

ATTACHMENT I

HANFORD NO. 2 SITE CERTIFICATION AGREEMENT

ENVIRONMENTAL MONITORING PROGRAM

I. GENERAL DESCRIPTION

The Environmental Monitoring Program established by the Supply System will have as its objective the determination of the effects of the Project operation on the environment. The monitored items will include land and its terrestrial life, adjacent waters and their aquatic life, air, and other eco-systems as are appropriate. The program will provide an environmental measurement history for evaluation by the Supply System and the Council. Such a program will use reasonable and available methods and techniques; and be maintained throughout the life of the Project.

The Hanford No. 2 Environmental Monitoring Program will be flexible and may be modified with concurrence of the Council as detailed information is acquired from the program. Any modifications will be based upon: (a) Project effects, if any, on the terrestrial and aquatic ecology including the wildlife, fish and other aquatic life in the Project influence area, (b) informational inputs obtained during the pre-operational monitoring, (c) siting by others of nuclear or other facilities in areas surrounding the site, (d) technological developments in the field of environmental monitoring, (e) changes in type and abundance of natural vegetation, and (f) changes in conditions which relate to the pathways which lead to human radiation exposure.

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A copy of the preoperational and operational Environmental Monitoring Program, and any supplements or revisions thereto, will be submitted to the Council for its review and concurrence.

II. ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM

A. Program Elements

1. Air sampling locations will be established on site and within present or future regions of high population density within a ten-mile radius of Hanford No. 2. Special attention will be given to location of air samplers within five miles from the plant. The zone from five to ten miles of the site is emphasized where populations are more concentrated, especially areas downwind of prevailing winds. The ten-mile radius zone includes parts of Franklin and Benton Counties.
2. In the terrestrial monitoring part of this program (vegetation, soil, farm products), the area within a ten-mile radius of Hanford No. 2 will be of primary concern. The predominant use of this area is for agriculture in the Franklin County area. The major crops are wheat, alfalfa hay, sugar beets, and potatoes. The major livestock forms are beef cattle, hogs and sheep.

Particular emphasis will be placed on the collection of those primary foodchain components which lead to man. Soil samples, native and cultivated vegetation, and dairy

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and poultry products (milk and eggs) will be sampled.

Also sampled will be domestic animals normally consumed

by man, such as chickens, beef cattle, and hogs, and wildlife such as deer and pheasants (if available).

3. In the aquatic program, sampling will include ground-water samples and surfacewater samples from the Columbia River. The municipal water supply for the City of Richland is the Columbia River; the intake for its supply, approximately eleven miles downstream from the Hanford No. 2 site, will be one of the Columbia River sample stations.

The aquatic food chain constituents included in this program will be taken from the Columbia River and will include the collection of bottom sediments, bottom organisms, plankton, periphyton and fish.

Sampling frequencies will depend upon weather, growing season, animal and fish activity and other considerations deemed appropriate in each case.

B. Surveillance Levels

The radiological monitoring program outlined in Table 1 represents the level of surveillance during the pre-operational phase (two years) and for one year of the operational phase. The surveillance program is to be based upon the "gradient concept" which is a degree of off-site monitoring commensurate

with the level of radioactive discharges during the operation of the Project.

Radiochemical analyses will be performed using analytical procedures equal to or better than those recommended by the U. S. Department of Health, Education and Welfare, Public Health Service, in "Radioassay Procedures for Environmental Samples," January, 1967.

TABLE 1 - Continued

6. Vegetation & Livestock				
a. Natural Vegetation	10	3 Samples Annually (During Growing Season)	}	(Gross Beta
b. Food & Feed Crops	10			90Sr
c. Food Animals	5			137Cs
7. Soil	5	Quarterly	}	131I (Gamma Scan
				(Gross Alpha
				(Gross Beta
				90Sr
				137Cs
8. Sediment	5	Quarterly	}	(Gamma Scan
				(Gross Alpha
				(Gross Beta
				90Sr
9. Milk	3	Monthly	}	(Gamma Scan
				131I
				90Sr
				137Cs
10. Aquatic Biota				(Elemental Calcium
a. Aquatic Life	3	Semiannually	}	(Gross Beta
b. Rooted Aquatic Plants and Slime	3	Semiannually	}	40K
				90Sr
11. Wildlife				(Gamma Scan
a. Rabbits	5	Annually	}	(Thyroid - 131I
B. Waterfowl	5	Annually	}	(Femur - 90Sr
				(Gamma Scan
				(Muscle 32P, 65Sr

