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Department of Energy

Richland Operations Office
P.O. Box 550
Richland, Washington 99352

91-PPB-364

FEB 11 1990

FEB 15 1991
CORRESPONDENCE CONTROL

Ms. Barbara Ritchie
State of Washington
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504

Dear Ms. Ritchie:

SEPA REQUIREMENTS FOR FUELS AND MATERIALS EXAMINATION FACILITY

Reference: Letter, Teddy Le, Ecology, to R. D. Izatt, DOE-RL, same subject, dated December 3, 1990.

In response to the reference letter, this letter serves to provide your office with the State Environmental Policy Act (SEPA) and the National Environmental Policy Act (NEPA) documentation for use in expediting the State Environmental Policy Act (SEPA) process for the Radioisotope Power System Facility (RPSF). Attached is a copy of the SEPA checklist for the RPSF as required by the Washington Administrative Code (WAC 197-11-960).

Approval of the PSD application has now become critical path for construction work on the RPSF. It is, therefore, of the utmost importance to the project that the SEPA process be completed as expeditiously as possible. Consequently, if there is anything this office can do to be of assistance in this matter, please do not hesitate to contact Mr. S. D. Stites of my staff on (509) 376-8566.

Sincerely,

R. D. Izatt, Director
Environmental Restoration Division

ERD:SDS

Enclosure:
State Environmental Checklist for
the Radioisotope Power Systems Facility

cc w/encl:
[redacted]
Michael J. Landon, Ecology
Tim Nord, Ecology

FEB 1991
RECEIVED
EDMC

STATE ENVIRONMENTAL POLICY ACT (SEPA)

CHECKLIST

FOR THE

RADIOISOTOPE POWER SYSTEMS FACILITY

REVISION 0

January 11, 1991

WASHINGTON ADMINISTRATIVE CODE
ENVIRONMENTAL CHECKLIST FORMS
[WAC 197-11-960]

A. BACKGROUND

1. **Name of proposed project, if applicable:**

   Radioisotope Power Systems Facility (RPSF)

2. **Name of applicants:**

   U.S. Department of Energy-Richland Operations Office (DOE-RL)

3. **Address and phone number of applicants and contact persons:**

   U.S. Department of Energy
   Richland Operations Office
   P.O. Box 550
   Richland, Washington 99352

   Contact Persons:

   R. D. Izatt, Director
   Environmental Restoration Division
   (509) 376-5441

4. **Date checklist prepared:**

   January 11, 1991

5. **Agency requesting the checklist:**

   State of Washington
   Department of Ecology
   Mail Stop PV-11
   Olympia, Washington 98504-8711

6. **Proposed timing or schedule: (including phasing, if applicable):**

   Preliminary construction activities, e.g., demolition, conduit rerouting, door opening revisions, are in progress in accordance with approval from Washington State Department of Social and Health Services, Washington State Department of Ecology, and the U.S. Environmental Protection Agency (EPA) (Attachment 1). Initiation of nuclear operations scheduled for October 1992.

7. **Do you have any plans for future additions, expansions, or further activity related to or connected with this proposal? If yes, explain.**

   The RPSF project involves the remodeling of portions of the Fuels and Materials Examination Facility (FMEF) at Hanford. The RPSF will use approximately 20 percent of the FMEF building. The balance of the FMEF building eventually should be made suitable for related or nonrelated nuclear activities. The FMEF building is a 250,000 square foot nuclear facility built in 1984. The FMEF has never achieved operational status due to changes in programmatic requirements.

8. **List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.**

A *Prevention of Significant Deterioration Permit Application for the Fueled Clad Fabrication System, the Radioisotope Power Systems Facility, and the Fuel Assembly Area*, 1989, DOE/RL-89-20, U.S. Department of Energy, Richland, Washington, has been submitted to the State of Washington. *Supplemental Information for a Notice of Construction for the Fueled Clad Fabrication System, the Radioisotope Power Systems Facility, and the Fuel Assembly Area*, DOE/RL 89-22 has been submitted to the State of Washington, Department of Health. *Application for approval for construction of the Fueled Clad Fabrication System, the Radioisotope Power Systems Facility, and the Fuel Assembly Area*, DOE/RL 89-21 has been submitted to the U.S. EPA.

A *National Environmental Policy Act of 1969* determination, based on the Radioisotope Power Systems Facility Action Description Memorandum (ADM) (Attachment 2), was documented by issuance of a memorandum from E. C. Baynard III, EH-25, to J. T. Garrish, NE-1, on August 22, 1988 (Attachment 3).

Additional environmental information regarding the Hanford Site can be found in the *Final Environmental Impact Statement - Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes*, DOE/EIS-0113 (U.S. Department of Energy, 1987, Richland, Washington), the *Hanford Site National Environmental Policy Act (NEPA) Characterization*, PNL-6415, Rev. 2, (Pacific Northwest Laboratory, 1989, Richland, Washington), *Environmental Impact Assessment for the Fuels and Materials Examination Facility*, Energy Research and Development Administration, 1977, *Environmental Assessment for the Fuels and Materials Examination Facility*, DOE/EA-0116, (U.S. Department of Energy, 1980, Washington, D.C.), and *FMEF Environmental Assessment Supplement for Secure Automated Fabrication (SAF)*, supplement to DOE/EA-0116, 1981.

9. **Do you know whether applications are pending for government approvals of other proposals directly affecting property covered by your proposal?**

Other applications are pending for areas within the FMEF building outside of the RPSF square footage. Clean Air Act documentation has been submitted to the State of Washington, Department of Health; the State of Washington Department of Ecology; and the U.S. Environmental Protection Agency, for missions identified as Fast Flux Test Facility (FFTF) Fuel Assembly Area (FAA) and Fueled Clad Fabrication System (FCFS).

10. **List any government approvals or permits that will be needed for your proposal, if known.**

Approval to Construct, pursuant to WAC 173-403-080 will be obtained. A WAC 402-80 Approval of Construction has been obtained from the State of Washington. A 40 CFR 61, NESHAPS Approval of Construction will be obtained if necessary.

11. **Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.**

    This project is intended to provide an area within the existing FMEF building that would support planned and future ^{238}Pu fueled radioisotope thermoelectric generators and major isotope power system programs for space and terrestrial applications to be conducted by the U.S. Department of Energy (DOE) Office of Special Applications (OSA). Radioisotope Power Systems currently are produced for the OSA at Mound Laboratories in Ohio. In January 1988, following a site evaluation, the DOE approved the reassignment of this production mission to the FMEF on the Hanford Site. The FMEF building is located in the 400 Area of the Hanford Site. The RPSF will be installed principally in the lower two levels of the FMEF building at a capital cost of $34,500,000. For additional details, refer to the NEPA Action Description Memorandum (Attachment 2) or the PSD Permit Application (DOE/RL-89-20).

12. **Give the location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.**

    Contained within the existing FMEF building in the Hanford Site 400 Area, approximately 4.5 miles west of the Columbia River and 2 miles southwest of the Washington Public Power Supply System WNP-2. Maps of the location are contained in the NEPA ADM (Attachment 2) and the PSD Permit Application (DOE/RL-89-20).

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site: Flat, rolling, hilly, steep slopes, mountainous, other.

The site is flat to gently rolling.

b. What is the steepest slope on the site (approximate percent slope)?

Negligible.

c. What general types of soils are found on the site? (for example, clay, sandy gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Eolian and fluvial sands with some gravel. No farming is permitted on the site.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

No.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate the source of the fill.

Not applicable, all activities will occur within the existing building.

f. Could erosion occur as a result of clearing, construction, or use? If so, describe.

Not applicable.

g. Approximately what percentage of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Nothing in addition to existing FMEF building surfaces.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if there are any?

Not applicable.

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.

Very minor emissions associated with construction. Some minor emissions of radionuclides resulting from normal operations. The PuO_2 particulate emissions are less than 2×10^{-15} Ci/year. Radon emissions are approximately 275 Ci/year. For more details, refer to the PSD permit application (DOE/RL-89-20).

b. Are there any off-site sources of emissions or odors that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to the air, if any?

All radionuclide particulate emissions generated by RPSF will be contained by three stages of testable HEPA filtration and directional air flow which were included in the design of FMEF per DOE Order 6430.1 and 6430.1A.

3. Water

a. Surface

1) Is there any surface water body in or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

No.

2) Will the project require any work over, in, or adjacent to (within 200 feet of) the described waters? If yes, please describe and attach available plans.

Not applicable.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of the fill.

Not applicable.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

Groundwater from existing 400 Area wells will be used. A minor amount of domestic sewage will be discharged to existing 400 Area sanitary sewer system.

2) Describe waste materials that will be discharged into the ground from septic waste tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Domestic sewage will be discharged to the soil through the leach field of the 400 Area septic tank system, sized to serve approximately 1300 people.

c. Water Run-off (including storm water)

1) Describe the source of run-off (including storm water) and methods of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other wastes? If so, describe.

