START 9613426.1973

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STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

April 29, 1996

Mr. Robert K. Stewart
CRCIA Project Manager
U. S. Department of Energy
P.O. Box 550, MSIN: HO-12
Richland, WA 99352

Dear Mr. Stewart:

Re: *Human Scenarios for the Screening Assessment* Draft

Enclosed are the Washington State Department of Ecology's comments on *Human Scenarios for the Screening Assessment*, DOE/RL-96-16-a Rev. 0 UC-630 Draft. They are provided in the requested review comment form and are being sent separately to you, and your contractor staff, in electronic format. 43221

Thank you for your willingness to work with the Columbia River Impact Assessment Team in developing and reviewing these documents. If you have any questions regarding these comments, please contact me at (509) 736-3027.

Sincerely,

David Holland
Nuclear Waste Program

DH:skr
Enclosure

cc: Ralph Patt, USDOE
Larry Gadbois, EPA
Stuart Harris, CTUIR
Paul Danielson, Nez Perce Tribe
Dan Landeen, Nez Perce Tribe
Lino Niccoli, YIN
Tom Woods, YIN
Amoret Bunn, Dames and Moore
Administrative Record:
DOE/RL-96-16-a Rev. 0 UC-630 Draft

Washington State Department of Ecology Comments on
Human Scenarios for the Screening Assessment:
Columbia River Comprehensive Impact Assessment

Compiled by: David Holland

Report Title: Human Scenarios for the Screening Assessment: Columbia River Comprehensive Impact Assessment, DOE/RL-96-16-a Rev. 0 UC-630 Draft.

Page, Paragraph	Comment	Resolutions
vi, para 2	This paragraph is inaccurate and needs to replaced for the following reasons: 1. It misrepresents the status referenced "team charter." A team charter does not exist. The reference given is only to a proposed draft charter ,which was never finalized and approved by the CRCIA Team. 2. It misrepresents the intent of the "team charter." The proposed team charter was not intended to reflect the current long-term objectives of the CRCIA reflected in the more recent TPA Change Order M-15-95-09. Rather, it reflected the limited (near-term, current condition) objectives reflected in the outdated M-13-93-06 and M-15-93-09 TPA Change Orders. This entire section on objectives needs to be revised and reviewed by the CRCIA Team.	
xi	The definition for bioaccumulation should include exposure by all routes (e.g., uptake of contaminants by gill and epithelial tissue), not solely dietary.	
xi	The definition for bioconcentration factor (BCF) should add "chemical concentration," in addition to radionuclide concentration. Also, indicate BCF is measured under steady state conditions.	
xii	The definition for deterministic value (i.e., natural random variation of a measured quantity around a central value) appears incorrect. The definition for stochastic variability has apparently been incorrectly inserted here. The illustration used does not accurately portray the meaning of a deterministic value. A deterministic value does redefine a tall person as representing average height. A definition of the deterministic value might be better represented as the "reasonably maximum height," which can be expected for a group of individuals utilizing a given doorway. If the average height of a group of people is 5'10", a doorway would not typically be built only to accommodate those 5'10" or less. It would be built to accommodate most individuals taller than the average height.	
xii	Include a definition for Dose.	
xii	The definition for hazardous chemicals indicates this term is generally used to differentiate from carcinogenic chemicals. This is arguably not true and serves only to confuse terminology (e.g.,	

