

*See Pocket for
Envelope*

000/CDP/83/06/02/0

- 1 -

JUN 03 1983

WM Record File 101.4 WM Project 10
Docket No. _____
PDR _____
LPDR _____

Mr. James B. Hovis
Hovis, Cockrill, Weaver,
and Bjur
316 N. 3rd Street
P. O. Box 487
Yakima, WA 98907

Distribution: _____

(Return to WM, 623-SS) C2

Dear Mr. Hovis:

As you requested during our telephone conversation last week, I am enclosing a copy of the Environmental Impact Appraisal for renewal of the Special Nuclear Material disposal license at the Hanford low-level waste disposal facility, along with a copy of Amendment 3, which both amended and reissued the license.

Sincerely,

EFH

Edward F. Hawkins, Section Leader
Site Suitability and Design Section
Low-Level Waste Licensing Branch

Enclosures:
As stated

cc: Mr. Dean Tousley

DISTRIBUTION:
Subject file DRMattson
NMSS r/f DKunihiro, Reg. V
REBrowning
JOBunting
EFHawkins
RMacDougall
JJSurmeier
MSKearney

OFC : WMPI *RMH* : WMLL *EFH* : : : : : :
NAME : RMacDougall : EFHawkins : : : : : :
DATE : 83/06/03 : 83/06/3 : : : : : :

8307270476 830603
PDR WASTE
WM-10 PDR

1/18/80 *Clf*

*Envelope to
6/3/83 memo
from Hawker
to House*



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Environmental Impact Appraisal for Renewal
of the Special Nuclear Material Disposal License
at the Nuclear Engineering Company's Hanford Facility

Summary

The action under consideration is renewal of the Nuclear Engineering Company's (NECO) license for disposal of special nuclear material (SNM) waste at NECO's shallow land burial facility located in the center of the Hanford Reservation near Richland, Washington. Renewal of the SNM disposal license will not result in any significant impact on the environment, and therefore does not require preparation of an environmental impact statement. In this action, NRC has considered three alternatives: (1) denial of the application for renewal, (2) renewal of the license, (3) renewal of the license incorporating upgraded safety requirements and further reducing potential environmental impacts. NRC believes the third alternative to be the most viable.

The renewed license is being issued for two years, after which NRC will reassess the terms and conditions of the license in light of forthcoming regulations for low-level waste (LLW) disposal. (NRC is currently drafting these LLW regulations and expects to issue them as proposed regulations within a year, with final regulations promulgated approximately a year later.) At the Hanford site, the NRC SNM license authorizes disposal of small quantities of plutonium, uranium-233, and uranium-235. However, after February 29, 1980 the disposal of plutonium is prohibited. As Washington is an Agreement State, the State of Washington licenses possession and disposal of source and byproduct material at the site.

Potential impacts (including operational effluents) from disposal of SNM waste at the NECO site are only a small increment of potential impacts from disposal of source and byproduct material at the site. Furthermore, the potential impacts from the entire NECO disposal operations, including NRC and State licensed activities, are only a small increment of the significantly larger waste management activities at the surrounding DOE Hanford Reservation. In 1975, a final environmental statement was published (ERDA-1538) which analyzed the potential impacts of the DOE waste management activities and found these potential impacts to be negligible.

Alternatives

Three alternative actions were considered by NRC staff: (1) denial of the renewal application, (2) renewal of the license, and (3) renewal of the license incorporating upgraded safety requirements and further reducing potential environmental impacts.

There is currently a continuing generation of small quantities of SNM waste for which safe disposal is essential. Three disposal sites in the country are currently licensed to accept small quantities of SNM-contaminated waste for disposal--Beatty, Nevada, Barnwell, South Carolina, and Hanford, Washington. Denial of the renewal application at Hanford could result in increased transportation risks as waste generators currently disposing of SNM waste at the Hanford site are forced to ship SNM waste to one of the two other sites. Also, with capacity available at only three sites, all remaining capacity needs to be fully utilized and maximum flexibility maintained. This alternative is therefore not a desirable one.

The next alternative is to renew the disposal license. As discussed below, the Hanford site is well suited for disposal of small quantities of SNM waste. However, NRC staff believe that there are a number of areas in which current site practices could be improved to enhance operational safety and further minimize potential environmental impacts. One obvious example is the need for improved requirements for waste form and packaging and inspection of as-received waste at the site for compliance with NRC regulations and license conditions. Therefore, this second alternative is also not desirable.

NRC believes the third alternative--to renew the license incorporating requirements to enhance operational safety and further reduce potential environmental impacts--is the most viable alternative. This alternative provides for the safe disposal of SNM waste in addition to improved site operating procedures. As part of this alternative, NRC believes that the renewed license should be renewed for a limited time period (two years), after which the terms and conditions of the license should be reevaluated in light of forthcoming regulations for LLW disposal. NRC is currently drafting the LLW regulations and expects to issue them as proposed regulations within a year, with final regulations promulgated approximately a year later.

The Site and Wastes

Figure 1 illustrates the location of the Hanford Reservation--a national laboratory operated by the Department of Energy (DOE)--within the State of Washington.¹ The Hanford Reservation is a 560 square mile site located in the Pasco Basin, a semiarid region of southeastern Washington

in the rain shadow of the Cascade range. The average annual precipitation at the Reservation is 6.25 inches. The Reservation boundaries lie mostly within Benton County, with portions of Franklin and Grant Counties also included. The Columbia River flows through the northern edge of the Hanford site forming part of the eastern boundary. The westernmost boundary is about 30 miles east of Yakima, Washington. The closest population center, Richland, Washington, is located three miles from the most southern portion of the Reservation boundary.

The Hanford complex consists of 60 major buildings which are generally supported by operations involving several other structures. (See Figure 2)² These facilities include nuclear reactors for plutonium production (100 areas); fuels and plutonium processing and high- and low-activity radioactive waste management (200 areas); fuel fabrication (300 areas); the Fast Flux Test Facility (400 areas); central service facility (1100 areas); on-site construction services (3000 areas); and administrative services (700 areas). These facilities provide for a broad range of research, engineering, and test capabilities.

Since the Hanford complex was established in 1943, radioactive waste generated during government defense and research operations has been stored or disposed of on site. High-level waste generated from processing production reactor fuels are stored in the 200 areas--generally in large tank farms. The volume of high-level waste stored in the tank farms is $1.78 \text{ E} + 5 \text{ m}^3$ and the activity is $1.08 \text{ E} + 8$ curies. DOE low-level waste has been disposed of in 370 separate locations in the 100, 200, and 300 areas (with a total combined liquid and solid disposed volume of about $1.8 \text{ E} + 6 \text{ m}^3$ having a total activity of about $1.7 \text{ E} + 6$ curies); but more recently, both solid and liquid low-level waste

has been disposed of exclusively in the 200 areas. Low-Level liquid wastes are discharged into the ground through the use of ponds and cribs. Solid low-level waste is disposed of by shallow land burial. Some of the existing disposed of LLW contains transuranic (TRU) isotopes. (TRU isotopes, which include plutonium isotopes, are isotopes having atomic numbers greater than 92.) However, in 1970, the Atomic Energy Commission, DOE's predecessor, instituted a policy whereby government waste containing plutonium isotopes in concentrations exceeding 10 nCi/gm was consigned to retrievable storage pending disposal into a repository. This policy is being continued by DOE and currently, TRU waste is being retrievably stored at five locations in the 200 areas. The volume and activity of the TRU waste stored are, respectively, $7.8 \text{ E} + 3 \text{ m}^3$ and $1 \text{ E} + 5$ curies.²

The NECO site on the Hanford reservation is used for disposal of waste generated from the commercial industry and was originally licensed by the AEC in 1965. The NECO site is located (See Figure 2) on 1000 acres of land leased from the Federal government to the State of Washington, who then sub-leases 100 acres of land to NECO for the disposal site. The term of the lease between the State and the Federal government is for 100 years.

Since December 31, 1966, when the State of Washington became an Agreement State, disposal of source and byproduct material at the NECO site has been regulated by the State. NRC only regulated disposal of special nuclear material, including uranium-233, uranium-235, and plutonium. Neither the State nor NRC regulate DOE waste management operations at the surrounding Hanford Reservation.

