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Department of Energy
Richland Field Office
P.O. Box 550
Richland, Washington 99352

93-RPS-333

SEP 1 4 1993

Mr. Ken Mosbaugh
U.S. Environmental Protection Agency
Region 10
4660 151st Street S. E.
Bellevue, Washington 98006

Dear Mr. Mosbaugh:

COMMENTS ON THE U.S. ENVIRONMENTAL PROTECTION AGENCY NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT FOR THE HANFORD 300 AREA TREATED EFFLUENT DISPOSAL FACILITY - U.S. ENVIRONMENTAL PROTECTION AGENCY PERMIT WA-002591-7

The U.S. Department of Energy, Richland Operations Office (RL) appreciates the opportunity to comment on this proposed permit prior to the public comment period. The proposed permit raises at least two issues that can be significant barriers to the successful operation of the Hanford 300 Area Treated Effluent Disposal Facility (TEDF) and compliance with the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) Milestone M-17-09 (hot start-up of the TEDF by December 1994).

Briefly, the critical issues are (a) the overly-stringent proposed discharge limits do not reflect the anticipated variability of the effluent, and (b) the proposed monitoring complexity and cost are unnecessarily burdensome. These issues and others are discussed in more detail with the enclosed comments.

RL requests that EPA consider its comments fully and incorporate them in the draft permit that will be sent out for public comment. RL may comment further during the public comment period. Should you have any questions, please contact Mr. S. D. Stites of my staff on (509) 376-8566.

Sincerely,

Robert G. Holt

Robert G. Holt, Acting Program Manager
Office of Environmental Assurance,
Permits, and Policy

EAP:SDS

Enclosure:
Comments to EPA draft NPDES permit

cc w/encl:
J. Eacker, WHC
R. Robichaud, EPA
M. Selby, Ecology

cc w/o encl:
R. Oldham, WHC
R. Stanley, Ecology

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THE UNITED STATES DEPARTMENT OF ENERGY

COMMENTS ON THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY'S DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT FOR THE HANFORD 300 AREA TREATED EFFLUENT DISPOSAL FACILITY

PERMIT APPLICATION WA-002591-7

The U.S. Department of Energy, Richland Field Office (RL) has prepared the following comments on the National Pollutant Discharge Elimination System (NPDES) permit and the accompanying Technical Information document that have been proposed for the Hanford 300 Area Treated Effluent Disposal Facility (TEDF) by the U. S. Environmental Protection Agency (EPA), Region 10. The page numbers and titles in *italics* refer to the proposed permit and Technical Information document. Copies of the EPA documents are attached for reference as APPENDIX D.

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*I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS*

*A. Specific Limitations and Monitoring Requirements*

This portion of the proposed permit specifies discharge limitations, compliance monitoring frequency and sample type for individual wastewater constituents that RL reported in its permit application as being present or likely to be present in the TEDF discharge. The proposed permit raises two significant barriers to successful and timely operation of the TEDF; the discharge limits are unworkably stringent and the on-going cost of the proposed monitoring is unnecessarily high.

Proposed "BPJ" Discharge Limits Are Not Attainable

EPA has proposed overly restrictive discharge limitations and monitoring requirements for this facility. Operating the TEDF under the discharge limitations of this draft permit could very likely place the facility in an unwarranted non-compliance mode and give the false impression that the receiving stream (Columbia River) is not being environmentally protected.

While the likely concentrations of constituents in the discharge from the TEDF are estimated to be very low, EPA has proposed discharge limits at or below the level of analytical capability. EPA has rationalized that these proposed limits represent achievable Best Professional Judgement (BPJ) "technology-based" limits. These proposed end-of-pipe discharge limits are physically unattainable by the facility in the long run and are not based on fact. There is not enough data available at this time to set defensible BPJ limits.

The actual quality of the treated wastewater that will be discharged from the TEDF over time is not known and will not be known until some time after the plant has been operating. Until actual effluent quality data is available that reflects the realities of variation in the input raw wastewater and the capability of the treatment system, the discharge quality can only be estimated.

An engineering study (the ESR) was performed (Engineering Summary Report, Hanford 300 Area Treated Effluent Disposal Facility, Project L-045H, CH2M-HILL, March 1992) to estimate the quality of the raw wastewater to be treated and to define the best available treatment (BAT) process. Five BAT process alternatives were developed and evaluated against cost and performance criteria. The BAT process that best meets all the criteria consists of iron co-precipitation to remove metals, UV/Oxidation to destroy organic compounds and thiol functional-group ion exchange specifically designed to reduce mercury to the lowest possible level. This is the BAT process that was proposed by DOE in the permit application and is currently being installed in the TEDF.

Bench-scale treatability tests were performed to confirm the effectiveness of the design of the treatment system. Because the actual wide range of pollutants and expected concentrations in the raw wastewater to be treated in the future is not known, it was approximated. A sample of the then-available 300 Area process sewer raw wastewater was collected and spiked with the constituents of concern to approximate the anticipated wastewater. This "synthetic" wastewater was used in the treatability testing.

The estimated treated effluent values provided in the permit application are from this "synthetic" raw wastewater, generated for the sole purpose of analyzing the capability of the treatment train to reduce constituent concentrations as much as practicable. EPA acknowledges this process correctly on Page 4, Paragraph 2 of the Technical Information document; "In the permit application, the applicant provided an estimate of wastewater characteristics for the treated wastestream".

The ESR estimates of treatability are not sufficient to be used directly as BPJ permit limits. While providing evidence of potential treatment efficiencies for a range of constituents, the data do not adequately reflect what the discharge composition from the treatment facility will be after it is operated. Furthermore, and most importantly, the data do not provide any indication of the variability in the performance of the wastewater treatment system.

The results of the treatability testing demonstrated that the chosen BAT process provided effective treatment under a range of anticipated raw wastewater qualities and plant operating scenarios. For that reason, a detailed discussion of the meaning of the results achieved or an explanation of the limitations of the tests conducted was not included in the ESR. Since the EPA has used the data provided in the ESR for purposes beyond its applicability, it is important to summarize some of the data's limitations:

1. All of the treatability testing was conducted on a bench-scale basis, using synthesized wastewater. The actual wastewater that will be

treated is not available, nor is its composition known with any great certainty.

2. Limited testing was performed, with only a few (usually two) tests conducted at any one possible operating condition. For example, at a set pH, iron dose, and sludge recirculation rate, only two duplicate tests were performed.

3. Iron co-precipitation was found to remove most metals to satisfactorily low concentrations, except perhaps mercury, silver and arsenic, depending upon what discharge criteria are used.

4. Ion exchange, using a thiol functional resin, was added specifically to remove mercury. The treatability tests showed that some additional removals were also obtained for the other metals and these additional removals are reflected in the ESR summary tables. These additional removals, however, cannot be relied on long term, since the resin will selectively remove mercury in preference to the other metals.

5. Analytical variability is method, pollutant and media dependent. For metals and some conventional parameters in industrial effluents, the variability can be 35 percent or more. Additionally, as constituent concentrations approach the detection level, as they do in the estimated TEDF discharge, the potential for false positive or false negative analytical values increases. The draft permit has several constituent limits set near, at, or below the analytical Practical Quantitation Limits (PQLs), thus making analytical variability a critical factor in compliance determination.

In summary, the uncertainties associated with diversity of constituents, variability of effluent, probable significant differences between bench scale tests and actual treatment facility performance and analytical methods that have not been considered by EPA make the proposed "BPJ" draft permit limits inappropriate at this time.

<u>Discharge Limits Based on BAT Treatment and a Limited Mixing Zone are Workable and Protective</u>

The treatment system being constructed for the TEDF is a modern system with sophisticated operational controls and clearly represents an acceptable "best available technology" (BAT). The low discharge concentrations expected from the TEDF will meet water-quality criteria outside a relatively small and protective mixing zone in the receiving water.

As noted by the EPA in the proposed permit Technical Information document, a mixing-zone dilution analysis using an EPA computer model was performed by CH2M-HILL to model the TEDF discharge plume in the Columbia River. It was

determined that, under worst case conditions of discharge and river flowrate, the Washington Administrative Code (WAC) 173-201A in-stream temperature standard of "...no temperature increase...greater than 0.3°C..." would be met within approximately 71 feet (downstream) of the outfall discharge port. The plume centerline dilution factor at 71 feet is predicted by the model to be approximately 260.

A dilution factor of 260 and its corresponding mixing zone is more than adequate to set achievable discharge limits for the TEDF that would have minimal impact on the river. A much smaller mixing zone consisting of a zone of initial dilution (ZID) for acute toxicity and an outer zone for chronic toxicity, with dilution factors of 30 and 100, respectively, would be adequate for all constituents of the discharge, other than temperature. The acute ZID would extend only three feet from the outfall discharge port and the chronic dilution zone would extend only 11 feet from the port.

Protective discharge limits that meet water quality standards and criteria and that account for effluent variability can be calculated by EPA's statistical methods described in EPA/505/2-90-001, Technical Support Document for Water Quality-based Toxics Control, March, 1991 (TSD). APPENDIX A presents discharge limits calculated by the methods of the TSD, using acute and chronic mixing zone dilution factors of 30 and 100, respectively. The water quality standards and criteria used in the calculation are shown in the table. These limits are protective of water quality standards and criteria outside the mixing zone and are more realistically achievable by the TEDF than those proposed by EPA as "BPJ" limits.

The calculations of APPENDIX A are based on EPA water-quality criteria and State of Washington Department of Ecology water-quality standards (WAC 173-201A). The criteria and standards used for certain constituents are more fully discussed individually in the following paragraphs. The calculations assume a discharge variability defined by an uncorrelated log-normal distribution with a coefficient of variation (CV) of 0.8. EPA assumes a default CV value of 0.6 for large, biologically based treatment systems such as sewage treatment plants. The EPA studied effluents from wastewater treatment systems involving chemical precipitation and settling of metals and found CVs ranging from 0.57 to 0.99 (U.S. Environmental Protection Agency, 1982, "A Statistical Analysis of the Combined Metals Industries Effluent Data, Appendix I", Report submitted to Office of Water Regulations and Standards (WH-553). A CV of 0.8 would thus appear to more appropriate for the TEDF than EPA's default value of 0.6.

Arsenic

The EPA National Toxics Rule (57 FR60848, 12/22/92) human health criterion (consumption of organisms and water) for Arsenic of 0.018 $\mu$g/l is difficult to properly interpret and apply because it is so much lower than other arsenic

criteria. The criterion is less than the analytical level of detection. There are a number of accepted criteria for Arsenic that vary widely in value. For example, the drinking-water standard (Maximum Contaminant Level) for Arsenic is currently 50 μg/l, 2,778 times higher than the human-health criterion of the National Toxics Rule, yet both are supposed to be protective of human health.

In view of the ambiguity of the Arsenic water quality criteria, RL proposes that the drinking-water standard of 50 μg/l be used as the basis for an end-of-pipe discharge limit. The drinking-water standard does not technically apply to a treated industrial effluent, but could be used in this case to establish a human health-based limit in preference to the ambiguity of the National Toxics Rule value.

**Recommended Change:**

Use the calculated AML95 and MDL99 values of 50 μg/l and 97 μg/l as discharge limits for Arsenic (total). The limits are based on meeting the 50 μg/l drinking water criterion at the end of the pipe (no dilution).

Beryllium

EPA/440/5-86/001 (Gold Book) does not contain criteria for Beryllium but lists the "lowest observed adverse effects level" (LOEL) for Beryllium for the protection of fresh-water aquatic life as 130 μg/l (acute) and 5.3 μg/l (chronic). Assuming a river background concentration of Beryllium of zero (tests on river water have shown the Beryllium concentration to be at or below an analytical detection level of 1 μg/l) the calculated AML95 for Beryllium would be 2010 μg/l and the MDL99 would be 3900 μg/l.

**Recommended Change:**

Use the calculated AML95 and MDL99 values of 2010 μg/l and 3900 μg/l as permit limits for Beryllium.

Halogenated Organic Compounds

Neither Washington State nor EPA have water quality standards or criteria for some of the halogenated organic compounds that may be present in the TEDF treated effluent. The EPA has, however, developed technology-based BAT effluent guidelines for the Organic Chemicals, Plastics, and Synthetic Fibers Industry. 40 Code of Federal Regulations (40 CFR) 414.100 contains BAT limitations for a number of halogenated organic compounds for direct discharge sources that do not use end-of-pipe biological treatment. The cited limitations are also New Source Performance Standards (NSPS). The 40 CFR 414.100 limitations do not regulatorily apply to the TEDF but they could be interpreted as a basis for determining a permit limit. The EPA effluent

guidelines for compounds that may be present in the TEDF treated effluent are summarized in TABLE I.

**TABLE I - EPA Effluent Guidelines for the Organic Chemicals, Plastics, and Synthetic Fibers Industry**

| CONSTITUENT | AVERAGE MONTHLY LIMIT (30 samples/mo.) (μg/l) | AVERAGE MONTHLY LIMIT (2 Samples/mo.) (μg/l) | MAXIMUM DAILY LIMIT (μg/l) |
|---|---|---|---|
| Methylene Chloride | 36 | 88 | 170 |
| Toluene | 28 | 38 | 74 |
| 1,1,1-Trichloroethane | 22 | 30 | 59 |
| Chloroform | 111 | 168 | 325 |
| Trichloroethylene | 26 | 36 | 69 |
| 1,1-Dichloroethane | 22 | 30 | 59 |
| Tetrachloroethylene | 52 | 85 | 164 |

The effluent guideline AMLs of 40 CFR 414.100 shown in the first column of TABLE I are based on a sampling frequency of 30 samples per month. Using the EPA statistical calculation methods of the TSD and a sampling frequency of twice per month as proposed in the draft permit results in the AMLs shown in the second column of TABLE I.