Precipitation is a potential source of run-off. However, because of the relatively dry climate and permeable nature of the native soils, little, if any run-off is expected. No run-off control structures are required. No surface water bodies exist in the vicinity of FMEF.

2) Could waste materials enter ground or surface waters? If so, generally describe.

No.

d. Proposed measures to reduce or control surface, ground, and run-off water impacts, if any:

Not required.

4. Plants

a. Check the types of vegetation found onsite.

___ deciduous tree
___ evergreen tree
___ shrubs
_X_ grass
___ pasture
___ crop or grain
___ wet soil plants
___ water plants
_X_ other types of vegetation (sagebrush)

b. What kind and amount of vegetation will be removed or altered?

None.

c. List threatened or endangered species known to be on or near the site.

None at FMEF building. Information concerning threatened or endangered plants on the Hanford Site are found in the *Final Environmental Impact Statement - Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes*, DOE/EIS-0113, U.S. Department of Energy, 1987, Richland, Washington and the *Hanford Site National Environmental Policy Act (NEPA) Characterization*, PNL-6415, 1988.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Not applicable.

5. Animals

a. Identify any birds and animals which have been observed on or near the site or are known to be on or near the site:

Deer, coyotes, rabbits, small mammals, raptors, ravens, and miscellaneous small birds have been observed on the FMEF site. Additional information on animals found on the Hanford Site can be found in the documents referred to in the answer to Checklist Question B.4.c.

b. **List any threatened or endangered species known to be on or near the site.**

The FMEF building is not known to be used by any threatened or endangered species. Information concerning threatened or endangered animals on the Hanford Site can be found in the documents referenced in the answer to Checklist Question B.4.c.

c. **Is the site part of a migration route? If so, explain.**

The Hanford Site is located in the Pacific Flyway; in addition , a major sandhill crane flyway passes over the Hanford Site.

d. **Proposed measures to preserve or enhance wildlife, if any:**

None.

6. Energy and Natural Resources

a. **What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.**

Electric energy will be used for heating, cooling, and process requirements.

b. **Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.**

No.

c. **What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any.**

None specific to the RPSF modification. The FMEF building uses energy conservation equipment such as stack heat recovery coils.

7. Environmental Health

a. **Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.**

Environmental health hazards associated with the RPSF operations are negligible as stated in the NEPA ADM attached and the *Prevention of Significant Deterioration New Source Review for the Fueled Clad Fabrication System, the Radioisotope Power Systems Facility, and the Fuel Assembly Area*, DOE/RL 89-20, U.S. Department of Energy, 1989, Richland, Washington.

1) **Describe special emergency services that might be required.**

Hanford Site emergency preparedness, security, fire response, and ambulance services are on call at all times in the event of an onsite emergency.

2) **Proposed measures to reduce or control environmental health hazards, if any:**

As described in B.2.c., the FMEF and RPSF modifications were designed in accordance with DOE Order 6430.1 *General Design Criteria* and subsequent 6430.1A requirements to minimize health hazards.

b. **Noise**

1) **What type of noise exists in the area which may affect your project (for example: traffic, equipment, operation, etc.)?**

None.

2) **What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, etc.)? Indicate what hours noise would come from the site.**

Construction activities will contribute short-term noise within the FMEF. Operation of the RPSF will contribute an insignificant amount of noise.

3) **Proposed measures to reduce or control noise impacts, if any:**

None.

8. <u>Land and Shoreline Use</u>

a. **What is the current use of the site and adjacent properties?**

The FMEF building is a nuclear facility completed in 1984. It has never achieved operational status and because of changes in programmatic needs, the FMEF is no longer needed for its original mission. The FMEF is located in the 400 Area of the Hanford Site. The primary facility in the 400 Area is the Fast Flux Test Facility (FFTF), a 400 MWt sodium cooled fast neutron flux reactor. FFTF was designed to irradiate fuels and materials for the U.S. Department of Energy (DOE). The 400 Area is located within the 560 acre Hanford Site near Richland, Washington. The Hanford Site has been used for national defense production and energy research. Commercial activities on the Hanford Site include a nuclear power plant (Washington Public Power Supply System WNP-2) and a State of Washington administered low-level radioactive waste burial area operated by U.S. Ecology.

b. **Has the site been used for agriculture? If so, describe.**

No.

c. **Describe any structures on the site.**

The 400 Area has two major facilities--the FFTF and the FMEF. Miscellaneous offices, guard houses, fire station, make up the balance of the structures.

d. **Will any structures be demolished? If so, what?**

No.

e. **What is the current zoning classification of the site?**

The Hanford Site is zoned by Benton County as an Unclassified Use (U) district.

f. **What is the current comprehensive plan designation of the site?**

The 1985 Benton County Comprehensive Land Use Plan designates the Hanford Site as the "Hanford Reservation". Under this designation, land on the Hanford Site may be used for "activities nuclear in nature." Nonnuclear activities are authorized "if and when DOE approval for such activities is obtained."

g. **If applicable, what is the current master shoreline program designation of the site?**

Not applicable.

h. **Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.**

No.

i. **Approximately how many people would reside or work in the completed project?**

Approximately 100 people would work in the RPSF.

j. **Approximately how many people would the completed project displace?**

None.

k. **Proposed measures to avoid or reduce displacement impacts, if any:**

None.

l. **Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:**

Does not apply. (Refer to answer to Checklist Question B.8.f.)

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high-, middle-, or low-income housing.

None. Most workers will be from the existing Hanford Site work force.

b. Approximately how many units, if any, would be eliminated? Indicate whether high-, middle-, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

None.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

1. Existing FMEF structure is approximately 117 feet at its highest point.

2. Concrete.

b. What views in the immediate vicinity would be altered or obstructed?

None.

c. Proposed measures to reduce or control aesthetic impacts, if any:

None.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. **Proposed measures to reduce or control light and glare impacts, if any:**

None.

12. Recreation

a. **What designated and informal recreational opportunities are in the immediate vicinity?**

None.

b. **Would the proposed project displace any existing recreational uses? If so, describe.**

No.

c. **Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any?**

None.

13. Historic and Cultural Preservation

a. **Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.**

No places or objects listed on, or proposed for, national, state, or local preservation registers are known to be on or next to the site. Additional information on the Hanford Site environment can be found in the environmental documents referred to in the answer to Checklist Question A.8.

b. **Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.**

All activities will take place entirely within existing facilities, which contain no known archaeological, historical, or Native American religious sites. Additional information on the Hanford Site environment can be found in the environmental documents referenced in the answer to Checklist Question A.8.

c. **Proposed measures to reduce or control impacts, if any:**

None.

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

The RPSF site may be accessed via Alabama Boulevard, which connects to Route 10, connecting with Highway 240. Alternately, Alabama Boulevard connects with Kentucky Boulevard, connecting with Route 4 South, and connecting to Stevens Drive in the city of Richland.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Yes. Only beginning and end of day shift by special commuter runs to the site.

c. How many parking spaces would the completed project have? How many would the project eliminate?

None.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

No.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Approximately 75 trips per day, assuming partial use of public transportation and car pooling. The peak volumes will occur from 7:00 a.m. to 7:30 a.m., and again from 4:00 p.m. to 4:30 p.m.

g. Proposed measures to reduce or control transportation impacts, if any:

None.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any:

None.

16. Utilities

a. List utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other:

Electricity, telephone, site sanitary and process sewer, and site water wells.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

No new utilities tie to the RPSF.

SIGNATURES

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

R. D. Izatt, Director
Environmental Restoration Division
U.S. Department of Energy
Richland Operations Office

2/8/91
Date

List of Attachments

1. Telephone Conference Memorandum, J. C. Bates with A. Conklin (DSHS), J. Drabek (Ecology), and J. Leitch, and R. Nye (EPA), " Air Quality Permits: Pre-Construction Activities," dated March 22, 1989.

2. Letter, M. K. Korenko to J. R. Hunter, "Radioisotope Power Systems Facility (RPSF) Action Description Memorandum," 8852776, dated April 27, 1988.

3. Memorandum, E. C. Baynard III, EH-25 to T. J. Garrish, NE-1, "NEPA Determination for Modification of the Fuels and Materials Examination Facility at Hanford and Operation of the Radioisotope Power System Facility," dated August 22, 1988.