Figure 3 is a scaled drawing of the NECO site.³ Only five trenches have been used thus far for disposal of solid waste received at the site. No liquid SNM waste has ever been received. Table 1 presents a trench-by-trench

analysis through August 1978 for the Richland site.⁴ Table 2 lists yearly volumes and quantities of waste received from 1973 through 1978.^{4,5,6} Table 3 provides trench-by-trench estimates of disposed of SNM volumes.⁴ As can be seen, the volume of SNM waste received at the site has been a fraction (11-35%) of the total volume of waste received at the site. (As discussed below, this fraction is expected to decrease.) The tables also illustrate that the majority of the SNM waste received at the site has been contaminated with uranium-235 and plutonium. The uranium-235 waste is generated from a number of sources, but mainly consists of calcium fluoride waste generated during conversion of enriched UF_6 to UO_2 as well as uranium fuel fabrication scrap or other contaminated trash. The plutonium waste mainly consists of scrap and trash from decontaminating small plutonium laboratories and hot cells, or waste from decontaminating small mixed oxide fuel fabrication facilities. In addition, some plutonium contaminated waste is generated through uranium fuel research and development activities.

In response to an NRC request, the licensee has projected a yearly average of approximately 18,000 cubic feet of SNM waste to be received at the site over the next few years.⁴ As the licensee was including plutonium-contaminated waste in this estimate, NRC staff believe that the estimate overstates the probable case. On November 29, 1979 the State of Washington issued Amendment No. 10 to the State byproduct and source material License No. WN-1019-2, renewing NECO's license and amending it in its entirety. The renewal license prohibits receipt and burial of TRU wastes in concentrations greater than 10 nanocuries per gram (nCi/gm) after February 29, 1980. In keeping with the

wishes of the State and consistent with the revised State license, the renewed NRC license prohibits disposal of wastes containing plutonium isotopes in concentrations exceeding 10 nCi/gm of waste. After February 29, 1980, only SNM waste contaminated with uranium-233 and uranium-235 will be authorized for receipt and disposal.

Potential Environmental Impacts

NRC expects the potential environmental impacts of continued disposal of small quantities of enriched uranium waste to be negligible, especially compared with the large quantities of government-generated radioactive waste which continues to be stored and disposed of on the surrounding Hanford Reservation. In December 1975, the Energy Research and Development Administration (ERDA), DOE's predecessor agency, published the "Final Environmental Statement on Waste Management Operations, Hanford Reservation, Richland, Washington" (ERDA-1538).¹ This document provides a detailed discussion of the hydrological, ecological, geological, and seismological characteristics of the site and surrounding areas, in addition to providing demographic and archeological data. The document also analyzes the potential environmental effects of normal waste management operations at the reservation, in addition to the potential effects of unlikely natural phenomena such as earthquakes, tornadoes, and floods, as well as accidents such as fires in waste disposal trenches. The environmental statement found such potential impacts from DOE wastes to be negligible. This conclusion is supported by hundreds of other published documents discussing the Hanford environment and waste management activities. See, for example, "Radioactive Waste Management" (TID-3349, August 1973) - a bibliography of over 2,000 studies and documents pertaining to the Hanford Reservation. A more recent document, by Geiser and Brown ("Assessment of Hanford Burial Grounds and Interim TRU Storage") was published in August 1977.⁷

For perspective, consider current DOE practices at the Hanford Reservation regarding liquid waste storage and disposal. As stated above, DOE is currently storing several million gallons of high-level waste in the 200 areas and has repeatedly discharged low-level liquid wastes into the ground in the 200 areas through the use of ponds and cribs. In ERDA-1538, the potential environmental impacts of low-level liquid waste discharge were analyzed and were determined to potentially result in an upper-bound dose of less than 10^{-6} mrem/yr to an individual potentially consuming water withdrawn from the aquifer underlying the Reservation. Furthermore, in the very unlikely case of a hypothetical accidental release of the entire contents of a DOE high-level waste tank (800,000 gallons), the maximum projected dose to an individual potentially consuming water withdrawn from the aquifer is 0.4 mrem/yr.¹

On the other hand, only dry solid waste containing no free standing liquids is allowed to be disposed of at the NECO Hanford site. The NECO site is located between the 200 E and 200 W areas (See Figure 2). The 200 areas are approximately 100 meters above the water table in an arid environment (an average of 6.25 inches of rain per year) in which the evapotranspiration rate greatly exceeds the precipitation rate. The soil underlying the site consists of glacio-fluvial sedimentary deposits consisting of sands, silts, and gravel. As discussed by Geiger and Brown:

....Meteoric water does not percolate to the water table over most of the Reservation, but rather enter the ground to a maximum depth of two to four meters where the water is held by strong capillary forces. Moisture is then slowly returned to the atmosphere via evapotranspiration. The net flux of soil moisture appears to be from the water table upward in the vapor phase with the geothermal gradient acting as the principal driving force. In this environment, the potential for dissolution and transport of radionuclides from dry wastes by meteoric water is small.

Infiltration rates have been measured for liquid waste disposal sites and have been found to be from about 0.40 to 0.50 cubic meters per square meter per day or the equivalent of about 16 to 22 millimeters of water per hour. Thus, rainfall is rapidly absorbed by the soil where it is held by capillary forces until it is released by evaporation. Under these conditions, surface runoff is negligibly small

Exceptions exist on the steep slopes of Rattlesnake Hills, Gable Butte and Gable Mountain; however, burial grounds are located well beyond the influence of such steep topographic features. Limited local runoff and ponding may occur during periods of rapid snow-melt over frozen ground; however, deep erosion of burial grounds by this mechanism is unlikely.

Thus, there appears to be little likelihood that disposed of waste in the NECO site will give rise to a potential off-site dose due to groundwater migration. The waste received at the site is a dry solid and there is essentially no driving force to move the buried waste to the underlying aquifer. It could possibly be conjectured that a flood could inundate the site and thus provide the driving force. However, the location of the NECO disposal facility is about six miles from the closest potentially inundated area on the Reservation and well above the maximum level of the postulated maximum probable flood. It is therefore extremely unlikely that floods could be of concern.¹

There are no SNM waste processing activities at the site and all SNM waste is received and buried in packaged containers. Thus, there are essentially no routine atmospheric releases. However, if it is postulated that waste containers have small leaks, surface contamination, or are ruptured occasionally and that the ensuing minor release is available for atmospheric transport, then theoretically a small quantity of SNM may be released. The licensee has provided NRC with an analysis of such a situation and the results of the analysis indicate that the impacts would have negligible effects.

Studies at two disposal sites located in humid environments (West Valley,

New York, and Maxey Flats, Kentucky) have indicated that small quantities of radioactive material can be transported through trench covers and into the atmosphere as gaseous compounds generated from decomposition of buried radioactive waste. Observed gaseous radioactive compounds include $^3\text{HCH}_3$, ^3HHO , ^3HH , and other tritiated hydrocarbons, as well as ^{85}Kr , ^{222}Rn , ^{14}CO , $^{14}\text{CH}_4$, and ^{14}C -hydrocarbons.^{8,9} None of the observed gaseous compounds include SNM material. In addition, the requirement for increased disposal trench cover and the arid nature of the disposal site environment (resulting in a significantly slower waste decomposition rate) are expected to reduce potential transport of gaseous non-SNM compounds to lower levels than those observed at the two humid sites.

Potential natural events that could be considered include the actions of hurricanes or tornadoes. Because of the inland nature of the facility, effects from a hurricane are highly improbable.² Tornadoes are very rare in the region of the Reservation, and tend to be small, causing little damage when they do occur. In 29 years of observation, a single small tornado was observed on the Reservation which resulted in no damage.² One analysis of the probability of a tornado striking the Hanford site and scattering unburied SNM waste has computed a probability of less than $2.7 \text{ E } \times -7$ per year.¹⁰

Other potential events can be postulated, including effects from potential accidental operational releases due to damaged containers, potential fires in disposal trenches, or other types of accident scenarios. Such events have been considered by the licensee and by DOE and have been calculated to have negligible effects.^{1,10} Of more interest are conditions in the renewed SNM

license¹¹ which would even further reduce the probability of such events occurring or minimize the effects of the events even if they do occur. For example:

- (1) After February 29, 1980, receipt and disposal of plutonium waste at the site is prohibited.
- (2) The potential for leaks and spills of waste at the site is reduced due to new requirements for improved waste forms, waste packages, and waste packaging techniques. License conditions include a prohibition of free standing liquid in the waste, a requirement to overpack leaking SNM waste packages prior to disposal, and improved inspection procedures for incoming shipments.
- (3) The renewed license prohibits packaging of waste into cardboard or fibreboard cartons or containers. This requirement will further reduce the potential risk of fire and will improve operational safety.
- (4) The maximum depth of cover for the waste buried at the site has been increased from three feet to eight feet. This reduces the potential for contact of the waste by animals and deep rooted plants, contact of the waste by man, and potential exposure of the waste by wind erosion. In addition, a rock covering at least 6 inches thick is required to be placed atop the completed trenches to minimize wind erosion.

