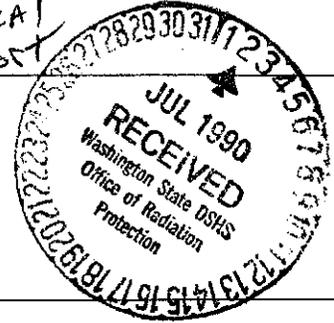


US Ecology, Inc.
9200 Shelbyville Road, Suite 300
P.O. Box 7246
Louisville, Kentucky 40207
502/426-7160

90-07-01 GR
OSE: Historical
Report



USEcology

an American Ecology company

June 29, 1990

Mr. Gary Robertson, Head
Waste Management Section
Department of Health
Mail Stop LE-13
Olympia, Washington 98504

Dear Mr. Robertson:

Enclosed are US Ecology's comments regarding the report generated for Condition 58 of the Washington Radioactive Materials License WN-I019-2. The 18 boxes containing the database report are being forwarded to you via UPS.

If we may be of further assistance, please contact this office.

Sincerely,

S. A. Carpenter
Vice President

SAC:njc

Encl.

SCOPE AND PURPOSE

On January 21, 1987, the Washington Department of Social and Health Services (DSHS), now the Washington Department of Health (WDOH), issued Amendment 17 to renew in its entirety US Ecology's Byproduct Materials License Number WN-1019-2. This action was followed by the U.S. Nuclear Regulatory Commission which on December 29, 1988, issued Amendment 8 to renew in its entirety US Ecology's Special Nuclear Materials License 16-19204-01.

In addition to the prescriptive elements that had been contained in previous licenses, these particular renewals contained conditions (Condition 58 in the state issued license and Condition 33 in the NRC revised license) that focused on the generation of descriptive plans and reports. Their purpose was to require reports in an attempt to gain a fuller understanding of historical facility operations in terms of modern reporting protocol.

These conditions require US Ecology to report the location and description of all waste disposed, with the total trench content of each radionuclide (including special nuclear material) listed. This report, therefore, encompasses the entire operational period of the Richland facility up to December 31, 1989. The first six months of 1990 are not included as the salient information is provided monthly by the Facility Receipt and Burial Activities Report and reported annually as a historical report of operations.

The preparation of this report involved the duplication, validation and encoding of over 10,000 discrete shipping documents of various formats describing nearly 1,000,000 disposal containers in order to create a computer database for waste shipments received from 1965 to February of 1982. March of 1982 was the beginning of the period during which all shipment manifests were encoded and entered into a database system.

In conjunction with this report, a supplement is included (Appendix A) to a report US Ecology submitted on March 24, 1988 from Mr. Steven R. Adams to Mr. Mikel J. Eisen of DSHS to fulfill the requirements of Condition 58(c). The initial submittal did not provide information on major shipments received prior to March of 1982 as required because that information had not yet been entered into the computer. Whereas now that all of these shipments have been placed in the database, the information is now available for presentation.

HISTORY OF REGULATORY REPORTING REQUIREMENTS

Current regulations require that radioactive waste shipments sent for disposal be thoroughly classified and described. Information on modern shipping documents is required to be exhaustive in order that the disposal facility operator can both qualitatively and quantitatively ensure that waste is acceptable for disposal, that it can be safely handled and that the facility can effectively isolate the waste material as designed.

The evolution of these shipping documents progressed from simple one page manifests of various formats prepared to meet Department of Transportation or ICC Regulations, to standard radioactive shipment records (RSRs) developed by US Ecology (then California Nuclear, Inc. and later Nuclear Engineering Company) to facilitate reporting of disposal activities as required by license, and finally to manifests containing federally mandated information in a format approved by the State of Washington DSHS.

In view of the dynamic evolution of the currently used manifests, it becomes clear that formerly used shipping documents must be evaluated in terms of how they fulfilled regulations during that time period for which they were current rather than against the more demanding requirements of today. For example, in 1965 a shipment of 60 drums of various isotopes (with Co-60 being the most prevalent) could legitimately appear in a shipping document as "60 drums of Radioactive Material, N.O.S., Co-60, 5 millicuries, solid." Whereas the information was complete for the requirements of that time period, it would not be adequate for a disposal facility operator today in making the proper evaluations of waste shipment acceptability as required by current regulations.

RESULTS OF REPORT AND ASSUMPTIONS

Shipment Records

Although current procedures provide for manifest corrections via a correction form or resubmittal of information in a corrected form, these mechanisms have not always existed. Consequently, many of the shipping records on file contain numerous discrepancies or are incomplete even by the standards of the day in which they were produced. However, the information listed on the shipping documents was taken at face value unless it was obviously and irrefutably in error.

To ensure a standardized review and to minimize the reporting of anomalous information (e.g. Ni-68 instead of Ni-63), each shipping document was encoded onto a standardized form which was designed for data entry of pertinent information. Encoding each document provided a step during which validity of the information could be determined and, if necessary, corrected.

Validating and correcting the data required the use of certain assumptions which are listed later in this discussion. In no case were original documents altered, rather all corrections took place on the duplicated forms used for encoding.

The listing of basic assumptions used in correcting shipping documents is as follows:

1. **Typographical errors and illegible entries were corrected using the following assumptions:**
 - A. **In isotopic nomenclature, the atomic weight is more likely to be correct than the chemical symbol; therefore, if there is an**

incorrectly named isotope, search for that particular isotope would be performed using the atomic weight first and the chemical symbol secondly.

