with the check valve program. The NRC inspection did not identify any violations or deviations.

Region II

Region II performed one check valve program inspection (North Anna) during 1992. The inspection was structured to follow the guidance of the TI.

The region is currently planning on performing one check valve program inspection during the 1993 calendar year, with St. Lucie being the selected site. It appeared that the region was going to use the same format for the St. Lucie inspection that was used at North Anna.

North Anna 1 and 2 (92-19)

A documented check valve program had been established which was considered to be comprehensive. The IST program for check valves was found to be acceptable. While a preventive maintenance program had been established, a weakness was identified in that it was found that no formalized method existed to determine which check valves should be placed into the program nor were there documented bases for the valves that were included in the program. Non-intrusive testing methodology had not been established; however, this was being actively pursued. A corrective action and trending program had been established and effectively implemented. The design application review was considered to be a strength, due to consideration of factors beyond flow, location, and orientation, and there was a continuous upgrade to the check valve program database. The program for handling applicable industry information was functioning in an acceptable manner. The licensee had established a training program, including the development of a "hands-on-lab" for personnel involved in check valves. Licensee self assessment consisted of a quality assurance inservice inspection audit. Strong management involvement and support was quite evident. The NRC inspection did not identify any violations or deviations and it was concluded that the licensee had an acceptable check valve program.

Region III

Four check valve program inspections have been performed: Perry; LaSalle 1 and 2; Kewaunee, and Fermi 2. The inspections at Perry and Fermi were structured to follow the guidance of TI 2525-110, while the inspections conducted at LaSalle and Kewaunee were an integrated approach using TIs (2515-110 and 2515-114 [IST]). It should be noted that the inspection at Fermi did not close out the TI, in that the inspector did not have sufficient time to review all inspection elements.

Region III has committed 1-1/2 FTE to the check valve program effort and it is currently their intent to inspect each of the sites within the region.

Perry (92005[DRS])

The licensee was in the process of establishing a formal check valve program and an administrative procedure to control the check valve program did not exist. A formal document did not exist to provide a basis for inclusion or exclusion of safety-related check valves from the IST program. Full flow exercise testing of check valves did not meet the guidance of Generic Letter 89-04. Formal guidance for preventive maintenance of check valves was lacking, even though some of the essential elements of such a guidance were being executed. Non-intrusive testing was not being used to verify valve position and only limited use was employed for detecting valve degradation. There was no formal program to control trending of check valve maintenance, repairs, test results and records from disassembly. The corrective action program appeared to be adequately implemented. The design application review was considered to be comprehensive and provided a rational basis for screening potential problem valves from the total population of check valves analyzed. Industry information appeared to be evaluated, tracked, and implemented in an adequate manner. The training program was considered to be a strength. There appeared to be a good level of management support. Licensee self assessment consisted of quality assurance audits and surveillances of the IST program and check valves in general. The NRC inspection did not identify any violations of deviations.

Fermi 2 (92014[DRS])

A check valve program had been developed and was generally considered to be good. However, there was no administrative procedure controlling the program. The program consisted of two parts: IST and preventive maintenance. Check valve testing was found to be in accordance with Generic Letter 89-04. The maintenance program was basically preventive, with disassembly and inspection a major element. A non-intrusive testing program had not been established. A formal trending program had not been established. The design application review appeared to be thorough and consistent with EPRI guidelines; however, in some cases the basis for exclusion of some valves was not clear. Additionally, it was not clear if valves outside of the systems identified by INPO were adequately reviewed for inclusion into the program. The NRC inspection did not identify any violations or deviations.

The report stated that the inspection was not complete and that the TI would remain open pending further inspection effort.

LaSalle 1 and 2 (92015[DRS])

This inspection, as identified above, was an integration of TIs 2515-110 and -114.