Other requirements in the renewed SNM license include:

- (5) Improvement and expansion of the applicant's environmental

monitoring program. (It should also be noted that the State has an environmental monitoring program at the site, and DOE has a very extensive program for the surrounding Reservation.)

- (6) More specific requirements for management audits.
- (7) Disposal of higher activity low-level waste material at greater depths in the disposal trenches, thus further removing such higher activity material from potential contact by man.
- (8) A requirement that the applicant prepare and submit a site closure and stabilization (decommissioning) plan. The purpose of this plan is to ensure that at the time of license termination, the site and disposed of waste have been stabilized so that no active maintenance of the site is required by the eventual site custodian.
- (9) Improvements in the recordkeeping and reporting requirements on the part of the licensee.
- (10) Improvements in the licensee personnel radiation protection program. Such improvements include more specific requirements for use of protective clothing and radiation instrumentation, and more specific requirements for personnel and disposal site decontamination. Other conditions, such as improved packaging requirements, greater depth of burial of higher activity material, and increased depth of cover over trenches, are expected to also further improve personnel radiation safety.

Finally, the issue of potential criticality of the SNM waste received at the site must be addressed. Numerous controls are in the renewed license to preclude such a possibility. For example, the prohibition of plutonium receipt and burial at the site will significantly reduce the quantity of SNM received at the site. Other requirements include the following:

- (1) No single package shall contain more than 100 grams of uranium-235, 60 grams of plutonium, or 60 grams of uranium-233, or any combination thereof, such that the sum of the ratios of the quantity of each special nuclear material to the quantities specified above does not exceed unity.
- (2) No single package shall contain more than 15 grams of any combined uranium-235, uranium-233, and plutonium per cubic foot of total volume.
- (3) Each accumulation of packages shall contain not more than 500 grams of uranium-235, 300 grams of uranium-233, or 300 grams of plutonium, or any combination thereof, such that the sum of the ratios of the quantity of each special nuclear material to the quantities specified above does not exceed unity.
- (4) Each accumulation of packages as described in item 3 above shall be stored at least 12 feet from any other package containing SNM.
- (5) Any accumulation of packages containing SNM in the quantities specified in item 3 above shall be buried in such a manner as to have a minimum of 8 inches of earth in all directions from any

other package containing SNM.

The licensee has also provided NRC with a criticality analysis of SNM waste received at the site.¹² The analysis indicates that even under unlikely, essentially unrealistic assumptions in which many of the restrictions discussed above are violated, the SNM waste received, stored or disposed of at the site would still be in a subcritical condition.

References

1. Final Environmental Statement, Waste Management Operations at the Hanford Reservation, Richland, Washington, ERDA-1538, U.S. Energy Research and Development Administration, December 1975.
2. Regulation of Federal Radioactive Waste Activities: Report to Congress on Extending the Nuclear Regulatory Commission's Licensing or Regulatory Authority to Federal Radioactive Waste Storage and Disposal Activities, NUREG-0527, U.S. Nuclear Regulatory Commission, September 1979.
3. Fact Sheet: NECO Low-Level Radioactive Waste Disposal Facility, Richland, Washington, Nuclear Engineering Company (NECO), February 1979.
4. Baer, T.S., December 5, 1978 letter fromm NECO to M.J. Bell, USNRC.
5. Records of the Nuclear Material Information System (NMIS), 1979.
6. U.S. Nuclear Regulatory Commission Records, 1979.
7. Geiger, J.F., D.J. Brown, Assessment of Hanford Burial Grounds and Interim TRU Storage, RHO=CD=78, Rockwell International, August 1977.
8. Lu, A.H., J.M. Matuszek, "Transport Through a Trench Cover of Gaseous Tritiated Compounds from Buried Radioactive Wastes," International Symposium on the Behavior of Tritium in the Environment, San Francisco, CA, 16-20 October 1978.
9. Clancy, J., et. al., "Maxey Flats Facility Studies, Progress Report No. 2, January - March 1979, " Dames and Moore for the Kentucky Department for Human Resources, May 1979.
10. Baer, T.S., January 30, 1979 letter from NECO to M.J. Bell, USNRC.
11. U.S. Nuclear Regulatory Commission Special Nuclear Material License No. 16-19204-01.
- 12.. Baer, T.S., May 21, 1979 letter from NECO to M.J. Bell, USNRC.