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TABLE 1

RADIOLOGICAL SAMPLING AND ANALYSIS PROGRAM

Sample Type	No. of Stations	Sampling Frequency	Analysis
1. Background			
a. Gamma Sensitive Detector	3	Continuous Recording)	(Background Gamma
b. TLD Dosimeters	10	Monthly - Annually)	(Readout and Record
2. Air (Particulates & Gas)	10	Weekly	(at Noted Frequency
			(Gross Alpha
			(Gross Beta
			(Gamma Scan
3. Cooling Water (After Plant Startup)	1	Continuously	+ Radioiodine
	1	Weekly	(Gamma Activity
			(Suspended Gross Alpha
			Gross Beta
			(Dissolved Gross Alpha
			Gross Beta
			(Gamma Scan
4. River Water	5	Quarterly	+ Tritium
			(Suspended Gross Alpha
			Gross Beta
			(Dissolved Gross Alpha
			Gross Beta
			(Gamma Scan
5. Ground Water and Rain Water (As Available)	6	Semiannually	+ Tritium
	3	Monthly	(Gross Alpha
			(Gross Beta
			(Gamma Scan
			+ Tritium

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The Supply System will furnish the Council or its designated representatives, upon advance request, half samples of specimens for their evaluation and analysis.

Sample stations are described in the following discussion of sample types and are located approximately in Figure 1.

1. Atmosphere

a. Gamma Detectors: (Δ in Figure 1).

The atmosphere is continuously monitored for gamma radiation using a gamma strip chart recorder. These stations are at three positions on the site boundary.

b. TLD Dosimeters: (Δ , \bigcirc in Figure 1).

Background levels of external radiation are established by exposing thermoluminescent dosimeters (TLD) for various periods of time at ten locations within a ten-mile radius of the site. Four dosimeters are maintained at each station. One dosimeter is changed and read monthly. The other dosimeters are changed and read annually. The dosimeters will be located at each air sampling station.

2. Airborne Particulates: (Δ , \bigcirc in Figure 1).

Airborne particulates are collected on a weekly basis at ten sampling stations. The filters, charcoal and particulate will be changed weekly. The filter housings are located 6-8 feet above ground level to reduce dust loadings of the filters and minimize the influence on sample activity of radon and its daughters emanating from the soil.

3. Cooling Water:

Cooling water blowdown will be monitored continuously for gamma activity. A weekly sample will be taken for more detailed analysis and for calibration of the continuous gamma monitor.

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4. River Water: (\bigcirc in Figure 1).

Sampling of the Columbia River is performed on a quarterly basis from five locations extending from about five miles above the plant intake to fifteen miles below the station.

5. Groundwater and Rainwater:

a. Groundwater: (\bigcirc in Figure 1).

Sampling of groundwater is performed semiannually from wells near the station. The wells are identified by the following numbers: 15-15, 27-8, 24-1, 20-E12, 10-E12, and S6-E14.

b. Rainwater: (Δ in figure 1).

Sampling of rainwater is performed monthly or as possible at these locations. These stations are located on the site boundaries, and are common to the continuous gamma monitors and records as well as air samplers.

6. Vegetation and Livestock Sampling

a. Natural Vegetation at Air Sampling Stations

Samples of the leafy portions of natural vegetation available at each of ten air sampling stations are collected annually. Samples will be taken throughout the growing season with the predominate vegetation at the station being the sample collected.

b. Food and Feed Crops

Edible portions of food and feed crops are sampled at ten locations within a ten-mile radius of the station. Four of the air sampling locations will be used along with the milk stations. Three other samples will be collected at random within the ten-mile radius. These samples should be collected throughout the growing season.

c. Food Animal Samples

Food animal samples will be collected near five air sampling stations. These food samples need only be a small portion of a large animal and can be obtained from farmers and ranchers as incidental to their personal or commercial butchering.

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7. Soil

Soil samples are collected quarterly at the air sampling locations 4, 5, 9, 10 and milk station M-2 (O in Figure 1).

8. Sediment Samples

Samples of the Columbia River bottom sediment are collected quarterly at or near the five Columbia River water collection stations, and at other such plant locations as may be required by plant design.

9. Milk Samples (M-1, M-2, M-3 in Figure 1)

Milk is sampled monthly from the bulk cooling tanks of three milk producers within ten miles of the plant. In the selection of milk sample locations, an attempt will be made to select established milk producers who are likely to remain in the business of milk production during succeeding years of plant operation. Information regarding source of food must be included with milk sample results.