The check valve program was well established and documented, and consisted of two parts: IST and preventive maintenance. The scope of the program was consistent with INPO's SOER 86-03. Review of check valve testing procedures and surveillance results indicated that, in general, the testing of valves was adequate. Preventive maintenance of check valves was divided into two parts: disassembly and inspection; and non-intrusive testing. A significant amount of disassembly and inspection was being performed in order to obtain extensive base line data. The licensee also performed non-intrusive testing both prior to and after disassembly and inspection in order to help validate the results of diagnostic testing. This was considered to be a strength. A formal trending program had not been established. Corrective actions appeared to be comprehensive although documentation and classification of identified problems could have been better. The design application review was considered to be comprehensive and included appropriate vendor and industry data. It also provided a rational basis for screening potential problem valves from the total population of check valves analyzed. Strong management support was in evidence. The NRC inspection did not identify any violations of deviations.

Kewaunee (92019[DRS])

This inspection, as identified above, was an integration of TIs 2515-110 and -114.

The check valve program was generally considered to be good, and consisted of two parts: IST and the check valve reliability program (primarily preventive maintenance). A review of IST procedures and completed surveillances indicated that testing methods and frequencies were adequate, and acceptance criteria were specified. However, it was identified that acceptance criteria for check valve full flow testing had been incorrectly established. Additionally, the licensee established alert levels and action levels at flow rates less than the required accident flow rates. It was also identified that procedures had not been established to control and document testing of the auxiliary feedwater pump discharge check valves. Apparently, the required reverse flow testing of these check valves was being performed, but only as a result of the testing configuration used for other surveillance requirements. A non-intrusive testing program had not been established. There was no formal trending of check valve failures, maintenance, or test results. The design application review for valves included in the check valve program appeared to be rigorous and thorough. However, a formal and documented basis for excluding certain check valves from the program did not exist. Licensee self assessment consisted of an annual independent technical review which documented an objective evaluation of the effectiveness of the IST program. This was considered a strength. Management involvement was considered good as illustrated by their commitment to improve the check valve program.

The NRC inspection did not identify any violations or deviations. The items pertaining to the IST program and design application review were characterized as weaknesses and concerns.

Region IV

Subsequent to the HQ led pilot inspection at Waterford, Region IV performed three check valve inspections at River Bend, Fort Calhoun, and Cooper.

River Bend (92-22)

The check valve program was satisfactory but lacked coordination/information sharing between the IST group and check valve program coordinator. Regarding check valves, the IST program was found to be acceptable. Maintenance activities were primarily predictive and were based on a well established non-intrusive testing program. A check valve performance trending program had not been established. A violation was identified for failure to initiate Condition Reports when check valves failed to meet surveillance test acceptance criteria. A check valve design application review was performed, but was limited to valve type and sizing, location, and orientation. A non-cited violation was identified for failure to evaluate vertical orientation of valves, after leak rate failures, in view of the manufacturer's recommendations to mount the valves in a horizontal position. Applicable industry information had been evaluated, incorporated, and well documented. The NRC inspection identified two violations (one non-cited) and no deviations.

Fort Calhoun (92-25)

The check valve program was sufficient but lacked coordination/information sharing between the program activity and other programs which might affect it. Regarding check valves, the IST program was found to be acceptable. Maintenance activities were preventive in nature; however, non-intrusive testing had not been established. A check valve performance trending program had not been established. Problems associated with check valves appeared to receive appropriate corrective actions. Several elements of the design application review were not in accordance with the guidelines established by EPRI and errors existed between the technical database and the isometric drawings. Applicable industry information had been evaluated and appropriately documented, with generic implications, beyond the specific details presented, considered. Management involvement in the check valve program had been recently increased and there appeared to be a strong commitment to strengthen the check valve program. The licensee's self assessment activities had identified the lack of formalized coordination between other groups and the check valve program engineer. The NRC inspection did not identify any violations or deviations associated with the check valve program.