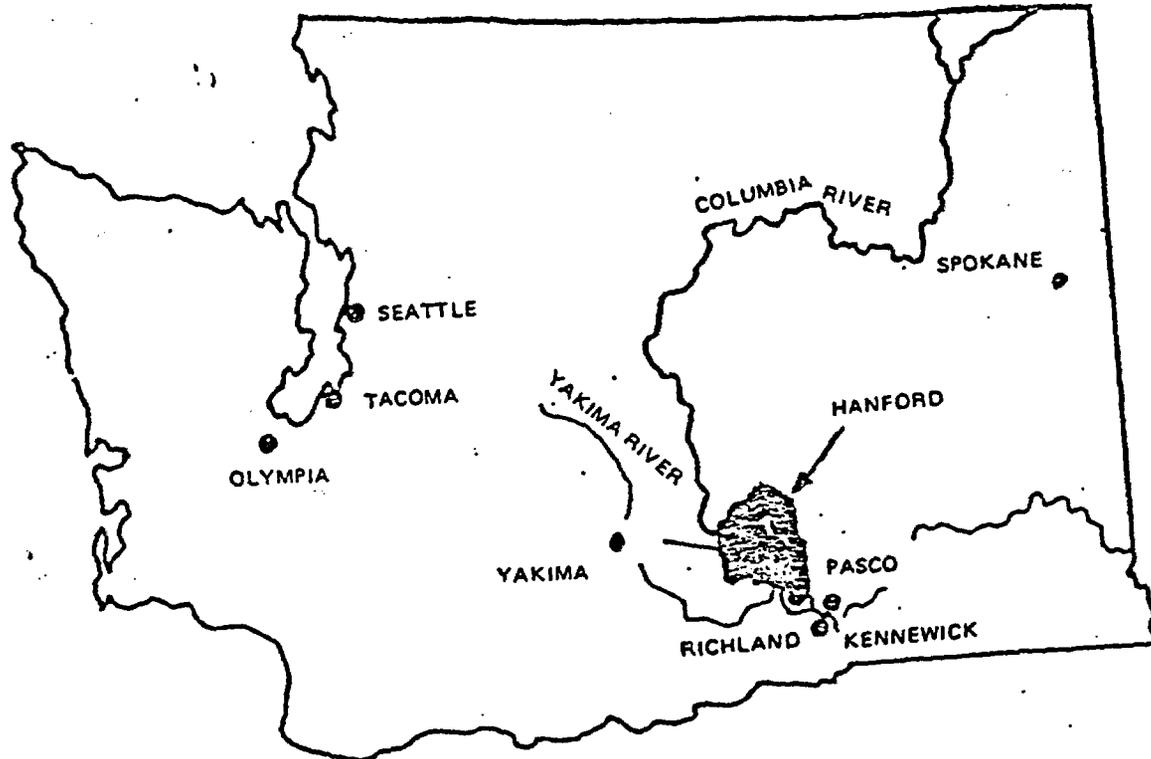


FIGURE 1

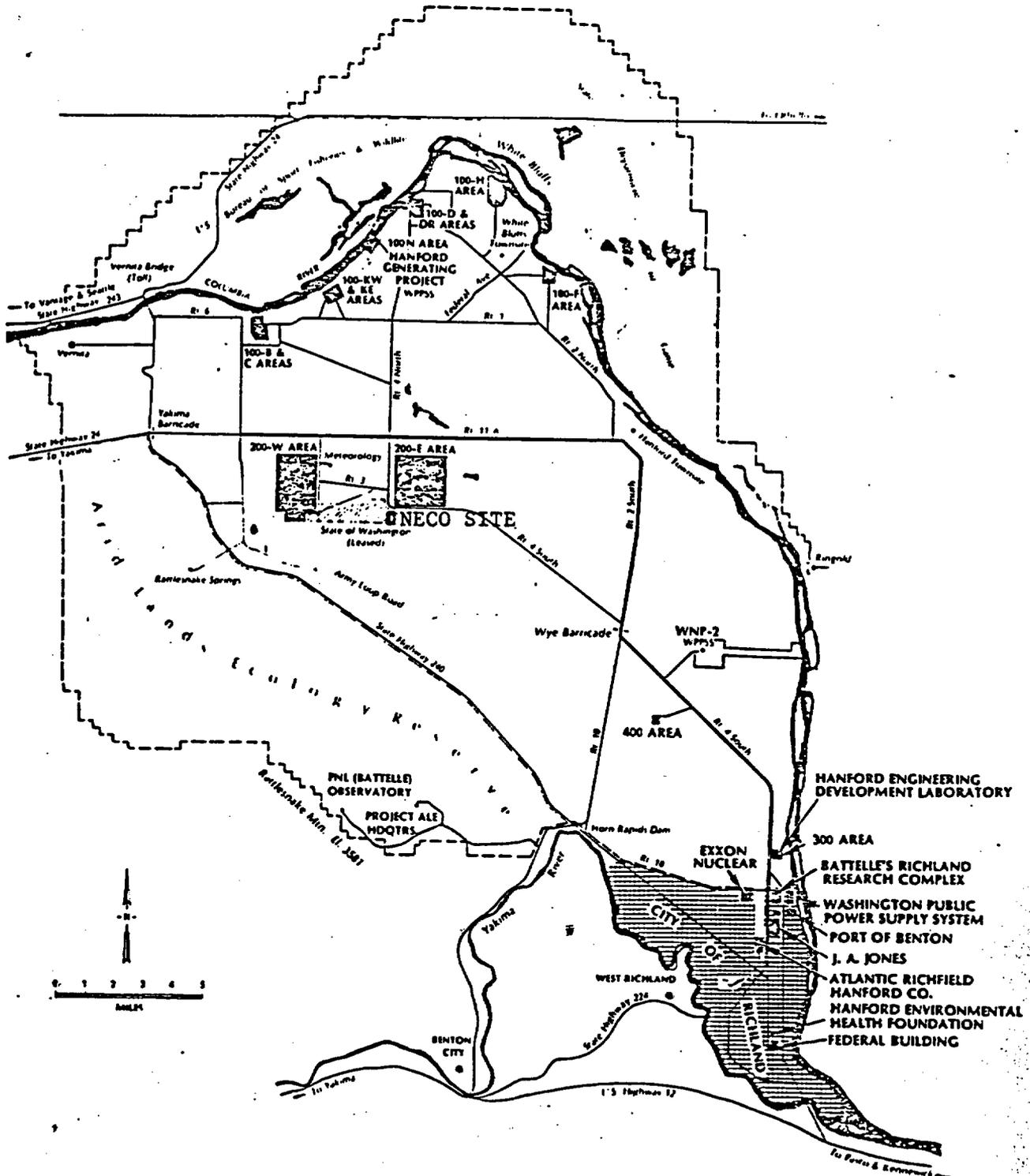


FIGURE 2

TABLE 1

WASTE BURIAL ANALYSIS THROUGH AUGUST, 1978 RICHLAND, WASHINGTON FACILITY

<u>TRENCH NUMBER</u>	<u>TOTAL CU. FT.</u>	<u>BY-PRODUCT (CURIES)</u>	<u>PLUTONIUM (GRAMS)</u>	<u>U-233 (GRAMS)</u>	<u>U-235 (GRAMS)</u>	<u>TOTAL SNM (GRAMS)</u>	<u>SOURCE POINTS</u>
1	63,571.3	1,106.36	*	*	*	816.03	53
2	148,075.6	168,855.07	16.945**	0	176.78**	861.81	1,63
3	129,549.1	101,690.10	1,640.79	0	13,149.93	14,790.72	11,95
4	300,646.1	247,660.0	28,993.09	0	64,024.65	93,017.74	24,50
5	148,002.61	1,334.13	25.65	0	56.42	82.07	0

*Figures not available

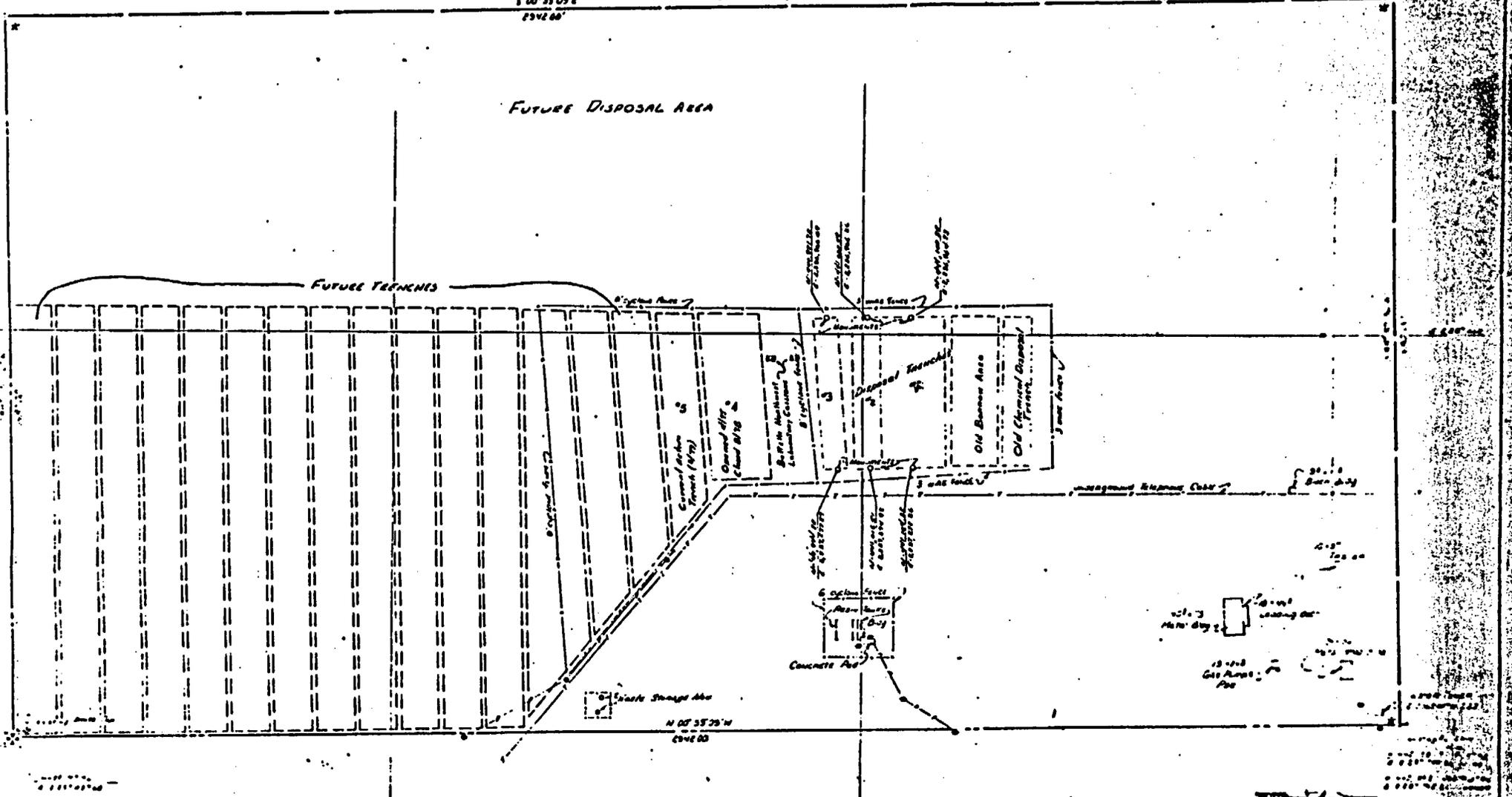
**Data incomplete, isotopic data not reported prior to June 1970.

