UNITED STATES
NUCLEAR REGULATORY COMMISSION

In the Matter of		
Barnett Industrial X-Ray Stillwater, Oklahoma	)	Docket No. 30-30691 License No. 35-26953-01 EA 90-102

ORDER IMPOSING CIVIL MONETARY PENALTY

I

Barnett Industrial X-Ray (BIX) (Licensee) is the holder of License No. 35-26953-01 issued by the Nuclear Regulatory Commission (NRC or Commission) on December 28, 1988. The license authorizes the Licensee to possess iridium-192 in sealed sources in various radiography exposure devices for use in industrial radiography in accordance with the conditions specified therein. The license is scheduled to expire on December 31, 1993.

II

An inspection of the Licensee's activities was conducted from April 7, 1990 to May 7, 1990, following an April 6, 1990 report from the Licensee to the NRC in regard to a radiography incident. The results of this inspection indicated that the Licensee had not conducted its activities in full compliance with NRC requirements. A written Notice of Violation and Proposed Imposition of Civil Penalty (Notice) was served upon the Licensee by letter dated September 7, 1990. The Notice described the nature of the violations, the provisions of the NRC's requirements that the Licensee had violated, and the amount of the civil penalty proposed for the violations. The Licensee responded to the Notice in two letters dated October 2, 1990. In its response, the Licensee disputed NRC's assertion that two individuals received radiation exposures in

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excess of NRC limits, claiming that one of the exposure estimates was based on inconclusive data which, in its view, was not credible. In addition, the Licensee requested remission or mitigation of the proposed civil penalty because it felt that BIX had suffered financially as a result of this matter.

III

After consideration of the Licensee's response and the statements of fact, explanation, and argument for mitigation contained therein, the NRC staff has determined, as set forth in the Appendix to this Order, that the violations occurred as stated and that the penalty proposed for the violations designated in the Notice should be imposed.

IV

In view of the foregoing and pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205, IT IS HEREBY ORDERED THAT:

The Licensee pay a civil penalty in the amount of $7,500 within 30 days of the date of this Order, by check, draft, or money order, payable to the Treasurer of the United States and mailed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555. In the alternative, the civil penalty may be paid in 36 monthly installments that would include accrued interest. If payment will

be made in monthly installments, the licensee shall contact the Director, Office of Enforcement in writing, within the thirty day period to arrange the terms and conditions of payment.

V

The Licensee may request a hearing within 30 days of the date of this Order. A request for a hearing should be clearly marked as a "Request for an Enforcement Hearing" and shall be addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555. Copies also shall be sent to the Assistant General Counsel for Hearings and Enforcement at the same address and to the Regional Administrator, NRC Region IV, 611 Ryan Plaza Drive, Suite 1000, Arlington, Texas 76011.

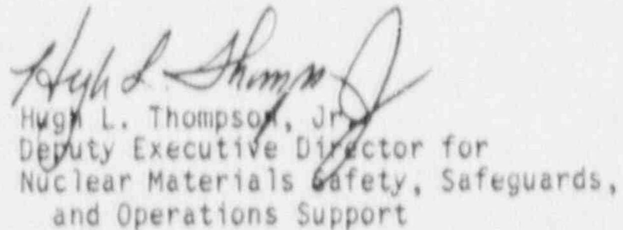
If a hearing is requested, the Commission will issue an Order designating the time and place of the hearing. If the Licensee fails to request a hearing within 30 days of the date of this Order, the provisions of this Order shall be effective without further proceedings. If payment of the entire civil penalty or a commitment in writing to pay the civil penalty in installments in accordance with Section IV above, has not been made by that time, the matter may be referred to the Attorney General for collection.

In the event the Licensee requests a hearing as provided above, the issues to be considered at such hearing shall be:

(a) whether the Licensee was in violation of the Commission's requirements as set forth in Violation I.B of the Notice referenced in Section II above, specifically, whether the radiographer received a whole body exposure in excess of three rems, and

(b) whether, on the basis of this violation and the violations admitted by the licensee, this Order should be sustained.

