COMPILATION OF COSTS FOR LOW-LEVEL WASTE DISPOSAL FACILITIES

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Abstract

Our goal was to provide a complete accounting of costs incurred to date and projected through disposal facility life cycle pursuant to the Low-Level Radioactive Waste Policy Act of 1980 (LLRWPA) and the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA). To help achieve this goal, a study was conducted to determine (1) how much the United States has spent and will spend on the development of new low-level radioactive (LLW) disposal capacity; (2) how much other countries, specifically Finland, France, Spain, and Sweden have spent to develop and operate their LLW disposal facilities; and (3) any significant trends in the volume and curie content of the LLW going to U.S. disposal sites from 1980 to the present. The results are published in an Office of Policy Planning (OPP) document.[1] In this paper, the OPP cost study is discussed along with policy implications resulting from the cost study.

Introduction and Discussion

In a February 2, 1993, meeting at the U.S. Nuclear Regulatory Commission (NRC), with representatives of the NRC's Offices of Nuclear Materials Safety and Safeguards (NMSS), State Programs (OSP), and Policy Planning (OPP), then-Commissioner James Curtiss requested a staff effort to provide information on the incurred and projected costs associated with the development of LLW disposal facilities as a result of the LLRWPA, and LLRWPAA. To the extent possible, we were asked to search for cost information which was publicly available. Specifically, the Commissioner requested that OPP determine, within about six weeks, (1) how much the United States has spent and will spend on the development of LLW disposal capacity; (2) how much other countries, specifically Finland, France, Spain, and Sweden have spent to develop their LLW disposal facilities; and (3) if there are any trends in the volume and curie content of LLW going to U.S. disposal sites from 1980 to the present. Knowledge of these

OSP and OPP sent LLW disposal cost information surveys to all of the host and potential host Agreement States (including California, Colorado, Illinois, Massachusetts, Nebraska, Nevada, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Texas, and Washington), to key non-Agreement host States (Connecticut, Maine, Michigan, New Jersey, and Vermont), and four Compacts (Central, Midwest, Northeast, and Southeast). Although the survey request was limited to asking the Agreement States for the information germane to its functions, it also included information on the Compacts that the Agreement State could complete if it so desired. In this way, information was also solicited for the Appalachian, Central Midwest, Northwest, Rocky Mountain, and Southwestern Compacts. Although it would have been ideal to survey all of the States and Compacts, OPP had been directed to keep the solicitation under the U.S. Office of Management and Budget clearance requirements, and the above approach accommodated that directive. In actuality, this designated group of States and Compacts included all of the key players in LLW disposal development and allowed us to potentially capture most of the desired costs.

The survey consisted of a number of major elements -- State administrative and programmatic activities relating to regulation and developmental activities; facility development (siting plans, site selection, facility design choice, site characterization, land, license preparation, facility construction-operation-decommissioning, monitoring and remediation after closure, life cycle, access fees, and insurance); compact activities (administrative, identification of host States, local involvement and public information); related litigation; and storage for generators until disposal is available.

DOE was contacted for information on the State and Compact costs, and for the costs of its programs relating to State's and Compact's development of LLW disposal facilities. DOE indicated that it did not compile State and Compact costs. The Electric Power Research Institute (EPRI) and Edison Electric Institute (EEI/U Waste), both representing generators, and Government Accounting Office and Congressional Office of Technology Assessment, both involved in reviewing the costs associated with the development of LLW disposal facilities were also contacted as supplemental sources of cost information. The NRC library scanned the DOE database for related cost information, and OSP and NMSS searched their files for documents, articles or other sources of LLW disposal cost information. This information was used to supplement or substantiate the data provided by the States and Compacts.

All of the States except Illinois, South Carolina, and Washington responded to our request. The contacted Compacts responded with the exception of the Central and Midwest Compacts.

Tables 1, 2, and 3 show data developed from the LLW disposal cost information collected by OSP and OPP on the States and the

comparison.) Other unit costs, strongly influenced by disposal volume, are illustrated in Table 4 and range from a low of $\$71/ft^3$ to a high of $\$258/ft^3$.

