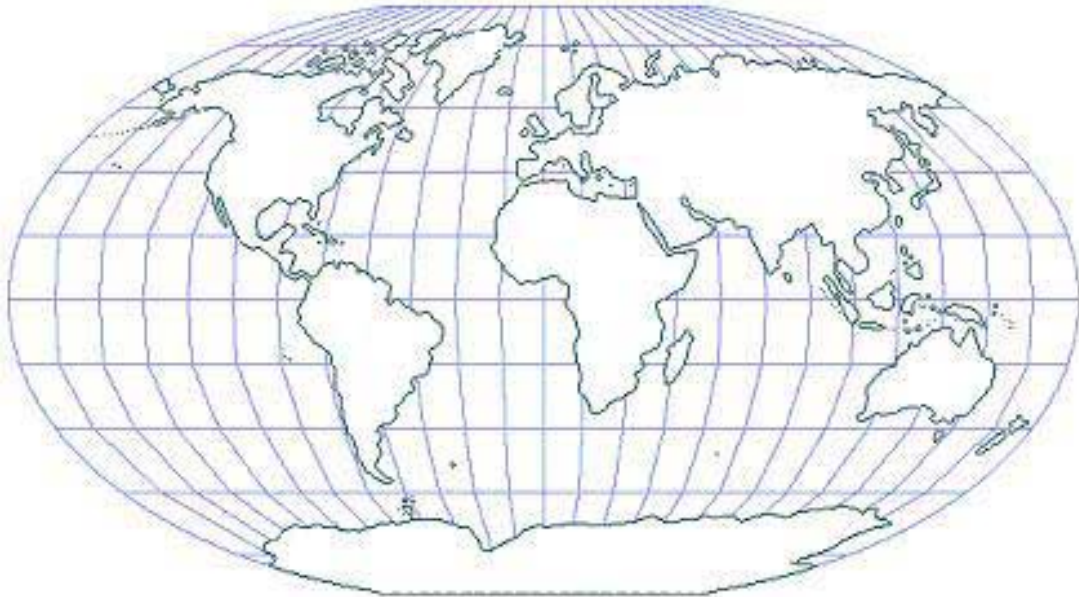


Hanford Nuclear Services, Inc.



Statement of Qualifications

September 1, 2002



Hanford Nuclear Services, Inc.

TABLE OF CONTENTS

MISSION STATEMENT	1
WORLDWIDE ENVIRONMENTAL SOLUTIONS	1
STATEMENT OF QUALIFICATIONS	2
Corporate Experience	2
Service and Products for SINS 899-1 through 899-4	4
SIN 899-1: Environmental Planning Services and Documentation	4
SIN 899-2: Environmental Compliance	5
SIN 899-3: Environmental and Occupational Training Services	8
SIN 899-4: Waste Management Services	8
Additional HNS Staff Capabilities	10
Quality Assurance / Quality Control Policy	10
Corporate Training Requirements	11
AFFILIATED COMPANY PROJECTS AND CLIENTS	11
CONCLUSIONS	14
APPENDIX	
General Services Administration Contract Award and Small Disadvantaged Business Certification	A
HNS' Resumes	B
Letters of Recommendation	C
Drawing / Photography Credits	D



Hanford Nuclear Services, Inc.



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MISSION STATEMENT

“Foundations of Success through Problem Solving”

Upon historically noted foundations of success, Hanford Nuclear Services, Inc., HNS, Inc., their affiliated RMC Environmental and Analytical Laboratories, and their diverse multi-disciplined affiliated team of highly skilled Environmental Engineers, Scientists and Consultants strive in seeking challenging opportunities as world leading problem solvers for both public and private industries as well as regulatory agencies.

HNS shares their extensive educational insights and demonstrates their practical scientific experience in pursuit of solutions for the environmental industry. Through in-house research and development activities, HNS pioneers new analytical methods, and applies science and engineering to develop substantive environmental protective measures as best available technologies and best management practices.

HNS, to the best of their abilities, offers results oriented solutions through relative yet cost-effective means and measures. Above all else, while committed to the bottom line, HNS provides advisory services to all clients through an empathetic focus of federal, state, and local regulatory requirements under the auspices of their common goal in benefiting and protecting the Health, Safety and Welfare of the Public and Environment.

WORLDWIDE ENVIRONMENTAL SOLUTIONS

Hanford Nuclear Services, Inc. is a dedicated world leader in providing innovative technically sound and cost-effective solutions for environmental concerns including solid waste management; hazardous material and hazardous waste treatment, storage, and disposal as well as nuclear waste management areas.



Hanford Nuclear Services, Inc.

HNS offers a complete package as a “one stop” environmental service firm including a state of the art R & D Laboratory, which has solved numerous groundwater, wastewater, and nuclear waste related storage problems in the U.S. at Hanford, WA and at other U.S. D.O.E facilities as well as at various international locations.

As a leading environmental services consulting firm today, HNS has a combined environmental industry experience of 30+ years including its affiliates. (HNS - 6 years, Sudharsan - 10 years, RMC - 16 years.) HNS' President Dr. R. Soundararajan, affiliated staff and consulting members, have environmental industry experience cumulative of over 363 total years.

STATEMENT OF QUALIFICATIONS

Corporate Experience

HNS and its affiliated staff have a thorough understanding of federal, state, local, and international environmental regulations.

Based on our in-depth understanding of these regulations, we were instrumental in developing EPA's current regulations on “Chemical Fixation”, “Stabilization / Solidification”, “Leach Test Protocols for Mine Tailings”, and “Total Waste Analysis.” We are also co-authors of “Guidelines for the Regional Program Managers for the Evaluation of Chemical Fixation Technology.” Dr. Soundararajan, also known as Dr. S, has personally provided or co-authored over 70 scientific publications, 25 of which are in the area of waste stabilization.

Numerous clients avail our many services ranging from NPDES permitting to RCRA and CERCLA compliance as we strive to stay ahead of regulatory changes and future up-dates.

In February of 1992, the Publishers and Editors of *The Engineering News Record* specifically sited Dr. S “for among the many who have served the best interests of the construction industry.”

In May of 2000, HNS was awarded a General Services Administration, GSA, Contract as an environmental service provider for all Offices, Departments, and Divisions of the federal government including Special Item Numbers, SINs 899-1 through 899-4 (Appendix A).

In May of 2002, HNS was certified as a Small Disadvantaged Business (certification number WA000010008516) under U.S. Small Business



Hanford Nuclear Services, Inc.

Administration guidelines. A copy of the certification letter can be found in Appendix A.

HNS' affiliated staff has specifically provided technical advice to industry and government clients or entities in response to the following environmental concerns:

1. Discharge permits for the electroplating industry.
2. RCRA and CERCLA compliance for U.S. EPA's Superfund and NPL hazardous waste sites.
3. Discharge Part B permits for landfills.
4. Permit application, risk analysis for the radioactive waste melter at Hanford, WA. Permits from U.S. EPA, NRC, and State Department of Ecology, WA.
5. Indoor air quality for the metal powder industry.
6. Industry air quality relative to volatile solvents used in the furniture industry.
7. 10 CFR 61 regulations for numerous clients.
8. RI/FS studies and performance standards for federal and state regulatory agencies.
9. Bacterial count, pH, NO₃/NO₂, Phosphate, Ammonia and other parameters for sewer treatment plants at various cities in Arkansas, Texas, Indiana, and Missouri.
10. TSCA regulations for numerous power companies, and the U.S. DOE at Hanford, WA.
11. Air quality permits for commercial incinerators.
12. Risk assessments from data obtained through "pocket mouse" and "fathead minnow" tests to identify, if any, nuclear materials released into the atmosphere.
13. Toxicity determinations through individual isomers of dioxin, dibenzo furan, chlorinated pesticides and herbicides.
14. Phase I & II Environmental Site Assessments, Site and Waste Characterizations, and Environmental Compliance Audits.

HNS utilizes as necessary the latest revisions of all environmental regulations in electronic form.



Hanford Nuclear Services, Inc.

HNS has a Research and Development laboratory at RMC Environmental & Analytical Labs acting as an affiliated branch of their services. Relevant highlights of RMC project services and experience includes:

1. Active research in the areas of hazardous waste solidification and high temperature incineration.
2. Collaborative research with Albert Environmental Center on thermo chemical mechanisms at very high temperatures.
3. Identification of intermediate species that form Dioxins.
4. Design thermo chemical reactions to prevent Dioxin formation.
5. Development and evaluation of 57 new binders for heavy metals for U.S. EPA Region IV.
6. Development and evaluation of new organic binders for stabilizing PCBs and Dioxin.
7. Incorporation of incinerator ash for the development of binders.
8. Development of binders for radioactive waste.
9. Development of leaching procedures for mine tailings for the U.S. EPA.

A more detailed explanation of SINS 899-1 through 899-4 follows as they relate to HNS' capacity as an environmental consulting firm with R & D Laboratory capabilities.

Service and Products for SINS 899-1 through 899-4

SIN 899-1: Environmental Planning Services and Documentation

HNS prepares and reviews documents such as preliminary site assessments, remedial investigations, feasibility studies, and remedial designs. These documents are based or reviewed federal, state, and local regulations. We can also provide performance evaluation criteria for any chosen technology.

HNS provides engineering and documentation services for the following remedial areas and technologies:



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- *Thermal desorption – air emission.*
- *Thermal destruction – site-specific design.*
- *Subsurface cement based grouting- all regulatory compliance.*
- *Soil washing / resources recovery.*
- *In-Situ vitrification.*
- *Clay liners and caps.*
- *Steam stripping.*
- *Solvent extraction.*
- *Chemical & physical stabilization.*
- *Fractionation.*

SIN 899-2: Environmental Compliance

In the past HNS and its affiliated staff have undertaken numerous environmental compliance projects to develop procedures, generate engineering plans; and establish management systems designed at reducing, minimizing, controlling, or preventing and avoiding chemical and biological environmental concerns within Solid & Hazardous Waste; Water Resources / Water Quality Management; and Air Quality fields of science.

In addition to meeting the environmental compliance needs of private industries identified in the “Corporate Experience” section of this statement, HNS and their affiliates have provided compliance services for the following Federal, State, and International government agencies:

- ***U.S. EPA, Office of Research and Development, ORD, Cincinnati, OH:*** Nuclear waste storage and treatment.
- ***U.S. EPA, Region I, Boston, MA:*** Landfill leachate.
- ***U.S. EPA Region IV, Atlanta:*** Compliance requirements for Lead, Cadmium and several other metals leaching into ground water systems.



Hanford Nuclear Services, Inc.

Our affiliates are quite knowledgeable in federal, state, and local compliance standards. We have also negotiated special compliance standards in several court cases. Due to HNS provision of technical support, substantial project cost savings were generated as estimated on the order of reductions of over \$500 Million dollars.

- **U.S. EPA, Region V, Chicago, IL:** Leachate – Hazardous waste landfills, Midco I & II sites.
- **U.S. EPA, Region VI, Dallas, TX:** Air emissions, and leachate, TSD waste oil recycling facility, Gurley Pit.
- **U.S. EPA, Region VIII, Denver, CO:** Explosives and propellants discharge at Morton – Thiokol.
- **U.S. EPA, Region X, Seattle, WA:** Air emission, nuclear waste combustion, for British Nuclear Fuels, BNF, under a DOE contract with EPA authority.
- **U.S. DOJ, Washington D.C:** Compliance education for Dept. of Justice attorneys in environmental issues.
- **U.S. DOE:** Air emissions from “watch list” tanks at Hanford, WA.

Through resolving a longstanding emissions problem, HNS has saved the U.S. DOE over an estimated \$1 Billion dollars eliminating the need to build 28 additional storage tanks.

- **U.S. DOE:** Benzene emissions from U.S. DOE Savannah River Site. K-Basin study at Hanford, WA, and PCBs & Radionuclides leachate data, compliance needs.
- **Missouri Division of Health:** Compliance requirement on toxicity of cattle feed from Chlordane.
- **Missouri Department of Natural Resources, Solid Waste Management Program:** Compliance requirements of SWMP Groundwater Enforcement Unit, and Permits Unit prior to Subtitle D’s effect for existing Solid, Demolition, and Special Waste landfills.

This included review of permit modifications, closures, and post closure requirements, as well as new permit applications. Attempted to seek compliance requirements of the Federal Subtitle D landfill closures and permitting requirements in advance of its near pending effective mandate.



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- **Missouri Department of Natural Resources, Hazardous Waste Program:** Compliance requirements of HWP Groundwater Enforcement Unit in review of groundwater monitoring programs, and annual monitoring report reviews of several TSD permitted facilities.

Developed Operations and Maintenance, O & M, and Comprehensive Monitoring Evaluation, CME Reports.

- **Iowa Department of Natural Resources, Leaking Underground Storage Tank Program:** Compliance requirements of LUST Site Characterizations, Assessment, Monitoring, and Treatment System Evaluation reports in review of IA's LUST Program reporting requirements.
- **Dept. of Ecology, The Philippines:** Marine toxicity by Sodium Cyanide.
- **Environmental Protection Agency, Italy:** Compliance requirements for Arsenic and Mercury in leachate. Finely tuned remediation techniques to achieve compliance standards.

HNS provided the necessary technology to achieve the compliance standards through findings in their treatability studies performed at their own R&D lab.

- **Auditing and Compliance with Environmental Regulation:** HNS has a considerable degree of experience in on-site field studies and through off site report reviews. On-site and adjacent properties' conditions and influences are considered in environmental compliance studies and audits.

Most of our auditing work has been completed for municipalities, city governments, and utility companies. Our air quality audits have been performed for television and furniture manufacturing facilities as well as facilities engaged in metal powders composite working whose metals included Vanadium, Magnesium, Aluminum, and Titanium. We have also conducted discharge audits for the electroplating industry.

- **Review of New Technology:** As one of HNS' strongest areas of expertise, we are reviewers for the SITE program for the U.S. EPA. We have also provided similar services to the U.S. DOE and other foreign government agencies.
- **Provision of Expert Testimony:** HNS has also provided key testimony through their expertise demonstrated in judicial courts and at jury trials involving environmental concerns.



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SIN 899-3: Environmental and Occupational Training Services

Our staff has long standing experience in providing training in several environmental areas. We have provided training to U.S. EPA's regional program managers on recent developments in solid, hazardous, and mixed waste management technologies; on principles of stabilization; biological treatment of wastewaters, reverse osmosis / nano-filtration; and on appropriate reagents and remedial processes necessary for treatment.

We have also provided training seminars through the Hazardous Materials Control Research Institute, HMCRI, for environmental professionals.

Additionally, HNS staff has previously provided training for Missouri's Solid Waste Technicians regarding groundwater monitoring systems and associated Solid Waste Landfill groundwater monitoring program requirements as well as Subtitle D Groundwater Monitoring, and Post Closure Monitoring and reporting requirements.

Our staff also updates or refreshes their periodic training in HAZMAT, OSHA, NRC and other environmental related training programs.

SIN 899-4: Waste Management Services

HNS has provided a multitude of services in the area of waste management. We have reviewed site plans, designed treatment processes, set up monitoring programs, and conducted RI/FS for landfill owners and city governments. We have generated stand-alone documents for every aspect of waste management.

We have provided remedial services to clients such as "Sinclair Oil", "Reynolds Aluminum Co.", "Ebasco", "Foster Wheeler", "Baltimore Port Authority", the "U.S. EPA's Regions I-X" in various capacities, and multiple U.S. DOE sites.

Our services include: engineering, design, permitting, grant applications, environmental compliance, RI/FS, performance standards, closure and post closure monitoring, new technology development for complex nuclear waste management problems, negotiations with local, state, and federal regulatory agencies, and expert witness testimony.

Although we have been providing hazardous waste services for the past 16 years, we have also expanded our services to mixed wastes.



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In the hazardous waste field, we have been providing services in waste characterization, RI/FS treatment development and design, as well as ensuring closure and post-closure monitoring requirements have been in compliance.

We have acted as liaison between joint authority federal government departments and agencies such as the U.S. DOE and EPA.

It should be noted that while providing our services for the U.S. Department of Energy, involving cases of mixed wastes, our innovation was required in combining more than one technology. Two examples are highlighted as follows:

1. **Depleted Uranium in Oil:** At Hanford, there are about 2000 drums containing depleted Uranium chips in mineral oil.

The mineral oil has been contaminated with PCBs, TCE and TCA. Conventional remedial techniques, such as cement based grouting, will not work for this mixed waste. Hence the U.S. EPA ORD in Cincinnati has requested that we help DOE to develop a remediation process for this waste.

Subsequently, HNS designed their proprietary process and now patented thermal desorption system operating at a reduced pressure in a Helium atmosphere due to the pyrophoric nature of Uranium.

The reduced pressure distills oils with the pollutants at a lower temperature. The distilled organics are then combusted and scrubbed. The dry Uranium is coated with HNS' patented radiation proof polymer. The materials are crushed, coated with the same polymer, and finally taken to the site's Emergency Response Disposal Facility, ERDF.

Our proposal met all compliance requirements and hence, was approved by U.S. EPA Region X, Washington State Dept. of Ecology and by the U.S. DOE. This project is typical of our capabilities in handling any type of waste.

2. **Groundwater Contamination by Radionuclides:** The N-Springs area at Hanford, WA had ground wastes contaminated with Radionuclides Sr-90 and Cs-137.

At the request of the general contractor, Bechtel, HNS was subcontracted to design a reverse osmosis/nano-filtration system and quantitatively remove all (99.8%) of the Radionuclides from the ground water.



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Our treatment method has been found to be the most cost-effective technology as these two nuclides have great demand in Radio Medicine. Effectively and atypical of most environmental cleanup activities, the overall operating cost for the cleanup can also be recouped from the sales of these clinical isotopes recovered.

Additional HNS Staff Capabilities

Additionally, some staff members have served as duty officers for regulatory agencies. HNS has been providing telephone advisory services for the past 16 years.

We have emergency analytical capabilities for chemical spills. We have prism manuals, a database on all hazardous waste materials, and a list of non-hazardous neutralization reagents.