FOR THE NUCLEAR REGULATORY COMMISSION



Hugh L. Thompson, Jr.
Deputy Executive Director for
Nuclear Materials Safety, Safeguards,
and Operations Support

Dated at Rockville, Maryland
this 31st day of December 1990

APPENDIX

EVALUATIONS AND CONCLUSIONS

Appendix to Order Imposing Civil Monetary Penalty

On September 7, 1990, a Notice of Violation and Proposed Imposition of Civil Penalty (Notice) was issued for the violations identified during the April 7 through May 7, 1990, NRC inspection. Barnett Industrial X-Ray (BIX) responded to the Notice of Violation and requested mitigation of the proposed civil penalty in letters dated October 2, 1990. NRC's evaluations and conclusions regarding the licensee's response follow:

Restatement of Violations

I. Violations Assessed a Civil Penalty

A. 10 CFR 34.43(b) requires the licensee to ensure that a survey with a calibrated and operable radiation survey instrument is made after each radiographic exposure to determine that the sealed source has been returned to its shielded position. The entire circumference of the radiographic exposure device must be surveyed. If the radiographic exposure device has a source guide tube, the survey must include the guide tube.

Contrary to the above, on April 6, 1990, a radiographer and a radiographer's assistant employed by the licensee made two radiographic exposures and did not survey the entire circumference of the radiographic exposure device and the source guide tube after each exposure to ensure that the sealed source had been returned to its shielded position.

B. 10 CFR 20.101(a) requires that the licensee limit the whole body radiation dose of an individual in a restricted area to 1.25 rems per calendar quarter, except as provided by 10 CFR 20.101(b). 10 CFR 20.101(b) allows a licensee to permit an individual in a restricted area to receive a whole body radiation dose of 3 rems per calendar quarter provided specified conditions are met.

Contrary to the above, a radiographer and radiographer's assistant employed by the licensee received whole body occupational radiation doses in excess of 3 rems during the second calendar quarter of 1990.

Collectively, these violations have been classified as a Severity Level I problem (Supplements IV and VI).

Cumulative Civil Penalty - $7,500 (assessed equally between the violations).

Summary of Licensee's Response to Notice of Violation

Of the two violations which resulted in the assessment of the proposed civil penalty, the Licensee admitted Violation I.A., and contested, in part, Violation I.B. In contesting I.B., the Licensee disputed NRC's assertion that two individuals had received whole body exposures in excess of the limits of 10 CFR 20.101. While admitting that the assistant radiographer received such an overexposure, the Licensee stated that the film badge for the radiographer involved in the April 6, 1990, incident indicated less than 3 rems, and that estimates of the radiographer's whole body exposure based on cytogenetic studies were inconclusive and subject to wide variances.

In regard to Violation I.B., the Licensee based its position in part on the results of the processing of the radiographer's film badge. The Licensee's film badge vendor reported an equivalent exposure of 2.7 rems. Additionally, the Licensee contended that while the cytogenetic test results provided by Oak Ridge Associated Universities (ORAU) indicated exposure in excess of 3 rems, those results were not credible because such exposure estimates involved what the Licensee believes to be a "low percentage rate for accuracy." The Licensee also noted that Oklahoma Medical Center, a second laboratory which also conducted cytogenetic studies, provided test results which were not conclusive with regard to whether an overexposure occurred.

NRC Evaluation of Licensee's Response to Notice of Violation

NRC's review of the incident which led to the exposure of the radiographer and his assistant included a detailed review of the actions of the two individuals involved in conducting radiographic operations on the evening of April 6, 1990. This included reenactment of their activities prior to and following their recognition that the radiographic source had not been returned to its shielded position within the exposure device, as well as review of the location of personnel radiation monitoring devices (film badges) relative to the unretracted iridium-192 source.

Although the radiographer was also involved in the recovery of the source once it became known that it had not retracted, NRC believes that the most significant exposures to the radiographer occurred during the positioning and retrieval of the film prior to the discovery of the unretracted source. NRC's review of this incident led NRC to conclude that the radiography source was not connected to its drive cable when the two involved radiography exposures were made. Thus, during activities between and following these exposures, the radiographer was exposed to the unshielded source. The radiographer indicated to NRC that his film badge had been attached to his front shirt pocket during the two radiographic exposures that were made prior to this discovery. Based on NRC's interviews with the radiographer, NRC concludes that the radiographer's back was to the source when he was positioning the radiographic film, creating a situation in which his body provided shielding for the badge. Thus, in NRC's view, the exposure indicated by the film badge is not the most accurate indication of the radiographer's actual radiation exposure.

The ORAU laboratory reported that the radiographer had received an equivalent whole-body dose of 17 rads (equivalent to 17 rems exposure for gamma radiation) as determined by the number of dicentric chromosomes observed in 1,050 first-division metaphases from peripheral blood lymphocyte cultures obtained from the radiographer shortly after the incident. The equivalent dose value is determined by comparison of the number of dicentric chromosomes observed in the subject's sample with those observed in "normal" cell cultures and cultures obtained from cells which have been exposed to radiation under controlled conditions. The dose range provided in the report, 8 - 27 rads with 95% confidence, represents standard statistical analysis conducted for test results as determined from the ORAU data-base and mathematical analysis.

