

BARNWELL NUCLEAR FUEL PLANT  
POST-DECOMMISSIONING  
SURVEILLANCE PROGRAM

Allied-General Nuclear Services has contracted with Chem-Nuclear Systems, Inc. of Barnwell, South Carolina, to perform the surveillance program described in the BNFP Decommissioning Plan (Attachment 1 to this License Application).

Chem-Nuclear is intimately familiar with the regulatory, radiological and industrial safety, and security aspects of nuclear operations in Barnwell, across the country, and around the world. This experience, the Company's reputation for quality, and the familiarity and proximity to the Allied-General Nuclear Services (AGNS) Barnwell Nuclear Fuel Plant make Chem-Nuclear superbly suited to operate the AGNS Surveillance Program.

The CNSI Surveillance Program of the AGNS Facility will consist of two phases:

- A. Radiological surveillance including provision of the Radiation Protection Officer
- B. Other inspections and tests

AGNS will provide to Chem-Nuclear the name and telephone number of a designated AGNS representative who will be notified immediately of any radiological, safety, or security problems detected on the AGNS property. In addition, AGNS is providing its own security program under contract with a separate organization.

Descriptions of each phase of the radiological, safety, and security surveillance programs follow.

A CNSI procedure has been prepared to implement the AGNS surveillance program. This procedure has been supplied to the AGNS representative and is attached as Appendix 2.1.

A. Radiological Surveillance

Chem-Nuclear will perform a semi-annual radiological survey of the Separations and UF<sub>6</sub> Facilities. The first of these surveys was performed as soon as possible after the AGNS decontamination project was completed in January 1984 with AGNS personnel escorting CNSI personnel through the facility on the initial survey to establish a baseline set of survey readings. The initial and the semi-annual surveys will be performed in accordance with existing CNSI radiological survey procedures.

The radiological survey will consist of:

- 1. A general safety and fire protection inspection of all areas entered.

2. Smear surveys of the entrance areas, ground floor, hallways, and stairwells of the Separations and UF<sub>6</sub> Facilities and of the hallways of the HCLA. Sample locations will be demarcated for standardization of samples. The smears will be counted for alpha and beta-gamma activity.
3. Smear surveys and portable alpha and beta-gamma instrument surveys of the HCLA Analytical Chemistry Lab, the Engineering Lab, and the Alpha Lab. Special attention will be given to the smear surveys of the external surfaces of gloveboxes, gloveports, and hoods for evidence of removable contamination.
4. At the UF<sub>6</sub> Facility, additional smear surveys and portable alpha and beta-gamma instrument surveys will be performed at the following equipment/locations: spray dryer, laboratory, base of main stack, decontamination tank, decontamination room, calciner, 8th floor bag house, and oxide vacuum system.

The AGNS representative will be notified of any contamination found in excess of 50 dpm/100 cm<sup>2</sup> alpha or 500 dpm/100 cm<sup>2</sup> beta-gamma or of any significant variation in radiological conditions from those found in the baseline survey.

In addition, semi-annual reports detailing the above surveys will be submitted to AGNS within 30 days of the end of the report period. If requested by AGNS, a copy of the report will also be submitted to the South Carolina Department of Health and Environmental Control.

Chem-Nuclear will designate the CNSI Director of Regulatory Affairs/Barnwell, as the "Contract Radiation Officer for the BNFP." He will be responsible for working with the South Carolina Department of Health and Environmental Control in matters related to the BNFP Radioactive Material License. Dr. Michael T. Ryan is the present Director of Regulatory Affairs/Barnwell, and a copy of his resume is appended.

The Radiation Protection Officer's training and experience (items 8 and 9 on the South Carolina Application for Radioactive Material License); Individual Users (item 9); Radiation Detection Instruments (item 10); Methods, Frequency and Standards Used in Calibrating Instruments Listed Above (item 11); Film Badges, Dosimeters, and Bio-Assay Procedures Used (item 12); Facilities and Equipment (item 13); Radiation Protection Program (item 14); and Waste Disposal (item 15) can be found on Chem-Nuclear Systems, Inc., Radioactive Material Licenses Numbers 097, 287-01, 287-02, and 287-03. These licenses are on file with the South Carolina Department of Health and Environmental Control, and all CNSI operations performed for AGNS will follow the procedures listed on these licenses.

