ENCLOSURE 2

ORGANIZATION:	Consolidated Power Supply Birmingham, Alabama
REPORT NO.:	999001263/93-01
CORRESPONDENCE ADDRESS:	Mr. Mark Mathias General Manager Consolidated Power Supply 3556 Mary Taylor Road Birmingham, Alabama 35235
NUCLEAR INDUSTRY ACTIVITY:	Supplies pipe and steel products for use at commercial facilities and nuclear power plants
INSPECTION CONDUCTED:	December 6 through 10, 1993
INSPECTOR:	Larry L Campbell 1/31/94 Larry L Campbell Date Reactive Inspection Section No. 1 Vendor Inspection Branch
OTHER INSPECTORS:	David H. Brewer, Reactor Engineer Donald G. Naujock, Materials Engineer
APPROVED:	Uldis V Potapovs 2-1-94 Uldis Potapovs, Chief Date Reactive Inspection Section No. 1 Vendor Inspection Branch
INSPECTION BASIS:	10 CFR Part 21 and Appendix B to 10 CFR Part 50
INSPECTION SCOPE:	To review and evaluate the Consolidated Power Supply (CPS) quality assurance program and its implementation in selected areas such as (1) control of purchased material and services, (2) material and traceability control, (3) training and inspection, and (4) commercial grade item dedication.
PLANT SITE APPLICABILITY:	Browns Ferry (50-259, 50-260, 50-296) Brunswick (50-324, 50-325) Farley (50-348, 50-364) Indian Point, Unit 2 (50-247) Pilgrim (50-293) South Texas Project (50-498, 50-499) Turkey Point (50-250, 50-251) Other plants using CPS products

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1. INSPECTION SUMMARY

1.1 Nonconformances

Contrary to Criterion VII of Appendix B to Title 10 of the Code of Federal Regulations (10 CFR) Part 50 and Section 3 of the Consolidated Power Supply (CPS) Quality Assurance (QA) Manual, the Material Critical Characteristics Form No. 701/FIT-14-216, Revision 0, dated January 23, 1993, and the Sales Order Form No. 6534424 for the supply of flanges and reducers in accordance with Bechtel Constructors Purchase Order (PO) No. CEF-5658, dated January 28, 1993, did not contain adequate measures to ensure that the material being supplied met the customer procurement document requirements (Nonconformance 99901263/93-01-01, see Section 3.4.1.1 of this report).

Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections 12 and 17 of the CPS QA Manual, calibration records for the CPS spectrometer were being stored on computer diskettes, were not easily retrievable due to the software program, and offered no documented objective evidence that these calibrations had been reviewed and accepted by the CPS QA Department (Nonconformance 99901263/93-01-02, see Section 3.5.2.1 of this report).

Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section V of the CPS QA Manual, CPS Procedure No. SP-202 did not contain an acceptance criterion for the daily spectrometer standardization and set no limits on the analysis range for each element affected by the one-point standardization method (Nonconformance 99901263/93-01-03, see Section 3.5.2.2 of this report).

1.2 Open Item

CPS performed an incorrect analysis of the calibration results for a pressure gauge found to be out of calibration. This incorrect analysis resulted in an error in CPS's notification to its customers. The inaccuracy of the notification to CPS customers is considered an open item pending corrective action by CPS (Open Item 99901263/93-01-04, see Section 3.2.1.1 of this report).

2 STATUS OF PREVIOUS INSPECTION FINDINGS

This was the first inspection at CPS.

3 INSPECTION FINDINGS AND OTHER COMMENTS

3.1 Entrance and Exit Meetings

In the entrance meeting on December 6, 1993, the NRC inspectors discussed the scope of the inspection and established interfaces with CPS management. During the exit meeting on December 10, 1993, the NRC inspectors discussed their findings and concerns with CPS management and other staff.

3.2 10 CFR Part 21

The NRC inspectors observed that CPS maintained the required 10 CFR Part 21 postings in three locations: the inspection area of the shop, the break room, and the testing laboratory. In the inspection area of the shop and the break room, Section 206 of the Energy Reorganization Act of 1974 was posted behind 10 CFR Part 21, so that it was not readily visible. When the NRC inspectors informed CPS of this, they immediately repositioned the Section 206 material so that it became readily visible.

CPS Procedure No. SP-601, "Identification, Evaluation and Reporting of Defects and Failure to Comply," Revision 4, dated October 6, 1993, was written to implement the provisions of 10 CFR Part 21. The NRC inspectors reviewed the procedure for compliance with the January 1, 1993, version of 10 CFR Part 21 and found no discrepancies.