Another part of the total costs resulting from LLRWPA and LLRWPAA is the money that has been spent by NRC and DOE to support the States/Compacts efforts. In order to determine the NRC's costs for this support, the Division of Low-Level Waste Management and Decommissioning (LLWMD) within NMSS and OSP each prepared resource analyses calculating office Full Time Equivalents (FTEs), travel, and program support costs back to the early 1980's. These figures were converted to yearly dollar expenditures to determine the NRC incurred costs of about $11 million. (See Table 5.)

For the DOE's costs, information was requested from the DOE National LLW Program. DOE reported that it had spent $4 million a year since 1986, for a total incurred cost through 1993 of $32 million. Table 5 estimates the total cost of Federal support to date - DOE plus NRC - at $43 million. It should be noted that DOE expended funds in support of the compacting efforts prior to 1986. We have been told informally that these costs total about $18 million which would raise the DOE total to $50 million and the Federal total to $61 million.

Table 6 shows the estimated total for the U.S. expenditures in response to LLRWPA and LLRWPAA (States costs, Compacts costs, NRC, and DOE costs) to be greater than $363 million.

Foreign Costs for Low-Level Radioactive Waste Disposal.

To gain an international perspective regarding the cost and schedules for developing LLW disposal capacity, OIP requested certain information from Finland, France, Spain, and Sweden. These countries have demonstrated programs for the disposal of LLW which have been developed over the same period of time as the U.S. effort to meet the LLRWPAA, that is, since about 1985. Information was requested from the organizations having regulatory and developmental responsibilities for each of these countries. From the regulatory agency, we requested costs for developing regulations, criteria, and procedures for regulatory review and approval; costs for public information, education, and incentives; and costs for regulatory review of proposed sites. From the organization responsible for development and/or operation of the disposal facility, we requested costs for public information, education, and incentives; costs for site identification, evaluation, and selection; and costs, or projected costs, for development and use of the facility in the following categories: land, site preparation, construction, operation, closure, and post-closure monitoring and remediation.

some routine maintenance operations at reactors. He indicated that when reactors clean out their spent fuel pools, control rod blades are disposed of, contributing low volumes but very high activity levels. In addition, when reactors have an outage, frequently they clean their primary loops which would produce significant increases in activity levels and volumes. We have not further researched the reasons for variations in volume and curie content.

Policy Implications

As a consequence of the cost study, we learned that the subject of the expenditures that the States/Compacts are making to develop LLW disposal capacity is a very sensitive one for them. One of the reasons is that early projected costs have escalated significantly, putting pressures on those planning and developing disposal facilities from both the public and governmental authorities. For example, our data indicate increases by a factor of four in Nebraska, six in California, and two and one-half in North Carolina. Some of the increase would be expected as designs mature going from the conceptual stage to final design and as increased engineering attention is focussed in response to public concerns about safety. However, these increases in costs have triggered the interest of some politicians and auditors who have performed audits.

Another reason for this sensitivity is that some representatives of States and Compacts believe that compilations of such costs can be misused by those persons who oppose the implementation of the LLRWPAA which gave the States the responsibility to provide for disposal of LLW.

We believe that the States and Compacts can benefit by having a central body compiling State and Compact cost information and by studying the information, searching for ways to contain costs within the framework of the LLRWPAA. If mutual lessons can be learned by the sharing of experience and cost data among States and Compacts, there may be opportunities to save resources.

Two State/Compact organizations that gather periodically together to address common problems and discuss varying views on issues are the Low-Level Radioactive Waste Forum and the Host State Technical Coordinating Committee. These appear to be the natural groups to sponsor cost studies. In that way, the States and Compacts themselves would be in complete control and potentially report the most accurate information and address cost containment directly. Cost containment is not a central concern of NRC whose mission is primarily the protection of the public health and safety and the environment and in this case the implementation of the LLRWPAA. However, since NRC is committed to the Compact process, cost containment is important since rising costs could thwart progress in achieving disposal capacity. DOE could also

Table 1

Major Cost Categories for LLW Disposal Facilites for Host States as Reported by States Unless Otherwise Footnoted (millions of dollars, 2 digit accuracy)