SECTION 9, TOWNSHIP 12 NORTH, RANGE 26 EAST, W.M.
BENTON COUNTY, WASHINGTON

S 00° 35' 05" E
2342.60'

FUTURE DISPOSAL AREA

FUTURE TRENCHES



General Trench Movement #1
From 8-1-58 and Closed 8-1-60
Total Volume 100,000 cu yd
Total Slurry Volume 100,000 cu yd

General Trench Movement #2
From 8-1-58 and Closed 8-1-60
Total Volume 100,000 cu yd
Total Slurry Volume 100,000 cu yd

General Trench Movement #3
From 8-1-58 and Closed 8-1-60
Total Volume 100,000 cu yd
Total Slurry Volume 100,000 cu yd

W. J. Kelly
10/1/58

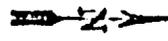
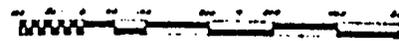


FIGURE 3

AS 2-1	
Richard J. Kelly	
10/1/58	
1	100
2	100
3	100

TABLE 2

WASTE BURIAL ANALYSIS--RICHLAND, WASHINGTON FACILITY

<u>YEAR</u>	<u>TOTAL CU. FT.</u>	<u>BY-PRODUCT (CURIES)</u>	<u>SNM/ TRANSURANICS CU. FT.</u>	<u>PLUTONIUM (GRAMS)</u>	<u>U-233 (GRAMS)</u>	<u>U-235 (GRAMS)</u>	<u>SOURCE POUNDS</u>
1973	36,511	61,669.89	4,114.90	126.9	0	6,916.46	4,956.4
1974	46,837	12,173.1	12,051.18	802.26	0	4,483.0	44.75
1975	59,318	113,340.19	14,888.75	11,137.67	0	7,376.8	464.05
1976	94,506	104,297.14	33,068.10	12,940.53	1 (a)	21,407.79	11,036.59
1977	96,022	7,465.0	17,560.13	1,880.62	53 (a)	26,056.86	6,063.6
1978 (b)	290,000	220,600	-	4,920	39 (a)	14,880	13,000

(a) From Reference 5.

(b) From Reference 6.

TABLE 3

ESTIMATES--SPECIAL NUCLEAR MATERIAL BURIED

<u>TRENCH</u>	<u>START</u>	<u>STOP</u>	<u>ESTIMATED SNM VOLUME CU. FT.</u>
1	9/65	8/66	1,000
2	8/66	11/66	1,000
3	12/71	3/75	20,000
4	4/75	8/78	78,000
5	4/78		

- Chp

3-29-83

CORRECTED COPY

SPECIAL NUCLEAR MATERIAL LICENSE
US Ecology, Inc.
Docket No. 27-48

License No. 16-19204-01
Amendment 3

Pursuant to Application dated September 27, 1982, License No. 16-19204-01 is renewed in its entirety to read as follows: Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (PL 93-478); 10 CFR 70, "Domestic Licensing of Special Nuclear Material," and in reliance upon the statements and representations contained in the renewal application dated February 24, 1978, as amended, a license is issued to US Ecology, Inc., 9200 Shelbyville Road, Louisville, Kentucky 40207, to receive, transport, possess, package, overpack, store and dispose of Special Nuclear Material at its facility located on the U.S. Department of Energy Reservation, Benton County, Washington. Under the authority of 10 CFR Part 70, Section 70.14, NRC grants an exemption to the Licensee from provisions of 10 CFR Part 70, Section 70.24 as they apply to Special Nuclear Material activities authorized under this license. This amendment supersedes all licensed activities at the Benton County site previously licensed under NRC License No. 13-10042-01 and this license; and shall expire November 30, 1985.

This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to the provisions of 10 CFR 19, "Notices, Instructions and Reports to Workers; Inspections" and 10 CFR 20, "Standards for Protection Against Radiation" and all other applicable rules, regulations, orders of the U.S. Nuclear Regulatory Commission now or hereafter in effect, and to the following conditions:

Acc.#
8303010336

Conditions - General

- (1) Special nuclear material may be received and disposed of only by burial at a site located in the southeast corner of Section 9, Township 12, North Range 26, EMW, Benton County, Washington. Except where specifically superseded by the following conditions, operations shall be conducted in accordance with the licensee's "Radiological Control and Safety Manual," Revision 1 as reissued 1/1/83, and "Site Operations Manual," Revision 1 as reissued 1/1/83 at the licensee's facility.

- (2) Operations at the site shall be conducted by a site manager, an assistant site manager or a site radiation safety officer who meet the qualifications stipulated for these individuals in the licensee's Radiological Control and Safety Manual and Site Operations Manual. In the event that a new site manager, new assistant site manager, or a new site radiation safety officer is employed, notification shall be provided to the NRC Region V Office and the Director of the Division of Waste Management within 30 days of employee hiring. All licensee site employees must satisfactorily complete the licensee's training program as set forth in Chapter 7 of the above listed manuals.

- (3) The licensee shall not store any waste at the site for more than six months from date of receipt.

- (4) Changes, Tests, and Experiments
 - (a) The licensee may, upon notification to the NRC Division of Waste Management but without prior approval, and subject to the provisions of subparagraph (b) below:
 - (i) Make changes in the disposal facility as described in the application;

 - (ii) Make changes in the detailed work procedures as described in the application;

- (iii) Conduct tests or experiments not described in the application.
- (b) Prior NRC Division of Waste Management approval is required if the proposed change, test or experiment:
 - (i) May potentially increase releases of radioactive material to unrestricted areas or otherwise cause a potential decrease in the protection of the health and safety of individuals in unrestricted areas now or in the future; or
 - (ii) May potentially increase radiological exposures to site personnel or otherwise cause a potential decrease in operational safety.
- (c) The licensee shall maintain records of changes in the disposal facility and of changes in procedures made pursuant to this condition, to the extent that such changes constitute changes in the disposal facility or procedures as described in the application. Records of tests and experiments carried out pursuant to subparagraph (a) of this condition shall also be maintained. These records shall include a written safety evaluation which provides the basis for the determination that the change, test, or experiment does not involve conditions described in subparagraph (b) above. The licensee shall furnish to the NRC Region V Office, with copies to the Director of Inspection and Enforcement and the Director of the Division of Waste Management, U.S. NRC, Washington, D.C. 20555, within thirty days following the changes, tests, or experiments a report containing a description of such changes, tests, or experiments, including a summary of the safety evaluation of each.
- (6) A monthly site receipt and burial activities report shall be submitted no later than the 15th day of the following month to the Director, Division of Waste Management, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 and the State of Washington Department of Social and Health Services. The report shall include tabulation of the following information for each shipment:

- name and address of the generator and shipper
 - grams of special nuclear material
- and to the extent practicable
- radionuclides and activity of each radionuclide, in millicuries
 - type and physical form of the waste
 - chemical form of the waste and solidification agent
 - total volume of Special Nuclear Material received and buried.

These data should be presented and maintained in a retrievable form to facilitate computer analysis. For example, data such as a listing of all shipments from a state, or total curies of an individual nuclide.

Conditions - Waste

(7) The licensee shall not possess unburied at any time at the facility located in Benton County, Washington, more than 5,000 grams of special nuclear material (see Condition 35 with regard to buried special nuclear material) in accordance with the following:

(a) No single package shall contain more than 100 grams of uranium-235, or 60 grams of uranium-233 or 60 grams of plutonium, or any combination thereof, such that the sum of the ratios of the quantity of each special nuclear material to the quantities specified herein does not exceed unity. Unity shall be determined by the following formula:

$$\frac{\text{grams contained U-235}}{100} + \frac{\text{grams contained U-233}}{60} + \frac{\text{grams contained Pu}}{60}$$

(b) No single package shall contain more than 15 grams of any combination of uranium-235, uranium-233, and plutonium per cubic foot of total volume.

(c) The licensee shall not receive waste containing greater than 100 nanocuries per gram of plutonium. Waste containing less than 100 nanocuries total plutonium nuclides per gram of waste is acceptable provided plutonium nuclides are evenly distributed within a homogeneous waste form.

(8) Each accumulation of packages shall contain not more than 500 grams of uranium-235 or 300 grams of uranium-233 or 300 grams of plutonium, or any combination thereof such that the sum of the ratios of the quantity of each special nuclear material to the quantities therein does not exceed unity, as described by the following formula:

$$\frac{\text{grams contained U-235}}{500} + \frac{\text{grams contained U-233}}{300} + \frac{\text{grams contained Pu}}{300} \leq 1$$

and shall be stored at least 12 feet from any other package containing special nuclear material.