3.2.1 Implementation of the CPS 10 CFR Part 21 Procedure

CPS Procedure No. SP-405, "Nonconformances," Revision 2, dated October 14, 1992, provides instructions for processing defects and failures to comply. The quality assurance manager is responsible for implementing the procedure and receiving reports. All nonconforming material is described in a nonconformance report (NCR) that is assigned a unique number. An NCR Log is maintained to track nonconforming material. A space on the NCR form is used for stating whether or not the nonconformance is reportable under the provisions of 10 CFR Part 21.

Within the last two years, CPS has filed the following Part 21 reports with the NRC:

(1) calibration of a pressure gauge used to pressure test pipe and fittings which showed the gauge was beyond acceptable limits for indicating accurate pressure,

(2) square steel pipe obtained from a supplier which showed inadequate closure in the welded seam, and

(3) inadequate traceability for material obtained from a supplier for upgrade to ASME Code, Section III, NCA-3867.4(e).

3.2.1.1 Pressure Gauge

The NRC inspectors reviewed documentation for the nonconforming gauge and observed that this gauge and other gauges were being calibrated in a timely manner and that a use log had been maintained identifying products that had been accepted using the gauge. The Gauge Use Record showed that the products of six customers had been accepted by the nonconforming gauge since the last calibration. The six customers were notified of the discrepancy identified by the calibration activity. Responses were received from all U.S. customers noting plans for resolving the situation. One customer, Comision Federal de

Electricidad, of Mexico, did not respond. CPS stated that the nonconforming gauge had been removed from service.

The nonconforming gauge had a range of 0 to 5000 pounds per square inch (psi). Calibration was performed at 1000-psi intervals from 0 to 5000 psi. The official calibration record showed that at 0 psi the gauge showed below 0 psi and at each of the pressures checked, the gauge showed from 150 to 200 psi lower than the standard. For example, when the standard was set to 2000 psi, the gauge indicated 1850 psi. The NRC inspectors observed that CPS had notified its customers that pressure testing of pipe and fittings was lower than the required pressure. The NRC inspectors noted that this was an incorrect analysis of the calibration report. If the gauge read 1850 psi when the actual pressure was 2000 psi, and the gauge was pressurized to 2000 psi, actual pressure would be 2150 psi. This means that the pressure used to test products was higher than indicated rather than lower. The inaccuracy of the notification to CPS customers is considered an open item pending corrective action by CPS (Open Item 99901263/93-01-04).

3.2.1.2 Steel Tubing

CPS obtained the defective 4 inch by 4 inch by 1/2 inch wall, A-500, Grade B, square structural steel tubing from the material manufacturer, UNR-Leavitt, Chicago, Illinois, and supplied the steel tubing to Bechtel Constructors for use at the Tennessee Valley Authority (TVA) Browns Ferry Nuclear Plant. During fabrication activity at Browns Ferry, a defective seam weld was observed in two pieces of tubing cut from the same length. CPS stated that UNR-Leavitt had performed root-cause analysis and taken corrective action. The NRC inspectors reviewed the CPS Part 21 file and found it contained a copy of the UNR-Leavitt root cause analysis and corrective action report. The NRC inspectors considered the corrective action adequate.

3.2.1.3 Improperly Upgraded Code Material

The NRC inspectors evaluated CPS's actions for the improperly upgraded American Society of Mechanical Engineers (ASME) Section III Code material. CPS procured one 24 inch flange, SA-182, Type 316L, from Texas Metal Works (TMW) and one test bar from TMW invoking the TMW quality program for traceability of the material within the TMW facility. The material was "upgraded" by CPS in accordance with the requirements of NCA-3867.4(e) and delivered to Connex Pipe Systems (Connex), Marietta, Ohio.

The initial concern for traceability was identified during a survey conducted by the ASME at CPS, October 12-14, 1992. The ASME auditor questioned the CPS upgrade process because the TMW certification stated that tests had been performed on material from the same heat but not from the same piece from which the flange had been produced. CPS performed a source surveillance at TMW on October 16-17, 1992, and verified that the material supplied to Connex had not come from a piece of material that had been tested by either TMW or CPS. Therefore, the flange supplied to Connex by CPS could not be properly upgraded according to the requirements of ASME Code, Section III, NCA-3867.4(e).

CPS initiated an evaluation to determine what other materials may have been supplied from TMW through CPS without acceptable ASME Code upgrade. Eleven orders were identified for review. CPS determined that two had used the same starting piece for testing and the production of parts, however nine orders had been improperly upgraded. CPS notified the customers affected by the nine orders that ASME Code certification for the affected materials had been withdrawn. CPS has determined that TMW is unwilling to perform the activities necessary to provide adequate traceability for ASME Code, Section III, NCA-3867.4(e), upgrade. CPS personnel stated that TMW has been removed from the CPS Approved Vendors List.

