

PDR

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IEB 84-02

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

March 12, 1984

IE BULLETIN NO. 84-02: FAILURES OF GENERAL ELECTRIC TYPE HFA RELAYS IN USE  
IN CLASS 1E SAFETY SYSTEMS

Addressees:

All holders of nuclear power reactor operating licenses (OLs) or construction permits (CPs) for action.

Purpose:

One purpose of this bulletin is to inform licensees and CP holders about recent HFA relay failures that indicate they are similar in nature to previous HFA relay failures reported in several General Electric (GE) Service Advice Letters (SALs) and Service Information Letters (SILs) which were issued to end-users in 1980 and 1982. (See Attachments to this bulletin.) Another purpose of this bulletin is to ask licensees and CP holders to inform the NRC about their plans, including schedules, for implementing the manufacturer's recommendations discussed in the subject GE letters. In addition, licensees are asked to provide information concerning their plans to upgrade surveillance and to justify continued operation in the interim.

Description of Circumstances:

During 1983, the NRC has received reports of several Class 1E relay failures at the Duane Arnold, Pilgrim, and Hatch nuclear power reactor plants. The subject relays are identified as GE type HFA 51 Series AC, using Lexan as the coil spool material. These latest failures indicate that this model HFA relay is still being used in safety-related systems at most boiling water reactors (BWRs) and pressurized water reactors, including the reactor protection systems at BWR nuclear power plants.

The recently reported relay failures all involved relays that were continuously energized in ac circuits and failed to open when de-energized. GE states the cause of failure of continuously energized HFA ac excited relay applications is the deterioration of the coil wire insulation as a result of the effects of aging. Failure mechanism begins with wire insulation failure resulting in shorted turns, causing increased coil temperature and eventual coil failure.

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In the event of failure, coil temperature can reach a level which can vaporize the insulating materials and can melt the coil spool. These materials may deposit on cooler surfaces of the relay and cause armature damage and/or fail to make a contact circuit.

Approximately 25 failures of normally energized safety-related HFA relays have been reported to the NRC in the past 2-1/2 years, six of these have occurred since August 1983. GE believes that these recent failures are the result of the above-mentioned end-of-life situation. According to GE, some commercial ac rated HFA relays (predating the Century Series available since 1978) manufactured with standard Class A insulation (nylon or Lexan coil spools and standard temperature wire) which are continuously energized can fail in approximately 10-12 years. Many of the licensed facilities are now approaching this time period, thus increasing the likelihood of concurrent failures. This potential for concurrent failure may be considered a precursor of ATWS (anticipated transient without scram), since concurrent failure of certain safety-related relays at nuclear power plants could result in failure of the reactor trip function.

#### Background:

Failures of HFA relays have been reported to the NRC since 1973, and GE has responded to these failures by issuing SALs from the Power Systems Management Department located in Philadelphia, Pennsylvania, and/or SILs from its Nuclear Energy Products Division located in San Jose, California. These GE letters discuss the relay failures and recommend replacing subject relays with relays considered more suitable. Additionally, the NRC has issued IE Bulletin 76-02 and Information Notices 81-01 and 82-13 referencing these GE letters. Licensees began replacing HFA relays in 1976 in response to IE Bulletin 76-02. IE Bulletin 76-02 referenced GE SAL 152.1 which recommended replacing relay coils. At that time, the relay coil of the HFA relay was wound on nylon spools. Winding failures occurred because of a moisture/halogens problem and affected mostly dc-excited normally de-energized relays. GE recommended replacing the nylon coil spool with one made of Lexan material. Subsequently the Lexan coils exhibited extensive cracking, which is considered a major precursor to the current HFA relay failures.

To resolve the Lexan spool cracking problem, GE Philadelphia issued SAL 152.2 in 1980 recommending that end-users replace the Lexan spool-type HFA relay with their new "Century Series" HFA relay. The Century Series relay uses a high-temperature-rated plastic material called "Tefzel" for coil spool construction and high-temperature coil wire, and employs a vacuum-impregnated insulation. According to GE this relay has been both environmentally and seismically qualified to the latest applicable IEEE standards and has been subjected to an accelerated life test which verified a continuously energized relay life in excess of 40 years.

In addition to SAL 152.2, other documents which recommended that end-users replace the relays having a Lexan coil spool with the newer Century Series HFA relay are: GE SAL 152.2A, 1982; SIL No. 44, Supplements 2 and 4, 1981 and 1982, respectively; and NRC documents IN 81-01 and IN 82-13 issued in 1981 and

1982, respectively. It should be noted that the SILs from GE (San Jose) offered an alternative to replace the existing coil spools with the Century Series Tefzel coil spool only, not the complete relay unit. The NRC believes that these two methods of replacement are equivalent.

Additionally, since past relay failures appear to be more predominant in normally energized ac circuits, it is suggested that affected licensees develop plans with replacement schedules which ensure that these types of applications are the first to be replaced with either the complete Century Series HFA relay or the Century Series Tefzel coil spools or equivalent.

Copies of the above-mentioned GE SALs and SILs are attached for your information and use. The NRC IEB 76-02, IN 81-01, and IN 82-13 can be obtained from your local public document room.

Actions for All Holders of Operating Licenses or Construction Permits:

Since GE asserts that the new Century Series HFA relay has been successfully tested to the environmental and seismic requirements specified in IEEE-323-1974 and IEEE-344-1975 Standards, this relay, or one of equal qualification, may be an acceptable replacement for Lexan/Nylon HFA relay now in service at many nuclear power plants. However, the licensee is responsible for determining that all safety grade equipment in the plant, including relays, is qualified for its intended service. That is, the licensee must establish and document that the service life and reliability of the relay is acceptable, and that the relays have been qualified for the environmental and seismic conditions that this equipment may encounter at its installed location in the plant.

1. Plants in Operation

- a. Develop plans and schedules for replacing (1) nylon or Lexan coil spool-type HFA relays used in normally energized safety-related\* applications and (2) nylon coil spool-type HFA relays used in normally de-energized safety-related applications. The replacement relays and any replacements made in the future should meet the requirements of the applicable IEEE standards. The replacement program for energized and de-energized relays should be performed on a "best efforts" basis during plant outages of sufficient duration. The entire replacement program should be completed within two years from the date of this bulletin.

\*For the purpose of the applicable actions of this bulletin, "safety-related" constitutes those systems covered by the definition given in 10 CFR Part 100, Appendix A Sections III.(c)(1), III.(c)(2), and III.(c)(3). In assessing the impact of Lexan/Nylon coil spool-type HFA relay in other systems at their facilities, licensees should consider the provisions of GDC 1 to 10 CFR Part 50, Appendix A.

The replacement schedule should consider the following recommended priority:

Nylon or Lexan normally energized in the reactor trip system  
Nylon or Lexan normally energized in other safety-related applications  
Nylon normally de-energized in the reactor trip system  
Nylon normally de-energized in other safety-related applications

- b. During the period before relay replacement, develop and implement surveillance plans that include:
  - (1) Monthly functional tests of all reactor trip system normally energized relays that verify relay contacts change state when the relay coil is de-energized;
  - (2) Visual inspections of all safety-related normally energized relays as soon as practical upon receipt of this bulletin. Thereafter, similar inspections should be accomplished in conjunction with the monthly functional test. These visual inspections should verify that relay coils are not deteriorating (e.g., inspect coil bobbins for visible cracks or melting), and should confirm cleanliness of the relay pole pieces.
- c. Provide a basis for continuing operation for the period of time until the normally energized relays are replaced. This basis should include a discussion of those measures addressed in Items 1a and 1b and any other preventive and/or corrective measures taken or planned.
- d. Provide a written report of the above actions, including schedules for completion. This report is to be submitted to the NRC within 120 days of receipt of this bulletin.

## 2. Plants Under Construction

- a. Provide plans and schedules for replacing both normally energized and normally de-energized HFA relays as specified by this bulletin in item 1a which are used in safety-related systems at your facility(ies). Your schedule shall ensure that these relays are replaced before the scheduled date for OL issuance or within two years from the date of this bulletin, whichever is longer. If these relays are not planned to be replaced before OL issuance, item 1b shall be implemented at the time of license issuance and a response to item 1c is required.
- b. Provide a written report of the actions specified in Item 2a. This report is to be submitted to the NRC within 120 days of receipt of this bulletin.

3. If your plant does not use or plan to use the nylon or Lexan-type GE HFA relays in the safety-related systems discussed above, a negative response is requested within 120 days of receipt of this bulletin, and no further action is required.
4. If your plant uses or plans to continue to use the nylon or Lexan-type HFA relay in systems other than those safety-related applications defined in this bulletin, then the appropriate administrative controls dealing with maintenance, storage, and handling of spare parts at your facility must be revised to ensure that the older and problematic HFA relay coils are not inadvertently used as a replacement part in safety-related applications in future maintenance efforts at your facility(ies).