In the past, HNS has provided assistance by phone for spills of Cyanides, Sulfuric acid, organo Arsenic and organo Mercury compounds, and necessary first aid requirements to remedy affected employees.

On one occasion, we helped an electroplating industry avoid a major disaster due to contaminated Sulfuric acid. We have provided similar services to many overseas clients.

HNS has more than adequate staffing to perform the GSA Contract SINs. We are also electronically linked with numerous affiliated experts, who can provide their services instantaneously, and can be made available for expert testimony for the U.S. Department of Justice, or for state or local entities concerning environmental lawsuits.

Quality Assurance / Quality Control Policy

While major sources of revenues have been provided through our laboratory service to various U.S. government agencies, our Lab strictly adheres to the ISO-9000 QA/QC program. We have used this system for some time, and fully intend to continue this practice in all future obligations.

HNS can customize or develop QA/QC programs for laboratory services and remedial programs.



Hanford Nuclear Services, Inc.

Corporate Training Requirements

All our staff members continue to undergo appropriate training programs offered by EPA, NRC, OSHA and other regulatory agencies. And we offer and provide training courses to regulatory agencies and environmental professionals. Our training courses are designed to merge sound engineering practices with sound based practical scientific principles.

AFFILIATED COMPANY PROJECTS AND CLIENTS

RMC Environmental and Analytical Laboratories

214 West Main Plaza, West Plains, MO 65775

Phone: (417) 256-1101 Fax: (417) 257-2841

RMC Labs Project List conducted for the U.S. EPA, U.S. Department of Energy, and other clients from 1990 to the present follows:

1. Chemical fixation of organic waste at the White House Site located near Atlanta (U.S. EPA Region IV, Atlanta, GA).
2. Development of leach procedure for mine tailings (U.S. EPA, Risk Reduction Engineering Lab, RREL, Cincinnati, OH).
3. Development of GC/MS procedure for Chemfix Site Program.
4. Evaluation of Morton Thiokol explosive waste problems.
5. Preparation of Permit Writer's Handbook for EPA (U.S. EPA, RREL, Cincinnati, OH).
6. Development of new binder for PCBs (U.S. EPA, RREL, Cincinnati).
7. Chemical fixation of Chromium VI (U.S. EPA, RREL, Cincinnati, OH)
8. Stabilization/solidification of Lead at Sapp Battery Site (U.S. EPA, Region IV, Atlanta, GA).
9. Fixation of Arsenic (U.S. EPA, RREL, Cincinnati, OH).
10. Development of protocols for the emission of volatiles during S/S process (U.S. EPA RREL, Cincinnati, OH).



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11. Interaction between quicklime and PCBs (U.S. EPA, RREL, Cincinnati, OH).
12. Chemical fixation of Mercury for Caffaro (ATMC Ecologia, Genoa, Italy).
13. Chemical fixation of metal Carbides (Fiat Teksid, Torn, Italy).
14. Recovery of Arsenic from high level contaminated soil (Agrimont, Italy).
15. Fixation of petrochemicals and sludge (INA, Rafineriaja Nafte, Rijeka, Yugoslavia).
16. Fixation of domestic incinerator ash (Pelt-Hooykaas, The Netherlands).
17. Liquid phase oxidation of Kelthane and other pesticides (Rohm and Haas, Italy).
18. Chemical destruction of Aniline waste (Akzo, Italy).
19. Chemical treatment and stabilization of Arsenic III and Arsenic V. (ATMC Ecologia, Italy and Sardinia).
20. Recovery of Styrol from industrial waste (ATMC Ecologia, Italy).
21. Fixation of mixed waste with pesticides and Mercury (Enichem, Italy).
22. Fixation of Pentachlorophenol, Arsenic, and Chromium (Private industry client's name withheld at their request).
23. Fixation of Hexavalent Chromium (Private industry client's name withheld at their request).
24. Recovery of Chromium from soil-lab scale demonstration (Baltimore Port Authority).
25. Destruction of Nitrates / Nitrites in underground storage tanks at Hanford, WA DOE Facility (U.S. Department of Energy, Washington, DC).
26. Stabilization / solidification of low-level radioactive waste (U.S. Department of Energy, Washington, DC).



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27. Recovery of Cesium, Ruthenium, and Technetium from radioactive waste (U.S. Department of Energy, Washington, DC).
28. Destruction of organics in the radioactive waste (U.S. Department of Energy, Washington, DC).
29. Stabilization of solidification of refinery waste (U.S. EPA Region VI, Dallas).
30. Stabilization/solidification of Lead in soil (U.S. EPA Region VI, Dallas).
31. Stabilization/solidification of organics and metals at a Superfund site (U.S. EPA Region V, Chicago).
32. Development of evaluation techniques for S/S processes (U.S. EPA, RREL, Cincinnati).
33. Development of integrated technology for the destruction of Nitrates/Nitrites and removal of metal from mixed radioactive wastes (in-house research & development lab, RMC Labs).
34. Fixation of Lead, Cadmium, Polymethylmethacrylate (U.S. EPA Region II).
35. Development and implementation of Cyanide Detection Test in marine fish for Bureau of Fisheries and Agricultural Resources (BFAR, The Philippines).
36. Recovery of clinical Radio isotopes (Sr-90 & Cs-137) from N-Basin water.
37. Chemical oxidation and polymer based grouting of K-Basin sludges.
38. Remediation of the "burping" watch tanks at Hanford, WA.
39. Development of Gel Technology for DOE.
40. Development and evaluation of radiation proof polymer for the containment of Radionuclides.
41. Development of attenuator composites for radioactive waste containment.



Hanford Nuclear Services, Inc.

42. Development of grouting process for Boron containing nuclear waste.
43. A comprehensive process for the management of all forms of mixed waste.
44. Woven fiberglass membrane (silicone coated) for capping radioactive burial locations at DOE Sites.
45. Solution for the problems of “Benzene release” during the precipitation of Cs-137 at a Savanna River DOE site.
46. Remediation of depleted Uranium stored under mineral oil.
47. Remediation of both conventional and nuclear ordnance.
48. Development of a proprietary process for shielding material utilizing depleted uranium for storage containers, transportation containers, and spent nuclear fuel.

CONCLUSIONS

In conclusion, HNS believes that through the past 16 years, we have grown in understanding our responsibilities and obligations as an environmental advisor and our efforts have been supported through our strongest asset – *“problem solving.”*

HNS has also proven historically that we offer most competitive rates by keeping overhead costs minimal while providing results. We will continue to accomplish this by bringing on board and retaining the best minds available while continuing to grow as necessary nationwide to accommodate future responsibilities in our commitments to meet or exceed clients’ needs.

References are available upon request at:

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Email: sschneider@hnswp.com
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Hanford Nuclear Services, Inc.

APPENDIX A

General Services Administration Contract Award

and

Small Disadvantaged Business Certification



ENVIRONMENTAL ADVISORY SERVICES, TFTP-EW-99-8999-1

General Information

Document Type: Award Notice
Solicitation Number: TFTP-EW-99-8999-1
Posted Date: May 11, 2000
Archive Date: May 30, 2000
Classification Code: B -- Special studies and analysis - not R&D

Contracting Office Address

General Services Administration, Federal Supply Service (FSS),
Management Services Center (10FT), 400 15th Street, SW, Auburn, WA
98001

Description

Contract Award Date: May 15, 2000
Contract Award Number: GS-10F-0231K
Contract Award Amount: \$25,000,000
Contract Line Item Number: 899-1, 899-2, 899-3, 899-4
Contractor: Hanford Nuclear Services, 1905 Wayhaven Drive,
West Plains, MO 65775

Point of Contact

Debbie Ginther, Contract Specialist, Phone (253) 931-7484, Fax (253)
931-7174, Email debbie.ginther@gsa.gov

Michael Lewis, Supervisory Contract Specialist, Phone (253) 931-7582,
Fax (253) 931-7174, Email michael.lewis@gsa.gov

Email your questions to Debbie Ginther at debbie.ginther@gsa.gov

Hanford Nuclear Services, Inc.

SF-26
Page 3

16. The following labor category hourly rates have been agreed to for SIN 899-1, 899-2, 899-3, and 899-4 for the first year of the contract:

<u>Labor Category</u>	<u>Government Hourly Rate</u>	<u>Government Daily Rate</u>
Clerical Administrator	\$ 19.80	\$ 158.40
Administration I	\$ 26.10	\$ 208.80
Administration II	\$ 30.60	\$ 244.80
Word Processor	\$ 32.40	\$ 259.20
Word Processor/Editor	\$ 36.00	\$ 288.00
Technician	\$ 40.50	\$ 324.00
Senior Technician I	\$ 44.10	\$ 352.80
Senior Technician II	\$ 48.60	\$ 388.80
Engr/Scientist II/Consul II	\$ 51.30	\$ 410.40
Engr/Scientist III	\$ 52.20	\$ 417.60
Engr/Scientist IV	\$ 56.70	\$ 453.60
Consultant II	\$ 62.10	\$ 496.80
Senior Technician III	\$ 64.80	\$ 518.40
Engr/Scientist V	\$ 68.40	\$ 547.20
Consultant III	\$ 71.10	\$ 568.80
Senior Eng/Scientist I	\$ 72.90	\$ 583.20
Senior Eng/Scientist II	\$ 76.50	\$ 612.00
Senior Eng/Scientist III	\$ 81.00	\$ 648.00
Consultant IV	\$ 83.70	\$ 669.60
Senior Consultant I	\$ 88.20	\$ 705.60
Senior Consultant II	\$ 92.70	\$ 741.60
Senior Consultant III	\$180.00	\$1,440.40
Principal Consultant I	\$126.00	\$1,008.00
Principal Consultant II	\$135.00	\$1,080.00
Executive Consultant I	\$149.40	\$1,195.20
Executive Consultant II	\$164.70	\$1,317.60
Sr Executive Consultant	\$218.70	\$1,749.60
Expert Witness I	\$126.00	\$1,008.00
Expert Witness II	\$135.00	\$1,080.00
Expert Witness III	\$149.40	\$1,195.20
Nuclear Eng/Scientist I	\$126.00	\$1,008.00
Nuclear Eng/Scientist II	\$135.00	\$1,080.00
Nuclear Eng/Scientist III	\$218.70	\$1,749.60
Health Physicist	\$144.90	\$1,159.20

The following courses are offered under SIN 899-3, Environmental/Occupational Training Services:

<u>Title of Course</u>	<u>Length of Course</u>	<u>Course Price</u>	<u>Min No. of Students</u>	<u>Price Per Add'l Students</u>
Stabilization/Solidification, Theory & Practice	8 hours	\$10,000.00	20	\$450.00
Recent Advances in Nuclear Waste Management	3 days	\$10,000.00	20	\$450.00



Hanford Nuclear Services, Inc.



U.S. SMALL BUSINESS ADMINISTRATION
WASHINGTON, DC 20416

MAR 28 2002

Dr. Rengarajan Soundararjar
President
Hanford Nuclear Services, Inc.
28 Court Square
West Plains, MO 65775

REF: SDB Tracking #: WA000010008516
Expiration Date – (Three years from date above)

Dear Dr. Soundararjar:

We are pleased to inform you that your firm is certified as a Small Disadvantaged Business (SDB) under U.S. Small Business Administration (SBA) guidelines. You are now eligible to participate in the SDB Program. Certification is valid for three years from the date of this letter. Your firm will be added to SBA's list of certified SDBs found in *PRO-Net*, SBA's on-line registry, at <http://pro-net.sba.gov>.

The SDB Program regulations in Title 13 of the Code of Federal Regulations, Section 124.1016(b), require that during your three-year term you report within 10 days any changes in ownership and control or any other circumstances which could adversely affect the eligibility of your firm as an SDB. Failure to do this could result in the decertification of your firm. Please note also that in order for your firm to continue to participate as an SDB after its three-year term, you must reapply for the SDB Program. I wish you much success in your future business endeavors.

Sincerely,

A handwritten signature in black ink that reads "Josephine F. Stallings".

Josephine F. Stallings
Assistant Administrator
Division of Program Certification and Eligibility
Office of Business Development

APPENDIX B

HNS' Resumes

Hanford Nuclear Services, Inc.

Hanford Nuclear Services, Inc. Resumes

DIRECT EMPLOYEES

Dr. R. Soundararajan, President of HNS

James A. Matejic, RG, Environmental Manager

Scott Schneider, RG, Environmental Geologist

Barrylyn Soundararajan, Administrative Assistant

CONSULTANTS

Robert Mournighan

John J. Barich, III

Kul B. Razdan

Steven R. Parikh, P.E.

Narayan Ramanujan, P.E.

Perichiyappan Senthilnathan

Srini Venkatesh

Nabil Morcos

Ronald F. Tucker, Jr. P.E.

Willis Mushrush

Samuel C. Short

Thomas A. Norton, Sr.



Hanford Nuclear Services, Inc.

DR. RENGARAJAN SOUNDARARAJAN

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West Plains, Missouri 65775

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EDUCATION

Ph.D. (The Chemistry of Hydrazine Derivatives), Indian Institute of Science, India, 1979.

PROFESSIONAL HISTORY

- President, Hanford Nuclear Services, West Plains, Missouri, 1995 to date
- President, Sudharsan International Inc., West Plains, Missouri 1993 to 1996
- Director of R & D, RMC Environmental, Missouri, 1985 to 1993
- Professor, Drury College, Springfield, Missouri, 1984-85
- Assistant Professor, Southeast Missouri State University, Cape Girardeau, MO, 1982-83
- Visiting Instructor, Clemson University, South Carolina, 1980-82
- Asst. professor, Madras University, 1970-79.

PROFESSIONAL ACTIVITIES

- Subcontractor, Fluor Daniel Northwest
- Project Director, Bechtel, Hanford Inc.
- Subcontractor BNFL
- Technical advisor, British Nuclear Fuel, Hanford, WA
- Consultant, U.S. Department of Justice, Washington D.C. (Expert witness 702 in the area of stabilization/solidification, Hazardous Waste and Environmental Chemistry).
- Consultant, U.S. EPA, on Hazardous Waste Stabilization/Solidification.
- Consultant U.S. Department of Energy
- Principal Chemist, Health Department, Springfield, Missouri.
- Consultant, Olin Corporation, Marion, Illinois.
- Consultant, Bond Tech/Ashland Chemicals
- Consultant, Foster Wheeler
- Consultant, International Waste Technologies
- Consultant, PRC Environmental Waste
- Consultant, Mactec, Hanford
- Consultant, Nukem, Germany
- Consultant, Siemens, Germany

CURRENT ACTIVITIES

- Destruction of Nitrates/Nitrites, recovery of radioisotopes from Hanford storage tanks.
- Active research in the areas of Hazardous Waste Stabilization/Solidification and high temperature incineration.
- Development and Evaluation of about 60 binders for heavy metals for US EPA Region IV. Incorporation of incinerator ash for the development of binders.
- Development of binders for radioactive waste and leaching procedure for mine tailings for US EPA.
- Development and Evaluation of new organic binders for stabilizing PCB's and Dioxin. Identification of intermediate species that form Dioxins. Design thermo-chemical reactions to prevent Dioxin formation.



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- Molecular weight exclusive reverse osmosis/nanofiltration for the enrichment and recovery of clinically useful radioisotopes (Sr-90 and Cs-137)
- Development and Evaluation of high-level radiation resistant polymer composites for high level rad waste isolation and containment.
- Thermal desorption/oxidation/polymer grouting of mixed wastes.
- Woven glass mats for landfill capping

PATENTS

- Coal desulfurization by flash photolysis of aqueous coal slurry by laser or by gamma radiation from cobalt 57, to produce self-sustaining chemical reaction liberating organic sulfur in gaseous compounds. High performance incinerator, and synthesis of organophilic clays (USA).
- Process for remediating PCB contaminated soil (USA, Pending).
- High-energy monopropellant (ALPH)A1(C104)3 3NH4 (INDIA).
- Gel Technology for the recovery of transuranic elements.

PROPRIETARY PROCESSES

- Reduction of organic wastes on and in soil and in stored aqueous sludge.
- Synthesis of novel organophilic clays for stabilization/solidification.
- Reduction of nitrates/nitrites to nitrogen gas for spent fuel process waste.
- Reverse osmosis/nanofiltration for the enrichment and recovery of radioisotopes
- Radioisotope enrichment by controlled cathode potential electrodeposition in room temperature molten salt systems, such as t-butyl pyridinium salts.
- Synthesis of composites for attenuation of high-energy radiation.
- Comprehensive process for the treatment of all types of mixed wastes.

EXPERIENCE (Highlights)

Resource Recovery:

- Considerable work experience in the areas of a controlled cathode potential isolation and recovery of metals such as Cu, Cd, Zn, Ag, Au, Ni, Co and Cr. This process is very useful to electroplating industries where all of the valuables can be recovered without polluting the environmental media. Further research is in progress using non-aqueous room temperature molten salt solutions.
- Recovery of clinical radio isotopes (Sr-90 and Cs-137).

Micro Chip Industry:

- Synthesis of Gallium Arsenide.
- Synthesis of Molybdenum Selenide.
- Experience in crystal growth and doping.

Waste to Energy:

Considerable work experience in waste to energy programs where landfill use has been cut by 85%. The combustible wastes are pelletized to produce Refuse Derived Fuel (RDF). Extensive work has been done for Tyson Foods where their used cardboard materials were pelletized with sawdust, paper and other combustible waste as a fuel in thermal power plants.

Area of Specialization (in USA):

- Several years of experience in the areas of electrochemical detoxification of hazardous waste materials soil washing, in-situ vitrification and desensitization of ordnance materials (explosives and propellants).