3.2.2 CPS Procurement Documents

The NRC inspectors examined the CPS Approved Vendor List for companies that provided calibration and nondestructive evaluation services. Seven companies provided these services to CPS. Three of these companies were selected for review to determine that purchase orders placed by CPS incorporated the requirements of 10 CFR Part 21 and 10 CFR Part 50, Appendix B. In each case, the NRC inspectors found the requirements of 10 CFR Part 21 and 10 CFR Part 50, Appendix B, had been incorporated in the purchase order, either directly in the PO's text or by reference to the company's QA manual.

Among the POs reviewed were those to SATEC Materials Testing Equipment for the calibration of the tensile testing machine; Laboratory Testing, Inc. for nondestructive examination (NDE) services (ultrasonic testing on the specific order reviewed); and Gage Lab Corp. for calibration services. The Approved Vendor List itemized the revision and date of the quality assurance manual to which each company was audited, the date of the most recent audit, and the expiration date of approval. The NRC inspectors observed that all audits were current.

3.3 CPS Commercial Grade Dedication Program

3.3.1 Methodology

The requirements for CPS's dedication process are prescribed in Procedure No. SP-701, Revision 3, dated January 9, 1992. The NRC inspectors reviewed Procedure No. SP-701 and several other procedures controlling CPS's dedication activities such as (1) processing incoming orders, (2) receiving inspection, (3) laboratory testing, (4) audits and surveys, and (5) quality control inspector training and certification. The implementation of CPS's dedication process was also reviewed and is discussed in Section 3.4 of this report.

Incoming customer purchase orders (POs) are initially reviewed by the Sales Department and a sales order is generated. The sales order includes a description of the material to be supplied, instructions for processing the material, and the appropriate quality level (QL) for the material being supplied. If a customer's PO is for several items having different QLs, a separate sales order is used for each QL.

CPS has assigned the QL-3 designation for items purchased as commercial grade that are to be dedicated for safety-related applications. Procedure

No. SP-701 requires that critical characteristics for an item to be dedicated be determined by a person who holds an engineering degree and who is familiar with the item, and be documented on CPS Form No. 701. A Form No. 701 is not prepared for each sales order, but is prepared for specific types and, in some instances, specific sizes of material (e.g., 4 inch and smaller A-105 carbon steel socket weld fittings or A-36 carbon steel angle). The completed Form No. 701 is reviewed by the QA Manager.

Before releasing the sales order for processing, the QA department reviews it to ensure that adequate instructions have been given, including the verification of critical characteristics identified on the applicable Form No. 701. Also, when a supplier is being used to control and verify a quality-related activity, the QA review ensures that the supplier has been audited or surveyed and approved for performing the activity.

3.3.2 Dedication Program Weaknesses

The NRC inspectors reviewed CPS's QA Manual, Third Edition, Revision 1, dated March 31, 1993, and determined that it failed to identify responsibilities and controls for the commercial grade dedication process. Although the title of Section 9, "Upgrade of Stock Material and Dedication of Commercial Grade Items," implies that its scope includes the dedication process, this section only requires that a procedure be developed to describe the dedication process. CPS informed the NRC inspectors that a revision to its QA manual, effective January 2, 1994, identifies a new position in CPS's organizational structure, a quality engineer, responsible for evaluating and documenting critical characteristics of material for the CPS commercial grade dedication program.

The NRC inspectors concluded that Procedure No. SP-701 addresses the essential elements of the dedication process and that sufficient guidance for performing activities such as inspection and testing are given in other procedures and instructions. Although the NRC inspectors determined that, in general, the CPS dedication process was adequate, the following program weaknesses appear to have contributed to the one unacceptable dedication package reviewed by the NRC inspectors (see Nonconformance 99901263/93-01-01 in Section 3.4.1 of this report):

(1) Procedure No. SP-701 does not contain requirements or guidance for selecting critical characteristics.

(2) The bases for not verifying certain material specification requirements (considered to be critical characteristics) are not required to be documented on the Material Critical Characteristics Form No. 701.

(3) Laboratory test results are accepted as meeting the material specification requirements without questioning what effects these results have on other material specification requirements not verified during the dedication process. This is of concern when the other material requirements, not verified, are considered critical characteristics or when there are questionable differences between the CPS test results and the test results provided by the material supplier.