Although the specific details involving the identified relay failures described above may not directly apply to your facility(ies), you are asked to review the general concerns expressed in the bulletin for applicability at your facility(ies). For example, if a different type of relay is used for the same safety functions described in this bulletin, or relays with similar materials are used for other safety-related functions, past operating history and the manufacturer's recommendations should be reviewed to determine if additional action is appropriate. Your response should describe the results of the review, and, if the general concerns apply, you should describe the short-term and long-term corrective actions to be taken and the schedules thereof.

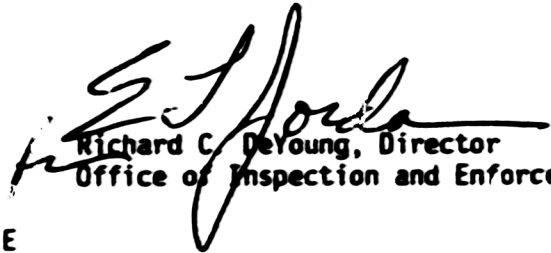
The written report required shall be submitted to the appropriate Regional Administrator under oath or affirmation under provisions of Section 182a, Atomic Energy Act of 1954, as amended. Also, the original copy of the cover letters and a copy of the reports shall be transmitted to the U.S. Nuclear Regulatory Commission, Document Control Desk, Washington, DC 20555 for reproduction and distribution.

This request for information was approved by the Office of Management and Budget under a blanket clearance number 3150-0011 which expires April 30, 1985. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports Management, Room 3208, New Executive Office Building, Washington, DC 20503.

Although no specific request or requirement is intended, the following information would be helpful to the NRC in evaluating the cost of this bulletin:

1. Staff time to perform requested review.
2. Staff time spent to prepare requested documentation.

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

  
Richard C. DeYoung, Director  
Office of Inspection and Enforcement

Technical Contact: V. D. Thomas, IE  
301-492-4755

Attachments:

1. GE SALs and SILs
2. List of Recently Issued IE Bulletins



February 13, 1981  
File Tab A

SIL No. 44  
Supplement No. 2  
Category 1

POSSIBLE COIL SPOOL (BOBBIN) FAILURES ON MFA RELAYS

Recently there have been several reports on MFA relays with cracked clear Lexan coil spools. Because of this the Power Systems Management Business Department of the General Electric Company issued a Service Advice No. 721-PSM-152.2 on possible MFA coil spool failures. This Service Advice recommended inspection of the coil spools in MFA relays and replacement where necessary. For Class 1-E equipment, the only option identified was that of replacing the entire relay with a new, improved relay meeting the latest Class 1-E qualification requirements. The purpose of this Service Information Letter (SIL) is to identify the added option of replacing the magnetic coil assembly only, and to make recommendations on MFA relay inspections in addition to those of SIL 44 and Supplement 1.

RECOMMENDED ACTIONS

General Electric recommends the following:

1. An immediate visual inspection for cracking of the end flange of the spool (bobbin) in the magnetic coil assembly of all safety-related MFA relays. This inspection should be performed by looking through the faceplate of the MFA relay with a flashlight.
2. At the first convenient outage, fully inspect for cracking in the end flanges of the spool (bobbin) with the faceplate removed for all safety-related MFA relays. The rear flange of the bobbin may be inspected with the aid of a mirror (dental type) and appropriate light.
3. Replace the magnetic coil assembly or entire relay for any relay found with cracked spools. For minor cracks (of approximately 1/4" length or less) the pull test of SIL 44, Supplement 1, may be used to determine continued serviceability until replacement parts may be obtained.

N O T E

Order replacement relays per Service Advice No. 721-PSM-152.2 or replacement coil assemblies by contacting your local General Electric service representative and referencing this SIL, the AC or DC coil voltage, and Drawing No. 184C4137. A qualification program for replacement coil assemblies is in progress now with completion scheduled before mid-year. Thus, qualified replacement coil assemblies should be available by mid-year from San Jose. Qualified relays are now available per the above Service Advice from Philadelphia.



SIL No. 44  
Supplement No. 2

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4. Establish a periodic visual inspection program (recommended on a yearly basis) for hobbin cracking, not only for Class 1-E applications, but also for non-safety related applications of MFA relays with nylon or Lexan hobbins.

NOTE

The new, improved longer-life, qualified relays or coil assemblies (as described in Service Advice No. 721-PSM-152.2) will upgrade the system and eliminate periodic visual inspections for hobbin cracking.

5. If your periodic visual inspection program on MFA relays reveals that a cleaning is necessary, clean the relay in accordance with SIL No. 332.

CAUTION

Do not use any contact-cleaning solvents or any lubricants since these can be detrimental to the integrity of polycarbonate spool materials (such as Lexan).

Prepared by: R.E. Bates

Approved by: *D.K. Willet*  
D.K. Willet, Manager  
BMR Product Service

Issued by: *D.L. Allred*  
D.L. Allred, Manager  
Utility Support Services

Product Reference:  
A71-Plant Recommendations





SIL No. 44  
Supplement 4  
Category 1

- 2 -

In contrast, the replacement of the magnetic coil assembly can be accomplished without disconnecting any of the signal leads. Consequently, a more practical approach, in the case of logic systems where large numbers of relays are used, may be to replace the magnetic coil assemblies and thus minimize the panel wiring work and subsequent testing.

To facilitate this replacement work, recommended guides for replacing the coil assembly are attached to this SIL supplement. Also attached are recommendations for checking the MFA relay contact wiper and gap and pick-up voltage. These recommendations expand on the adjustment requirements outlined in the MFA relay instruction manual GEH-2024.

#### RECOMMENDATIONS

General Electric recommends the following:

1. Continue with periodic MFA relay inspection programs as recommended in SIL 44 and Supplements 1 and 2 until replacement of all coil assemblies having nylon and lexan bobbins is completed.
2. Replace at the first convenient opportunity all magnetic coil assemblies (having nylon or lexan bobbins) in MFA relays used in I-E application.
3. Review and update as necessary your MFA relay and magnetic coil replacement procedures. Use for reference Attachment A, Recommended Guides for Magnetic Coil Replacement, and Attachment B, Recommended Guides for Testing and Checking the Contact Wiper, Gap and Pick-up Voltage After Replacement or Maintenance.

#### C A U T I O N

Recommendations for wiper, gap and pick-up voltage adjustments are included because they can have a significant effect on the seismic performance of the relay. Normally, the contact gap and wiper are set at the factory and no further adjustments are required. However, if some of the contacts have been changed from normally open to normally closed or vice versa by turning the fixed contact over, or if the maintenance has been performed on the relay that required partial disassembly, these adjustments should be checked.

Prepared by: R. E. Bates

Approved by:

  
D. L. Layton, Manager  
Customer Service Support

Issued by:

  
D. L. Allred, Manager  
Customer Service Information

Product Reference:  
A71 - Plant Recommendations

SIL No. 44  
Supplement 4

ATTACHMENT A

RECOMMENDED GUIDES FOR

HFA MAGNETIC CORE ASSEMBLY REMOVAL AND REPLACEMENT

W A R N I N G

Before working on the relay, assure that power has been removed from all electrical circuits connected to the relay and that the circuits cannot be energized while work is in progress.

**1. Magnetic Coil Assembly Removal**

- 1.1 Refer to the HFA instruction manual (GEH-2024) and the HFA Renewal Parts Bulletin (GEH-2757) for illustration and nomenclature definition.
- 1.2 Remove the relay cover and release the control spring by lifting the control spring adjusting nut and screw out of the slot in the armature tail piece.

N O T E

Do not rotate the control spring adjusting screw in either direction as this will change the pickup voltage calibration of the relay.

- 1.3 Lift the moving contact/armature assembly out of the relay to uncover the magnetic coil assembly.
  - 1.4 Disconnect the two (2) relay coil leads and remove stop bar.
  - 1.5 Remove the four (4) magnetic assembly mounting screws from the back of the relay.
  - 1.6 Remove the old magnetic assembly.
- 2. Installation of New Magnetic Coil Assembly**
- 2.1 Install the new magnetic assembly and reassemble the relay. Follow steps 1.3 through 1.5 in reverse order.
  - 2.2 Tighten the four (4) coil mounting screws located in the back of the relay housing to a torque of 18-20 inch pounds.
  - 2.3 Replace the relay nameplate with the new relay nameplate provided with the conversion kit. To replace the nameplate, loosen the right screw of the contact assembly (nameplate) one turn only.

ATTACHMENT B

RECOMMENDED GUIDES FOR

HFA RELAY CONTACT WIPE, GAP AND PICK-UP VOLTAGE CHECK AND ADJUSTMENT

1. Special Tools

Figure 1 of this attachment illustrates three tools that should be fabricated before performing this procedure.

2. Contact Wipe and Gap Inspection

W A R N I N G

Before working on the relay, assure that power has been removed from all electrical circuits connected to the relay and that the circuits cannot be energized while work is in progress.