10. Aquatic Biota

a. Animals

Aquatic animals are collected semiannually from the Columbia River at three locations, river water sampling stations (O) 1, 2, and 5 and at such plant effluent locations as may be required by plant design.

b. Vegetation

Rooted aquatic plants and slime growths on submerged surfaces in littoral locations will be collected semiannually.

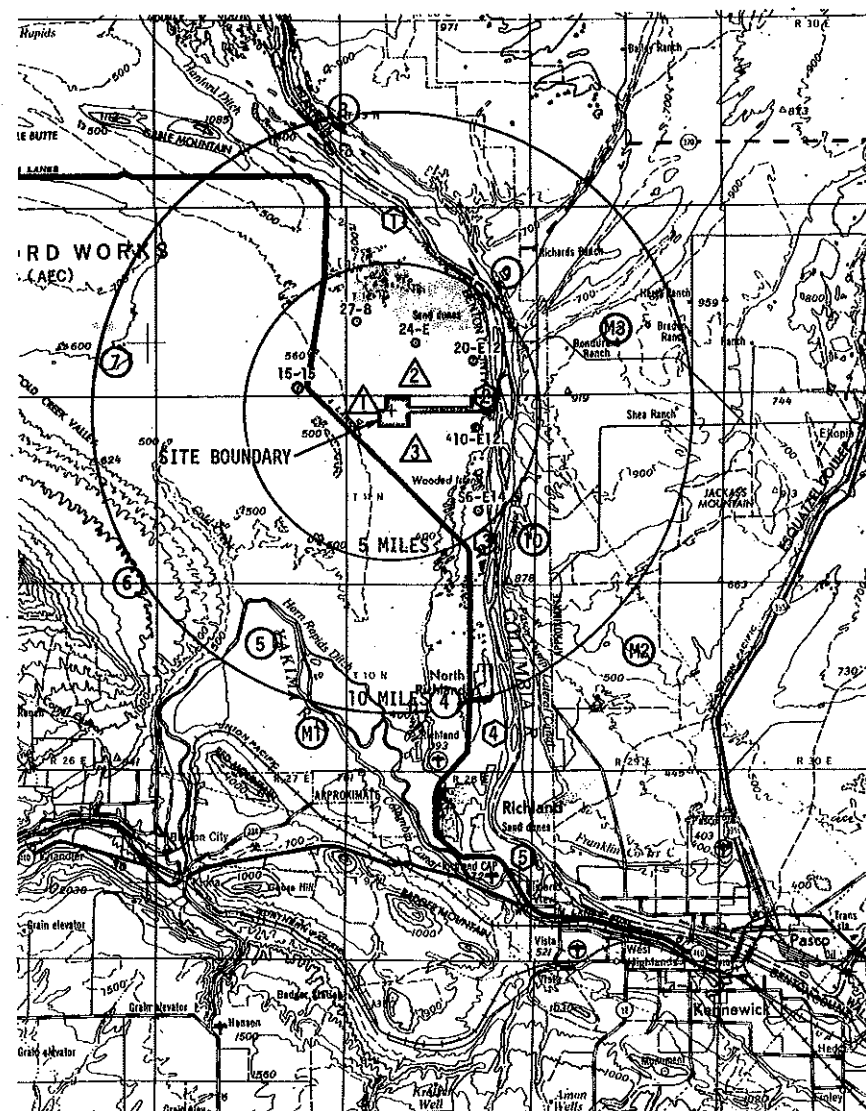
11. Wildlife

a. Five rabbits will be collected annually from land adjacent to the site. An effort will be made to take these animals from different locations.

b. Five waterfowl will be collected annually near the site. It is desirable to obtain resident birds, so the collection should be made when migrations are not underway.

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FIGURE 1



SAMPLE STATIONS FOR RADIATION MONITORING
(See text for meaning of symbols)

III. METEOROLOGICAL PROGRAM

In support of the Atomic Energy Commission's nuclear generating plant licensing requirements, the Supply System will install a meteorological tower to establish meteorological characteristics of the Hanford No. 2 site over a period of at least two years prior to startup. This data is in addition to the vast accumulation of meteorological data available for the Hanford Reservation. Detailed measurements of wind speed, direction, low level stability and humidity will be gathered. Following this intensive two-year data collection period, the Supply System will maintain wind speed and direction instrumentation, but no detailed evaluation of the data need be made.

IV. AQUATIC LIFE PROGRAM

The aquatic life environmental monitoring program consists of three phases:

1. A literature review and a preliminary pre-operational sampling phase;
2. A pre-operational survey; and
3. An operational monitoring program.