- B. Unreadable isotopes were assumed to be the most restrictive isotopes, in terms of radiotoxicity and half-life, that would be found elsewhere on the shipment record based upon other packages' contents. For example, carbon-14 or tritium were the isotopes typically assigned for unreadable isotope entries on documentation from medical facilities unless other more restrictive isotopes such as Ra-226 could be expected. Other indicators used to determine the specific isotope were radiation levels and similar shipment records of the same material from the same generator.
2. Some generators always send the same isotopes on their shipments (e.g. Teledyne Wah Chang). When a typographical error appeared on a shipment from one of these facilities, other records of similar shipments were used to confirm the correction.
3. Obvious and indisputable errors such as those indicated in the following listing were corrected.
 - A. Drum weights entered in the source (kg) or special nuclear material (gms) column when there were no source or special nuclear material isotopes.
 - B. When a 55-gallon drum was used to package carboys or other liquid containers for disposal, shippers frequently listed only the gallons of liquid contained instead of the volume of the drum.
 - C. Mathematical errors made by shippers when adding shipment totals were discovered and corrected.
4. Although it may have been allowable for generators to use the abbreviation "MFP" for mixed fission products, it was necessary to assign isotopes to this abbreviation in order to fulfill the requirements of Condition 58. In like manner, the following abbreviations had to be addressed:

MBP - mixed byproduct material	AP - activation products
MAP - mixed activation products	BP - byproducts
FP - fission products	FF - fission fragment (fuel flea was rejected because it is a more modern usage)

Because these abbreviations were used primarily by utilities, where in a general sense similar isotopic breakdowns could be expected, they were grouped together under the category of MFP.

To obtain isotopic mixes for each of these abbreviations, an isotopic breakdown was obtained from the utilities' waste classification by using 3-1/2 years of data on shipping manifests. The ten most prevalent isotopes in this breakdown were then assigned to the above listed abbreviations. Their factors of abundance were calculated by

the total isotopic content of that element and then divided by the total radioactivity from the utilities. Each was rounded according to its weighted contribution in order to obtain unity (See Table 1). These factors were then multiplied against the original MFP, MAP, MBP, FP, AP, BP or FF abbreviations and the software executed a global data change. This caused the isotopes and their calculated values to appear in the database in place of the abbreviations.

5. A situation similar to that of MFP isotopes surfaced for wastes from medical, university and clinical generators. However, these generators more frequently used the abbreviations "3-87" or "3/88" to indicate the range of atomic numbers that could be on the shipment. As was the case for the MFP situation, 3-1/2 years worth of shipping records from the medical, university and clinical categories were compiled and sorted for the ten most common radioisotopes (See Table 2). Abundance factors were then assigned, rounding as previously described, and a global data change was executed as was done for MFP listings.

TABLE 1

MFP /MAP /MBP /FP /AP /BP /FF

Co-60	44%
Fe-55	29%
Cs-137	8%
Sr-90	5%
Ni-63	4%
Mn-54	2%
Zn-65	2%
Co-58	2%
Cr-51	2%
Cs-134	2%

TABLE 2

3-87/3-88/3-89
3/87/3/88/3/89

H-3	55%
Co-60	21%
Fe-55	12%
Cs-137	4%
P-32	3%
Sr-90	2%
S-35	2%
C-14	.89%
Ra-228	.1%
Ra-226	.01%

6. Other isotopic assignments were made for listings such as "DU" (depleted uranium) which was assigned as U-238 or "Pu" (plutonium) which was assigned as Pu-239 based upon modern day shipment records from generators who had shipped similar material in the past.

Trench Records

From the outset of this project to prepare the report intended to meet the license conditions, it was recognized that a benchmark had to be established to ensure accuracy.

Since records were not required of the specific trenches into which individual shipments were placed, a simple computer search to establish individual trench totals could not be performed. Therefore, it was decided in the absence of any records to the contrary, that the information provided on trench monuments be used as the key guide as to total quantities of waste in any particular trench. Further refinements in the process of assigning shipments to specific trenches included consideration of the date of receipt with respect to a trench's open and closed dates and, as available, waste package types, weights and radiation levels.

These considerations are summarized as follows:

1. During overlap periods when one trench was nearing closure and the next trench had just been opened or was preparing to open, shipments were segregated according to operational convenience and prudent handling/disposal practices. For example, shipments of liners (right circular cylinder containers), boxes or heavy containers received during the overlapping period were either placed on the floor of the new trench or set into storage for later placement into the new trench when finished. This is because liners, boxes and heavy containers cannot be safely set upon randomly placed drums because of their weight, configuration and the increased potential to create unfillable void spaces.
2. Similarly, drum and small package shipments were placed into the trench nearing closure because their smaller size allowed for more accurate placement with regard to requisite disposal depths.
3. Disposal depth requirements were attached to a package's external radiation levels; therefore, the higher the radiation level, the more likely the waste was disposed of at a lower depth in order to take advantage of shielding provided by other waste packages on top of it and backfill (i.e., only available in the new trench). If, for example, a liner had a radiation reading of 50 R/hr and weighed 6,000 pounds, it would have been placed into the new trench where it could be quickly covered to reduce exposures to facility workers.
4. Because the liquid storage and processing area was decommissioned in 1985 with those wastes going into Trench 11A, special care had to be exercised to minimize duplicate reporting of volume and activity. Due to the large volume of waste generated as a result of decommissioning activities and subsequent disposal in Trench 11A, the original volume of the liquid wastes stated in gallons was not reported due to it being much smaller by comparison. Furthermore, when the result of the volume reduction activities are considered (solar and electric evaporators when the area was functional) the original volume of the liquid wastes are considered unuseable. However, its activity was reported so that there would not be any reduction due to radioactive decay. This results in a

slight duplication in the conservative direction. Additionally, because of radioanalysis conducted during decommissioning activities, wastes disposed of in Trench 11A show additional isotopes not originally reported.

For trench records entered on the computer database from March of 1982 to present, differences between trench markers and the computer or differences between reported values and current computer values can be attributed to both rounding errors and data entry errors.

Using these rules as guidance, the individual trench results were obtained as described in Table 3.