(4) The NRC inspectors questioned CPS's practice of including unvalidated supplier material certifications (stamped "QA Accepted" during the initial screening of incoming commercial grade items) in documentation packages supplied to customers when confirmatory material property overchecks clearly show that the supplier certification was questionable (see Section 3.4.1.1 of this report).

(5) The NRC inspectors expressed a concern that CPS does not appear to be documenting abnormal laboratory conditions that could potentially impact test laboratory results (see Section 3.5.4 of this report).

CPS informed the NRC inspectors that in response to a November 18, 1993, letter to CPS (Mr. Steven W. Andrews, Quality Assurance Manager) from NRC (Leif J. Norrholm, Chief, Vendor Inspection Branch), "Request for Interpretation on Commercial Grade Dedication Practices," in which the NRC responded to several dedication questions, CPS will be revising its dedication program.

3.3.3 Dedication Program Strengths

The NRC inspectors considered the following to be strengths in CPS's dedication program:

(1) Strong management support and involvement in establishing a commercial grade dedication program consistent with recent NRC correspondence to CPS.

(2) CPS test laboratory capabilities for verifying material critical characteristics includes equipment such as the Baird spectrometer, a nitrogen analyzer, a Baldwin tensile machine, and various types of hardness testers. The CPS lab is outfitted with rebuilt equipment that utilizes computer enhancements and new equipment that utilizes the latest improvements associated with proven technology. CPS management is responsive to the needs of the lab. The lab technician has received special training from the suppliers of the lab equipment. The lab is involved in round-robin chemical testing programs which helps CPS evaluate its lab's performance.

(3) CPS personnel performing testing, inspection, and document review activities were knowledgeable about their work and had a positive attitude.

(4) Limited-scope audits and surveys were used to support dedications.

(5) Initial screening of commercial grade material using material test reports submitted by the commercial suppliers (these test reports were not considered to be valid and were not used to verify critical characteristics; however these reports, along with receiving inspections, were used to screen potentially unacceptable material before subjecting the material to laboratory testing).

(6) CPS performed some type of test(s) on each QL-3 piece of material being dedicated.

3.4 CPS Commercial Grade Dedication Program Implementation

The NRC inspectors reviewed several in-process and completed QL-3 commercial grade material dedication sales order packages to determine if the critical characteristics for materials had been properly identified and verified, and if adequate procedural controls were in place. The NRC inspectors also observed in-process inspection and testing activities, test equipment calibrations, and processing of sales orders for QL-3 materials.

3.4.1 QL-3 Sales Order Packages

The NRC inspectors reviewed the following completed QL-3 sales orders.

3.4.1.1 1993 Completed Order Packages

1. Sales Order No. 6537637 for the supply of one piece of 48-inch-wide by 96-inch-long by 1/2-inch-thick, A-240, Type 316L, plate in accordance with Carolina Power & Light PO No. 7J2390CH, dated August 8, 1993, to the Brunswick Nuclear Plant. CPS tested a sample and confirmed that the following material critical characteristics met specification requirements: (1) yield and ultimate strength, (2) chemistry (including nitrogen), (3) elongation, and (4) hardness.

2. Sales Order No. 6535197 for the supply of 2 1/2 inch diameter by 11 to 13 foot, A-479, Type 316, round bar in accordance with Florida Power & Light Company PO No. C93677-90332, dated March 31, 1993, to the Turkey Point Nuclear Plant. CPS tested a sample and confirmed that the following material critical characteristics met specification requirements: (1) yield and ultimate strength, (2) chemistry (including nitrogen), (3) elongation, and (4) reduction of area.

3. Sales Order No. 6535751 for the supply of one piece of 1 inch by 4 foot by 8 foot, A-36 carbon steel plate in accordance with Boston Edison Company PO No. STR129269, dated June 2, 1993, to the Pilgrim Nuclear Station. CPS tested a sample and confirmed that the following material critical characteristics met specification requirements: (1) yield and ultimate strength, (2) chemistry, (3) elongation, and (4) reduction of area.

4. Sales Order No.6534424 for the supply of several 2 1/2 inch and 3 inch, A-216, Grade WCB, flanged fittings in accordance with Bechtel Constructors PO No. CEF 5658, dated January 13, 1993, to the Consolidated Edison Company's Indian Point Nuclear Plant, Unit No. 2. CPS purchased these fittings, with flange bolt holes undrilled, from Glover Machine Works (Glover), an unapproved vendor. The fittings were sent to Jordan Machine Company (Jordan), an approved supplier for machining and traceability of material for machining services. Jordan machined the bolt holes for each flanged fitting and bagged the machined

filings, identified each bag so that it was traceable to the machined fitting, and sent the machined flanged fitting and bags of machined filings to CPS.

