March 24, 2000

Mr. Valeri Tolstykh
Regulatory Activities Unit
Safety Assessment Section
Division of Nuclear Installation Safety
International Atomic Energy Agency
Wagramer Strasse 5
P.O. Box 100, A-1400
Vienna, Austria

Dear Mr. Tolstykh:

Enclosed are the following IRS reports:

- POTENTIAL FIRE HAZARD IN THE USE OF POLYALPHAOLEFIN IN TESTING OF AIR FILTERS (NRC Information Notice 99-34).

- OPERATIONAL ISSUES IDENTIFIED IN BOILING WATER REACTOR TRIP AND TRANSIENT (NRC Information Notice 2000-01).

- 1999 ENFORCEMENT SANCTIONS FOR DELIBERATE VIOLATIONS OF NRC EMPLOYEE PROTECTION REQUIREMENTS (NRC Information Notice 2000-04).

Each report is being submitted in the following two media: (1) a hard copy of the input file for the AIRS database; and (2) a 3.5-inch HD diskette containing the input file for the AIRS database in Microsoft Word 6.0 format.

If you have any questions regarding these reports, please call Eric J. Benner of my staff. He can be reached at (301) 415-1171.

Sincerely,

/RA/
Ledyard B. Marsh, Chief
Events Assessment, Generic Communications and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Enclosures: As stated

cc w/enclosures 1 and 2:
Mr. Lennart Carlsson
Nuclear Safety Division
Nuclear Energy Agency
Organization for Economic
Cooperation and Development
Le Seine Saint Germain
12, Boulevard des Iles
92130, Issy-les-Moulineaux, France

March 24, 2000

Mr. Valeri Tolstykh
Regulatory Activities Unit
Safety Assessment Section
Division of Nuclear Installation Safety
International Atomic Energy Agency
Wagramer Strasse 5
P.O. Box 100, A-1400
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Mr. Lennart Carlsson
Nuclear Safety Division
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Cooperation and Development
Le Seine Saint Germain
12, Boulevard des Iles
92130, Issy-les-Moulineaux, France

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INCIDENT REPORTING SYSTEM

IRS NO. | **EVENT DATE** | **DATE RECEIVED**
99/12/28

EVENT TITLE

POTENTIAL FIRE HAZARD IN THE USE OF POLYALPHAOLEFIN IN TESTING OF AIR FILTERS (NRC Information Notice 99-34)

COUNTRY
USA

PLANT AND UNIT
Generic

REACTOR TYPE
(BWR or PWR)

INITIAL STATUS
N/A

RATED POWER (MWe NET)
N/A

DESIGNER
(WEST, GE, CE, B&W)

1st COMMERCIAL OPERATION
N/A

ABSTRACT

This IRS report discusses a recent event in which a flame was emitted from a thermal aerosol generator being used for in-place testing of a high-efficiency particulate air (HEPA) filter. The aerosol was generated from a synthetic aliphatic hydrocarbon, polyalphaolefin (PAO). The flame did not result in personnel injury, but it had the potential to create serious consequences.

POTENTIAL FIRE HAZARD IN THE USE OF POLYALPHAOLEFIN IN TESTING OF AIR FILTERS (NRC Information Notice 99-34)

Please refer to the dictionary of codes corresponding to each of the sections below and to the coding guidelines manual.

1.	**Reporting Categories:**	**1.4**		
2.	**Plant Status Prior to the Event:**	**2.0**		
3.	**Failed/Affected Systems:**	**3.H**		
4.	**Failed/Affected Components:**	**4.2.8**		
5.	**Cause of the Event:**	**5.5.7**	**5.7.1**	
6.	**Effects on Operation:**	**6.0**		
7.	**Characteristics of the Incident:**	**7.0**		
8.	**Nature of Failure or Error:**	**8.0**		
9.	**Nature of Recovery Actions:**	**9.1.1**		

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555-0001

December 28, 1999

NRC INFORMATION NOTICE 99-34: POTENTIAL FIRE HAZARD IN THE USE OF POLYALPHAOLEFIN IN TESTING OF AIR FILTERS

Addressees

All holders of licenses for nuclear reactors and fuel cycle facilities.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to a recent event in which a flame was emitted from a thermal aerosol generator being used for in-place testing of a high-efficiency particulate air (HEPA) filter. The aerosol was generated from a synthetic aliphatic hydrocarbon, polyalphaolefin (PAO). The flame did not result in personnel injury, but it had the potential to create serious consequences. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response to this notice is required.