TABLE 3

TRENCH	Volume (cu.ft.)	Activity (mCi)	SNM (gms)	Source (Kg)
1 Marker Computer	64,571.30 <u>64,546.69</u>	1,106,360.00 <u>811,308.943</u>	916.03 <u>751.85</u>	242.07 <u>207.42</u>
Dif.	- 24.61	- 295,051.057	- 164.18	- 34.65
2 Marker Computer	148,075.60 <u>147,116.95</u>	168,855,060.00 <u>133,335,958.061</u>	861.81 <u>791.61</u>	741.77 <u>800.74</u>
Dif.	- 958.65	-35,519,101.939	- 70.20	+ 58.97
3 Marker Computer	129,549.10 <u>129,408.29</u>	101,690,100.00 <u>85,792,075.862</u>	14,790.72 <u>11,572.16</u>	5,423.13 <u>4,523.39</u>
Dif.	- 140.81	-15,898,024.138	-3,218.56	- 899.74
4 Marker Computer	300,646.10 <u>293,924.43</u>	247,660,000.00 <u>273,128,822.172</u>	93,017.74 <u>92,286.54</u>	11,233.34 <u>11,964.29</u>
Dif.	- 6,721.67	+25,468,822.172	- 731.20	+ 730.95
4A Marker Computer	12,143.72 <u>12,143.72</u>	4,360.00 <u>4,357.470</u>	0 <u>0</u>	3,916.70 <u>3,916.51</u>
Dif.	0	- 2.530	0	- .19
4B Marker Computer	411.00 <u>411.00</u>	251,797,260.00 <u>251,797,244.655</u>	0 <u>0</u>	0 <u>0</u>
Dif.	0	- 15.345	0	0
5 Marker Computer	485,940.85 <u>486,224.46</u>	251,665,920.00 <u>226,182,377.066</u>	10,575.10 <u>22,670.14</u>	53,496.69 <u>9,987.62</u>
Dif.	+ 283.61	-25,483,542.934	+12,095.04	- 43,509.07
6 Marker Computer	439,769.53 <u>444,815.94</u>	77,129,060.00 <u>74,402,178.852</u>	1,198.94 <u>2,110.81</u>	24,149.25 <u>38,189.37</u>
Dif.	+ 5,046.41	- 2,726,881.148	+ 911.87	+ 14,040.12
7 Marker Computer	1,087,967.44 <u>1,087,967.44</u>	42,679,520.00 <u>43,007,951.600</u>	2,463.39 <u>2,463.39</u>	1,120,292.81 <u>1,120,292.81</u>
Dif.	0	+ 328,431.600	0	0
7A Marker Computer	7,226.00 <u>7,226.00</u>	59,890.00 <u>63,609.213</u>	6.84 <u>6.84</u>	.08 <u>.08</u>
Dif.	0	+ 3,719.213	0	0

TABLE 3 (Cont.)

TRENCH	Volume (cu.ft.)	Activity (mCi)	SNM (gms)	Source (Kg)
8 Marker	1,119,190.48	43,710,090.00	0	829,954.14
Computer	<u>1,118,446.61</u>	<u>15,316,750.243</u>	<u>36.25</u>	<u>773,945.55</u>
Dif.	- 743.87	-28,393,339.757	+ 36.25	- 56,008.59
9 Marker	1,541,586.06	127,115,040.00	11,717.495	625,266.52
9A Computer	1,529,989.14	83,765,778.480	11,702.56	625,262.75
9B Computer	<u>11,596.92</u>	<u>43,623,643.035</u>	<u>20.99</u>	<u>3.77</u>
Dif.	0	+ 274,381.515	+ 6.055	0
10 Marker	2,183,935.41	95,191,350.00	0	1,729,852.97
Computer	<u>2,179,557.97</u>	<u>81,810,639.782</u>	<u>.06</u>	<u>1,742,950.68</u>
Dif.	- 4,377.44	-13,380,710.218	+ .06	+ 13,097.71
11A Marker	1,159,578.14	8,642,610.00	7,602.61	384,934.53
Computer	<u>1,159,578.14</u>	<u>8,781,788.324</u>	<u>7,601.86</u>	<u>384,934.53</u>
Dif.	0	+ 139,178.324	- .75	0
11B 12/89	54,024.88	295,559,510.00	237.93	117.00
Computer	<u>52,911.34</u>	<u>295,778,739.590</u>	<u>233.02</u>	<u>116.82</u>
Dif.	- 1,113.54	+ 219,229.590	- 4.91	- .18
13 12/89	1,226,592.95	179,271,710.00	13,430.77	547,838.95
Computer	<u>1,227,577.04</u>	<u>179,453,535.927</u>	<u>13,430.74</u>	<u>547,838.95</u>
Dif.	+ 984.09	+ 181,825.927	- .03	0
14 12/89	1,260,942.02	14,064,240.00	21,911.16	468,571.22
Computer	<u>1,261,033.97</u>	<u>14,150,550.378</u>	<u>21,916.07</u>	<u>468,574.77</u>
Dif.	+ 91.95	+ 86,310.378	+ 4.91	+ 3.55
Reactor Head	605.9	49,400.00	0	0
Computer	<u>605.9</u>	<u>49,400.00</u>	<u>0</u>	<u>0</u>
Dif.	0	0	0	0
<u>TOTALS</u>				
Marker	11,222,756.48	1,906,251,480.00	178,730.535	5,806,031.17
Computer	<u>11,215,081.95</u>	<u>1,811,256,709.62</u>	<u>187,596.89</u>	<u>5,733,510.05</u>
Difference	- 7,674.53	-94,994,770.38	+8,864.355	- 72,521.12

Chemical Trench Inventory

An area in the north-center portion of the 100-acre sublease is identified as a chemical trench. It is an irregularly shaped quadrangle with the following description and approximate dimensions. At a point immediately to the north and about 125 feet from the north boundary of Trench 1, proceed 60 feet due north, then 298 feet west, then 34 feet south, and finally 308 feet east back to the east boundary. This area is reported to have been utilized for the disposal of nonradioactive material during the years 1968 through 1972. Detailed searches of all files at the facility did not produce any records with information regarding the nature or quantities of the material disposed of in this area.

A search of records in storage at the corporate office in Louisville, Kentucky yielded a series of files which are essentially hand compiled invoice worksheets which were apparently transferred from the California Nuclear office in Cowell, California. It is surmised that invoicing for the Richland facility was accomplished through the Cowell office.

From these invoicing records, we were able to establish that at least four generators may have shipped nonradioactive wastes to the Richland facility. An attempt was made to contact these four generators and solicit information regarding such disposal. In addition, two former California Nuclear/Nuclear Engineering Company employees whose names appeared on various purchasing documents were contacted. Unfortunately, their institutional memory proved to be quite limited and they were able to do little except confirm the name of a single generator (Attachments 1, 2 and 3).