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- Developed and evaluated binders for US EPA to stabilize heavy metal saturated soil. All of the binders passed drinking water standards. Also, the cost was cut in half due to the commercially available components of the binders.
- Advisor and reviewer to the US EPA on several projects including the SITE program and Morton Thiokol high energy waste problem.
- Worked on simulated single shell tank wastes at the DOE Hanford site and developed a process to destroy the Nitrates/Nitrites by reducing them to elemental Nitrogen gas.
- Co-authored the handbook, "Physical and Chemical Tests for Evaluating the Stabilization/Solidification of Hazardous Wastes", developed for US EPA.
- Developed several pioneering new analyses, techniques and tests. Developed the leach test, "Total Waste Analysis (TWA)", which is used for evaluation of stabilization binders.
- Developed several methodologies for the evaluation of stabilization/solidification binders using physicochemical techniques such as Fourier Transform Infrared (FTIR), Thermogravimetric Analysis (TGA), and Differential Scanning Calorimetry (DSC). US EPA for treatability studies has adopted all these protocols.
- Solved the problem of periodic explosive gas release from Hanford Tank wastes.
- Resource recovery and fixation of chromium plumes
- Developed a radiation resistant polymer for the immobilization of radioactive wastes and for the storage of spent fuel rods.
- Developed a comprehensive treatment for all forms of mixed waste.

Areas of Specialization (in Abroad):

JAPAN: JGC Corporation, Oarai - Destruction of Nitrates/Nitrites in the Hanford tank waste. Isolation and recovery of all the radioisotopes including daughter isotopes. (in progress)

ITALY: Fiat/Teksid Automobile Facility, Torino - Recovery of Styrol from industrial waste: A fractional distillation process was developed for the recovery of Styrol from polymeric industrial waste at the facility. The methodology is still in use at the automobile facility.

Responsible for stabilization of catalytic materials containing mercury using a pre-treatment and subsequent stabilization/solidification process. This innovative process chemically fixes mercury in spite of inertness.

Responsible for the fixation of metal carbides and recovered Arsenic from soil. Chemical fixation of mercury recovery of arsenic from industrial catalyst.

GERMANY: Remediation of process and D&D wastes from commercial nuclear power plants.

UKRAINE AND SLOVAKIA: Polymer based grouting of Boric acid wastes from Russian built commercial nuclear power plants.

SINGAPORE: Chem-Solv Technologies Pvt. Limited, Singapore-Recovery of Zinc and other heavy metals from rubber waste and from industrial effluent. (in progress)

SWITZERLAND: Asea Brown Boveri Corporate Research, Switzerland Chemical fixation and solidification of Lead and other heavy metals in incinerator ash. (in progress)



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PHILIPPINES: Bureau of Fisheries and Agricultural Resources (BFAR), Philippines - Aquarium as well as food fish are caught with Sodium Cyanide in the Philippines. Further, the Cyanide has been destroying the coral reef. A methodology was developed for the detection of fish caught with cyanide. The test was versatile and (BFAR), Philippines adapted this test for implementation. Implementation of this test has greatly reduced Cyanide fishing which has brought about catastrophic results to the coral reef in the Philippines.

PUBLICATIONS

Over 100 publications, 30 in the area of stabilization/solidification.

HANFORD NUCLEAR SERVICES /RMC ENVIRONMENTAL LABS PROJECTS WITH OFFICE OF RESEARCH AND DEVELOPMENT, U.S. EPA, CINCINNATI, OHIO

- 1) Development of a new binder for PCBS
- 2) Chemical fixation of chromium VI
- 3) Stabilization/solidification of lead at Sapp Battery Site
- 4) Fixation of arsenic
- 5) Interaction between quicklime and PCBs
- 6) Chemical fixation of organic waste at the White House Site
- 7) Development of leach procedure for mine tailings
- 8) Development of GC/MS procedure for Chemfix site program.
- 9) Evaluation of Morton Thiokol explosive waste problems
- 10) Preparation of permit writers handbook for EPA
- 11) Development of protocols for the emission of volatiles during S/S process
- 12) Development of a new leach test for stabilized waste, "The Total Waste Analysis" (TWA)
- 13) Development of Infra-red, DSC/TGA, DSC/GC/MS evaluation protocols for the evaluation of wastes.

HANFORD NUCLEAR SERVICES / RMC ENVIRONMENTAL LABS PROJECTS WITH REGIONAL EPA

1. Stabilization/solidification of lead at Sapp Battery Site
 - U.S. EPA, Region IV, Atlanta, GA
2. Chemical fixation of organic waste at the White House Site
 - U.S. EPA, Region IV, Atlanta, GA
 - Oil recycling facility, approximately 30,000 cubic yards
3. Evaluation of Morton Thiokol explosive waste problems
 - U.S. EPA, Region VIII, Denver, CO
4. Gurley Pit Site, West Memphis
 - U.S. EPA, Region VI, Dallas, TX
 - Midco I & II, Gary, Indiana, U.S. EPA, Region V, Chicago, IL



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PROJECTS WITH U.S. DEPARTMENT OF ENERGY

1. Development of a comprehensive technology for the remediation of Hanford Radioactive waste tanks.
2. Gel technology for recovery of radioisotopes from fission products. (Joint DOE patent)
3. Peroxide destruction of organics in K-Basin sludges.
4. Enrichment and Recovery of Sr-90 and Cs-137 from N-Spring water using reverse osmosis and nanofiltration.
5. Solving the problem of periodic release of explosive gasses from single shell tank wastes.
6. Novel polymer coated fiberglass fabric for landfill caps.
7. Thermal desorption/polymer based grouting for depleted uranium stored under mineral oil.
8. Release of explosive gases (benzene) from the Cesium precipitation plant at Savannah River D.O.E. Site.

HANFORD NUCLEAR SERVICES / RMC ENVIRONMENTAL LABORATORIES PROJECTS WITH U.S. DEPARTMENT OF JUSTICE

- 1) Gurley Pit site, West Memphis, U.S. Department of Justice, Washington, D.C. EPA, Region VI, Dallas TX).
- 2) Midco I and II, Gary Indiana, U.S. Department of Justice, EPA, Region V, Chicago, IL).
- 3) Envirite Case, carbonation of metal hydroxides, U.S. Department of Justice EPA, Region I, Boston, MA).

HANFORD NUCLEAR SERVICES / RMC ENVIRONMENTAL LABORATORIES TECHNOLOGIES

PROJECTS WITH OVERSEAS CLIENTS

- 1) Fixation of Petrochemical and sludge. (INA, Rafinerija, Nafta, Rijeka, Yugoslavia)
- 2) Chemical fixation of metal carbides. (Flat/Teksid, Torino, Italy)
- 3) Recovery of Arsenic from high level Arsenic contaminated soil. (Agrimont, Italy)
- 4) Chemical fixation of Mercury for Caffaro. (ATMC Ecologia, Genoa, Italy)
- 5) Fixation of domestic incinerator ash. (Pelt-Hooykaas, the Netherlands)
- 6) Liquid phase oxidation of Kelthane and other pesticides. (Rohm and Haas, Italy)
- 7) Chemical destruction of aniline waste. (Akzo, Italy)
- 8) Chemical treatment and stabilization of Arsenic III and Arsenic V at Sardinia. (ATMC Ecologia, Genoa, Italy)
- 9) Recovery of Styrol from industrial waste. (ATMC Ecologia, Genoa, Italy)
- 10) Fixation of mixed waste with pesticides and Mercury. (Enichem, Italy)
- 11) Electrochemical destruction of PCBs.
- 12) Stabilization / solidification of red palm oil residues. (Kualalumpur, Malaysia, Chemsolv Industries, Singapore)



Hanford Nuclear Services, Inc.

James A. Matejcic, RG

28 Court Square, West Plains, Missouri 65775, (417) 257-2741

E-mail: jmatejcic@hnswp.com

CAREER OBJECTIVE:

Working in a team environment with a consulting industry leader as a Manager with environmental, geotechnical, and loss prevention experience employing diverse industry, engineering, consulting and regulatory experience while utilizing logical analytical methods and field experience in characterizing and assessing sites to ensure design requirements are met while promoting safety and production when committed to the team and bottom line in ensuring protection of the health, safety and welfare of the public and environment.

EXPERIENCE:

Present-2000 **Environmental Manager** \ Hanford Nuclear Services, Inc. – West Plains, MO

∧ Managing environmental services while seeking GSA contract opportunities for HNS and it's affiliated firms RMC Environmental and Analytical Laboratories and ACCI, LLC.

2000-1998 **Contract Services** \ Strom Engineering Corporation - Minnetonka, MN.
Tennessee

∧ Provided environmental services at Peterbilt Company of Nashville and Wheland Foundry of Chattanooga, TN for daily inspection, maintenance and repair of hazardous and non-hazardous waste material collection systems, at a PLC controlled paint spray clean-room environment; and at an iron foundry's air quality control baghouses which included dry/wet pumping and storage systems; material recycling and reclamation systems. Provided preventative maintenance recommendations to maximize operating efficiency and minimize waste. Also, provided supervisory environmental service and training of maintenance laborers in daily operations of Wheland's Broad Street No. 1 and No. 2 Plants while overseeing handling of air quality control waste material for Wheland's Middle Street Plant. Supervised various contract projects as Site Manager.

1998-1997 **Offshore Drilling \ Logistics Administrator.**

∧ GPM, Inc. - Lafayette, LA. Gulf of Mexico, Ports of Venice and Morgan City, LA. Provided offshore petroleum industry contract drilling and workover administrative services for CNG and the Shelf Division of Shell Offshore, Inc. utilizing prior oilfield, environmental, and safety experience with PERC, WDM & DIMS petroleum engineering and drilling information systems, MS Office, and IBS accounting systems under Windows 3.11, Win 95, and 97NT operating platforms with daily budgets up to \$150K.

1997 **Survey Crew** \ J. R. Grimes Consulting Engineers, Inc. - St. Louis, MO. Illinois and MO

∧ Part-time survey crew member at commercial and industrial development sites using Sokia Instrumentation.



Hanford Nuclear Services, Inc.

- 1997-1996 **Project Manager \ Environmental Engineer \ MO Registered Geologist #910.**
ATC Environmental Inc. - St. Louis, MO. Illinois, Kansas, Wisconsin, Minnesota and Missouri.
- ^ Provided ASTM - Phase I Environmental Site Assessments, Phase II-III Assessments, and Compliance Audits. Initiated teamwork. Provided assessment details for site developments within project scopes and budgets meeting objectives in resolving environmental concerns through cost-effective solutions.
- 1995-1994 & **Groundwater Enforcement \ Permits Unit MO DNR Central Ofc. \ Envr. Engineer.**
- *1993-1990 Hazardous Waste \ *Solid Waste Management Programs - Jefferson City, MO.
- ^ Utilized practical knowledge and common sense approach to bureaucracy in government providing regulatory compliance in review of design permits, modifications, and RCRA/CERCLA operating conditions. Recognized for Governor's Award for Quality and Productivity reinforcing the department's mission and reflecting a positive commitment to community services in streamlining SWMP's site characterization\landfill permit processes.
- 1994-1993 **Environmental Engineer \ Hydrogeologist \ Iowa DNR Underground Storage Tank Liaison \ Contract Project Manager.** GSI - IA DNR UST Contract - Des Moines, IA.
- ^ Re-engineered project management responsibilities to increase productivity, develop teamwork, and provide results under a TQM system enabling team members to contribute and grow in responsibilities within the consulting firm. Exceeded IDNR's projections and expectations while leading and training the team in practical review techniques of UST and Leaking UST site characterizations, assessments, monitoring, and treatment system evaluations.
- 1990 **Environmental Engineer \ Consultant \ Certified 40 Hour OSHA HazWOper.**
Law Environmental, Inc. - St. Louis, MO. Illinois, Tennessee, Arkansas and Missouri
- ^ Installed, logged, developed and sampled over 40 groundwater monitoring wells at LUST sites in MO and IL. Developed health and safety plans for 30 UST sites in MO & IL. Collected Phase II ESA stream & sump sediment samples of up to 50% PCBs in level D personal protective gear at a regional gas compressor station in TN. Sampled GWM wells quarterly for TCE at a manufacturing facility in AR. Introduced on-site use of hydrocarbon adsorbent materials for meteoric groundwater clean-up and waste disposal within municipal waste compliance discharge limits enabling cost-effective tank pulls during over-excavation of temporarily saturated contaminated soils.
- 1989-1985 **Property Conservation \ Loss Prevention Engineering Consultant.** Factory Mutual Engineering Assoc. - St. Louis, MO. Oklahoma, Tennessee, Arkansas, Kentucky, Kansas, Illinois and Missouri.
- ^ Conducted over 500 loss prevention inspections for fire, flood, surface water, earthquake, burglary & theft, and business interruption of Highly Protected Risk insurance policies at commercial and industrial properties insured to \$100M. Reviewed new construction plans and tested public/private water supplies, fire



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protection\alarm systems verifying installation adequacy and operating efficiency meeting FMEA's and NFPA's design criteria. Developed a new system of managing change during site visits for the 200 year old corporation committed to service, property conservation and managing human element programs.

1985-1984 **Office Manager \ Sales Engineer \ Manufacturer's Representative.** Brock, Easley, Inc. - Bismarck, ND. North Dakota and Montana.

^ Opened a new office to provide sales and service of 25 manufacturers' process, control, instrumentation, and material handling equipment for oil\gas, power generating, and mining industries netting \$100K profit.

1983-1981 **Petroleum Engineer.** - Double EE Service Inc. - Williston, ND. Williston Basin ND & MT

^ Expanded services by conducting detailed field analysis and generating reports for over 300 dynamometer tests of oil well pumping units evaluating work and operating efficiency under In-Situ conditions. Conducted gas\oil ratio tests, sampling, and over 600 fluid level determinations with an electrical acoustic well sounding instrument. Tripled the company's expanded field services, known for increasing oil production under gaseous fluid column conditions. Resulted in field service income exceeding \$300K enabling Double EE to reach \$1M gross business for the first time in their history.

1980-1976 **Undergraduate Summer Jobs** - St. Louis, MO. Missouri

^ Southern Cross Lumber & Millwork Carpenter's Union, Order Filler, Whse & Forklift

^ Houston Natural Gas Electrical Resistivity Crew

^ Chrysler Fenton Plant Assmly Line - Floater - Ramcharger Line

^ Lever Brothers Chemical Plant Warehouse & Forklift

EDUCATION, REGISTRATION, SEMINARS, SYMPOSIUMS, & ON-THE-JOB TRAINING:

HNS, Inc. 40 Hour Lead Inspector and Assessor Training

Peterbilt Company 24-Hour Hazardous Waste Operators Training

Wheland Foundry Hazardous Waste Operations Training

GPM PERC; WDM; DIMS; SQ Hazard; IBS; Windows 3.11; Win 97NT

GPM / ATC / EPA / GSI: 8-Hour Refresher - OSHA-Hazardous Waste Operations Training, Marine Safety and Offshore Environmental Protection; Helicopter Safety

Missouri Registration: Registered Geologist #910

GPM / ATC: MS Office 97 \ Word 6.0, Excel; WordPerfect for Windows 6.0, Win 95

MDNR HWP / EPA: RCRA Orientation (CERCLA, Superfund, CWA, CAA, DOT & OSHA)

DGLS Water Tracing Basics-Environmental Geology

GSI: Microsoft Word for Windows Version 2.0c for IA's LAN.

IA Environmental Professionals: Groundwater Remediation Technologies

MDNR: Multi-Media & Communication Training; Diversity Training

University of Wisconsin-Madison: Sanitary Landfill Design and Closure



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EPA: TQM Seminar - Permit Streamlining Process; GIS Intro \ Multimed GW Modeling; RCRA - Subtitle D Regulator Training; Design, Operation & Closure of Municipal Solid Waste Landfills; Design and Installation of Groundwater Monitoring Wells

MDNR SWMP: MDNR Orientation; Landfill Operator Training, Word Perfect 5.1, dBase IV, Managing Multiple Projects

RIEDEL: 40-Hour OSHA Hazardous Materials Handling and Response

FMEA Consulting Workshop; Loss Prevention Consulting, Fire & Extended Coverage 1 & 2

Delta X: Oil Well - Rod Pumping Systems Analysis School

ESSE: H₂S Safety School

University of Missouri-Rolla: Geological Engineering, Baccalaureate of Science.

Additional Software\Equipment: Win 98, Lotus SmartSuite 97; GRITS/STAT v4.2; AQTESOLV v1.00; Surfer\Grapher; rCad 14; MS Paint; iPhoto Plus; TurboCAD; Animator; 3D, Multimate; Wordpad; Notepad; Mustek Scanner; Canon Bubble Jet Color Printer; HP Laser Printer



Hanford Nuclear Services, Inc.

Scott M. Schneider, RG

28 Court Square West Plains, Missouri 65775, USA

Work Phone (417) 257-2741

Email: sschneider@hnswp.com

PROFESSIONAL WORK HISTORY

2000-Present, *Hanford Nuclear Services, Inc.*

Environmental Geologist

Perform geologic investigations at hazardous and toxic waste sites. Conduct Phase I/II site assessments. Prepare environmental impact statements in accordance with all applicable local, state, and federal regulations. Create proposals for contract environmental work. Involved in information management by maintaining the LAN server and troubleshooting computer hardware and software problems.

1997-2000, *The Doe Run Company*

Operations Mine Geologist

Perform geologic mine mapping, study mineral zonation, alteration types and structure. Utilize mapping to guide mining department in profitable extraction of ore. Conducted grade-control program that involves excellent communication skills to convey grade information to foreman. Monitor and calculate mine ore grades for royalty payments of leased properties. Calculate and maintain annual mine ore reserves in both database and map formats. Design underground diamond and percussion drilling prospecting program and directly supervise three personnel connected to these programs. Directed surface diamond drilling program to increase mine reserves. This was accomplished by studying surface and underground geologic structures, analyzing surface hole structure contour maps, as well as mineralization intensity contour maps. Develop monthly and annual mine plans by interacting with mine supervision and reviewing reserve information. Lay out developments for mining department for orebody access. Managed a special lead collection project while working at Brushy Creek mine that generated \$500K of extra income for the mine in a year's time. Have worked at four different mines (Buick, Brushy Creek, Fletcher, and Sweetwater) in the Viburnum Trend in Missouri.