	"hazardous waste" may include carcinogens).	
xiii	The definition of screening assessment is generally good. Consider changing the last line to read, "where ***greatest*** potential exists for adverse effects."	
xiii	The definition for sensitivity analysis should be amended to state, it is a method to examine the variation in model output resulting from systematic changes to individual model inputs. Sensitivity analysis is most often defined as one component of uncertainty analysis. Another component of uncertainty analysis is probability analysis (e.g., Monte Carlo simulation).	
xiv	The definition for uncertainty should state, uncertainty is a lack of precise knowledge to what the truth is, whether qualitative or quantitative. This should be distinguished from variability. Variability, in turn, should be defined separately as a measure of heterogeneity or data dispersion. Variability describes the scatter of measurements around the center of a distribution (e.g., range, variance). It is recognized in practice, however, it is often difficult to treat uncertainty and variability separately.	
1.2, para 3	The first sentence is misleading in representing the intent of the screening assessment. It should not be an overestimate of exposure. The deterministic value should accurately reflect the "reasonable" higher end of the exposure range. The scenarios should accurately reflect the reasonable maximally exposed individuals. The second sentence requires clarification. This sentence should read, "would consume biota **from the Site.**"	
1.3, para 3	The description of potentially exclusive pathways can also be described by stating, exposure to contaminants from multiple sources (e.g., soil and sediment) via the same pathway (e.g., inhalation) is constrained by limitations imposed by physiological and physical properties influencing the pathway (e.g., inhalation rate and mass loading or volatilization factors are limited in magnitude). Note grammatical error in sentence 5.	
1.4, para 3	Describe more clearly, both deterministic and stochastic analyses will be conducted. Also, clarify the "resulting sensitivity and uncertainty analyses" will appear in a separate report (as stated on page ix).	
1.4, para 3	The deterministic value should not be an "overestimate" contaminant exposure. The deterministic value should accurately reflect the "reasonable" higher end of the exposure range. The scenarios should accurately reflect the reasonably maximum exposed individuals.	
2.1, para 3	Although it is stated the HSRAM industrial scenario is included without modification, there appears to be modification. For example, HSRAM specifies inhalation for surface water, but does not specify external radiation exposure from surface water. Table 2.1 specifies the opposite.	
2.4, para 1	Define or describe "minimal shielding."	

3.1, para 1	Suggest changing the word "ecologies" to "ecosystems."	
3.1, para 2, 3rd bullet	Suggest either the word "hunter," or including the word "bird," in bullet.	
3.1, para 3	Recreational uses include hunting and fishing. Please include these activities in the first sentence of the paragraph.	
3.1, para 5	Paragraph should include a definition for **recreational** wild and scenic scenario. The Act defines it as "Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past." This is the proposed designation for the Hanford Reach.	
3.2, para 5	Last sentence of the page, recreational scenario is not similar to the hunter/fisher. Please refer to comments on recreational scenario.	
3.4	The units for contact rate for dermal sediment should be mg/cm^2, not mg^2.	
3.5, General Hunter/Fisher Scenario	The author needs to elaborate more on the fishing portion of the scenario, i.e., while fishing she/he fishes x number of hours for crayfish, bullfrogs, salmon, steelhead, sturgeon and smallmouth bass. Please include the species crayfish and bullfrog in the scenario. WDFW has a season on bullfrogs. Crayfish have an open season (year round) for personal use, limit of 10 pounds/day and 2 pots.	
3.5, para 4	Last sentence. Suggest changing the word "browse" to the word "forage."	
3.5, para 4	The hunter/fisher scenario fails to discuss how many x hours the fisher spends fishing along with a list of species, which should include bullfrog and crayfish.	
3.5, para 4	Second sentence. Suggest including the word "amphibians" after the word "deer."	
3.5, para 5	Hunting scenario should include morning doves as a migratory species and quail as an upland species.	
General Hunter/Fisher Scenario	Please extend the number of days of exposure for bird hunting, since the quail season runs longer than the pheasant season, and the dove season starts and ends before the pheasant season.	
3.6, table 3.2	Intake/contact rate: four hours seems extremely low for an avid hunter/fisher. I spend more than four hours hunting for upland species/day and almost all day/day when flyfishing. Please increase the number of hours the hunter/fisher spends on site.	
3.7, bullets 1,3,4,5	Again, 4 hours seems low.	
3.7, bullet 6	HSRAM lists 1 g/day for game ingestion in various scenarios for the same 45 kg deer/family/yr assumed by Paustenbach (1989). Where does 15 g/day come from?	
3.7, bullet 6	The deer ingestion rate used becomes 3 grams/day rather than 15 grams/day once the 19% success rate is incorporated, and only one hunter per family of four is assumed. The 3 gram/day value should be clearly stated in this paragraph.	
3.7, bullet 7	Should include information on quail.	