Host State/ Compact (Compact percentage of National LLW-1993)	Total Costs to Date	Total Regulatory Costs (A)	Total Development Costs (B)	Total Construction Costs (C)	Total Cost to Operation (D)= (A)+(B)+(C)	Lifecycle Costs
North Carolina/ Southeast (21)	38 (to 3/29/93)	4.5	83	65	150	NP
Illinois/ Central Midwest (17)	NR; 85[a] (1987-3/93)	NR	NR; >$9.1[a]	NR	NR	NR
Texas (9)	22 (to 3/10/93)	0.66	26	20 (1990$)	47	260 (1990$)
California /South-western (8)	41[b]	3.4 (FY86-92)	14	8.5-11	26-29	390 (1991$)
Pennsyl-vania/ Appala-chian (6)	>4.4 (1993$) (5/85-6/92)	10 (1993$)	29 (1993$)	27 (1993$)	66 (1993$)	920 (1993$)
Nebraska/ Central (5)	NR; 47[c]	15	NR; 72[c]	NR; 50[f]	NR; 140[h]	NR
Ohio/ Midwest (5)	0.07 (10/1/92 to 3/31/93)	NP	NP	NP	NP	NP
New York (4)	35 (to 12/31/92)	NP; >15[k]	NP; >34[l]	NP	NP	NP
Massachu-setts (3)	0.23 (1993$)	NP	35 (1992$)	8.6 (1992$)	NP;>43[j] (1992$)	390 (1992$)
Connecti-cut/ Northeast (3)	9.6 (FY88-93)	NP	NP;>25[k] (FY88-95)	NP	NP	NP
New Jersey/ Northeast (2)	2.1 (FY90-92)	NP	75	18	93	NP
Vermont (<1)	3.8	0.35	38	3.3	42	110 (1992$)
Maine (<1)	9.3	NP	7.7	NP	NP	NP
TOTALS	>300	>49	>450	>180	>610	>2,100

NR: No Response
NP: Not Provided by State
[a]Letter from Governor of Illinois to Members of Illinois House of Representatives, 3/3/93
[b]For Martinsville Siting Commission, Tom Ortciger, Director, Illinois Department of Nuclear Safety, ACNW Meeting, 3/23/93
[c]About $24 million is developer funds that may not be recovered through fees.
[d]Nebraska Governor Nelson, February 18, 1993, including $6.3 million by US Ecology, Ron Gaynor, US Ecology, memo from Kitty Dragonette to Janet Lambert, 3/4/93
[e]122-50=72
[f]Richard Paton, Vice President, US Ecology, ACNW Meeting, 3/23/93
[g] million project cost from letter from Secretary of Health and Environment, Kansas, hair, Central States Compact, 12/14/92, + regulatory cost (A)
[h] partments of Health and Environmental Control expenditures to 12/31/92 plus propriations to 3/31/94
[i]YS Siting Commission and ERDA expenditures to date plus appropriations to 3/31/94
[j](B) + (C). (A) not provided
[k]Development costs assumed to be all costs to date

Table 3

Compact Cost Categories as Reported by Compacts or States Unless Otherwise Footnoted
(millions of dollars, 2 digit accuracy)

Compact (Percentage National LLW-1992)	Total Costs to Date	Administration	Local Costs	Public	Other
Southeast (21)	2.8[a] (6/30/83-6/30/92) Includes all costs except funding elements. 23[a] (6/30/83-6/30/92) Includes all costs.	2.8[a] (6/30/83-6/30/92) Includes all costs except funding elements. 0.17 Host State Identification[a] 0.14 Congressional Consent[a]	NP	0.06 Legislative Conference[a]	1 (to 6/30/92) Grant to North Carolina LLW Authority[a,d] 13 Capacity Assurance Fee (to 6/30/90)[a,d] 6.2 Access Fee (to 6/30/92)[a,d]
Central-Midwest (16)	NR; >0.74[b]	NR	NR; 0.34 grant to Martinsville during prelicensing[b]	NR; 0.4 to proponents and opponents of Martinsville[b]	NR
Northwest (14)	0.6 (FY88-92)	0.6 (FY88-92)	NP	NP	NP
Southwest (8)	0.07 (FY93-94)	0.07 (FY93-94)	NP	NP	NP
Appalachian (6)	0.86[a] (FY90-93)	0.86[a] (FY90-93)	NP	NP	NP
Central (5)	NR	NR	NR	NR	NR
Midwest (5)	3.8[a] (FY87-93)	1.2[a] (FY87-93)	NP	0.28 (FY92)	0.38 (FY89-93) studies and reports 1.2 (FY88) special studies and site development 0.28 (FY87) siting study 0.28 (FY89-92) legal 8 (FY89) host State transfer[d]
Northeast (5)	1.42 (FY87-12/31/92)	1.27 (FY87-12/31/92)	0	0.15 (FY87-12/31/92)	0
Rocky Mountain (2)	NR; 0.63[a] (FY89-90,91-93)	NR; 0.58[a] (FY89-90,91-93)	NR	NR	NR; 0.002 NW contract[a] 0.018 NY v. USA Supreme Court case[a] 0.31 US Ecology case[a]
TOTALS	>10	>6.8	>0.34	>0.89	>2.2[a]