1995-1997, *US Army Corps of Engineers*

Geologist

Reviewed, researched, and prepared work plans for geological investigations at hazardous and toxic waste sites. Field activities included supervising a 3-4 person drill crew, installing monitoring wells, logging soil borings, taking soil and water samples for site characterization, and using geophysical methods for site investigations. Created budgets for field activities and planned for delivery of materials to the work site. Attended planning meetings for project work currently being performed and gave geologic summaries of completed and upcoming work for each project. Conducted oversight and offered technical guidance for contracted environmental work at numerous Air Force Bases throughout the United States. Duties also included dam safety and flood plain protection programs. Monitored Corps of Engineer dams during high water events (Pipestem Dam in Jamestown, North Dakota and Oahe Dam in Pierre, South Dakota) and provided technical guidance to the Emergency Management Office.



Hanford Nuclear Services, Inc.

1994, *City of St. Louis, Missouri*

Summer Internship

Worked with the Refuse Division. Duties included working on landfill reduction programs and basic office duties.

MILITARY EXPERIENCE

1987-1991, *Army National Guard*

Military Police

Performed police duties concerning both military and civilian laws. The unit was activated for Desert Storm for support of regular army personnel.

EDUCATION

University of Missouri - Rolla

Major: Geology & Geophysics

Emphasis: Environmental Geochemistry and Groundwater Hydrology

Bachelor's Degree: December of 1994

PROFESSIONAL REGISTRATION

Registered Geologist, State of Missouri Registration Number 2001020174

COMPUTER SKILLS

Highly proficient in use of PC based computers. Utilize AutoCAD, Microstation, Stratifact, Lotus 123, Internet Applications, Microsoft Office (Word, Excel, and Powerpoint), Adobe, and Surfer (modeling software).

TRAINING

Hazardous Waste Site Worker and Emergency Response (40 hour HAZWOPER, as per 29 CFR 1910.120)

REFERENCES

Available upon request.



Hanford Nuclear Services, Inc.

BARRYLYN SUZANNE SOUNDARARAJAN

28 Court Square – West Plains, Missouri – 65775

Phone: (417) 257-2741

Fax: (417) 257-2841

E-mail: barrylyn@hnswp.com

CAREER OBJECTIVE: Seeking a challenging and fulfilling position, which will utilize my combined experience in retail sales and public relations in an organization where teamwork is the key to attaining mutual goals.

PROFESSIONAL SKILLS AND ABILITIES:

Retail Sales:

- Consistently have met and exceeded quotas set by the company.
- Over 8 years experience in retail sales, merchandising, and creating product displays. Responsibilities included training employees, inventory, ordering supplies and selecting product promotions.

Public Relations:

- Have successfully marketed new business for the company, established new business accounts, serviced current accounts and reestablished a working relationship with former clients.
- Completed PS-10s (on-site work environment observations) to assess the needs of the customers, monitored job-placements and performed on-site counseling and warnings with temporaries. Conducted interviews, orientations, safety training, certifications and reference checks for prospective employees; arranged interviews for clients upon request.

Personal and Self-Management:

- Energetic dedicated professional with record of building strong working relationships being sympathetic to the needs of others, while maintaining a positive & friendly attitude under fast-paced, highly stressful conditions.
- Possesses excellent written and verbal communication skills, and maintains a natural ability to motivate others to attain mutual goals.

EXPERIENCE:

5-25-00 to Present

Secretary/Assistant—Hanford Nuclear Services—West Plains, MO 65775

Phone: 417-257-2741

4-26-99 to 5-24-00

Wireless Business Consultant—U.S. Cellular—West Plains, MO 65775

Phone: 417-331-8300

9-98 to 4-99

Service Assistant—Manpower Temporary Staffing Services—West Plains, MO

Phone: 417-256-6775

4-96 to 9-98

Assistant—Hanford Nuclear Services—1905 Wayhaven Dr. West Plains, MO

Phone: 714-256-6103



Hanford Nuclear Services, Inc.

10-93 to 4-96

Assistant Bakery Manager—Consumers Markets—U.S. Hwy 160, West Plains, MO

EDUCATION

Attended and Graduated from South Central ATVS – Diploma of Modern Business Technology 1996-97

Attended Southwest MO State University, Springfield, MO 1984

Southeast MO State University, Cape Girardeau, MO - 1982 to 1983 With Studies in Business & Education

ACTIVITIES & AWARDS

Top Regional Salesperson of the Month for U.S. Cellular 9/99, Manpower's Tiffany Award for Outstanding Work 11/98. Vice President, Membership Chairperson and Box Tops for Education Coordinator for West Plains Elementary PTA, 1998 to 1999. Volunteer for March of Dimes (1996) & American Cancer Society (1995). Employee of the Month (11-95) for Consumers Markets.

References Available Upon Request



Hanford Nuclear Services, Inc.

ROBERT MOURNIGHAN

6146 N. Mercier St.
Kansas City, MO 64118
(816) 746-0501

ACCOMPLISHMENTS

- Responsible for EPA Office of Research and Development Technical Assistance to EPA Region 7 Superfund Program and RCRA Corrective Action
- Provided EPA-wide Regional Office research needs to the Office of Research and Development (ORD) as part of the development of ORD's program prioritization and budget submissions for the President's budget. Received EPA Bronze Medal Award for my contributions to the effort.
- Evaluated and reported on environmental and radiological hazards at seven former U.S. Air Force bases and three former Atlas E and Atlas F sites (42 sites)
- Recommended and help implement improvements in radiation safety for EPA Superfund workers
- Evaluated and reported on the radiation and metal hazards at the former Burlington (IA) AEC thermonuclear weapons production and maintenance plant for the Superfund program.
- Received EPA Silver Medal Award for providing the technical basis for regulation, permits and standards for hazardous waste thermal treatment facilities.
- Received EPA Bronze Medal Award for management of the EPA's Incineration Research Facility
- Received EPA Bronze Medal Award for development of technical basis for Best Demonstrated Available Technology (BDAT) standards for hazardous waste incinerators.
- Received EPA Bronze Medal Award for Superfund Innovative Technology Evaluation (SITE) program evaluation of Spray irrigation as a method of treating contaminated groundwater.
- Awarded two patents for the invention of catalysts for the solution of polymerization of butadiene.
- Participated in the start-up of Goodyear's 100,000,000 pound per year polybutadiene plant using one of my patented catalysts
- Can read German, with some Spanish, and technical Portuguese and Russian

EDUCATION

MScE, University of Akron, Akron, Ohio, 1973

- Majored in separation processes; distillation, extraction
- Minored in advanced mathematics and treatment of engineering data

BScE, Worcester Polytechnic Institute, Worcester, MA, 1964

EXPERIENCE

U.S. EPA Office of Science Policy, Kansas City, KS

Superfund Technical Liaison, October 1992-Present

Responsible for providing technical assistance for the EPA Region 7 Superfund program in areas of personal expertise and obtaining technical



Hanford Nuclear Services, Inc.

support from EPA offices, other federal government agencies and departments and universities.

U.S. EPA Office of Research and Development, Cincinnati, OH Research Program Manager, October 1976 – October 1992

Responsible for directing research programs on environmental impacts of energy conservation and production of alcohol fuels until August 1981. Responsible for directing research programs on incineration, burning of hazardous waste in industrial processes, and directing the operation of EPA's Incineration Research Facility until September 1988.

Worked on pesticide disposal projects for the U.S. State Department in Sudan and Pakistan and the Pan American Health Organization (PAHO) in Brazil until January 1992. SITE Program Manager until October 1992.

FMC Corporation and Avtex Fibers, Front Royal, VA

Technical Advisor, July 1974 – October 1976

Responsible for providing technical and engineering assistance to the polyester and rayon plants, Served as Polyester polymer plant supervisor for six months. Instituted an energy conservation program, saving the plants \$500,000/yr

Goodyear Tire & Rubber Co., Akron, OH

Research Chemical Engineer, June 1964 – July 1974

Responsible for research and development programs for synthetic rubber.



Hanford Nuclear Services, Inc.

John J. Barich, III

11007 SE 24th Place, Bellevue, WA 98004
Telephone: 425/451-1221 Fax: 425/646-4403
Email: jbarich@seanet.com

Summary

Civil/environmental engineer with 30 years of experience in environmental project management, water resource management, and pollution prevention and control. Has presented, advised, and managed projects in countries including Poland, Slovakia, Czech Republic, Netherlands, Italy, France, and the Arab Republic of Egypt. Contributes two to three publications each year to the environmental literature.

Emphasizes effective methods for managing natural resources, achieving compliance with regulations and norms, applying sound project management and business principles in solving or avoiding environmental problems (an example being environmental management systems), and matching promising innovative technologies to classes of problems.

Organizes and teaches a variety of environmental management courses and workshops.

Extensive experience in hazardous and solid waste, water resource/water quality, and air quality programs.

Managed both public sector and private sector organizations.

Employment History

1994 to date	Enatai Associates (concurrent with U.S. Environmental Protection Agency)
1977 to date	U.S. Environmental Protection Agency
1976	Earthdata, Inc.
1970 to 1975	U.S. Environmental Protection Agency
1969	U.S. Federal Water Pollution Control Administration
1968	U.S. Naval Radiological Defense Laboratory

Representative Work Experience

Solid and Hazardous Waste

As Technical Liaison, managed a variety of cooperative projects with the Slovak Environmental Agency. Organized a team of U.S. experts who provided on-site evaluations, recommendations, and methods transfer at the Zilina municipal landfill and Vajskova industrial hazardous waste landfill. Conducted technical workshops on waste site risk assessment/risk management techniques to district, regional, and national officials.

Transferred and help adapt for Slovak use state-of-the-art hazardous waste site management software tools. The Slovak Environmental Agency required an integrated means of conducting risk analyses, selecting remedial measures, and estimating reductions in risk once remedial measures are implemented. Groundwater, surface water, soil, and air resources all require management. Methodologies were field tested at several waste sites in the Jelsava-Lubenik district. Key questions included the applicability of the method to Slovak sites and the affordability of input data.

Served as a scientific coordinator and lecturer for the Central and Eastern European Regional Training Centre (CEE-RTC) for Implementation of the Basel Convention. Provided senior instructors on various topics including municipal waste management, incineration, hazardous waste management technologies, and waste transportation. All management techniques emphasized the 'green' priorities of waste avoidance, pollution prevention, and



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waste recycle/reuse. Rapporteur at the First Session of the CEE-RTC General Assembly. The 19-nation CEE-RTC group includes representatives from Estonia in the north to Albania in the south.

As Manager of the Uncontrolled Hazardous Waste Site Project, identified and completed the initial investigations of over 1500 hazardous waste sites in the Pacific Northwest. Recruited and trained a group of 17 waste professionals who completed the work. Established work protocols and information management systems. Protocols were based on a triage system whereby the most bothersome sites were inspected first at a rate that peaked at 30 per month. Lesser priority sites were evaluated using standard environmental record audits, photogrammetry, and telephone interviews.

Organized a major "Decision Support Tools" workshop that examined a number of policy and implementation issues related to the large body of software available to environmental managers. Attended by over 150 specialists. The workshop addressed fate, transport, and remediation software, and dealt with issues including acceptance of model results by the public and government, code transparency (public domain v proprietary), data requirements in relation to the value of the decision being examined, and the independent audit/qualification of tools to a particular use.

As Chief of Technical Support, assigned project managers to U.S. designated Superfund sites, secured operating resources, and directed work. Provided through a professional staff engineering analyses and support to the most difficult active hazardous waste management facilities in the Pacific Northwest.

Designed and implemented a series of hazardous waste treatability studies to demonstrate and confirm whether proposed technologies could achieve specified results on a waste- and site-specific basis. Developed test plans and protocols, procured financial, materiel and personnel resources, and managed projects to meet the needs of sponsors. Example technologies so evaluated include vitrification, solvent extraction, chemical and physical stabilization, soil washing, and fractionation.

Water Resources/Water Quality Management

Developed procedures and managed a program to assess the environmental impact of wastewater treatment and sewerage projects, including direct effects such as water quality degradation and loss of aquatic habitat, and indirect effects such as urban sprawl, loss of open space, and jeopardized air quality.

Completed technical analyses of salinity standards in the Colorado River System, including the effect of increased salinity on the ability of the U.S. to meet water resource treaty commitments to Mexico.

Directed water quality management studies from southwest Arizona to northern California (Las Vegas/ lower Colorado River, Lake Tahoe, Reno/Truckee and Carson Rivers.) The objective of each of these was to estimate the probability that water development proposals maintain or restore instream water quality. Effective public (stakeholder) involvement was emphasized.

Completed flow regulation studies that predicted downstream water quality conditions given alternative operating rules implemented at reservoirs operated for flood control, power generation, agricultural supply, and instream minimum flows. Tools used in these studies included academic models that were modified and adapted for use on local computers.

Managed oil and hazardous material spill response programs in California/Nevada/Arizona. Received spill reports and assigned field response teams to direct or oversee cleanup activities.

Co-authored the first U.S. regional nonpoint source water quality management strategy. This strategy specified the use of best management practices rather than unit discharge requirements as the preferable means of water resource protection.



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Developed models to simulate surface waves generated by underwater explosive events. Interpreted deep ocean diffusion data to confirm model predictions of the behavior of internal waves.

Air Quality

Managed a project to demonstrate whether electricity generated by state-of-the-art windmills in isolated Arctic villages could reliably replace diesel generation.

Managed for the U.S. Environmental Protection Agency the emergency air pollution response program in the South Coast Air Basin of California (Los Angeles area.) This entailed coordinating short term (same-day to two-day) meteorological forecasts of air quality conditions, and whenever forecast pollution levels exceeded action levels, actuated large-employer mitigation plans. The type of response depended both on the magnitude and duration of the predicted exceedance, and the amount of advance warning provided by the monitoring network/forecasts.

Organizational Management

As founder and Principal of Enatai Associates, an environmental consultancy, provides technology evaluations/investment recommendations, represents innovative technologies to a variety of customers, and collaborates with other firms to provide specialized project teams to meet client requirements.

As Manager of Environmental Services, Earthdata, organized and managed the environmental sciences division of a medium-sized (150 persons) consulting firm. Developed the initial business plan, including client mix, professional services, and financial goals. Assembled the personnel and engineering assets to implement the business plan.

As Chief of Program Planning and Evaluation, USEPA, directed the preparation of five-year strategic plans and annual operating budgets for an office of 300 persons and \$60 million in base operations. Integrated the technical and financial inputs from Office Directors responsible for overall water pollution/water supply, air pollution, solid and hazardous waste, and laboratory services programs.

Managed four projects that demonstrated how environmental firms (as represented by environmental industry associations) can assist with the introduction of innovative technologies, and verify the performance of important environmental technologies.

Education and Qualifications

M.S. Environmental Engineering, Stanford University (1968)

B.S. Civil Engineering, Stanford University, (1967)

Certificate in International Business, University of Washington (1998)

Certificate, EARA Approved ISO 14000 Advanced EMS Auditor (1997)

Certificate, EMS Auditor, ANSI-RAB Accredited Auditor Course (1997)

Certified Instructor, Environmental Impact Assessment, USEPA (1994)

Certified Contract Administrator, USEPA (1993)

Registered Professional Engineer, State of Washington (1984)

Certified Value Engineer, Society of American Value Engineers (1984)

Certified Project Officer, USEPA (1983)

Registered Professional Engineer, State of California (1976)

Recent Publications: Refer to "John J. Barich, III, Publications (1987-2000)"



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Kul B. Razdan

EDUCATION

M.B.A. University of Chicago
M.E. Structural Engineering, University of Roorkee, India
B.S. Civil Engineering, Banaras Hindu University, India

REGISTRATION

Project Management Institute
American Society of Civil Engineers
American Concrete Institute of Steel Construction
Structural Engineers Association of Illinois

EXPERIENCE

Mr. Razdan has more than 28 years experience in structural engineering, engineering management, project engineering and project management. This experience has been gained in licensing, nuclear and fossil power plants, industrial and commercial facilities. Mr. Razdan has more than 22 years supervisory experience.

Currently, Mr. Razdan is a principal of **TECHNOW** Engineering providing technical quality overview on all of the company's engineering projects. He reviews client requirements, conceptual solutions, interdisciplinary considerations, and constructability of the proposed solutions. Clients have included commonwealth Edison Company, Georgia Power Company, Metra, Illinois State Toll Highway Authority, Consumers Power Company, Electric Power Research Institute, and the Department of Energy.

Over a four-year period, Mr. Razdan and various consultants provided design input and overview of the Architecture/Engineering, resolving complex technical issues, for their Midland Nuclear Plant Site Remediation Project. He made numerous contributions in the fields of management, engineering and licensing. He interacted extensively with NRC/NRR and provided support during hearings.

As a consultant to the Georgia Power Company, he assisted Georgia Power in their prudence review of the Vogtle Power Plant. Mr. Razdan helped plan the prudence work in defense of past management decisions, control systems and actual project cost and schedule. He also assisted the Georgia Power Company in coordinating the implementation of this prudence response effort, which culminated in preparation of a five-volume report published in April 1987 and submitted to the Georgia Public Service Commission. Mr. Razdan also has supported Georgia Power in preparing responses to the prudence auditor's testimony.

He has directed the following pertinent projects at **TECHKNOW**:

- Seven papers for the Electric Power Research Institute (EPRI) on waste management issues, including research on ion-exchange resin regeneration,



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radioactive waste oil recycling methods, non-cfc decontamination systems and bibliography of radwaste solidification literature.