## B. Other Inspections and Tests

In addition, Chem-Nuclear will perform the following inspections and tests:

1. The fire water pump will be operated once a week for 30 minutes and will be tagged to indicate the date the test was performed.
2. The water level of Beacon Pond will be checked each time the water pump is operated. AGNS will be notified if water levels drop significantly or if it is at the overflow level.
3. The fire alarm in the administration buildings will be tested monthly.
4. Fire extinguishers will be inspected semi-annually.
5. A semi-annual sprinkler system flow test will be performed on the sprinkler systems in Administration Buildings 2 and 3.
6. The fire hose stations in the administration area will be inspected semi-annually.
7. The AGNS insurance inspector will be assisted in performing annual fire hydrant flow tests and inspections.
8. Post indicator valves will be inspected annually.
9. A hydrostatic test of all fire hoses in the administration area will be performed every two years.

An annual report to AGNS will verify the completion of these tests and inspections.

## C. Security Inspection

In addition, AGNS is maintaining a security guard which at least quarterly will perform security inspections which will consist of:

1. Checking the outside doors and gates of all buildings for signs of attempted entry.
2. Entering the warehouses and administrative buildings and checking for signs of entry or removal of equipment.
3. Inspecting the BNFP boundary for damages. All incidents will be reported to AGNS and damages to fences or gates will be repaired.
4. Checking posted signs for legibility and replacing them as necessary.
5. Checking for possible safety or fire protection problems throughout the inspection.

Further, AGNS will control access to the BNFP via Osborne Road in the off-hours and on weekends. This will be accomplished using an electronically operated gate that is controlled by the AGNS security guard. Upon arrival, all persons are required to report to the AGNS security guard with proper identification. Individuals will also be required to check out at the security station upon leaving the AGNS Facility.

## MICHAEL T. RYAN

PERSONAL

Address: 1018 Hilton Street  
Aiken, SC 29801

Date of Birth: 8-21-52  
Marital Status: Married

EDUCATION

1982 Certified by the American Board of Health Physics in Comprehensive Practice.

1982 Ph.D., Health Physics, Georgia Institute of Technology, Atlanta, Georgia. Dissertation title: "The In Vitro Transport of  $^{238}\text{PuO}_2$  and  $^{239}\text{PuO}_2$  Through a Membrane Filter and its Importance in Radiation Dosimetry."

1976 M.S. in Radiological Sciences and Protection, University of Lowell, Lowell, Massachusetts. Thesis Title: "An Evaluation of Aggregate Recoil Particle Transfer in Glass Fiber Filtration Media."

1975-76 ERDA Traineeship.

1974 B.S. in Radiological Health Physics, Lowell Technological Institute, Lowell, Massachusetts.

EXPERIENCE

April 1983 -  
March 1984 Chem-Nuclear Systems, Inc., Barnwell, South Carolina. Director of Environmental and Dosimetry Laboratory.

March 1984 -  
Present Chem-Nuclear Systems, Inc., Barnwell, South Carolina. Director of Regulatory Affairs/Barnwell.

1983 American Board of Health Physics - Member Panel of Examiners.



EXPERIENCE CONTINUED

January 1983 -  
April 1983

Industrial Safety and Applied Health Physics  
Division, Oak Ridge National Laboratory, Oak  
Ridge, TN. Section Head, Radiation Dosimetry  
Dose Data and Radioassay.

Supervised the analysis of bioassay samples.  
Supervised and performed data interpretation for  
all dosimetry related measurements. Supervised  
the data base management for all personnel  
dosimetry records.

February 1981 -  
January 1983

Industrial Safety and Applied Health Physics  
Division, Oak Ridge National Laboratory, Oak  
Ridge, Tennessee. Internal Radiation  
Dosimetrist. Major Duties: Evaluation of all  
significant internal exposures by interpretation  
of bioassay and in vivo counting data.  
Development of methods of dose calculation for  
compliance with DOE and NRC regulations and  
recommendations of the international and  
national radiation protection groups.

1982

Member of the 1982 Marshall Islands Dosimetry  
and Medical Field Evaluation Team.