The limits of TABLE I are lower for all constituents than water-quality based limits as calculated in APPENDIX A, except for Tetrachloroethylene. For example, water-quality based discharge limits for Trichloroethylene calculated from its human health criterion of 2.7 μg/l by the methods and assumptions used in APPENDIX A are: AML95 = 270 μg/l and MDL99 = 524 μg/l. Note that the dilution factor of 100 has been used in APPENDIX A for calculating both the chronic aquatic-life limits and the human-health limits. The limited mixing zone defined by a dilution factor of 100 is overly conservative for calculating human health limits because humans are not using the river within the mixing zone for a life-long source of drinking water or aquatic food, as is assumed by the health risk analysis used for deriving human health criteria.

**Recommended Change:**

Use the limits of TABLE I for the identified wastewater constituents.

Iron and Manganese

EPA referenced the secondary drinking water standards for Iron 300 μg/l) and Manganese (50 μg/l) as being applicable to the TEDF discharge. Drinking water standards apply to the quality of potable water after treatment, not to industrial wastewater discharges. Water treatment plants can expect to provide treatment, when necessary to meet the standards, for removal of Iron and Manganese. EPA has published (Gold Book) a freshwater chronic criterion for Iron of 1000 μg/l that is more appropriate than the secondary drinking water standard for determining a discharge limit for the TEDF.

EPA has not established freshwater criteria for Manganese for protection of aquatic life or human health. A discharge limit for Manganese is not warranted because there is no applicable standard or criterion for Manganese and because the discharge of Manganese from the TEDF is reasonably expected to be small.

**Recommended Change:**

Use the calculated AML95 and MDL99 values of 85,652 μg/l and 165,924 μg/l as discharge limits for Iron. Delete the proposed limit for manganese.

Radium

EPA has referred in the Technical Information document to the Radium primary drinking water standard of 5 pCi/l as being applicable to the TEDF, although the proposed permit limit was based on RL's estimate of the concentration of Radium that may be present in the TEDF discharge. Drinking water standards are not generally applicable to industrial discharges for the reasons given in the discussion of limits for Iron and Manganese, above. The Radium drinking water standard could be used as a "not to be exceeded" discharge limit for the TEDF, given the uncertainty of the quality of the future discharge and in the absence of any other standard.

**Recommended Change:**

Change the proposed discharge limits for Radium to a single, "not to be exceeded" value of 5 pCi/l.

Total Suspended Solids (TSS)

EPA has proposed discharge limits for TSS although no significant amount of TSS can be released from the treatment system except, perhaps, under emergency conditions. All of the wastewater will be passed through a sand filter following the iron co-precipitation step and through the thiol functional-group ion exchange resin columns before being discharged. The sand filter is designed to remove virtually all the suspended solids to prevent the ion exchange columns from becoming clogged. If any significant quantity of suspended solids do escape the filtration step, it will be quickly detected in the operation of the ion exchange columns and the discharge will be interrupted until the problem is solved.

Monitoring for TSS costs time and money and a discharge limit is meaningless unless there is a reasonable expectation of discharge. Neither monitoring nor a discharge limit are necessary for TSS.

**Recommended Change:**

Delete the proposed discharge limit and monitoring requirement for Total Suspended Solids.

Whole-Effluent Toxicity (WET)

The proposed permit prematurely specifies a discharge limit for whole-effluent toxicity (WET). NPDES regulations under 40 CFR 122.44(d)(1) require that all pollutants that "...cause, have the potential to cause or contribute to an excursion above a water quality standard..." be controlled. EPA must consider the following factors in determining "reasonable potential": (a) existing controls on the pollution source, (b) variability of the pollutant parameter in the effluent, (c) sensitivity of the test species to toxicity testing and (d) the dilution of the effluent in the receiving water. EPA has not followed its own guidance for applying the above factors (Chapter 3, TSD) to determine whether this discharge has the potential to violate water quality standards.

Because this is a new discharge, neither the variability of whole-effluent toxicity in the effluent nor the sensitivity of the proposed test species to the effluent are known to the permittee or EPA. Furthermore, the high level of toxicity controls (wastewater treatment) provided by the TEDF and the relatively large amount of dilution available in the Columbia River significantly reduce the potential for whole-effluent toxicity. Thus, it is premature for EPA to set a permit WET limit until "reasonable potential" has been established with actual data.

**Recommended Change:**

Delete the proposed WET limit. Evaluate the required WET monitoring data after one year of discharge to determine whether a permit limit is necessary.

Summary of Recommended Concentration Discharge Limits

The TEDF treatment system is a modern system that will remove wastewater contaminants to the lowest practicable level and therefore, should be recognized as meeting the requirement for BAT. Because the concentration variation of contaminants in the wastewater discharge are not statistically known, EPA's proposed "BPJ" discharge limits are not reasonable or workable.

Use the discharge limits that were developed in APPENDIX A and TABLE I and were summarized in TABLE II for the permit. These limits are realistically achievable, meet the requirements of BAT and water-quality standards and criteria and use a limited mixing zone that is a very small part of the Columbia River.

**TABLE II - SUMMARY OF LIMITS PROPOSED BY RL AND EPA**

| | RL LIMITS | | EPA LIMITS | |
|---|---|---|---|---|
| CONSTITUENT | AML95 | MDL99 | AML | MDL |
| Bis(2-Ethylhexyl) phthalate | 180 | 349 | <1.8 | 1.8 |
| Dichlorobromomethane | 27 | 52 | <1 | 1.0 |
| Chlorodifluoromethane | 570 | 1,106 | <5 | 5 |
| Methylene Chloride | 88 | 170 | <2 | 2.0 |
| Toluene | 38 | 74 | 5.0 | 6.0 |
| 1,1,1-Trichloroethane | 30 | 59 | 1 | 5 |
| Trichloroethylene | 36 | 69 | 0.2 | 0.4 |
| Chloroform | 168 | 325 | <5 | 5.0 |
| 1,1-Dichloroethane | 30 | 59 | <2 | 2 |
| Tetrachloroethylene | 85 | 164 | 0.2 | 0.4 |
| Aluminum | 2,714 | 5,258 | 70.0 | 85.0 |
| Arsenic | 50 | 97 | 1.0 | 10.0 |

| | | | | |
|---|---|---|---|---|
| Beryllium | 2,010 | 3,900 | <1 | 1 |
| Cadmium | 32 | 63 | <0.7 | 0.7 |
| Copper | 126 | 245 | 3.0 | 7.0 |
| Cyanide | 340 | 659 | <5 | 5.0 |
| Iron | 85,652 | 165,924 | 100.0 | 1,000.0 |
| Lead | 118 | 229 | 0.7 | 1.0 |
| Manganese | NL, NM[1] | NL, NM | <10 | 40.0 |
| Mercury | 1 | 2 | <0.2 | <0.2 |
| Nickel | 9,199 | 17,820 | 1.0 | 30.0 |
| Nitrite | 6,000 | 11,640 | <60 | 60.0 |
| Selenium | 309 | 599 | <4 | 5.0 |
| Silver | 15 | 30 | <0.1 | 1.0 |
| Zinc | 1,056 | 2,046 | <5 | 10 |
| Total Radium (pCi/l) | Not to | Exceed 5 | 0.08 | 0.2 |
| Suspended Solids (TSS) | NL, NM | NL, NM | 3,000 | 9,000 |
| Temperature (°F) | 95 | 105 | 95 | 105 |
| Total Coliform Bacteria | 100[2] | 200[3] | 50 | 100 |
| WET (NOEC)[4] | NL[5] | NL | <=0.33% | Effluent |
| pH (standard units) | 6-9 | | 6-9 | |

Notes to TABLE II:

Numbers are calculated values, not rounded to reflect analytical precision

[1] NL, NM = No limit, no monitoring

[2] Geometric mean value of colonies per 100 ml

[3] Not more than 10% of all samples may exceed this value

[4] Whole Effluent Toxicity measured as the No Observed Effects Concentration (percent effluent)

[5] NL = No limit, monitoring only

## Calculation of Mass Discharge Limits

EPA expressed its proposed discharge limits as both concentration limits and daily mass limits. Although not explained in the permit or technical information document, the mass limits were evidently calculated from an effluent flow rate of 300 gpm (gallons per minute). RL proposes that the estimated maximum through-put capacity of the TEDF of 325 gpm be used in calculating mass limits from concentration limits.

**Recommended Change:**

Use the TEDF maximum through-put capacity of 325 gpm, rather than 300 gpm, to calculate mass discharge limits.

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### *B. Treated Effluent Disposal Facility (TEDF) Startup*

40 CFR 122.29 requires that a new discharger "start-up" all pollution control equipment required to meet the conditions of its permits before beginning to discharge. The discharger must meet all permit conditions within 90 days. It is logical that the 90-day period should begin with the start of discharge. The proposed permit however, defines the 90-day period as starting from the issuance date of the permit, although discharge of treated process wastewater will not occur until some time after issuance of the permit.

**Recommended Change:**

Change the beginning of the 90-day period from the issuance date of the permit to the start date of treated process wastewater discharge.

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### *C. Biomonitoring Program Requirements*

Paragraph C.2. of the proposed permit requires that biomonitoring testing be initiated within 90 days of the permit issuance date. The 90-day testing period should begin with effluent discharge, as discussed above.

**Recommended Change:**

Change Paragraph C.2. to begin the 90-day testing period from the start date of treated process wastewater discharge.

### *D. Receiving Water Quality Monitoring Requirements*

The proposed permit requires annual sampling of the Columbia River above and below the discharge outfall to monitor the in-stream concentration of wastewater constituents. Such monitoring, in RL's opinion would not achieve a useful result because of the sampling and analysis uncertainties when dealing with the very low concentrations of constituents in this discharge.

Most wastewater constituents will be discharged at, or near, their analytical detection levels. The EPA dilution model referred to earlier predicts that at the proposed monitoring point of 71 feet downstream of the discharge point, the plume center-line dilution factor is 260; thus, the concentration of the wastewater constituents would be 1/260-th of their already low discharge concentrations. Monitoring at such dilutions would not be productive.

The 325 gpm (maximum) discharge rate from the TEDF is extremely small compared with the flow in the west channel of Johnson Island, let alone the river as a whole. The estimated flow rate of the river between the west bank of the river at the outfall location and Johnson Island, at the estimated lowest dam-regulated total river flow rate of 36,000 cubic feet per second (cfs), is 5600 cfs ($2.5 \times 10^6$ gpm). Thus, the total dilution factor for the TEDF discharge in the west channel is $(2.5 \times 10^6 + 325)/325 = 7.7 \times 10^3$.

A more effective method to assess in-stream wastewater constituent concentrations resulting from the discharge would be to confirm the results of the EPA computer dilution model by performing a tracer check in the river. This would only have to be done once, perhaps under low and high TEDF discharge flow rates. Once calibrated by a tracer check, the EPA model would adequately characterize the wastewater constituent concentrations and location in the river. In-stream wastewater constituent concentrations could then be calculated from the known discharge concentrations reported during the frequent compliance monitoring required by the permit and the dilution factors in the wastewater plume calculated by computer modelling.

RL characterized chemical and radiological pollutant concentrations in the Columbia River for this project in 1991/1992 and summarized the results in the report, Columbia River Characterization Data Report in Support of Hanford Project L-045H, WHC-SD-L045H-DP-002, Rev. 0, March 1992. A copy of this report was provided to EPA as part of the NPDES permit application package. Concentrations of all toxic pollutants measured were relatively low; either less than the constituents's water-quality criterion or near, or less than, their analytical detection limits. EPA has not declared this stretch of the Columbia River as being water-quality limited for any parameter.

## *II. MONITORING, RECORDING AND REPORTING REQUIREMENTS*

### *B. Monitoring Procedures*

The proposed monitoring requirements are more extensive than necessary for this discharge; they can be reduced and still provide adequate environmental protection while achieving a significant cost reduction.

The cost of monitoring required by the proposed EPA permit was estimated from analytical services costs provided by various vendors. The estimated annual cost to conduct the monitoring ranges from $650,515 to $699,005, depending upon how many duplicate samples or more detailed analyses might be required. TABLE III summarizes the estimated costs and APPENDIX B presents the details of the estimate.

**TABLE III - Estimated Cost of EPA Proposed Permit Monitoring Requirements**

| MONITORING COST CATEGORY | ANNUAL COST |
|---|---|
| Organic Analyses (from biweekly monitoring) | $253,200 |
| Metals Analyses (from biweekly monitoring) | $121,490-162,960 |
| Miscellaneous Parameters Analyses (from biweekly monitoring) | $54,860 |
| Frequently Monitored Parameters Analyses | $15,565 |
| River Monitoring Analyses | $12,640 |
| WET Analyses (quarterly monitoring) | $12,000 |
| Sample Collection | $49,000 |
| Validation | $131,760 |
| Total | $650,515-699,005 |

Note: Cost is based on 40 CFR Part 136 analytical methods

Most of the excessive monitoring cost of the proposed permit is due to the cost of the specialized chemical analytical techniques necessary to attempt to reach the low detection levels required. The monitoring necessary to determine compliance with the limits proposed by RL in TABLE II can be based on broader, less expensive analytical techniques. For example, all the metals except Arsenic and Mercury can be analyzed by EPA Method 200.7 rather than the element-specific techniques that would be required under the proposed monitoring requirements. See APPENDIX C for details of RL's proposed monitoring methods and estimated costs.

TABLE IV summarizes an improved monitoring scheme that is adequate for determining discharge compliance, is less prone to error because it is shorter and simpler, and is less expensive to conduct.

**TABLE IV - Estimated Cost of RL Proposed Permit Monitoring Requirements**

| MONITORING COST CATEGORY | ANNUAL COST FOR 612 SAMPLES |
|---|---|
| Organic Analyses (from biweekly monitoring) | $172,600 |
| Metals Analyses (from biweekly monitoring) | $88,600 |
| Miscellaneous Parameters Analyses (from biweekly monitoring) | $54,860 |
| River Dye Test (annual monitoring) | $4000 |
| WET Analyses (quarterly monitoring) | $12,000 |
| Sample Collection | $45,000 |
| Validation | $43,604 |
| Total | $420,664 |

The monitoring scheme proposed by RL is estimated to cost some $238,000 to $272,000 per year less than that proposed by EPA.