(9) The licensee is not authorized to open any package containing Special Nuclear Material at the facility except for purposes of returning outer shipping containers or for purposes of package contents inspection as specifically authorized or directed by NRC. Damaged or leaking packages shall be overpacked prior to disposal and records maintained in accordance with Condition (15).

(10) The licensee shall receive at the site only Special Nuclear Material which is packaged and prepared in accordance with NRC regulations, DOT regulations and the conditions of this license including the following conditions:

(a) Liquid special nuclear material absorbed in absorbents is not acceptable for receipt for disposal unless specifically approved by

the NRC Division of Waste Management for individual waste forms or individual shipments.

- (b) The licensee shall not receive liquids, evaporator bottoms, concentrates, or other wastes containing detectable free standing liquids. For purposes of this condition, "no detectable free standing liquid" shall be defined as one percent (1.0%) by waste volume of noncorrosive liquids per container. Liquids which have been solidified with one of the solidification media specified below may be received, provided: the requirements of other conditions as specified in this license are met, and the solidified wastes contain no detectable free standing liquids. Acceptable solidification media are:
- (i) Dow media
 - (ii) Cement (Including Envirostone)
 - (iii) Asphalt
 - (iv) Delaware custom media
 - (v) Solidification media and processes reviewed and approved by the NRC Division of Waste Management and the Washington State Department of Social and Health Services (the Department).
- (c) Ion exchange resins and filter media containing special nuclear material and a total specific activity of $1 \mu\text{Ci/cc}$ or greater of materials with half-lives greater than 5 years must be stabilized by solidification and shall contain no detectable free standing liquids.
- (d) Waste packages received at the site must have been evaluated by the shipper to assure that the packages will arrive at the site without significant package deformation, loss or dispersal of the package contents, increase in the maximum radiation levels recorded or

calibrated at the external surface of the package, or significant chemical, galvanic, or other reaction among packaging components, or between the packaging components and the package contents. Except for overpacks which are removed prior to burial, cardboard, fiberboard, and paper packages are prohibited. All wooden boxes shall be banded with metal bands. Void spaces within the waste form and package should be minimized.

- (e) No pyrophoric or chemically explosive waste containing special nuclear material, or special nuclear material waste that might react violently with water or moisture shall be received for disposal at the site.
- (f) Waste containing both toxic chemicals (including pathogenic or infectious material) and special nuclear material shall require the generator to provide an independent evaluation of both hazards. If the chemical hazard exceeds the radiological hazard, the waste shall not be disposed of at the site unless treatment and packaging is specifically approved by the NRC Division of Waste Management. Records of hazard evaluation, waste treatment, and packaging shall be kept by the generator for inspection by NRC and a copy of the evaluation shall be forwarded with the shipment.
- (g) Biological (excluding animal carcasses) pathogenic, or infectious material or equipment (e.g., syringes, test tubes, capillary tubes) used to handle such material, shall be treated so that the material, if nonradioactive, could have been disposed of at a sanitary land fill. The waste container shall be restricted to a DOT 17H specification container and it shall be lined with a plastic liner (minimum 4 mil) which shall be sealed. The waste container shall be placed in a metal container meeting DOT 7A performance specifications with a heavy duty closure and having a capacity at least 40% greater than the inner container. The inner container shall be completely surrounded by an absorbent. Only absorbents approved by the NRC Division of Waste Management shall be allowed.

- (11) Biological material, including animal carcasses, containing, or contained in, radioactive materials shall be packaged in accordance with the following minimal requirements: the biological material shall be layered with absorbent and lime and placed in a metal container meeting DOT 7A performance specification and having a heavy duty closure device. The inner container shall be sealed and placed in a metal container meeting DOT 7A performance specification with a heavy duty closure device and having a capacity at least 40% greater than the inner container. The inner container shall be completely surrounded by additional absorbent material and the outer container must be sealed. Diatomaceous earth or other absorbent materials as approved by the NRC Division of Waste Management shall be used.
- (12) All metal drums with a capacity of 55 gallons or greater shall have a 5/8 inch or larger bolt for securing the closure device (ring). All metal containers shall have an in tact heavy duty closure device when presented for disposal.

Conditions - Receipt of Waste

- (13) The licensee shall maintain the capability in the licensee's health physics building for (a) safely opening and inspecting the contents of waste packages received at the site to determine compliance with site and shipping requirements, and (b) overpacking damaged or leaking waste packages as required.
- (14) Surveys of incoming vehicles shall be conducted in accordance with conditions set forth in Appendix B of this license. Surveys also shall be conducted during off-loading and handling operations to assess radiation and contamination levels and to identify problem situations. Vehicles shall be surveyed before release to determine compliance with DOT, NRC, and license requirements. Maximum radiation levels detected in receipt and release surveys shall be documented and records maintained for inspection. The requirements set forth in Appendix B are intended to define minimum requirements and are not meant to limit survey activities.

- (15) In the event that significant package deformation, loss or dispersal of package contents, or packages with maximum radiation levels in excess of DOT or NRC regulations are observed during waste receipt or an unloading operation, that operation shall be terminated. Appropriate safety measures as outlined in the Site Operations Manual or the Radiation Control Manual shall be instituted concurrent with notification to Region V, NRC, of the incident and a description of the problem areas.

The customer shipping the waste shall be advised of the situation and may be allowed up to 24 hours to provide a representative to inspect the shipment. After the representative's inspection, or if an inspection is waived by the customer or if conditions warrant an earlier decision and with approval of the Region V, NRC (except when conditions warrant immediate measures to be taken by personnel) the shipment in violation shall be either off-loaded from transport vehicles and overpacked prior to disposal, or be returned to the shipper, provided that return of the shipment would not be in violation of DOT regulations. Shipments in violation of placarding, labeling or bracing requirements may be off-loaded and disposed of. Future receipt of waste at the site from shippers in violation of any packaging requirements of this license and any applicable regulations may be prohibited until corrective actions satisfactory to the NRC and the licensee have been taken by the shipper.

- (16) Any shipment in which there is evidence that special nuclear material is missing or that the waste packages have been tampered with or damaged in transit shall be impounded by the licensee for the NRC and safely stored pending further action by NRC authorities. Any waste impounded per this condition does not constitute storage as the waste has not yet been received by licensee.

- (17) The licensee shall ensure that each radioactive shipment record form used to describe a special nuclear material waste shipment received at the site has at least the following certification properly executed by a representative of the shipper/generator of the waste: "Certification is hereby given to the U.S. Nuclear Regulatory Commission that this shipment of low-level radioactive waste has been inspected in accordance with the

requirements of U.S. NRC License No. 16-19204-01, as amended, within 48 hours prior to shipment; and further certification is made that the inspection revealed no items of noncompliance with all applicable laws, rules, regulations, and license conditions."

Date: _____ By: _____

Title and Organization: _____

Address and Telephone: _____

Waste shipments shall not be accepted at the site unless the shipments are accompanied by a completed and certified radioactive waste shipment and disposal record.

Conditions - Site Operations

- (18) Wastes containing chelating agents in packages with amounts greater than 1% of package volume shall be segregated from other wastes upon receipt, stored separately, and be disposed of either in separate trenches or in specifically segregated areas within an existing trench, and isolated from other wastes not containing chelating agents with 10 feet of site soil.
- (19) A minimum of eight feet of site soil shall separate the top of the disposed waste and the top of the trench. After final grading, the top of the trench shall be maintained at the natural grade level of the land prior to excavation.
- (20) All burial trenches, shall be in a controlled area, surrounded by a chain link fence, eight feet high, and topped with barbed wire. Filled and capped burial trenches shall be completely covered with at least six inches of large gravel and rock which shall extend at least ten feet beyond the edges of the trench. After capping, trenches shall be marked with a monument inscribed with the following information:
- (a) Total activity of radioactive material, in Curies, excluding source and special nuclear materials; total amount of source material in

kilograms; and total amount of special nuclear material, in grams, in the trench;

(b) Trench number;

(c) Date of filling and capping the trench; and

(d) Volume of waste in the trench.