NR: No Response from Compact nor State
NP: Not Provided by Compact nor State
[a]Annual Report of Compact
[b]LLW Forum Meeting Report, April 1992, p. 7
[c]without funding elements
[d]funding element

Table 6

Estimated Total U.S. Expenditures Through 1993 in Response to the 1980 LLRWPA and the 1985 LLRWPAA (costs to date in millions of dollars)

	States		Federal
Host States	$300	NRC	$ 11
Other States	$ 10	DOE	$ 32
Compacts	$ 10		
States Subtotal	$320	Federal Subtotal	$ 43
Federal Subtotal	$ 43		
Total to Date	$363		

Table 7

Cost Summaries for Foreign LLW Disposal Facilities costs in millions of dollars (except as noted)

Cost Category	Finland	France	Spain	Sweden
Regulatory	0.6	40	1.1	0.27
Developmental	2.7	37	21	14
Construction	18	190	45	137
Operation	9/yr	35/yr	4/yr	2.7/yr
Closure/ Monitoring	4.5	165	8	14
Type of facility	Underground, >70m in bedrock	Engineered vaults	Engineered vaults	Rock cavern, 50m below seabed
Schedule: Start to operation	1987 to 1992	1984 to 1992		
Yearly volume	200m³	2-3x10³m³		

Table 9

Low-Level Radioactive Waste Received at Commerical Disposal Sites 1980 - 1992[1]

Year	National Totals			Percentage by Source											
	Volume (in 10^6 ft^3	Activity (in 10^3 ci)	Specific Activity (uci/cc)	Academic		Government		Industrial		Medical		Non-Utility Total		Utility Total	
				(Vol)	(Act)	(Vol)	(Act)	(Vol)	(Act)	(Vol)	(Act)	(Vol)	(Act)	(Vol)	(Act)
1980	3.77	333	3.1	*	*	*	*	*	*	*	*	48	73	52	27
1981	3.1	280	3.2	*	*	*	*	*	*	*	*	46	66	54	34
1982	2.68	414	5.5	*	*	*	*	*	*	*	*	21	36	79	64
1983	2.71	505	6.6	3.0	*	2.0	*	28	*	3	*	36	4	64	96
1984	2.66	601	8.0	2.0	*	2.0	*	32	*	2	*	38	27	62	73
1985	2.68	749	9.9	1.7	0.1	3.3	1.0	37	21	1	<0.1	43	22	57	78
1986	1.8	234	4.6	1.6	<0.1	4.5	2.1	35	25	1	<0.1	43	27	57	73
1987	1.84	270	5.2	2.6	<0.1	7.2	2.7	36	16	2	<0.1	48	19	52	82
1988	1.43	260	6.4	3.1	0.7	6.1	3.6	33	13	2	<0.1	43	18	57	82
1989	1.62	867	18.8	4.1	0.2	7.0	1.4	35	15	2	<0.1	48	16	52	84
1990	1.14	548	16.9	4.3	0.2	6.3	1.9	31	19	2	<0.1	44	21	56	79
1991	1.37	800	20.6	3.5	0.1	7.6	2.4	40	9	2	<0.1	53	12	47	89
1992	1.74	1,000	20.2	2.5	0.2	9.1	4.1	52	10	2	<0.1	65	14	35	86

* Data not available

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[1] "State-by-State Assessment of Low-Level Radioactive Waste Received at Commercial Disposal Sites (1980-1991)," U.S. Department of Energy, National Low-Level Waste Management Program.