Monitoring Frequency

The proposed monitoring frequency of "biweekly" (assumed to mean 2 samples per month) could also be reduced to once per month for many of the constituents if monitoring data on the actual discharge warrants such a reduction. The permit should provide for a reduction in monitoring frequency after the first one to two years of discharge, after EPA review of the monitoring data.

**Recommended Changes:**

Clarify that "bi-weekly" means two samples per month. Use RL's proposed monitoring scheme of APPENDIX C in conjunction with the proposed discharge limits of TABLE II for a balanced and achievable compliance requirement. Include a permit clause allowing reduction in monitoring frequency after the first one to two years of discharge, after EPA review of the monitoring data.

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*D. Additional Monitoring by the Permittee*

The proposed permit requires that RL submit monitoring data if it monitors "...any pollutant..." more frequently than required in the permit. This requirement is ambiguous in that it could be interpreted to require reporting of routine process-control data. The requirement should clearly exempt reporting of process-control data that might be taken at various intermediate points in the wastewater treatment process.

**Recommended Change:**

Change the proposed permit wording of Paragraph II. D. to the following:

If the permittee monitors any pollutant in the treated wastewater discharge at the compliance monitoring sampling point more frequently than required by this permit...(retain the rest of the paragraph)

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*III. COMPLIANCE RESPONSIBILITIES*

*B. Penalties for Violations of Permit Conditions*

This provision does not provide for a waiver of penalties during the allowed 90-day start-up period for the TEDF. Also, each of the references to criminal violations should track the statutory language more closely, if not exactly. EPA typically views enforcement as a discretionary function, therefore the use of "shall" is not consistent with the statute or agency practice.

**Recommended Change:**

Include a waiver of penalties for discharge exceedences that might occur during the 90-day start-up period of the TEDF and change the word "shall" to may in regard to enforcement.

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*IV. GENERAL REQUIREMENTS*

*J. Oil and Hazardous Substance Liability*

This provision should be deleted or qualified by the phrase, Except as provided by law because Section 311 of the Clean Water Act addresses the release of substances that will be discharged pursuant to the NPDES permit for the TEDF. The permit should be a shield against prosecution for the discharge of pollutants in accordance with the permit.

**Recommended Change:** Delete this provision, or add the phrase, "Except as provided by law..."

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*N. State Laws*

This provision should be narrowed with respect to discharges in compliance with the permit. The affected state or states have the opportunity under 40 CFR 124.53 to certify the NPDES permit; therefore the state(s) should not be able to sue for discharges that are in compliance with the permit.

COMMENTS ON EPA'S "TECHNICAL INFORMATION" STATEMENT OF PERMIT BASIS

The following comments pertain to the Technical Information document that EPA prepared in accordance with 40 CFR 124.7 as a statement of the basis for the proposed NPDES permit conditions.

*Item 2, Page 2*

The third paragraph of Item 2 states that there are approximately 30 facilities within the Hanford 300 Area that discharge liquid effluent to the process sewer. This earlier estimate of approximately 30 facilities has now been changed to approximately 50 facilities.

**Recommended Change:**

Change "approximately 30 facilities" to approximately 50 facilities.

The fourth paragraph of Item 2 attempts to discuss interim remedial measures that have been taken under the Hanford Federal Facility Agreement and Consent Order (known as the Tri-Party Agreement, TPA) regarding discharges to the process trenches. Regulation and remediation of the process trenches are not within the scope of the NPDES permit, and this limited discussion, which does not adequately describe the full situation, should be removed from the technical information document.

**Recommended Change:**

Delete the discussion regarding activities related to regulation and remediation of the process trenches.

*Item 3, Receiving Water Quality Standards, Page 6*

This section references the water-quality standards, criteria and other bases selected by the permit writer for determination of the proposed discharge limits. RL has recommended changes on the use and interpretation of several of these items in its comments on the proposed discharge limits.

**Recommended Change:**

This section should be changed to be consistent with RL's recommended changes.

*Item B, Control of Radioactivity and Radionuclides, Page 9*

This section refers to regulation and release of radionuclides other than Radium. Radium is the only radioactive pollutant regulated under the Clean Water Act and this proposed permit. References to other radionuclides that may be present in the treated wastestream, and monitoring under DOE's directives and the Atomic Energy Act are not relevant to the permit and should be removed from the technical information document.

**Recommended Change:**

Delete references to regulation and monitoring of radionuclides other than Radium.

*Item 5, Basis of Limitations, Page 9*

RL has commented extensively on the inappropriateness of the proposed discharge limits in the discussion above and has recommended changes for improvement. This section should be re-written to reflect the recommended improvements.

**Recommended Change:**

Change this section to be consistent with recommended changes to the proposed discharge limits and the bases for their determination.

*Item 5, Treated Effluent Disposal Facility (TEDF) Startup, Page 15*

This section does not clearly establish that the 90-day start-up period should begin with commencement of discharge, as RL has recommended in its comments on the proposed permit.

**Recommended Change:**

Change this section to clearly state that the 90-day start-up period begins with commencement of treated effluent, as recommended in RL's comments on the proposed permit.

*Item 6, Monitoring Requirements, Page 15*

This section notes that "...waste influent flow to and effluent from the TEDF will be required to be monitored daily". The requirement is ambiguous inasmuch as it could be interpreted to mean that the quality, rather than simply the quantity of influent to the TEDF is to be monitored.

Recommended Change:

Change "waste influent flow" to "waste influent flowrate" to clearly indicate that influent quantity and not quality is to be monitored.

*Item B, Ambient Water Quality Monitoring, Page 16*

This section addresses the proposed requirement for in-stream monitoring. RL has recommended in its comments on the proposed permit that computer modelling, with field calibration by means of a dye tracer, is a more appropriate method of estimating discharge plume conditions.

**Recommended Change:**

Change this portion to be consistent with RL's recommended changes.

*Map, Page 17*

This map, showing the location of the proposed outfall, which was included in the ESR does not reflect developments since publication of the ESR. The TEDF has been sited and the outfall location was moved slightly up-river. An updated location map is provided as APPENDIX E.

**Recommended Change:**

Use the up-dated map of APPENDIX E in the Technical Information document.

8/19/93

# APPENDIX A - HANFORD 300 AREA TREATED EFFLUENT DISPOSAL FACILITY WATER-QUALITY BASED DISCHARGE LIMITS

## APPENDIX A

## HANFORD 300 AREA TREATED EFFLUENT DISPOSAL FACILITY
## WATER-QUALITY BASED DISCHARGE LIMITS

| | | | |
|---|---|---|---|
| Acute DF | 30 | Chron DF | 100 |
| Effluent CV | 0.8 | RAC DF | 100 |
| Samples/mo. | 2 | | |

| CONSTITUENT | RIVER (ppb) | WQ CRITERIA (ppb) | WLA (ppb) | LTA 99 (ppb) | AML 95 (ppb) | MDL 99 (ppb) |
|---|---|---|---|---|---|---|
| | | | | | | |
| Bis(2-Ethylhexyl) | | NS | | | | |
| phthalate | | NS | | | | |
| | 2.5 | 1.8 | 180 | | 180 | 349 |
| | | | | | | |
| Dichlorobromo- | ? | 11000 | 330000 | 82170 | 170092 | 329502 |
| methane | | NS | | | | |
| | | 0.27 | 27 | | 27 | 52 |
| | | | | | | |
| Chlorodifluoro- | ? | NS | | | | |
| methane | | NS | | | | |
| | | 5.7 | 570 | | 570 | 1106 |
| | | | | | | |
| Methylene | | NS | | | | |
| chloride | | NS | | | | |
| | 2.8 | 4.7 | 190 | | 190 | 369 |
| | | | | | | |
| Toluene | ? | NS | | | | |
| | | NS | | | | |
| | | 6800 | 680000 | | 680000 | 1319200 |
| | | | | | | |
| Trichloroethylene | ? | NS | | | | |
| | | NS | | | | |
| | | 2.7 | 270 | | 270 | 524 |
| | | | | | | |
| Chloroform | ? | NS | | | | |
| | | NS | | | | |
| | | 5.7 | 570 | | 570 | 1106 |

## APPENDIX A

## HANFORD 300 AREA TREATED EFFLUENT DISPOSAL FACILITY
## WATER-QUALITY BASED DISCHARGE LIMITS

| | | | |
|---|---|---|---|
| Acute DF | 30 | Chron DF | 100 |
| Effluent CV | 0.8 | RAC DF | 100 |
| Samples/mo. | 2 | | |

| CONSTITUENT | RIVER (ppb) | WQ CRITERIA (ppb) | WLA (ppb) | LTA 99 (ppb) | AML 95 (ppb) | MDL 99 (ppb) |
|---|---|---|---|---|---|---|
| | | | | | | |
| Tetrachloro- | ? | NS | | | | |
| ethylene | | NS | | | | |
| | | 0.8 | 80 | | 80 | 155 |
| | | | | | | |
| Aluminum | 57.2 | 750 | 20784 | 5175 | 10713 | 20753 |
| | 57.2 | 87 | 2980 | 1311 | 2714 | 5258 |
| | | NS | | | | |
| | | | | | | |
| Arsenic | ? | 360 | 10800 | 2689 | 5567 | 10784 |
| | | 190 | 19000 | 8360 | 17305 | 33524 |
| | | 50 | 50 | | 50 | 97 |
| | | | | | | |
| Cadmium | <0.1 | 2.1 | 63 | 16 | 32 | 63 |
| | | 0.7 | 70 | 31 | 64 | 124 |
| | | NS | | | | |
| | | | | | | |
| Copper | 2.03 | 10.2 | 245 | 61 | 126 | 245 |
| | 2.03 | 7.1 | 507 | 223 | 462 | 895 |
| | | NS | | | | |
| | | | | | | |
| Cyanide (Total) | ? | 22 | 660 | 164 | 340 | 659 |
| | | 5.2 | 520 | 229 | 474 | 917 |
| | | 700 | 70000 | | 70000 | 135800 |
| | | | | | | |
| Iron | | NS | | | | |
| | 59.6 | 1000 | 94040 | 41378 | 85652 | 165924 |
| | | NS | | | | |
| | | | | | | |
| Lead | <0.8 | 32.4 | 972 | 242 | 501 | 971 |
| | | 1.3 | 130 | 57 | 118 | 229 |
| | | NS | | | | |

## APPENDIX A

## HANFORD 300 AREA TREATED EFFLUENT DISPOSAL FACILITY
## WATER–QUALITY BASED DISCHARGE LIMITS

| | | | |
|---|---|---|---|
| Acute DF | 30 | Chron DF | 100 |
| Effluent CV | 0.8 | RAC DF | 100 |
| Samples/mo. | 2 | | |

| CONSTITUENT | RIVER (ppb) | WQ CRITERIA (ppb) | WLA (ppb) | LTA 99 (ppb) | AML 95 (ppb) | MDL 99 (ppb) |
|---|---|---|---|---|---|---|
| | | | | | | |
| Mercury (Total) | <0.2 | 2.4 | 72 | 18 | 37 | 72 |
| | | 0.012 | 1 | 1 | 1 | 2 |
| | | 0.14 | 14 | | 14 | 27 |
| | | | | | | |
| Nickel | 3 | 935.8 | 27984 | 6968 | 14424 | 27942 |
| | 3 | 104 | 10100 | 4444 | 9199 | 17820 |
| | 3 | 610 | 60700 | | 60700 | 117758 |
| | | | | | | |
| Nitrite | | NS | | | | |
| | | NS | | | | |
| | <10 | 60 | 6000 | | 6000 | 11640 |
| | | | | | | |
| Selenium | <0.8 | 20 | 600 | 149 | 309 | 599 |
| | | 5 | 500 | 220 | 455 | 882 |
| | | NS | | | | |
| | | | | | | |
| Silver | <0.2 | 1 | 30 | 7 | 15 | 30 |
| | | NS | | | | |
| | | NS | | | | |
| | | | | | | |
| Zinc | 4.1 | 72.4 | 2049 | 510 | 1056 | 2046 |
| | 4.1 | 65.6 | 6150 | 2706 | 5601 | 10851 |
| | | NS | | | | |
| | | | | | | |
| Total Radium | | NS | | | | |
| (pc/l) | | NS | | | | |
| | 0.04 | 5 | 5 | | | 5 |
| | | | | | | |

## APPENDIX A

### HANFORD 300 AREA TREATED EFFLUENT DISPOSAL FACILITY
### WATER-QUALITY BASED DISCHARGE LIMITS

| | | | |
|---|---|---|---|
| Acute DF | 30 | Chron DF | 100 |
| Effluent CV | 0.8 | RAC DF | 100 |
| Samples/mo. | 2 | | |

| CONSTITUENT | RIVER (ppb) | WQ CRITERIA (ppb) | WLA (ppb) | LTA 99 (ppb) | AML 95 (ppb) | MDL 99 (ppb) |
|---|---|---|---|---|---|---|

Notes:

The numbers in this table are un-rounded, calculated numbers and do not indicate precision
NS = no water quality standard or criterion
Limits calculated per TSD for Water Quality-based Toxics Control (EPA/505/2-90-001)
Effluent CV = Assumed coefficient of variation of discharge (log normal distribution)
? = concentration unknown (assumed 0 for calculations)
RIVER = Background river concentration (Engineering Summary Report, Hanford 300 Area Treated Effluent Disposal Facility, WHC-SD-L045H-ER-002, Rev. 0)
WLA = Waste Load Allocation
LTA(99) = Long Term Average concentration (99 percentile level)
AML(95) = Average Monthly Limit (95 percentile level)
MDL(99) = Maximum Daily Limit (99 percentile level)
Acute, Chron DF & RAC DF = Acute, Chronic and Reference Ambient Concentration (human health) dilution factors
WQ criteria are from National Toxics Rule, Federal Register 60848, Dec. 22, 1992, EPA Gold Book (EPA 440/5-86-001) or WAC 173-201A, for a hardness of 65 mg/l and the appropriate water effects ratio from WAC 173-201A
WQ criteria are presented in the table in the order; acute, chronic, human health