- Review and conceptual design of Liquid Radwaste System for James Y. Fitzpatrick plant.
- Laundry, Tool Storage & Dry Active Waste Processing and Storage Building Design.
- Support services, including off-gas system design, for the conceptual design of a Pressurized Water ALWR radwaste project in Taiwan.
- Support services (procurement, seismic analysis, and estimating) for the conceptual design of a Boiling Water ALWR radwaste project in Taiwan.
- Vogtle Plant Prudency Units 1 and 2 including review of radwaste facility technical alternates, cost estimates, regulatory considerations, etc.
- Quad Cities Chemistry Lab (Hot and Cold) design.
- Dresden Chemistry Lab facility (Hot and Cold).
- Design of a hazardous waste laboratory for an incinerator for Waste Management in Chicago.
- Engineering for Decommissioning of Yankee Rowe Nuclear Plant and Fort St. Vrain.
- Structural design of skids for separation of tritium from soil for clean-up site in Fernald, Ohio.
- Independent Structural Design Review of Process Condensate Treatment Facility for 242-A Evaporator/Purex Plant at Hanford.
- Design of Robots for remote handling at TMI and other nuclear plants.
- Emergency Preparedness for Commonwealth Edison.
- Development of chemical system for recovery of precious metals from electroplating sludge. This eliminates the need for disposal in landfills. This project includes negotiations for financing.
- Development of a chemical process for treatment of high-level nitrate/nitrite radioactive wastes at Hanford. This project is being considered for a CRADA with ANL by DOE. Mr. Razdan has conducted negotiations with a number of commercial organizations for possible financing.

Prior to his establishing *TECHKNOW*, Mr. Razdan worked for more than 10 years for a large Architectural Engineering firm in the Chicago area. He worked



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in structural design, planning and scheduling and structural project engineering departments.

In structural design, he worked in various positions up to and including Chief Structural Design Engineer. In this position, he managed the structural design of all power plant projects (including 8 nuclear), headed a department of 350 engineers and was responsible for development of structural design standards. He was also a member of the Nuclear Design Council and Structural Standards Review Committee.

As an Assistant Chief Structural Design Engineer, he managed the structural design of six new power plants, as well as all of the then existing nuclear plant modification projects. Earlier, as a Supervising Design Engineer, he supervised the structural design of the Clinton Nuclear Power Project. During his tenure, he supervised:

- Preparation of design standards, including one for foundations for massive power plant turbines, which are subjected to extremely tight displacement requirements.
- Preliminary design of an underground nuclear plant for Israel with aircraft impact requirements.
- Design of turbine foundation for Clinton Nuclear Plant including constructability requirements.
- Design of foundations for the BWR-Mark III reactor subjected to extremely tight tolerances for displacements.
- Prepared standards for foundation analysis and modeling using finite element techniques.

As Structural Project Engineer, Mr. Razdan was responsible for the coordination of civil and structural engineering work on various fossil projects, including preparation of specifications, bidders lists, and bid evaluations.

As a Senior and Structural design Engineer, he designed Fermi Nuclear Plant (Reactor Building and RHR Complex, Sacrificial shield doors) and Baily Nuclear Plant (Foundations).

Mr. Razdan was on a DOE committee to review the design, constructability, and quality of the Muon Barrel Torrid Supercollider in Texas.

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Steven R. Parikh

111 Mountain View Lane, Richland, Washington 99352
(509) 372-9180

ENGINEERING MANAGEMENT

Over 35 years' diversified experience and broad-based knowledge in engineering supervision and management of design and construction of mining, ore beneficiation and handling, smelting, leaching, solvent extraction, and electrowinning process facilities for major copper, iron ore, nickel, aluminum, and silver, Mining and Metallurgical Projects; Nuclear Power Plants; Steel Industry Facilities; Defense and Space Projects; and Environmental Restoration and Waste Management Projects. Supported by thorough familiarity with local/international, state and federal codes and standards regulating above activities.

Representative competencies include:

Technical

- Environmental Restoration & Waste Management
- Environmental and Safety Standards Enforcement
- Geotechnical Evaluation
- Site Selection and Development
- Foundation and Superstructure Design
- Contractual and Technical Documentation
- QA/QC Monitoring
- Engineering and Construction Verification
- Blast Resistant Concrete and Steel Structures Design
- Value Engineering Studies and Facilitations

Managerial

- Engineering Department Procedures and Training
- Manpower Planning
- Budgeting and Budget Management
- Management and Supervision of Engineering Staff
- Contract Negotiations and Administration
- Engineering Planning and Scheduling
- Interface with other Departments and Outside Agencies
- Interface with client
- Conflict Resolution
- Development and implementation of Value Management Program

EDUCATION

B.S., M.S., Civil/Structural Engineering, University of Michigan, Ann Arbor, MI
M.B.A., Business Administration and Management, Golden Gate University, San Francisco, CA
C.V.S., Certified Value Specialist (LIFE), SAVE International "The Value Society," North Brook, IL, USA

CONTINUING EDUCATION

- Clay Liners and Covers for Waste Disposal Facilities (EN92059, CEU-1.5) - University of Texas, Austin, TX
- Designing with Geosynthetics (CEU-1.4) - Geosynthetic Research Institute, Drexel



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University, Philadelphia, PA

PROFESSIONAL AFFILIATION

- Licensed General Contractor in State of California
- Registered Professional Civil Engineer - California
- Registered Professional Structural Engineer - Ohio
- Registered Professional Engineer - New York
- Registered Professional Engineer - State of Washington
- Registered Professional Engineer - Tennessee
- Fellow - American Society of Civil Engineers (FASCE)
- Member - American Concrete Institute (ACI)
- Member -SAVE International "The Value Society"

SPECIAL TRAINING

- 40-Hour OSHA Training per 29 CFR 1910.120
- 8-hour Annual Refresher Training
- Asbestos Removal Contractor Supervisor Training (TSCA Title II - 40 hour)
- Hazard Communication Training
- Hazardous Materials Module Training Program (1-12 Modules - 40 Hour)
- Value Engineering Work Shops (Module I - 40 Hour; Module II - 24 Hour)
- Contracts Work Shop (Sponsored by Bechtel Contracts Dept., S.F.)
- Construction Rigging Work Shop (Sponsored by Bechtel Construction Operation)

TECHNICAL PAPERS

- S. R. Parikh, et al.: "Capping Options for a Low-Level Radioactive Material Storage Pile," Proceedings of the Symposium on Waste Management at Tucson, Arizona, Feb. 28-March 4, 1993 (Pages 1579-1583).
- S. R. Parikh, et al.: "Designing, Testing, and Installing Polypropylene Geomembrane Capping System for Low-Level Radioactive Interim Storage Piles," Proceeding of the Symposium on Waste Management at Tucson, Arizona, Feb. 27-March 3, 1994.
- S. R. Parikh: "Pilot-Scale Soil Washing Treatability Test to Investigate the Removal of Radionuclides from Contaminated Soils in the 100-Area of the Hanford Site," presented in ER '95 Symposium on Environmental Restoration at Denver, CO, August 13-18, 1995.
- S. R. Parikh: "Innovative Technology for Recovering Marketable Radionuclides from Hanford Waste Forms," presented in Waste Management '98 Symposium at Tucson, Arizona, March 1 - March 5, 1998.
- S. R. Parikh: "Enhancing development of Non-Time-Critical Removal Actions under CERCLA through the application of Value Methodology," presented in SAVE International Annual Conference at San Antonio, Texas, June 25-30, 1999.

AWARDS

- Performance Plus - "Silver Award" - CARGOSCAN™ for TOSI Project, S.F.
- Performance Plus - "Bronze Award" - Stennis Component Test Facility, O.R.
- Thirty year Bechtel Service Award
- Bechtel Award for Technical Papers
- Bechtel Award for C.V.S. Certification



Hanford Nuclear Services, Inc.

NARAYAN (RAM) RAMANUJAM, P.E.

4890 Keane Drive, Carmichael, CA 95608

Phone: 916-483-1025

CIVIL/ENVIRONMENTAL ENGINEER

EDUCATION

University of Alberta, Canada: M.S. Civil Engineering, 1971

Indian Institute of Science, India: M.S. Civil Engineering, 1967

University of Madras, India: B.S. Civil Engineering, 1964

REGISTRATION

Professional Engineer: California (No: CO27455) and

Illinois (No: 33601)

PROFESSIONAL HISTORY

California EPA, Dept. of Toxic, Sacramento, 1989 to date

CH₂M Hill, Emeryville, California, 1987-1989

Woodward-Clyde Consultants, Chicago, 1985-1987

Consumers Power Company, Jackson, Michigan, 1980-1984

Sargent & Lundy Engineers, Chicago, 1973-1980

PROFESSIONAL EXPERIENCE

- Head of Superfund Group with **Woodward-Clyde Consultants** in Chicago
- Senior Project manager with **CH₂M Hill**, Emeryville, CA
- Supervisor, Geotechnical Department, **Sargent & Lundy Engineers**, Chicago
- Responsible for the foundation analysis and design of fossil and nuclear power plants in U.S. and abroad
- Managing Superfund Projects in the areas of Work Plan, RI, FS and remedial design projects
- Review of various Remedial Design Projects, Construction Drawings and Specifications
- RCRA compliance and monitoring
- Preparation of Regulations for Liners and Leak Detection Systems for Hazardous Waste Disposal Facilities
- Assessment of various technologies for remediation
- Seismic analysis and design of TSDFs
- Review of groundwater (Flow and Contaminant Transport) models
- Tank Foundation analysis and design
- Review of various projects in Hazardous Waste Management and Site Mitigation Branch.

PROFESSIONAL AFFILIATION:

Member, American Society of Civil engineers (ASCE)

PROFESSIONAL COMMITTEE:

Chairman (past), Remediation Engineering Committee, ASCE



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Perichiyappan Senthilnathan

Education: B. E. (Chemical Engineering) (Honours); M.Tech. (Chemical Reaction Engineering)
Ph.D.(Environmental Engineering)

Professional Experience: 20 years of working experience in chemical and environmental engineering fields

Pertinent Experience:

Extensive background in wastewater treatment and environmental related matters. Specific experience includes environmental auditing, waste characterization, obtaining environmental permits, process development, design and operation of wastewater treatment plants, troubleshooting and optimization. Knowledge of pure water and ultra pure water (Pharmaceutical Grade) production technologies. Extensive background in the practical application of chemical engineering and environmental engineering with experience in manufacturing/ production, consulting/design, research & development, teaching, troubleshooting, waste minimization, energy & water conservation, computer aided design, and mathematical modeling. Worked with Merck & Co. (a major pharmaceutical industry) in solving challenging environmental problems and providing technical support to ongoing environmental projects. Optimized wastewater treatment to minimize operating cost. This plant was selected as a Model Plant by the US Environmental Protection Agency. Assisted Bristol-Myers Squibb in various wastewater treatment projects. One of their wastewater treatment plant (at Puerto Rico) was selected as the best plant in the Island by Puerto Rico Sewer Authority. Worked with Zenon Environmental Inc. in providing technical support for wastewater treatment plant design, advanced water & waste treatment techniques, project costing and management, and design reviews. Provided expert advice to several industries around the world (USA, Puerto Rico, Mexico, France, Netherlands, India, Italy, England, Ireland, Saudi Arabia, Thailand, and Taiwan) in solving wastewater treatment problems. Assisted major industrial clients (pharmaceutical, food, chemical, petrochemical, electronics, automotive, refinery, and textile) around the world in solving water and wastewater treatment problems. The list of companies includes Bristol-Myers Squibb, Johnson & Johnson, Merck, Pfizer, Syntex, Roche, Allergan, Warner Lambert, Exxon, Uniroyal, Cargill, A.E.Staley, Tyson Foods, Coors, and IBM. Currently teaching (as an Adjunct Professor) environmental engineering related subjects at McMaster University and Mohawk College.

Employment History:

October 1995 to Present:

President, EnviroGem Inc., Canada

Provide consulting services to various industries for water & wastewater treatment. Current clients include Bristol-Myers Squibb, Johnson & Johnson, Pfizer, Merck, Uniroyal, Olin Chemicals, Exxon, Cargill, A.E. Staley, Coors, Tyson Foods, and City of Pittsburgh (USA). Recent projects include optimization of a hazardous groundwater treatment facility, design/review of several large scale wastewater treatment plants, troubleshooting and optimization of various wastewater treatment plants, startup, acceptance testing, and operator training.

Assisted industries in eighteen countries in solving complex wastewater treatment problems.



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May 1991 to October 1995:

Senior Technical Specialist, ZENON Environmental Inc., Canada

Responsible for the direction and supervision of wastewater and water treatment projects, technology evaluation, research & development, and business development. Projects included technology evaluation for municipal and hazardous waste leachate treatment, design of seven industrial wastewater treatment facilities (capacities ranging from 2000 to 12000 cubic meters per day), design review of a hazardous groundwater treatment facility, water recovery & reuse, troubleshooting and optimization of existing wastewater treatment plants, design of membrane based water & wastewater treatment plants, and evaluation of package treatment plants.

Worked on several international projects in the USA, Puerto Rico, France, England, Mexico, Netherlands, Italy, Thailand, and Taiwan. Critically reviewed several full scale wastewater treatment plant designs and identified areas for improvement and cost savings; avoided 7 million dollars worth of problems and minimized capital expenditure. Gained knowledge in advanced treatment methods, namely, microfiltration, ultrafiltration, reverse osmosis, and pervaporation. Worked with several pharmaceutical industries in projects involving wastewater treatment and pharmaceutical grade water production.

May 1989 - May 1991

Senior Environmental Engineer, Merck & Co. Inc., Elkton, Virginia, USA

Responsibilities included troubleshooting and optimization of pharmaceutical wastewater treatment plants, hazardous waste and sludge management, waste minimization, development of new technologies, conducting environmental audits, establishing an "Environmental Process Development Laboratory", assisting in obtaining and meeting regulatory requirements, and providing technical assistance to international branches.

Achieved \$500,000 savings in annual operating costs. Identified and evaluated new technologies for sludge disposal. Avoided 1.5 million dollars capital cost in sludge disposal. Increased the capacity of existing wastewater treatment plant by 30% with a minimal cost. Assisted in designing a cyanide destruction facility. Evaluated several wastewater treatment technologies. Developed procedures for characterizing waste streams and waste minimization.

1983 - 1989:

Graduate Research Assistant/Teaching Assistant, University of Toronto, Canada.

Specialized in biological wastewater treatment. Involved/participated in studies for solidification of hazardous waste, leachability of metals from slag, detoxification of cyanide waste, anaerobic treatment of landfill leachate, and biodegradability of polymers. Involved in selecting major analytical equipment (respirometers, TOC analyzers, ion analyzers, etc.) for environmental lab applications.

1979 - 1983:

Assistant Engineer, Engineers India Limited, New Delhi, India (An engineering consulting company in the field of petroleum refinery, petrochemicals, and fertilizers)

Responsibilities included process development through pilot studies, industrial wastewater treatment, computer aided chemical plant design, process simulation, and mathematical modeling of reactive distillation systems and multi-component distillation systems. Design



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projects included sour water strippers for refinery wastewater, urea hydrolyzer-stripper for urea plant wastewater, recovery of phenol from coke plant wastewater, recovery of chemicals from coal tar, purification of titanium chloride, and mathematical modeling of heavy water and urea plants.

1975 - 1979

Chemical Engineer, Tata Oil Mills Company Limited, Cochin, India (A company producing soaps, oils, fatty acids, glycerin, and cosmetics).

Responsibilities included production, troubleshooting, process services, product planning, water and energy conservation, process optimization, operator training, and labour management. Achievements include design, erection, and commissioning of glycerin extraction unit and glycerin bleaching unit; minimization of operating costs (~\$100,000 per year); product planning using linear programming; water and energy conservation by process and plant modification; and capacity and productivity enhancement.

Publications/Presentations: (Relevant Publications)

Published/presented 20 journal articles in wastewater treatment. Chaired several sessions related to wastewater treatment.

Jordan, E., and Senthilnathan, PR. (1996) "Advanced Wastewater Treatment with Integrated Membrane Biosystems: Case Studies", presented at AIChE Conference, New Orleans, Feb 1996.

Senthilnathan, PR. (1996) "Gas Phase Emissions: Treatment and Destruction -- Overview", presented at AIChE Conference, New Orleans, Feb 1996.

Senthilnathan, PR., - Chair Person - Novel Reactor Design for Processes & Waste Treatment, American Institute of Chemical Engineers' Conference, New Orleans, Feb 1996.

Senthilnathan, PR., - Chair Person - Gas Phase Emissions: Treatment & Destruction, American Institute of Chemical Engineers' Conference, New Orleans, Feb 1996.

Senthilnathan, PR., Mourato, D., and Rollins, R. M., (1995) Application of membrane bioreactor and reverse osmosis to treat highly saline pharmaceutical wastewater, presented at AIChE conference, Miami, November 1995.

Senthilnathan, PR., - Chair Person - Separation Processes for Total Water Management, American Institute of Chemical Engineers' Conference, Boston, August, 1995.

Mourato, D., Senthilnathan, PR., Grecu, G. M., and Rollins, R. M., (1995) Application of membrane biological reactor and reverse osmosis for pharmaceutical wastewater treatment, presented at AIChE conference, Boston, July 1995.

Reddy, M. P., Pagilla, K.R., Senthilnathan, PR., Johnson, H. W., and Golla, P. S., (1994) Estimation of biomass concentration and population dynamics in a CAPTOR activated sludge system, *Wat. Sci. Technol.*, Vol. 29(7), 149-152.

Senthilnathan, PR., and Sigler, R. G., (1993) Improved sludge dewatering by dual polymer conditioning, *Wat. Sci. Technol.*, Vol. 28(1), 53-57.

Golla, P. S., Senthilnathan, PR., and Johnson, H. W., (1992) Application of electro acoustics for dewatering pharmaceutical sludge, *Environ. Prog.*, Vol. 11(1), 74-79.

Senthilnathan, PR., - Chair Person - Industrial Sludge Management Session, American Institute of Chemical Engineers' Conference, Pittsburgh, August 18-21, 1991.



