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**ENVIRONMENT DEPARTMENT**  
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MARK E. WEIDLER  
SECRETARY

EDGAR T. THORNTON, III  
DEPUTY SECRETARY

November 12, 1996

Paul H. Lohaus, Deputy Director  
Office of State Programs  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Lohaus:

Technical assistance is requested as to whether the enclosed protocol meets the solubility requirement for the release of radionuclides into the sanitary sewer.

It is of utmost importance that we receive a response to this request as soon as possible as the renewal of the radioactive material license for Interstate Nuclear Services (INS) a nuclear laundry located in Santa Fe, depends on whether the solubility question is adequately addressed in this proposed protocol.

Since 10CFR Part 20.2003(a)(1) is a compatibility requirement we believe that the NRC should be able to provide us with a ruling as to adequacy of this proposal.

Also enclosed are the schematics for proposed modifications to the INS Wastewater Treatment System in Santa Fe.

Should you have any questions, please contact me at (505) 827-1564.

Sincerely,

*William M. Floyd*  
William Floyd, Program Manager

WF:lmg

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# Patterson Associates, Incorporated



Environmental  
Consultants

VIA FEDERAL EXPRESS

November 6, 1996



Mr. William M. Floyd  
Program Manager  
Radiation, Licensing & Registration  
Hazardous & Radioactive Materials Bureau  
New Mexico Environment Department  
2044 Galisteo  
P.O. Box 26110  
Santa Fe, New Mexico 87502

Dear Mr. Floyd:

Per Dr. Patterson's request, I am enclosing a revised copy of the document entitled: "Application of Best Available Treatment Technology to Demonstrate Compliance with Solubility Criteria for Effluent Releases to Sanitary Sewerage".

If you have any questions or comments, please call.

Cordially yours,

*Chriso Petropoulou*

Chriso Petropoulou, Ph.D.  
Senior Project Engineer

CP/jg

Enclosure

cc: K. Watson  
T. Mills  
J. Patterson



APPLICATION OF BEST AVAILABLE TREATMENT TECHNOLOGY TO DEMONSTRATE  
COMPLIANCE WITH SOLUBILITY CRITERIA FOR EFFLUENT RELEASES TO  
SANITARY SEWERAGE

1.0 Background

In 10 CFR Part 20.2003(a)(1), the U.S. Nuclear Regulatory Commission (NRC) promulgated regulation for the discharge of liquid effluent to sanitary sewerage. The regulation requires that material released into sanitary sewerage must be "... readily soluble (or is readily dispersible biological material) in water..." These criteria have been incorporated into the New Mexico Administrative Code (20NMAC3.1, Section 435.A.1). There has been much discussion regarding an appropriate operational definition of "solubility." In an Information Notice, the NRC provided guidance regarding the interpretation of this discharge requirement (NRC, 1994). The guidance discussed certain common scientific and technical approaches to demonstrate compliance with the solubility criteria. Approaches discussed included application of theoretical solubility calculations for known mineral salts, and the utilization of certain methods for laboratory analyses, typically based upon laboratory filtration using a 0.45 micron pore filter.

The NRC recognizes that there could be alternative equally acceptable approaches to demonstrate compliance with 10 CFR 20.2003(a)(1), ranging from theoretical solubility

calculations at one extreme, to bench-scale filtration tests, to applications of full scale advanced effluent treatment technologies. As discussed below, in comparable rule-making, the federal government via the U.S. Environmental Protection Agency has deemed that the required utilization of demonstrated advanced full-scale treatment technology best accomplishes the national goals of protection of human health and the environment.

## 2.0 Precedent

The U.S. EPA was directed by Congress in conjunction with the Federal Water Pollution Control Act Amendments of 1972 to address a comparable issue to that addressed herein. The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive national environmental program to restore and maintain the chemical, physical and biological integrity of the Nation's waters [Section 101(a)]. Under that law, by July 1, 1977, existing industrial dischargers were required to achieve "effluent limitations requiring the application of the best practicable control technology currently achievable" (BPTCA), [Section 301(b)(1)(A)]; and by July 1, 1983, existing industrial dischargers were required to achieve "effluent limitations requiring the application of the best available technology economically achievable (BATEA)... which will result in reasonable progress toward the national goal of eliminating the discharge of all pollutants" [Section 301(b)(2)(A)].

BATEA levels of wastewater treatment technology represent a high level of wastewater treatment technology, higher than those required by BPTCA. BATEA is based on the very best (state-of-the-art) control and treatment measures that have been developed, or are capable of being developed (EPA, 1988). The approach fulfills the mandate of ALARA. The EPA has not established BATEA for commercial laundries such as INS, but has established BATEA regulations for a broad spectrum of other industrial categories (approximately thirty to date) ranging from Aluminum Forming to Timber Processing. Many of those industries are regulated for effluent suspended solids, under the federal categorical National Pollutant Discharge Elimination System (NPDES) regulations. Typically, EPA has established gravity settling as the BPT technology for suspended solids, and has commonly established effluent pressure filtration or equivalent as BATEA. Effluent filtration through granular filters represent a state-of-the-art treatment technology, even for industries discharging directly into the Nation's lakes and rivers. The effectiveness of effluent filtration is such that suspended solids are removed, leaving only soluble and perhaps some semi-soluble (e.g. frangible or colloidal) materials in the filtrate. ]

The EPA has sought technical equity in the promulgation of BATEA-based discharge regulations (Patterson, 1977). Technology based discharge regulations require the achievement



of effluent quality equal to that resulting from the application of the very best control and treatment measures, and this serves to advance environmental protection toward the national goal of "eliminating the discharge of all pollutants" while requiring industrial dischargers to install equivalent treatment systems. Effluent pressure filtration, as will be installed at the INS Santa Fe facility, represents a BATEA level of technology for removal of suspended solids, leaving behind an effluent best achieving the requirements of 10 CFR 20.2003(a)(1). The performance of filtration technology is amply documented in the literature (Eckenfelder, 1966; JMM, 1985; Patterson, 1985; EPA, 1995; WEF, 1996).

3.0 Designation of BAT to Demonstrate Compliance with 10 CFR 20.2003(a)(1)

The history of pollution abatement research and development has amply demonstrated that theoretical thermodynamic calculations of solubility rarely have relevance to full-scale performance. Equally, bench-scale surrogate methods (such as fine-pore laboratory filtration as a predictor of the performance of full-scale advanced treatment technology) are unreliable (JMM, 1985; Patterson, 1987). The EPA, in implementing the Congressional mandate to promulgate discharge limits requiring the best state-of-the-art treatment, relies, upon demonstrated best available technology. For achievement of an effluent limited to soluble and semi-soluble constituents, this technology is pressure filtration.

It is therefore recommended that the New Mexico Environment Department recognize effluent pressure filtration for the INS facility, as achieving operational compliance with the subject solubility criteria.

#### 4.0 References

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EPA, 1988, Pretreatment Facility Inspection, Office of Water Enforcement and Permits.

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Patterson, J.W., 1977, Technical Inequities in Effluent Limitations Guidelines, Journal, Water Pollution Control Federation, July 1986-1990.



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WEF (Water Environment Federation), 1996, Developing Source Control Programs for Commercial and Industrial Wastewaters, Manual of Practice No. OM-4, Alexandria, VA.