Description of Circumstances

On April 28, 1999, at the Department of Energy's West Valley Demonstration Project (WVDP), operations personnel were conducting in-place testing of a high-efficiency particulate air (HEPA) filter on a main filter bank using a thermal aerosol generator (NUCON F-1000-DG Model F) to produce a test aerosol of polyalphaolefin (PAO).

In accordance with West Valley's established procedure, the generator heater temperature had stabilized at 720 °F. The liquid flow valve was placed in the "on" position and adjusted to produce a predetermined flow rate. Then the vapor adjust control valve (carrier air) was opened slowly until a steady supply of aerosol was observed. As the vapor adjust control valve was slowly opened, a 2-to 3-foot-long flame was emitted from the generator discharge port. The attending operator was able to extinguish the flame by immediately closing both the vapor control valve and the liquid flow valve.

The thermal aerosol generator had earlier been used to generate dioctyl phthalate (DOP) test aerosol. Such an aerosol is produced in the generator at a heater block temperature of approximately 720°F; the auto-ignition temperature of DOP is 735°F. The heater block temperature is not adjustable, but the temperature regulator can be replaced with one that will maintain the heater block temperature at about 625°F, which is adequate for producing the PAO aerosol while maintaining a margin below the PAO auto-ignition temperature of 650°F. WVDP had changed the test aerosol to PAO but had not modified the heater controls to produce the lower temperature applicable to PAO.

ML993550113

The operators actuated the two control valves in an order opposite to the order presented in the vendor's operating manual. The vendor's manual recommends that air flow ("carrier air") be initiated before establishing liquid flow.

Following the event, West Valley suspended all HEPA filter testing on site until corrective actions were completed. The vendor of the thermal aerosol generator simulated the event under the same flow conditions and valve manipulations. The vendor observed flames at the aerosol discharge port in approximately 75 percent of the tests.

West Valley has modified its generator heater block controls and its valve operating procedures appropriately and, in conjunction with the vendor, has modified the carrier air valve so that it remains open a small amount even when in the closed position.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below, the appropriate regional office, or the appropriate Project Manager of the Office of Nuclear Reactor Regulation (NRR) or of the Office of Nuclear Material Safety and Safeguards (NMSS).

Original signed by

Michael F. Weber, Director
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Original signed by

Ledyard B. Marsh, Chief
Events Assessment, Generic Communications
and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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INCIDENT REPORTING SYSTEM

IRS NO. | **EVENT DATE** | **DATE RECEIVED**
2000/02/11

EVENT TITLE

OPERATIONAL ISSUES IDENTIFIED IN BOILING WATER REACTOR TRIP AND TRANSIENT (NRC Information Notice 2000-01)

COUNTRY
USA

PLANT AND UNIT
Generic

REACTOR TYPE
(BWR or PWR)

INITIAL STATUS
N/A

RATED POWER (MWe NET)
N/A

DESIGNER
(WEST, GE, CE, B&W)

1st COMMERCIAL OPERATION
N/A

ABSTRACT

This IRS report discusses a recent transient at the Hatch nuclear power plant. On January 26, 2000, at Hatch Unit 1, the reactor automatically scrammed on low reactor water level after a partial loss of feedwater occurred. One of two main feedwater lines was isolated when a valve unexpectedly closed in the feedwater flow path to the reactor. The licensee later determined that the valve closed because of a problem with the valve control switch. As a result of the valve closure, feedwater flow was significantly decreased; therefore, reactor water level decreased, and the reactor automatically scrammed as expected. The high-pressure coolant injection (HPCI) system and the reactor core isolation cooling (RCIC) system automatically actuated and injected water into the reactor as designed. These systems, along with the feedwater system, increased reactor water level rapidly. The feedwater and RCIC systems tripped on high level as expected. However, the HPCI system did not immediately trip as designed on high level and continued to inject water into the reactor for about 1 minute before tripping. Reactor water level increased to the point that water entered the main steam lines. The licensee closed the main steam isolation valves (MSIVs) in accordance with the emergency operating procedure.

OPERATIONAL ISSUES IDENTIFIED IN BOILING WATER REACTOR TRIP AND TRANSIENT
(NRC Information Notice 2000-01)

Please refer to the dictionary of codes corresponding to each of the sections below and to the coding guidelines manual.