For each bag of machined filings received, CPS cleaned the machined filings, melted them into a test specimen, and tested the chemistry of each specimen to confirm that the chemistry requirements of Material Specification A-216 were met. CPS did not perform hardness checks or other tests to confirm the physical properties of the fittings.

The NRC inspectors discussed the dedication of the fittings with CPS, and determined that the Material Critical Characteristics Form No. 701/FIT-14-A216, "Carbon Steel Castings, Suitable for Fusion Welding-High Temperature Service, Specification A-216," did not identify adequate critical characteristics to ensure that the fittings met the requirements of Specification A-216. The NRC inspectors also expressed a concern to CPS on the use of chemistry testing to accept the physical properties of the fittings.

The following is a listing of certain chemical elements for selected A-216 fittings (supplied in accordance with Bechtel Constructors PO No. CEF-5658) obtained by the CPS test laboratory and compared to Glover's test report and the A-216 specification requirements:

Element	A-216 Specification Requirement (w/o)*	Glover Material Test Report (w/o)*	CPS Material Test Report (w/o)*
Carbon (C)	0.30 maximum	0.23 to 0.27	0.069, 0.095 0.101, 0.130 0.199, etc.
Manganese (Mn)	1.0 maximum	0.62 to 0.68	0.554, 0.633 0.561, 0.655 0.698, etc.
Silicon (Si)	0.60 maximum	0.27 to 0.58	0.208, 0.277 0.435, 0.288 0.315, etc.
Phosphorus (P)	0.04 maximum	0.007 to 0.011	0.0186, 0.0193 0.0174, 0.0185 0.0202, etc.
Sulfur (S)	0.045 maximum	0.016 to 0.021	0.0277, 0.0258 0.0192, 0.0262 0.0275, etc.

* Weight percent

The NRC inspectors also discussed the acceptance of the CPS chemistry test results with CPS QA personnel and determined that acceptance of the results was based on not exceeding the maximum percent of the element identified in Specification A-216. The NRC inspectors were informed by the CPS QA manager that neither an evaluation to assess the impact of the reported chemistry on the materials physical properties nor a comparison of the CPS test results to the supplied vendor test report was required. The NRC inspectors discussed the results of the chemistry analysis with CPS including the acceptance of the material physical properties based only on verifying the material chemistry. The NRC inspectors identified several material specifications, other than A-216, having chemistry requirements enveloping the CPS identified chemistry. The NRC inspectors further identified that several of these specifications permitted the material to have less tensile strength than that required by the A-216 specification.

Although CPS did not take credit for the Glover Certified Material Test Report (CMTR), based on significant descrepancies between the chemical compositions stated in the Glover CMTR and those obtained by CPS (e. g., carbon), it appears that the CMTR supplied by Glover was not for the A-216 fittings received by CPS. This is based on the assumption that Jordan, an approved supplier, maintained traceability of the machined filings. The certification from Glover, used for the initial screening of the incoming commercial grade material, was reviewed and accepted by CPS QA. The certification from Glover and CPS test laboratory results were both included in the documentation package supplied to CPS's customer.

The NRC inspectors determined that there are no requirements in CPS's dedication program for comparing and evaluating CPS's test results to the vendor-supplied test reports, and for identifying questionable vendor test reports when they are being supplied to a customer. The NRC inspectors reviewed several documentation packages for dedicated material forwarded by CPS to its customers and determined that the certification used for the initial screening was included in these packages. The NRC inspectors questioned CPS's practice of including the unvalidated supplier certification (stamped "QA Accepted" during the initial commercial grade material screening process) in the documentation packages supplied to customers when confirmatory material property overchecks by CPS clearly show that the supplier certification was questionable. The NRC inspectors considered this an area needing improvement. When documentation provided by a supplier is questionable, such documentation should be identified as questionable when it is being supplied to a customer.

The NRC inspectors considered the dedication of these fittings to be a nonconformance because the critical characteristics identified and the verification methods did not provide reasonable assurance that the flanges and reducers supplied met the customer's procurement document requirements (Nonconformance 99901263/93-01-01).

3.4.1.2 In-process Sales Order Packages

1. Sales Order No. 6538718 for the supply of 12-inch-wide by 20-foot-long by 1/4-inch-thick, A-36 flat bar in accordance with Houston Power & Light PO No. QS003624, dated December 1, 1993, to the South Texas Project Electric Generating Station. CPS tested a sample and confirmed that the following material critical characteristics met specification requirements: (1) yield and ultimate strength, (2) chemistry, (3) elongation, and (4) reduction of area. CPS then shipped the material to Metalplate Galvanizing Inc., a CPS-qualified source, for galvanizing in accordance with CPS PO No. Z65-38314, Revision 0, dated December 2, 1993. The NRC inspectors observed the tensile and chemical testing of this material (see Section 3.5.3 of this report).