ATTACHMENT 1

TELEPHONE CONFERENCE MEMORANDUM

Westinghouse Hanford Company

_____ INCOMING __X__ OUTGOING DATE 03/22/89 TIME

WITH	Al Conklin	OF	Washington State Department of Social & Health Services, Office of Radiation Protection (DSHS)	PHONE 206-586-0254
WITH	John Drabek	OF	Washington State Department of Ecology (Ecology)	PHONE 206-867-7117
WITH	Jerry Leitch	OF	U.S. Environmental Protection Agency (EPA)	PHONE 206-442-7660
WITH	Ray Nye	OF	U.S. Environmental Protection Agency (EPA)	PHONE 206-442-4226

COPIES TO:

WHC:

M. E. Borgeson	N1-23
D. G. Carter	N1-49
C. K. Disibio	B3-06
C. J. Geier	H4-57
R. J. Landon	H4-50 Landon
R. E. Lerch	H4-51
J. J. Luke	H4-57
H. E. McGuire	H4-51
D. S. Takasumi	N1-23
S. A. Wiegman	H4-50
B. D. Williamson	B3-15
EDMC	H4-51
File/LB	

DOE-RL:

M. J. Anthony	A6-95
E. A. Bracken	A6-95
R. F. Brich	A5-55
A. J. Knepp	A6-95

SUBJECT: AIR QUALITY PERMITS: PRE-CONSTRUCTION ACTIVITIES

Department REG COMPL Signature [signature] Telephone Number 509-376-2088

SUMMARY OF CONFERENCE

Each of the listed agencies were contacted for confirmation that preliminary preparatory activities in the 4862 [Fuels and Materials Examination Facility (FMEF)] Building may be completed in advance of air quality approvals required prior to commencement of construction of any new or modified source of airborne radioactivity. The Fueled Clad Fabrication Line (FCFL), the Radioisotope Power Systems Facility (RPSF), and the Fuel Assembly Area (FAA) are being grouped under the air regulations as a new source of hazardous (radioactive) air emissions.

Each of the agencies were given a brief description of the projects and the preliminary preparatory activities planned in conjunction with their proposed location within the 4862 Building. Such activities were said to include removal of walls, rerouting electrical conduit, removal and relocation of HVAC ductwork, changing doors, chipping and repouring floors, and replacement of carbon steel cell liners with stainless steel liners per original design.

Al Conklin of the DSHS office was contacted first. He indicated that such preliminary activities in an existing facility would not be considered "construction of the new source if they did not directly involve actual construction of the equipment which will provide the source of new emissions, and could be applicable to other potential uses of the 4862 Building. Given that the preliminary activities met such criteria, a brief letter to his office describing the preliminary activities would be adequate documentation. When specifically asked if some form of approval from his office would be necessary he stated no; the letter of description would be adequate.

Jerry Leitch and Ray Nye of the EPA, and John Drabek (for Jay Willenberg) of the Washington State Department of Ecology, each confirmed the same position expressed by DSHS. They stated that a copy of the letter of description should be forwarded to their respective offices.

Each of the offices confirmed that the actual construction of a routine source of radioactive air emissions, however small, would require applicable approvals/permits related to air quality regulations.

ATTACHMENT 2

Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

April 27, 1988 8852776

Mr. J. R. Hunter, Director (3)
Operations Division
U. S. Department of Energy
Richland Operations Office
Richland, Washington 99352

Dear Mr. Hunter:

RADIOISOTOPE POWER SYSTEMS FACILITY (RPSF) ACTION DESCRIPTION MEMORANDUM

Reference: Letter, M. K. Korenko to J. R. Hunter, "Radioisotope Power Systems Facility (RPSF), Action Description Memorandum," 8851613, March 9, 1988.

Attached for your concurrence is a Westinghouse Hanford approved Action Description Memorandum (ADM) for the Radioisotope Power Systems Facility (RPSF) in the 427 Building (FMEF). This ADM has incorporated comments received from DOE-RL on the draft ADM submitted in the referenced letter. It has been reviewed by our safety, environmental, and legal staffs.

It is Westinghouse's position that this ADM provides adequate information to support a DOE-RL recommendation to DOE-HQ for a Memorandum-to-File closure of the RPSF environmental documentation. Please call R. L. Knecht of my staff on 376-8724 with any questions you may have on this matter.

Very truly yours,

Mike Korenko

M. K. Korenko, Manager
Advanced Reactor Development Division

dc

Attachment

DOE/RL - O. A. Farabee
M. S. Karol
A. W. Kellogg, AMO Operations Officer (w/o attachment)
J. P. Neath

ACTION DESCRIPTION MEMORANDUM

RADIOISOTOPE POWER SYSTEMS FACILITY

1.0 SUMMARY

This Action Description Memorandum (ADM) addresses the potential environmental impacts from the proposed modifications to, and utilization of, a portion of the Fuels and Materials Examination Facility (FMEF) located in the 400 Area of the Hanford Site, near Richland, Washington. The modifications would result in the Radioisotope Power Systems Facility (RPSF). The RPSF is a proposed facility which would receive components, allow assembly of those components into radioisotope (as plutonium oxide) power sources, test the sources, store the sources, and ship the sources for the U.S. Department of Energy (DOE).

As discussed later in this ADM (Section 4.0), there are several potential environmental impacts related to the proposed modifications to the FMEF in developing the RPSF. These impacts are not considered significant as part of the overall impacts of the Hanford Site, and are significantly less than the impacts discussed in earlier environmental documentation prepared for the FMEF facility (ERDA 1977a, DOE 1980, DOE 1981b; see Section 4.0 for a summary of the previous environmental documentation).

2.0 DESCRIPTION OF PROPOSED ACTION

The purpose of the proposed project is to provide the capability to produce Radioisotope Power Systems on the Hanford Site for the U.S. Department of Energy. The proposed facility would provide the necessary support equipment and power to produce those Radioisotope Power Systems.

The proposed project will provide a facility, the Radioisotope Power Systems Facility (RPSF), with the capability of assembling, testing and storing plutonium-238 (^{238}Pu) power sources for planned programs of the DOE Office of Special Applications (OSA), Space and Defense Power Systems. The RPSF would occupy the bottom level (approximately 28,000 square feet of floor space) of the existing Fuels and Materials Examination Facility (FMEF) at the Hanford Site. The RPSF would displace only the destructive examination portion of the original Post-Irradiation Examination (PIE) mission. The estimated cost to modify the previously unused portion of the FMEF is $25 to $30 million for project construction start in fiscal year 1989, and project completion in fiscal year 1991. The design life of the proposed facility is 20 years.

The proposed project would modify a portion of the existing 427 building at FMEF to incorporate the Radioisotope Power Systems Facility (RPSF). The RPSF would receive iridium-encapsulated sintered plutonium oxide (PuO_2) pellets from a separate DOE facility (Savannah River). The encapsulated pellets, called Fueled Clads (FCs), are contained within welded stainless steel

canisters inside of DOE fuel shipping casks. The plutonium radioisotopic content of the FCs is approximately 83.5% Pu-238 and 16.5% Pu-239 (by weight). The FCs will be removed from the packing material, surveyed, and decontaminated if necessary, with decontaminating solutions (e.g., aqueous solutions of nitric acid and hydrofluoric acid). Four FCs will be assembled into a pre-machined graphite block to produce a General Purpose Heat Source (GPHS) module. The GPHS will be approximately 2 inches high, 3.7 inches wide and 3.8 inches deep. The GPHS could be used in various configurations and numbers to assemble heat sources for Dynamic Isotope Power System (DIPS), space Radioisotope Thermoelectric Generators (RTG), and High Performance Generator (HPG) terrestrial RTGs. Other forms of PuO_2, such as those used in a Special Application Terrestrial (SAT) RTG, may be used in the RPSF. The SAT RTG heat source is PuO_2 shards contained by a three-layer capsule consisting of two layers of a tantalum alloy and a Hastelloy C-276 clad. The completed heat sources or RTGs will be tested at the RPSF. The RPSF will have the testing capabilities to determine thermoelectric generator performance at simulated space conditions. The testing will include vibration, magnetic properties, mass properties and exposure to high vacuum. The power sources will be packaged in accordance to user specifications prior to shipment. The power sources will be stored in the RPSF until delivered to DOE's Office Of Special Applications, Space and Defense Power Systems. The delivery will be via DOE transport from the shipping and receiving area located within the FMEF structure. The assembly process is discussed in more detail in Appendix A.

The building modifications to FMEF required to construct the RPSF will be conducted within the confines of the existing FMEF structure and utility systems. The modifications include structural (demolition, wall additions and replacements, decking), mechanical (HVAC, hot cell atmospheric control, process cooling systems, emergency cooling system, process services), interior electrical services (normal electrical power, emergency electrical power, uninterruptible power supply), interior telecommunications and alarm systems, fire protection, efficient control and monitoring of solid waste disposal, energy conservation, radiation protection (criticality detection, contamination sampling), additional safety modifications/upgrades (instrumentation and control, emergency cooling water, oxygen monitoring, hot cell atmospheric control, finished product monitoring, HVAC), contamination confinement, and plutonium material safeguards. Integration into existing FMEF facilities and systems will be conducted whenever possible. The modifications will generate miscellaneous construction waste in the form of structural building materials and equipment installed for previous missions. All waste generated during construction for the modifications will be nonradioactive, since the bottom level of FMEF has never been used.