The NRC staff does not dispute the 2.7 rems exposure reading provided by the licensee's film badge vendor, but maintains that this exposure reading represents the exposure to the film badge, which is not necessarily the same as that received by the radiographer. Further, the staff does not believe that the 95% confidence interval provided for ORAU's dose determination supports the Licensee's assertion regarding the inaccuracy of this test or method of analysis. NRC also notes that even the lower end of ORAU's estimate (8 rads) would indicate that the radiographer received an exposure in excess of 3 rems. While the NRC staff agrees that it is difficult to precisely determine the exposure received by the radiographer, the NRC staff concludes that his exposure did exceed 3 rems.

NRC concludes that the violation occurred as stated, that both the radiographer and assistant received doses in excess of 3 rems, and that the explanation provided by the licensee does not merit modification of the proposed civil penalty.

NRC also notes that, as a practical matter, even if it had accepted the Licensee's position that an overexposure to the radiographer had not occurred, it would not have altered NRC's position that the violation occurred nor its view that it was a Severity Level I violation. This is based on the fact that the assistant radiographer received an exposure to the tissue of the neck substantially in excess of the minimum criteria for a Severity Level I violation. Thus, the failure to survey in combination with the exposure to the assistant radiographer would have resulted in the classification of the two violations collectively at Severity Level I whether or not the radiographer had been involved in the incident. The only practical effect of accepting or rejecting the licensee's argument is the assignment of a whole-body exposure to the permanent exposure record for the radiographer. In NRC's view, the more conservative measure in this case would be to assign the radiographer a whole-body exposure equal to that estimated by ORAU, which in NRC's view is a more accurate estimate of the individual's actual whole-body exposure.

Summary of Licensee's Request for Mitigation

In protesting the proposed civil penalty, the Licensee stated that its license was suspended for three weeks following the April 6, 1990, incident (actually, the Licensee voluntarily suspended radiographic activities at NRC's request for two weeks while NRC reviewed the circumstances surrounding the incident). The

Licensee stated that this suspension created substantial loss of income, and that the publicity surrounding the incident caused and continues to cause a loss of clientele. In summary, the Licensee stated that he feels that he has "suffered enough financial loss" and requested remission or mitigation of the proposed civil penalty.

NRC's Evaluation of Licensee's Request for Mitigation

NRC is not in a position to dispute the Licensee's statement that he has suffered financially as a result of the April 6, 1990, incident. NRC accepts the Licensee's statement that the suspension of activities and the publicity surrounding the incident have had a financial impact on the company. Such financial consequences frequently result from significant enforcement actions. NRC also recognizes that the Licensee cooperated fully with NRC in agreeing to suspend its activities pending NRC's review of the incident (the Licensee's agreement was confirmed in a Confirmation of Action Letter dated April 9, 1990). NRC notes, however, that the actual voluntary suspension lasted from the date the incident was reported to NRC on April 6 until April 20, the date of a meeting between the Licensee and NRC in Arlington, Texas, and thus was in effect for two rather than three weeks.

NRC's Enforcement Policy states that it is not NRC's intention that monetary civil penalties put licensees out of business or detract from a licensee's ability to conduct licensed activities safely. Considering the size of the civil penalty in this case and the opportunity to pay in regular installments if necessary, NRC believes that these unintended effects need not occur. While NRC is sympathetic to the Licensee's argument that it has suffered financially, NRC is also cognizant of the fact that a serious radiation exposure occurred as the result of Licensee personnel failing to perform required radiation surveys. In that NRC's regulations are designed to prevent such exposures, and in that NRC's regulations were not followed in this case, NRC believes it has applied its Enforcement Policy appropriately. NRC believes that this civil penalty, when it was proposed, was already mitigated to the extent provided for by the Enforcement Policy (25 percent mitigation as a result of the Licensee's promptly reporting the incident to NRC). NRC does not believe the Licensee has introduced any information that NRC was not aware of and did not take into account in proposing the $7,500 civil penalty.

NRC Conclusion

In conclusion, NRC does not believe the Licensee has provided any information that warrants modification of the proposed civil penalty. NRC concludes that the violations that led to the proposed civil penalty occurred as stated in the original Notice, that the violations were appropriately classified at Severity Level I, and that the proposed civil penalty of $7,500 was appropriate given the seriousness of the resultant radiation exposures. Consequently, the proposed $7,500 civil penalty should be imposed by Order.

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