Cooper (92-23)

A formal, documented check valve program had not been established because the licensee had considered their past actions on assuring check valve reliability

to be adequate. A program was, however, being developed. The IST program, with respect to check valves, was found to be acceptable. Preventive maintenance activities, consisting of disassembly and inspection, had been established and were being implemented. Non-intrusive testing methodology had not been established. A check valve performance trending program had not been established. The check valve data base was not accurate, in that the original check valve design review, dated September 1989, had not been updated when subsequent design changes involving check valves were made. The licensee was in the process of re-establishing the design review baseline. Applicable industry information, including generic implications, had been appropriately evaluated and documented. The licensee's self assessment activities identified the need to establish a formal, documented check valve program and to establish a non-intrusive testing program. All levels of management appeared to be cognizant and supportive of these efforts, as evidenced by actions taken. The NRC inspection did not identify any violations or deviations.

Region V

The region had just recently performed a check valve program inspection at Palo Verde (92-36); however, the report has not been issued as of this date. Discussion with the lead inspector indicated that Palo Verde had an acceptable check valve program but it was identified that some valves had not been reverse flow tested. The region is planning on performing one check valve inspection during calendar year 1993 at WNP-2.

San Onofre 2 and 3 (92-15)

It appeared that, in general, development of the check valve program was in its early stages even though industry guidance had been available since 1986 and the licensee had direct check valve failure experience since 1985. Review of the valve IST program revealed the following conditions which were identified as weaknesses: numerical designations and valve sizes were not consistent between the plant computer data management system and the IST program and an applicable procedure, and test acceptance criteria established for a number of check valves in several safety-related systems did not comply with Position 1 in Generic Letter 89-04. In addition, a non-cited violation was identified regarding approximately 49 check valves in safety-related systems that had not received the required reverse flow testing. There were no administrative procedures addressing check valve maintenance activities and several poor maintenance practices were identified. A non-intrusive testing program had not been established; however, check valve closure was being determined by radiography. There was no documentation of check valve trending activities. It was concluded that a program for identifying and correcting check valve deficient conditions existed and was being implemented. The licensee did not perform a check valve design application review. The review of certain industry information (Information Notice 88-70) was not adequate as evidenced by the failure to identify that reverse flow testing of check valves was not being performed and the failure to verify that all required valves were in the IST program. Check valve training activities were largely inadequate, in that the only check valve training received by maintenance personnel since 1985, was a yearly discussion of current industry events.

Senior management involvement in check valve program implementation and assessment was not readily apparent. The NRC inspection identified one non-cited violation and no deviations.

CONCLUSION/RECOMMENDATION

Basically, there are 10 inspection elements identified in the TI which, for the most part, have been addressed during the inspections. In general, each region has applied a similar inspection approach, with some elements being weighted more than others. The inspection methodology of TI 2515-110 is rather extensive; however some of the elements can be looked at in an integrated fashion, with more effort being focused on IST, maintenance, and design application review. The inspection results revealed a wide range in licensees' responsiveness to establishing check valve reliability programs. Programs ranged from being virtually nonexistent with little management involvement, to those that were well established and having exceptional management support. It was interesting to note that most of the identified "hits", in terms of impact, occurred in the area of IST. Considering the extensive amount of industry information, including NRC Information Notices and Generic Letter 89-04, and NRR review of licensee programs, it would seem that this area should have had the least problems. It was also noted that only three licensees had established non-intrusive testing programs and just one had implemented trending activities.

In terms of documenting findings, Region IV has identified two violations (one non-cited) and Region V has identified one non-cited violation. For whatever reasons, other findings appeared to have been violations but were not documented as such.

Regardless, the inspections act as a catalyst for increased licensee actions, and hopefully, improved performance in an area that has experienced continuing problems. It is recommended that Region IV continue this inspection activity at the remaining four sites (Wolf Creek, ANO, Comanche Peak, and South Texas). Our remaining inspections should be weighted more heavily towards check valve IST, design application reviews, and maintenance activities.

Attached, is a summary table which provides a brief statement describing the status of each of the identified inspection elements, by site.