The four generators and their responses to US Ecology's inquiries are summarized as follows:

1. An August 25, 1971 letter from G. Whitsett (Boeing, P. O. Box 3707, Seattle, Washington, to Frank DeMent, NECO, referenced nine each 55-gallon barrels of nonradioactive waste (Attachment 4). In a February 14, 1990 response to inquiry, Mr. W. Morgan of Boeing characterized the waste as solid beryllium/copper metal shavings from a manufacturing process (Attachment 5).
2. The University of Washington, Seattle, Washington, responded on April 11, 1990 that no nonradioactive wastes were shipped to the Richland facility other than the then nonregulated scintillation fluids.
3. A single driver's trip assignment sheet (Attachment 7) showed a dispatch for pick-up of 56 drums of chemicals at Pfizer, 3333 NW Industrial Road, Portland, Oregon. Written requests were returned "address unknown." No telephone listing exists for Pfizer in Portland.
4. Crown Zellerbach, Chemical Products Division, Camas, Washington, was identified through a purchase request (Attachment 8) and a file of invoice worksheets (an example of which is attached as Attachment 9). These documents reveal that from sometime in 1968 through sometime in 1972, an average of one shipment of sixty 55-gallon drums

per month may have been shipped to the Richland facility. This material was described as phenolic waste from the thio-phenols plant. Assuming that this material is present in the described quantities, it represents approximately 27,000 cubic feet of waste material. Crown Zellerbach no longer operates the facility. The Camas, Washington facility currently operates as James River Paper Company. Representatives were contacted by telephone (206-834-8199) several times but declined knowledge of previous activities or waste streams. Written responses were promised but never received.

CONCLUSION

Whereas this report has been generated in order to comply with Conditions 58 and 33 of US Ecology's byproduct and special nuclear materials licenses, respectively, the reviewer is reminded that although a records search has been completed and information placed into a computer database, it is considered to not be any more valid than the information previously submitted by the Richland facility beginning in 1965. Indeed, after all of the manipulation of the information for the pre-electronic filing period (pre March 1982), the manually compiled totals were generally more conservative (higher), probably due to conservative rounding and differences in reporting as compared to today's requirements and techniques.

However, this effort has been useful in view of the fact that it has improved US Ecology's and WDOH's knowledge of the earlier years of facility operation and how those operations compare with those being conducted today.

ATTACHMENT 2
USEcology, Inc.
P.O. Box 638
Richland, Washington 99352
509/377-2411

USEcology Nuclear

USEcology, Inc.
an American Ecology company

January 18, 1990

Frank DeMent
200 S. Union #50
Kennewick, Wa 99336

Dear Mr. DeMent:

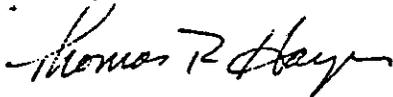
US Ecology, Inc. is in the licensed operation of the commercial low level radioactive waste disposal facility on the Hanford reservation near Richland, WA. Current licensing requirements include characterization of facility activities over the lifetime of the facility in order to adequately plan for closure.

Our archives indicate that some chemical waste disposal activities were conducted during the late 1960's and early 1970's under the auspices of one of our predecessor companies; either California Nuclear Company or Nuclear Engineering Company.

We are requesting your assistance in identifying chemical waste generators who may have used the facility during this period. Any additional information such as volumes, waste streams, approximate shipping dates, physical/chemical forms, etc., would also be appreciated.

In order to comply with the requirements of our operating licenses, the information I have requested must be provided no later than March 1, 1990. Please feel free to contact me at the above address or by phone at 377-2411 if you can be of any assistance to us in this project. Thank you.

Sincerely,



Thomas R. Hayes
Facility Manager

TRH/dg

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. Show to whom delivered, date, and addressee's address. 2. Restricted Delivery.

3. Article Addressed to:

FRANK DeMENT
200 S. UNION, # 50 D
KENNEWICK, WA 99336

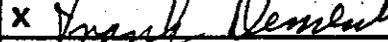
4. Article Number

Type of Service:

Registered Insured
 Certified COD
 Express Mail

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature -- Addressee

X 

8. Addressee's Address (ONLY if requested and fee paid)

Same 

6. Signature -- Agent

X

7. Date of Delivery

1/19/90

PS Form 8811, Feb/1986

DOMESTIC RETURN RECEIPT

USEcology, Inc.
P.O. Box 638
Richland, Washington 99352
509/377-2411

ATTACHMENT 3

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. <input checked="" type="checkbox"/> Show to whom delivered, date, and addressee's address.		2. <input type="checkbox"/> Restricted Delivery.	
3. Article Addressed to: ROY JENNINGS 200 WEST BERNARDINO, LOT 102 ROA:PT. CA 92376 EG		4. Article Number	
		Type of Service: <input type="checkbox"/> Registered <input type="checkbox"/> Insured <input checked="" type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Express Mail	
		Always obtain signature of addressee or agent and DATE DELIVERED	
5. Signature -- Addressee X <i>Roy Jennings</i>		8. Addressee's Address (ONLY if requested and fee paid)	
6. Signature -- Agent X			
7. Date of Delivery 1-22-90			
PS Form 3811, Feb. 1986		DOMESTIC RETURN RECEIPT	

USEcology Nuclear

USEcology, Inc.
an American Ecology company

January 19, 1990

Roy Jennings
200 West San Bernardino, Lot 102
Rialto, CA 92376

Dear Mr. Jennings:

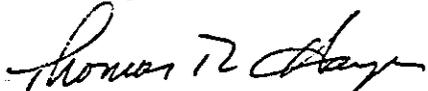
U S Ecology, Inc. is the licensed operator of the commercial low level radioactive waste disposal facility on the Hanford reservation near Richland, WA. Current licensing requirements include characterization of facility activities over the lifetime of the facility in order to adequately plan for closure.

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We are requesting your assistance in identifying chemical waste generators who may have used the facility during this period. Any additional information such as volumes, waste streams, approximate shipping dates, physical/chemical forms, etc., would also be appreciated.

In order to comply with the requirements of our operating licenses, the information I have requested must be provided no later than March 1, 1990. Please feel free to contact me at the above address or by phone at 509/377-2411 if you can be of any assistance to us in this project. Thank you.