3.7, bullet 7	Suggest deleting the word "and" after the word hunter, first line.	
3.7, bullet 8	Should also include information on doves.	
3.7, bullet 8	Suggest deleting the word "and" after hunter, first line.	
3.8, para 5	Please include the following activities under the recreational scenario: water skiing and swimming.	
3.8, para 6,7	The 7 days/year exposure is only a 56 hour/year exposure. This is low for local recreational users.	
3.8, para 6,7	The WDFW believes the exposure for the recreational visitor is extremely low, especially for a person or family who is involved in all the activities cited in HSRAM, i.e., hunting, fishing, boating, water skiing, and swimming. The exposure would be underestimated for someone from local surrounding communities.	
3.8, para 7	Under recreational scenario in HSRAM activities include "hunting, fishing boating, water skiing and swimming." The inclusion of water skiing and swimming would differentiate this scenario from the hunter/fisher scenario.	
4.4, para 6	The fish consumption rate of 540 g wet wt/day seems high. For example, assuming salmon is roughly 20% protein of wet wt, this would yield 108 g protein/day, which is approximately 1.9 times the recommended dietary allowance (RDA) for protein intake for adult males. While the RDA values may not be fully applicable for a tribal subsistence resident scenario, a re-evaluation of the consumption rates for protein may be in order.	
4.5, para 2	Similarly, the "animal protein" intake appears high, if it is in addition to the fish intake. The 150 g animal protein wet wt is equivalent to 50 g protein dry wt, assuming the 3:1 wet:dry ratio. The sum of fish protein and "animal protein" is approximately 158 g protein/day, which represents about 2.8 times the protein RDA for adult males. Again, while the RDA values may not be fully applicable for a tribal subsistence resident scenario, a re-evaluation of the consumption rates for protein may be in order.	
4.5, para 3	As mentioned, exposure to nursing infants from mother's breast milk is potentially significant. The lactation pathway should be included in the screening assessment, since lipid soluble substances may compartmentalize into milk and infants represent a sensitive subpopulation.	
4.7, footnote e	Explain the Andelman (1990) footnote in greater detail, here and in other appearances.	
4.7, footnote j	"Animal protein" is a misnomer, if it includes fat. Is the fat a significant portion of the 150 g?	
4.9	Inhalation rate for air and soil should be 30 m^3/day, not only for consistency with the Native American Subsistence Resident scenario (Table 4.1), since the hunter/gatherer is presumably more active than the average resident.	
4.9	"Game" has been substituted for "animal protein," although it is presumably the same thing. Is it? Be consistent in terminology.	
4.10	Why is the soil/sediment inhalation rate 10 m^3/day, rather than 20 m^3/day, the rate for air inhalation? Why are soil and sediment	