BARNWELL LOW-LEVEL RADIOACTIVE
WASTE MANAGEMENT FACILITY
RATE SCHEDULE

All radwaste material shall be packaged in accordance with Department of Transportation and Nuclear Regulatory Commission Regulations in Title 49 and Title 10 of the Code of Federal Regulations, Chem-Nuclear's Nuclear Regulatory Commission and South Carolina Radioactive Material Licenses, Chem-Nuclear's Barnwell Site Disposal Criteria, and amendments thereto.

1. BASE DISPOSAL CHARGES: (Not including Surcharges, Barnwell County Business License Tax, and Cask Handling Fee)

A.	Standard Waste	$42.73/ft^3
B.	Biological Waste	$44.58/ft^3
C.	Special Nuclear Material (SNM)	$42.73/ft^3

Note 1: Minimum charge per shipment, excluding Surcharges and specific other charges is $1,000.

Note 2: Base Disposal Charge includes:

Extended Care Fund	$ 2.80/ft^3
South Carolina Low-LEvel Radioactive Waste Disposal Tax	$ 6.00/ft^3
Southeast Regional Compact Fee	$ .89/ft^3

2. SURCHARGES:

A. Weight Surcharges (Crane Loads Only)

Weight of Container	Surcharge Per Container
0 - 1,000 lbs.	No Surcharge
1,001 - 5,000 lbs.	$ 585.00
5,001 - 10,000 lbs.	$1,040.00
10,001 - 20,000 lbs.	$1,465.00
20,001 - 30,000 lbs.	$1,885.00
30,001 - 40,000 lbs.	$2,770.00
40,001 - 50,000 lbs.	$3,640.00
greater than 50,000 lbs.	By Special Request

Effective July 1, 1992

E.	Cask Handling Fee	$1,560.00 per cask, minimum
F.	Special Nuclear Material Surcharge	$7.10 per gram
G.	Barnwell Surcharge	2.4%

3. MISCELLANEOUS:

A. Transport vehicles with additional shielding features may be subject to an additional handling fee which will be provided upon request.

B. Decontamination services (if required): $130.00 per man-hour plus supplies at current Chem-Nuclear rate.

C. Customers may be charged for all special services as described in the Barnwell Site Disposal Criteria.

D. Terms of payment are NET 30 DAYS upon presentation of invoices. A service charge per month of 1-1/2% shall be levied on accounts not paid within thirty (30) days.

E. Company purchase orders or a written letter of authorization in form and substance acceptable to CNSI shall be received before receipt of radioactive waste material at the Barnwell Disposal Site and shall refer to CNSI's Radioactive Material Licenses, the Barnwell Site Disposal Criteria, and subsequent changes thereto.

F. All shipments shall receive a CNSI allocation number and conform to the Prior Notification Plan. Additional information may be obtained at (803) 259-3577 or (803) 259-3578.

G. This Rate Schedule is subject to change and does not constitute an offer of contract which is capable of being accepted by any party.

H. A charge of $11,000.00 is applicable to all shipments which require special site set-up for waste disposal.

I. Class B/C waste received with chelating agents, which requires separation in the trench, may be subject to a surcharge if Stable Class A waste is not available for use in achieving the required separation from other wastes.

US Ecology Inc
9200 Shelbyville Road Suite 300
P.O. Box 7246
Louisville, Kentucky 40257-0246
502/426-7160

USEcology

an American Ecology company

Earl -
FYI

January 23, 1992

Dear Customer:

Enclosed is a revised schedule of charges for the Richland, Washington and Beatty, Nevada low-level radioactive waste disposal facilities. The effective date is March 1, 1992.

This schedule of charges, which applies to both facilities, represents the first modification in our pricing schedule since August 1, 1990. We are pleased to have been able to maintain prices at these levels for this 19 month period.