RIV:MS:RI	C:MS			
LEEIlershaw	TFStetka			
/ /93	/ /93			

CHECK VALVE PROGRAM SUMMARY TABLE

STATE REPORT NO	CHECK VALVE PROGRAM	CHECK VALVE TEST EFFORT	CHECK VALVE MAINTENANCE	NON-INTRUSIVE TESTING	CHECK VALVE TRENDING	CORRECTIVE ACTION	CHECK VALVE DESIGN REVIEW	CHECK VALVE INDUSTRY INFORMATION	CHECK VALVE TRAINING	CHECK VALVE PROGRAM SELF ASSESSMENT AND MANAGEMENT INVOLVEMENT
TMI-1 (92-04)	A CONTROLLED PROGRAM DOCUMENT DID NOT EXIST	A CONTROLLED AND CONSOLIDATED PROGRAM DOCUMENT DID NOT EXIST	THE PROGRAM WAS CONSIDERED STRONG AND CONTINUED TO SHOW IMPROVEMENT	VERY PRODUCTIVE AND EFFECTIVE	VIRTUALLY NON-EXISTENT	CONSIDERED STRONG AND EFFECTIVE	INCOMPLETE AND CRITICAL VELOCITY CALCULATIONS HAD NOT RECEIVED A FORMAL REVIEW	THE PROGRAM WAS EFFECTIVELY IMPLEMENTED	APPEARED TO BE EFFECTIVE	SELF ASSESSMENT WAS NOT ADDRESSED, BUT MANAGEMENT INVOLVEMENT WAS APPARENT
NORTH ANNA 1 AND 2 (92-19)	THE PROGRAM WAS DOCUMENTED AND COMPREHENSIVE	ACCEPTABLE	A PM PROGRAM HAD BEEN ESTABLISHED BUT WAS WEAK	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM HAD BEEN ESTABLISHED AND IMPLEMENTED	ESTABLISHED AND IMPLEMENTED	VERY COMPREHENSIVE AND STRONG	THE PROGRAM WAS EFFECTIVELY IMPLEMENTED	APPEARED TO BE EFFECTIVE	LIMITED SELF ASSESSMENT BUT STRONG MANAGEMENT SUPPORT
PERRY (92015(DRS))	A FORMAL PROGRAM AND CONTROLLING PROCEDURE DID NOT EXIST	THE PROGRAM WAS POOR AND FULL FLOW EXERCISE TESTING DID NOT MEET GL 89-04	FORMAL GUIDANCE WAS LACKING	VERY LIMITED USE	A PROGRAM HAD NOT BEEN ESTABLISHED	ADEQUATELY IMPLEMENTED	COMPREHENSIVE AND STRONG	THE PROGRAM HAD BEEN ADEQUATELY IMPLEMENTED	VERY STRONG	GOOD LEVEL OF SELF ASSESSMENT AND MANAGEMENT SUPPORT
FERM1 2 (92014(DRS))	A PROGRAM HAD BEEN DEVELOPED BUT THERE WAS NO CONTROLLING ADMINISTRATIVE PROCEDURE	ACCEPTABLE	AN ACCEPTABLE PM PROGRAM CONSISTING OF DISASSEMBLY AND INSPECTION HAD BEEN ESTABLISHED	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM HAD NOT BEEN ESTABLISHED	WAS NOT INSPECTED	THOROUGH AND CONSISTENT WITH EPRI GUIDELINES, HOWEVER, BASIS FOR EXCLUSION OF CERTAIN VALVES WAS NOT CLEAR	WAS NOT INSPECTED	WAS NOT INSPECTED	WAS NOT INSPECTED
LASALLE 1 AND 2 (92015(DRS))	THE PROGRAM WAS WELL ESTABLISHED AND DOCUMENTED	ACCEPTABLE	A PM PROGRAM CONSISTING OF DISASSEMBLY AND TESTING HAD BEEN ESTABLISHED AND WAS CONSIDERED ACCEPTABLE	THE PROGRAM WAS CONSIDERED VERY STRONG	A PROGRAM HAD NOT BEEN ESTABLISHED	COMPREHENSIVE, HOWEVER WEAKNESSES IN DOCUMENTATION WERE IDENTIFIED	THOROUGH AND COMPREHENSIVE	WAS NOT INSPECTED	WAS NOT INSPECTED	SELF ASSESSMENT WAS NOT ADDRESSED, HOWEVER STRONG MANAGEMENT SUPPORT WAS EVIDENT