Due to changes in programmatic needs, the area of the FMEF proposed for RPSF uses is no longer needed for its originally intended mission. The original mission of that portion of FMEF to be modified (the minus 35 foot level of the facility), the destructive examination portion of a post-irradiation examination (PIE) facility for examination of Fast Flux Test Facility (FFTF) fuels, would have involved approximately 740,000 curies per year of fission products. Impacts of the original mission were addressed in an environmental assessment, and a Finding of No Significant Impact (FONSI) was issued (ERDA 1977a, DOE 1980). A modification to the original mission, the Secure Automated Fabrication (SAF) facility, was also subjected to an environmental analysis and review (DOE 1981b) and no significant impacts were

identified. For comparison, the proposed RPSF mission, described above, will involve approximately 82,000 curies per year, in the form of PuO_2 (predominantly Pu-238).

The RPSF will have the capability to produce 240 GPHS modules (960 FCs) annually. Each FC contains 153 grams of PuO_2 for a total annual throughput of approximately 147 kilograms of PuO_2. The total RPSF design inventory of PuO_2 in the form of assembled power sources and in-process material is two years production, or 294 kilograms of PuO_2. The FC canister storage area will have a design capacity of 140 canisters (280 FCs) or 42.8 kilograms of PuO_2. The Module Reduction and Monitoring Facility (MRMF) portion of RPSF, where an autoreduction of PuO_2 will be performed, will have a design capacity of 105 MRMF canisters (840 FCs) or approximately 128 kilograms of PuO_2. The Dynamic Isotope Power System (DIPS) heat source storage area will be designed for two DIPS assemblies, or approximately 147 kilograms of PuO_2. The Radioisotope Thermoelectric Generator (RTG) storage area will be designed for seven RTGs, or a total of 77 kilograms of PuO_2. The storage areas will be designed to preclude criticality considerations for stored materials.

There are several effluents anticipated as a result of the proposed RPSF project. The original mission (PIE) also projected various effluents as a result of the destructive examination. Table I offers a qualitative comparison of the projected RPSF effluents and the PIE effluents.

The effluents specifically related to the RPSF mission will consist of gases, liquids, and solids. Gaseous effluents will be the following:

-Heated air from the HVAC systems

Approximately 8500 cubic feet per minute (CFM) will be exhausted from the RPSF. Increased air flows required by the RPSF will be provided by recirculating and filtering the air within the facility. There will be no increased exhausts over the original FMEF design. Exhausts from potentially radioactively-contaminated areas (hot cells with air atmosphere) will be passed through High Efficiency Particulate Air (HEPA) filters prior to entering the FMEF exhaust system. The FMEF exhaust is passed through two additional HEPA filters before being released to the environment. The FMEF stack releases are monitored by redundant Continuous Air Monitors (CAMS) that measure alpha, beta, and gamma radiation.

-Exhaust from argon atmosphere enclosures

Argon will be exhausted from the hot cells operating in an argon atmosphere, the Inert Atmosphere Assembly Chambers (IAAC), and the MRMF. The exhausts from the hot cells and IAACs will be minimized by maintaining the purity within the enclosures with recirculating purification units. The exhaust flow is expected to be less than 10 CFM. The argon exhaust will be passed through HEPA filters prior to entering the FMEF exhaust system upstream of the final HEPA filters. The FMEF stack exhaust is monitored by CAMs as described above.

TABLE I

EXAMPLES OF EFFLUENTS FROM FMEF

Effluent	PIE		RPSF	
Radioisotopes: (Ci/yr)	Noble gases	430	PuO_2	2.2×10^{-13} (from FC* surface contamination)
	Halogens	2×10^{-3}		
	Volatile solids	5×10^{-8}		
	All remaining fission products	4×10^{-7}		
	Uranium	5×10^{-17}		
	Transuranium (i.e., Am-241)	2×10^{-10}		
	Tritium	3		
Gases	Air, nitrogen Incinerator combustion products		Air, nitrogen Argon, helium Volatile organics	
Liquids[a]	Kerosene Decon solutions Personnel decon solutions Photographic film developing solutions		Acids: Hydrofluoric/Nitric Methylene chloride Personnel decon solutions Ethyl alcohol Deionized water	
Solids[b]	Filters Swabs, swipes Housekeeping material		Filters MRMF** canisters FC canisters Swabs, swipes Housekeeping material	

*FC = Fueled Clad
**MRMF = Module Reduction & Monitoring Facility

a Contaminated waste water from the PIE mission was estimated at approximately 55,000 gallons per year, approximately 130,000 gallons per year from the combined FMEF, while the RPSF estimate is 50 gallons per year.

b Solid radioactive wastes from the PIE mission was estimated to require the commitment of less than one acre of land from total life operation of the facility (assuming a 20 year design life, approximately 12,000 cubic feet annually). The RPSF estimate is no more than 75 cubic feet of nonradioactive solid waste annually, and less than 50 cubic feet of radioactive solid waste annually.

used FC canisters, MRMF canisters and swabs, swipes, and miscellaneous housekeeping materials generated in the hot cells. The level of contamination is not known at this time, but for the purpose of this document, the waste will be considered transuranic waste (greater than 100 nanocuries of transuranic material per gram of waste). These wastes will be compacted within the RPSF, when practical, before packaging and are expected to be generated at a rate of less than 50 cubic feet per year. The packaged waste will be transported to the 200 Areas and stored pending final disposal decisions.

-Nonradioactive solid wastes

Nonradioactive solid waste generated within the RPSF will consist of packing materials and assorted housekeeping supplies. These wastes will be compacted prior to packaging, and will be generated at an annual rate of no more than 75 cubic feet per year. These wastes will be transported to the Central Landfill for disposal.

Each federal agency such as the DOE, with jurisdiction over any property or facility that may discharge air pollutants, must comply with applicable federal, state, interstate and local requirements to control and abate air pollution. Specific regulations which apply include: National Emission Standards for Hazardous Air Pollutants; Standards for Radionuclides (40 CFR 61): National Emission Standard for Radionuclide Emissions from Department of Energy (DOE) Facilities (Subpart H); Washington State Department of Ecology: Ambient Standards for Emission of Radionuclides (WAC 173-480); Regional Air Pollution Control Authority Regulations (e.g., the Benton-Franklin-Walla Walla Air Pollution Control Authority). Specific Hanford Site DOE guidelines are even more restrictive than the above standards. There are no defined limits for the possible routine non-radioactive gaseous effluents from RPSF. Table II is a summary of the maximimum anticipated annual routine releases from RPSF to the environment.

The postulated routine RPSF radioactive releases would be in the form of particulates initiating from PuO_2 capsule surface contamination. Any gaseous effluent release to the environment must pass through three stages of HEPA filtration. The calculated release from the displaced PIE mission (see Section 4.0) was 430 Ci/yr of noble gases, 3 Ci/yr tritium, and 4×10^{-7} Ci/yr of fission product particulates (ERDA 1977a). Those releases yielded an estimated maximum whole body dose rate to the general population at the FMEF boundary of 4×10^{-10} millirem per hour (mrem/hr). The SAF operations would have increased the external radiation dose rate by 1.74×10^{-15} mrem/hr and 1.34×10^{-7} mrem/hr of inhalation uptake (DOE 1981b).

The proposed RPSF project emissions would be only a small fraction of the PIE calculated routine dose consequences. The shipping requirements for the FCs are that they have no more than 20,000 dpm per FC. At 4.5×10^{-13} Ci/dpm, and with 960 FCs processed annually, a maximum of 8.6×10^{-6} Ci of plutonium would be available per year within the facility for environmental release during routine operations. It was assumed that one percent of the available activity is respirable and could be released from the FCs. This is quite

-Exhaust from nitrogen atmosphere RTG storage

The nitrogen atmosphere purity in the RTG storage area will be maintained by feed and bleed. The flow of nitrogen required to maintain the purity is expected to be less than 5 CFM. In addition to the continuous flow of nitrogen, the space will be deinerted as necessary to insert or remove RTGs for storage. Establishing an air atmosphere within the RTG storage area will require exhausting approximately 4100 cubic feet of nitrogen. When the nitrogen atmosphere is reestablished, the air will be removed by dilution. A total of 40,000 cubic feet of nitrogen might be required. Deinerting the RTG storage area might be required five or six times a year. The nitrogen exhaust will be introduced into the FMEF exhaust upstream of the final HEPA filters.

-Process exhaust

Process exhausts will include the ultrasonic cleaner hood exhaust (metal cleaning operations with volatile organics) and exhausts from vacuum pumps located at the MRMF, the IAACs, and vacuum test vacuum chambers. The process exhaust will be introduced into the FMEF exhaust upstream of the final HEPA filters.

Small quantities of liquid wastes will be generated within the RPSF. The liquid wastes will consist of the following:

-Decontaminating solutions

Less than 50 gallons of FC decontaminating solutions will be generated annually. This radioactively-contaminated solution of nitric acid, hydrofluoric acid, and water will be considered mixed waste. The material will be packaged in 50-gallon containers, transported to the 200 Area plateau and stored pending final disposal decisions.