1981

Member of the 1981 Marshall Islands Dosimetry  
and Medical Field Evaluation Team.

1981

Member of the Governor's Hazardous Waste Policy  
Council, State of Florida.

September 1976 -  
February 1981

Health and Safety Research Division, Oak Ridge  
National Laboratory, Oak Ridge, Tennessee.  
Research Associate.

Integrated Assessment of the Phosphate Industry.  
This assessment examined the non-occupational  
and environmental impacts of the phosphate  
industry in the United States. Particular  
attention was paid to radiological impacts. The  
interest of the Florida Institute of Phosphate  
Research resulted in a significant new study of  
radon in houses in central Florida sponsored by  
the FIPR.

EXPERIENCE CONTINUED

FUSRAP Program (Formerly Utilized Sites/Remedial Action Program), Radiological Survey Team Leader. Duties and Responsibilities: Planning, execution, and report writing of radiological assessment surveys of former Atomic Energy Commission (AEC) and Manhattan Engineer District (MED) industrial sites. Team consisted of up to ten scientific and technical personnel, depending upon the site.

Division Safety Committee, Member, July 1, 1979 to July 1, 1980. Division Safety and Radiation Control Officer, July 1, 1980 to February 1981. Environmental Protection Officer, July 1, 1980 to February, 1981.

September 1977 -  
September 1978

Georgia Institute of Technology, Atlanta, Georgia. Educational leave of absence for work toward the degree of Doctor of Philosophy. Reactor Operator - AGN-201. Licensed March 17, 1978, NRC #R-111 (Concurrent with academic program).

June 1975-  
September 1976

Division of Chemical Technology, Oak Ridge National Laboratory, Oak Ridge, Tennessee. Research Associate. (Summer months only).

April 1975-  
June 1975

Defense Civil Preparedness Agency (DCPA), University of Lowell, Lowell, Massachusetts. Consultant (Course Material Preparation).

September 1973 -  
June 1974

University of Lowell, Lowell, Massachusetts. Research Assistant. (Academic months only.)

PROFESSIONAL  
MEMBERSHIPS

Health Physics Society  
Sigma Xi  
American Industrial Hygiene Association

References furnished upon request.

PUBLICATIONS

- M.T. Ryan, W.A. Goldsmith, J.W. Poston, F.F. Haywood, J.P. Witherspoon. July 1983. "Radon Dosimetry: A Review of Radon and Radon Daughter Exposure Conditions in Dwellings and Other Structures," ORNL/TM-5286.
- D.C. Kocher, M.T. Ryan. 1983. "Animal Data on GI-Tract Uptake of Plutonium: Implications for Environmental Dose Assessments," Rad. Protection Dosimetry, Vol. 5, No. 1, pp. 37 - 43.
- L.C. Henley, M.T. Ryan, W.W. Parkinson. (In preparation). "A Useful Method for Estimation of Body Burdens from Early Excretion of Selected Soluble Radionuclides," to be submitted to Radiation Protection Dosimetry.
- M.T. Ryan, G.N. Case, W.J. McDowell, L.C. Henley. December 1982. "A Preliminary Comparison of Two Techniques for Bioassay of Urine for Plutonium," ORNL/TM-8531.
- H.M. Johnson, M.T. Ryan, K.F. Eckerman, K.W. Skrable. 1982 "Application of Inhalation Retention Functions to In Vivo Measurement," Rad. Protection Dosimetry, Vol. 3, No. 4.
- M.T. Ryan, M.F. Fair. 1981. "The Radiation Warning Symbol," Health Physics 41, 416-417.
- M.T. Ryan, H.M. Butler, E.D. Gupton, C.S. Sims. May 1982. "Calibration of the Indium Foil Used for Criticality Accident Dosimetry in the UCC-ND Employee Identification Badge," ORNL/TM-8294.
- M.T. Ryan. September 1981. "INTDOS: A Computer Program Implementing Recent Recommendations of the International Commission on Radiological Protection." ORNL-TM-7928.
- M.T. Ryan, S.J. Cotter. May 1980. "An Integrated Assessment of the Phosphate Industry," ORNL-5583.
- D.C. Kocher, D.E. Dunning, Jr., R.W. Leggett, M.T. Ryan, K.F. Eckerman. June 1980. "Uncertainties in the Calculation of Long-Term Collective Dose and Health Effects - A Preliminary Assessment." NUREG/CR-1303, ORNL/NUREG/TM-378.
- M.T. Ryan, D.E. Dunning, Jr. March 1981. "A Comparison of 50-year and 70-Year Internal Dose Conversion Factors." ORNL/TM-7415.
- M.T. Ryan. Jan. - Feb. 1981. "A Summary of the Radiological Impacts of Uranium Recovery in the Phosphate Industry," Nuclear Safety, Vol. 22, No. 1.
- M.T. Ryan, D.E. Fields, eds. May 1981. "PREREM: An Interactive Data Preprocessor for INREM II." ORNL/NUREG-71.