	combined in this table? Why is cultural inhalation rate expressed as 1 hr, as opposed to m^3/day? Should be consistent in terminology, format, etc., where possible.	
4.10	A horizontal line segment is inappropriately drawn at the bottom of the sediment/soil box.	
4.11, table 4.4	According to EPA's 1995 Health Effects Assessment Summary Tables (HEAST), the ingestion slope factor for cobalt-60 is 1.89E-11 risk/pCi, not 6.73E-6 risk/pCi. You should also include the external exposure slope factor for cobalt-60 (9.76E-6 risk/yr per pCi/g soil), since this is used in your external exposure equation.	
4.11, para 1	The particle density between 5e-8 and 4e-6 particles per meters cubed is assumed in this report. However, in Sula's, "Radiological Survey of Exposed Shorelines and Islands of the Columbia River Between Vernita and the Snake River Confluence," 1980, for D-Island, he gave a density of 5e-3 particles per square foot at 6 inch depth. This converts to approximately 4.2 particles per meters cubed. Secondly, a density of 1.3 particles/100 square meters for D-Island was reported by the Washington State Department of Health survey report, "Radiological Survey of 100 D-island, "Jaquish 1995. This roughly equates to 0.1 particles per meters cubed. A USRADS survey in April 1992 found 107 discrete radioactive particles in approximately 12.5 acres surveyed. This should roughly equate to 0.17 particles per meter cubed, if the 6 inch depth is assumed. Also, since this survey was done on a 10 foot grid pattern, and all particles the effective width of the survey instruments were about one foot, it is likely the majority of the particles within the survey area were not found. It is recommended D-Island be evaluated separately, and show calculations. Ecology believes a wider range of densities exists and should be looked at accordingly.	
4.11, para 2	The specific equations for cobalt-60 particle exposure should be developed more formally, mathematically and incorporated into Section 6.0 of the report, along with other equations.	
4.12, para 2	Clarify what the toxic endpoint is for inhalation exposure. By not including a slope factor in the inhalation equation, I am assuming the endpoint is a noncancer effect (e.g., burn, ulceration). Is this correct?	
5.1, para 3	It is not clear from this paragraph and the inclusion of the groundwater pathways in the corresponding Table 5.2, whether the Agricultural Resident Scenario is onsite, offsite, or both. How many, and which, Agricultural Resident Scenarios are to be used?	
5.2	In some cases, HSRAM specifies different exposure factors for noncarcinogens vs. carcinogens (e.g., in the agricultural scenario, air inhalation is 10 m^3/day for noncarcinogens vs. 20 m^3/day for carcinogens). Values in Table 5.2 appear to be a mix. A rationale should be given.	

5.3	Same comment for page 5.2 applies here.	
5.3	Should "groundwater" be "seep/spring," as in the HSRAM resident scenario in Table 5.1?	
5.3	HSRAM lists 1 g/day for game ingestion in various scenarios for the same 45 kg deer/family/yr assumed by Paustenbach (1989). Where does 15 g/day come from?	
6.1, para 1	Amend first two sentences to explain the exposure equations included in this section calculate intakes only. These doses will be combined with cancer slope factors and reference doses to determine cancer risk and hazard quotients, respectively, in a future report.	
6.2, para 2	Note for noncarcinogens, ED=AT, so these terms cancel. For carcinogens, dose is averaged over lifetime (AT=70 yrs), so ED does not necessarily equal AT. This comment applies to all non-radiological equations (dermal, inhalation, ingestion).	
6.3, para 2	Because dermally absorbed dose is expressed per day, a weighted average should be calculated for combining results of children and adults. Simple dose summation is incorrect due to the "per day" factor. This comment applies to all non-radiological equations. On the other hand, dose summation is appropriate for combining separate radiological doses expressed in rem (no time factor). Also, further refinement could be achieved for estimating intake by evaluating even more age categories separately (e.g., 6-21 yrs of age).	
6.5, para 2	Units for contaminant concentration (C) in river water, seep water, and milk should be expressed as mg/L, not mg/kg. Similarly, units for ingestion rate (IR) of river water, spring water, and milk should be expressed as L/day, not kg/day.	
6.5, para 3	Elaborate on how concentration values would be estimated from "concentration ratios, bioaccumulation factors, or other related techniques."	
6.6, para 2	Units for contaminant concentration (C) in river water, seep water, and milk should be expressed as pCi/L, not pCi/g. Similarly, units for ingestion rate (IR) of river water, spring water, and milk should be expressed as L/day, not kg/day.	
6.6, para 3	Same comment as page 6.5, para 3.	

9613426.1980

TSD FACILITY UNMANIFESTED DANGEROUS WASTE REPORT

Mail Original To:

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
ATTN: H.W. Section R/6 Bldg. 4
Mail Stop PV-11
Olympia, WA 98504-8711

FORM 6

DATE RECEIVED BY WDOE

DEPARTMENT USE ONLY

I. RECEIVING FACILITY INFORMATION

EPA/State I.D. #: WA7890008967 Facility Name: Hanford Facility, Low-Level Burial Ground

Facility Address (incl. City, State, Zip): PO 550, Richland, WA 99352

Facility Contact Person: John D. Wagoner, Manager Phone Number: (509) 376-7395

II. GENERATOR INFORMATION

EPA/State I.D. #: CA4890008986 Generator Name: Lawerence Berkeley National Laboratory

Generator Address (incl. City, State, Zip): 1 Cyclotron Road, Berkeley, CA 94720

III. TRANSPORTER INFORMATION

EPA/State I.D. #: MOD095038998 Transporter Name: Tri State Motor Transit Co.