-Metal component cleaning solutions

Less than 500 gallons each of the liquids used in metal component cleaning (organic solvents [e.g.,methylene chloride, ethyl alcohol] and water) will be generated annually. Hazardous liquids (e.g., methylene chloride) will be packaged in 50-gallon containers and transported to the 200 Area plateau for storage, pending final disposal decisions. Nonradioactive and nonhazardous liquid wastes (e.g., water) will be routed through the existing FMEF process sewer system.

Small quantities of solid wastes will be generated within the RPSF. The solid wastes will consist of the following:

-Radioactive solid wastes

Radioactive wastes generated within the RPSF will consist of

TABLE II

SUMMARY OF MAXIMUM ANTICIPATED ROUTINE RPSF RELEASES TO THE ENVIRONMENT

Release	Quantity (units/yr)	Limit	Limit Source
PuO_2	2.2x10-13 Ci	4X10-06 Ci	DOE DCGs[a]
Heated Air	4.5x10+09 cu ft	b	
Nitrogen	< 3x10+06 cu ft	b	
Argon	< 5x10+06 cu ft	b	
Helium	< 5x10+03 cu ft	b	
Methylene Chloride (liquid)	< 500 gal	c	
Methylene Chloride (vapor)	< 50 gal	b	
Ethyl Alcohol (liquid)	< 500 gal	c	
Ethyl Alcohol (vapor)	< 50 gal	b	
Hydrofluoric Acid (liquid)	< 25 gal	c	
Nitric Acid (liquid)	< 25 gal	c	

a Derived Concentration Guide; DCG-Public are those concentrations of radionuclides in air that would result in maximum effective committed dose equivalent of 100 mrem per year using ICRP 30 dose methodology under conditions of continuous exposure or use.

b No National standards exist. The DOE standards for nonradioactive emissions apply. For general pollutants (i.e., air contaminants [general] and water vapor, the standard of "must not impact health, safety or welfare of any person or damage property" is based on the WAC 173-400-040.

c No National standards exist. Liquid waste will be transported to the 200 Areas plateau and handled appropriately (See Section 4.0).

conservative considering that the FCs have been decontaminated for shipping purposes, and any residual contamination would have a tendency to adhere to the FCs (since the activity was not removed during the decontamination process). The activity would be released through three stages of HEPA filters, but for conservatism only two stages of HEPA filters were assumed, with a transmission fraction of 2.5×10^{-6}. Based on these assumptions, routine operations of the RPSF could result in a maximum postulated release of approximately 2.2×10^{-13} Ci/yr of ^{238}Pu and 1.4×10^{-16} Ci/yr of ^{239}Pu. Such a release would result in a population whole body dose of 7×10^{-11} person-rem. This release is negligible when compared to the postulated releases of the SAF mission (i.e., 4.6×10^{-3} person-rem, DOE 1981b).

The maximum annual routine release from the RPSF (2.2×10^{-13} Ci of PuO_2; Table I) is less than the DOE derived concentration guides for controlling exposure to members of the public for a new source of airborne emissions of radioactive materials (4×10^{-06} Ci Pu-238). For additional comparison, dose rate measurements at the adjacent FFTF facility for 1986 showed only normal background radiation levels of 0.008 mrem/hr (PNL 1987). This value may be compared further with DOE limits for radiation exposure to the general public of 500 mrem/yr for occasional exposure and 100 mrem/yr for prolonged exposure periods (assuming 365 days/yr and 24 hr/day, 0.06 mrem/hr and 0.01 mrem/hr, respectively). Doses are addressed further in Section 6.0.

Worker exposure to radiation and hazardous chemicals will be controlled through a combination of facility design features, exposure level monitoring, optimizing work procedures to minimize exposure, and actual exposure measurement. For radiation exposure control, the RPSF design philosophy is that exposures will be limited to less than one-fifth of current DOE operating limits; i.e., one rem per year. Preliminary RPSF radiation shield design criteria are shown in Table III.

Radiation exposure values are monitored with installed radiation detection devices and by radiation protection technicians using hand-held instruments and air sampling devices. While individual worker whole body exposure is administratively limited by the operating contractor to 4 rems per year (compared to a DOE limit of 5 rems per year), the operating contractor also actively pursues a program to keep worker exposure As Low As Reasonably Achievable (ALARA) through design features and work procedures. The actual worker exposure will be measured with a combination of thermoluminescent, finger ring, and pencil dosimeters. Routine thermoluminescent dosimeter processing frequencies range from monthly (for those personnel with anticipated exposures of greater than 300 mrem per month) to annually (for those personnel with anticipated exposure of less than 500 mrem per year). Finger ring dosimeters are processed monthly and pencil dosimeters are recharged after logging the indicated exposure weekly. Records of worker exposure are maintained by Pacific Northwest Laboratories, a separate DOE-RL contractor.

Worker exposure to hazardous chemicals will also be controlled. The solvent used in the RPSF metal cleaning operation is currently identified as methylene chloride. Efforts to find a less hazardous chemical that may serve as a satisfactory substitute are in progress. The cleaning operation will use an ultrasonic cleaning tank with an integral hinged lid. The tank will be within a hood with a controlled exhaust flow. The hood's effectiveness in

TABLE III

PRELIMINARY RPSF RADIATION SHIELD DESIGN CRITERIA

Access Time Allowed	Exposure(mrem/hr)	
	Initial Design Level	Maximum
Full time	0.2	0.5
Less than 1 hr/day	2	5
Less than 1 hr/wk	10	20
Less than 5 hr/yr	100	200
Less than 1 hr/yr	500	1000
No access permitted	1000	Unlimited

controlling the concentration of solvent vapor in the work area will be determined by measurements performed by personnel from the Hanford Environmental Health Foundation, a separate DOE-RL contractor.

The original missions of the FMEF, which have been subjected to environmental reviews (ERDA 1977a, DOE 1980, DOE 1981b), have not been carried out in full due to programmatic changes. Most of the FMEF complex is inactive and the proposed RPSF project, along with the Fast Flux Test Facility (FFTF) fuel supply activities in the Fuel Assembly Area (FAA), will be the only activities presently identified for the FMEF. The FAA was intended to produce FFTF fuel assemblies from mixed uranium/plutonium oxide fuel pins made in the FMEF Secure Automated Fabrication (SAF) facility (DOE 1981b). Completed assemblies would also have been stored in the FAA. Although the SAF facility is currently inactive, the FAA will be used to produce metallic FFTF fuel assemblies and store miscellaneous fuel pins remaining from the FFTF oxide fuel program. The metallic fuel assemblies will be produced by encapsulating rods of an enriched uranium-zirconium alloy in stainless steel tubes and assembling the resulting fuel pins into FFTF fuel assemblies. The metallic fuel inventory is expected to be approximately ten completed assemblies in storage and the equivalent of two assemblies in the production process. The metallic fuel inventory will be approximately 495 kilograms of uranium, including 160 kg of uranium-235. The additional inventory represented by the fuel pins remaining from the FFTF oxide fuel program is the equivalent of 23 fuel assemblies, or 225 kg of plutonium oxide (PuO_2). Routine FAA operations will not result in any radioactive gaseous discharges to the environment, nor will waste generated during operations pose any negative impacts to the public or the environment (see Section 6.0).

3.0 LOCATION OF PROPOSED ACTION

The FMEF is located in the 400 Area which is part of the 570 square mile semiarid Hanford Site in southeastern Washington (Figure 1). The plant site is approximately 4.5 miles from the Columbia River, the nearest natural watercourse. The projected 100-, 500-year flood does not include the 400 Area. The 400 Area is more than 100 feet above the groundwater table. Grade level at the FMEF is 550 feet, which is more than 100 feet above the maximum probable flood. The region is characterized as one of low to moderate seismicity. The nearest population center is the city of Richland (Benton County), about 12 miles away.

The area has a mild climate with annual precipitation of six to seven inches, and infrequent periods of high winds (up to 80 miles per hour). Tornadoes are extremely rare. Only one tornado has been recorded in the region, and the probability of a tornado hitting any given facility on-site is estimated at six chances in one million during any given year.

The sagebrush/cheatgrass-Sandberg's bluegrass vegetative community dominates the Hanford Site, including the 400 Area. The important shrubs are big sagebrush and rabbitbrush, while the understory is primarily composed of cheatgrass and Sandberg's bluegrass.