The volume of low-level radioactive waste disposed of at the Richland and Beatty facilities during 1991 was slightly higher than 1990. This higher volume was due to anticipation of a 200% increase in Host State Surcharges for generators located in states which have failed to meet the milestone specified in the Low-Level Radioactive Waste Policy act as amended. For states out of compliance with the milestone, we project that the volume of LLRW for 1992 will decrease substantially from 1991 since those generators now face a combined disposal plus surcharge rate in excess of $150.00 per cubic foot for all categories of waste. The projected decrease in volume delivered to US Ecology coupled with ever increasing operating costs necessitates an increase in the schedule of charges.

In the event that an agreement for services has been executed between your firm and US Ecology, the revised schedule of charges will be implemented according to the terms and conditions of that agreement. This letter represents the notification of a change where required.

US Ecology continues to strive to maintain excellent service at a fair price. Should you desire to discuss your special needs for our services, please contact our Business Development Group in Louisville, Kentucky at 1-800-999-7160 or 502-426-7160; or Jim Testa in our Coal City, Illinois office at 815-634-2022. Future correspondence, including revisions to purchase orders, may be sent to US Ecology using our new automated telecopy at 502-426-5010.

Thank you for the opportunity to be of service,

Sincerely,

Arvil Crase

Arvil Crase
Customer Service Manager

encl.

Road, Suite 300
Louisville, Kentucky 40257-0248
502/426-7160

US ECOLOGY
WASHINGTON & NEVADA NUCLEAR CENTERS
SCHEDULE OF CHARGES
RADIOACTIVE WASTE DISPOSAL

US Ecology

an American Ecology company

EFFECTIVE: March 1, 1992

1. DISPOSAL CHARGES

A. Packages (Except as noted in Section B)

R/HR AT CONTAINER SURFACE	PRICE PER CU. FT.
0.00 - 0.20	$36.00
0.201 - 1.00	37.80
1.01 - 2.00	39.20
2.01 - 5.00	40.70
5.01 - 10.00	44.70
10.01 - 20.00	53.30
20.01 - 40.00	61.60
Over 40.00	By Request

B. Disposal Liners Removed From Shield (Greater Than 12.0 Cu.Ft. Each)

R/HR AT CONTAINER SURFACE	SURCHARGE PER LINER	PRICE PER CU. FT.
0.00 - 0.20	No Charge	$36.00
0.201 - 1.00	$ 240.00	36.00
1.01 - 2.00	540.00	36.00
2.01 - 5.00	910.00	36.00
5.01 - 10.00	1,450.00	36.00
10.01 - 20.00	1,900.00	36.00
20.01 - 40.00	2,180.00	36.00
Over 40.00	By Request	By Request

2. SURCHARGE FOR HEAVY OBJECTS:

Less than 5,000 Pounds	No Charge
5,000 - 10,000 "	$500.00
10,001 - 15,000 "	1,000.00
15,001 - 20,000 "	2,500.00
20,001 - 25,000 "	5,000.00
Over 25,000 "	By Request

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3. SURCHARGE FOR CURIES (Per Load)

Less than 50 curies	No Charge
50 - 100 "	$1,000.00
101 - 300 "	2,000.00
301 - 500 "	2,500.00
501 - 1,000 "	3,000.00
1,001 - 5,000 "	3,500.00
5,001 - 10,000 "	5,100.00
10,001 - 15,000 "	7,200.00
Over 15,000 "	By Request

4. SURCHARGE FOR SPECIAL NUCLEAR MATERIAL (SNM) (Greater Than 5 Grams Per Shipment) Per Gram: $10.00

5. MINIMUM CHARGE PER SHIPMENT $1,000.00

6. CASK HANDLING FEE (Minimum per Cask): $1,000.00

7. WASTE CONTAINING CHELATING AGENTS IN AMOUNTS GREATER THAN 0.1% BY WEIGHT AFTER TREATMENT: By Request

8. SOLIDIFIED OILY WASTES REQUIRING SEGREGATION: By Request

9. RADIUM SOURCES (NEVADA ONLY)
   50 mCi per package or less: $500.00
   More than 50 mCi per package: By Request

10. DISPOSAL OF POLY HIC IN ENGINEERED BARRIER: By Request

11. SURCHARGE FOR NON-ROUTINE PERSONNEL EXPOSURE (DUE TO DESIGN OR PHYSICAL DEFECT OF CONTAINER OR SHIELD) Per Person-mrem: $100.00