PUBLICATIONS CONTINUED

- M.T. Ryan, R.W. Leggett, F.F. Haywood, W.H. Shinpaugh, R.W. Doane, and W.M. Johnson. December 1978. "Radiological Survey of the E.I. Dupont Company, Deepwater, New Jersey." DOE Report, DOE/EV-0005/8.
- W.A. Goldsmith, F.F. Haywood, R.W. Leggett, W.D. Cottrell, M.T. Ryan, D.L. Anderson, D.J. Christian, R.W. Doane, B.S. Ellis, W.M. Johnson, W.H. Shinpaugh. September 1979. "Radiological Survey of the St. Louis Airport Storage Site, St. Louis, Missouri." DOE Report. DOE/EV-0005/16.
- W.A. Goldsmith, R.W. Leggett, F.F. Haywood, W.D. Cottrell, D.J. Crawford, M.T. Ryan, P.T. Perdue, M.E. Owens, H.W. Dickson, J.L. Danek, D.L. Anderson, J.E. Burden, R.W. Doane, B.S. Ellis, R.E. Hamilton, W.H. Shinpaugh. December 1981. "Radiological Survey of the Mallinckrodt Chemical Work, St. Louis, Missouri." DOE/EV-0005/27, ORNL 5715.
- R.W. Leggett, F.F. Haywood, C.J. Barton, W.D. Cottrell, P.T. Perdue, M.T. Ryan, J.E. Burden, D.R. Stone, et al. April 1978. "Radiological Survey of the Former Vitro Rare Metals Plant, Canonsburg, Pennsylvania (Interim Report)." DOE/EV-0005/3.
- R.W. Leggett, W.D. Cottrell, J. Burden, and M.T. Ryan. May 1978. "Radiological Survey of the Tonawanda New York Plant of Linde Division of Union Carbide Corporation." DOE/EV-0005/5.
- M.T. Ryan, R.W. Leggett, J.E. Burden, D.J. Christian, B.S. Ellis, and D.L. Anderson. January 1978. "Radiological Survey of the Hooker Chemical Company, Niagara Falls, New York." DOE/EV-0005/2.
- G.D. Kerr, M.T. Ryan, and P.T. Perdue. January 1978. "Measurements of Airborne Concentrations of Rn-220 Daughter Products by Alpha Particle Spectroscopy," Proceedings of the Eleventh Midyear Topical Symposium.
- W.J. McDowell, F.G. Seeley, M.T. Ryan. May 1977. "Penetration of HEPA Filters by Alpha Recoil Aerosols," Health Physics 32.
- M.T. Ryan, W.J. McDowell, G.N. Case. February 1977. "Observations of the Distribution and the Nature of Alpha-active Particulate Material in a HEPA Filter Used for Plutonium-containing Dust." ORNL-TM 5765.
- W.J. McDowell, F.G. Seeley, M.T. Ryan. July 1976. "Penetration of HEPA Filters by Alpha Recoil Aerosols," Proceedings of the Fourteenth Annual ERDA Air Cleaning Conference.
- M.T. Ryan, K.W. Skrable, G.E. Chabot. November 1975. "Retention and Penetration Characteristics of a Glass Fiber Filter for Pb-212 Aggregate Recoil Particles," Health Physics 29, 798-799.