Sincerely,



Thomas R. Hayes
Facility Manager

TRH/dg

HEADQUARTERS OFFICES · P.O. BOX 3707 · SEATTLE, WASHINGTON 98124

August 25, 1971

IN REPLY REFER TO

1-1881-70R-206

Nuclear Engineering Company, Inc.
P. O. Box 638
Richland, Washington 99352

Attention: Frank Dement

Subject: Packaged Hazardous Waste Material for Disposal

References: a) Telecon - August 25, 1971; G.A. Whitsett and Wayne Clarke
b) Radioactive Shipment Record (attached)
c) Copies of Secondary Container Packaged Radioactive Waste
for Land Disposal Labels (attached)
d) Purchase Order Y-477946-0773N

Gentlemen:

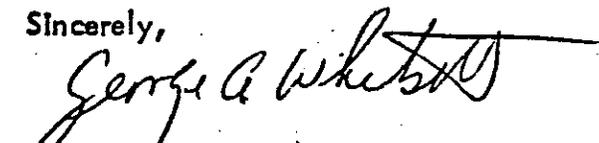
Please find attached documents describing contents which comprise the following quantities of hazardous material waste:

1. 7 each - 55 gallon drums containing radioactive material (7.4 ft³/drum).
2. 5 each - Cartons containing low level radioactive material contaminated exhaust hood filters (4.8 ft³/carton).
3. 9 each - 55 gallon drums containing non-radioactive Be-Cu waste (7.4 ft³/drum).

This waste is presently stored at The Boeing Company's 2-97 Building, Plant II, 7725 East Marginal Way South, Seattle, Washington. We suggest that Nuclear Engineering Company personnel go to Plant II sign-in area and call us to meet them there (Phone: 656-5077). We will then escort your vehicle to the 2-97 Building and transfer the waste.

Also enclosed are related maps of the immediate area to assist you in finding Plant II.

Sincerely,


George A. Whitsett
Radiation Protection Engineer

Enclosures.

⊗

Shipment #2

NUCLEAR ENGINEERING COMPANY, INC.

P. O. BOX 594
WALNUT CREEK, CALIF.

1990

NAME **The Boeing Company**

ADDRESS **Seattle, Washington**

↓ PICKED UP ↓

QUAN.	CONTAINER	SOLID	LIQUID	REMARKS
	4.5 CU. FT. BOX(ES)			
16	55 GAL DRUMS	X		
5 boxes		X		24 cuft.

↓ DELIVERED ↓

	4.5 CU. FT. BOX(ES)			
	55 GAL DRUMS			

Other Data

Date

Received By

[Handwritten Signature]
1-18-81



CUSTOMER'S COPY

February 14, 1990
4-1210-90R-0116

U. S. Ecology, Inc.
Attention: Steve Carpenter
P.O. Box 7246
Louisville, Kentucky 40207

Subject: Non-Radioactive Chemical Waste Shipment to Richland,
Washington burial site by The Boeing Company

Reference: Letter dated January 16, 1990 from U. S. Ecology to The
Boeing Company, signed by S. A. Carpenter

Dear Sir:

The only possible "non-radioactive chemical waste" that was ever shipped to the Richland repository is described as follows:

9 each - 55 gallon drums containing non-radioactive beryllium-copper (2% beryllium alloy waste). This material was in solid physical form and was comprised of beryllium-copper metal shavings, turnings, etc., from manufacturing processes. Low level contaminated laboratory/protective equipment (i.e. paper towels, gloves, protective clothing) may also have been included in the drums. The drums were purchased from Nuclear Engineering Company Inc. and, therefore, were certainly acceptable containers per the then existing site policies. A copy of Nuclear Engineering Company Inc. radioactive shipment record is attached. This document describes the complete land disposal shipment which included the non-radioactive beryllium-copper material. You can see that Frank Dement signed this shipment record when he picked up the material on August 31, 1971. I am also enclosing a copy of the cover letter to Nuclear Engineering from Boeing describing the shipment in question. This letter and associated documentation was sent to Nuclear Engineering Company Inc. prior to the actual shipment taking place so that the documentation could be reviewed and approved before the actual shipment took place.

To our knowledge this is the only shipment from Boeing to the Richland site that contained any waste form that could be classified as "non-radioactive chemical wastes." We hope this information satisfies your request in the referenced letter.

Very truly yours,


William E. Morgan
Radiation Health Protection
Org 4-1210 M/S 6Y-38
Phone 393-3050

GAW:rs

Enclosure

BOEING

USEcology

an American Ecology company

January 16, 1990

The Boeing Company
P. O. Box 3707
Seattle, Washington 98124

Dear Sir/Madam:

US Ecology, Inc. is the licensed operator of the commercial low-level radioactive waste disposal facility located on the Hanford Reservation near Richland, Washington. Current licensing requirements include characterization of facility activities over the lifetime of the facility in order to adequately plan for closure.

Our archives indicate that some chemical waste disposal activities were conducted during the late 1960's and early 1970's under the auspices of one of our predecessor companies, either California Nuclear Company or Nuclear Engineering Company. The records further show that your organization utilized these disposal services.

US Ecology is requesting your assistance in identifying, to the extent practicable, the volumes, waste streams, dates of shipment and physical/chemical forms of any material which your organization shipped to the Hanford facility. Any additional detail you can supply would be appreciated.

In order to comply with the requirements of our operating licenses, I must have this information no later than March 1, 1990. If you have any questions, please don't hesitate to call.

Sincerely,



Stephen A. Carpenter
Vice President

SAC:njc

SHIPPING SURVEY

TO

FROM

Name Nuclear Engineering Company Inc.
P.O. Box 638Organization 1-1881Address Richland, Washington 99352Laboratory Radioactive Waste Area

AEC License Number _____

AEC License Number WN-1005-5Date Shipped 8/31/71Date of Pickup 8/31/71Shipping Memo Number N/A

Radiation Survey Results:

mr/hr at S 1.0 to 40.0 MR/hrmr/hr at 39" 0.1 to 4.0 MR/hrcontamination outside package None Detectedcontamination inside package None DetectedLabels used AEC/DOT Radioactive Yellow IIShipping Memo
Item No.

Isotope

Quantity

Chemical Form

Shipping Memo Item No.	Isotope	Quantity	Chemical Form
	MIXED (see attached sheets)	7 each - 55 gallon	
		Drums containing Radioactive Material Waste	
	3-83 NOS	5 each - Cardboard	
	<1.0mCi/box	Boxes containing Low-level Contaminated Exhaust Hood	
		Filters	

Remarks: 9 each - 55 gallon Drums containing non-radioactive Be-Cu Waste was included
with this shipment.