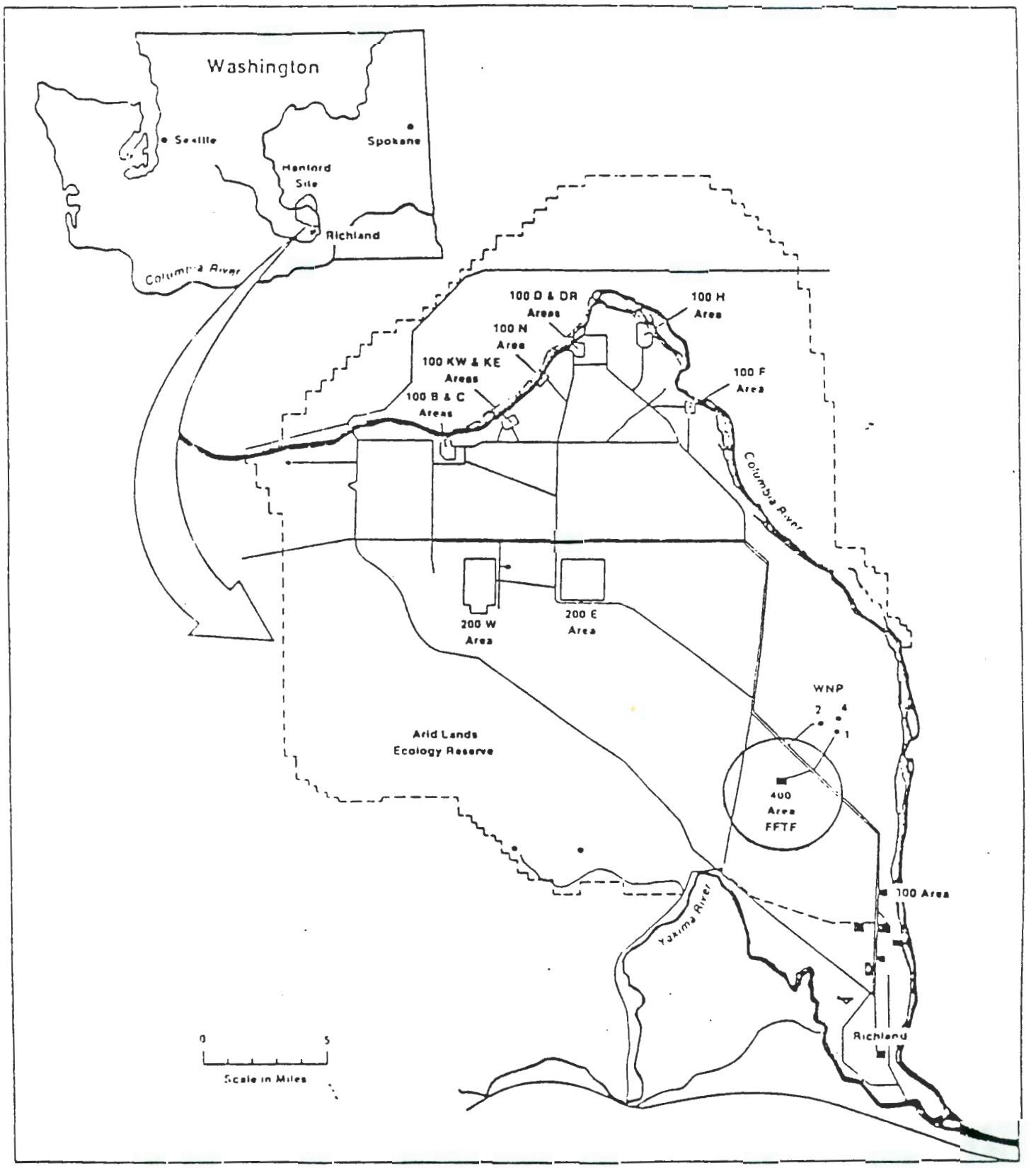

FIGURE 1
HANFORD SITE

Most mammal species known to inhabit the Hanford Site are small, nocturnal creatures, primarily pocket mice and jackrabbits. Large mammals found on the site are deer and elk, although the elk are almost entirely on the Arid Lands Ecology Reserve. Coyotes and raptors are the primary predators. Only a few species of small birds nest in the Hanford Site steppe environment. Semiannual peaks in variety and abundance occur during migration seasons. The bald eagle is a winter resident, but no species of plant or animal registered as rare, threatened, or endangered are known to depend on habitats unique to the 400 Area.

Other characteristics of the Hanford Site, such as rural or urban qualities, environmental setting, and economic conditions of the area may be found in the final EIS for disposal of Hanford defense wastes (DOE 1987).

4.0 POTENTIAL ISSUES

The Fuels and Materials Examination Facility (FMEF) and the High Performance Fuel Laboratory (HPFL) were originally proposed to be constructed as separate facilities in the 400 Area of the Hanford Site, near Richland, Washington. The environmental effects of those two facilities were described and evaluated in an FMEF environmental impact assessment (ERDA 1977a) and the HPFL Final Environmental Impact Statement (ERDA 1977b). For economic reasons, it was decided that the two facilities would not be built as separate facilities. The FMEF facility plans were modified to incorporate some of the features of the proposed HPFL facility while retaining essentially all of the capabilities of the original FMEF mission. The original mission was to perform nondestructive and destructive examinations of Fast Flux Test Facility (FFTF) and other Liquid Metal Fast Breeder Reactor (LMFBR) program fuels and materials. These activities constituted the original Post Irradiation Examination (PIE) mission. An Environmental Assessment (EA) was written (DOE 1980) to update the original FMEF EA (ERDA 1977a) to appropriately reflect the addition of certain HPFL features into the FMEF facility and to assess the environmental effects of the facility which would result from inclusion of HPFL features into the FMEF facility. The FMEF combined mission was further modified to incorporate the Secure Automated Fabrication (SAF) Facility. An environmental analysis was conducted for the SAF, and reviewed by DOE-Headquarters (DOE-HQ) (DOE 1981b).

The earlier NEPA documentation (ERDA 1977a, DOE 1980,) evaluated the impacts related to the original mission of that portion of FMEF which is affected by the proposed project. The earlier documentation resulted in a Finding of No Significant Impact (FONSI) for the construction and operation of FMEF. The addition of SAF to FMEF also resulted in a determination that no additional NEPA documentation was required (DOE 1981b).

Several potential impacts associated with the construction and operation of the RPSF have been identified and compared to previously projected FMEF impacts. The projected impacts from the proposed RPSF are even less than those impacts evaluated in ERDA 1977a, DOE 1980, or DOE 1981b. Tables IV, V, and VI (Section 6.0) show a comparison of impacts. This section contains a detailed explanation of those potential environmental issues/impacts

associated with the proposed modifications to FMEF to provide the RPSF capability. The specific issues are addressed below.

1. Gaseous discharge to the environment.

   Gaseous discharges will consist of a small amount of exhaust emissions from the construction equipment. Operations of the facility will result in gaseous emissions to the atmosphere through High-Efficiency Particulate Air (HEPA) filters. The emissions will be constantly monitored for radiation. Routine emissions will be insignificant compared to normal background radiation (See Section 6.0).

2. Particulate or droplet releases to the environment.

   Construction activities will result in the release of minor amounts of dust inside the building. Filters will prevent release of the dust to the atmosphere.

3. Thermal discharges to the environment.

   Equipment used during construction will release inconsequential amounts of heat to the atmosphere. The ventilation system will release heated air, through HEPA filtration, to the atmosphere during operation of the facility.

4. Liquid discharges to the environment.

   No direct discharge of radioactive or hazardous liquid effluents to the environment will take place during construction or operation of the facility. Any liquid waste that is either radioactive mixed waste or hazardous waste generated during operations will be transported to the 200 Areas plateau and handled appropriately. The radioactive liquid wastes will be discharged to double-shell tanks and disposed of as tank waste, subject to the forthcoming Record of Decision (ROD) on the Final Environmental Impact Statement for disposal of Hanford defense wastes (Disposal of Hanford Defense High-Level,Transuranic, and Tank Wastes, DOE/EIS-0113, 1987). Hazardous wastes will be packaged and disposed of in accordance with the Washington Administrative Code (WAC) 173-303, Dangerous Waste Regulations. Nonradioactive and nonhazardous liquid waste will be routed through the existing FMEF process sewer to the 400 Area leaching ponds.

5. Oil and Chemical Spill Control and Prevention..

   Due to the nature of liquids used in the facility (decontamination solutions), an Oil and Chemical Spill Control and Prevention Plan will be required. Prior to operation of the proposed project, the Oil and Chemical Spill Control and Prevention Plan will be in place as part of the Facility Operating Procedures.

6. Solid waste disposal.

During construction, miscellaneous scrap building material that is generated will be disposed of in the Central Landfill. During operations, solid wastes (radioactive and nonradioactive) will be generated. Some of the radioactive wastes may potentially be transuranic (TRU) wastes. The definition of TRU waste is waste contaminated with more than 100 nanocuries of TRU activity per gram of waste. Any TRU or TRU mixed wastes will be treated and stored on the 200 Areas plateau until disposal, as forthcoming in the Record of Decision for the Final Environmental Impact Statement for disposal of Hanford defense wastes (Disposal of Hanford Defense High-Level, Transuranic, and Tank Wastes, DOE/EIS-0113, 1987). Low-level wastes will be packaged, transported and disposed of on the 200 Areas plateau. Any low-level radioactive mixed wastes will be packaged and transported to the 200 Areas plateau and stored. Nonradioactive solid wastes (e.g., packing materials) will be disposed of in the Central Landfill. Additionally, materials contaminated with hazardous chemicals (e.g., methylene chloride) may be generated. Hazardous waste will be packaged and disposed of in accordance with WAC 173-303, Dangerous Waste Regulations.