# APPENDIX B - ESTIMATED COST OF EPA PROPOSED PERMIT MONITORING REQUIREMENTS

## APPENDIX B - ESTIMATED COST OF EPA PROPOSED PERMIT MONITORING REQUIREMENTS

The following detailed cost analysis of EPA's proposed permit monitoring requirements explains the cost summary presented in TABLE III of the text.

| Organic Biweekly Analytes | Duplicate | 136 Method Cost |
|---|---|---|
| **601**<br>Dichlorobromomethane<br>Methylene Chloride<br>1,1,1-Trichloroethane<br>Chloroform<br>1,1-Dichloroethane<br>Trichloroethylene<br>Tetrachloroethylene | yes | $775 per sample<br>+<br>1 Dup.<br>=<br>$1,550 per 2 weeks |
| **602**<br>Toluene | yes | $775 per sample<br>+<br>1 Dup.<br>=<br>$1,550 per 2 weeks |
| **624**<br>Dichlorobromomethane<br>Chlorodifluoromethane<br>Methylene Chloride<br>Toluene<br>1,1,1-Trichloroethane<br>Chloroform<br>1,1-Dichloroethane<br>Trichloroethylene<br>Tetrachloroethylene | yes | $775 per sample<br>+<br>1 Dup.<br>=<br>$1,550 per 2 weeks |
| **625**<br>Bis (2-ethylhexyl phthalate) | yes | $1895 per sample<br>+<br>1 Dup.<br>=<br>$3,790 per 2 weeks |
| **Field Blank**<br>VOA Eight per year | NA | $775 x 8<br>=<br>$6,200 per year |
| **Equipment Blank**<br>One VOA and One Semi-VOA Eight per year | NA | ($775 + $1895) x 8 =<br>$21,360 per year |
| **Trip Blank**<br>Eight VOA per year | NA | $775 x 8 =<br>$6,200 per year |
| **Total Annual Cost** | | $253,200 |

| Metals Biweekly Analytes | Duplicate | 136 Method Cost |
|---|---|---|
| 202.1/202.2<br>Aluminum | yes | $195 per sample + 1 Dup.<br>=<br>$390 per 2 weeks |
| 206.2<br>Arsenic | For verification as required | $270 per sample<br>$270-540 per 2 weeks |
| 210.1/210.2<br>Beryllium | For verification as required | $275 per sample<br>$275-550 per 2 weeks |
| 213.2<br>Cadmium | For verification as required | $270 per sample<br>$270-540 per 2 weeks |
| 220.1/220.2<br>Copper | For verification as required | $195 per sample<br>$195-390 per 2 weeks |
| 236.1/236.2<br>Iron | yes | $195 per sample + 1 Dup.<br>=<br>$390 per 2 weeks |
| 239.2<br>Lead | yes | $270 per sample + 1 Dup.<br>=<br>$540 per 2 weeks |
| 243.1/243.2<br>Manganese | For verification as required | $195 per sample<br>$195-390 per 2 weeks |
| 245.1<br>Mercury | yes | $270 per sample +<br>1 Dup.<br>=<br>$540 per 2 weeks |
| 249.1/249.2<br>Nickel | For verification as required | $195 per sample<br>$195-390 per 2 weeks |

| | | |
|---|---|---|
| 270.2<br>Selenium | For verification as required | $270 per sample<br>$270-540 per 2 weeks |
| **Metals Biweekly Analytes** | **Duplicate** | **136 Method Cost** |
| 272.2<br>Silver | yes | $200 per sample +<br>1 Dup.<br>=<br>$400 per 2 weeks |
| 289.1/289.2<br>Zinc | For verification as required | $195 per sample<br>$195-390 per 2 weeks |
| **Field Blank/200.7**<br>One ICP, Eight per year | NA | $890 x 8 =<br>$7,120 per year |
| **Equipment Blank/200.7**<br>One ICP, Eight per year | NA | $890 x 8 =<br>$7,120 per year |
| **Total Annual Cost** | $121,490-169,980 | |
| | | |
| **Miscellaneous Biweekly Analytes** | **Duplicate** | **600/Other Method Cost** |
| 335.2<br>Cyanide | yes | $215 per sample +<br>1 Dup.<br>=<br>$430 per 2 weeks |
| 354.1 (353.3)<br>Nitrite | yes | $200 per sample +<br>1 Dup.<br>=<br>$400 per 2 weeks |
| 903.0 (not 136 method)<br>Total Radium | yes | $400 per sample +<br>1 Dup.<br>=<br>$800 per 2 weeks |
| 350.2<br>Ammonia | yes | $140 per sample +<br>1 Dup.<br>=<br>$280 per 2 weeks |

| | | |
|---|---|---|
| SM908<br>Total and Fecal Coliform | yes | $100 per sample +<br>1 Dup.<br>=<br>$200 per 2 weeks |
| Total Annual Cost | $54,860 | |
| Biweekly Sample Collection Cost<br>Total | $1,500 per day<br>$39,000 per year | |
| Biweekly Monitoring Annual Cost<br>Total | 136: 253.2+(121.49-169.98)+54.86+39 =<br>$468,550-517,040 | |
| | | |
| Frequently Monitored Analytes | Duplicate | 136 Method Cost |
| Field Test<br>pH (daily) | No | $17<br>$6,205 per year |
| 160.2<br>Total Suspended Solids (3/week) | No | $60<br>$9,360 per year |
| Total Annual Cost | $15,565 | |
| | | |
| Quarterly WET Testing | Split | 600 Method Cost |
| Pimephales promelas (4/year) | NA | $1000 per sample<br>$4000 per year |
| Ceriodaphnia dubia (4/year) | NA | $1000 per sample<br>$4000 per year |
| Selenastrum capricornutum<br>(4/year) | NA | $1000 per sample<br>$4000 per year |
| | | |
| Sample Collection Cost | $1,500 per day<br>$6,000 per year | |
| Total Annual Cost | $18,000 | |
| | | |
| Annual River Monitoring | Duplicate | 136 Method Cost |
| 213.2<br>Dissolved Cadmium | yes | ($270 per sample) x 2 + 2<br>Dup. =<br>$1,080 per year |
| 213.2<br>Total Recoverable Cadmium | yes | ($270 per sample) x 2 + 2<br>Dup. =<br>$1,080 per year |

| | | |
|---|---|---|
| 220.1/220.2<br>Dissolved Copper | yes | ($195 per sample) x 2 + 2 Dup. =<br>$780 per year |
| 220.1/220.2<br>Total Recoverable Copper | yes | ($195 per sample) x 2 + 2 Dup. =<br>$780 per year |
| 239.2<br>Dissolved Lead | yes | ($270 per sample) x 2 + 2 Dup. =<br>$1,080 per year |
| 239.2<br>Total Recoverable Lead | yes | ($270 per sample) x 2 + 2 Dup. =<br>$1,080 per year |
| 249.1/249.2<br>Dissolved Nickel | yes | ($195 per sample) x 2 + 2 Dup. =<br>$780 per year |
| 249.1/249.2<br>Total Recoverable Nickel | yes | ($195 per sample) x 2 + 2 Dup. =<br>$780 per year |
| 272.2<br>Dissolved Silver | yes | ($200 per sample) x 2 + 2 Dup. =<br>$800 per year |
| 272.2<br>Total Recoverable Silver | yes | ($200 per sample) x 2 + 2 Dup. =<br>$800 per year |
| 289.1/289.2<br>Dissolved Zinc | yes | ($195 per sample) x 2 + 2 Dup. =<br>$780 per year |
| **Annual River Monitoring** | **Duplicate** | **136 Method Cost** |
| 289.1/289.2<br>Total Recoverable Zinc | yes | ($195 per sample) x 2 + 2 Dup. =<br>$780 per year |
| 130.2<br>Total Hardness as $CaCO_3$ | yes | ($65 per sample) x 2 + 2 Dup. =<br>$260 per year |
| Field Blank/200.7<br>One ICP | NA | $890 per sample 1 per year<br>$890 per year |
| Equipment Blank/200.7<br>One ICP | NA | $890 per sample 1 per year<br>$890 per year |
| River Sample Collection Cost | $2000 per day for 2 days<br>$4,000 per year | |

| | |
|---|---|
| River Sample Total Annual Cost | $12,640 + $6,000 = $18,640 per year |
| | |
| Annual Validation Cost | $131,760 |
| Total Annual Compliance Monitoring Cost | $650,515-699,005 |

The cost range is due to the unknown frequency of duplicate analyses. If the primary sample analysis indicates that a limit has been exceeded, the duplicate will be analyzed for confirmation.

# APPENDIX C - ALTERNATIVE MONITORING SCHEME PROPOSED BY RL

## APPENDIX C - ALTERNATIVE MONITORING SCHEME PROPOSED BY RL

The following monitoring scheme, with its estimated cost is proposed by RL as a reasonable and cost-effective alternative to that proposed by the EPA. The cost data are summarized in TABLE IV of the text.

| Organic Biweekly Analytes | Duplicate | 40 CFR Part 136 Method Cost |
|---|---|---|
| 624<br>Dichlorobromomethane<br>Chlorodifluoromethane<br>Methylene Chloride<br>Toluene<br>1,1,1-Trichloroethane<br>Chloroform<br>1,1-Dichloroethane<br>Trichloroethylene<br>Tetrachloroethylene | yes | $775 per sample<br>+<br>1 Dup.<br>=<br>$1,550 per 2 weeks |
| 625<br>Bis (2-ethylhexyl phthalate) | yes | $1895 per sample<br>+<br>1 Dup.<br>=<br>$3,790 per 2 weeks |
| **Field Blank**<br>VOA Eight per year | NA | $775 x 8<br>=<br>$6,200 per year |
| **Equipment Blank**<br>One VOA and One Semi-VOA Eight per year | NA | ($775 + $1895) x 8 =<br>$21,360 per year |
| **Trip Blank**<br>Eight VOA per year | NA | $775 x 8 =<br>$6,200 per year |
| **Total Annual Cost** | | $172,600 |

| Metals Biweekly Analytes | Duplicate | 136 Method Cost |
|---|---|---|
| 200.7<br>Aluminum<br>Beryllium<br>Cadmium<br>Copper<br>Iron<br>Lead<br>Manganese<br>Nickel<br>Selenium<br>Silver<br>Zinc | yes | $890 per sample + 1 Dup.<br>=<br>$1,780 per 2 weeks |
| 206.2<br>Arsenic | yes | $270 per sample<br>$540 per 2 weeks |
| 245.1<br>Mercury | yes | $270 per sample +<br>1 Dup.<br>=<br>$540 per 2 weeks |
| Field Blank/200.7<br>One ICP, Eight per year | NA | $890 x 8 =<br>$7,120 per year |
| Equipment Blank/200.7<br>One ICP, Eight per year | NA | $890 x 8 =<br>$7,120 per year |
| Total Annual Cost | $88,600 | |
| | | |
| Miscellaneous Biweekly Analytes | Duplicate | 600/Other Method Cost |
| 335.2<br>Cyanide | yes | $215 per sample +<br>1 Dup.<br>=<br>$430 per 2 weeks |
| 354.1 (353.3)<br>Nitrite | yes | $200 per sample +<br>1 Dup.<br>=<br>$400 per 2 weeks |
| 903.0 (not 136 method)<br>Total Radium | yes | $400 per sample +<br>1 Dup.<br>=<br>$800 per 2 weeks |

| | | |
|---|---|---|
| 350.2<br>Ammonia | yes | $140 per sample +<br>1 Dup.<br>=<br>$280 per 2 weeks |
| SM908<br>Total and Fecal Coliform | yes | $100 per sample +<br>1 Dup.<br>=<br>$200 per 2 weeks |
| Total Annual Cost | $54,860 | |
| | | |
| Biweekly Sample Collection Cost<br>Total | $1,500 per day<br>$39,000 per year | |
| Biweekly Monitoring Annual Cost<br>Total | 172.6+88.6+56.42+39 =<br>$355,060 | |
| | | |
| Quarterly WET Testing | Split | 600 Method Cost |
| Pimephales promelas (4/year) | NA | $1000 per sample $4000 per year |
| Ceriodaphnia dubia (4/year) | NA | $1000 per sample<br>$4000 per year |
| Selenastrum capricornutum (4/year) | NA | $1000 per sample<br>$4000 per year |
| | | |
| Sample Collection Cost | $1,500 per day<br>$6,000 per year | |
| Total Annual Cost | $18,000 | |
| | | |
| River Sample Tracer Test Cost | $4,000 per year | |
| | | |
| Annual Validation Cost | $43,604 | |
| Total Annual Compliance Monitoring Cost | $420,664 | |

# APPENDIX D - U. S. ENVIRONMENTAL PROTECTION AGENCY, REGION 10 PROPOSED NPDES PERMIT AND TECHNICAL INFORMATION DOCUMENT

United States
Environmental Protection
Agency

Region 10
1200 Sixth Avenue
Seattle WA 98101

Alaska
Idaho
Oregon
Washington

EPA

March 16, 1993

Received 4/2/93 JFT

Reply To
Attn Of: WD-134

Jim Rasmussen
U.S. Department of Energy
Richland Field Office
P.O. Box 550
Richland, Washington 99352

Dear Mr. Rasmussen:

Enclosed for your preliminary review are copies of the draft National Pollutant Discharge Elimination System (NPDES) permit (No. WA-002591-7) concerning your proposed discharge from the 300 Area Treated Effluent Disposal Facility (TEDF) to the Columbia River.

We are required under our NPDES regulations at 40 CFR § 122.49(c) to ensure, in consultation with the U.S. Department of the Interior, Fish and Wildlife Service (FWS), that the proposed permit action is not likely to jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat. In view of this requirement, I have asked FWS to provide a list of any endangered or threatened species present at the proposed TEDF discharge location.