- 2.1 Use the lead puller (Figure 1) to pull the six braided contact leads clear.
- 2.2 Attach indicator lights (or equivalent) across each contact connected in such a manner that the light goes on when the contact closes.
- 2.3 Inspect the contact wipe (NO and NC) and contact gap:

2.3.1 "NO" Contact Wipe

Place a .039" thickness gage (See Figure 1) between the coil pole piece and the section of the armature that is under the armature stop screw. Press down on the armature. All of the "NO" contact indicator lights should light (indicating that these contacts are closed). If one or more of the indicators are not lit, adjust the contacts in accordance with the adjustment procedure in step 2.5. If correct indication is obtained, remove the thickness gage and proceed to the next step.

2.3.2 "NC" Contact Wipe

Place the .039" thickness gage directly between the stop screw and the armature. Allow the tension of the control spring to seat the armature firmly against the thickness gage. All the "NC" contact indicator lights should light (indicating continuity through the "NC" contacts). If one or more of the "NC" indicators are not lit, adjust the contacts in accordance with the adjustment procedure in step 2.6. If all the "NC" contact indicators light, remove the thickness gage and proceed to the next step.

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2.3.3 Contact Gap

Use a .220" thickness gage (See Figure 1) to check that the contact gap between the moving and stationary contacts of one "NO" set of contacts is  $.220 \pm .015$  inches. If the contact gap is not correct, perform adjustments in accordance with steps 2.5 and 2.6.

2.3.4 When step 2.3.3 is successful, remove the indicator lights and continue with step 2.4.

2.4 Perform the pickup voltage test:

C A U T I O N

Before applying power to test the relay, the tester must assure that external circuits are electrically isolated from the relay coil and contact circuits or protected by other suitable means such as deenergizing the external circuits.

2.4.1 Operate the armature by hand to assure that it is properly seated, that it moves freely and that the control spring returns the armature to the open position when the armature is released.

2.4.2 Connect the voltage source, AC (50 or 60 Hz) or DC, as applicable, to the operating coil of the relay, terminals 13-14.

2.4.2.1 DC Coils

Connect a variable DC voltage source to the operating coil of the relay.

- o 125 VDC coil - apply DC voltage of approximately 65 volts and increase the voltage until relay energizes. Relay should energize when applied voltage is between 71.25 and 75 VDC.
- o 250 VDC coil - apply DC voltage of approximately 135 volts and increase the voltage until relay energizes. Relay should energize when applied voltage is between 142.5 and 150 VDC.

2.4.2.2 AC Coils

Apply increasing AC voltage (0-92V, proper Hz) to the relay coil. The relays should operate and seat firmly against the pole piece at a voltage between 87.4 and 92 VAC.

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Supplement 4

- 2.4.3 If a relay fails to operate within the applicable voltage limits specified in Steps 2.4.2.1 or 2.4.2.2, grasp the control spring adjusting screw and lift the adjusting nut about 1/16 inch above the armature tail piece. Turn the nut clockwise, as viewed from the front of the relay, to raise pickup voltage or counterclockwise to lower pickup voltage. Reseat the adjusting nut in the hexagonal groove in the armature tail piece. Reset pickup voltage until acceptable.
- 2.4.4 Detach the equipment. Replace the relay window and record the required inspection/test data.
- 2.5 Adjust "NO" Contacts (with contact indicator lights connected)
  - 2.5.1 Place a .039" thickness gage between the coil pole piece and the section of the armature that is under the armature stop screw. Press down on the armature and use the contact bender (shown in Figure 1) to bend the moving contact arms for the "NO" contacts until all "NO" contacts just break. (Bend the moving contact arm in all steps that require bending.)
  - 2.5.2 With the thickness gage still in place, hold the armature against it and bend the moving contact arm of each set of "NO" contacts until each "NO" contact just makes. This sets all "NO" contacts within a 1/32" plane and a 3/64" wiper.
  - 2.5.3 Remove the thickness gage from under the armature and loosen the stop screw.  
  
Use the .220" thickness gage to measure the gap between the contact tips of one "NO" set of contacts while the stop screw is adjusted to set the armature so that the gap is .220". After adjustment is correct, hold stop screw in position and tighten the stop screw lock nut. The "NO" contacts are now adjusted.
  - 2.5.4 If there are no "NC" contacts, repeat steps 2.3.1 through 2.3.4 to verify proper adjustment. If there are "NC" contacts, proceed to step 2.6.
- 2.6 Adjustment of "NC" contacts (Adjustment should be accomplished with contact indicator lights connected and after "NO" contacts and the "NO" contact gaps have been adjusted.)
  - 2.6.1 Place the .039" thickness gage between the stop screw and the armature. Allow the tension of the control spring to seat the armature firmly against the thickness gage. Bend the "NC" moveable contact arms until each set of "NC" contacts just makes. This sets all the "NC" contacts within a 1/32" plane and at 3/64" wiper.
  - 2.6.2 Repeat steps 2.3.1 through 2.3.4 to verify proper adjustment.

SIL No. 44  
 Supplement 4

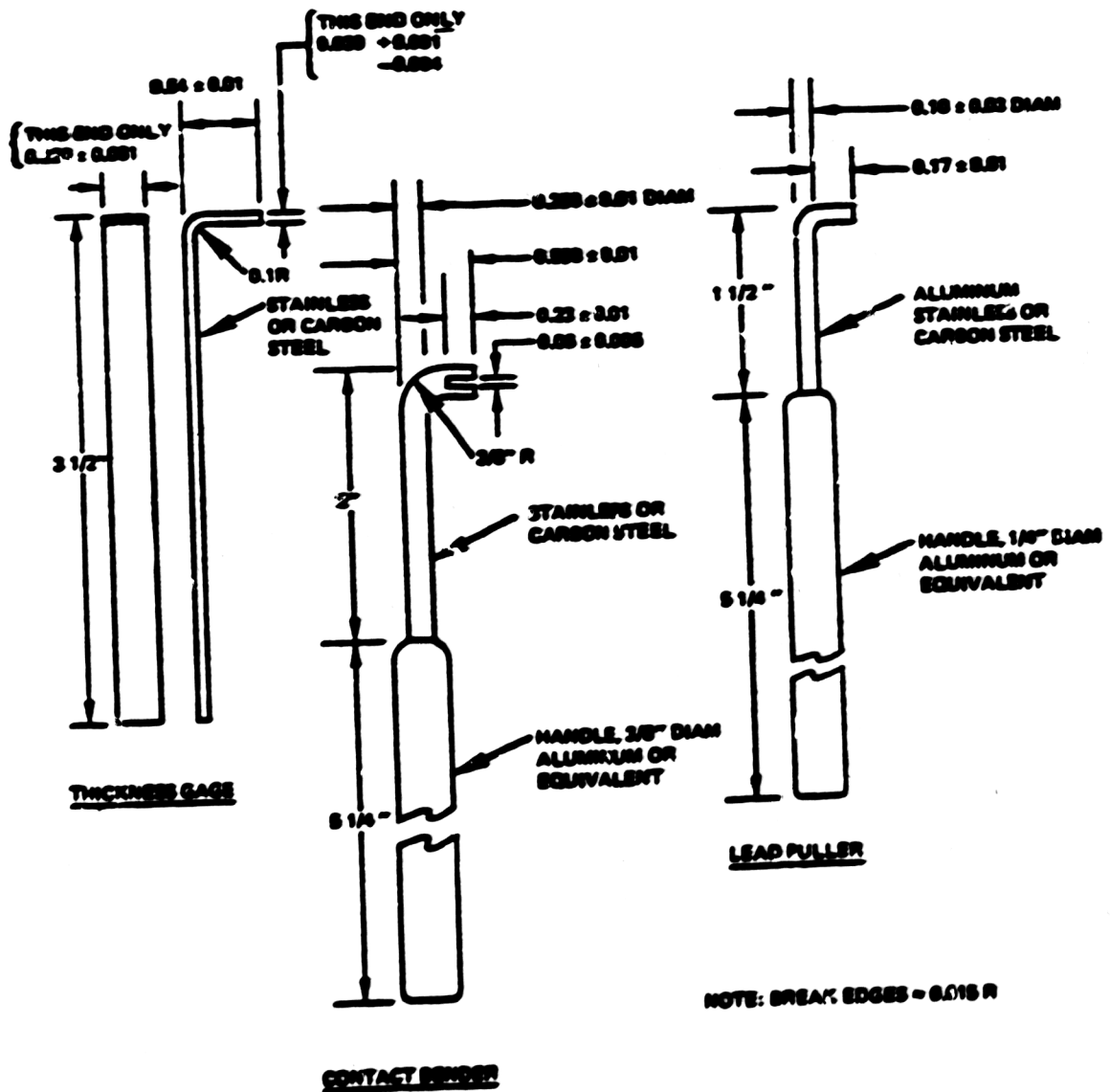


FIGURE 1. SPECIAL TOOLS AND GAGE FOR INSPECTING AND ADJUSTING MFA RELAY CONTACTS

Enclosure 2

S.A. 721 - PSM - 152.2

In line with our policy of informing users of possible problems with our products, the following information applies to type HFA relays.

In April 1976, Service Advice 721-PSM-152.1 was issued which described problems involving HFA relays. This communication discussed a report from a customer of cracked black Lexan coil spools. This problem was traced to improper mixing of black Lexan by the vendor.