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SRINI VENKATESH

504 Crystal Creek West, Qugusta, GZ 30907
706-855-0972 (home), 706-855-5433 (office)

EDUCATION:

M.B.A. University of Pittsburgh, Pittsburgh, PA—1987
PH.D (Chem. Eng.), Clarkson University, Potsdam, NY—1980
M.S. (Chem. Eng.), Clarkson University, Potsdam, NY—1977
B. Tech (Chem. Eng.), University of Madras, Madras, India—1976

WORK EXPERIENCE:

- 06/95-Present** Consultant Smart Tech Enterprises, Augusta, GA
Provide Consulting services to chemical and nuclear processing industries.
- 06/95-Present** Program Manager, High Level Waste Engineering Section, Westinghouse Savannah River Co. Aiken, SC
Responsible for management of project engineering for the pretreatment of high-level radioactive waste, decontamination, design, development and operation of large mechanical transfer systems.
- 10/91-05/95** Manager, High Level Waste Operational Readiness, Westinghouse Savannah River Co.
Responsible for the integration of startup programs in Defense High Level Radioactive Waste facilities and operations. Assessment of Operational Programs for DOE & regulatory compliance.
- 04/89-10/91** Manager, Waste Management Systems, Westinghouse Savannah River Co. Aiken, SC.
Responsible for preliminary design and development of systems for Nuclear and hazardous waste management and environmental restoration.
- 10/86-04/89** Manager, Program Development, Westinghouse R&D, Pittsburgh, PA
Technical Marketing/Mgmt of Energy Programs such as Fuel Cells and Batteries. Product/Service Strategic Planning and Development of Environmental Systems with government and commercial customers.
- 09/84-10/86** Sr. Eng. Westinghouse Advanced Energy Systems, Pittsburgh, PA
Process Design and Development of Pollution-free energy systems, Supervision of laboratory for Materials Characterization, Customer Interface for technical areas.
- 11/81-09/84** Sr. Eng. Occidental Chemical Corporation, Niagara Falls, NY
Operations Support for Industrial and Specialty Chemical Operations, Process Development of energy efficient chlorine/caustic systems, and waste minimization.
- 08/80-11/81** Research Eng. Continental Can Energy Systems, Cupertino, CA
Design and Development of energy storage processes such as batteries & supercapacitors.
- 08/76-08/80** Research Assistant, Clarkson University, Potsdam, NY.
- HONORS:** Several Awards at Westinghouse, Deans List, MBA Program



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PROFESSIONAL SOCIETIES: Chairman, ASTM Mixed Waste Management Committee,
Member, American Society of Mechanical Engineers
Chairman, DOE/EPA Mixed Waste Characterization Workshop

PUBLICATIONS: Over 25 papers in various technical journals and magazines

Hanford Nuclear Services, Inc.

Nabil Morcos

Education: Ph.D.: Nuclear Chemistry/Radiochemistry, University of Arkansas, Fayetteville, AR, 1971. B.A.: Chemistry/Mathematics, Andrews University, Berrien Springs, MI, 1967.

Areas of Strength: Radiochemistry, including radioisotope production, decontamination and purification, cyclotron target design, cross section and excitation function measurement, radioisotope generator design and preparation, nuclear spectroscopy (alpha, beta, gamma), and radiation counting techniques. Safety Analysis technical Reviews (SAR reviews), Safety Analysis Reports (SAR, FSAR) development, and Safety Evaluation Reports (SER) writing. Technical consultant to the DOE Office of River Protection Hanford Facility and safety analysis expert. Performance-based training in accordance with NRC and INPO standards. Fluent (Speaking/Reading/writing) French Language (French educated through H.S.)

Radiopharmaceuticals: Clinical studies, Investigative New Drug Application and New Drug Application filings for radiopharmaceuticals in accordance with the U.S. Food and Drug Administration requirements. Working knowledge of "Good Manufacturing Practices" and radiopharmaceuticals quality control process. Research and development of radiopharmaceuticals from conception through manufacturing. Radioisotope generator design and manufacturing. (Three patents in Radiopharmaceuticals.)

Safety Analyses:

Safety Analysis Report development in accordance with U.S. Department of Energy (USDOE) Orders and Standards.

Safety Analysis Report evaluations in accordance with USDOE Orders and Standards. Reviewed and assessed most Safety Analysis Reports written for the US DOE Tank Waste Farms at Hanford, Washington (1994-1998).

Review of nuclear power plants Offsite Dose Calculation Manuals with respect to compliance with US Nuclear Regulatory Commission (USNRC) guidelines and requirements.

Assessment of dose exposure to the public
Low-level Radioactive Waste Management
Process parameter studies
Waste form characterization
Waste solidification and leachability studies
Team organization and management

Education: Research Professor, Environmental Engineering/Physics Departments, Vanderbilt, University, Nashville, TN. Adjunct Professor, University of Idaho. Courses taught on the graduate and undergraduate level: Nuclear and Radiochemistry, Environmental Chemistry, Unit Operations in Chemical Engineering. Development and Implementation of Performance-Based Training Based on INPO & NRC Standards.

Organizational Assessment and Training Needs Evaluation and Determination

Job/task analysis

Training materials development

Training implementation

Design and development of user friendly, menu-driven computer programs including relational database management systems (Clipper, Basic, and Visual Basic)



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Ronald F. Tucker, Jr. P.E.

EDUCATION	<u>Ph.D. Physics, University of Illinois, 1958</u> M.S. Physics, University of Illinois 1951 P.S. Physics, Union College, 1950
REGISTRATION	Registered Professional Engineer
PROFESSIONAL SOCIETIES	American Nuclear Society American Society of Mechanical Engineers (member Radwaste System Committee)
HONOR	Member, Society of Sigma XI
EXPERIENCE	<p>Dr. Tucker is currently directing TECHKNOW'S efforts in radwaste engineering and related areas. He has 30 years of industrial experience in engineering design, product development and technical management. The past 18 years have been spent working on low level radioactive waste management systems for nuclear power plants in Sargent & Lundy's Radwaste Division.</p> <p>Dr. Tucker worked in Sargent & Lundy's radwaste design division from the inception of the group in June 1973, until March 1990.</p> <p>Recently in his capacity as senior technical specialist and supervising radwaste engineer, Dr. Tucker participated in a detailed study and evaluation of radwaste systems, components, operations and operating procedures for the Palo Verde Nuclear Generating Station. Two previous studies had been made for Palo Verde under Dr. Tucker's direction.</p> <p>Regulatory matters were the subjects of studies directed by Dr. Tucker (for Martin Marietta Energy System, Inc. (operator of Oak Ridge National Lab) and the Illinois Department of Nuclear Safety as well as an S. L sponsored Informal Guide to Radwaste Regulation.</p> <p>Dr. Tucker has worked on many backfit design projects, including a waste gas modification for the Byron and Braidwood stations, steam generator blowdown modification at Zion, volume reduction system for Byron and Braidwood, off gas modification for Dresden Unit 1, various solid waste system and modifications including those at Clinton, Zion, Pilgrim, Byron and the Fermi-2 onsite storage facility.</p> <p>Earlier, Dr. Tucker was responsible for the original design of the liquid and solid waste systems for the Clinton station as well as design review for the gaseous radwaste system. He worked on the original radwaste design of the Byron, Braidwood, Marble Hill and Carroll County nuclear power plants.</p>



Hanford Nuclear Services, Inc.

Dr. Tucker directed and participated in a number of radwaste study projects. These projects range from a design review of radwaste systems to consulting with a research institute on waste drying techniques. He was the study manager for Sargent & Lundy's contract with Electric Power Research Institute (EPRI) for a study of advanced radwaste treatment. Recent studies have covered radiolytic gas generation in radwaste materials and cost/benefit studies to support the EPRI BRC program. Dr. Tucker participated in numerous other studies concerning the feasibility and cost effectiveness of volume reduction, solidification systems and the evaluation of off gas system for various nuclear power stations.

Dr. Tucker also worked as senior physicist and manager of the solid state research department of Corning Glass Works. Communications and electronics area were emphasized. Three years were spent at Signetics Corp., a Corning subsidiary company that produced semi conductor integrated circuits. Dr. Tucker worked on the development of process systems for transfer to production for new read-only memory devices.

While a graduate student at the University of Illinois, Mr. Tucker worked as a teaching assistant in Physics, and as a research assistant in cyclotron operation, a research associate in developing proficiency tests for USAF radio mechanics, a research associate designing radar circuits on a classified project, and a research assistant in a radio frequency spectroscopy group where he specialized in microwave paramagnetic resonance spectroscopy.

Hanford Nuclear Services, Inc.

Willis C. Mushrush, Jr.

1418 West Second Street, West Plains, MO 65775
(Home) 417-257-7156, (Work) 417-256-2391

Summary of Qualifications

Owned and operated a multi-unit retail business for 14 years. Managed 5 multi-million departments for major retailer, meeting requirements for buying, scheduling, staffing, budgeting, and sales for 3 years.

Chaired community planning commission for 5 years, worked in planning community growth for housing, transportation, retail establishments, and industry. Related activities including funding, labor studies, and market analysis.

Administered labor agreement, interviewed, staffed, planned and organized training programs, and performed positive industrial relations activities for a major defense contractor. Successful assisted in tow labor agreement negotiations.

Assists in providing education and training opportunities and counseling services for business and industry in seven counties in southern Missouri.

Education

B.S., Management, Southwest Missouri State University, 1972
MBA, University of Arkansas, 1973

Certifications

Senior Professional Human Resources, Society for Human Resource Management
Associate Contracting Assistance Specialist, Association of Government Marketing Assistance Specialists

Work Experience

1997 to Present University Outreach and Extension, West Plains, Missouri
Business and Industry Specialist

Provide educational training opportunities for existing business and industry in 7 southern Missouri counties. Counsel individuals, interested in starting a business, in all aspects of development. Assist in developing a business plan and obtaining sources of capital. Network with economic developers and government agencies to promote economic growth in Missouri. Assist with a statewide monthly industry newsletter. Serve as a liaison to the Missouri Small Business Development Center and the Missouri Procurement Assistance Center. Member of Missouri Enterprise Development Focus Team.



Hanford Nuclear Services, Inc.

1989 to 1997

Systems & Electronics, Inc., West Plains, Missouri

Industrial Relations Specialists/ Human Resource Representative

Administered policies and programs covering employment, labor relations, job evaluations, and employee training. Maintained applicant sources, conducted screening and preliminary indoctrination and training for newly hired employees. Prepared and conducted training programs for employees by conferring with management to identify work situations requiring preventative or remedial training. Assisted in company communication programs including the publication of the company newsletter. Advised Plant Manager on approaches to employee relations problems, grievance resolution, labor agreement administration, and employee evaluation. Supervised plant security, EEO, AAP, salary administration, and workmen's compensation programs. Assisted in contract negotiations.

1976 to 1991

J.W. Mushrush & Company, West Plains, Missouri

Co-Owner

Owned and operated three retail clothing stores. Responsibilities included buying, staffing, inventory control, marketing, financing, sales, and general management. Worked one on one with supervising 13 employees and dealing with personnel relations. Established positive community relations in the three towns in which stores were located and served on several civic organizations.

1990 to 1997

Drury College, Springfield, Missouri

Supply Instructor

Utilized group teamwork effort in establishing model business in the classroom environment. Classes taught included Economics, Personnel Management, Organizational Behavior, Marketing, Management, Business Law I & II, and Management & Leadership II.

1974 to 1976

J. C. Penney Company, Inc., Springfield, Missouri

Merchandise Manager

Managed five departments, both softlines and hardlines. Responsibilities included supervising 40 employees, staffing, budgeting, inventory control, cost control, promoting, maintaining productivity standards, buying, and sales within the guidelines of corporate policies and procedures. Established and implemented company drive for obtaining new credit applications.

1973 University of Arkansas, Fayetteville, Arkansas

Graduate Assistant

Assisted instructors in the Finance Department with grading and evaluating undergraduate students. Taught one course in Financial Management, and did research in the law library for an article published by Dr. Warren Banks on Estate Planning for the Harvard Law Review.



Hanford Nuclear Services, Inc.

Professional Schooling/Training

Human Resources

TQM Training

Sexual Harassment Seminar Communicative Supervisor-Union Workshop

Personnel Evaluation Selection Criteria Seminar

Supervisory and Personnel Management Courses

Senior Professional Human Resources Management Workshop-38 Hours

Computer

Introduction to DOS

Marketing on the Internet

FISCAL

Procurement

Introduction to Government Marketing, George Washington University Law School,
16 hours

Association of Government Marketing Assistance Specialists (AGMAS) conference,
32 hours

North Central Regional Council for Small Business Education and Advocacy, 16
hours

Introduction to EDI, 8 hours

1999 AGMAS Conference, 32 hours

Y2K, 4 hours

Management

Strategic Management Assessment and Review Tool (SMART)

Interactive Presentations, 16 hours

Retail Training, National Small Stores Institute, 32 hours

Developing an Existing Business Retention and Expansion Program

How to Start and Manage a Business

Sharpening Your Small Business Assistance Skills, 24 hours

Managing Conflict, 16 hours

Professional Organizations

Curriculum Development Committee-West Plains Schools

Advisor Board-Mountain Grove Vo-Tech, Past Chairman

West Plains Chamber of Commerce

Advisor Board-South Central Area Vo-Tech, Past Chairman

Job Security Employer's Council

Society for Human Resource Management

Association of Government Marketing Assistance Specialist

Missouri Enterprise Development Focus Team

References

Furnished upon request.



Hanford Nuclear Services, Inc.

SAMUEL C. SHORT

6235 County Rd. 9300, West Plains, MO 65775
Home Phone: 417-257-0810, Work Phone 417-257-2741

EDUCATION:

Graduate work: biomedical Technology
Bachelor of Science Degree-Southwest Missouri State University, Springfield, MO
Major: Environmental Chemical Technology
Minor: Information Systems Management

PROFESSIONAL WORK HISTORY:

1993-Present: *Senior Chemist*

1988-1993: *Chemist*

RMC Laboratories & Analytical Laboratories-West Plains, MO

Perform analysis of inorganics by Atomic Absorption (Graphite Furnace), Analysis of organics by Gas Chromatography with ECD, FID, NPD, Developmental applications for extraction procedures such as: SW-846 procedures including ANS 16.1, MCC-IP Static Leach Test Method , Multiple extraction procedure-Method 1320, Toxicity characteristics Leaching Procedure (TCLP), EP TOX-Method 1310, New composites for stabilization of radioactive wastes, Colorimetric analysis using Spectronic 21
Other analytical procedures including ISE analysis, Kjeldahl nitrogen, and Parr bomb calorimeter, Flashpoint (Tag Close-Cup). Perform site sampling & expert witness, evaluate new analytical procedures,

1985-1988: *Position-92B10 Medical Laboratory Technician*

U.S. Army – Fort Riley, KS, AIT – Sam Houston, Texas

Permanent Party – F Company 701st Support Battalion

Served as field Lab technician in a field medical corp. unit, analyzed specimens, took samples, stocked and maintained equipment, and performed repairs and upkeep of billet housing unit

1977: *Lab Assistant to Dr. Wymann Grindstaff / Chemical stock inventory person*

1978-80: *– Organic Lab Assistant to Dr. James Wilbur*

Southwest Missouri State University – Springfield, MO

Prepared all necessary solutions for classroom use as well as all, prior to actual chemical lab procedures, assisted students in completion of laboratory analysis and projects and wrote computer program for chemical stock inventory updating control file.

SKILLS:

Active research in chemical fixation, resource recovery and waste energy fuel sources. Experienced in polymeric matrices and radionuclide encapsulation and containment.



Hanford Nuclear Services, Inc.

THOMAS A. NORTON, SR. (TOM)

10518 CR 9690
WEST PLAINS, MISSOURI 65775
417-256-8283

SUMMARY OF QUALIFICATIONS:

33 years industrial management, the last 25 of which involve the manufacture of a full range of commercial/military vehicles.

Provided management direction for Manufacturing Engineering, Quality Assurance (MIL I 45208), Field Services, Health and Safety Programs, Environmental Compliance Efforts, Site Security, Plant Maintenance and General Facility arrangement and expansion.

Certified Welding Inspector, AWS. 1979 to 1997

RECENT MAJOR ACCOMPLISHMENTS:

Implemented Safety Program that reduced total accident rate below the Standard Industrial Classification for Truck and Trailer Manufacture. LWDI dropped from 18 to 1.2 in 8 years.

Direct labor group worked 1 year with no lost time accidents.

Added 200,000 square feet of completely equipped manufacturing space at or under budget (Project cost \$5.5M million, three major buildings).

Chaired the first 6 annual Company Family Picnics at or under budget.

Co-recipient of a Governor's Pollution Prevention Award in 1997

COMMUNITY INVOLVEMENT:

United Way Campaign Chairman, two years

Chamber of Commerce, Board of Directors

West Plains City Council

Steering Committee, Telecommunications, West Plains

First United Methodist Church, Pastor Parish Relations Committee, Finance Committee

Member and past Chairman of the Technical Advisory Committee for the South Central Vocational Technical School



Hanford Nuclear Services, Inc.

Member and Committee Chair technical advisory group for the new SMSU Technical Training Center

WORK EXPERIENCE (1974 TO PRESENT):

SOUTHWEST MOBILE SYSTEMS. West Plains Missouri

Facilities Manager: Responsible for Plant buildings and grounds, preventative maintenance programs for all plant equipment and utilities and proactive safety and environmental compliance programs. Act as the primary contact with OSHA and the MoDNR in all matters concerning the Plant and Project Manager for major facility rearrangements and expansions. Administer an annual budget of \$3.9 million.

Facilities Coordinator: To provide leadership for major rearrangement of production lines and facilities to increase efficiency, decrease moves and support point of use manufacturing.

Production Program Manager: A functional position to manage production programs at the manufacturing facility in West Plains. Duties include the coordination of all operation departments to attain schedule commitments and cost targets. Provide main contact with Product Engineering in St. Louis, the Program Manager and the customer.

Manager of Facilities and Special Projects: Managed Health, Safety, Environmental, Security and Maintenance organizations as well as a major facility expansion which added 200,000 square feet to the Plant's existing capacity. Provided resource-consulting services at the direction of the VP of Operations for plant welding, painting and cleaning processes.

Manufacturing Engineering Manager: Provided management direction for Manufacturing Engineering, Health and Safety Programs and Environmental compliance as well as Field Services for all systems under test in the field. Provided technical assistance and direction to the plant including tooling, process procedures, welding equipment and procedures and production control. Provided primary contact with customers and product engineering which was located in St. Louis.