2. Sales Order No. 6538800 for the supply of Number 22-gage, 4-foot-wide by 10-foot-long, A-527 galvanized sheet steel in accordance with Alabama Power Company PO No. QP931738, dated November 23, 1993, to the Farley Nuclear Plant. The NRC inspectors observed the processing of this sales order and the QA review before its release for work. In addition to identifying the need for chemical and physical testing, the sales order identified a requirement for CPS source inspection to witness the cutting of the test sample and for establishing material traceability.

3.5 Testing Laboratory

CPS has the capabilities of performing in-house dimensional checks, mechanical tests, and chemical analysis. Tests not performed in-house are performed by qualified testing facilities.

3.5.1 Calibration

The NRC inspectors reviewed current and historical calibration records for: (1) a Baldwin universal tensile testing machine and extensiometers, (2) two Wilson hardness testers, (3) a Clark portable hardness tester, and (4) a Baird DV-4 spectrometer. The calibration records were reviewed for frequency of calibration and for compliance to the requirements of CPS Procedure No. SP-202, "Calibration and Maintenance of Measuring and Test Equipment," Revision 6, dated October 6, 1993.

3.5.2 Spectrometer Calibration

The Baird DV-4 spectrometer, CPS QA Identification (ID) No. 55, Serial Number (S/N) 1487, was calibrated annually in accordance with CPS Procedure No. SP-703, "Chemistry Testing," Revision 5, dated October 6, 1993, and consisted of two steps. The first step is the creation of a curve-set by developing curves for each element (a curve-set is a family of individual curves). The curve is a plot of light intensity emitted from a spark and the certified chemical concentration from purchased standards. The plot starts at zero and rises steadily up and to the right with increasing chemical concentrations. The second step is the standardization of the curve-set.

3.5.2.1 Curve-Set Calibration

The NRC inspectors reviewed the current carbon (C) and manganese (Mn) calibration curves and found that the Mn curve was not traceable to the National Institute of Standards and Technology (NIST) standards as required by Section 12.3 of the CPS QA manual. Further investigation by the NRC inspectors revealed that the NIST standards were part of the data base used to generate the original curve, but their relationships to the curves were not documented and traceable to NIST. CPS demonstrated to the NRC inspectors that the Mn curve was traceable to NIST standards by reconstructing the exact curve, which included the relative locations of selected NIST standards with respect to the curve. The Mn curve was printed, dated, and filed for future reference.

CPS informed the NRC inspectors that it assigns each curve-set a unique name, and that the computer software program requires changing the curve-set name when a change is made in the curve-set. Hard copies of curve-sets and changes to the curve-sets were not readily available for review by the NRC inspectors. CPS reviewed historical data that was stored on computer floppy diskettes in order to determine the date that a curve-set was installed in the computer. Each entry reviewed listed the curve-set name along with the average chemical analysis. By reviewing all entries stored on the diskettes, CPS was able to identify when the curve-sets were changed for the "low carbon and alloy steel" systems. CPS determined that changes were made to the curve-sets on February 7, 1991; April 17, 1992; and October 12, 1993, and recreated the curve-sets. The NRC inspectors considered the calibration records to be a nonconformance because calibration records for the CPS spectrometer were being stored on computer diskettes, were not easily retrievable due to the software program, and offered no documented objective evidence that these calibrations had been reviewed and accepted by the CPS QA Department (Nonconformance 99901263/93-01-02).

CPS informed the NRC inspectors that it would review the historical data, make copies of the curve-sets used with the different alloy systems, and date each curve in the curve-sets. During the conduct of the inspection, CPS prepared Nonconformance Report No. 93-212 and Corrective Action Request No. I93-33, both dated December 10, 1993, to document the unavailable spectrometer calibration records.

3.5.2.2 Curve-Set Standardization

The NRC inspectors and CPS discussed the standardization of curve-sets. The stored curve-sets are sensitive to atmospheric effects, equipment wear, and equipment cleanliness. In order to maintain a high level of accuracy, repeatability, and reproducibility, CPS repositions the curve-sets each day before their use or more frequently if necessary.

The repositioning of a curve-set is called "standardization" (STDZ). The most common type of STDZ is two-point STDZ. Two-point STDZ is accomplished by sparking standards that contain high and low chemical values of each element and locking the curves on these values. When the approximate chemical analysis of a test sample is known, a standard of similar chemical composition

can be used to lock the curve-set at that point. Locking the curve-set on a chemical composition is called one-point STDZ.