1.	**Reporting Categories:**	**1.6**		
2.	**Plant Status Prior to the Event:**	**2.1.1**		
3.	**Failed/Affected Systems:**	**3.AF**	**3.FG**	**3.IE**
4.	**Failed/Affected Components:**	**4.1.7**	**4.3.7**	
5.	**Cause of the Event:**	**5.1.1**	**5.1.5.2**	**5.5.1**
		5.5.8	**5.5.9.1**	**5.6.2**
6.	**Effects on Operation:**	**6.1.1**	**6.5.1**	
7.	**Characteristics of the Incident:**	**7.11**		
8.	**Nature of Failure or Error:**	**8.2.1**		
9.	**Nature of Recovery Actions:**	**9.2**		

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D. C. 20555-0001

February 11, 2000

NRC INFORMATION NOTICE 2000-01: OPERATIONAL ISSUES IDENTIFIED IN BOILING WATER REACTOR TRIP AND TRANSIENT

Addressees

All holders of licenses for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to equipment and procedural issues experienced in a recent transient at the Hatch nuclear power plant. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific actions or written response is required.

Description of Circumstances

On January 26, 2000, at Hatch Unit 1, the reactor automatically scrammed on low reactor water level after a partial loss of feedwater occurred. One of two main feedwater lines was isolated when a valve unexpectedly closed in the feedwater flow path to the reactor. The licensee later determined that the valve closed because of a problem with the valve control switch. As a result of the valve closure, feedwater flow was significantly decreased; therefore, reactor water level decreased, and the reactor automatically scrammed as expected.

The high-pressure coolant injection (HPCI) system and the reactor core isolation cooling (RCIC) system automatically actuated and injected water into the reactor as designed. These systems, along with the feedwater system, increased reactor water level rapidly. The feedwater and RCIC systems tripped on high level as expected. However, the HPCI system did not immediately trip as designed on high level and continued to inject water into the reactor for about 1 minute before tripping. Reactor water level increased to the point that water entered the main steam lines. The licensee closed the main steam isolation valves (MSIVs) in accordance with the emergency operating procedure.

Pressure in the shutdown reactor began to slowly increase because of decay heat. A licensee operator attempted to open a safety relief valve to control reactor pressure but did not receive the expected indications on the control panel. The operator then actuated the control switches for other safety relief valves until he received the expected open indication on one valve. Subsequently, several safety relief valves were operated satisfactorily to control reactor pressure. Later, the licensee determined that the safety relief valves had opened properly when actuated. Safety relief valve tailpipe temperature indications, available on a control room

back panel recorder, clearly indicated the valves had operated. Reactor pressure reached a maximum value slightly above normal operating pressure and did not approach an operational safety limit.

The licensee controlled the reactor water level using HPCI and RCIC. Although initial attempts to restart RCIC were unsuccessful, the licensee was able to use the system later in the event. HPCI was manually operated several times for water level control and the licensee observed that it tripped properly at the high-level setpoint twice during the recovery.

On January 30-February 5, 2000, the NRC conducted an augmented team inspection (AIT) of the circumstances of this event. The objectives of this inspection were to (1) determine the facts of the event, (2) assess the licensee's response to the event, (3) assess the licensee's event review and recovery actions, and (4) assess any generic aspects of the event.

Discussion

In this event, several systems did not perform as expected.

Safety Relief Valves

The licensee's investigation into the response of the safety relief valves focused on the valve's position indication, the effect water has on the operation of the safety relief valve, and the effect that water passing through the safety relief valve has on the tailpipes, tailpipe vacuum breakers, and tailpipe pressure switches. The licensee was assisted by the nuclear steam supply system vendor, General Electric (GE), and the safety relief valve vendor, Target-Rock, in conducting this investigation and assessment. The licensee concluded that the safety relief valves operated each time the control switches were actuated in the control room. However, the operators were unaware that the safety relief valves were open because they did not receive the expected indicating light on the control panel. A pressure switch located in each safety relief valve tailpipe actuates due to increased tailpipe pressure when the safety relief valve is opened and, in turn, actuates an indicating light on the control panel. During this event, pressure in the tailpipes did not increase sufficiently to actuate the pressure switches while the safety relief valve was passing water. The licensee sent several of the safety relief valve control assemblies (topworks) to a valve test facility for testing and inspection. No abnormalities as a result of this event were identified. The licensee conducted inspections of the safety relief valve tailpipes and other plant components that may have been subjected to the water in the steam lines and did not identify any adverse conditions that resulted from this event.