This preliminary draft permit package does not necessarily reflect the outcome of any evaluation relative to endangered or threatened species. Depending on the outcome of an evaluation, if there are endangered or threatened species in the area of the proposed discharge, it is possible that the permit conditions could be made more stringent.

If you or your staff have any questions about these enclosures, please give me a call at Area Code (206) 562-3135.

Sincerely,

Kenneth Mosbaugh

Kenneth Mosbaugh

cc: Steve Stites, USDOE
Luis Soler, Jr., WHC
Jeff Luke, WHC
Jerry Turnbaugh, WHC

TECHNICAL INFORMATION

1. Applicant

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

NPDES Permit Application No. WA-002591-7

2. Project Activity and Location

The applicant is engaged in a wide range of activities on the Hanford Reservation. In the 300 Area where the proposed discharge covered by this NPDES application will occur, activities range from testing laboratories; to commercial, physical, and biological research; to activities related to support of waste cleanup on the reservation. In this capacity, the 300 Area serves as a U.S. Department of Energy (DOE) research center. Also located in the Area are office buildings and support facilities including a powerhouse, warehouses, and fabrication and maintenance shops.

Currently, industrial process waste water from the area which accumulates in a process sewer, is disposed of to the soil column in the 300 Area Process Trenches. Milestone M-17-09 of the Federal Facility Agreement and Consent Order, commonly called the Tri-Party Agreement, requires that discharge of the process waste water into the soil column process trenches be ceased. To comply with this requirement, the applicant is undertaking a program to reduce the waste flow quantity, provide treatment of the waste water in a new facility called the 300 Area Treated Effluent Disposal Facility (TEDF), and discharge the treated effluent to the Columbia River on the West side of Johnson Island through a new outfall/diffuser at approximate River Mile (R.M.) 345.5. Upon completion of the TEDF, process waste flow to the process trenches will be eliminated and all liquid waste will henceforth be treated in the TEDF and discharged to the Columbia River via the outfall/diffuser.

Approximately 30 facilities within the 300 Area discharge liquid effluent to the process sewer from heating, ventilation, and air conditioning (HVAC) systems, floor drains, sinks, and process equipment. All of this effluent will be treated in the TEDF.

Until the TEDF is planned to become operational in December of 1994, the applicant has indicated that liquid effluent to the soil trenches will be continued on a reduced

basis. The applicant's justification for this as expressed in June of 1992, is based on a number of factors including the following:

(1) Shutting down the facilities that generate flows contributing to the total process flow, would require at least 3 years longer than the current plan which emphasizes flow reduction and early implementation of the treatment system.

(2) Some of the work at 300 Area facilities cannot be conducted at other locations of the national DOE complex, such as analytical chemistry which supports characterization of the single and double shell storage tanks, and chemistry which supports stabilization of the tanks. In addition, high heat radioactive material requiring cooling water for cooling is stored in 300 Area facilities. A majority of flow to the 300 Area Process Trenches is attributable to operation of the steam powerhouse and heat exchangers for cooling.

(3) Requiring 300 Area facilities to not generate waste water would shut-down the majority of 300 Area operations. The 300 Area would be largely uninhabitable due to lack of heating and cooling, as well as unsafe due to lack of fire suppression water, and HVAC systems.

(4) Waste water discharges to the Trenches have been reduced by greater than 1.7 million gallons a day from approximately 1471 gallons per minute (gpm) at the beginning of the flow reduction efforts in 1990 to less than 400 gpm in 1981. An additional flow reduction to 300 gpm is planned for December 1992 as part of the Shutdown Plan. The 1993 reductions will minimize the quantity of effluent requiring processing in the treatment facility.

(5) An Expedited Response Action (ERA) was implemented to remove contaminated soil from the trenches. The contaminated soil was removed to prevent migration of contamination to groundwater. With the removal of most of the contaminated soils and the reduction of effluent discharge which drove some of the contaminants to the groundwater, contamination has been significantly diminished.

(6) Other constraints to an immediate shutdown of the waste water includes federal and state requirements regarding: fire safety, potable water, facility heating, and safety cooling requirements for specialized equipment and materials. These

requirements would constrain the time allowed for the shut-down of the process trenches.

(7) The steam powerhouse provides heat, compressed air, and vacuum lines to the 300 Area facilities. The steam powerhouse provides heat for facilities to ensure the pipes in the facilities will not freeze and cause flooding, the steam powerhouse also heats the firewater storage tanks, and pipe freezing would also impair the fire protection system.

The applicant through two of its contractors, Battelle Environmental Management Operations and Westinghouse Hanford Company, subcontracted with CH,M-Hill Consultants to evaluate alternatives for treatment of the process sewer waste flow, make recommendations for best available treatment technology to be applied to the waste water, and to design the treatment facility. A treatment train was selected consisting of (1) iron coprecipitation, clarification, and filtration for metals removal, (2) UV/peroxide oxidation for removal of cyanide and organics, and (3) thiol functional group ion exchange resin for mercury removal. Bench-scale treatability testing of the selected treatment components by the consultant, confirmed their ability to remove target contaminants from the anticipated wastestream. An elaborate approach for selection of a treatment train was needed in this case because of the large number and wide range of pollutants expected to be in the waste flow.

In the permit application, the applicant provided an estimate of wastewater characteristics for the treated wastestream. The application data are listed in Table 1 below.

Table 1 - Effluent Data

| Pollutant | Maximum Daily Value | Average Daily Value |
|---|---|---|
| Group A | | |
| $BOD_5$ | 6000 ug/l | 5000 ug/l |
| COD | 50000 ug/l | 25000 ug/l |
| Total Organic Carbon | 30000 ug/l | 20000 ug/l |
| Suspended Solids | 9000 ug/l | 3000 ug/l |
| Flow | 325 gpm | 300 gpm |
| Ammonia (as N) | 400 ug/l | 100 ug/l |
| Temperature (winter) | 70°F | 65°F |
| Temperature (Summer) | 105°F | 95°F |
| pH - field (pH units) | 8.5 | 7.0 |

Group B

| | | |
|---|---|---|
| Bromide | 4 ug/l | 2 ug/l |
| Coliform (No./100ml) | 100 | <50 |
| Flouride | 200 ug/l | 100 ug/l |
| Nitrate | 6000 ug/l | 500 ug/l |
| Nitrite | 60 ug/l | <60 ug/l |
| Total Phosphorous | 100 ug/l | 50 ug/l |
| Alpha Activity | 9 pCi/l | 4 pCi/l |
| Beta Activity | 40 pCi/l | 5 pCi/l |
| Total Radium | 0.2 pCi/l | 0.08 pCi/l |
| Sulfate | 30000 ug/l | 13000 ug/l |
| Sulfide | 2 ug/l | <2 ug/l |
| Aluminum | 85 ug/l | 70 ug/l |
| Barium | 60 ug/l | 40 ug/l |
| Boron | 60 ug/l | 25 ug/l |
| Iron | 1000 ug/l | 100 ug/l |
| Magnesium | 5000 ug/l | 4000 ug/l |
| Manganese | 40 ug/l | <10 ug/l |
| Tin | 100 ug/l | 50 ug/l |
| Titanium | 20 ug/l | 10 ug/l |
| Beryllium | 5 ug/l | <5 ug/l |
| Chromium | 10 ug/l | 5 ug/l |
| Lead | 1 ug/l | 0.7 ug/l |
| Nickel | 30 ug/l | 1 ug/l |
| Silver | 1 ug/l | <0.1 ug/l |
| Zinc | 10 ug/l | <5 ug/l |
| Arsenic | 10 ug/l | 1 ug/l |
| Cadmium | 1 ug/l | <0.8 ug/l |
| Copper | 8 ug/l | 3 ug/l |
| Mercury | 1 ug/l | <0.1 ug/l |
| Selenium | 5 ug/l | <4 ug/l |
| Cyanide | 5 ug/l | <5 ug/l |

GC/MS FRACTION-VOLATILE COMPOUNDS

| | | |
|---|---|---|
| Dichlorobromethane | 2 ug/l | 1 ug/l |
| Toluene | 6 ug/l | 5 ug/l |
| 1,1,1-Trichloroethane | 5 ug/l | 1 ug/l |
| Trichloroethene | 0.4 ug/l | 0.2 ug/l |
| Chloroform | 15 ug/l | 10 ug/l |
| 1,1-Dichloroethane | 2 ug/l | <2 ug/l |
| Tetrachloroethylene | 5 ug/l | 0.8 ug/l |

GS/MS FRACTION-ACID COMPOUNDS

None

GS/MS FRACTION-BASE/NEUTRAL COMPOUNDS

| | | |
|---|---|---|
| Bis(2-ethylhexyl)phthalate | 3 ug/l | 2 ug/l |

GC/MS FRACTION-PESTICIDES

None

The applicant also indicated in the application that laboratory analysis has detected each of the following constituents in the current process sewer flow: chlorine, strontium, uranium, vanadium, and xylene.

3. Receiving Water Quality Standards

The Columbia River in vicinity of the proposed discharge is designated in Chapter 173-201 WAC, Water Quality Standards for Surface Waters of the State of Washington, as a Class A (excellent) receiving water with the following characteristic uses: water supply (domestic, industrial, agricultural); stock watering; salmonid migration, rearing, spawning, and harvesting; other fish migration, rearing, spawning, and harvesting; clam, oyster, and mussel rearing, spawning, and harvesting; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing, spawning, and harvesting; wildlife habitat; recreation (primary contact recreation, sport fishing, boating, and aesthetic enjoyment); and commerce and navigation.

Receiving water quality criteria to protect these uses are contained in WAC 173-201A-030(2), 040, 050, and 130(21); EPA's Toxics Rule, 40 CFR Part 131 (57 FR 60848 December 22, 1992); EPA Quality Criteria for Water 1986 (so-called the Gold Book) as amended; and/or other criteria published by EPA. This is also in accordance with WAC 173-201A-040(5) which specifies that "Concentrations of toxic, and other substances with toxic propensities not listed in subsection (1) of this section shall be determined in consideration of USEPA Quality Criteria for Water, 1986, and as revised, and other relevant information as appropriate."

For temperature, the water quality standards contain a "Special Condition" for the Columbia River in vicinity of the proposed discharge. It is specified in this condition that river temperatures shall not exceed 20.0°C due to human activities. When natural conditions exceed 20.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at any time, exceed $t = 34/(T+9)$ where "t" represents the maximum permissible temperature increase measured at a dilution zone boundary; and "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge.

In terms of pH, the applicable receiving water criterion calls for hydrogen ion concentration (pH) to be maintained within the range of 6.5 to 8.5 with a human-caused variation within a range of less than 0.5 pH unit.

The other receiving water quality criteria most applicable to the proposed discharge are listed below in Table 2 along with their sources.

Table 2 - Other Applicable Water Quality Criteria

| Parameter (ug/l) | Water Quality Criteria[1] Acute | Chronic | Source |
|---|---|---|---|
| Bis(2-ethylhexyl phthalate) | Human Health[2] - 1.8 | | EPA Toxics Rule |
| Dichlorobromo-methane | Human Health[2] - 0.27 | | EPA Toxics Rule |
| Chlorodifluoro-methane | Human Health[2] - 5.7 | | EPA Toxics Rule |
| Methylene Chloride | Human Health[2] - 4.7 | | EPA Toxics Rule |
| Toluene | Human Health[2] - 6800 | | EPA Toxics Rule |
| 1,1,1-Trichloro-ethane | None above background | | WAC 173-201A-040(1) |
| Trichloroethylene | Human Health[2] - 0.27 | | EPA Toxics Rule |
| Chloroform | Human Health[2] - 5.7 | | EPA Toxics RUle |
| 1,1-Dichloroethane | None above background | | WAC 173-201A-040(1) |
| Tetrachloroethylene | Human Health[2] - 0.8 | | EPA Toxics Rule |
| Aluminum (Al) | 750 | 87 | 53 FR 33177, 4/30/88 |
| Beryllium (Be) | None above background | | WAC 173-201A-040(1) |
| Cadmium (Cd) | 2.1 | 0.7 | WAC 173-201A-040(3) |
| Copper (Cu) | 10.2 | 7.1 | WAC 173-201A-040(3) |
| Cyanide (Cn) | 22.0 | 5.2 | WAC 173-201A-040(3) |
| Iron (Fe) | Water Supply | 300 | EPA Gold Book |
| Lead (Pb) | 32.4 | 1.3 | WAC 173-201A-040(3) |
| Manganese (Mn) | Water Supply | 50 | EPA Gold Book |
| Mercury (Hg) | 2.4 | 0.012[4] | WAC 173-201A-040(3) |
| Nickel (Ni) | 935.8 | 104.0 | WAC 173-201A-040(3) |
| Nitrite ($NO_2^-$) | - | 60[2] | EPA Gold Book |
| Selenium (Se) | 20.0 | 5.0 | WAC 173-201A-040(3) |
| Silver (Ag) | 1.0 | - | WAC 173-201A-040(3) |
| Zinc (Zn) | 72.4 | 65.6 | WAC 173-201A-040(3) |
| Radium (pCi/l) | Water Supply | 5[4] | WAC 173-201A-050(1) |

[1] Unless otherwise specified, the criteria are expressed in terms of acute and chronic levels for protection of aquatic life.

[2] These human health criteria are based on consumption of water and organisms with a $10^{-6}$ risk factor for carcinogens.

[3] This human health criterion is based on best professional judgement and was chosen by analogy to the human health criterion for chloroform.

[4] If the four-day average chronic concentration is exceeded more than once in a three-year period, the edible portion of the consumed species should be analyzed. Said edible tissue concentrations shall not be allowed to exceed 1.0 mg/kg of methylmercury.

[5] This chronic level is protective for salmonid fishes.

[6] Criterion is based on WAC 173-201A-050(1)(b) and 40 CFR § 141.15, and is the maximum permissible contaminant level combined for radium 226 and radium 228.