Recently we have received two reports of HFA relays with cracked clear Lexan coil spools. These relays were manufactured in 1975. On this basis, the earlier Service Advice, copy attached, is amended to include clear Lexan spools. We recommend, as described in Service Advice 721-PSM-152.1, that HFA coil spools be checked during your normal inspection of the relay. A cracked coil spool could result in a broken piece which could prevent desired contact action in response to energization or de-energization of the relay.

Except for Class 1-E nuclear applications, standard replacement magnetic assemblies (coil, laminations and shading ring, when used), will be furnished. Current standard design uses Tefzel spools and formex coated wire. If requested, long-life Century Series magnetic assemblies with Tefzel spools, high temperature wire and impregnated insulation can be supplied at added cost.

The spool material has been changed and all coils wound for the HFA relay since January 1979 are made of Tefzel. Tefzel has a color that ranges from a light beige to a charcoal gray. Any relay with the last letter of the date code ending in K, L, M, N, or P fall into the 1974 to 1979 time span. A typical date code is 14HL which means August 1975.



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For Class 1-E nuclear installations, replacement should be made by applying a Century Series HFA relay of equivalent function. The Century Series family of relays has been qualified for class 1-E nuclear application per IEEE 323 - 1974.

This problem has been reported to the NRC by General Electric Co.

If you wish a standard magnetic assembly replacement, a purchase order should be forwarded to this office specifying the model number of your relay and its coil voltage. In the event that you want a Century Series magnetic assembly replacement, include that information on your purchase order.

If you want a Century Series HFA, which is the only option for class 1-E nuclear application, your purchase order should specify the model number of the Century Series relay and coil voltage. General Electric Handbook sections 7210, 7211, 7212 and 7292 describe ordering, prices and relay descriptions of the various HFA models.

In response to this Service Advice, the price for a coil replacement kit or Century Series replacement relay will be 50% of the handbook price. This special price offer will expire May 1, 1982.

**Enclosure 3**

**S.A. 721 - PSM - 152.2A**

In late 1980 Service Advice 721 - PSM - 152.2 was issued advising of possible cracking of Lexan coil spools used in HFA relays. It stated that a cracked coil spool could result in a broken piece preventing the desired contact action in response to energization or de-energization of the relay.

It has been brought to our attention recently that this condition has actually taken place in field applications. We would emphasize again, as described in Service Advice 721 - PSM - 152.1, that HFA coil spools be checked during your normal inspection of the relay.

For class 1-E nuclear installations, replacement should be made by applying a Century Series HFA relay of equivalent function. The Century Series family of relays has been qualified for Class 1-E nuclear application per IEEE 323-1974.

Attached you will find a copy of Service Advice 721 - PSM - 152.1 and 152.2 detailing actions to be taken. The 50% of handbook price for a replacement kit or Century Series replacement relay will be extended until May 1, 1983.

If you have any further questions or need assistance please contact the undersigned.

Further information can be obtained from  
John C. Dyckman  
Philadelphia, Pa.  
8\*245-3759 or 215-726-3759

LIST OF RECENTLY ISSUED IE BULLETINS

| Bulletin No.    | Subject  | Date of Issue | Issued to  |
|-----------------|--|---------------|--|
| 84-01           | Cracks in Boiling Water Reactor Mark I Containment Vent Headers  | 02/03/84      | All BWR facilities with Mark I containment and currently in cold shutdown with an OL for Action and All other BWRs with an OL or CP for information        |
| 83-08           | Electrical Circuit Breakers with an Undervoltage Trip Feature in Use in Safety-Related Applications Other Than the Reactor Trip System         | 12/28/83      | All power reactor facilities holding an OL or CP   |
| 83-07<br>Supp 2 | Apparently Fraudulent Products Sold by Ray Miller, Inc.  | 12/09/83      | Same as IEB 83-07  |
| 83-07<br>Supp 1 | Apparently Fraudulent Products Sold by Ray Miller, Inc.  | 10/26/83      | Same as IEB 83-07  |
| 83-07           | Apparently Fraudulent Products Sold by Ray Miller, Inc.  | 07/22/83      | All power reactor facilities holding an OL or CP; Other fuel cycle facilities and Category B, Priority I (processors and distributors) material licensees. |
| 83-06           | Nonconforming Materials Supplied by Tube-Line Corporation Facilities at Long Island City; New York; Houston, Texas; and Carol Stream, Illinois | 07/22/83      | All power reactor facilities holding an OL or CP   |
| 83-05           | ASME Nuclear Code Pumps and Spare Parts Manufactured by The Hayward Tyler Pump Company   | 05/13/83      | Utilities with power reactor facilities holding an OL or CP use or plan to use ASME Nuclear Code Pumps Mfg by Hayward Tyler Pump Co.                       |

OL = Operating License  
CP = Construction Permit

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

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99999

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

103831092357 1 99999  
BRENTWOOD BD OF SELECTMEN  
RFD DALTON RD  
BRENTWOOD NH 03833

108731091409 99999  
MAYOR OF LACEY TOWNSHIP  
818 LACEY RD  
FORKED RIVER NJ 08731

102109065479 1 99999  
WILLIAM S. ARNOTT  
50 CONGRESS ST  
SUITE 225  
BOSTON MA 02109

111581092043 1 99999  
S. ANDIMAN  
30 KALMIA LA.  
SARASOTA FL 34231

SELECTION-00000010 SETS - 01  
TOT: CNT = 2483 BULK = 2650

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SELECTION-00000010 SETS - 01  
TOT: CNT = 2483 BULK = 2650

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SELECTION-00000010 SETS - 01  
TOT: CNT = 2483 BULK = 2650

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SELECTION-00000010 SETS - 01  
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SELECTION-00000010 SETS - 01  
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SELECTION-00000010 SETS - 01  
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SELECTION-00000010 SETS - 01  
TOT: CNT = 2483 BULK = 2650

103862092358 1 99999  
BOARD OF SELECTMEN  
TOWN HALL  
SOUTH WAMPTON NH 03862

119320054576 99999  
MARJORIE M. ARMOUR  
RD 5  
COATESVILLE PA 19320

198115093809 1 99999  
G. C. ANDERSON  
7719 RIDGE DR NE  
SEATTLE WA 98115

193401094148 1 99999  
ELIZABETH APPELBERG  
1415 C. J. JERRO  
SARASOTA FL 34231

W09 C09063 W0 DATE - 031384  
DATE COMPLETED - 03/13/84

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W09 C09063 W0 DATE - 031384  
DATE COMPLETED - 03/13/84

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TIME COMPLETED - 0939

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|---|-------------------|--|-------------------|
| 00141411  | WA 01433          | SOUTH HAMPSTEAD  | WA 01467          |
| 10071001000<br>WILLIAM S. LACEY<br>510 LACEY DR<br>SUMMIT HILLS                 | 00000<br>NJ 08731 | 11012004476<br>HARJENI M. DAMINI<br>P.O. S<br>CLATTSVILLE  | 00000<br>PA 19120 |
| 102107003470<br>WILLIAM S. ARNOTT<br>50 CONGRESS ST<br>SUITE 075<br>DORSTON     | 00000<br>MA 02109 | 100115001000<br>C. C. ANDERSON<br>7719 PINE ME<br>SEATTLE  | 00000<br>WA 98119 |
| 111501002003<br>ANDREW<br>20 KALINA LA<br>VALLEY STREAM                         | 00000<br>NY 11501 | 103001004100<br>ELIZABETH OFFERBERG<br>1014 COZADEN<br>SAN LUIS OBISPO                               | 00000<br>CA 93401 |
| 110204001000<br>ROBERT M. HESTER<br>0720 CUMBER RD<br>SAN ANTONIO               | 00000<br>TX 78204 | 100720079022<br>JAMES W. STEIN<br>704 CLAYTON ST<br>CHARLESTON                                       | 00000<br>MI 49720 |
| 203001000401<br>THOMAS J. BIRN<br>80 S. MAIN ST<br>MORRISON                     | 00000<br>MD 20601 | 111700004010<br>WILLIAM R. SUMNER<br>MT. AIRY RD<br>SHIRAZ MAN                                       | 00000<br>NY 11786 |
| 117070004070<br>WILLIAM A. BRANT<br>1117 CHURCHMAN<br>HOUSTON                   | 00000<br>TX 77030 | 120070023172<br>D. A. BUNSON<br>RTE 1 PO BOX 92-C<br>LITTLE MOUNTAIN                                 | 00000<br>SC 29075 |
| 117037000100<br>JIM Z. LITVINSON<br>1111 S. 11TH ST<br>PO BOX 400<br>MIDDLEBURY | 00000<br>PA 17057 | 200000000200<br>DAVID A. CACCIA<br>RD 2 BOX 70-A<br>SEWELL   | 00000<br>NJ 08000 |
| 103001003713<br>DAVID A. CANNON<br>120 DANIEL ST<br>MORRISON                    | 00000<br>MI 49001 | 101013002350<br>WILLIAM C. BROWN<br>DIRECTOR IN CHARGE CIVIL OFFENSE<br>TULSA DISTRICT<br>ATF BUREAU | 00000<br>MA 01013 |
| 102030000050<br>JAMES A. CLEGGAN<br>27 ROCKWELL ST<br>MORRISON                  | 00000<br>MA 02030 | 211700003000<br>PETER FRIDMAN<br>SUPPORT & CONTROL OPERATIVE<br>M. L. I. OPERATING UNIT<br>HAINPARK  | 00000<br>NY 11700 |
| 100070027113<br>FRANK C. CRUCIANI<br>15 N. 11TH<br>DUNSMVILLE                   | 00000<br>NJ 08070 | 113030007030<br>J. P. CRIVELLO<br>0152 N. STATE TRAIL D-124<br>451 RD<br>MIRA MAR                    | 00000<br>FL 33433 |
| 102007003000<br>DAVID L. CUMMINGS<br>715 PAUL C. ROAD<br>MORRISON HILLS         | 00000<br>CA 92007 | 107010007210<br>JAMES W. HARRINGTON<br>10 WINDY HILL<br>DORSTON                                      | 00000<br>MI 49720 |