KEOWEET (920194081)	THE PROGRAM WAS CONSIDERED GOOD	ESTABLISHED. HOWEVER, FULL FLOW TESTING ACCEPTANCE CRITERIA WAS INCOMPLETE AND PROCEDURES NOT ESTABLISHED TO TEST AUX PW PUMP DISCHARGE CHECK VALVES	A PM PROGRAM HAD BEEN ESTABLISHED AND WAS GENERALLY CONSIDERED GOOD	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM HAD NOT BEEN ESTABLISHED	WAS NOT INSPECTED	COMPREHENSIVE AND THOROUGH, EXCEPT A FEW EXCLUDING CERTAIN VALVES DID NOT EXIST	WAS NOT INSPECTED	WAS NOT INSPECTED	SELF ASSESSMENT WAS CONSIDERED A STRONG MANAGEMENT INVOLVEMENT WAS STRONG
RIVER BEND (92-22)	THE PROGRAM WAS ESTABLISHED BUT LACKED COORDINATION AND INFORMATION SHARING WITH OTHER GROUPS	ACCEPTABLE	PROGRAM WAS ACCEPTABLE AND BASED ON PREDICTIVE MAINTENANCE	THE PROGRAM WAS WELL ESTABLISHED	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM WAS ESTABLISHED BUT CONDITION REPORTS NOT INITIATED WHEN CHECK VALVES FAILED TO MEET TEST ACCEPTANCE CRITERIA	A MINIMAL DESIGN APPLICATION REVIEW WAS PERFORMED	AN ACCEPTABLE PROGRAM HAD BEEN ESTABLISHED	WAS NOT INSPECTED	MANAGEMENT INVOLVEMENT WAS NOT CONSIDERED STRONG
SITE REPORT NO.	CHECK VALVE PROGRAM	CHECK VALVE TEST EFFORT	CHECK VALVE MAINTENANCE	NON-INTENSIVE TESTING	CHECK VALVE TRENDING	CORRECTIVE ACTION	CHECK VALVE DESIGN REVIEW	CHECK VALVE INDUSTRY INFORMATION	CHECK VALVE TRAINING	CHECK VALVE PROGRAM SELF ASSESSMENT AND MANAGEMENT INVOLVEMENT
FORT CALHOUN (92-25)	THE PROGRAM WAS ESTABLISHED BUT LACKED COORDINATION AND SHARING WITH OTHER GROUPS	ACCEPTABLE	A PM PROGRAM HAD BEEN ESTABLISHED AND WAS CONSIDERED ACCEPTABLE	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM HAD BEEN ESTABLISHED AND WAS CONSIDERED ACCEPTABLE	DESIGN APPLICATION REVIEW WAS NOT IN ACCORDANCE WITH EPRI GUIDELINES AND ERRORS EXISTED BETWEEN TECHNICAL DATABASE AND DRAWINGS	THE PROGRAM APPEARED TO BE STRONG	WAS NOT INSPECTED	SELF ASSESSMENT ACTIVITIES HAD IMPROVED AND MANAGEMENT INVOLVEMENT APPEARED TO BE STRONG
COOPER (92-23)	A FORMAL DOCUMENTED PROGRAM HAD NOT BEEN ESTABLISHED	ACCEPTABLE	A PM PROGRAM HAD BEEN ESTABLISHED AND WAS CONSIDERED ACCEPTABLE	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM HAD BEEN ESTABLISHED AND APPEARED TO BE ADEQUATE	THE DESIGN REVIEW DATABASE WAS INADEQUATE IN THAT IT HAD NOT BEEN MAINTAINED CURRENT	THE PROGRAM HAD BEEN ESTABLISHED AND APPEARED TO BE EFFECTIVE	WAS NOT INSPECTED	SELF ASSESSMENT ACTIVITIES HAD IMPROVED AND MANAGEMENT INVOLVEMENT WAS SUPPORTIVE