CPS uses a checklist in the STDZ procedure and files the checklist along with the proof of accuracy as a QA record. The proof of accuracy consists of sparking a NIST standard on the spectrometer and comparing the chemical analysis with the standard deviations printed on the certified material test report (CMTR) for that NIST standard. CPS informed the NRC inspectors that although its acceptance criterion is not proceduralized, the acceptance criterion for elements, which routinely exceed the standard deviations for a particular NIST standard, would be a 2-percent maximum deviation. The NRC inspectors reviewed selected files back to July 7, 1992, and found that the verbally stated acceptance criterion for STDZ was followed. The absence of this acceptance criterion and its potential effect on test results is further discussed in Section 3.5.3 of this report. The NRC inspectors considered the absence of an acceptance criterion to be a nonconformance because CPS Procedure No. SP-202 did not contain an acceptance criterion for the daily spectrometer standardization and set no limits on the analysis range for each element affected by the one-point standardization method (Nonconformance 99901263/93-01-03).

3.5.3 Tensile and Chemical Testing

The NRC inspector observed the tensile and chemical testing of a sample taken from a 12-inch-wide by 20-foot-long by 1/4 inch thick, A-36 flat bar (see Item 2, Section 3.4.1.2 of this report). From the test sample, CPS machined a longitudinal tensile test and cut a chemical test. Both tests were assigned Lab No 93-1893. The tensile test was pulled on the Baldwin tensile machine, QA ID No. 21, in accordance with CPS Procedure No. SP-706, "Tensile Testing," Revision 2, dated October 6, 1993. The results were calculated with the aid of the M-TEST software package from Advance Machine Technology, Inc.

Before running the chemical test, the spectrometer was STDZ using two-point STDZ and checked against NIST Standard No. 1763 for proof of accuracy. The Mn result was 1.44 percent, which was below the certified value of 1.58 percent. CPS moved the Mn curve to the certified value using one-point STDZ. A recheck with NIST Standard No. 1763 verified that the curve was reading correctly with a Mn value of 1.589 percent. Lab Sample No. 93-1893 was tested and recorded a Mn value of 0.65 percent. Because the value for Lab Sample No. 93-1893 was well below the one-point STDZ value, the Mn curve was checked using NIST Standard 1761. NIST Standard No. 1761 produced a Mn value of 0.80 percent, well above the certified Mn value of 0.678 percent.

The NRC inspectors observed that the CPS lab technician recognized that a problem existed with the Mn curve, but did not have procedures or training to resolve it. The lab technician consulted with technical representatives from Baird Company and discovered that the STDZ Mn curve was approximately 0.10 percent above the certified Mn value for NIST Standard No.1763. CPS determined that using the one-point STDZ, the entered Mn curve was shifted proportionally to the certified value of 1.58 percent. The shifted Mn curve gave correct values at 1.58 percent, but gave higher values for Mn with lower

chemical concentrations, and that the further from the one-point STDZ value of 1.589 percent, the greater the error. The large error detected between Lab Sample No. 93-1893 and NIST Standard No. 1761 illustrates the importance of having an acceptance criterion for chemical ranges when using one-point STDZ. The absence of this acceptance criterion is addressed in Section 3.5.2.2 of this report (Nonconformance 99901263/93-01-03).

After restandardization of the spectrometer, CPS retested Lab Sample No. 93-1893 and determined that it met the requirements of A-36 and certified by CPS to the values in the following table. A comparison sample was sent to an independent lab, NIMS Company, for chemical analysis. The chemical analysis from NIMS Company, a qualified source for CPS, verified the results obtained by CPS. The results of the various chemistry testing follow.

Mid-America Steel's CMTR Data, CPS Test and Comparison Test

C w/o*	Mn w/o*	P w/o*	S w/o*	Tensile ksi	Yield ksi	Elongation (percent)	Remarks
0.25	0.70	0.009	0.004	70.4	51.9	27.5	From Mid America CMTR
0.17	0.52	0.013	0.012	64.0	45.0	29.0	CPS verification tests (elongation in 2-inches Lab No. 93-1893)
0.16	0.49	0.010	0.009				NIMS verification analysis

* Weight Percent

CPS used the test report results from Mid America for the initial screening of the commercial grade purchased plate. CPS's test results showed that the plate met the requirements of A-36.