|  |                   |  |                   |
|--|-------------------|--|-------------------|
| ANNAPOLIS HILLS  | CA 41047          | 142114   | MD 21411          |
| 27012095100<br>1000 N W BAYVIEW<br>130<br>4300 EAST 11TH<br>MILWAUKEE<br>WIS 53212 | 99999             | 14725030000<br>1000 N W BAYVIEW<br>130<br>4300 EAST 11TH<br>MILWAUKEE<br>WIS 53212 | 99999<br>IN 47250 |
| 100003093015<br>10000<br>1332 BROADWAY<br>LONG BEACH                               | 99999<br>CA 90803 | 170010091007<br>10000<br>1332 BROADWAY<br>LONG BEACH<br>CA 90803                   | 99999<br>DC 70016 |
| 103300032200<br>10330<br>11037 SOUTH AVE<br>SCARBOROUGH                            | 99999<br>AZ 85304 | 102135002100<br>10330<br>11037 SOUTH AVE<br>SCARBOROUGH<br>AZ 85304                | 99999<br>MA 02134 |
| 101130000077<br>10113<br>115 WEST POINT AVENUE<br>UNIVERSITY CITY                  | 99999<br>MO 63130 | 170100002200<br>10113<br>115 WEST POINT AVENUE<br>UNIVERSITY CITY<br>MO 63130      | 99999<br>TX 76100 |
| 117700030000<br>11770<br>11000 UNIVERSITY ST<br>DUNSMIRE                           | 99999<br>NC 27705 | 110003001100<br>11770<br>11000 UNIVERSITY ST<br>DUNSMIRE<br>NC 27705               | 99999<br>PA 19062 |
| 127000032000<br>12700<br>115 W MAPLE ST<br>MILWAUKEE                               | 99999<br>NC 27602 | 270000007070<br>12700<br>115 W MAPLE ST<br>MILWAUKEE<br>NC 27602                   | 99999<br>LA 70002 |
| 100030000001<br>10003<br>1055 W WINDSOR AVE<br>CHICAGO                             | 99999<br>IL 60630 | 103207007527<br>10003<br>1055 W WINDSOR AVE<br>CHICAGO<br>IL 60630                 | 99999<br>AZ 85202 |
| 173101073270<br>17310<br>10000 UNIVERSITY ST<br>OKLAHOMA CITY                      | 99999<br>OK 73101 | 273040000000<br>17310<br>10000 UNIVERSITY ST<br>OKLAHOMA CITY<br>OK 73101          | 99999<br>CA 93440 |
| 100210001300<br>10021<br>10000 UNIVERSITY ST<br>OKLAHOMA CITY                      | 99999<br>CO 80210 | 170110000100<br>10021<br>10000 UNIVERSITY ST<br>OKLAHOMA CITY<br>CO 80210          | 99999<br>LA 70116 |
| 101001071021<br>10100<br>10100 UNIVERSITY ST<br>OKLAHOMA CITY                      | 99999<br>IL 61001 | 102107000000<br>10100<br>10100 UNIVERSITY ST<br>OKLAHOMA CITY<br>IL 61001          | 99999<br>MO 67107 |
| 230100000177<br>23010<br>10000 UNIVERSITY ST<br>OKLAHOMA CITY                      | 99999<br>MO 64100 | 111000000000<br>23010<br>10000 UNIVERSITY ST<br>OKLAHOMA CITY<br>MO 64100          | 99999<br>NY 11100 |





|   |          |  |          |
|---|----------|--|----------|
| STATE COLLEGE   | PA 16801 | 51111 1111<br>VILLAGE  | PH 67676 |
| 21000001225<br>21000001225<br>MUNICIPALITY OF COUNTY COURTHOUSE<br>MUNICIPALITY | PA 16404 | 12791000130<br>MUNICIPALITY OF COUNTY COURTHOUSE<br>MUNICIPALITY             | MC 27516 |
| 101220003016<br>101220003016<br>101220003016<br>101220003016<br>101220003016    | WI 53729 | 103711002707<br>103711002707<br>103711002707<br>103711002707<br>103711002707 | WI 53711 |
| 101730003700<br>101730003700<br>101730003700<br>101730003700<br>101730003700    | PA 01730 | 103312001301<br>103312001301<br>103312001301<br>103312001301<br>103312001301 | FL 33313 |
| 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000         | CA 94602 | 20000000000<br>20000000000<br>20000000000<br>20000000000<br>20000000000      | MI 48004 |
| 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000         | LA 70004 | 22700000000<br>22700000000<br>22700000000<br>22700000000<br>22700000000      | NC 27605 |
| 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000         | CA 90404 | 10700000000<br>10700000000<br>10700000000<br>10700000000<br>10700000000      | NM 83051 |
| 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000         | NC 27101 | 27000000000<br>27000000000<br>27000000000<br>27000000000<br>27000000000      | LA 70003 |
| 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000         | LA 70006 | 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000      | NY 40474 |
| 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000         | MI 48204 | 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000      | MI 48201 |
| 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000         | PA 17027 | 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000      | PA 17025 |
| 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000         | MS 39209 | 10000000000<br>10000000000<br>10000000000<br>10000000000<br>10000000000      | MS 39206 |





AL 16470 AL 16110

AL 16319 AL 15201

AL 15203 AL 49011

WA 00120 AL 16371

NJ 07000 SC 29012

SC 29012 PA 17009

PA 17009 MI 33024

MI 33024 TN 30012

MI 49100 NY 11761

CT 06032

PA 10020

AL 16110

AL 16110

AL 15201

AL 49011

AL 16371

SC 29012

PA 17009

MI 33024

TN 30012

NY 11761

CT 06032

PA 10020

AL 16110



10701000100  
AMERICAN  
IL 67000

10701000100  
AMERICAN PUBLIC SERVICE CO  
PLANT MANAGER  
MUSKOGEE  
AZ 09007

10701000100  
AMERICAN PUBLIC SERVICE CO  
PLANT MANAGER  
MUSKOGEE  
AZ 09001

10701000100  
AMERICAN PUBLIC SERVICE CO  
PLANT MANAGER  
MUSKOGEE  
AZ 09030

17201000100  
AMERICAN LIGHT CO  
PLANT MANAGER  
MUSKOGEE  
AR 72001

17201000100  
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PLANT MANAGER  
MUSKOGEE  
CA 90070

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AMERICAN LIGHT CO  
PLANT MANAGER  
MUSKOGEE  
CA 90070









INDUSTRIAL RELATIONS DIV  
1700 MISSION ST  
SAN FRANCISCO, CALIF 94103  
CA 94103

12001001700  
SECRETARY GENERAL  
SAN FRANCISCO DIV  
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INDUSTRIAL RELATIONS DIV  
1700 MISSION ST  
SAN FRANCISCO, CALIF 94103  
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SAN FRANCISCO  
CA 94103









127100000000  
123 N. MAIN ST  
COLUMBUS OH 43216

127100000000  
SUN HALLWAY  
SUNSHINE QUALITY ASSURANCE  
101 CILLO AVENUE  
BALD CRYSTAL PA 19004

127200000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
PLANT MANAGER  
NEW HILL NC 28208

127200000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
PLANT MANAGER  
NEW HILL NC 27962

127300000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
PLANT MANAGER  
NEW HILL NC 27962

127300000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
PLANT MANAGER  
HARTSVILLE SC 29950

127400000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
GENERAL COUNSEL  
NEW HILL NC 27962

127400000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
GENERAL COUNSEL  
NEW HILL NC 27962

127500000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
GENERAL COUNSEL  
NEW HILL NC 27962

127500000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
GENERAL COUNSEL  
HARTSVILLE SC 29950

127600000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
GENERAL MANAGER  
NEW HILL NC 27962

127600000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
GENERAL MANAGER  
NEW HILL NC 27962

127700000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
PRESIDENT  
NEW HILL NC 27962

127700000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
PRESIDENT  
NEW HILL NC 27962