Reactor Core Isolation Cooling

During the event, the RCIC system automatically initiated on low reactor water level and continued to inject until the RCIC turbine steam admission valve closed on high reactor water level as designed. Initial attempts to restart RCIC were unsuccessful. Water from the main steam lines had entered the line supplying steam to the RCIC turbine, which affected the turbine control system and resulted in closing the trip and throttle valve. The licensee concluded that the closure of the trip and throttle valve was due to an electrical overspeed

condition caused by water carryover into the turbine governor valve. In addition, the licensee's procedural guidance and training for restarting the tripped system with water in the steam supply line was inadequate. The licensee successfully manually started the system later in the event and identified no further problems with its operation.

The licensee concluded that, in accordance with its procedures and training, operators attempted to restart the turbine by resetting and opening the trip and throttle valve with (1) the steam admission valve full open and (2) the turbine control system demanding maximum speed. This method results in rapid admission of steam into the turbine, which increases the possibility of tripping the turbine on electrical overspeed. Additionally, it was determined that the trip and throttle valve response on the simulator did not accurately model the actual valve response in the plant.

The NRC has issued several information notices (listed below) on experiences at other nuclear power plants with water in the steam supply to turbine-driven pumps.

High Pressure Coolant Injection

Early in the transient, the system initiated, as designed, upon reaching its reactor water low-level setpoint and injected to assist the RCIC and feedwater systems in recovering the reactor water level. The system did not immediately trip upon reaching the high reactor water level but tripped after about 1 minute of continued operation. Later in the transient, the licensee manually restarted HPCI several times for reactor water level and pressure control. The system promptly tripped, as designed, at the high-level setpoint on two occasions.

The licensee conducted a detailed investigation regarding HPCI operation and did not conclusively determine why the system did not immediately trip during its initial operation. Testing of the associated components failed to identify the cause of the event but supported operability of the system.

Feedwater Valve Handswitches

The partial loss of feedwater occurred when a valve in the main feedwater flow path to the reactor closed unexpectedly. Later, the licensee determined that the valve closed because of a malfunction of a GE Type CR 2940 control switch. In 1977, GE issued Service Information Letter No. 217, which indicated that this model control switch was overly sensitive during positioning and that the switch contacts may close prematurely from the slightest movement of the selector switch.

Performance of Licensed Operators:

Several operational performance issues complicated the transient and recovery. For example, after the initial injection, several efforts to restart RCIC were unsuccessful because the procedural guidance and simulator training were not adequate for the existing conditions. The event occurred during shift turnover when a large number of operators were in the control room and resulted in unclear lines of responsibility and communication difficulties during some phases of the event. For example, there was a slight delay by the operators in shutting the

MSIVs. Additionally, the operators did not identify that HPCI did not immediately trip at the high-level setpoint.

Health and Safety Assessment

The AIT concluded that the event did not adversely affect the health and safety of the public. The event did not result in a radiological release, and no operational safety limits were approached. Safety-related systems remained capable of accomplishing their required safety functions, although some problems occurred with important plant equipment. No need existed to declare an unusual or emergency condition.

Generic Implications

The AIT concluded that several issues identified during the inspection potentially have generic implications. They are:

1. Safety relief valve operation and indication is affected when the valve is passing water instead of steam. Opening times may be slower, on the order of several seconds versus milliseconds. Tailpipe pressure experienced when passing water may not be sufficient to actuate pressure switches used for position indication.

2. Procedural guidance for closing the main steam isolation valves and setpoints for the high-level trips of the injections systems may not prevent complications due to water collecting in the main steam lines.

3. RCIC performance is affected by resetting the turbine trip and throttle valve with the steam admission valve open and a flow demand present, especially if excessive moisture is present in the steam supply to the turbine.

Related Generic Communications

- Information Notice 85-50, “Complete Loss of Main and Auxiliary Feedwater at a PWR Designed by Babcock & Wilcox,” July 8, 1985

- Information Notice 85-76, “Recent Water Hammer Events,” September 19, 1985

- Information Notice 86-14, “PWR Auxiliary Feedwater Pump Turbine Control Problems,” March 10, 1986

- Information Notice 86-14, Supplement 1, “Overspeed Trips of AFW, HPCI, and RCIC Turbines,” December 17, 1986

- Information Notice 86-14, Supplement 2, “Overspeed Trips of AFW, HPCI, and RCIC Turbines,” August 26, 1991

- Information Notice 88-77, “Inadvertent Reactor Vessel Overfill,” December 17, 1986

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

/RA J. E. Lyons
Acting for Ledyard B. Marsh, Chief
Events Assessment, Generic Communications
and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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INCIDENT REPORTING SYSTEM