Transporter Address (incl. City, State, Zip): PO Box 113, Joplin, MO 64802

Driver's Name: Jean Louis Capdeville Driver's License No.: R0437917 State: CA

Vehicle License No: Unknown State: ICC or Other License Numbers:

Print or Type Please

IV. WASTE INFORMATION

A. Date This Waste Shipment Received By Your Facility: 10/20/89 and 8/10/90 (mm dd yy)

B. Identification of Waste(s) Additional waste streams may be entered on the reverse of this form.

LINE NUMBER	1 Physical State S=solid L=liquid G=sludge	2 Chemical Nature O=Organic I=Inorganic	3 Description of Waste	4 Handling Method Code	5 Dangerous Waste Number	6 Amount of Waste	7 WEIGHT CODE
1.	S	O	RQ Waste Radioactive Material, n.o.s., Radioactive Material UN2982 (complete shipping description varies by drum) (See attached info provided by LBNL.)				
2.	S	O	RQ Waste Radioactive Material, n.o.s., Radioactive Material UN2982 (complete shipping description varies by drum) (See attached info provided by LBNL.)				
3.							

V. COMMENTS

The first shipment was made on 10/20/89. It included 30-55 gallon drums. It is not clear exactly what wastes went into these drums. All drums were shipped as low-level waste. No manifest was used. These drums were accepted by Hanford and buried.

The second shipment was made on 8/10/90. It included 24-55 gallon drums. It is not clear exactly what wastes went into these drums. All drums were shipped as low-level waste. No manifest was used. These drums were accepted by Hanford and buried.

This information is based on information from LBNL. Should additional information become available an updated form will be submitted.

VI. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

John D. Wagoner, Manager (PRINT OR TYPE NAME) — John D. Wagoner (SIGNATURE) — 4/19/96 (DATE SIGNED)

CONTINUATION PAGE — Form 6 — TSD FACILITY UNMANIFESTED DANGEROUS WASTE REPORT

RECEIVING FACILITY NAME: _____

RECEIVING FACILITY ID NO.: | | | | | | | | | | | | |

GENERATOR NAME: _____

GENERATOR ID NO.: | | | | | | | | | | | | |

IV. WASTE INFORMATION (Cont. from reverse side)

LINE NUMBER	1 Physical State S=solid L=liquid G=sludge	2 Chemical Nature O=Organic I=Inorganic	3 Description of Waste	4 Handling Method Code	5 Dangerous Waste Number	6 Amount of Waste	7 WEIGHT CODE
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
11.							
12.							
13.							
14.							
15.							

Print or Type Please

COMMENTS

TSD FACILITY UNMANIFESTED DANGEROUS WASTE REPORT

FORM 6

For Shipments 10/20/89 and 8/10/90

ATTACHMENT LINE 1

Waste consists predominantly of a mixture of water containing >10% methanol absorbed on silica gel. The weight of the absorbed liquid comprises approximately 33% of the total weight of the waste. While the percentage of the organic component in the absorbed liquid varies from container to container, it is estimated that on average 50% of the waste absorbed liquid is organic. In addition to methanol, the following constituents are potentially present in some containers and may contribute to the noted waste codes. In no case would an individual waste container contain all of the indicated constituents.
Moreover, very few individual waste containers would have constituents that would yield designations other than WT02 or, possibly, State of Washington F003.