127800000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
MANAGER  
NEW HILL NC 27962

127800000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
MANAGER  
NEW HILL NC 27962

127900000000  
CANDLER POWER & LIGHT CO  
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NEW HILL NC 27962

127900000000  
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12311 W. BERRY  
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CANDLER POWER & LIGHT CO  
12311 W. BERRY  
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CANDLER POWER & LIGHT CO  
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NEW HILL NC 27962

128200000000  
CANDLER POWER & LIGHT CO  
12311 W. BERRY  
MANAGER  
NEW HILL NC 27962







1001100010  
OH 44601

1001100011  
OH 44101

1001100012  
OH 44101

1001100013  
IL 60530

1001100014  
DE 19000

1001100015  
MD 63130

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CO 80220

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WI 53511

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GA 30617

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CT 06005

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MD 70814

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MD 70814

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OH 44101

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OH 44001

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CA 90701

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OR 97304

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CA 90701

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GA 30617

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WI 53511

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OH 43001

1001100031  
OH 44101

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CT 06005

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CT 06005

1000 PROSPECT HILL DR  
WINDSOR CT 06095

CONSTRUCTION ENGINEERING INC  
C-1 SYSTEMS  
1000 PROSPECT HILL DR  
WINDSOR CT 06095

CONSTRUCTION ENGINEERING INC  
1000 PROSPECT HILL DR  
WINDSOR CT 06095

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CONSTRUCTION ENGINEERING INC  
1000 PROSPECT HILL DR  
WINDSOR CT 06095

10130100000  
PLANT MANAGER  
MARISS  
IL 60490

10130100000  
PLANT MANAGER  
MARISS  
IL 60490

10130100000  
PLANT MANAGER  
MARISS  
IL 61341

10130100000  
PLANT MANAGER  
MARISS  
IL 61242

10130100000  
PLANT MANAGER  
MARISS  
IL 60000

10130100000  
PLANT MANAGER  
MARISS  
IL 60490

10130100000  
PLANT MANAGER  
MARISS  
IL 60000

10130100000  
PLANT MANAGER  
MARISS  
IL 61242

10130100000  
PLANT MANAGER  
MARISS  
IL 61010

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PLANT MANAGER  
MARISS

1011000100  
STATE ASSY  
JAMES ON GLEW & LANE MICHIGAN  
LION IL 60000

1011000100  
COMMISSIONER OF COLLEGE UN  
C. DE WILDE  
CH. INC. MANAGER  
MICHIGAN 48100  
3030 ANTIWERP  
BELGIUM

1011000100  
COMPUTER DATA ENGINEERING CONP  
SIRHAN  
VICE PRESIDENT  
1010 STEVENSON CROWN BLVD  
SAN JOSE CA 95120

1000000100  
CONTR. INC.  
DEPT. OF VETERANS AFF  
4400 S. MICHIGAN  
CH. DIV. MANAGER  
1000 S. MICHIGAN ST  
ANN ARBOR MI 48106

1011000100  
LORDS INTERNATIONAL  
CH. MANAGER  
DEPT. SYSTEMS MGR  
1000 WASHINGTON ST  
BOSTON MA 02108

1011000100  
CONTRACTOR  
CONTRACT PRODUCTS DIVISION  
U. S. FEDERAL  
DIVISION MANAGER  
1000 WASHINGTON AVE  
BOSTON MA 02108

1011000100  
CONTRACTOR  
CONTRACT PRODUCTS DIVISION  
U. S. FEDERAL  
DIVISION MANAGER  
1000 WASHINGTON ST  
BOSTON MA 02108

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CONTRACT PRODUCTS DIVISION  
U. S. FEDERAL  
DIVISION MANAGER  
1000 WASHINGTON ST  
BOSTON MA 02108

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DIVISION MANAGER  
1000 WASHINGTON ST  
BOSTON MA 02108

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DIVISION MANAGER  
1000 WASHINGTON ST  
BOSTON MA 02108

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U. S. FEDERAL  
DIVISION MANAGER  
1000 WASHINGTON ST  
BOSTON MA 02108

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CONTRACTOR  
CONTRACT PRODUCTS DIVISION  
U. S. FEDERAL  
DIVISION MANAGER  
1000 WASHINGTON ST  
BOSTON MA 02108

210 CHESTNUT ST  
PHILADELPHIA PA 19100

1011000100  
COMPUTER ENGINEERING SVCS INC  
LINDSEY A. JONES  
PRESIDENT  
2015 TELEGRAPH AVE  
SUITE 410  
DUBLIN CA 94705

1011000100  
CONTRACTOR  
CONTRACT PRODUCTS DIVISION  
U. S. FEDERAL  
DIVISION MANAGER  
1000 WASHINGTON ST  
BOSTON MA 02108

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CONTRACT PRODUCTS DIVISION  
U. S. FEDERAL  
DIVISION MANAGER  
1000 WASHINGTON ST  
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DIVISION MANAGER  
1000 WASHINGTON ST  
BOSTON MA 02108



DAVID V. VANDERBILT  
DIRECTOR OF LIC. ADMINISTRATION  
1905 W. PALM BEACH BLVD  
JACKSON MI 49201

7001 ST MAIN STREET  
TOWSON CA 92714

192710001036  
COMPUTER CONSULTANTS INC  
2001 S. MAIN ST  
TOWSON CA 92714

192710001037  
COMPUTER DATA CODE  
2001 S. MAIN ST  
TOWSON MI 49201

192710001038  
COMPUTER DATA CODE  
NATIONAL ASSOCIATION  
OF COMPUTER MANAGERS  
NACOMAN  
2001 S. MAIN ST  
TOWSON MI 49201

192710001039  
COMPUTER PRODUCTS CORP  
NATIONAL ASSOCIATION  
OF COMPUTER MANAGERS  
NACOMAN  
2001 S. MAIN ST  
TOWSON MI 49201

110127001000  
COMPUTER SERVICES  
2001 S. MAIN ST  
TOWSON PA 16127

110127001000  
COMPUTER SERVICES INC  
2001 S. MAIN ST  
TOWSON PA 16127

110127001001  
COMPUTER SERVICES  
2001 S. MAIN ST  
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110127001001  
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110127001003  
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2001 S. MAIN ST  
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110127001004  
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2001 S. MAIN ST  
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110127001008  
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2001 S. MAIN ST  
TOWSON PA 16127

110127001008  
COMPUTER SERVICES  
2001 S. MAIN ST  
TOWSON PA 16127

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DIRECTOR  
COUNTY HOUSE  
410 WINE  
OH 94000

744077000120 00000  
COUNTY OF SACRAMENTO  
BOARD OF SUPERVISORS  
333 J STREET  
SACRAMENTO  
OH 44077

744010007101 00000  
COUNTY OF SACRAMENTO  
BOARD OF SUPERVISORS  
700 W ST  
SACRAMENTO  
CA 95810

7734300003007 00000  
COUNTY OF SULLY  
COUNTY ADMINISTRATOR  
1200 VIRGINIA AVENUE  
PORT PIERCE  
FL 33490

744000002022 00000  
COUNTY OF SACRAMENTO  
BOARD OF SUPERVISORS  
COUNTY HOUSE  
CHAIRMAN  
COUNTY HOUSE-16TH & COLOR ST  
BLAIR  
OH 44000

774310003004 00000  
COUNTY OF SULLY  
BOARD OF COMMISSIONERS  
EXECUTIVE SECRETARY  
SULLY  
OH 55313

1003710727004 00000  
DIRECTION OF ENGINEERING  
610 EXECUTIVE BLVD  
WILLOW BROOK  
IL 60521

10210007007 00000  
CRANE VALVE & GAGE CO  
8 F BELL  
QA MANAGER  
1550 SUMMIT SECOND STREET  
ST LOUIS  
MO 63104

102003052000 00000  
CRANE VALVE & GAGE CO  
8 F BELL  
QA MANAGER  
63 REMONDIC ST  
WRENTHAM  
MA 02093

10410001007 00000  
RTI NUCLEAR INC  
RICHARD MATH  
QA MANAGER  
1027 E 10TH ST  
CLEVELAND  
OH 44106

102700072700 00000  
3700 ADVANTAGE INC  
1700 WILSON BLVD  
CINCINNATI  
OH 45206

102710000210 00000  
CSCA TRIPLE SERVICES  
COUNCIL OF WOMEN  
ENGINEERING  
244 BIRCHVIEW AVE 24TH ST

425 FIFTH ST COUNTY COURTHOUSE  
SUPERIA  
CA 95501

743437005770 00000  
COUNTY OF SACRAMENTO  
NIGHT SUPERVISOR'S AGENCY  
1405 O STREET  
SACRAMENTO  
OH 44077

742101000317 00000  
COUNTY OF SAN DIEGO  
BOARD OF SUPERVISORS  
CHAIRMAN  
SAN DIEGO  
CA 92101

773007000000 00000  
COUNTY OF SULLY  
BOARD OF SUPERVISORS  
SHERIFF  
CHAIRMAN  
SULLY COUNTY COURTHOUSE  
SULLY  
IA 27603