PUBLICATIONS CONTINUED

- R.W. Leggett, J. Burden, M.T. Ryan, D.L. Anderson, B.S. Ellis, and D.J. Christian, F.F. Haywood. 1979. "Radiological Survey of the Former Simonds Saw & Steel Company, Lockport, New York." DOE/EV-0005/17.
- B.A. Berven, H.W. Dickson, W.A. Goldsmith, W.M. Johnson, W.D. Cottrell, F.F. Haywood, M.T. Ryan and W.H. Shinpaugh. February 1982. "Radiological Survey of the Kellex Research Facility, Jersey City, New Jersey." DOE/EV-0005/29, ORNL-5734.
- R.W. Leggett, P.T. Perdue, M.T. Ryan, F.F. Haywood, E.B. Wagner, C.J. Barton. September 1977. "Radiological Survey of the Property at 9200 Latly Avenue, Hazelwood, Missouri." DOE Interim Report.

PRESENTATIONS

- "Environmental Monitoring and the Chem-Nuclear Low-Level Radioactive Waste Facility in Barnwell, South Carolina," presented at the meeting of the Atlanta Chapter of the Health Physics Society, Atlanta, Georgia, January, 1984.
- "Environmental and Dosimetry Programs at the Chem-Nuclear Low-Level Radioactive Waste Facility in Barnwell, South Carolina," a seminar presented at Clemson University to the faculty and students of the Department of Environmental Systems Engineering, September, 1983.
- "Formerly Used Sites Remedial Action Program - FUSRAP - Monitoring Methods and Site Characterization," presented at the mini symposium, Environmental Monitoring and Risk Assessment, sponsored by the Greater New York Chapter of the Health Physics Society, December 1982.
- "A Comparison of the In Vitro Dissolution Rates of  $^{238}\text{PuO}_2$  and  $^{239}\text{PuO}_2$  and Implications for Internal Radiation Dosimetry," presented at the 28th Annual Bioassay, Analytical and Environmental Dosimetry Conference, October 1982, Natick, Massachusetts.
- "The Marshall Islands 1981." A paper presented at the 1981 WATtec Energy Conference held in Knoxville, TN, February 24-26, 1981.
- "Basic Health Physics Review." A 20-hour course given for the technical staff of the Industrial Safety and Applied Health Physics Division, Oak Ridge National Laboratory, completed in January 1982.
- "Radiological Assessment Techniques Used at Formerly Utilized MED/AEC Sites" presented at the American Nuclear Society Student Conference, University of Florida, March, 1978.
- "Aggregate Recoil Transfer in Glass Fiber Filtration Media," presented at the Annual Meeting of the New England Chapter of the Health Physics Society, May 1975.

INDIVIDUAL USER(S)

As described elsewhere in the Application, the Barnwell Nuclear Fuel Plant has been shut down, decontaminated, and areas which contain even residual contamination in inaccessible areas such as inside process vessels and pipes and hoods have been sealed after being surveyed to determine that there was no smearable contamination in accessible areas. Thus, there are no individual users, and there is no need for the Company Representative to have any special expertise or experience in handling radioactive materials. However, the Company Representative does have the assistance of Chem-Nuclear Systems, Inc. available to him for such radiological surveillance and protection.

The Company Representative is Mr. Christian T. Nielsen, who may be contacted at the following address:

Mr. Christian T. Nielsen, Vice-President  
Allied Chemical Nuclear Products, Inc.  
c/o Allied Corporation  
P. O. Box 3000-R  
Morristown, NJ 07960

Telephone: (201) 455-3367

Christian T. Nielsen is the Vice-President of Allied Chemical Nuclear Products, Inc., a division of the Allied Corporation, which is located in Morristown, New Jersey. He is 42 years old and has been with Allied for his entire career. He advanced through a succession of line positions in chemical plants in Syracuse, New York; Baton Rouge, Louisiana; and Chicago, Illinois, serving ultimately as Plant Manager. In the Chicago Plant in 1981, he was appointed Director - Maintenance and Process Analysis for Allied Corporation and then was appointed Vice President - Operations for the Allied Industrial Products Co.

Mr. Nielsen holds a B.S. Degree in Chemical Engineering from Lehigh University and an M.B.A. Degree from Louisiana State University. He is a registered professional Chemical Engineer in Louisiana.