12. DECONTAMINATION SERVICES (If Required)
    Per Hour: $150.00
    Supplies: Cost plus 25%

13. PROCESS LICENSE VARIANCE REQUESTS: $200.00

14. DRUM VOLUMES: 55-Gallon - 7.50 Cu.Ft.
    30-Gallon - 4.01 Cu.Ft.
    5-Gallon - 0.67 Cu.Ft.

15. All waste material shall be properly classified, described, packaged, marked, labeled, and certified in accordance with all applicable Federal, State and Local laws, rules and regulations and shall be in compliance with all license requirements and amendments thereto applicable at the disposal facility.

6. This Schedule of Charges does not constitute an offer of contract which is capable of being accepted by any party and is subject to change solely upon notice by US Ecology.

------- Washington & Nevada Nuclear Centers: Effective March 1, 1992 ----------

QUADREX ENVIRONMENTAL COMPANY
INSTITUTIONAL WASTE BROKERS
FAX (904) 373-0040

COMPANY NAME/ADDRESS	PHONE NUMBER	CONTACT
ADCO SERVICES, INC. 17650 DUVAN DRIVE TINLEY PARK, IL 60477	PH 708-429-1660 FX 708-429-9759	STAN HUBER
ALLIED ECOLOGY SERVICES, INC. 7066A COMMERCE CIRCLE PLEASANTON, CA 94566	PH 415-463-9280 FX 415-463-9283	TOM DIAS JEFF CROMWELL
APPLIED HEALTH PHYSICS, INC. 2986 INDUSTRIAL BLVD. BETHEL PARK, PA 15102	PH 412-563-2242	ROBERT GALLAGHER JOHN KOWAL
BIONOMICS, INC. 2046 PLACITA DE QUEDO SANTA FE, NM 87505	PH 505-473-9220	LISA WILBURN
ROUTE 8, BOX 342 HARRIMAN, TN 37748	PH 800-325-1336 FX 615-882-9715	GARY KINDRICK
CHEM NUCLEAR SYSTEMS, INC. 220 STONERIDGE DRIVE COLUMBIA, SC 29210	PH 803-259-178[illegible]	ROGER JOHNSON
ECOLOGY SERVICES, INC. 300 2ND STREET LAUREL, MD 20707	PH 301-498-1514 FX 301-498-9432	TIM OSBORNE FINLEY WATTS
THOMAS GRAY AND ASSOCIATES 3106 SOUTH FAITHHOME ROAD TURLOCK, CA 95380	PH 209-667-1102 FX 209-667-1583	BOB BASSETT
1205 WEST BARKLEY AVENUE ORANGE, CA 92668	PH 714-997-8090 FX 714-997-3561	THOMAS GRAY RICH GALLEGO KEVIN LUCE
INTERSOL P.O. BOX 270383 13902 NORTH DALE MABRY TAMPA, FL 33688	PH 813-963-1534 FX 813-960-2467	CURT HARE MIKE FLYNN PAT EASTMAN
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RADIAC RESEARCH CORPORATION 261 KENT AVENUE BROOKLYN, NY 11211	PH 718-963-2233 FX 718-388-5107	JOHN TEKIN ART GREEN FRANK MCKENNA
RSO, INC. P.O. BOX 1526 LAUREL, MD 20725-0953	PH 301-953-2482 FX 301-498-3017	RICK DISALVO
TELEDYNE ISOTOPES 50 VAN BUREN AVENUE WESTWOOD, NJ 07675	PH 201-664-7070 FX 201-664-5586	STEVEN BLACK
U.S. ECOLOGY, INC 9200 SHELBYVILLE ROAD P.O. BOX 7246 LOUISVILLE, KY 40207	PH 800-626-5334	ARVIL CRASE

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Peter Pastorelle NDL Organization 1000 Lower S. Street / PO BOX 791 Peekskill, NY 10566	Phone: 914-737-7200 1989 Dues: N	FAX: Membership type: Voting
Maurice Axelrad Newman & Holtzinger, P.C. 1615 L Street N.W. Washington, DC 20036	Phone: 202-955-6600 1989 Dues: N	FAX: Membership type: Interested