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The Special Counsel

August 4, 2000

The President
The White House
Washington, D.C. 20500

Re: OSC File No. DI-98-0894

Dear Mr. President:

In accordance with 5 U.S.C. § 1213(e)(3), I am transmitting a report from the Honorable Carolyn L. Huntoon, Assistant Secretary for Environmental Management, U.S. Department of Energy, sent to me pursuant to 5 U.S.C. §§ 1213(c) and (d). I transmitted the disclosure to the Honorable Bill Richardson, Secretary of the Energy Department. Secretary Richardson delegated authority to Assistant Secretary Huntoon to sign and review the report. The report sets forth the findings and conclusions of Assistant Secretary Huntoon's review of disclosures of information allegedly evidencing a substantial and specific danger to public safety by officials at the U.S. Department of Energy (DOE), Oak Ridge Operations, Oak Ridge, Tennessee.

The whistleblower, Mr. James Hutton, provided comments to the agency report to this office, which I am also transmitting. We have carefully examined the original disclosures and reviewed the agency's response and Mr. Hutton's comments. Pursuant to 5 U.S.C. § 1213(e)(2), I have determined that the findings in the agency's report appear reasonable and contain all the information required by statute.

Specifically, Mr. Hutton alleged that the transportation of uranium hexafluoride (UF₆) is unsafe. UF₆ is a chemical produced and processed by the nuclear industry prior to its conversion into reactor fuel. When the uranium is enriched to more than 1%, the UF₆ is classified as "fissile" material for transportation. Fissile material must be transported in protective overpacks pursuant to Nuclear Regulatory Commission regulations.¹ Mr. Hutton explained that alternatively, cylinders of UF₆, with up to 14 tons of material containing less than 1% enrichment, are routinely transported by common carriers without protective overpacks. Mr. Hutton alleged that there has been no actual testing on the large "unprotected" UF₆ cylinders to determine their combustibility after exposure to a fire.

Because no actual fire testing has been conducted on large cylinders, there is no known answer to the question of what happens to the large cylinders of UF₆ when they

¹ Codified at 10 C.F.R. § 71.73.

are exposed to fire. Mr. Hutton stated that "Such knowledge could be significant in terms of emergency response as a result of transportation or other emergency." Mr. Hutton explained that UF6 escaping from a ruptured cylinder in a fire could react explosively with hydrocarbon fuels to create a large fireball. Exposure to the chemicals released from the fire can cause heavy metal poisoning, effecting mainly the kidneys, and severe burns to skin and lung tissue if inhaled. Mr. Hutton stressed that although contamination may affect a large geographical area, no fire testing of large cylinders has been conducted to validate the effects.

Mr. Hutton filed a complaint with DOE's Office of Inspector General (OIG) recommending the testing of large cylinders containing UF6. According to the OIG report, dated October 22, 1986, provided by Mr. Hutton, the OIG found that "Mr. Hutton's question as to what happens when one of these larger cylinders of UF6 is exposed to an oil fire to be a legitimate one." The OIG report indicated that in 1965, DOE conducted tests of small cylinders, each containing less than 250 pounds of UF6, which resulted in the explosion of three of the five cylinders tested, after their exposure to fire for less than 10 minutes. Additionally, the explosion of a cylinder containing 248 pounds of UF6 left a fire area over 78 feet across and 75 feet high. The OIG concluded that Mr. Hutton's recommendation should be addressed, "Given the force of the explosion of UF6, and the fact that shipping casks containing over 27,000 lbs. of UF6 are routinely transported over public roads. . ."

Mr. Hutton alleges that while the OIG report substantiated his recommendation, the complaint remained unresolved. In 1996, DOE conducted a "computer simulation" study referred to as the "K25 Cylinder Yard Final Safety Analysis Report" (FSAR study²) which analyzed the time at which a larger cylinder would rupture after exposure to fire. The FSAR study calculated that the time at which a 48-inch diameter³ cylinder would rupture at a 1700°F-fire temperature, was 5.5 minutes. The timing is paramount because the 5.5-minute rupture time would not permit "the fifteen-minute time interval that is required by the fire department to initiate actions to mitigate a fire."