SAN ONOFRIL 2 AND 3 (92-15)	DEVELOPMENT OF THE CHECK VALVE PROGRAM WAS IN ITS EARLY STAGES	THE PROGRAM WAS WEAK. INCORRECT DATA EXISTED. TEST ACCEPTANCE CRITERIA DID NOT COMPLY WITH GL 89- 104 AND 49 CHECK VALVES HAD NOT RECEIVED THE REQUIRED REVERSE FLOW TESTING	THERE WERE NO ADMINISTRATIVE PROCEDURES ESTABLISHED FOR CHECK VALVE MAINTENANCE ACTIVITIES	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM HAD NOT BEEN ESTABLISHED	A PROGRAM EXISTED AND WAS BEING IMPLEMENTED	NONE WAS PERFORMED	THE PROGRAM WAS CONSIDERED INADEQUATE	CHECK VALVE TRAINING ACTIVITIES WERE CONSIDERED INADEQUATE	SELF ASSESSMENT AND MANAGEMENT INVOLVEMENT WAS NOT APPARENT
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INVOICE

INVOICE NUMBER

MAKE CHECKS PAYABLE TO THE U.S. NUCLEAR REGULATORY COMMISSION, WRITE THE INVOICE NUMBER ON THE CHECK, AND
MAIL TO:U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF RESOURCE MANAGEMENT
DIVISION OF ACCOUNTING AND FINANCE
WASHINGTON, DC 20555

INVOICE DATE

October 17, 1986

LICENSE NUMBER (if applicable)

REFERENCE NUMBER (if applicable)

CONTACT:

NAME

TELEPHONE

AREA
CODE
301

NUMBER

TO:
Southern California Edison Company
P.O. Box 800
2244 Walnut Grove Avenue
Rosemead, California 91770

DESCRIPTION

AMOUNT

Received full payment for EA 86-97, dated September 17, 1986,
Docket No. 50-206.

\$180,000

AMOUNT DUE
(See Terms)

\$180,000

TERMS. Interest will accrue from the invoice date at the annual rate of _____%. Payment is due immediately. However, interest will be waived if payment is received within 30 days from the invoice date.

NOTE. If there are any questions about the existence or amount of the debt, contact the individual named above. For NRC debt collection procedures, including interest and penalty provisions, see 31 U.S.C. 3717, 4 CFR 101-105, and 10 CFR 15. The revocation of a license does not waive or affect any debt then due from a licensee. See 10 CFR 170.41 regarding failure by an applicant or licensee to pay prescribed fees.

A- 692371

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1220



Southern California Edison Company

Payable through Bank of America NT & SA
Walnut Grove-Rush Branch, Rosemead, California

SEP 23 1986

Paul Zesillo
PAYMENT AUTHORIZED FOR CONTROLLER IF OVER \$100,000

pay to the
order of

TREASURER OF THE UNITED STATES

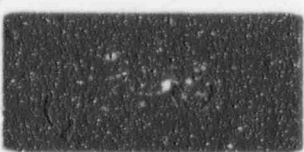
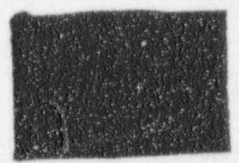
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Dr. L. Israel

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[Signature]