IRS NO. | **EVENT DATE** | **DATE RECEIVED**
2000/02/25

EVENT TITLE

1999 ENFORCEMENT SANCTIONS FOR DELIBERATE VIOLATIONS OF NRC EMPLOYEE PROTECTION REQUIREMENTS (NRC Information Notice 2000-04)

COUNTRY
USA

PLANT AND UNIT
Generic

REACTOR TYPE
(BWR or PWR)

INITIAL STATUS
N/A

RATED POWER (MWe NET)
N/A

DESIGNER
(WEST, GE, CE, B&W)

1st COMMERCIAL OPERATION
N/A

ABSTRACT

This IRS report discusses sanctions that could result from deliberately violating NRC Employee Protection requirements. The NRC places a high value on nuclear industry employee's freedom to raise potential safety concerns both to licensee management and to the NRC without fear of reprisal or actual harassment and intimidation. Section 211 of the Energy Reorganization Act (ERA), as amended and 10 CFR 19.20, 30.7, 40.7, 50.7, 60.9, 61.9, 70.7, 72.10, and 76.7 provide that no employer may discharge or otherwise discriminate against any employee with respect to compensation, terms, conditions, or privileges of employment because the employee engaged in certain protected activities. These protected activities include notifying an employer of an alleged violation of the Atomic Energy Act or the ERA, refusing to engage in any practice made unlawful by those acts, testifying before Congress or in a Federal or State proceeding regarding any provision of these acts, or commencing, testifying, assisting, or participating in any manner in a proceeding under these acts. Licensees and contractors are responsible for ensuring that they do not discriminate against their employees for engaging in such protected activities. Licensees and contractors that discriminate against their employees who engage in protected activities are subject to sanctions by the NRC. These sanctions include notices of violation (NOVs) and civil penalties (CPs).

1999 ENFORCEMENT SANCTIONS FOR DELIBERATE VIOLATIONS OF NRC EMPLOYEE PROTECTION REQUIREMENTS (NRC Information Notice 2000-04)

Please refer to the dictionary of codes corresponding to each of the sections below and to the coding guidelines manual.

1.	**Reporting Categories:**	**1.4**		
2.	**Plant Status Prior to the Event:**	**2.0**		
3.	**Failed/Affected Systems:**	**3.Z**		
4.	**Failed/Affected Components:**	**4.0**		
5.	**Cause of the Event:**	**5.1.10.3**	**5.3.4**	**5.6.1**
6.	**Effects on Operation:**	**6.0**		
7.	**Characteristics of the Incident:**	**7.0**		
8.	**Nature of Failure or Error:**	**8.0**		
9.	**Nature of Recovery Actions:**	**9.0**		

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
OFFICE OF ENFORCEMENT
WASHINGTON, D.C. 20555

February 25, 2000

NRC INFORMATION NOTICE 2000-04: 1999 ENFORCEMENT SANCTIONS FOR DELIBERATE VIOLATIONS OF NRC EMPLOYEE PROTECTION REQUIREMENTS

Addressees

All U.S. Nuclear Regulatory Commission licensees.