The Office of Oversight, Environment, Safety and Health Evaluations (ES&H) was directed to review the FSAR study. ES&H concluded that the FSAR study should not be relied on because it utilized too high a fire temperature to study the effects on the large cylinders. ES&H maintained that the standard fire temperature of 1475°F, codified in Nuclear Regulatory Commission regulations should be the fire temperature used. Although this regulation pertains to "protective overpacks" for chemicals such as UF6, ES&H asserted that this fire temperature should be applied to the "unprotected" cylinders of UF6.

² This study was dated July 7, 1996.

³ Mr. Hutton, with the corroboration of the OIG report, indicated that largest cylinder tested in an actual fire was 8 inches in diameter, and the study was conducted in 1965.

DOE conducted another computer simulation study on June 6, 1997. This simulation included an analysis of the effect of fire temperatures on the large cylinders, using both the lower 1475°F (regulatory) temperature, as well as, the 1700°F temperature. In this study, for a 1475°F fire, the time to rupture a 48-inch diameter cylinder would be about 12.2 minutes. This amount of time still falls below the fifteen-minute response time required by the fire department. Management stated in their response, that at 1475°F temperatures, large UF6 cylinders “[w]ill only last about 20-25 minutes before failing catastrophically. This time lag permits manual response to an incident.” The response, however, does not cite to any particular studies that support this contention. According to Mr. Hutton, the two DOE studies described above, do not corroborate management’s conclusion.

In addition, Mr. Hutton alleges that the “regulatory” fire temperature of 1475°F is not representative of a fuel fire typically associated with a vehicle accident. According to Mr. Hutton, the 1475°F standard was based upon fire criteria for building fires, not fuel fires. Mr. Hutton provided information on fire temperature ranges for various hydrocarbon fuel sources, credited to the Fire Protection Handbook,⁴ which states that the fire temperature range for Gasoline is 1520°F - 2510°F. Even the lowest end of this temperature range is higher than the regulatory standard currently codified in Nuclear Regulatory Commission (NRC) regulations. Thus, it is Mr. Hutton’s contention that the regulatory fire temperature has a flawed technical basis and insufficient safety margins to protect the public. Mr. Hutton asserts that the 1475°F standard was adopted by the Atomic Energy Commission in the 1960’s, and ignores the experimental research and computer modeling knowledge that is currently available.

I transmitted this information to Secretary Richardson for an investigation of the allegations described above and a report, pursuant to 5 U.S.C. §§ 1213(c) and (g). According to the agency’s report, the investigation findings did not support Mr. Hutton’s claim that DOE’s transportation of UF6 poses a specific danger to public safety. The report states that DOE’s contractors fully comply with all Hazardous Material Regulations concerning the transportation of UF6.⁵ The agency notes that these regulations have been developed from more than 50 years of UF6 transportation experience and the regulations are constantly reviewed and revised as new information becomes available. According to the report, “Compliance with these Regulations provides the general public, [DOE’s] workers, and the environment with a publicly acceptable level of safety.”

DOE acknowledges that its contractors often transport cylinders containing nonfissile quantities of UF6 without protective overpacks. DOE notes, however, that the Hazardous Material Regulations in Section 173.420, “Uranium Hexafluoride,” do

⁴ *The SFPE Handbook of Fire Protection Engineering*, First Edition, 1988.

⁵ See 49 C.F.R. § 173.420.

not require protective overpacks for nonfissile quantities of UF6. Furthermore, DOE transferred its uranium enrichment activities to the U.S. Enrichment Corporation in 1997. This transfer of activities has significantly reduced the DOE's transportation of UF6. Specifically, DOE has not transported UF6 offsite for over two years and DOE has no plans to do so "for the next few years."

The report also acknowledges that DOE has no recorded fire tests of large unprotected cylinders filled with nonfissile quantities of UF6. The Hazardous Material Regulations do not require fire tests for cylinders containing nonfissile UF6. Furthermore, the regulations do not require actual physical testing of any radioactive materials package. Compliance with the regulations may be demonstrated by (1) performing tests on prototypes, samples, or computer models, (2) reference to previous, satisfactory demonstration of compliance of a sufficiently similar nature, or (3) calculations or reasoned evaluation. Thus, even if fire tests were required under the regulations, compliance would not require actual physical testing as urged by Mr. Hutton. Furthermore, DOE notes that physical testing of radioactive materials is uncommon due to the significant environmental and economic impacts of performing an actual test.

