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cc: W Leach, AEO

**EVENT REPORT COVER PAGE**

**AGREEMENT STATE**

**EVENT REPORT NO.** CA - - -

**DATE:** NOVEMBER 26, 1996

**TO:**

**Deputy Director  
Office of State Programs**

**SUBJECT:** CONTAMINATION EVENT INVOLVING Am-241 THAT OCCURRED 2/1/96  
AT NDC SYSTEMS, IN IRWINDALE, CALIFORNIA  
(ABNORMAL OCCURRENCE REPORT AND LESSONS LEARNED)

**STATE:** CALIFORNIA

**Signature and Title:** Donald E. Bunn, Chief

Compliance and Enforcement

Radiological Health Branch, CA

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**MEMORANDUM**

Date : November 26, 1996

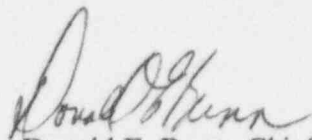
To : Patricia Larkins  
Office of State Programs  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

From : Don Bunn, Chief  
Compliance and Enforcement  
Radiologic Health Branch  
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Subject : NDC Systems Abnormal Occurrence Report.

Attached is the Abnormal Occurrence Report concerning the February 1996 NDC incident at Irwindale, CA. Also attached are lessons learned as the result of this accident that should be an addendum to the Incident Report I forwarded to you on September 25, 1996.

We hope that all reporting requirements concerning this incident are now satisfied. If more information is needed please contact me.



Donald E. Bunn, Chief  
Compliance and Enforcement

**Attachments**

cc: Ed Bailey  
Paul Baldenweg

OSP  
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Abnormal Occurrence Report  
NDC Systems Inc., Irwindale, CA  
February 1996

**Introduction**

NDC Systems is a manufacturer of specialized thickness gauging devices that are used for process quality control by a variety of industries. One example is the manufacture of sandpaper that must adhere to thickness tolerances. The company's gauging devices have radioactive sources installed that emit a beam of radiation through the product that strikes a detector on the other side. The thicker the product the greater the beam is attenuated, therefore, the signal that reaches the detector is reduced. By calibration, the system can detect variations in the thickness of the product and provide a valuable quality control mechanism.

The radioactive sources installed by NDC Systems are Americium 241 ( $\text{Am}^{241}$ ) because of the monoenergetic 60 KEV x-ray that is emitted which makes it ideal in measuring devices. Alpha radiation emitted by  $\text{Am}^{241}$  sources is not used and is contained inside the source by the shielding of the source capsule. Before the sources are installed in the gauging system, the  $\text{Am}^{241}$  sources must be wiped and tested for external contamination (leak tested) to confirm that the capsule is intact. The company has handled several thousand sources in the past and they had never detected a leaking source until this incident occurred.

## **Americium 241 Contamination at NDC Systems in Irwindale, California**

**Date and Place** - February 1, 1996; NDC Systems; Irwindale, California

**Nature and Probable Consequences** - On Thursday, February 1, 1996, during a routine wipe test of six research and development Americium 241 sealed sources, the President and Radiation Safety Officer (RSO) and the Radiation Office Administrator (ROA) of the company discovered one or more of the sources were leaking. These sources had been in storage for over ten years because their design did not meet the criteria the company needed when they were developed. The company was planning to dispose of them after they were leak tested. As a routine, the sealed sources were wipe tested in the handling room while the leak testing equipment was located approximately 200 feet away in the ROA's office. Initially, the sources were removed from two lead pigs labeled "Saclay" and "dumped" onto a handling table. Once wipe tested, they were placed into another container for disposal. When it was discovered they were leaking ( $>0.005$  microcuries), the sources were placed back into their original lead pigs. A wipe test on the outside of the lead pigs revealed further contamination.

On Friday, February 2, 1996, working on the assumption other objects may also be contaminated, the Alternate Radiation Safety Officer (ARSO) wipe tested the handling table and it too was found to be contaminated. This table was posted out of service and not to be used. The source loading room has two other tables and these were still in use on Friday.

On Monday, February 5, 1996, the RSO closed off the source handling room. The ARSO surveyed the floor in this area and it too was found to be contaminated.

The California Department of Health Services was officially notified at 11:00 on this date.

A health physics consultant was hired and he arrived to check the situation and to confirm NDC Systems had contained the contamination. Using an alpha scintillation detector, the consultant determined there were areas outside the source loading room with levels as high as 64,000 disintegration per minute/100 square centimeters (originally, the licensee only detected levels  $>300$  disintegration per minute/100 square centimeters).

The culmination of the above events led to the contamination of up to approximately 30,000 square feet of work area and the internal uptake of one individual. The total cleanup time was estimated to be 500 man hours at a cost of approximately \$100,000 dollars.

**Cause or Causes** - The licensee had never experienced a leaking sealed source so they were unfamiliar with the proper procedures to follow; first, the containment of the contamination. Also, the spread of the contamination was not completely detected because they were using equipment which was not adequately suitable for this type of radioactive material.

**Actions Taken to Prevent Recurrence**

**Licensee** - The Licensee's plan for preventing a reoccurrence of the incident includes: 1) incoming sealed source inspection assumes sources to be leaking until confirmed otherwise; 2) new alpha particle detecting equipment has been purchased to detect Americium 241 more efficiently; 3) protective latex gloves are being worn by everyone handling loose sources; 4) the number of individuals handling loose sources has been significantly reduced; and, 5) removing unused sources for disposal will further limit the chance of recurrence.

**California Department of Health Services** - The Department's plan to prevent recurrence of the incident includes providing licensees who handle similar sources special instructions as follows: 1) for those licensees who lack experience with leaking sealed sources, special care must always be taken and proper procedures followed in case a leaking source does occur; 2) whenever sealed sources are being tested for leakage, proper protective equipment such as latex gloves should always be worn; 3) sealed source leak testing equipment should always be located near where the sources are being wiped; 4) licensees who possess alpha sources such as Americium 241 should have alpha particle detection survey instruments; 5) sealed sources in storage should still be tested for leakage every two years; 6) once a sealed source is shown to be leaking, contamination controls should be put into place immediately; do not let it spread; and, 7) all contamination cleanup should be accomplished as expeditiously as possible. A time table should be established and followed as closely as possible.

This item is considered closed for the purpose of this report.

## LESSONS LEARNED

1. For those licensees who only possess sealed sources and have never experienced a leaking source, special care must always be taken and proper procedures followed in case a leaking source does occur.
2. Whenever sealed sources are being tested for leakage, proper protective equipment such as latex gloves should always be used.
3. Sealed source leak testing equipment should always be located near where the sources are being wiped.
4. Licensees who possess alpha sources such as Americium 241 should have alpha particle detection survey instruments.
5. Lack of leaking source experience is not an excuse for inadequate response. Proper contamination procedures should be established and practiced as often as necessary in case such an incident were to occur.
6. Sealed sources in storage should still be leak tested every two years.
7. Once a sealed source is shown to be leaking, contamination controls should be put into place immediately. Do not let it spread.
8. All contamination cleanup should be accomplished as expeditiously as possible; a timetable should be established and followed.