The Table 2 criteria for iron, manganese, and radium are based on Columbia River water use for domestic water supply. Where metal criteria were determined from formulas listed in the water quality standards that specify hardness, a river water hardness value of 65 mg/l total hardness (as $CaCO_3$) was used. (See Appendix A for specific calculations.) This hardness value is representative of the pH values which occur in the Columbia River in vicinity of the proposed discharge.

4. Statutory and Regulatory Requirements

A. Requirements Related to Control of Conventional, Nonconventional, and Toxic Pollutants

It is stipulated in the Water Quality Act of 1987 (Act) that issued NPDES permits must contain effluent limitations reflecting the most stringent of (1) receiving water quality standards established pursuant to state law or regulations and (2) technology-based effluent guidelines established by EPA for three levels of wastewater treatment technology. These levels include Best Practicable Control Technology Currently Available (BPT); Best Conventional Pollutant Control Technology Currently Available (BCT) for the parameters: $BOD_5$, TSS, pH, fecal coliform bacteria, and oil & grease; and Best Available Technology Economically Achievable (BAT) for nonconventional and toxic pollutants.

Where effluent guidelines have not been promulgated by EPA, the Act and NPDES regulations at 40 CFR § 125.3 require the permit writer to establish BPT, BCT, or BAT effluent limits on a case-by-case basis based on Best Professional Judgement (BPJ).

There are no EPA promulgated effluent guidelines applicable to the TEDF. The suspended solids (TSS) and pH

limitations of the proposed permit are based on BPJ determination of BPT (BCT limits were also set equal to these limits). The temperature and whole effluent toxicity limitations are based on receiving water quality standards. And all of the other limitations in this permit are based on BPJ/BAT.

B. Control of Radioactivity and Radionuclides

The anticipated presence of alpha activity, beta activity, and total radium in the treated waste flow is indicated in the permit application. And in documents attached to and submitted with the application, the following radionuclides have been identified and are anticipated to be present in the raw process waste flow (TEDF influent): americium (Am)-241, cesium (Cs)-137, cobalt (Co)-60, plutonium (Pu)-238, plutonium (Pu)-239/240, plutonium (Pu)-241, promethium (Pm)-147, ruthenium (Ru)-106, strontium (Sr)-90, strontium (Sr)-Total, tritium ($H_3$), and uranium (U)-Total.

The term "pollutant" as defined in NPDES regulations at 40 CFR § 122.2, includes the radioactive material "radium". Therefore, EPA is addressing this parameter in the proposed permit.

All of the other radioactivity and radionuclide parameters mentioned above are regulated solely by the Department of Energy (DOE), Richland Field Office, and are controlled under the Atomic Energy Act by DOE in accordance with provisions of DOE Order 5400.5, "Radiation Protection of the Public and the Environment". The Richland Field Office will also monitor the TEDF Outfall 001 discharge for radioactivity and radionuclides. (See Appendix B, March 3, 1993 letter from James D. Bauer, Department of Energy, Richland Field Office.)

5. Basis of Limitations

The wastewater constituents in the influent to the TEDF that require treatment can broadly be classified in three groups: metals, organics, and cyanide. Because of the wide range of wastewater parameters involved in the process waste flow, there is no conventional type of treatment system available for treating this type of waste. This required that treatability testing be conducted on the wastestream to determine the unit processes needed for treating the wastewater. Such testing of the waste flow was conducted for the applicant by CH2M-Hill and it was determined through these tests that a TEDF treatment train consisting of iron co-precipitation, UV/peroxide, and thiol functional ion exchange can meet most of the regulatory

target limits (which in most cases are the water quality criteria contained in the Washington Water Quality Standards or EPA's Toxic Rule) in the TEDF effluent discharge. Those parameters which cannot be reduced to the regulatory target limits and receiving water quality standards through the treatment train, can be reduced to the standards criteria levels within a mixing zone in the Columbia River a short distance downstream of the discharge.

The results of CH,M- Hill's treatability testing on the wastestream and subsequent recommendations for the treatment train, are contained in a report entitled, "Engineering Summary Report, Hanford 300 Area, Treated Effluent Disposal Facility, Project L-045H, March 1992" (ESR) which was included as Attachment A of the NPDES permit application. The ESR and data included in the NPDES permit application provide the basis for most of the BPJ limitations in the proposed permit.

BPJ/BPT limitations for TSS are based on permit application data, and the BPJ/BPT limit for pH is based on the facts that (1) where national effluent guidelines for waste sources have been promulgated by EPA, most contain a 6.0 to 9.0 pH unit limitation, and (2) as a general observation, oxidation is required to remove organic wastes, precipitation or ion exchange technology is required to remove metals, there is no other way of practically controlling discharges of strongly acidic and alkaline substances than through pH adjustment, and a pH range of 6.0 to 9.0 is ideally suited for all of these treatment technologies.

BPJ/BAT limits for bis(2 ethylhexyl)phthalate, dichlorobromomethane, chlorodifluoromethane, methylene chloride, cadmium, cyanide, mercury, nitrite, and sulfide are based on the ESR. Through use of the selected treatment train, levels of these parameters can be achieved that will meet the permit limits.

Chloroform was not considered in the ESR as a regulatory target limitation to be achieved in the treated effluent, but it is expected to be in the TEDF influent at levels higher than the Toxics Rule human health criterion. Since chloroform is similar in chemical structure to chlorodifluoromethane which was a regulatory target limit in the ESR at 5.7 ug/l (believed to be effectively treated by the planned UV/peroxide treatment unit process to less than 5 ug/l) and is covered in the ESR by the same human health criterion of 5.7 ug/l, identical effluent limitations for both chemicals based on BPJ/BAT are included in the proposed permit.

Beryllium was covered in the ESR with a regulatory target limit of 5.3 ug/l (treatable to less than 5 ug/l), but treatability tests reported in the ESR show that the beryllium concentration in a spiked sample of unfiltered waste water was reduced by treatment from 25 ug/l to less than 1 ug/l. Therefore, the permit limits for beryllium in the proposed permit are based on a BPJ/BAT level of 1 ug/l.

BPJ/BAT limits for total coliform bacteria, aluminum, copper, lead, manganese, selenium, silver, and zinc are based on both the ESR and data provided in the permit application.

BPJ/BAT limits for toluene, 1,1,1-trichloroethane, trichloroethylene, 1,1-dichloroethane, tetrachloroethylene, iron, nickel, arsenic, and radium are based on permit application data.

The applicable receiving water quality standards criteria will essentially be met in the TEDF effluent discharge pipe for all of the effluent parameters except for dichlorobromethane, trichloroethylene (the monthly average effluent limit will meet the standards criteria level but the daily maximum will not), tetrachloroethylene (the monthly average effluent limit will meet the standards criterion level but the daily maximum limit will not), mercury, and temperature. The standards criteria for the first four of these parameters will be met a very short distance downstream of the TEDF discharge outfall/diffuser, less than 20 feet at low river flow conditions. (Dilutions of treated effluent with Columbia River water on the order of 3.7, 1.5, 6.3, and 83.3, respectively, are needed and will be achieved. The chronic water quality standards criterion for mercury is 0.012 ug/l, but the current analytical detection limit for this parameter is 0.2 ug/l; consequently, the proposed permit limits for this parameter are "non-detectable".)

The permit application contains expected effluent temperatures of 65°F(daily average) and 70°F(daily maximum) for the winter season, and 95°F(daily average) and 105°F(daily maximum) for the summer season. In response to questions raised by the EPA permit writer on the NPDES permit application and ESR, the applicant through it's contractor (CH,M-Hill) conducted some followup modelling of the discharge to describe the expected discharge plume at the location of the proposed outfall/diffuser (Columbia River on the West side of Johnson Island) during worst case conditions based on a regulated low river flow of 36,000 cubic feet per second (cfs)(proportioned to the amount of river flow in the West Channel), 325 gallons per minute (gpm) (0.468 million gallons per day) of TEDF effluent flow

at a maximum discharge temperature of 105°F, and a maximum ambient river temperature of 21.5°C (70.7°F).

The results of this modelling indicated that the most restrictive of the Columbia River Washington Water Quality Standards temperature criteria (no increases greater than 0.3°C allowed when the ambient river temperature exceeds 20.0°C) will be met 71 feet downstream from the point of discharge. The modelling also indicated the width of the discharge plume at this point to be 12.1 feet. This is an acceptable mixing zone, considering the fact that this zone is representative of absolute worst case discharge conditions. It is specified in the Washington Water Quality Standards at WAC 173-201A-100(7)(a) that the maximum size of discharge mixing zones shall not extend greater than 300 feet downstream nor greater than 25 percent of the width nor greater than 25 percent of river flow at the point of discharge but in WAC 173-201A-100(6), it is explained that "The size of a mixing zone and the concentration of pollutants present shall be minimized." In view of WAC 173-201A-100(6) and the applicant's river modelling of the proposed discharge, the mixing zone used in the proposed permit is based on a length of 71 feet, width of 12.1 feet, and the respective volume of West Channel Columbia River flow (calculated for the river velocity and crossectional area at a width of 12.1 feet) at the point of discharge.

Within this mixing zone, the Washington Water Quality Standards criteria for temperature and mercury, as well as the EPA Toxics Rule water quality criteria for dichlorobromomethane, trichloroethylene, and tetrachloroethylene will be met. Therefore, the BPJ/BAT effluent limits in the proposed permit are based on the ESR for dichlorobromomethane and mercury, and NPDES permit application data for trichloroethylene, tetrachloroethylene, and temperature. And as explained above, all of the applicable receiving water quality criteria for the other effluent parameters covered by the permit will be met in the TEDF discharge pipe. The proposed permit limitations are predicated on the outfall/diffuser being constructed as described in the ESR and Table 8 of a September 15, 1992 CH,M-Hill Technical Memorandum entitled, "Hanford 300 Area Outfall Dilution Modeling".

The proposed permit contains the following water quality standards related whole effluent toxicity limitation for the TEDF discharge based on the "no observable effect concentration" (NOEC) on the most sensitive of three test species. Using the mixing zone described above and information contained in the ESR and October 7, 1992 draft CH,M-Hill Technical Memorandum entitled, "Hanford 300 Area Outfall Dilution Modeling: Extreme Low-Flow Discharge

Condition", the whole effluent toxicity (NOEC) limitation was calculated as follows.

At the discharge point under low river flow conditions,

Surface river velocity = 1.86 ft/sec
Bottom river velocity = 1.35 ft/sec

$$\text{Average river velocity} = \frac{1.86 + 1.35}{2} = 1.61 \text{ ft/sec}$$

Width of discharge plume = 12.1 feet

Volume of West Channel Columbia River flow through a width of 12.1 feet at the point of discharge ($Q_R$), or the mixing zone volume

$$= AV = 124 \text{ ft}^2 \times 1.61 \text{ ft/sec} = 200 \text{ ft}^3\text{/sec},$$

where A = crossectional area of the discharge plume based on a width of 12.1 feet and depths of the West Channel in the discharge plume at a water level of 341 feet above the National Geodetic Datum (NGVD)

and

V = average river velocity

Percent of Volume of West Channel river flow

$$= \frac{200 \text{ ft}^3\text{/sec}}{5633 \text{ ft}^3\text{/sec}} \times 100 = 3.6\%$$

$$Q_{Effluent} = 300 \text{ gal/min} \times 60 \text{ min/hr} \times 24 \text{ hr/day} \times \frac{1}{10^6}$$

$$= 0.432 \text{ mgd}$$

$$Q_{West\ Channel\ river\ flow} = 5633 \text{ cfs} \times 0.646317 \text{ mgd/cfs}$$

$$= 3640.704 \text{ mgd}$$

$$\text{Toxicity (NOEC)} = \frac{Q_{Effluent}}{0.036\ (Q_{West\ Channel\ river\ flow}) + Q_{Effluent}} \times 100\%$$

$$= \frac{0.432}{0.036\ (3640.704) + 0.432} \times 100$$

$$= 0.33\% \text{ Effluent}$$

This limitation is designed to protect freshwater organisms in the West Channel Columbia River at Johnson Island from any potential observed toxicity effects due to the discharge. The toxicity limitation is proposed in conformance with the national policy adopted by EPA concerning the development of water quality-based permit limitations for toxic pollutants (49 FR 9016, March 9, 1984) which emphasizes the use of an integrated strategy consisting of both biological and chemical methods to address control of toxic pollutants from industrial and municipal sources to meet water quality standards.

The limitation is based on a regulated low Columbia River flow of 36,000 cfs which was proportioned to the amount of river flow expected through the West Channel at Johnson Island; and the allowable mixing zone as described above, was factored in to the whole effluent toxicity limitation calculations.

The proposed effluent limitations for the TEDF discharge are as follows.