- (21) The licensee shall bury any accumulation of packages containing special nuclear material in the quantities specified in Conditions (7) and (8) in such a manner as to have a minimum of eight inches of site soil or a minimum of four feet of non-special nuclear material bearing waste in all directions from any other package containing special nuclear material.
- (22) The licensee should conduct operations in a manner which will minimize dispersal of excavated material by wind, and minimize wind erosion of the filled trenches.
- (23) Permanent records shall be kept which show the boundaries of each trench or other waste disposal area. Boundaries of each trench or disposal area shall be located by engineering survey and reference to bench marks or other permanent features such that the boundaries can be accurately located at a later date.
- (24) Those wastes having radiation readings, without shielding, in excess of 10 R/hr but less than 100 R/hr at any package surface, must be placed at a minimum depth of 20 ft. below the natural grade level of the land. Wastes with radiation readings in excess of 100 R/hr on the package surface shall be placed at a minimum depth of 30 feet below the undisturbed elevation of the site surface. The intervening space between the top of the waste and the surface may be filled with other waste received for disposal provided that the requirements of this Condition and other conditions are met.

(25) Licensee personnel shall wear protective clothing (at a minimum, coveralls and gloves) at all times while handling or disposing of radioactive waste at the disposal site. The licensee shall provide change rooms for the employees and maintain procedures for checking for contamination and decontaminating clothing and personnel. Additional onsite safety equipment (including respiratory equipment, fire extinguishers, and safety showers) must be provided and tested at least once every six months. Standard operating procedures for use, maintenance, and cleaning of respiratory equipment shall be followed by the licensee, included in employee training, and implemented if such equipment is used.

(26) Waste handling and disposal operations shall be conducted according to specific written procedures as included in the licensee's Site Operations Manual. At a minimum, procedures shall be written for (a) overpacking operations, (b) decontamination operations, including packaging and disposal of removed contamination, (c) handling and disposal of special nuclear material delivered to the site, including handling and disposal of solid low-activity waste, organic and biological waste, and high-gamma content waste requiring shielding, and (d) inspection of waste packages.

These procedures and all other written procedures governing site operations shall at a minimum include the following information:

- (a) The personnel required and their responsibilities;
- (b) The equipment required for performing the operations (including requirements for protective equipment and clothing) as well as for radiation monitoring and surveillance;
- (c) Who is responsible for assuring that the required personnel and equipment are available and used properly;
- (d) The specific uses of equipment and personnel actions, including use of time, shielding, and distance, to ensure that operations are conducted in a manner to ensure that radiation exposures are as low as reasonably achievable.

In any disposal, decontamination, or overpacking operation, an employee(s) shall be designated whose sole responsibility shall be surveying, monitoring and recording radiation levels, and correlating received waste packages with information contained in the shipment manifest documents. This employee shall be physically present at all times during operations and be equipped with a calibrated and functioning survey meter.

(27) SNM waste receipt, handling, packaging, repackaging and disposal operations shall not be conducted unless, at a minimum, the following number of properly calibrated and properly functioning radiation detection instruments and samplers are available onsite. Radiation detection instruments, except pocket dosimeters, in order to be used under this license, shall be calibrated at intervals not to exceed six months. Each scale of the instrument shall be calibrated at approximately one-third and two-thirds of full scale. The licensee shall have available, at the site, instrumentation capable of measuring contamination levels in the attached Appendix A, Part II (assuming smear samples are taken over an area 100 cm²):

- (a) One continuous air sampler to be used in the area in which the disposal operations are taking place. In addition a sampler shall be available as required for collecting iodine vapors. Potentially contaminated air is to be sampled and air sample filters analyzed in accordance with site operating procedures.
- (b) One continuous air sampler to be used during any waste package content inspection or overpacking operation for the purpose of assessing airborne concentration levels and identifying the need for respiratory equipment at the location where the operations are being conducted. As required, air sampling media shall be capable of collecting iodine vapor.
- (c) At least two survey meters for measuring low radiation levels of beta-gamma shall be available at the site. At least one meter must be in use in the area in which receipt, handling and disposal operations are being conducted.

- (d) At least two survey meters capable of measuring high radiation levels shall be available at the site. At least one meter must be in use in the area in which the receipt, handling or disposal operations are being conducted when potential radiation levels require the use of such an instrument.
 - (e) At least two survey meters capable of measuring alpha radiation shall be available at the site. At least one meter must be in use in an operations area in which alpha contamination could be present.
 - (f) An operational liquid scintillation counter for analysis of smear samples shall be available at the site.
- (28) The licensee's corporate management audit program, described in Section 2.1.1 of the Site Operations Manual, shall be expanded to require comprehensive management audits of those site activities and requirements of the license which are not specifically listed in Section 4.0 of the Radiological Controls Manual and assigned thereby to the Chief Radiological Control and Safety Officer. These audits shall include, but not be limited to, audits of trench filling methods and inspection of shipping records, certifications, and incoming packages and containers. Comprehensive management audits will be made at least once in each calendar quarter with two of the quarterly inspections each year being unannounced. Each inspection shall include a direct observation of the receipt, handling, and burial of waste materials over a two work-day period. Audit information, inspection findings and corrective measures shall be documented. Corrective measures shall be instituted to correct any problems identified. The audit and inspection findings and corrective measures shall be documented and maintained for inspection for at least five years unless otherwise specified in NRC regulations. The management official conducting the audits and inspections shall prepare a formal report as documentation and the notification procedures as outlined in paragraph two of Section 2.1.3 of the Site Operations Manual shall be followed.

Corporate management audits as described above shall be made by an individual or individuals other than the official designated as Chief Radiological Control and Safety Officer.

The site manager or his designated representative shall conduct and document a weekly inspection of the operating checklists and conduct a random sampling of supporting documents to verify that they are being completed properly. Findings and corrective measures shall be documented by the site manager and all reports shall be maintained for inspection by corporate management and the NRC.

- (29) Waste handling and disposal operations, including off-loading, inspection, and overpacking operations, shall be conducted in radiation controlled areas.

Conditions - Environmental Monitoring and Surveillance

- (30) The licensee shall conduct an environmental monitoring program. At a minimum, the program shall include collection of samples and analysis at frequencies listed in Section I of Appendix A to this license. Results of the sample analyses shall be forwarded to the NRC Division of Waste Management within 30 days of receipt by the licensee. The licensee shall compare the results of the sample analysis with action levels approved by the NRC Division of Waste Management.
- (31) In the event that action levels for gross radioactivity or individual radionuclide concentrations are exceeded in samples collected and analyzed in accordance with Condition 30, the site manager or site radiation safety officer shall notify the licensee's Chief Radiological Control and Safety Officer immediately and the NRC Region V within 48 hours. The licensee shall implement environmental contingency actions listed in Section 9.7 of the Radiological Controls Manual. In addition, the licensee shall furnish as directed a written report of actions taken to the NRC Division of Waste Management.

(32) The licensee shall conduct a site and personnel surveillance program to maintain contamination of skin, personal clothing, protective clothing, items for unconditional release, sole use vehicles, equipment, and site areas to levels as low as reasonably achievable. Contamination limits must be within those specified in Section II, Appendix A, of this license. The licensee shall perform at least the minimum site radiological surveys listed in Section III, Appendix A, to determine compliance with the specified contamination limits. The results of the site survey shall be recorded on forms suitable for licensee's management audits and NRC inspection. If decontamination operations are required to meet the limits of Section II, Appendix A, the survey record shall state the readings observed both prior to and after decontamination operations are complete. In addition, the licensee shall conduct at least the minimum personnel surveys listed in Section IV, Appendix A.

(33) The licensee shall conduct, at a minimum, a quarterly site inspection program and a site maintenance program to verify proper maintenance and upkeep of all fences, filled and capped trenches, caissons and all disposal areas. Records of inspections and any maintenance performed shall be maintained and submitted with the stabilization plan for final site closure. The records are to include, but not be limited to:

(a) The date of the inspection.

(b) The name of the inspector.

(c) Identification of fences, trenches, caissons or other disposal areas which have been inspected.

(d) Identification and location (marked on a scaled map of the site) of fences, caissons, trenches, or other disposal areas needing repair. (For example, trenches needing repair would be those exhibiting erosion, shrinkage, subsidence, settling, cracking, gullyng, or loss or thinning of the gravel cap.) Maintenance of fences shall include, but not be limited to clearing away tumbleweeds and/or drifting sand.