Any changes in the scope or details of this program will be based upon the "gradient concept."

A. The Literature Review and Preliminary Pre-Operational Sampling Phase

The literature survey will consist of a summary of past and current published studies on the aquatic environment of

the stretch of the Columbia River from the City of Richland, through the Hanford Reservation, up to and including Priest Rapids Dam, as particularly related to the Project. This literature compilation will be kept up-to-date as publications are issued throughout the history of the Project. This literature survey along with limited preliminary pre-operational sampling will be used as a base for designing the pre-operational survey. To the extent that acceptable base points may be established by this work for the Project's area, subsequent elements in this program may be deleted.

B. Preliminary Description of the Pre-Operational Survey

1. A bioassay program utilizing simulated temperatures and concentrations of river salts in the anticipated discharge shall be required. The bioassay should simulate temperatures ranging from 85°F downward, incorporating the different concentrations of river salts that may be found in the blowdown. The bioassay will be performed on fish and invertebrate fauna.
2. The two-year pre-operational survey will be of a qualitative and semi-quantitative nature and will include the aquatic organisms listed below. The semi-quantitative measurements will include:
 - a. Catch per unit of effort.
 - b. The mean and variance of numbers or organisms obtained in compatible samples. The organisms will

include, but not necessarily be limited to:

- 1) juvenile salmon - coho and chinook (sampled by gill net and beach seine);
- 2) juvenile steelhead trout (gill net and beach seine);
- 3) whitefish (gill net, beach seine, and hook and line);
- 4) squawfish (gill net and beach seine);
- 5) an omnivorous-feeding form, such as carp, or possibly sturgeon;
- 6) benthic organisms (manual removal by grab and dredge) would receive particular attention as they may be the best indicator organisms; and
- 7) plankton (metered plankton net).

c. The sampling would be performed at three sites:

- 1) in an area above the intake;
- 2) at the discharge location outside the dilution zone; and
- 3) in an area downstream of the plume.

d. Pertinent information such as river flow, dam discharges, counts of up- and down-stream migrants from other data-gathering sources would be incorporated as is appropriate.

3. Thermographs will be available at the intake and discharge locations to record fluctuations in temperature. These thermographs will remain for an indeterminate period of time as a part of the post-operational monitoring.

4. Seasonal SCUBA observations, if possible, on typical discharge situations will be taken to record any unusual concentration or dispersion of fishes in the area anticipated to be affected by the discharge plume. Similarly, bottom observations might be recorded by photograph, if necessary.

5. Sampling will be performed initially at each location approximately eight times a year, or as may be required by application of the "gradient concept."

C. Operational Monitoring Program

1. An operational monitoring program will be developed based on the results from the pre-operational monitoring program. This program will be developed by the Supply System and concurred in by the Council.

V. WATER QUALITY MONITORING PROGRAM

That portion of the Environmental Monitoring Program associated with water quality will consist of sampling and analysis of water being discharged through the discharge system, sampling and analysis of river water upstream of and at the boundary of the diffusion zone, and analysis of groundwater withdrawals.

This sampling may be modified with the concurrence of the Council.

A. Pre-Operational Monitoring Phase

No sampling is required for this phase.

B. Operational Monitoring Sampling

1. Samples to be taken of the discharge in the blow-down line include:

- a. Quantity, continuous recording;
- b. Temperature, continuous recording;
- c. Dissolved oxygen, once per day;
- d. pH, continuous recording;
- e. Turbidity, continuous recording;
- f. Chlorine sample, continuous recording;
- g. Coliform, once per week; and
- h. Dissolved solids, once per week.

2. Samples taken at the diffusion zone boundary and upstream include:

- a. Temperature, once per month;
- b. Dissolved oxygen, once per month;
- c. pH, once per month;
- d. Turbidity, once per month;
- e. Chlorine, once per month;
- f. Coliform, once per month; and
- g. Dissolved solids, once per month.

Data will be correlated with river flow and blowdown conditions.

3. Groundwater sampling is to be made of well waters annually and includes measurements of:

- a. Temperature;
- b. pH;
- c. Coliform; and
- d. Water table elevation.

4. Results of operational water quality monitoring shall be reported at the following frequencies:

- a. Blowdown line discharge, monthly;
- b. Diffusion zone boundary, quarterly;
- c. Upstream, quarterly; and
- d. Groundwater, annually.

VI. AIR QUALITY MONITORING PROGRAM

Stack monitoring will be conducted when the diesel generators or auxiliary boiler are being operated.