Because the Hazardous Materials Regulations do not require protective overpacks or fire testing on nonfissile quantities of UF6, DOE asserts that Mr. Hutton's "allegations are related to the safety basis for the Hazardous Materials Regulations and not to the DOE's lack of safety in shipping uranium hexafluoride." The report notes that the Department of Transportation recently published an Advanced Notice of Proposed Rulemaking to consider adopting the latest regulations of the International Atomic Energy Agency. The regulations identify additional requirements for transporting UF6 cylinders, including overpacks for fire protection and fire test evaluations. DOE will provide comments to the Department of Transportation concerning the regulations. Therefore, DOE has encouraged Mr. Hutton to make his concerns known to the Office of the Assistant Manager for Environment, Safety Health and Emergency Management at the DOE's Oak Ridge Operations Office. Alternatively, Mr. Hutton is urged to respond directly to the Advanced Notice of Proposed Rulemaking as a member of the public.

The report disputes Mr. Hutton's allegation that UF6 escaping from a cylinder could react explosively with hydrocarbon fuels and create a large fireball. UF6 is a corrosive and is not flammable or explosive. DOE explains that the cylinders that violently ruptured during fire tests did so because of the quick internal pressure of gases built up within the cylinder. The report states that this "cannot occur in a large cylinder because the cylinders can take up to 25 minutes to rupture."

The report also addresses Mr. Hutton's assertion that the regulatory fire temperature of 1475°F is not representative of the fuel fire typically associated with a

vehicle accident. The report states that this is not a DOE issue but an issue for the National Regulatory Commission.

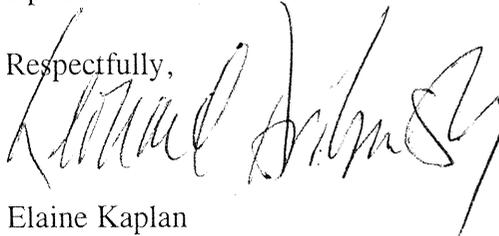
In conclusion, the DOE denies that they transport their cylinders of UF6 unsafely and denies that there is a substantial and specific danger to public safety. The report states that the United States has been transporting cylinders of UF6 for more than 50 years. In that time, there has been no recorded incident or accident involving a cylinder of UF6 and a fire. Thus, the report claims that there is no demonstrated need for overpacks or change to the Hazardous Materials Regulations.

In his comments, Mr. Hutton stated that the information contained in the report was misleading, erroneous, and incorrect. Mr. Hutton asserted that although DOE infers that they do not transport UF6, they "share in the responsibility to protect the public" and will "continue to play a lead role in the promulgation of regulations for the transport of uranium hexafluoride." Mr. Hutton noted that recent internal safety analysis indicates that a cylinder rupture on site would impact off site areas. Mr. Hutton refers to a 1995 report which states that safety analyses of the UF6 cylinders was incomplete and do not provide DOE with reasonable assurance that the operations can be accomplished without undue risk.

Mr. Hutton disagreed with the report's conclusion that the cylinders can take up to 25 minutes to rupture. Mr. Hutton stated that this information is inconsistent with their own contractor safety analysis, which indicates the rupture time period was between 6 and 15 minutes. Mr. Hutton also commented that the DOE has retaliated against him for submitting his safety concerns to the Office of the Inspector General and DOE's Office of Environmental, Safety and Health.

Pursuant to 5 U.S.C. § 1213(e)(2), I have concluded that the findings in the report appear reasonable and meet the statutory requirement of section 1213(d). As required by section 1213(e)(3), I have sent copies of the report and Mr. Hutton's comments to the Chairman of the Senate Committee on Energy and Natural Resources and the Chairman of the House Committee on Resources. We have also filed a copy of the report and Mr. Hutton's comments in our public file and closed the matter.

Respectfully,



Elaine Kaplan

Enclosures