- (e) A graphic description of the condition requiring repair. (For example, details such as the size and extent of cracks or the depth of any sunken areas.
- (f) A description of the repairs made to the fence, trench, caisson, or disposal area (including a list of time and materials required to make the repairs).
- (34) In addition to the environmental monitoring program discussed in Condition (30), the licensee shall place passive monitoring devices (e.g., film badges, TLDs) at the boundary of restricted radiological control areas to determine compliance with 10 CFR Part 20.105. These monitoring devices shall be replaced and analyzed on a monthly basis. The results of the analysis shall be recorded on a form suitable for NRC inspection and maintained for at least two years.
- (35) After November 30, 1985, this license, except for its authority to receive and bury special nuclear material waste shall continue in full force and effect until final NRC action on license transfer or termination has been completed. All requirements for environmental monitoring site inspection and maintenance, and site security shall continue whether such wastes are being buried or not.
- (36) Site closure and stabilization of the licensee's facility near Richland, Washington shall be accomplished in accordance with a site closure and stabilization plan prepared by the licensee and approved by the NRC. The site closure and stabilization plan shall be prepared in accordance with State of Washington Department of Social and Health Services performance objectives outlined in Appendix C, "Position-Low-Level Waste Burial Ground Site Closure and Stabilization," dated May 17, 1979, as revised, November 26, 1979.
- (37) On or before February 28, 1983, the licensee shall submit the plan required in Condition 36 to the NRC staff for review and approval. The plan shall consider in addition to performance objectives referred to in Condition 36,

the impact of site operations on closure and stabilization activities. The plan shall be updated every five years, or at the time of license renewal, whichever is sooner. Plan update submittals shall be concurrent with similar submittal requirements by the Department of Social and Health Services. Upon approval of the site closure and stabilization plan the plan will become part of this license.

- (38) One year prior to the anticipated termination or transfer of the NRC license for the Richland site, and radioactive material buried pursuant to the terms of it, to the custodial agency, the licensee shall submit a final version of the plan required in Condition 36. This submittal shall include a schedule for implementation of all remaining plan elements, previously unfulfilled, and a description of the mechanics of orderly transfer in coordination with the custodial agency. This submittal will be subject to review and approval by the NRC.
- (39) On or before January 1, 1983, the licensee shall revise, update and submit to the NRC staff for approval the "Site Operations Manual" and the "Radiological Control and Safety Manual."
- (40)a Nothing in this license shall abrogate or diminish the authority of the State of Washington under its Agreement under § 274b of the Atomic Energy Act of 1954, as amended, with the United States Nuclear Regulatory Commission to regulate, inspect, or otherwise exercise control of operations with respect to source and byproduct material for disposal of that material at the commercial low level radioactive waste disposal site at Richland (Hanford).
- (40)b Nothing in this license shall abrogate or diminish the authority of the State of Washington to regulate, inspect, or otherwise exercise control of transportation of source, byproduct, or special nuclear material by the licensee within the borders of the State of Washington within the limits of authority relinquished to the State by the United States Nuclear Regulatory Commission under § 274b of the Atomic Energy Act of 1954, as amended, or exercised by the State on behalf of the NRC within the limits of any

cooperative agreement under § 274i of the Act, or pursuant to authority granted by the Department of Transportation or the Department of Energy pursuant to agreements with or regulations promulgated by those federal agencies.

- (41) Upon completion of site closure and stabilization in accordance with the site Closure and Stabilization plan required in Condition 36 supplementary requirements in Conditions 37 and 38 above the licensee shall apply for license transfer to the designated agency or for license termination.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Low-Level Waste Licensing Branch
Division of Waste Management

Date _____

APPENDIX A: ENVIRONMENTAL MONITORING AND SITE SURVEILLANCE

1. Environmental Monitoring Program

<u>Samples</u>	<u>Location</u>	<u>Activity Detected</u>	<u>Frequency</u>
aqueous	5 off-site wells ¹	as reported by U.S. DOE	quarterly; or as performed by U.S. DOE
soil (split with DSHS at minimum one quarter of each year ²)	4 site corners	gross alpha ³ gross beta ⁴ gross gamma ⁵	quarterly
vegetation (split with DSHS at minimum one quarter of each year ²)	4 site corners	gross alpha ³ gross beta ⁴ gross gamma ⁵	quarterly
vegetation, if present	filled and capped trenches	gross alpha ³ gross beta ⁴ gross gamma ⁵	at least annually, each trench
TLD's (split with DSHS ²)	4 site corners	mR	quarterly
TLD's	1 at site perimeter in prevailing wind direction from operating trench and at closest point to burial operations being conducted.		

1. Wells routinely sampled are identified by the following numbers: 699-31-53B; 699-32-62; 699-33-56; 699-34-51; and 699-36-61B.
2. Department of Social and Health Services (DSHS) shall specify the quarterly samples that are to be split.
3. Action level of 20 picocuries per milliliter or gram.
4. Action level of 90 picocuries per milliliter or gram.
5. Action level of 200 picocuries per milliliter or gram.

Note: In the event that an action level is exceeded, a spectrum analysis shall be performed to determine the contributing isotopes.

*Department of Social and Health Services DSHS

II. Operational Contamination Limits

(a) Skin and personal clothing:

No detectable alpha or beta-gamma activity*

(b) Protective clothing:

No detectable alpha activity

1000 dpm beta-gamma activity

(c) Waste Transportation Vehicles (including sole use vehicles):

Fixed contamination:

0.5 mrem/hr at any accessible surface

Removable contamination:

2200 dpm/100 cm² beta-gamma

220 dpm/100 cm² alpha

(d) All site areas, facilities, equipment, or tools outside restricted (radiation controlled) areas.**

Fixed contamination:

0.1 mrem/hr

Removable contamination:*

220 dpm/100 cm² beta-gamma

22 dpm/100 cm² alpha

*These contamination limits are considered met when a properly calibrated Eberline Model E-140N survey meter with pancake probe or equivalent is used for measuring beta gamma activity and PAC6/AC-24 or equivalent for measuring alpha activity.

**No decontamination operations may be conducted outside of the licensee's restricted area.

(e) All site areas, facilities, equipment or tools inside restricted (radiation controlled) areas:

Fixed contamination:

0.5 mrem/hr

Removable contamination:

1000 dpm/100 cm² beta-gamma
220 dpm/100 cm² alpha

III. Site Surveillance Program

<u>Location</u>	<u>Inspection Frequencies</u>	
	<u>Removable Contamination</u>	<u>Fixed Radioactivity</u>
radiation controlled facilities or buildings	daily	weekly
operational trench	N/A	daily
normal traffic areas outside operational trench area	N/A	weekly
site equipment	weekly	
nonradiation controlled facilities or buildings	monthly	monthly
waste transport vehicles	arrival/ departure	arrival/ departure

IV. <u>Personnel Surveillance Program</u>	<u>Inspection Frequencies</u>	
	<u>Removable Contamination</u>	<u>Fixed Radioactivity</u>
skin and personnel clothing	N/A	departure from radiation control
protective clothing, feet, and hands	N/A	departure from radiation control

APPENDIX B: VEHICLE SURVEYS

Arrival Surveys:

Radiation levels shall be determined by monitoring all sides of the transport vehicle surface and at six feet from the vertical sides of the vehicle and at the positions normally occupied in the vehicle cab. Radiation levels underneath the vehicle shall be surveyed if readings around the sides are near allowable limits. Smears to survey for removable contamination shall be taken at areas where contamination is most likely to occur, including cargo access doors and suspect areas identified by visual inspection. At least two smears on each side of the vehicle, two from the trailer cargo door(s), and two from the deck or off-loading area shall be checked for alpha and beta-gamma contamination.

Handling and Operational Surveys

At least three smears to check for removable alpha and beta-gamma contamination shall be obtained from accessible packages before off-loading begins. Additional smears shall be taken when visual inspection warrants. At least three additional smears of waste packages shall be taken at random during off-loading. These smears shall be checked for alpha and beta-gamma contamination. Beta-gamma surveys shall be performed continuously as wastes are off-loaded except when the radiation safety technician is conducting visual inspection, shipment record examinations.

Release Surveys

Beta-gamma and alpha (if applicable) levels shall be determined on all interior and exterior vehicle surfaces by direct survey with appropriate instrumentation. Smears shall be taken to evaluate all hot spots in excess of levels stated in Appendix A. If decontamination is required, all surveys will be repeated until acceptable contamination limits are reached. Smears shall be analyzed for alpha and low energy beta and gamma emitters if applicable. (e.g., C-14, H-3 and I-125).