JES/GWA

Signed: Radiation Monitor

WEN/SEA

Signed: Radiation Specialist

Recorded in Log Book: Yes

1-1681

④

SHIPMENT #2

UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98195

W11.8.1

Environmental Health & Safety
201 Hall Health Center, GS-05
Radiation Safety Office, (206) 543-0463

April 11, 1990

Stephen A. Carpenter
US Ecology, Inc.
9200 Shelbyville Road, Suite 300
P.O. Box 7246
Louisville, Kentucky 40207

Dear Mr. Carpenter:

This is in response to your letter requesting information on chemical waste disposal by the University of Washington at your facility during the 1960's and early 1970's.

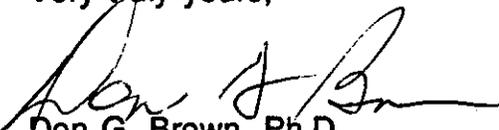
There are two groups in our organization which would have used your site during this time period. One dealt with chemical waste and the other group with radioactive waste, which had to some extent a chemical waste component. The chemical group has assured me that chemical waste generated during these years was disposed through Western Processing Co., Kent, Washington and that none of their waste was sent to US Ecology or any predecessor companies.

Records regarding radioactive waste sent to your facility are not available prior to 1975. The available records after 1975 indicate that "radioactive" was the only term used to describe the waste disposed. No information regarding the chemical form is noted. Radioactive waste types sent after 1975 were listed as dry solid, animal carcasses, and liquid scintillation vials. Liquid scintillation fluid at that time would have been mainly toluene and xylene. Enclosed is a list of dates and volumes of vials of liquid scintillation waste sent to your facility for the period 1975 through 1980.

Lead was the only other likely chemical in the waste which was in the form of small shield containers for shipping radioactive material. We would have no way of knowing how much lead you were sent. However, we believe it represents an extremely small fraction of the total waste volume.

If I can be of any further assistance please let me know.

Very truly yours,



Don G. Brown, Ph.D.
Director

DGB:np
encl

Liquid Scintillation Vial Waste Sent
to US Ecology or Predecessor Companies

<u>DATE</u>	<u>VOLUME</u>
12/11/80	173 ft ³
10/15/80	292 ft ³
8/23/80	180 ft ³
7/17/80	227 ft ³
5/21/80	180 ft ³
2/28/80	165 ft ³
1/25/80	172 ft ³
11/29/79	199 ft ³
9/13/79	293 ft ³
7/27/79	311 ft ³
6/19/79	124 ft ³
4/30/79	382 ft ³
3/28/79	202 ft ³
11/15/78	292 ft ³
7/27/78	187 ft ³
5/17/78	368 ft ³
2/23/78	240 ft ³
8/30/77	225 ft ³
6/27/77	202 ft ³
5/19/77	142 ft ³
5/5/77	45 ft ³
3/23/77	172 ft ³
2/10/77	37 ft ³
1/13/77	157 ft ³
11/18/76	172 ft ³
10/28/76	202 ft ³
9/1/76	142 ft ³
7/28/76	180 ft ³
6/22/76	172 ft ³
5/13/76	67 ft ³
3/30/76	112 ft ³
3/3/76	102 ft ³
1/20/76	125 ft ³
12/11/75	73 ft ³
11/6/75	66 ft ³

TRIP ASSIGNMENT & PHONE ORDER

960

TO: Roy Jennings
 FROM: Frank Dement

DATE: May 24, 1971
 TIME: 1630

ASSIGNMENT: DATE: May 25, 1971 TIME: 0800

CUSTOMER: 56 drums of chemicals at Pfizer 3333 NW Industrial road.

PICK UP: _____

DELIVER: Tractor to White Trucks 2705 NW Nicolai

CHECK LIST OF EQUIPMENT NEEDED

✓ YES

BY - PRODUCT	WEIGHT →	SIDE RACKS	<input type="checkbox"/>
	LENGTH →	TARP	<input type="checkbox"/>
S. N. M.	DRUMS →	PERMITS	<input type="checkbox"/>
	BOXES →	SIGNS	<input type="checkbox"/>
RAD. LEVELS	CARTONS →	MARKINGS	<input type="checkbox"/>
	SPEC. CONTAINERS		

SPECIAL INSTRUCTIONS

CONTACT MR. Eric Strid (Pfizer) PHONE 222-9281

TRACTOR NO. <u>Avis</u>	HUB READING OUT <u>trac 70253</u>	HUB READING IN <u>TRAC 70753</u>	FUEL SITE <u>full</u>	FUEL PURCH. <u>189 GAL</u>	OTHER:
TRAILER NO. <u>1</u> & NO.	<u>tlr 24798</u>	<u>TLR 85935</u>			

DRIVERS: <u>Roy Jennings</u>	CASH ADVANCED	CASH OWED	OTHER CASH EXPENSE:
			CHECK NO.:

LOAD -	MILLICURIES	GRAMS-SNM	LBS.-SOURCE	CUBIC FEET	REMARKS:
TRENCH NO.					
TRENCH NO.					

TRIP MILES IN: ROUTE: _____	STATE <u>Wash</u>	MILES <u>334</u> <u>166</u>	DRIVERS TIME RECORD		DRIVERS REMARKS:	
	<u>Ora</u>		#1	#2		
			LOADING	<u>2</u>		
			FUELING			
	MISC. <u>WASH</u>		<u>1 1/2</u>		SIGNATURES: <u>Roy Jennings</u>	
	<u>WASH</u>		<u>4</u>			
TOTAL PAY MILES		<u>500</u>	TOTAL PAY HOURS	<u>7 1/2</u>	X	



Crown Zellerbach Corporation

CHEMICAL PRODUCTS DIVISION

ATTACHMENT 8

MANUFACTURERS OF PULP AND PAPER

CAMAS, WASHINGTON 98607

December 29, 1969

RECEIVED

JAN 9-1970

NECO

Nuclear Engineering Company, Inc.
P.O. Box 638
Richland, Washington

Attn: Mr. Frank Demint

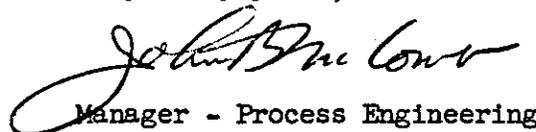
Gentlemen:

Currently we use your company's services in disposing of a phenolic waste material. This material, contained in 55 gallon steel drums, is picked up at our plant about once a month (approximate load is 60 drums). As you know, costs to us for this service are \$13.50 per drum.