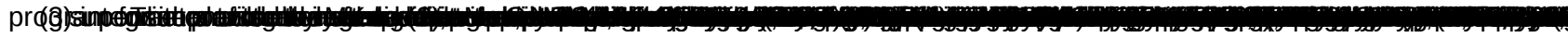
Purpose

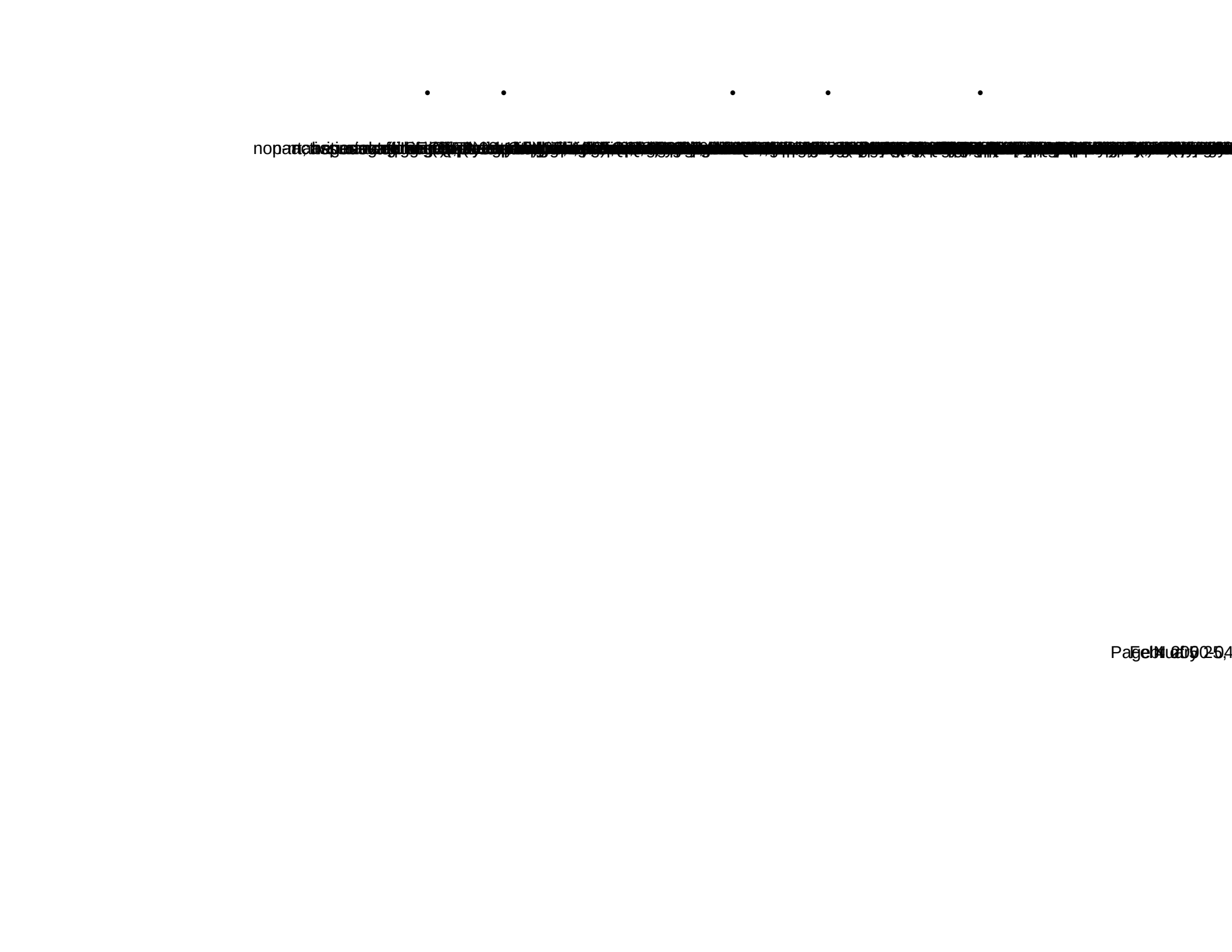
The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to remind licensees and their employees of the sanctions that could result from deliberately violating NRC Employee Protection requirements. Licensees are expected to review this information notice, distribute it to management and staff involved in licensed activities, including senior management at nuclear power plants, fuel cycle facilities, and byproduct materials facilities and consider appropriate actions to avoid similar problems. No written response is required.

Discussion

The NRC places a high value on nuclear industry employee's freedom to raise potential safety concerns both to licensee management and to the NRC without fear of reprisal or actual harassment and intimidation. Section 211 of the Energy Reorganization Act (ERA), as amended and 10 CFR 19.20, 30.7, 40.7, 50.7, 60.9, 61.9, 70.7, 72.10, and 76.7 provide that no employer may discharge or otherwise discriminate against any employee with respect to compensation, terms, conditions, or privileges of employment because the employee engaged in certain protected activities. These protected activities include notifying an employer of an alleged violation of the Atomic Energy Act or the ERA, refusing to engage in any practice made unlawful by those acts, testifying before Congress or in a Federal or State proceeding regarding any provision of these acts, or commencing, testifying, assisting, or participating in any manner in a proceeding under these acts. Licensees and contractors are responsible for ensuring that they do not discriminate against their employees for engaging in such protected activities. Licensees and contractors that discriminate against their employees who engage in protected activities are subject to sanctions by the NRC. These sanctions include notices of violation (NOVs) and civil penalties (CPs).

In addition, under the Deliberate Misconduct Rule (see 10 CFR 30.10 and 10 CFR 50.5) licensee and contractor employees, including senior managers, are subject to sanctions by the NRC for discrimination against other employees who engage in protected activities. These





Contact
E-mail:
Office of Nuclear

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March 23, 2000

ADAMS ACCESSION #: ML010...0369

TEMPLATE #: NRR-

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