Dangerous Waste Source: methylene chloride - FOO2*; methanol, ethyl acetate, and acetone - FOO3*; benzene and toluene - FOO5*

Ignitable Waste:** methanol ethyl acetate, acetone, benzene, ethanol, toluene, acetonitrile, triethylamine, tetrahydrofuran, dioxane, tetramethylethylene diamine, pentane and dimethylformamide
Designation: DOO1**

Washington Toxicity: acetonitrile, dibromomethane, triethylamine, methanol, tetrahydrofuran, dimethylformamide, ethyl acetate, benzene, methylene chloride, dioxane, chloroform, tetramethylethylene diamine, acetic acid, methylmorpholine, propanolamine, triethylborane, and thionyl chloride
Designation: WT02

Washington Persistence: methylene chloride, chloroform, dibromomethane, and cyanogen bromide
Designation: WP02 or WC01

Washington Carcinogen: benzene, methylene chloride, and chloroform
Designation: WC02 or WC01

9613926.1982

TSD FACILITY UNMANIFESTED DANGEROUS WASTE REPORT

FORM 6

For Shipments 10/20/89 and 8/10/90

ATTACHMENT LINE 2

Waste consists predominantly of a mixture of water containing >1% acetonitrile absorbed on silica gel. The weight of the absorbed liquid comprises approximately 33% of the total weight of the waste. While the percentage of the organic component in the absorbed liquid varies from container to container, it is estimated that on average 50% of the waste absorbed liquid is organic. In additional to acetonitrile, the following constituents are potentially present in some containers and may contribute to the noted waste codes. In no case would an individual waste container contain all of the indicated constituents. ***Moreover, very few individual waste containers would have constituents that would yield designations other than WT02 or, possibly, State of Washington F003.***

Dangerous Waste Source: methylene chloride - F002*; methanol, ethyl acetate, and acetone - F003*; benzene and toluene - FOO5*

Ignitable Waste:** methanol, ethyl acetate, acetone, benzene, ethanol, toluene, acetonitrile, triethylamine, tetrahydrofuran, dioxane, tetramethylethylene diamine, pentane and dimethylformamide
Designation: D001**

Washington Toxicity: acetonitrile, dibromomethane, triethylamine, methanol, tetrahydrofuran, dimethylformamide, ethyl acetate, benzene, methylene chloride, dioxane, chloroform, tetramethylethylene diamine, acetic acid, methylmorpholine, propanolamine, triethylborane, and thionyl chloride
Designation: WT02

Washington Persistence: methylene chloride, chloroform, dibromomethane, and cyanogen bromide
Designation: WP02 or WP01

Washington Carcinogen: benzene, methylene chloride, and chloroform Designation: WC02 or WC01.

*-Washington regulated only assuming mixture rule was legally in effect. Federal (RCRA) mixture rule was not in effect. ***For Washington only F003, unclear whether regulated if non-ignitable.***

** - If free liquids are present.

9613426.1985

TREATMENT, STORAGE, AND/OR DISPOSAL FACILITY

UNMANIFESTED DANGEROUS WASTE REPORT

FORM 6

RESPONSIBLE PERSONNEL CERTIFICATION

Responsible personnel have been fully involved in the compilation of information and in the preparation of this unmanifested dangerous waste report. Based on my inquiry of the person or persons who manage the operations, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

for _____ 4/19/96

A. LaMar Trego, President
Westinghouse Hanford Company

Date

TREATMENT, STORAGE, AND/OR DISPOSAL FACILITY

UNMANIFESTED DANGEROUS WASTE REPORT

FORM 6

RESPONSIBLE PERSONNEL CERTIFICATION

Responsible personnel have been fully involved in the compilation of information and in the preparation of this unmanifested dangerous waste report. Based on my inquiry of the person or persons who manage the operations, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

R. E. Traister, Director
Projects and Site Services
Westinghouse Hanford Company

4/18/96
Date

fr W. H. Hamilton, Jr., Director
Solid Waste Disposal
Westinghouse Hanford Company

4/18/96
Date

R. D. Pierce, Manager
Generator and Waste Acceptance Services
Westinghouse Hanford Company

4/18/96
Date