Manufacturing Engineer Manager and Quality Assurance Manager: Directed Manufacturing Engineering at the West Plains Facility and Quality Assurance at all Company locations in accordance with MIL I 45208. Provided Field Services on all fielded vehicles and systems as well as serving as the customer contact in West Plains.

Plant Engineer: Provided Manufacturing Engineering services to the West Plains facility including tooling, process and welding procedures, new equipment design and acquisition and general facility enhancements.

WORK EXPERIENCE (1965 TO 1974):

Engineer: Supervisor for three different companies located in Las Vegas, Nevada, and Salt Lake City, Utah. Companies listed chronologically are: Titanium Metals Corp., N.L. Industries and Rowley Construction.



Hanford Nuclear Services, Inc.

PROFESSIONAL SCHOOLING/TRAINING:

- Introduction to Total Quality Management
- Equal Employment Opportunity/Sexual Harassment and Ethics Workshop
- ESCO Safety and Environmental Seminar including:
 - Clean Air Act OSHA
 - Clean Water Act SARA Title III/HAZCOM
 - RCRA
- "The Communicative Supervisor"
- Emerson Electric Co. Health, Safety and Environmental Seminar, including:
 - Toxic Substance Control Act Waste Minimization
 - Clean Air Act OSHA
 - Clean Water Act SARA Title III/HAZCOM
 - Safe Drinking Water Act RCRA
- Production Painting
- PERT and CPM Workshop
- Industrial Hydraulics Workshop
- Cleaning Processes for Paint Shop
- Occupational Hearing Conservation Certification
- DMT II Advanced Managerial Strategies Workshop
- Welding Methods and Time Study Workshop
- Industrial Painting Process Workshop
- Geometric Dimensioning and Tolerancing Workshop
- Cost Savings Through Quality Improvements Workshop
- Welding Inspection Certification
- Welding Metallurgy Workshop
- Resistance Welding Clinic
- Weld Design and Cost Savings Workshop



APPENDIX C

Letters of Recommendation

Hanford Nuclear Services, Inc.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

AUG 28 1992

Dr. R. Soundararajan
RMC Environmental and
Analytical Laboratories
214 W. Main Plaza
West Plains, MO 65775

Dear Dr. Soundararajan:

I am writing to extend my gratitude for your efforts in helping this Region develop consistent and pragmatic criteria for evaluating the effectiveness of stabilization/solidification. The support that you have provided in this endeavor is appreciated as has been your assistance in developing a stabilization binder for both the Cal West and PAB Oil Superfund sites.

Additionally, based upon the success of your past technical training seminar for the Regional technical Superfund staff, I am trying to organize another session. The past course was so well received that those unable to attend have been requesting another scheduled training. I'll let you know if the Region has the available funds.

Again, thanks for your assistance and I look forward to a continued productive working relationship.

Sincerely,

A handwritten signature in black ink, appearing to read "SAG", is written over a horizontal line.

Stephen A. Gilrein, P.E.
Chief, ALNM Remedial Section (6H-SA)
Superfund Programs Branch

RECEIVED AUG 31 1992

Hanford Nuclear Services, Inc.



Technion City, Haifa 32 000

Tel: 04-2921111 טל

קריית הטכניון, חיפה 32000

טלפקס: 46406 TECOM טלפקס

FAX: 972-4-221581 פקסימילית

Our Ref: L.V/misc/0488/eg/ra

June 16, 1991

Dr. R. Soundarajan
214 W. Main Plaza
West Plains, MO 65775
U.S.A.

Dear Dr. Soundarajan,

Many thanks for your letter of April 9 and the enclosed list of projects by RPM Labs.

The issues and works you have carried out for EPA and Europe are very impressive. The situation here in Israel is quite acute from the environmental angle, especially with regard to our water resources. We have a deficit of about 2 billion metric cubes of water in addition to the very rapid deterioration of the quality of water, and some of our water wells along the coast contain a high percentage of nitrates, etc.

The awareness on the toxicity of wastes and its irreversible damage to the environment and water source is growing rapidly and will probably induce the governments to allocate larger sums of money for environmental protection.

The only rivulet in this area is heavily polluted by industrial effluents from several industries which is a severe blow for a country like ours with very meager water resources. We are now negotiating with the E.P. authorities for offering a clean-up system.

Our department has done research work on a number of environmental issues such as, recycling of agricultural and animal wastes, detoxification, denitrification of water and handling toxic wastes using the method of solidification/stabilization. I am enclosing some write up on works in which some of my colleagues are engaged.

It occurs to me that there might be a possibility for a cooperation which is operable in both directions, i.e. for us to pass on inquiries and work in your direction from this country, Europe and elsewhere where we have working relations, while on the other hand, you may find some use of the items we developed here. I also believe that it may be of mutual benefit to make use of our proximity and connections in Europe if we can have any assignment there.

Sincerely yours,

Ephraim Glaser
Senior Researcher
Environmental and Water Resources Engineering

RECEIVED JUN 28 1991

encl:

Hanford Nuclear Services, Inc.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
CENTER FOR ENVIRONMENTAL RESEARCH INFORMATION
CINCINNATI, OHIO 45268

To whom it may concern:

Dr. R. Soundararajan has participated in several research projects for the United States Environmental Protection Agency. I have been the work assignment manager for several of these projects including the solidification/stabilization of hazardous waste as well as explosive waste remediation. The total costs of these work assignments was approximately \$500,000.

Sincerely,


Edwin F. Barth, P.E.

 Printed on Recycled Paper.

Hanford Nuclear Services, Inc.

August 2, 1996

Dr. R. Soundararajan
Hanford Nuclear Services
1905 Wayhaven Drive
West Plains, MO 65775

Dear Dr. Soundararajan:

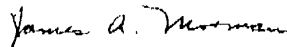
At your request I have reviewed the irradiation test and the subsequent data from the ANSI 16.1 leach tests that you performed.

After reviewing the material provided by Dr. Stan Pitman, it is clear that the ^{60}Co irradiation facility exposure tubes are properly calibrated and that corrections for the source decay since the dates of calibration (8-24-84 through 10-5-84) were applied to calculate the source strength during irradiation of your samples. Neglecting round-off error introduced when the exposure data was tabulated to only 1 significant figure, the samples were exposed to a total of 1.1×10^8 R (roentgen). The irradiation is nearly all from the primary ^{60}Co decay gamma rays with energies of 1173.2 keV and 1332.5 keV. With an energy absorption coefficient for the material in the samples, the conversion from roentgen to rad cannot be accurately made.

The calibration reports give an average calibration uncertainty for most of the exposure tubes of six percent near the peak flux position, and an uncertainty of 15% for tube 34A, where some of the samples were irradiated.

The ANSI 16.1 leach data for three samples is shown in the attached table and the accompanying graphs. In general, it is clear that only minor differences exist between the irradiated and non-irradiated samples, and that in some instances it appears that the irradiated samples have a better retention capability than the non-irradiated samples (see especially the graphs for Cu and Zn). While more measurements would probably reduce the scatter in the data, it seems justified to conclude from the present data that polymeric matrix of the samples has not undergone significant damage during the exposure to 1.1×10^8 R of gamma irradiation and that the ability of the matrix to retain contaminants has not been compromised at this level of exposure.

Sincerely,



James A. Morman, Ph. D.



Hanford Nuclear Services, Inc.



December 28, 1992

Dr. Sondararajan
RMC Environmental
214 West Maine
Westplains, MO 65725

Dear Mr Sondararajan:

I enjoyed talking with you about your ideas for treating the high level waste in the Hanford tanks. Your four step treatment sounds very innovative and would be a big step toward solving the Hanford waste problem. Our company is considered by Leo and the Department of Energy to be innovative and aggressive. We would enjoy working with you on this project.

I have asked Brian Roy to contact you after you have received the information on our company. I hope we can work with you on this exciting project.

Sincerely,

H. W. Arrowsmith

H. W. Arrowsmith
President

cc: Brian Roy
Rick Bahorich
RMC file

*Rec'd.
12-29-92*

P.O. Box 2530
1560 Bear Creek Rd.
Oak Ridge, Tennessee 37831-2530
(615) 481-0929

P.O. Box 2308
Carlsbad, New Mexico 88220
(505) 887-1673

1234 Columbia Dr. S.E.
Richland, Washington 99352
(509) 736-0626



Hanford Nuclear Services, Inc.

DYNAMAC
CORPORATION
Environmental Services

River Center
111 North Canal Street
Suite 941
Chicago, IL 60606

Telephone: 312-466-0222 ✓
Fax: 312-466-0266 ✓

October 19, 1994

VIA FACSIMILE
(417) 256-6103-
0771

Rengarajan Soundararajan, Ph.D.
President
Sudharsan International, Inc.
1905 Westhaven Drive
Westplains, MO 65775

Re: U.S. Environmental Protection Agency
Contract No. 68-W4-0005
Work Assignment No. C05001

Dear Dr. Soundararajan:

The U.S. Environmental Protection Agency (EPA), Region V, has requested your services as an expert witness consultant for the above-referenced work assignment and contract. The nature of the requested effort is in support of EPA's efforts with respect to the Midco I and Midco II Superfund Sites in Gary, Indiana. A more detailed summary of the scope of the requested expert consultant support is provided in the attached excerpts from Dynamac Corporation's (Dynamac) work plan and from the EPA scope of work.

To facilitate securing your services and providing the required contractual documents, please be prepared to respond to the following questions and issues:

- (1) Are you interested in, and willing to, provide the support requested?
- (2) Please clarify whether the contract will be between Dynamac and you, individually, or with your employer, RMC Environmental.
- (3) Please provide/describe your standard and preferred consulting rates and fees.
- (4) Please perform a personal and organizational conflict-of-interest (COI) screening and written certification of such, against the attached list of Potentially Responsible Parties (PRPs) associated with the Midco I and Midco II Sites. Documentation certifying your organizational COI screening and disclosure of any apparent COI must be provided to EPA prior to initiating technical support services.
- (5) Please certify, in writing, whether you have any affiliations with any solidification/stabilization vendor (equipment, chemical, or professional services).
- (6) Please provide a clean copy of your current resume.

Rec'd.
10-21-94



Hanford Nuclear Services, Inc.

Rengarajan Soundararajan, Ph.D.
October 19, 1994

Page 2

- (7) Please provide a cost estimate for your services based upon the attached scope of work. For planning purposes, assume 400 hours of professional effort, 8 round trips to Chicago, Illinois, and 1 round trip to Gary, Indiana. All costs, including any projected costs for copying, report preparation, travel, telephone, delivery (e.g., mail, overnight delivery), and other related expenditures that are not included in your professional rate must be clearly identified in your cost proposal.
- (8) To establish a subcontracting affiliation with Dynamac for purposes of serving as an expert witness to the U.S. EPA, you will be required to enter into a Technical Services Agreement (TSA) with Dynamac. I will provide a TSA for your signature under separate cover.

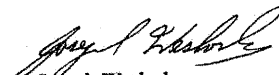
Please note that although EPA is the ultimate client for any work you will perform in support of this assignment, your contract will be with Dynamac. Dynamac will provide a technical services agreement that must be signed prior to authorizing any expenditures in support of this work assignment. Your invoices will be submitted to, approved, and paid by, Dynamac. Throughout the performance of this work assignment, you will be responsible for providing monthly status reports detailing the technical and financial progress of your effort. In addition, copies of all deliverables must be provided to Dynamac concurrent with submission to EPA. Services outside of the approved budget and scope of work that have not been approved by Dynamac, in writing, are at your own risk. No charges against this work assignment are authorized except as directed, in writing, by Dynamac. This letter and the subsequent Technical Services Agreement do not serve as authorization to begin work.

Also note that because you services will be in support of EPA's cost recovery effort at two separate Superfund Sites, all your expenditures must be tracked by Site. Prior to initiation of work, Dynamac will provide you with two distinct charge numbers so that your invoices will reflect charges associated with the appropriate site.

To meet EPA's deadline for the work assignment and cost estimate submittal, Dynamac requires your written response to the above-listed items no later than close-of-business Thursday, October 20, 1994. You may submit your response either via overnight delivery or via facsimile to my attention at Dynamac's Chicago, Illinois office. Please do not hesitate to telephone should you have any questions or concerns regarding this matter.

Sincerely,

DYNAMAC CORPORATION


Joseph Weslock
Manager, Chicago Operations

Enclosures

cc: David Biver, Dynamac Contracts Manager
Wanda Neal, Dynamac Contracts Specialist

Attachments: Scope of Work
Site-Specific PRP Lists



Hanford Nuclear Services, Inc.



U. S. Department of Justice

Washington, DC 20530

June 7, 1990

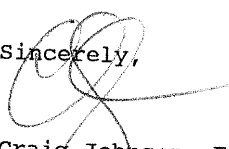
Dr. R. Soundararajan, Director (R & D)
RMC Environmental Laboratory
214 W. Main
West Plains, MO 65775

Dear Dr. Soundararajan,

Thank you for your conversation of earlier today. As a result of that communication, the United States would like to enlist your services as an expert witness in U.S. v. Gurley Refining Co., Inc. I have enclosed a copy of the Appendices to the United States Remedial Investigation for the Site, the Waste Analysis from the Design Analysis Report, and information regarding the Method for Stabilization of Sludge, Pat. 4615809 for your evaluation.

Thank you for your assistance. I will be in touch with you soon.

Sincerely,


Craig Johnson, Esq.
Environmental Enforcement Section
Environment and Natural
Resources Division
Room 1541
10th and Pennsylvania Ave., N.W.
Washington, D.C. 20530

Hanford Nuclear Services, Inc.



McGraw-Hill, Inc.
1221 Avenue of the Americas
New York, New York 10020
Telephone 212/512-2500
FAX 212/512-2007

Howard M. Mager
Vice President - Publisher

December 23, 1991

Mr. R. Soundararajan
RMC Environmental and
Analytical Laboratories
214 West Main Plaza
West Plains, MO 65775

Dear Mr. Soundararajan:

Congratulations on being selected by Engineering News-Record Magazine as one of "Those Who Made Marks" in the construction industry in 1991. You will be recognized on the editorial page of the January 6 issue of the magazine. One of the 35 individuals on the list, who has already been informed, has been selected as Construction's Man of the Year.

This letter is our personal invitation to attend a black tie dinner as our guest. It will be held at the Plaza Hotel in New York City on February 12. As one of the 1991 Marksmen, you will be seated on the dais together with the Man of the Year and be acknowledged for your significant construction industry achievement during this past year.

Please complete and return the enclosed RSVP card to receive your complimentary registration.

I look forward to seeing you at the dinner.

Sincerely,


Howard M. Mager

HMM/smb
encs.

Hanford Nuclear Services, Inc.



Genova: May - 31 - 91

Dear Prof. Soundararajan,

It was a pleasure to see you in Italy and I thank you for your visit to CSM in Rome. I regret for not meeting you here in Genova but probably you were too busy with Alessio.

You will remember that we discussed about the possibility of managing the radioactive wastes (low & medium activity) with an advanced technology; being in touch with some European Economic Community's people who are in charge of this matter, I anticipated to them that we would like to propose to EEC a research on this topic.

I asked if European Community could met part of the costs of such an interesting and strategic research and they suggested to submit a detailed proposal.

As far as I know, the radioactivity release is a matter of atomic aspect instead of molecular one and I would be greatfull if you could find a little time to send to me some more information on the fundamentals of your technology.

The above request is due to the fact that a research proposal to EEC should be comprehensive of many items like :

- Technical description of the research content
- Comparison with current technologies
- Economical and environmental benefits
- Transferibility of the research results to industrial scale
- Time scheduling
- Economical effort requested to EEC

If you could find a little time to assemble some information to give to me, I will take care of prepare a draft of the document. I will mail it to you and, in a couple of feedbacks, I'm sure that we will be able to submit to EEC General Direction XI (responsible for nuclear protection) an interesting research proposal.

Thank you in advance for your help,

yours faithfully

Ercole Gialdi

Hanford Nuclear Services, Inc.

Kennecott
Utah Copper
8002 West 10200 South
P.O. Box 525
Bingham Canyon, Utah 84006-0525
(801) 569-6000

6-78

Kennecott

July 3, 1990

HMC Environmental
214 West Main Plaza
West Plains, MO 65775

Gentlemen:

Re: Wastewater Treatment Plant Sludge Stabilization

It is our understanding that your firm has experience in stabilizing/solidifying wastes containing heavy metals. Currently, Kennecott is working to develop stabilization formulas for our impounded wastewater treatment plant calcium sulfate/calcium sulfite/metal hydroxide sludge. Our approach to solving this problem is to pursue parallel test work activities within and outside our company. We would like your company to submit a firm priced proposal to perform laboratory and field sludge stabilization test work, complying with the attached specification. The proposal should include the following: 1) a statement of qualification, 2) a scope of work, 3) a schedule of work per receipt of samples, 4) manpower and equipment requirements, and 5) cost for both laboratory and field portions of the work.

We are looking forward to receiving your proposal. If you have any questions regarding the test specification, please call me at (801) 569-6698. Your proposal should be delivered to P.O. Box 525 or 8362 W. 10200 South, Bingham Canyon, Utah 84006-0525 no later than July 17, 1990. An additional copy of your proposal should be sent to Mr. Jerry Reed, Contract Engineer, at the same address.

Very truly yours,

Laurie Poulson

Laurie Poulson

cc: T.A. Hisebaugh
M.H. Gibson
G.A. Reed

RECEIVED JUL 0 9 1990

Hanford Nuclear Services, Inc.

Wastewater Treatment Plant Sludge Stabilization Specifications

Phase I (Laboratory Work):

- o Kennecott will provide representative samples of sludge from three (3) impoundments.
- o Stabilization/solidification formulas will be developed for each sample. Stabilization criteria will be <75% of TCLP limits for arsenic, barium, cadmium, chromium, mercury, lead, selenium, and silver at 3 and 7 days. Results of testing will be reported to Kennecott in writing and will include a description of laboratory technique and a not to exceed unit price for actual stabilization.