7. Increased noise level.

Noise levels will temporarily increase in the immediate vicinity of routine construction activities. Since construction will take place predominently inside the existing FMEF, minimal effects to the outside environment are anticipated. Appropriate precautions to minimize deleterious health impacts to personnel (e.g., use of noise suppressors) will be used.

8. Use of carcinogens, pesticides, or toxic substances.

Some hazardous liquids would be used for cleaning metal components and as decontaminating solutions. These liquids would eventually outlive their usefulness and be considered waste. Liquid mixed waste (radioactively-contaminated hazardous liquid wastes) will consist of aqueous solutions of radioactively-contaminated nitric and hydrofluoric acid (no more than 50 gallons total per year). Nonradioactive liquid waste will include small quantities (approximately 500 gallons annually each) of liquids used in metal component cleaning, such as methylene chloride, ethyl alcohol, and water. The liquid wastes (radioactive mixed waste, hazardous waste, and nonradioactive waste) would be disposed of as discussed in Item 4 above.

9. Long-term commitment of nonrenewable resources.

A small amount of additional building materials, such as concrete and steel, and equipment will be committed over the long term. Since the RPSF will use an existing facility, most of the resource commitments have already been made.

10. New utilities or modifications to existing facilities.

No new site utilities will be required for this project; however, modified utilities will be required for construction of the facility. Existing systems (e.g., electrical, fire prevention) will be redistributed and/or upgraded to provide required services for the facility.

11. Transportation of hazardous and/or nuclear materials.

Any environmental impacts involved with the transportation of materials to and from the RPSF would not be expected to be different than the impacts presently involved with the shipments to and from Mound Laboratories, Miamisburg, OH, where Radioisotope Power Systems are presently produced. Nuclear materials are received at Mound from Savannah River Plant. The RPSF SNM feed material is expected to be either FCs shipped directly from Savannah River to the FMEF or the Special Application Terrestrial RTG heat sources shipped from Savannah River to Los Alamos and then from Los Alamos to the FMEF. The 960 FCs required annually for the RPSF process are expected to be delivered in monthly shipments of about 80 FCs (approximately 12 kg of PuO_2) each. Three FC canisters containing two FCs each will be packaged in a shipping cask for transport.

The small quantities of SNM (approximately 2 kg of PuO_2 annually) in the Special Application RTG heat sources will be packaged in shipping casks for transport from Los Alamos to FMEF. Shipping casks are designed to prevent the loss or dispersal of their radioactive contents, retain shielding efficiency, ensure criticality safety, and provide adequate heat dissipation under all normal and test conditions.

Shipment of SNM between DOE sites will be by truck with DOE Safe Secure Transports (SST). Routing of all SNM shipments between DOE sites, including Hanford, is coordinated through the DOE Albuquerque Operations Office.

The completed power sources intended for space applications will be shipped directly from FMEF to a launch site. Power sources used in National Aeronautics and Space Administration (NASA) missions will be launched from Cape Canaveral in Florida. Power sources used in Department of Defense (DOD) missions will be launched from either Cape Canaveral or the Vandenberg Air Force Base in California. The destination of terrestrial RTGs produced in the RPSF for the DOD is classified information. All power sources produced in the RPSF will be shipped in SSTs.

Transportation of radioactive materials to and from the Hanford Site will be regulated by one or more of four Federal agencies: 1) the Department of Transportation (DOT), 2) the Department of Energy (DOE), 3) the Nuclear Regulatory Commission (NRC), and 4) the Interstate

Commerce Commission (ICC). These agencies have developed comprehensive regulations covering the performance of the shipping packagings, vehicle safety, routing of shipments, physical protection, and economics. Shipments would be conducted in accordance with DOT regulations (49 CFR 170-179). The DOE has also developed applicable transportation requirements, which are set forth in DOE 5480.3 (DOE 1985). All applicable Federal and State regulations will be followed.

The transport of plutonium is part of ongoing DOE operations and would continue independent of the operation of the proposed RPSF. The environmental consequences associated with routine (non-accident) transport of plutonium are enveloped by the consequences presented in the Nuclear Regulatory Commission (NRC) Final Environmental Impact Statement on the Transportation of Radioactive Material by Air and Other Modes (NRC 1977). Under normal transport conditions, no shipments would be expected to result in any significant exposures.

The TRU-waste material shipments made within the Hanford Site would be conducted in accordance with DOT regulations (49 CFR 170-179). Hazardous waste would be transported and handled in accordance with EPA requirements (40 CFR 263) and Washington Administrative Code (WAC 173-303).

No conflicts with any federal, state, or local environmental regulations which may apply to this project have been identified.

6.0 CONCLUSIONS

The data shown in Tables IV, V, and VI are presented for comparison of environmental impacts evaluated in existing environmental documentation for FMEF proposed operations. The environmental effects of the FMEF were originally analyzed in two environmental assessment documents, ERDA 1977a and DOE 1980. The effect of adding the Secure Automated Fabrication (SAF) project fuel fabrication facility to the FMEF was also evaluated (DOE 1981b). A comparison of potential environmental effects from FMEF with SAF (DOE 1981b), FMEF without SAF (DOE 1980), and the proposed RPSF is shown in Tables IV, V, and VI. The anticipated environmental effects resulting from the remaining FFTF fuel supply activities (Fuel Assembly Area) are also shown for information.

The small inventory of radioactive material to be used for the proposed RPSF mission clearly result in negligible impacts to the environment, based on the earlier environmental documentation (ERDA 1977a, DOE 1980, DOE 1981b). The estimated maximum annual doses to the individual from routine operations (2×10^{-12} millirem) and from a postulated upper-bound accident (0.3 millirem) remain well below the current Department of Energy limits for exposure of the general public to radiation of 100 millirem per year for prolonged exposure and a 500 millirem per year for occasional exposure.

Table IV

POTENTIAL ENVIRONMENTAL EFFECTS FROM FMEF OPERATIONS

Component	FMEF/SAF	FMEF	RPSF	FAA
In-Process PuO_2 (Kg)	4,000	430	294	225
In-Process U (Kg)	0	0	0	495
Solid Transuranic Waste (ft^3/yr)	2,600	1,500	50	0
Solid Low-Level Radioactive Waste (ft^3/yr)	3,400	3,400	a	185
Nonradioactive Solid Waste (ft^3/yr)	14,000	12,000	75	250
Radioactive Liquid Waste (gallons/yr)	130,000	130,000[b]	<50	0

a The RPSF is expected to generate a total of 50 ft^3/yr of radioactive waste. It is not known at this time if the contamination levels will require handling as TRU waste.

b These wastes were not differentiated between mixed wastes and radioactive wastes. However, the majority of these wastes would have originated in the FMEF decontamination facility and would have had a high concentration of decontamination chemicals (acids and caustics).

Table V

MAXIMUM 50-YEAR DOSE COMMITMENTS
ROUTINE OPERATIONS

Facility	Maximum Individual (rem, 1-year intake)	Population[a] (person-rem)
1981 FMEF/SAF[b]		
Whole Body	1.5x10-6	4.6x10-3
Bone	9.5x10-6	4.0x10-2
Lung	2.9x10-6	1.1x10-2
Updated FMEF/SAF[c]		
Whole Body	1x10-7	4x10-3
Bone Surface	1x10-6	5x10-2
Lung	4x10-7	1x10-2
RPSF		
Whole Body	2x10-15	7x10-11
Bone Surface	2x10-14	7x10-10
Lung	8x10-15	3x10-10
FAA		
Whole Body	0	0
Bone Surface	0	0
Lung	0	0
400 Area (CY 1986)		
Whole Body	6x10-7	1x10-2
Bone Surface	2x10-7	7x10-3
Lung	7x10-8	3x10-3

a The 1981 FMEF/SAF data were based on projected population for the year 2000 within an 80-km radius of the 400 Area; all the others (i.e., updated FMEF/SAF, RPSF, FAA, 400 Area) are based on the 1980 population within an 80-km radius of the 400 Area.
b Reference DOE 1981b; maximum individual dose at 2.4 km.
c Used same source term as 1981 data, but used updated (ICRP 30) dose calculation methods (rather than ICRP 2), and 1980 population.

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APPENDIX A

RPSF ASSEMBLY PROCESS

The RPSF assembly is as follows (see Figure A for identification of components):

Plutonium oxide (PuO_2) will be received at the RPSF, via DOE transportation in DOE fuel shipping casks, in the form of iridium encapsulated sintered PuO_2 pellets (Figure A). Two pellets, called Fueled Clads (FCs), are contained within welded stainless steel canisters within the DOE fuel casks. The fuel casks will be moved from the ground level unloading area inside the FMEF structure on a freight elevator to the RPSF.