Table 3 - Outfall 001 Effluent Limitations

| | Mo. Avg. | | Daily Max. | |
|---|---|---|---|---|
| | ug/l | lb/day | ug/l | lb/day |
| Bis(2-ethylhexyl phthalate) | <1.8 | <0.0065 | 1.8 | 0.0065 |
| Dichlorobromo-methane | <1.0 | <0.0036 | 1.0 | 0.0036 |
| Chlorodifluoro-methane | <5.0 | <0.0180 | 5.0 | 0.0180 |
| Methylene Chloride | <2.0 | <0.0072 | 2.0 | 0.0072 |
| Toluene | 5.0 | 0.0180 | 6.0 | 0.0216 |
| 1,1,1-Trichloro-ethane | 1.0 | 0.0036 | 5.0 | 0.0180 |
| Trichloroethylene | 0.2 | 0.0007 | 0.4 | 0.0014 |
| Chloroform | <5.0 | <0.0180 | 5.0 | 0.0180 |
| 1,1-Dichloroethane | <2.0 | <0.0072 | 2.0 | 0.0072 |
| Tetrachloroethylene | 0.8 | 0.0029 | 5.0 | 0.0180 |
| Aluminum (Al) | 70 | 0.2521 | 85 | 0.3061 |
| Arsenic (As) | 1 | 0.0036 | 10 | 0.0360 |
| Beryllium (Be) | <1.0 | <0.0036 | 1.0 | 0.0036 |
| Cadmium (Cd) | <0.7 | <0.0029 | 0.7 | 0.0029 |
| Copper (Cu) | 3.0 | 0.0108 | 7.0 | 0.0288 |
| Cyanide (Cn) | <5.0 | <0.0180 | 5.0 | 0.0180 |
| Iron (Fe) | 100 | 0.3602 | 1000 | 3.6016 |
| Lead (Pb) | 0.7 | 0.0025 | 1.0 | 0.0036 |
| Manganese (Mn) | <10 | <0.0360 | 40 | 0.1441 |
| Mercury (Hg) | Non-detectable | | Non-detectable | |
| Nickel (Ni) | 1 | 0.0036 | 30 | 0.1081 |

| | | | | |
|---|---|---|---|---|
| Nitrite ($NO_3^-$) | <60 | <0.2161 | 60 | 0.2161 |
| Selenium (Se) | <4.0 | <0.0144 | 5.0 | 0.0180 |
| Silver (Ag) | <0.1 | <0.0004 | 1.0 | 0.0036 |
| Zinc (Zn) | <5 | <0.1801 | 10 | 0.0360 |
| Radium (pCi/l) | 0.08 | - | 0.2 | - |
| Suspended Solids | 3000 | 11 | 9000 | 32 |
| Temperature °F (°C) | 95 (35) | - | 105 (40.6) | - |
| Total Coliform (No. per 100ml) | 50 | - | 100 | - |

Whole Eff. Toxicity Not equal to or less than 0.33% Effluent.
pH - pH units Not less than 6.0 nor greater than 9.0.
Floating solids and visible foam - None in other than trace amounts.

5. Treated Effluent Disposal Facility (TEDF) Startup

The applicant will be required to install and have in operating condition, and "startup" all pollution control equipment before beginning to discharge effluent from the TEDF. And within the shortest feasible time not to exceed 90 days, the permittee must meet all permit conditions, including all of the proposed permit effluent limits.

And during this initial TEDF startup period, the permittee will be required to comply with all of the monitoring requirements of the proposed permit.

6. Monitoring Requirements

Self-monitoring of discharge parameters is necessary for the permittee to demonstrate compliance with effluent limitations and to assure that water quality standards are being met. The monitoring requirements are based on the Agency's determination of the sample types and minimum sampling frequencies needed to adequately characterize the discharge.

A. Effluent Monitoring

The Outfall 001 discharge as measured in the effluent flow from the EF-T-10 Effluent Tank will be required to be monitored on a biweekly grab sample basis for bis(2-ethylhexyl)phthalate, dichlorobromomethane, chlorodifluoromethane, methylene chloride, toluene, 1,1,1-trichloroethane, trichloroethylene, chloroform, 1,1- dichloroethane, tetrachloroethylene, aluminum, arsenic, beryllium, cadmium, copper, cyanide, iron, lead, manganese, mercury, nickel, nitrite, selenium, silver, zinc, radium, total coliform bacteria, and ammonia; three times per week on a grab sample basis for suspended solids (TSS); daily on a grab sample basis for pH; and continuously for

temperature. In addition, waste influent flow to and effluent from the TEDF will be required to be monitored daily.

B. Ambient Water Quality Monitoring

To document the impact, if any, of the discharge on receiving water quality, and to verify on a continuing basis that the TEDF discharge is not resulting in exceedence of the applicable receiving water quality standards, the proposed permit requires the applicant to conduct ambient monitoring of Columbia River water on the West side of Johnson Island in vicinity of the proposed discharge at low river flow during August of each year at each of the following locations.

1. Immediately upstream of the TEDF discharge.

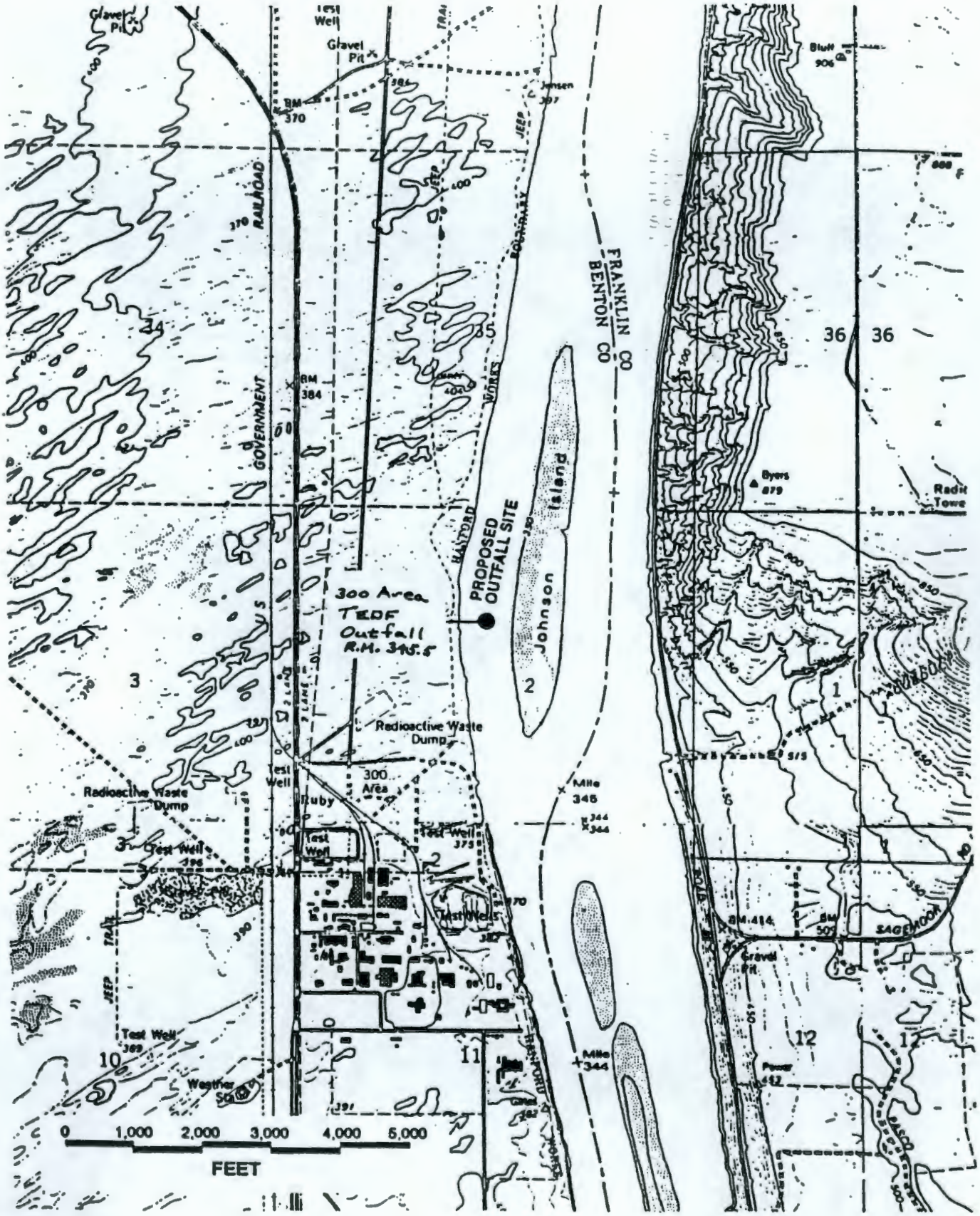
2. Approximately 71 feet downstream of the TEDF discharge.

The river grab samples will be required to be collected and analyzed for all of the effluent discharge parameters and total hardness (as $CaCO_3$). In addition, metal samples for cadmium, copper, lead, nickel, silver, and zinc would be required to be collected and analyzed for both "dissolved" and "total recoverable" individual metals, while all of the other metals and arsenic will be required to be collected and analyzed on a "total recoverable" parameter basis.

C. Biomonitoring Requirements

Based on the EPA national policy mentioned above concerning the use of an integrated strategy involving both biological and chemical methods to address toxic pollutants, some whole effluent toxicity biomonitoring of the Outfall 001 (TEDF) discharge is proposed. Biomonitoring of the discharge four times per year on a 24 hour composite basis is proposed based on use of three organisms: Fathead minnow *Pimephales promelas*, *Ceriodaphnia dubia*, and *Selenastrum capricornutum*.

This type of biomonitoring has been used by the Agency in ambient stream monitoring studies, and has been required in other NPDES permits. It will be used to monitor for possible synergistic or additive effects of combined pollutants in the discharge and to demonstrate compliance with the permit toxicity limitations.




**OUTFALL SITE IN COLUMBIA RIVER**

Appendix A

| Parameter | | Criterion |
|---|---|---|
| 1. Cadmium (Cd) | Acute | $= (0.865)(e^{(1.128[\ln \text{hardness}]-3.828)})$<br>$= (0.865)(e^{(1.128[\ln 65]-3.828)})$<br>$= 2.1$ ug/l |
| | Chronic | $= (0.865)(e^{(0.7852[\ln \text{hardness}]-3.490)})$<br>$= (0.865)(e^{(0.7852[\ln 65]-3.490)})$<br>$= 0.7$ ug/l |
| 2. Copper (Cu) | Acute | $= (0.862)(e^{(0.9422[\ln \text{hardness}]-1.464)})$<br>$= (0.862)(e^{(0.9422[\ln 65]-1.464)})$<br>$= 10.2$ ug/l |
| | Chronic | $= (0.862)(e^{(0.8545[\ln \text{hardness}]-1.465)})$<br>$= (0.862)(e^{(0.8545[\ln 65]-1.465)})$<br>$= 7.1$ ug/l |
| 3. Lead (Pb) | Acute | $= (0.687)(e^{(1.273[\ln \text{hardness}]-1.460)})$<br>$= (0.687)(e^{(1.273[\ln 65]-1.460)})$<br>$= 32.4$ ug/l |
| | Chronic | $= (0.687)(e^{(1.273[\ln \text{hardness}]-4.705)})$<br>$= (0.687)(e^{(1.273[\ln 65]-4.705)})$<br>$= 1.3$ ug/l |
| 4. Nickel (Ni) | Acute | $= (0.95)(e^{(0.8460[\ln \text{hardness}]+3.3612)})$<br>$= (0.95)(e^{(0.8460[\ln 65]+3.3612)})$<br>$= 935.8$ ug/l |
| | Chronic | $= (0.95)(e^{(0.8460[\ln \text{hardness}]+1.1645)})$<br>$= (0.95)(e^{(0.8460[\ln 65]+1.1645)})$<br>$= 104.0$ ug/l |
| 5. Silver (Ag) | Acute | $= (0.531)(e^{(1.72[\ln \text{hardness}]-6.52)})$<br>$= (0.531)(e^{(1.72[\ln 65]-6.52)})$<br>$= 1.0$ ug/l |
| 5. Zinc (Zn) | Acute | $= (0.891)(e^{(0.8473[\ln \text{hardness}]+0.8604)})$<br>$= (0.891)(e^{(0.8473[\ln 65]+0.8604)})$<br>$= 72.4$ ug/l |
| | Chronic | $= (0.891)(e^{(0.8473[\ln \text{hardness}]+0.7614)})$<br>$= (0.891)(e^{(0.8473[\ln 65]+0.7614)})$<br>$= 65.6$ ug/l |

# Appendix B

Permit No.: WA-002591-7
Application No.: WA-002591-7

United State Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et seq., as amended by the Water Quality Act of 1987, P.L. 100-4, the "Act,"

U.S. Department of Energy
Richland Field Office

is authorized to discharge from the 300 Area Treated Effluent Disposal Facility (TEDF) located on the Hanford Reservation near Richland, Washington to a receiving water named Columbia River at approximate River Mile 345.5 in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective

This permit and the authorization to discharge shall expire at midnight,

Signed this day of

Director, Water Division, Region 10
U.S. Environmental Protection Agency

DRAFT

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# I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

## A. Specific Limitations and Monitoring Requirements

During the period beginning on the effective date of this permit, and lasting through the expiration date, the permittee is authorized to discharge from Outfall 001 to the Columbia River at approximate River Mile (R.M.) 345.5, subject to the following limitations and monitoring requirements. (See Part I.B. below regarding TEDF start-up conditions.)