Phase II (Field Test Work):

- o If the results of Phase I work are satisfactory to Kennecott, field test work to confirm laboratory results will take place at our site in Garfield, Utah. At that time, approximately 5 tons of sludge from each impoundment will be stabilized, allowed to cure, and sampled for TCLP, moisture, and compressive strength determination. Kennecott's laboratory will be responsible for performing Phase II analytical work. The results of the field tests will be reported to Kennecott in writing and will include a description of field stabilization methods, a firm unit price for stabilization (including guarantee and QA/QC) and a schedule for performing the work.

Hanford Nuclear Services, Inc.

COPY

Journal of Clean Technology and Environmental Sciences

AN INTERNATIONAL JOURNAL
Devoted to Pollution Prevention and Clean Technology
OFFICIAL ORGAN OF INTERNATIONAL ASSOCIATION FOR CLEAN TECHNOLOGY
EDITORS-IN-CHIEF: M.A. MEHLMAN & S.P. MALTEZOU

27 November 1990

R. Soundararajan
Director
RMC Environmental Laboratories
214 W. Main Plaza
West Plains, MO 65775

Dear Dr. Soundararajan:

The *Journal of Clean Technology and Environmental Sciences* debuts in January 1991 as the official organ of International Association for Clean Technology (IACT). On behalf of the editors of the journal I am writing to request that we publish your paper, "Evaluation of Chemical Bonding Between Organophilic Binders and Organic Hazardous Waste," in this first issue of the *Journal of Clean Technology and Environmental Sciences*. Your manuscript was received by IACT in Austria, and forwarded on to our editorial office.

Please let us know, in writing, as soon as possible if you would like your paper included in the journal. Please also send original copies or transparencies of the figures included in your paper. We hope to publish your work and we look forward to hearing from you soon.

Sincerely,

Martha Erskine
Managing Editor

cc: M.A. Mehlman

Princeton Scientific Publishing Co., Inc.
P.O. Box 2155
Princeton, New Jersey 08543
Telephone: 609-683-4750 / FAX: 609-683-0838



Hanford Nuclear Services, Inc.



1992 IEEE CEMENT INDUSTRY TECHNICAL CONFERENCE



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MAY 10-14, 1992

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Peggy Lubbock (214) 837-9997
Helen Koster (214) 355-4421

March 12, 1992

Hr. R. Soundararajan
R.M.C. Environmental
314 West Main Plaza
West Plains, MO. 65775

Dear Hr. Soundararajan,

Thank you for the time for our phone conversation yesterday, and congratulations for the recognition and commendation for your work by the 'Engineering News Record' of January 6, 1992.

In our discussions I said that I will have a registration package sent to you for this IEEE Conference May 10-14 in Dallas. Panel members are not required to register; the package is for your information.

Please give us the honor of having you on the panel discussion of "Kiln Dust, (Cement and Lime), problems and solutions", May 12 at about 3:00 p.m. The other panel members are:

Fat Nicholson with N-VIRO	419-535-6374
Gene Kulezza with Riverside Cement	713-683-3668

and possibly:

Trish Erickson with EPA	513-569-7884
-------------------------	--------------

The schedule with this letter lists the authors and their papers.

This 34th annual meeting has as its' major theme "Environmental Problems".

It is an international meeting and we expect over six hundred registrants and about one third that many will bring their spouses.

RECEIVED MAR 16 1992

Hanford Nuclear Services, Inc.

Page 2
Mr. R. Soundararajan
R.M.C. Environmental

We have invited representatives from all the lime companies to join with the cement industry for this conference.

The presentations and panel discussions can include 35mm slides, but both must be technical and non-commercial.

We are having a Texas welcome reception party on Monday night from 6:00 - 9:00 p.m. to which you are cordially invited.

There are about twenty - five equipment and service suppliers who will have hospitality suites open after the daily schedule, for meeting and talking.

You will be doing a great service to our industries by accepting this sincere call to be on our panel.

Very sincerely yours,



Patton Caldwell,
For the Environmental and Safety
Working Group Committee

PC/lk



Hanford Nuclear Services, Inc.

Environmental
Restoration
Contractor **ERC Team**
Interoffice Memorandum

Job No. 22192
Written Response Required? NO
Close CCN N/A
OU: N/A
TSD: N/A
ERA: N/A
Subject Code: 8700

TO: S. C. Foelber H4-85

DATE: March 7, 1995

FROM: S. R. Parikh
Design Engineering
H4-85 372-9180

SUBJECT: **PROPOSED NEW TECHNOLOGY FOR REMEDIATION TASKS AT HANFORD
BY GELtek, INC.**

Please find attached, the statement of capabilities for GELtek, Inc. Submitted by Dr. Soundararajans' associate. I have known about Dr. Soundararajan through Dr. Gomes Ganapathi, of our Oak Ridge office. He was nominated for the "Man of the Year" award by ENR in 1992, for his outstanding accomplishments in chemical engineering.

Last year, Dr. Soundararajan was called in by DOE to evaluate results of soil washing efforts in the 300 Area at Hanford by ART Inc. As I am involved in providing technical oversight to soil washing efforts at Hanford, I had talked to Dr. Harold Forsen on several occasions about bringing Dr. Soundararajan on board as a consultant. Due to funding limitations, however, this did not materialize.

Recently, Dr. Soundararajan and his group has come up with a unique process system (patented), using GEL technology to separate radionuclides from contaminated water and soils. It is believed that this technology will provide the opportunity for secondary recovery of radionuclides which may lead to offsetting some of the remediation costs. Several pharmaceutical companies have shown interest in processing recovered radionuclides for medical purposes.

As a result of the patent, companies like Vectra and Lockheed are eager to team up with GELtek to work on some of the difficult remediation tasks at Hanford. GELtek however, has shown interest in teaming up with Bechtel to further this technology in stopping the migration of radiological wastes from leaking tanks.

I personally believe that at Bechtel we have an excellent opportunity to tap into this new technology and to win a big contract for cleaning the Hanford Tank farms. I therefore recommend that we should seriously consider GELtek's proposal and invite them to give a short presentation of their capabilities and explain their proposed involvement.


S. R. Parikh

SRP:ola

Attachment: Statement of Capabilities for GELtek, Inc.

0307foel.srp/ola



Hanford Nuclear Services, Inc.

(8-89)
EFG (07-90)

United States Government

Department of Energy

memorandum

DATE: SEP 30 1999
REPLY TO
ATTN OF: (E. Rizkalla, EM-33)

SUBJECT: Hanford Nuclear Services (HNS) Inc.

TO: Waste Management Steering Committee

The Office of Waste Management continues to collaborate with the Office of Science and Technology (OST) in seeking and deploying technological innovative solutions for waste management end-users.

Over the past few years, HNS of West Plains, Missouri has been working with the Richland Operations Office to seek technologically innovative solutions for waste management challenges. Also, HNS has contacted the OST to explore the feasibility of supporting OST efforts.

Attached for your information is background information on HNS which may be useful in your efforts to seek innovative solutions for waste management challenges in your sites.

For further information about HNS please contact them directly at (417) 256-6103.



Mark W. Frei
Acting Deputy Assistant Secretary
for Waste Management
Environmental Management

Attachment

cc:
G. Boyd, EM-50
M. Gilbertson, EM-52
R. Soundararajan, HNS



Hanford Nuclear Services, Inc.



P.O. BOX 34201 STN 'D'
VANCOUVER, B.C. CANADA
V6J 4N1 604 284-5111
TELEPHONE (604) 684-8111
FAX (604) 683-2331

FAX 604 683-2331

June 2, 1992

Rengarajan Soundararajan
Director of Research and Development
RMC Environment and Analytical Laboratories
214 West Main Plaza
WEST PLANS, Missouri 65775
U.S.A. FAX NO. 417-256-1103

Dear Sir:

I enjoyed reading your "Environment Managers Risk Credibility" article in Remediation Forum. I flat out confess that I am one of those chemically ignorant executives that you have correctly reprimanded.

As you are undoubtedly aware low cost clean-up solutions are being explored mainly in "faith" primarily because the client and the remediator are hopeful, perhaps naively so, that there is a simple and therefore inexpensive solution to their problem.

We are primarily a National Paving Company and have been drawn into the environmental clean-up business for several reasons:

1. We have been doing an enormous amount of recycling (asphalt and concrete).
2. The misbelief that blacktop can take everybody's problems and safely encapsulate them, i.e., surplus waste problems such as glass, asbestos, rubber (tires), plastic and a host of other contaminants.
3. Our competency set is in bulk materials handling.
4. We are normally looking for new business opportunities.

Therefore it isn't too surprising that we are sought out as a solver of "contaminated materials" problems and that

Hanford Nuclear Services, Inc.

Page 2

we find ourselves working away on those environmental issues.

Your main point, however, that we are primarily people with an engineering and geophysical orientation at best and almost totally lacking in chemical understanding is profoundly correct.

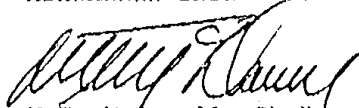
Despite these obvious limitations we have managed to stumble upon some encapsulating techniques that seem to work. These techniques use asphaltic materials to lock-up both metals (primarily lead as tested by TCLP) and some Petroleum Contaminated Soils (PCS).

Your frank honesty appeals to me and I am wondering if you would be willing to work with us in an advisory capacity to review our design work and ideas. Except for some metal contaminated soils we have avoided totally any toxic chemical cleanups. To-date we have limited ourselves to exploring remediation and encapsulation ideas in the "non-hazardous" domain.

The environmental cleanup business depends totally on high trust solutions in my opinion and your credibility issue is central to both regaining the public's trust in industry and designing dependable alternatives.

Again, I appreciate the candour of your article and I look forward to discussing the topic with you further. Please contact me if you are interested.

Yours very truly
ASHWARREN INTERNATIONAL INC.



M.T. McDowell, Ph.D.
President

MTM/aj

Hanford Nuclear Services, Inc.

Bechtel

Interoffice Memorandum

To	Distribution	File No.	
Subject	Presentation by Dr. Soundararajan	Date	June 15, 1994
		From	Jim Goskowitz <i>JG</i>
		Of	Engineering & Technology
Copies to		At	Oak Ridge ext. 2247

There will be a presentation by Dr. R. Soundararajan on Monday, June 20, 11:45 - 12:30, in conference room 413B. Dr. R. Soundararajan is the President of Sudharsan International, Inc. (SII). His work in the areas of chemical fixation, soil washing, radioactive waste management etc., has been recognized internationally. He has published about 75 papers in these areas and has been developing evaluation protocols for U.S. EPA for various technologies under the SITE Program. He is also a consultant for the U.S. Department of Justice and the U.S. Department of Energy at the Hanford Operations.

COPY



JUN 17 '94 10:27AM BNI FUSRAP DOC CTRL

P.3

Hanford Nuclear Services, Inc.



CITY OF ANAHEIM, CALIFORNIA
Public Utilities Department

Dr. Soundararjan
RMC Environmental Laboratory
214 West Main Plaza
West Plains, Missouri 65675

May 3, 1991

Dear Dr. Soundararjan,

I would like to request the paper that you have written concerning the remediation of PCB contaminated soils using quicklime as part of the process. I was referred to you by Bob Bowden at EPA, he stated that you would be able to provide the best information on this process.

My phone number is (714) 533-5769 if you should require further information in order to forward the paper. Thank you for your time.

Sincerely,

Janis Lehman
Janis Lehman
Environmental Services Specialist

RECEIVED MAY 09 1991

(714) 999-5100
P. O. Box 3222, Anaheim, California 92803



Hanford Nuclear Services, Inc.

19 February 1992

Henning Hill Associates
7535 45th Avenue NE
Seattle, WA 98115

Dr. Rengarajan Soundararajan
Director, RMC Environmental and Analytical Laboratories, Inc.
214 West Main Plaza
West Plains, MO 65775

Dear Dr. Soundararajan:

Thank you very much for your telephone call and the materials which you sent in the mail. I have spent some time today reviewing your literature and I am most impressed.

You and RMC appear to have several elements which I feel could give you a competitive edge for success in the German market:

- cost effective products
- proven success demonstrating the efficacy of your process
- an impeccable academic background followed by continued scholarship
- products for which there may well be a market in Germany.

In the latter category, your work with mercury, arsenic, pesticides, mine tailings and explosives all address categories of problems being analyzed in the former East Germany. For example, the Germans "inherited" a large stock of unusable munitions and storage facilities from the former East German military and security forces and are even now trying to assess the scope of what the ex-Soviet Army will leave behind in the next years. As you have surely read, the eastern chemical industry in the Bitterfeld area has acquired its own special negative reputation, collectivized agriculture was not careful about either fertilizers or pesticides, and Sachsen-Anhalt is trying to deal with the remainders from mining activity.

Our company, Henning Hill Associates, specializes in the export of North American environmental expertise to meet European environmental needs. Our European experience and established network of contacts in the Treuhandaanstalt, the German military, and in private industry enables us to find applications for specialized products and processes.

I am interested in further discussions with you and I will contact you to see how we might proceed. If your travel schedule permits, you might also want to meet my colleague in Brussels, Mr. Adolf Spangenberg, who is the HHA Director for Europe. He could be very helpful in explaining certain aspects of the Belgian culture prior to your meeting with Solvay.

Sincerely,



Hartmut H. Lau
Managing Director

RECEIVED FEB 24 1992

RECEIVED FEB 24 1992



Hanford Nuclear Services, Inc.

02/07/00 15:28 FAX 504 757 1974

Innovative Rehab

02

Rubicon, INC.

11697 RUE VILLANTRAY
BATON ROUGE, LA. 70810
(225)757-1113
FAX (225)763-6978

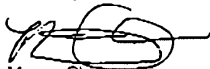
February 7, 2000

To Whom It May Concern:

Rubicon, Inc., a high tech company, recently evaluated the polymer/depleted uranium based shielded container technology, developed by Dr. R. Soundararajan, President, Hanford Nuclear Services, Inc., for its technical merits and market share. After extensive discussions with experienced nuclear scientists and experts in this industry, Rubicon has concluded that (1) the technology is scientifically sound, (2) it has no matching competition in the field, (3) it will enjoy monopoly status for a long time in the nuclear waste management business. Our projections indicate that the new business will generate between \$450-\$500 million a year.

Rubicon estimates a face value of \$25 million for the licensing of the technology and 6.25% royalty on the sales of the containers for the rest of the lifetime of the patent.

Sincerely,



Moses Choi
Chief Operating Officer

cc: File

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Hanford Nuclear Services, Inc.



060519

Job No. 22192
Written Response Required: NO
Due Date: N/A
Actionee: N/A
Closes CCN: N/A
OU: N/A
TSD: N/A
ERA: N/A
Subject Code: 6800

JUL 3 1 1998

Hanford Nuclear Services, Inc.
Dr. R. Soundararajan
1905 Wayhaven Drive
West Plains, Missouri 65775

Subject: **RECOVERY OF MARKETABLE RADIONUCLIDES FROM HANFORD WASTE FORMS**

Dear Dr. Soundararajan:

We understand that a recent bench-scale test organized by Steve Parikh of Bechtel Hanford, Inc. and performed by Hanford Nuclear Services, Inc. in Richland, Washington for recovering clinically useful radioisotopes (^{90}Sr and ^{137}Cs) from 105-N Basin waste water using membrane technology proved to be highly successful. The results of the tests showed that the membrane captured 99.4% of ^{137}Cs , 99.1% of alpha and 99.8% of beta activities.

Knowing that Hanford wastes consist of substantial quantities of medically useful, and marketable radioisotopes, recovery of such isotopes would help a number of patients suffering from cancer and other diseases. It is recognized that this also has the potential to create a new industry, and thereby aid in the economic development of this area.

Hence, we would like to have a meeting with you and your associates from Global American Advanced Technologies, Inc. (GAATI) to discuss any future prospects for your process for recovering clinically useful radioisotopes. We propose that the meeting be held in Richland, WA at 3350 George Washington Way in room 2C22 on August 6, 1998 at 1:00 p.m.

If you have any questions, please call Steve Parikh at 509-372-9180.

Sincerely,

A handwritten signature in black ink that reads "S. C. Foelber" with a stylized flourish at the end.

S. C. Foelber, Manager,
Engineering and Technology

SRP:jmh

COPY

::ODMA\PCDOCS\IERCDOCS\87151M

BECHTEL HANFORD, INC.

3350 George Washington Way
Richland, WA 99352

tel (509) 375-4640
fax (509) 375-4644



Hanford Nuclear Services, Inc.

Dr. Soundararajan
Page 2

060519

JUL 31 1998

bcc:

J. W. Darby, H0-18
S. C. Foelber H0-18
S. D. Liedle, H0-14
R. F. Potter, H0-14
S. R. Parikh, H0-18
Document and Info Services H0-09

CONCURRENCES

DATE	<i>SRP</i>	7/30/98
INITIALS	SRP	



Hanford Nuclear Services, Inc.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

AUG 28 1992

Letter of Reference

To Whom It May Concern:

Dr. R. Soundararajan is a widely respected chemist who has provided in the past and continues to provide valuable technical assistance in the complex area of waste stabilization and solidification. I was first acquainted with Dr. Soundararajan over two years ago when, under contract to the Environmental Protection Agency's Office of Research and Development, he provided expert testimony on behalf of the government. His credentials and experience were so impressive that this office has since retained him for technical staff training and site-specific technical consultation and treatability studies. He has assisted in the development of stabilization binders for the Cal West Superfund site in New Mexico (metals) and the PAB Oil site in Louisiana (metals/organics).

Dr. Soundararajan's input has also weighed heavily in the Region's recent efforts to develop consistent guidelines for evaluating the effectiveness of various stabilization procedures and he will continue to be consulted in our efforts to better understand this technology. I hope that this information is useful when reviewing his technical credentials. If there are additional questions or if clarification is required, I can be reached at (214) 655-6710.

Sincerely,

A handwritten signature in black ink, appearing to read "SAG".

Stephen A. Gilrein, P.E.
Chief, ALNM Remedial Section (6H-SA)
Superfund Programs Branch

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APPENDIX D

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