In developing budget cost for the upcoming months, we are re-examining our entire waste disposal problem. For this reason we would appreciate an indication from you as to whether or not you anticipate any increases (or reductions) in the above cost.

Thank you for your consideration, and we await your reply.

Very truly yours,


Manager - Process Engineering

JOHN B. McCOMB/hw

Jim?

Aug. 31, 1971

8634

W

CHPH-44-71

Net 30

Crown Zellerbach Corp.
Chemical Products Div.
Canaw, Wash. 98607

Removed 8-23-71

60 drums phenolic waste
@ \$13.50/drv. \$810.00



NUCLEAR ENGINEERING COMPANY INC.

P. O. BOX 594
WALNUT CREEK, CALIF.

1989

NAME **Crown Zellerbach Corp**

ADDRESS **Camas, Washington**

↓ PICKED UP ↓

QUAN.	CONTAINER	SOLID	LIQUID	REMARKS
	4.5 CU. FT. BOX(ES)			
60	55 GAL DRUMS		X	

↓ DELIVERED ↓

	4.5 CU. FT. BOX(ES)			
	55 GAL DRUMS			

Other Data **PO# CHPD-44-71**

Date **August 23, 1971**

Received By *Doug Miller*

INVOICE COPY

CrownZellerbach

1500 S.W. First Avenue, Portland, Oregon 97201
(503) 227-6481



ATTACHMENT 9 (Cont'd)
RECEIVED IA 1077 REV. 12/70

AUG 19 1971

NECO

ORIGINAL

Purchase Order

DUNS No. IDENTIFYING VENDOR PAYING
LOCATION MUST APPEAR ON ALL INVOICES.

DATE AUGUST 17, 1971

TO: NUCLEAR ENGINEERING COMPANY INC.
P. O. BOX 594
WALNUT CREEK, CALIFORNIA

ORDER NO. **CHPD 44-71**

TO INSURE PROMPT PAYMENT
SHIP AND MAIL 4 COPIES OF INVOICE WITH B/L.

MARK ABOVE ORDER NO. ON ALL SHIPMENTS.
INVOICES, AND BILLS OF LADING.

TO: CHEMICAL PRODUCTS DIVISION, CAMAS, WN. 98607

ROUTING YOUR TRANSPORTATION

WHEN SHIP ---

F.O.B. DESTINATION

TERMS

AS MARKED

QUANTITY	DESCRIPTION	UNIT	LIST	DISCOUNT	FOR C. Z. USE ONLY
	PICKUP 60 DRUMS OF PHENOLIC WASTE & DISPOSE OF IT AT YOUR SITE	DRUM	13.50		1/2 2073-603-3 1/2 2073-603-3 DFM
	CONFIRMS PHONE TO FRANK DEMINT WEEK OF AUGUST 23RD.				
KD TLN					
CHECK ONE <input checked="" type="checkbox"/>	CHARGE TAX <input checked="" type="checkbox"/> NOT FOR RESALE	FOR RESALE <input type="checkbox"/>			

IMPORTANT INSTRUCTIONS

This order, including the provisions on the reverse side, states all the terms of this purchase. **ACCEPTANCE OF THIS ORDER IS EXPRESSLY LIMITED TO THESE TERMS AND NO OTHERS.**

CROWN ZELLERBACH CORPORATION

BY K. D. Tomblason
PURCHASING DEPARTMENT

Do not substitute goods or change routing without our written approval. No charges will be allowed by us for boxing, packing, or cartage unless specified. Do not place marine insurance on any shipments. Attach to invoice original B/L and original E/B for any prepaid freight. Time is of the essence of this order.



OFFICE OF RADIATION PROTECTION
CONVERSATION RECORD

LICENSE #: WN-1019-2

DATE April 1, 1988

TIME 9:15 A.M. P.M.

INCOMING CALL OUTGOING CALL VISIT

PERSON CALLING <i>MIKE ELSEN</i>	OFFICE/ADDRESS <i>ORP</i>	PHONE NUMBER <i>3-1116</i>
-------------------------------------	------------------------------	-------------------------------

PERSON CALLED <i>Steve ADAMS</i>	OFFICE/ADDRESS	PHONE NUMBER <i>1-800-626-5317</i>
-------------------------------------	----------------	---------------------------------------

CONVERSATION

SUBJECT <i>Historical Report</i>	LICENSEE NAME <i>USEcology</i>
-------------------------------------	-----------------------------------

SUMMARY

I called S. Adams and told him that we will be requiring an up date to the historical report for Major or large activity sources disposed prior to 1982. The historical report is supposed to be that historical went just back to 1982. He said they are working on going back through all the manifests to enter the info. into their data base. The historical report submitted only went back to 1982 for Major or large shipments.

also suggested that they show where Trunk 9A & 9B are located on topographical maps. - They are in Trunk 9 with NO separation. I told him that since they refer to T 9A & 9B they should be shown on the maps.

License Condition #58, Amendment 17

REFERRED TO:

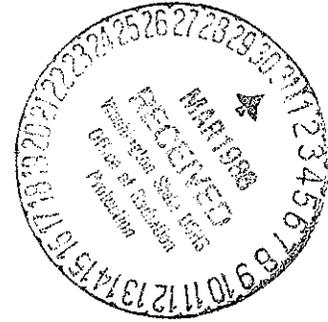
ACTION TAKEN <i>- will require info prior to 1982.</i>	INITIALS <i>[Signature]</i>
	DATE

USEcology

an American Ecology company

March 24, 1988

Mr. Mikel J. Elsen
Office of Radiation Protection
Department of Social and Health Services
Thurston Airdustrial Center Bldg. 5
Mail Stop LE-13
Olympia, WA 98504



SUBJECT: Historical Report of Operations for the Richland
LLRW Disposal Facility

Dear Mr. Elsen:

License Condition #58 requires, in part, a Historical Report of Operations for the Richland LLRW Disposal Facility. This report was sent to your office on January 21, 1988. Subsequently we have discussed comments from your office on the report concerning descriptions of disposal unit waste quantities, topographic maps, and descriptions of significant disposal operations. At this time we are submitting a revised report which we believe resolves those comments. The revisions are as follows:

- o The description of waste volumes and activities reported earlier were in error and have been corrected. The revised description is Attachment 1 of this correspondence.
- o The topographic maps have been modified to show all fence line TLD locations and the map legend was modified to show that the air monitoring stations are where the soil and vegetation sampling occurs, as specified in the Facilities Standards Manual. Two copies of the revised topographic map are attached.