700027000313 00000  
COUNTY OF WELD  
BOARD OF COUNTY COMMISSIONERS  
CHAIRMAN  
PO BOX 750  
GREELEY  
CO 80632

107000037004 00000  
WALTER & CO INC  
QA MANAGER  
150 WADSWORTH RD  
SCHALESBURG  
NJ 07094

101171053737 00000  
CRANE CO  
QUALITY ENGINEERING  
QA MANAGER  
101 MANCHESTER ST  
MIDDLETOWN  
MA 01131

102003001000 00000  
CRANE VALVE & GAGE CO  
QA MANAGER  
63 REMONDIC ST  
WRENTHAM  
MA 02093

110400050077 00000  
CONQUEST ENERGY SERVICES  
11111 FIFTH ST  
UPPER MERION ROAD  
LIMEFIELD  
PA 19460

107000091000 00000  
CUSTOM ALLOY CORP  
QA MANAGER  
877 511  
CALIFORNIA  
NJ 07010

102710000407 00000  
LVI INC  
WALLACE R RUSKIN  
QA MANAGER  
PO BOX 2110  
FILLMORE  
OH 43216

104370000212 00000  
CSCA TRIPLE SERVICES  
COUNCIL OF WOMEN  
ENGINEERING  
244 BIRCHVIEW AVE 24TH ST



100 ATLANTIC AVE 24TH FL  
BOSTON MA 02210

10400 101111 MAYA LN  
1700 JAWHIN, SUITE 505  
RICHMOND VA 99152

103074007033 9999  
CYCMA ENERGY SERVICES  
SAN DIEGO OFFICE  
JACK W HEAD  
125 STEVENS STREET  
SUITE 110  
SOLANA BEACH CA 92075

104111059551 9999  
CYCMA ENERGY SERVICES  
TECHNICAL LIBRARY SERVICES  
JERRY WING  
101 CALIFORNIA ST  
SUITE 1000  
SAN FRANCISCO CA 94111

103074001670 9999  
O C O'BRIEN INC  
O C O'BRIEN  
O C O'BRIEN  
PRESIDENT  
ONE CHASE PARK  
PO BOX 150  
STAMFORD NH 03074

103074002000 9999  
O C O'BRIEN INC  
O C O'BRIEN  
O C O'BRIEN  
PRESIDENT  
ONE CHASE PARK  
STAMFORD NH 03074

113235003000 9999  
DIAPOLOMA CONSULTING ENG INC  
PATRICK P O'HARA  
10 BUFF RD  
PITTSBURGH PA 15235

134037000447 9999  
DAIRYLAND POWER COOPERATIVE  
LACROSSE  
PLANT MANAGER  
PO BOX 275  
GENEA WI 54632

134001003033 9999  
DAIRYLAND POWER COOPERATIVE  
JIM YAVION  
2557 GENERAL MANAGER  
7015 E AVENUE SOUTH  
LACROSSE WI 54601

134001003033 9999  
DAIRYLAND POWER COOPERATIVE  
JIM YAVION  
2557 GENERAL MANAGER  
7015 E AVENUE SOUTH  
LACROSSE WI 54601

173201007027 9999  
BALLAS POWER & LIGHT CO  
RAN H TAMM  
VICE PRESIDENT  
1500 COMMERCE ST  
BALLAS VA 75201

170002001672 9999  
BALLAS POWER & LIGHT CO  
LAURENCE HIGGINS  
GA MANAGER  
BALLAS VA  
GREENVILLE SC 29602

170002001672 9999  
BALLAS POWER & LIGHT CO  
LAURENCE HIGGINS  
GA MANAGER  
BALLAS VA  
GREENVILLE SC 29602

122170001700 9999  
BELL NEWS ASSOCIATES INC  
311 MICHAEL LA  
BOX 311  
STERLING VA 22170

170002001044 9999  
BAY STATE AUTOMATION INC  
RUD JOHNSON  
PO BOX 7100  
CHARLESTON SC 29405

200107003010 9999  
BAY STATE AUTOMATION INC  
RUD JOHNSON  
PO BOX 7100  
CHARLESTON SC 29405

100100050173 9999  
BAY STATE AUTOMATION INC  
RUD JOHNSON  
PO BOX 7100  
CHARLESTON SC 29405

104421001673 9999  
BE LAVA TUBING INC  
ENGLW & COMPRESSION DIV  
R F WYER  
GA MANAGER  
570 05TH AVE  
ORLANDO CA 94621

170010070107 9999  
BENTLEY ELECTRICAL AGENCY  
DANIEL FRISCH PARDON RES INST  
DIACON PA-PAVILLISI-10-CHANCE  
REVISION MD 20416

210003000459 9999  
BE LAURENCE DEPT OF NATL RES SOURCE  
DIV IN ENVIRONMENTAL CONTROL  
MANAGER-TECHNICAL SERVICES  
PM BOX 1001  
MURKIN DE 19903

210003000459 9999  
BE LAURENCE DEPT OF NATL RES SOURCE  
DIV IN ENVIRONMENTAL CONTROL  
MANAGER-TECHNICAL SERVICES  
PM BOX 1001  
MURKIN DE 19903

110003000459 9999  
BE LAURENCE DEPT OF NATL RES SOURCE  
DIV IN ENVIRONMENTAL CONTROL  
MANAGER-TECHNICAL SERVICES  
PM BOX 1001  
MURKIN DE 19903

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BE LAURENCE DEPT OF NATL RES SOURCE  
DIV IN ENVIRONMENTAL CONTROL  
MANAGER-TECHNICAL SERVICES  
PM BOX 1001  
MURKIN DE 19903

170021001670 9999  
BETA SMITHSON CN  
J H SMITHSON  
GA MANAGER



1155 GILMAN AVE  
CH 47750

17001001470 99999  
BRISSELA INDUSTRIES INC  
INDUSTRIAL VALVE DIV  
P O BOX 1430  
ALEXANDRIA LA 71101

17007000300 99999  
DUNE POWER CO  
NUCLEAR STATION  
ENGINEER  
P O BOX 1430  
SENECA SC 29670

17007000400 1 99999  
DUNE POWER CO  
ENGINEER  
PLANT MANAGER  
SENECA SC 29670

17024200000 1 99999  
DUNE POWER CO  
NUCLEAR STATION  
ENGINEER  
P O BOX 1100  
CHARLOTTE NC 28242

17024200100 1 99999  
DUNE POWER CO  
ASSOCIATE GENERAL COUNSEL  
P O BOX 1100  
CHARLOTTE NC 28242

17024200100 1 99999  
DUNE POWER CO  
DESIGN ENGINEERING  
P O BOX 1100  
CHARLOTTE NC 28242

17024200300 1 99999  
DUNE POWER CO  
NUCLEAR STATION  
ENGINEER  
P O BOX 1100  
CHARLOTTE NC 28242

17024200400 1 99999  
DUNE POWER CO  
ASSOCIATE GENERAL COUNSEL  
P O BOX 1100  
CHARLOTTE NC 28242

17024200500 1 99999  
DUNE POWER CO  
NUCLEAR STATION  
ENGINEER  
P O BOX 1100  
CHARLOTTE NC 28242

10010001470 99999  
BRISSELA INDUSTRIES INC  
INDUSTRIAL VALVE DIV  
P O BOX 1430  
ALEXANDRIA LA 71101

11507700470 99999  
BRISSELA INDUSTRIES INC  
INDUSTRIAL VALVE DIV  
P O BOX 1430  
ALEXANDRIA LA 71101

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BRISSELA INDUSTRIES INC  
INDUSTRIAL VALVE DIV  
P O BOX 1430  
ALEXANDRIA LA 71101

100250001670 99999  
BRISSELA INDUSTRIES INC  
INDUSTRIAL VALVE DIV  
P O BOX 1430  
ALEXANDRIA LA 71101

17007000400 1 99999  
DUNE POWER CO  
ENGINEER  
PLANT MANAGER  
SENECA SC 29670

17007000400 1 99999  
DUNE POWER CO  
ENGINEER  
PLANT MANAGER  
SENECA SC 29670

17024200100 1 99999  
DUNE POWER CO  
NUCLEAR STATION  
ENGINEER  
P O BOX 1100  
CHARLOTTE NC 28242

17024200100 1 99999  
DUNE POWER CO  
NUCLEAR STATION  
ENGINEER  
P O BOX 1100  
CHARLOTTE NC 28242

17071000000 1 99999  
DUNE POWER CO  
NUCLEAR STATION  
ENGINEER  
P O BOX 750  
CLOVER SC 29710

17003100000 2 99999  
DUNE POWER CO  
ENGINEER  
PLANT MANAGER  
CHARLOTTE NC 28242

17071000000 1 99999  
DUNE POWER CO  
NUCLEAR STATION  
ENGINEER  
P O BOX 750  
CLOVER SC 29710

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DUNE POWER CO  
ENGINEER  
PLANT MANAGER  
CHARLOTTE NC 28242

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BRISSELA INDUSTRIES INC  
INDUSTRIAL VALVE DIV  
P O BOX 1430  
ALEXANDRIA LA 71101