ORGANIZATION: CRANE COMPANY - CHEMPUMP DIVISION
WARRINGTON, PENNSYLVANIA

REPORT
NO.: 999001048/86-01

INSPECTION
DATE: 03/04-05/86

INSPECTION
ON-SITE HOURS: 20

CORRESPONDENCE ADDRESS: Crane Co., Chempump Division
ATTN: Richard Carpenter
Director of Quality
Assurance/Engineering
175 Titus Avenue
Warrington, Pennsylvania 18976
ORGANIZATIONAL CONTACT: Mr. Terry Flynn
TELEPHONE NUMBER: (215) 343-6000

NUCLEAR INDUSTRY ACTIVITY: Manufacture of pumps and valves/spare parts.

ASSIGNED INSPECTOR:

J. C. Harper
J. C. Harper, Reactive Inspection Section (RIS)

5/12/86
Date

OTHER INSPECTOR(S): J. T. Conway, RIS

APPROVED BY:

E. W. Merschoff
E. W. Merschoff, Chief, RIS, Vendor Program Branch

5/12/86
Date

INSPECTION BASES AND SCOPE:

- A. BASES: 10 CFR Part 21
- B. SCOPE: The inspection was made as a result of problems noted with swing check valve operability at Nuclear Power Plants. The Crane Company, Chempump Division was inspected to obtain information regarding technical requirements, quality control and other related problems associated with the manufacture and maintenance of swing check valves.

PLANT SITE APPLICABILITY: TVA 1, 2 and 3 (50-259, 50-260 and 50-296)

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REPORT
NO.: 999001048/86-01

INSPECTION
RESULTS:

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A. Violations:

1. Contrary to Section 21.21 of 10 CFR Part 21, the Crane Co., Chempump Division failed to have a procedure for evaluating and reporting defects and nonconformances relating to safety-related ASME Section III components (valves and pumps) for nuclear service manufactured at their facility. The existing Procedure QAP-5 Rev. 0 "Reporting of Defects and Noncompliances on Delivered Components" does not describe a method of notifying the Commission of a defect in cases where notification is necessary.
2. Contrary to Section 21.31 of 10 CFR Part 21, the Crane Co., Chempump Division failed to pass down the requirements of 10 CFR Part 21 to the Abar Corp. The Abar Corp. supplied the Chempump Division with welding services on diaphragm operated globe control valves, PO 74390 on October 1982. The original order was from TVA, Browns Ferry Nuclear Plant, job order number 82PA2-828937. (86-01-02)

B. Nonconformances:

None.

C. Unresolved Items:

None.

D. Other Findings or Comments:

1. Crane Co. Background - Nuclear Valves

Prior to 1976, Section III valves were fabricated by the Valve and Fittings Division (VFD) of Crane Company located in Chicago, Illinois. The Crane Chicago plant let their "N" and "NPT" stamps expire in 1976 and transferred the entire operation to locations in Washington, Iowa; Chattanooga, Tennessee; and Indian Orchard, Massachusetts. Safety related nuclear valves and Section III spare parts for valves produced at the Chicago facility apparently were not being produced at these three locations since none of the facilities ever possessed an "N" or "NPT" stamp. Crane's Director of Engineering for the VFD, located in Elmsford, New York, indicated that to the best of his knowledge, spare parts have not been fabricated by Crane for the pressure retaining components (i.e., body, bonnet, disc, and bonnet

ORGANIZATION: CRANE COMPANY - CHEMPUMP DIVISION
WARRINGTON, PENNSYLVANIA

REPORT

NO.: 999001048/86-01

INSPECTION
RESULTS:

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fasteners) for nuclear valves fabricated at the Chicago facility. He also said that the manufacturing and QA records for the Section III valves were probably destroyed.