Mr. Mikel J. Elsen
March 24, 1988
Page 2

- o The description of significant disposal operations have been modified. Per your verbal request a review was made of the Richland facility disposal database. The database shows that 63 shipments were made to the Richland facility since March 1982 with inventories exceeding 1,000 curies. Attachment Two lists these shipments by date, generator, disposal unit, and the shipment activity in curies. It should be noted that ALARA evaluations at Richland have demonstrated that there is no correlation between the activity of the waste in a package, the radiation exposure rate in the vicinity of the package, and the dose received by workers during waste disposal operations.

If you have any questions or require further information, please do not hesitate to call upon me.

Sincerely yours,



Steven R. Adams
Chief Radiological Control
and Safety Officer

SRA/r1s/0927

attachment

cc: T.S. Baer
S.A. Carpenter
J.H. DeOld
C.E. Coleman
R.E. Sauer
Reg. File

<u>TRENCH NO.</u>	<u>VOLUME (CU. FT.)</u>	<u>BY-PRODUCT (CURIES)</u>	<u>SPECIAL NUCLEAR (GRAMS)</u>	<u>SOURCE (kg)</u>
1	64,571.3	1,106.36	916.03	242.07
2	148,075.6	168,855.06	861.81	741.77
3	129,549.10	101,690.10	14,790.72	5,423.13
4	300,646.1	247,660.00	93,017.74	11,233.34
4A	12,143.72	4.36	0	3,916.7
4B	411.00	251,797.25	0	0
5	485,940.85	251,665.92	10,575.1	53,496.69
6	439,769.53	77,129.06	1,198.94	24,149.25
7A	7,226.0	59.89	6.84	0.08
7	1,087,967.44	42,679.52	2,463.39	1,120,292.81
8	1,119,190.48	43,710.09	0	829,954.14
9A	1,529,989.14	83,494.51	11,697.61	625,262.75
9B	11,596.92	43,620.34	20.99	3.77
10	2,183,935.41	95,191.35	0	1,729,852.97
11A	1,155,765.13	8,615.66	7,602.24	383,761.52
11B*	51,484.64	193,513.30	231.26	1,289.69
13*	1,199,791.04	160,667.29	13,384.13	547,836.52
14*	469,419.21	3,600.98	2,519.71	133,529.62
Reactor head trench	605.9	49.4	0	0

* Through December 31, 1987

ATTACHMENT 2
SIGNIFICANT DISPOSAL OPERATIONS

<u>DATE</u>	<u>GENERATOR</u>	<u>DISPOSAL UNIT(S)</u>	<u>SHIPMENT ACTIVITY (Curies)</u>
03-26-85	ICN Pharmaceuticals	11A/11B	27,051
07-23-85		11A/11B	11,412
05-06-86		13	26,902
08-05-86		13	8,167
02-10-87		13	9,043
09-01-87		14/11B	11,308
12-30-85	Moravек Biochemicals	13	1,054
02-12-87	US Ecology (Pleasanton)	13	4,117
04-01-85	Northwest Nuclear	4B	29,841
06-10-85		4B	53,316
08-09-85		4B	9,286
12-29-86	Iowa Electric	11B	19,873
02-14-85	EG&G	11B	1,007
08-21-86	Commonwealth Edison/Dresden	11B	11,466
11-26-85	New England	13	39,379
12-13-85		13	38,239
12-27-85		13	4,929
06-23-86	Dupont	13	7,032
09-18-85	Northern State Power	11B	1,888
10-09-85		11B	1,466
01-16-86		11B	26,915
10-30-85	3M	11B	1,508
11-05-85		11B	1,407
11-14-85		11B	1,490
09-25-85	Nebraska Public Power	11B	3,116
10-24-85		11B	15,376
11-12-85		11B	1,368
11-20-85		11B	1,920
12-05-85		11B	1,920
12-06-85		11B	2,070
12-23-85		11B	1,998
12-30-85		11B	1,711

<u>DATE</u>	<u>GENERATOR</u>	<u>DISPOSAL UNIT(S)</u>	<u>SHIPMENT ACTIVITY (Curies)</u>
09-23-86	Bulova Watch Company	13	3,045
04-19-85	Portland General Electric	11B	1,637
04-30-85		11B	1,637
05-20-85	Isotex	11B	3,436
04-06-87	Wastechem	11B	11,597
10-22-82	Applied Technology	10	6,000
02-04-83	Douglas Aircraft	7	3,107
12-13-82	Cyclotrons Corp.	10	5,444
07-28-82	ICN	10	1,137
03-23-83		7	8,010
10-11-83		7	8,155
05-23-84		9B	8,363
07-18-83	Moravek Biochemicals	7	3,102
11-26-84	US Ecology (Pleasanton)	9A	3,071
07-16-84	Northeast Nuclear	4B	53,118
10-09-84		4B	53,118
11-19-84		4B	53,118
11-10-82	Nuclear Diagnostics	10	4,663
04-03-84	EG&G	9B	1,087
11-19-84		9B	1,020
11-21-84		9B	1,057
07-07-82	HQS, US Army Arrcom	10	2,036
09-06-83	Army Armament, Rock Island	7	1,094
11-28-83	New England Nuclear	9A	27,916
11-30-83		9A	8,701
12-22-83		9A	34,388
09-04-84	Neutron Products	9B	1,330
07-07-82	NRD Div., Mark IV Ind.	10	2,365
09-27-83		7	2,276
12-03-84		11A	2,061
12-16-82	Safety Light Corp.	10	8,352
06-15-84	Automation Industries	9A/9B	2,541
03-08-83	Art Griffin, MD	7	2,250