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BRISSELA INDUSTRIES INC  
INDUSTRIAL VALVE DIV  
P O BOX 1430  
ALEXANDRIA LA 71101

PLANT MANAGER  
PA 15077

11507700001  
SHIPPINGPORT PA 15077

11507700002  
SHIPPINGPORT PA 15077

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SHIPPINGPORT PA 15077

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SHIPPINGPORT PA 15270

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SHIPPINGPORT PA 15270

10001001773  
UT 00119

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UT 00119

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UT 00119

RECORDS MGMT SUPERVISOR  
PA 15077

11507700009  
SHIPPINGPORT PA 15077

21507700010  
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PA 15210

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10020001131  
NJ 07074

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NJ 08001

10011001004  
CO 80112

11170001005  
UT 00119





10151244  
PO BOX 716  
18400 FALLS ID 83401

10150202732 I 9999  
ENERGY INC  
TECHNICAL MANAGER  
JACKIE (PH)  
PO BOX 716  
18400 FALLS ID 83407

10150037003 I 9999  
ENERGY TECHNOLOGY GROUP INC  
POWER DISTRIBUTION  
600-1 TULLY RD  
WALTHAM MA 02156

101510001700 I 9999  
ELECTRONIC ANALYSIS SERVICES  
PO BOX 557  
EAST GREENWICH RI 02810

11710001490 I 9999  
COMMUNICATIONS PUBLISHERS CO  
COMMUNICATIONS  
PO BOX 117  
117TH STREET  
MADISON WI 53740

10150013107 I 9999  
LAW FIRM  
PO BOX 844  
PO BOX 7450  
SAN JOSE CA 95150

110001001005 I 9999  
NATION COLLEGE ON NUC POWER  
675 MILWAUKEE AVENUE  
STATE COLLEGE PA 16801

11710000157 I 9999  
LAW FIRM  
PO BOX 140  
PO BOX 140  
UNIVERSITY OF CAROLINA  
CHARLIE HILL NC 27514

10150010402 I 9999  
LAW FIRM  
PO BOX 104  
PO BOX 2174 AVE  
DALLAS TX 75210

10150010030 I 9999  
LAW FIRM  
CANTON OF SEARCH GROUP  
PO BOX 100  
333 N BROADWAY ST  
SUITE 100  
ALEXANDRIA VA 22304

10150010000 I 9999  
LAW FIRM  
LAW FIRM  
QUALITY ASSURANCE ENGINEER  
PO BOX 100  
PA 19107

10150010000 I 9999  
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ENERGY TECHNOLOGY ENGR CENTER  
FACILITY DESIGN CENTER  
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LAW FIRM

1701 SPRING FOREST RD  
BELLINGHAM WA 98220

100332001700 9999  
MILITARY COMPANY INC  
MILITARY TALENT MGMT  
C J WILLIAMS  
QA MANAGER  
1701 MIAMI RAPIDS RD  
BELLINGHAM WA 98222

170320001003 9999  
J & A MEDICAL SERVICES INC  
PAUL MANNING  
QA MANAGER  
PO BOX 30307  
DALLAS TX 75229

110033000079 9999  
JANITIA SYSTEM SYSTEMS INC  
SYSTEMS CONTRACTS DIV  
A P KUND  
TECH MANAGER  
RIMMBOY DRIVE  
MICHIGAN PA 18003

171000000001 9999  
FINLAND INST OF RADIAT PROTECT  
PAUL KUND  
ADMINISTRATOR  
PO BOX 709  
00101 HILLSIDE IL FINLAND

100120001200 9999  
FINLAND CONTROLS INTERNATIONAL  
GEOFFREY HALLIDAY  
QA MANAGER  
PO BOX 100  
MARSHALLTON IA 50150

100120001200 9999  
FINLAND CONTROLS INTERNATIONAL  
GEOFFREY HALLIDAY  
TECH MANAGER  
PO BOX 11  
MARSHALLTON IA 50150

100700001000 9999  
CALIF ANALYSIS CENTER  
GILBERT  
WILLIAM ARMITAGE  
PROGRAM DIRECTOR  
CUBANA CA 91720

112301010000 9999  
FLORIDA OFFICE OF HEALTH & ENVIRONMENTAL  
PROTECTION  
VITEL JENNIFER  
1111 WINDWARD BLVD  
SUITE 110  
TALLAHASSEE FL 32301

112301000000 9999  
FLORIDA OFFICE OF PUBLIC CRIMINAL  
JUSTICE  
JACK SCHEFF  
MANAGEMENT DIRECTOR  
TALLAHASSEE FL 32301

112301000000 9999  
FLORIDA OFFICE OF PUBLIC CRIMINAL  
JUSTICE  
JACK SCHEFF  
MANAGEMENT DIRECTOR  
TALLAHASSEE FL 32301

112301000000 9999  
FLORIDA OFFICE OF PUBLIC CRIMINAL  
JUSTICE  
JACK SCHEFF  
MANAGEMENT DIRECTOR  
TALLAHASSEE FL 32301

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MANAGEMENT DIRECTOR  
TALLAHASSEE FL 32301

100332001000 9999  
MILITARY COMPANY INC  
MILITARY TALENT MGMT  
C J WILLIAMS  
QA MANAGER  
1701 MIAMI RAPIDS RD  
BELLINGHAM WA 98222

102002001000 9999  
CALIFORNIA MUTUAL RESPONDER GROUP  
GREGORY WILSON  
1511 ANTIUM-DRIVINENCE TPK  
MURFREESBORO TN 37062

100240001000 9999  
JAN CO  
LEN EDWARDS  
QA SYSTEMS MANAGER  
1701 WASHINGTON AVE AIRPORT ST  
PO BOX 9210  
LOS ANGELES CA 90749

171000000001 9999  
FINLAND INST OF RADIAT PROTECT  
PAUL KUND  
ADMINISTRATOR  
PO BOX 709  
00101 HILLSIDE IL FINLAND

100120001200 9999  
FINLAND CONTROLS INTERNATIONAL  
GEOFFREY HALLIDAY  
QA MANAGER  
PO BOX 100  
MARSHALLTON IA 50150

100120001200 9999  
FINLAND CONTROLS INTERNATIONAL  
GEOFFREY HALLIDAY  
TECH MANAGER  
PO BOX 11  
MARSHALLTON IA 50150

100700001000 9999  
CALIF ANALYSIS CENTER  
GILBERT  
WILLIAM ARMITAGE  
PROGRAM DIRECTOR  
CUBANA CA 91720

112301010000 9999  
FLORIDA OFFICE OF HEALTH & ENVIRONMENTAL  
PROTECTION  
VITEL JENNIFER  
1111 WINDWARD BLVD  
SUITE 110  
TALLAHASSEE FL 32301

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JUSTICE  
JACK SCHEFF  
MANAGEMENT DIRECTOR  
TALLAHASSEE FL 32301







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| 1000000000 | CA 92130 | SAN DIEGO  | GENERAL ELECTRIC CO | 1000000000 | CA 92130 | SAN DIEGO  | GENERAL ELECTRIC CO |
| 1000000000 | CT 06140 | 1000000000 | GENERAL ELECTRIC CO | 1000000000 | CT 06140 | 1000000000 | GENERAL ELECTRIC CO |
| 1000000000 | MA 01910 | 1000000000 | GENERAL ELECTRIC CO | 1000000000 | CA 94004 | 1000000000 | GENERAL ELECTRIC CO |
| 1000000000 | CA 95125 | 1000000000 | GENERAL ELECTRIC CO | 1000000000 | NC 27002 | 1000000000 | GENERAL ELECTRIC CO |
| 1000000000 | CT 06602 | 1000000000 | GENERAL ELECTRIC CO | 1000000000 | CA 95125 | 1000000000 | GENERAL ELECTRIC CO |
| 1000000000 | MA 01910 | 1000000000 | GENERAL ELECTRIC CO | 1000000000 | CA 95125 | 1000000000 | GENERAL ELECTRIC CO |
| 1000000000 | NC 27002 | 1000000000 | GENERAL ELECTRIC CO | 1000000000 | IL 60490 | 1000000000 | GENERAL ELECTRIC CO |
| 1000000000 | MA 01930 | 1000000000 | GENERAL ELECTRIC CO | 1000000000 | CA 95125 | 1000000000 | GENERAL ELECTRIC CO |
| 1000000000 | CT 06602 | 1000000000 | GENERAL ELECTRIC CO | 1000000000 | MA 0014  | 1000000000 | GENERAL ELECTRIC CO |
| 1000000000 | CA 95112 | 1000000000 | GENERAL ELECTRIC CO | 1000000000 | CA 95112 | 1000000000 | GENERAL ELECTRIC CO |
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1000 EAST HANPTON  
CT 06474

17201001110 I 0000  
1000 CRYSTAL AVE  
SUITE 200  
SANTA CLARA CA 95050

17201001120 I 0000  
1000 CRYSTAL AVE  
SUITE 200  
WASHINGTON DC 20006

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