Crane purchased Flomatics Corporation, a west coast company, in the late sixties and moved the equipment to Warrington, Pennsylvania and started operations as the Chempump Division (CD) in 1971. In the 1973-1974 time frame, CD produced the initial N-stamp valves for the Crystal River facility of Florida Power & Light. CD's Certificate of Authorization (CA) Nos. for the "N" and "NPT" stamps are N-2057 and N-2058, respectively, with an expiration date for both of March 24, 1987. The scope of the two CAs is for the manufacture of Section III pumps, valves, parts and appurtenances, piping subassemblies, and component supports at the Warrington, Pennsylvania facility.

Chempump's product line includes a canned motor pump made to Section III requirements, a metering pump and the Flomatic valve line plus converter gear. The percent of nuclear activity relating to the manufacture of spare parts for pumps and valves is approximately 15 percent and 30 percent, respectively.

The CD has never produced a Section III swing-type check valve or associated spare parts for a commercial nuclear power plant. With the exception of four nuclear valves (globe and angle control) produced for the Tennessee Valley Authority, the majority of Section III valves and spare parts have been produced for Aerojet Nuclear Company and EG&G-Idaho for the Idaho National Engineering Laboratory (INEL). Approximately eleven swing-type check valves were manufactured and sent to the INEL between 1975-1978. The valves produced at CD are considered an engineered product line, and distributors are not used to market CD's products. Usually one to three valves are fabricated to a specific design, and they are shipped directly to the customer. In the field, marketing is handled by independent representatives.

During a review of the Engineering Records for six orders of swing-type check valves produced for INEL, it was noted that Crane engineering personnel performed calculations to size the valves based on the customer's specification requirements referenced in the technical specification. With the exception of feedback from EG&G on the globe valves, CD management was not aware of any contact with other customers regarding failures of swing-type check valves.

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NO.: 999001048/86-01

INSPECTION
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In late 1985, Crane purchased Aloyco (formerly Walworth Co.), located in Linden, New Jersey, and transferred the equipment and records to Romeoville, Illinois. Crane is in the process of renewing the "N" and "NPT" stamps originally held by Aloyco to allow them to continue to manufacture Section III valves and spare parts at the Romeoville facility. In May 1985, Crane purchased from Mark Controls eight valve service reconditioning facilities located in Baton Rouge, Louisiana; Chicago, Illinois; Houston, Texas; Pittsburgh and Philadelphia, Pennsylvania; Los Angeles and San Francisco, California; and Springfield, Massachusetts.

2. Part 21

The CD did not have the correct posting of 10 CFR Part 21 according to Section 21.6. A Part 21 procedure was posted (QAP-5), however neither the Part 21 notice nor Section 206 were posted as required. At the time of the inspection the QA Manager was made aware of Crane's option to post only Section 206 and a notice which describes the regulations/procedures as stated in Section 21.6(b) of 10 CFR Part 21.

The CD Part 21 procedure QAP-5 "Reporting of Defects and Noncompliances on Delivered Components" was inadequate. The procedure does not address reporting of defects and noncompliances for components manufactured by the Crane Company, nor does it describe methods of notifying the NRC when reporting defects and noncompliances. (86-01-01)

It was determined by the NRC inspector that purchase order no. 74390, dated October 1982 to the Abar Corp. from the CD, did not have the requirements of 10 CFR Part 21 as an applicable requirement. The Abar Corporation supplied the CD with body and seat weldments and carbon steel with stellite seat rings on 2" - 900 lb. diaphragm operated globe control valves. The original order to CD, was from TVA, order no. A2-828937, Browns Ferry Nuclear Plant, for diaphragm operated globe control valves. (85-01-02)

ORGANIZATION: CRANE COMPANY - CHEMPUMP DIVISION
WARRINGTON, PENNSYLVANIA

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E. Exit Meeting:

<u>Name</u>	<u>Title</u>	<u>Company</u>
1. Jeff Harper	Met Eng.	US NRC
2. Thomas Rittenhouse	Product Eng.	Crane Company Chempump Division
3. Rex Vernon	Crane/Flomatic Sales Mgr.	Crane Company
4. Jim Conway	Met Eng.	US NRC