3.5.3.1 CPS Material Test Report

The NRC inspectors reviewed the CPS test report for the Lab Sample No. 93-1893 chemical and physical tests, and determined that the test equipment was not identified on the test report as is required by Paragraph 11.7 of Section 11, "Test Control," of the CPS QA Manual. CPS informed the NRC inspectors that it had revised the test report form on October 10, 1993, and eliminated the requirement to enter the test equipment ID number on the form. CPS informed the inspectors that its QA manual had been revised and, effective January 2, 1994, Section 11 of the QA Manual would not require that test equipment be identified on the test report, but that all test reports shall identify and/or be traceable to the equipment used. Although this statement resolves the NRC inspectors' concern that the test equipment is not identified on the CPS test report, the NRC inspectors found that the hardness test reports are not easily traceable to the hardness testing equipment. After

hardness readings are taken, they are recorded on Form No. 709B, "Rockwell Hardness Sample Result Log." Form No. 709B, at present, does not identify which of the three hardness testers were used for a particular entry. CPS was able to demonstrate to the NRC inspectors a method for matching the entries with the associated hardness testers. CPS informed the NRC inspectors that a column would be added to Form No. 709B for entering the test equipment ID number.

3.5.4 Abnormal Laboratory Conditions

The NRC inspectors determined that CPS does not maintain historical data on abnormal laboratory conditions that can have an effect on test results. For example, when the NRC inspection team arrived at CPS on December 6, 1993, one phase of electricity was not connected to the facility. Of the two remaining phases, one phase was supplying power to the spectrometer, but not to the lab computers. The effect of the power outage was a temporary loss of color to the cathode-ray tubes attached to the lab computer. The NRC inspectors, through discussions with CPS, identified another example when the CPS test laboratory experienced difficulties standardizing the spectrometer. The cause for the difficulties was identified as contaminated argon. By replacing the argon with a higher purity argon, the difficulties were resolved. Since the problem occurred suddenly and was detected during STDZ, CPS surmised that the contaminated argon did not affect test results. The NRC inspectors expressed a concern that, in the future, either of the conditions discussed could potentially impact test laboratory results, and CPS should document and evaluate the abnormal conditions. The NRC inspectors and CPS discussed that one method available for documenting and evaluating the effects of abnormal laboratory conditions is the use of the CPS nonconformance process, however the NRC inspectors agreed that this is not the only acceptable method to evaluate abnormal laboratory conditions.

3.6 CPS Inspector Certification Process

The NRC inspectors reviewed the CPS QA program for inspector training. CPS maintains three procedures relating to training, qualification, and certification of inspection and audit personnel: Procedure No. SP-501, "Qualification and Certification of Lead Audit Personnel," Revision 1, dated January 9, 1992; Procedure No. SP-502, "Indoctrination and Training," Revision 1, dated January 9, 1992; and Procedure No. SP-503, "Qualification and Certification of Inspection Personnel," Revision 1, dated January 9, 1992. In all cases, the QA Manager was responsible for establishing qualification requirements and documenting the completion of those requirements.

Procedure No. SP-503 defined four levels of inspection personnel: (1) Inspector in Training and (2) Level I, (3) Level II, and (4) Level III. General requirements for qualification at each level were well defined, but the NRC inspectors observed that requirements for inspection personnel to demonstrate their capabilities during the certification process (e.g., performance demonstration and/or written examination) were not well defined. The NRC inspectors reviewed documentation in the inspector training files indicating that the inspectors were adequately trained to perform their duties. However, the procedure could be strengthened by being more

prescriptive in performance based requirements for the inspector certification process. The NRC inspectors considered this a weakness in the CPS inspector certification process.

4 PERSONNEL CONTACTED

Consolidated Power Supply Division (Consolidated Pipe and Supply Company, Inc.)

* \+ Howard Kerr, President
* \+ Mark Mathias, General Manager
* \+ Steven Andrews, Quality Assurance Manager
* \+ Carl Marr, Sales Manager
  Jeff Shaw, Regional Manager
* Connie Zeitvagel, Sales Services/Operations Manager
* \+ Charles Hayes, Quality Control Manager
* Gary Parsons, Warehouse Manager
* \+ Mark Woodard, Laboratory Supervisor
* \+ Robert Stockton, Assistant Quality Assurance Manager
* \+ Linda Hollon, Quality Assurance Representative
* \+ Joe Robbins, Quality Assurance Representative
* \+ Rachel Woods, Quality Assurance Representative
* \+ Keith Kennedy, Quality Assurance Representative
* Sandra Robbins, Quality Assurance Clerk
* \+ Bryan Parnell, Quality Control Inspector
* \+ Jeremy Smith, Quality Control Inspector

* Attended the Entrance Meeting
\+ Attended the Exit Meeting