The FC canisters will be removed from the fuel casks, visually inspected, weighed and characterized with calorimeters and radiation spectrometers within a receiving area (Room 159, Figure B). The fuel casks containing FCs will be temporarily stored in this area, since the calorimetry will pace the rate of receiving inspection. Following inspection, the FC canisters will be moved to the General Purpose Heat Source (GPHS) assembly line.

The GPHS assembly line will be located in a bank of hot cells originally intended to house radiochemistry and radiometallurgy facilities (ERDA 1977a). These hot cells are stainless steel lined enclosures located behind high density concrete walls. One of the cells will be converted into a storage area which will store FCs in canisters until the FCs are needed in the GPHS assembly process. The GPHS assembly will be performed in successive hot cells with components being passed through transfer ports between cells.

The assembly process, once the material is received, consists of the following steps:

-Decanning

The decanning operation will be conducted in cell 134 of the RPSF. The decanning operation consists of removing the Fueled Clads (FCs) from the FC canisters and visually inspecting the FCs.

-Decontamination

The decontamination operation will be conducted in cell 137 of the RPSF. The decontamination operation consists of determining the contamination level of the FC exterior surface, and if necessary, decontaminating the FCs in an aqueous solution of nitric and hydrofluoric acid.

-GPHS assembly

The GPHS assembly will take place in cells 135 and 136 of the RPSF. A sintered metal vent on the FC is activated and four FCs are inserted into a graphite block. Parallel cells are equipped for the assembly

process to provide an increased production capability. These cells will operate in a high-purity argon atmosphere, whereas the previous cells operated in an air atmosphere.

-MRMF canister loading

The MRMF canister loading will take place in cell 138 of the RPSF. Two assembled GPHSs will be loaded into a canister and the canister's closure welded into place. This operation will be performed in a high-purity argon atmosphere.

The GPHS modules contained within the MRMF canisters will be taken to the MRMF where an autoreduction of the PuO_2 will be performed. The auto reduction process will be carried out at high temperature (self heating by the PuO_2) and at high vacuum. Upon completion of the autoreduction step (as determined by analysis of the residual gas in the MRMF canister), the canisters are back-filled with argon. The argon-filled MRMF canister will be kept in the MRMF until the GPHS modules are needed for the power source assembly.

The power source assembly will be performed in one of three Inert Atmosphere Assembly Chambers (IAAC). The IAACs will operate in a high-purity argon atmosphere and will be equipped to remove the GPHS modules from the MRMF canisters and assemble the GPHS modules into the various configurations required by the power sources. The possible power source configurations include:

-Dynamic Isotope Power System (DIPS) Heat Source Assembly
-Radioisotope Thermoelectric Generator (RTG) intended for space applications
-Terrestrial Radioisotope Thermoelectric Generator (TRTG) intended for terrestrial applications

The IAACs may also be used to assemble power sources from PuO_2 configurations other than that of the Fueled Clad/GPHS. One possibility is the Special Application Terrestrial (SAT) RTG. The SAT RTG heat source is PuO_2 shards contained by a three-layer capsule consisting of two layers of a tantalum alloy and a clad of Hastelloy alloy. These special heat sources will receive the same receipt inspection as the FC (weighing, calorimetry, and radiation spectroscopy) and will be stored in the FC canister storage area (cell 139) until assembly into the power source.

The assembled power sources will be subjected to a series of tests, depending on the requirements of the particular power source. The RPSF will have testing capabilities of vibration, magnetic properties, mass properties, and high vacuum, intended to determine thermoelectric generator performance at simulated space conditions.

The assembled and tested power sources will be stored in one of two locations. The DIPS heat sources will be stored in an air atmosphere within a shielded enclosure (Room 116). The RTGs will be stored in a nitrogen atmosphere within a second shielded enclosure (Room 112).

The power sources will be packaged in accordance to user specifications

prior to shipment. Power source delivery to the Office of Special Application will be via DOE transport from the shipping and receiving area located within the FMEF structure.

There are other RPSF processes which support the power source assembly process. Metal components used in the assembly process (e.g., tools, MRMF cans) are first cleaned in an ultrasonic cleaner containing methylene chloride followed by rinses in deionized water and ethyl alcohol. These metal components are then baked out in a vacuum furnace (540°C, 10^{-5} torr) and sealed in plastic containers until needed in the assembly process. The GPHS graphite components are baked out in a vacuum furnace (1550°C, 10^{-6} torr) and stored in an argon atmosphere within a metal container until needed in the assembly process.

APPENDIX B

RPSF POSTULATED UPPER-BOUND ACCIDENT

It was determined that the postulated upper-bound accident would occur during the decanning, decontamination, or GPHS assembly operations when the plutonium is least protected. (It is actually quite well protected during these operations by the iridium cladding, but as the FCs are assembled into canisters and graphite blocks in the later processing stages, the plutonium becomes even more protected.) A failure of two FC capsules was postulated to occur by a nonmechanistic event such as a heavy object falling onto the capsules.

It was conservatively estimated that 1% of the plutonium in the two capsules is released in respirable size particles (less than 10 um). This is substantiated by documents (ANSI 1981, Selby et al 1975) which recommend a 1% release fraction for nonvolatile solids from heated or molten fuel, and fuel involved in a fire or explosion. Given that each of the capsules contains 153 g of plutonium oxide, and ignoring the weight contributed by the oxygen, the amount of respirable plutonium released from the two capsules would be about 3.1 g. The exhaust from the operating areas passes through 3 stages of HEPA filters before reaching the environment, but for the sake of conservatism it was assumed that the first stage is somehow compromised. Assuming the two stages of HEPA filters have a transmission factor of 2.5×10^{-6}, and that no deposition of the plutonium occurs during its exit through the ventilation system, the respirable release to the environment would be 7.8×10^{-6} g. At weight percentages of 85% Pu-238 and 15% Pu-239 (conservative weight percentages used for calculations) and specific activities of 17 Ci Pu-238 per gram and 0.062 Ci Pu-239 per gram, the respirable activities released would be 1.1×10^{-4} Ci Pu-238 and 7.3×10^{-8} Ci Pu-239. The calculated consequences of this event (see Table IV in Section 6.0) are 3×10^{-4} rem whole body to the maximum individual at the site boundary and 1×10^{-1} whole body person-rem to the population within 50 miles of the 400 Area. These doses are lower than the updated doses calculated for the upper-bound accident from the FMEF/SAF facility of 1×10^{-3} rem whole body at the site boundary and $2 \times 10^{+2}$ whole body person-rem to the population.

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ATTACHMENT 3

United States Government

Department of Ener

memorandum

DATE August 22, 1988

REPLY TO ATTN OF: EH-25

SUBJECT: NEPA Determination for Modification of the Fuels and Materials Examination Facility at Hanford and Operation of the Radioisotope Power System Facility

TO: Theodore J. Garrish, NE-1
Assistant Secretary
for Nuclear Energy

The Office of Environment, Safety and Health has reviewed the Action Description Memorandum (ADM) for the proposed radioisotope program activities at Hanford, as requested in the July 19, 1988, memorandum from James A. Turi, NE-53, to Carol M. Borgstrom, EH-25. The ADM, prepared in response to the February 3, 1988, memorandum from this office, describes the proposed modifications to the Fuels and Materials Examination Facility (FMEF) and the subsequent activities related to assembly and testing of radioisotope power systems in the Radioisotope Power System Facility (RPSF).

Based on my staff's review and analysis and its recommendations, and after consultation with the Office of the General Counsel, I have determined that neither an environmental assessment nor an environmental impact statement is required for the proposed action because the action will clearly not have significant environmental impacts. FMEF modification will be conducted within a portion of the existing structure that is not radiologically contaminated. Operation of the RPSF is expected to generate only small volumes of radioactive waste, estimated at approximately 50 cubic feet of solid waste and less than 50 gallons of liquid waste annually. Estimated maximum annual doses to an individual from routine operation of the RPSF (2×10^{-2} mrem) and from a postulated upper-bound accident (0.3 mrem) are well below the current DOE exposure limits. Moreover, the impacts from the proposed action are significantly less than those discussed in earlier environmental documentation prepared for the FMEF.

This determination completes the National Environmental Policy Act (NEPA) process for the modification of the FMEF and operation of RPSF. Accordingly, I am now able to concur in NE's proposed action, as outlined in the October 28, 1987, Action Memorandum regarding selection of the FMEF for future radioisotope program activities.

Ernest C. Baynard, III
Assistant Secretary
Environment, Safety and Health

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Subject STATE ENVIRONMENTAL POLICY ACT CHECKLIST FOR THE RADIOISOTOPE POWER SYSTEMS FACILITY PREVENTION OF SIGNIFICANT DETERIORATION PERMIT

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