1. Such discharge shall be limited as specified below:

| EFFLUENT CHARACTERISTIC | DISCHARGE LIMITATIONS[1/] | | | | MONITORING REQUIREMENTS | |
|---|---|---|---|---|---|---|
| | Monthly Avg. ug/l | Monthly Avg. lb./day | Daily Max. ug/l | Daily Max. lb./day | Measurement Frequency | Sample Type |
| Flow-mgd | - | - | - | - | Daily | - |
| Bis(2-ethylhexyl)phthalate | <1.8 | <0.0065 | 1.8 | 0.0065 | Biweekly | Grab |
| Dichlorobromomethane | <1.0 | <0.0036 | 1.0 | 0.0036 | Biweekly | Grab |
| Chlorodifluoromethane | <5.0 | <0.0180 | 5.0 | 0.0180 | Biweekly | Grab |
| Methylene Chloride | <2.0 | <0.0072 | 2.0 | 0.0072 | Biweekly | Grab |
| Toluene | 5.0 | 0.0180 | 6.0 | 0.0216 | Biweekly | Grab |
| 1,1,1,-Trichloroethane | 1.0 | 0.0036 | 5.0 | 0.1800 | Biweekly | Grab |
| Trichloroethylene | 0.2 | 0.0007 | 0.4 | 0.0014 | Biweekly | Grab |
| Chloroform | <5.0 | <0.0180 | 5.0 | 0.0180 | Biweekly | Grab |
| 1,1-Dichloroethane | <2.0 | <0.0072 | 2.0 | 0.0072 | Biweekly | Grab |
| Tetrachloroethylene | 0.8 | 0.0029 | 5.0 | 0.0180 | Biweekly | Grab |
| Aluminum (Al) | 70 | 0.2521 | 85 | 0.3061 | Biweekly | Grab |
| Arsenic (As) | 1 | 0.0036 | 10 | 0.0360 | Biweekly | Grab |
| Beryllium (Be) | <1.0 | <0.0036 | 1.0 | 0.0036 | Biweekly | Grab |
| Cadmium (Cd) | <0.7 | <0.0029 | 0.7 | 0.0029 | Biweekly | Grab |
| Copper (Cu) | 3.0 | 0.0108 | 7.0 | 0.0288 | Biweekly | Grab |
| Cyanide (Cn) | <5.0 | <0.0180 | 5.0 | 0.0180 | Biweekly | Grab |
| Iron (Fe) | 100 | 0.3602 | 1000 | 3.6016 | Biweekly | Grab |

| EFFLUENT CHARACTERISTIC | DISCHARGE LIMITATIONS[1] | | | | MONITORING REQUIREMENTS | |
|---|---|---|---|---|---|---|
| | Monthly Avg. ug/l | Monthly Avg. lb./day | Daily Max. ug/l | Daily Max. lb./day | Measurement Frequency | Sample Type |
| Lead (Pb) | 0.7 | 0.0025 | 1.0 | 0.0036 | Biweekly | Grab |
| Manganese (Mn) | <10 | <0.0360 | 40 | 0.1441 | Biweekly | Grab |
| Mercury (Hg)[2] | Non-detectable | | Non-detectable | | Biweekly | Grab |
| Nickel (Ni) | 1 | 0.0036 | 30 | 0.1081 | Biweekly | Grab |
| Nitrite ($NO_3^-$) | <60 | <0.2161 | 60 | 0.2161 | Biweekly | Grab |
| Selenium (Se) | <4.0 | <0.0144 | 5.0 | 0.0180 | Biweekly | Grab |
| Silver (Ag) | <0.1 | <0.0004 | 1.0 | 0.0036 | Biweekly | Grab |
| Zinc (Zn) | <5 | <0.1801 | 10 | 0.0360 | Biweekly | Grab |
| Radium, Total (pCi/l) | 0.08 | - | 0.2 | - | Biweekly | Grab |
| Suspended Solids (TSS) | 3000 | 11 | 9000 | 32 | 3 per week | Grab |
| Temperature °F (°C) | 95 (35) | - | 105 (40.6) | - | Continuous | Recording |
| Total Coliform Bacteria (No. per 100 ml) | 50 | - | 100 | - | Biweekly | Grab |
| Total Ammonia (as N) | - | - | - | - | Biweekly | Grab |

2. Based on the no observable effect concentration (NOEC) for the three species and biomonitoring requirements outlined in Part I.C. below, the whole effluent toxicity of the discharge shall not be equal to or less than 0.33% Effluent.

3. The pH shall not be less than 6.0 nor greater than 9.0 standard units, and shall be monitored daily on a grab sample.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts, or oily wastes which produce a sheen on the surface of the receiving water.

5. Samples taken in compliance with the monitoring requirements shall be taken at the following location: In the effluent flow from the EF-T-10 Effluent Tank at the point of Effluent Tank overflow to the river outfall prior to discharge into the Columbia River

6. Waste influent flow to the TEDF shall also be monitored and recorded on a daily basis. Submittal of this flow data is not required unless requested by the permit issuing authority.

7. The arsenic and metal samples shall be analyzed on an individual "total recoverable" parameter basis.

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1/ All parameter limitations are expressed in units of "ug/l" and "lb/day" except for flow which is expressed in "mgd", total radium which is expressed in pCi/l , temperature which is expressed in "°F and °C", total coliform bacteria which is expressed in "No. per 100 ml", toxicity which is expressed in "% Effluent", and pH which is expressed in "pH units".

2/ Nondetectable is defined as 0.2 ug/l.

B. Treated Effluent Disposal Facility (TEDF) Startup

The permittee shall install and have in operating condition, and shall "start up" all pollution control equipment required to meet the conditions of this permit before beginning to discharge effluent from the TEDF.

The permittee shall comply with all monitoring requirements specified in Part I.A. above and all other monitoring conditions of this permit beginning with the initiation of effluent discharge from the TEDF.

And within the shortest feasible time (not to exceed 90 days from the issuance date of this permit), the permittee must meet all permit conditions, including the effluent limitations specified in Part I.A. above.

C. Biomonitoring Program Requirements

1. Within 30 days of the issuance date of this permit, the permittee shall submit any existing toxicity data to EPA for review.

   Biomonitoring testing on the Outfall 001 effluent shall be initiated within 90 days of the permit issuance date. Biomonitoring results shall be submitted the month after testing along with the monthly DMRs.

2. The permittee shall conduct chronic tests for effluent toxicity using protocols contained in Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA/600/4-89/001). Such testing will determine if the effluent affects the survival or growth of the test organisms. The tests conducted shall be the 7-day fathead minnow, *Pimephales promelas*, test, the 7-day *Ceriodaphnia dubia* test, and the 4-day *Selenastrum capricornutum* growth test. All tests shall be conducted on split samples from the same 24-hour composite samples of effluent. If, in any test, more than 10% of the control organisms die within 96 hours or more than 20% of the control organisms die during the duration of the test, that test shall be repeated.

   Toxic effects will be demonstrated if there is a statistically significant difference in response between the control and test organisms for any of the three tests. The permittee shall conduct the three tests four times a year, during February, May, August, and November throughout the term of this permit.

3. The chronic tests shall identify the no observable effect concentration (NOEC) for each of the three species. The tests shall include a series of dilutions using a dilution factor of 0.32 starting with 100% effluent (100, 32, 10, 3, 1, and 0.3). The NOEC shall be determined to be the effluent concentration (expressed as % Effluent) in control water at which there is no statistically significant difference in response between the control and test organisms in any of the three tests.

4. All quality assurance criteria used shall be in accordance with Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, (Fourth Edition), (EPA/600/4-90/027), September 1991, Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/600/4-89/001, Quality Assurance Guidelines for Biological Testing, EPA/600/4-78-043, Quality Assurance Bibliography, EPA/600/4-80-009, and other EPA Region 10 approved protocols. All test organisms and procedures used shall be in accordance with the protocols in EPA/600/4-90/027 and EPA/600/4-89/001. The selection of an appropriate control water for the toxicity tests shall be submitted to EPA for review and approval prior to use.

D. Receiving Water Quality Monitoring Requirements

1. Within 3 months of the effective date of this permit, the permittee shall implement a receiving water quality monitoring program which meets the following specifications:

   a. The receiving water quality monitoring shall be conducted in the Columbia River on the West side of Johnson Island.

   b. As a minimum, monitoring stations shall be established at the following locations.

      (1) Columbia River (West side of Johnson Island) immediately upstream of the TEDF discharge outfall/diffuser.

      (2) Columbia River (West side of Johnson Island) at a point approximately 71 feet downstream of the TEDF discharge outfall/diffuser.

      (3) Both the upstream and downstream monitoring stations shall be located along the approximate centerline of the discharge plume.

   c. Receiving water sampling shall be conducted at low river flow during August of each year and the sampling day each year shall be selected to coincide with a day that effluent sampling is being conducted on the discharge. The discharge shall be sampled for all of the Part I.A. parameters and effluent characteristics identified in the respective effluent monitoring requirements above, with the addition of total hardness (as $CaCO_3$).

d. River grab samples at both monitoring stations shall be collected immediately below the water surface for all of the parameters identified in Part I.A.1. and 3. above, with the addition of total hardness (as $CaCO_3$). Metal samples for cadmium, copper, lead, nickel, silver, and zinc shall be collected and analyzed for both the "dissolved" and "total recoverable" individual metals. The other metals and arsenic shall be analyzed on an individual "total recoverable" parameter basis.

e. The Columbia River flow on the West side of Johnson Island shall be measured or estimated at the time of each receiving water monitoring.

f. Receiving water and discharge sampling results, along with the Columbia River flow in the West Channel, shall be submitted the month after sampling with the monthly DMR.

E. Definitions

1. "Average monthly discharge limitation" means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

2. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

3. "Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

4. A "Grab" sample is a single sample or measurement taken at a specific time or over as short a period of time as is feasible.

5. "Maximum daily discharge limitation" means the highest allowable "daily discharge".

6. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

7. A "24-hour composite" sample shall mean a flow-proportioned mixture of not less than 8 discrete aliquots. Each aliquot shall be a grab sample of not less than 100 ml and shall be collected and stored in accordance with procedures prescribed in the most recent edition of Standard Methods for the Examination of Water and Wastewater.

8. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

## II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling. Samples taken in compliance with the monitoring requirements established under Part I shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

B. Monitoring Procedures. The mercury samples shall be analyzed using the Cold Vapor Technique (Flameless Atomic Absorption Spectrophotometer-AA) test procedure. Samples for the other metals shall be analyzed using the AA(Furnace) test procedure. All of these procedures are outlined in the EPA Methods for Chemical Analysis of Water and Wastes.

All other monitoring must be conducted according to test procedures approved under 40 CFR Part 136.

C. Reporting of Monitoring Results. Monitoring results shall be summarized each month on the Discharge Monitoring Report (DMR) form (EPA No. 3320-1). The reports shall be submitted monthly and are to be postmarked by the 10th day of the following month. Legible copies of these, and all other reports, shall be signed and certified in accordance with the requirements of Part IV.H. Signatory Requirements, and submitted to the Director, Water Division and the State agency at the following addresses:

original to: United States Environmental Protection Agency (EPA)
Region 10
1200 Sixth Avenue, WD-135
Seattle, Washington 98101

copy to: Washington Department of Ecology (Ecology)
7601 W. Clearwater
Suite 102
Kennewick, Washington 99336

copy to: Washington Department of Ecology (Ecology)
P.O. Box 47600
Olympia, Washington 98504-7600
Attention: David Jansen

D. Additional Monitoring by the Permittee. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

E. Records Contents. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurement;
2. The individual(s) who performed the sampling or measurements;
3. The date(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical technique or methods used; and
6. The results of such analyses.

F. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time. Data collected on-site, copies of Discharge Monitoring Reports, and a copy of this NPDES permit must be maintained on-site during the duration of activity at the permitted location.

G. Twenty-four Hour Notice of Noncompliance Reporting.

1. The following occurrences of noncompliance shall be reported by telephone within 24 hours from the time the permittee becomes aware of the circumstances:

   a. Any noncompliance which may endanger health or the environment;

   b. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part III.G., Bypass of Treatment Facilities.);

   c. Any upset which exceeds any effluent limitation in the permit (See Part III.H., Upset Conditions.);

   d. Violation of a maximum daily discharge limitation for any of the pollutants listed in the permit to be reported within 24 hours.

2. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its causes;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Water Compliance Section in Seattle, Washington, by phone, (206) 553-1256.

4. Reports shall be submitted to the addresses in Part II.C., Reporting of Monitoring results.

H. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.C. are submitted. The reports shall contain the information listed in Part II.G.2.

I. Inspection and Entry. The permittee shall allow the Director, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; or

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

J. Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit (Part I) shall be submitted no later than 10 days following each schedule date.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. Penalties for Violations of Permit Conditions.

1. Civil penalty. The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall be subject to a civil penalty, not to exceed $25,000 per day for each violation.

2. Criminal Penalties:

a. Negligent Violations. The Act provides that any person who negligently violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall be punished by a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or by both.

b. Knowing Violations. The Act provides that any person who knowingly violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall be punished by a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or by both.

c. Knowing Endangerment. The Act provides that any person who knowingly violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. A person which is an organization shall, upon conviction of violating this subparagraph, be subject to a fine of not more than $1,000,000.

d. False Statements. The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this Act or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under this Act, shall upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or by both.

Except as provided in permit conditions in Part III.G., Bypass of Treatment Facilities and Part III.H., Upset Conditions, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F. Removed Substances. Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

G. Bypass of Treatment Facilities:

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2 and 3 of this section.

2. Notice:

   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible, at least 10 days before the date of the bypass.

   b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part II.G., Twenty-four Hour Notice of Noncompliance Reporting.

3. Prohibition of bypass.

   a. Bypass is prohibited and the Director may take enforcement action against a permittee for a bypass, unless:

      (1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

      (3) The permittee submitted notices as required under paragraph 2 of this section.

b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph 3.a. of this section.

H. Upset Conditions.

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph 2 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a. An upset occurred and that the permittee can identify the cause(s) of the upset;

   b. The permitted facility was at the time being properly operated;

   c. The permittee submitted notice of the upset as required under Part II.G., Twenty-four Hour Notice of Noncompliance Reporting; and

   d. The permittee complied with any remedial measures required under Part III.D., Duty to Mitigate.

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset ha the burden of proof.

I. Toxic Pollutants. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

## IV. GENERAL REQUIREMENTS

A. Changes in Discharge of Toxic Substances. Notification shall be provided to the Director as soon as the permittee knows of, or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. One hundred micrograms per liter (100 ug/l);

   b. Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

   c. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or

   d. The level established by the Director in accordance with 40 CFR 122.44(f).

2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. Five hundred micrograms per liter (500 ug/l);

   b. One milligram per liter (1 mg/l) for antimony;

   c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or

   d. The level established by the Director in accordance with 40 CFR 122.44(f).

B. Planned Changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source as determined in 40 CFR 122.29(b); or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under Part IV.A.1.

C. Anticipated Noncompliance. The permittee shall also give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

D. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

E. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit.

F. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

G. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

H. Signatory Requirements. All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed as follows:
   a. For a corporation: by a responsible corporate officer.

   b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.

   c. For a municipality, state, federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described above and submitted to the Director.

b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility of activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

3. Changes to the authorization. If an authorization under paragraph IV.H.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph IV.H.2. must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

I. Availability of Reports. Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Director. As required by the Act, permit applications, permits and effluent data shall not be considered confidential.

J. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from ny responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

K. Property Rights. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

L. Severability. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstance, and the remainder of this permit, shall not be affected thereby.

M. Transfers. This permit may be automatically transferred to a new permittee if:

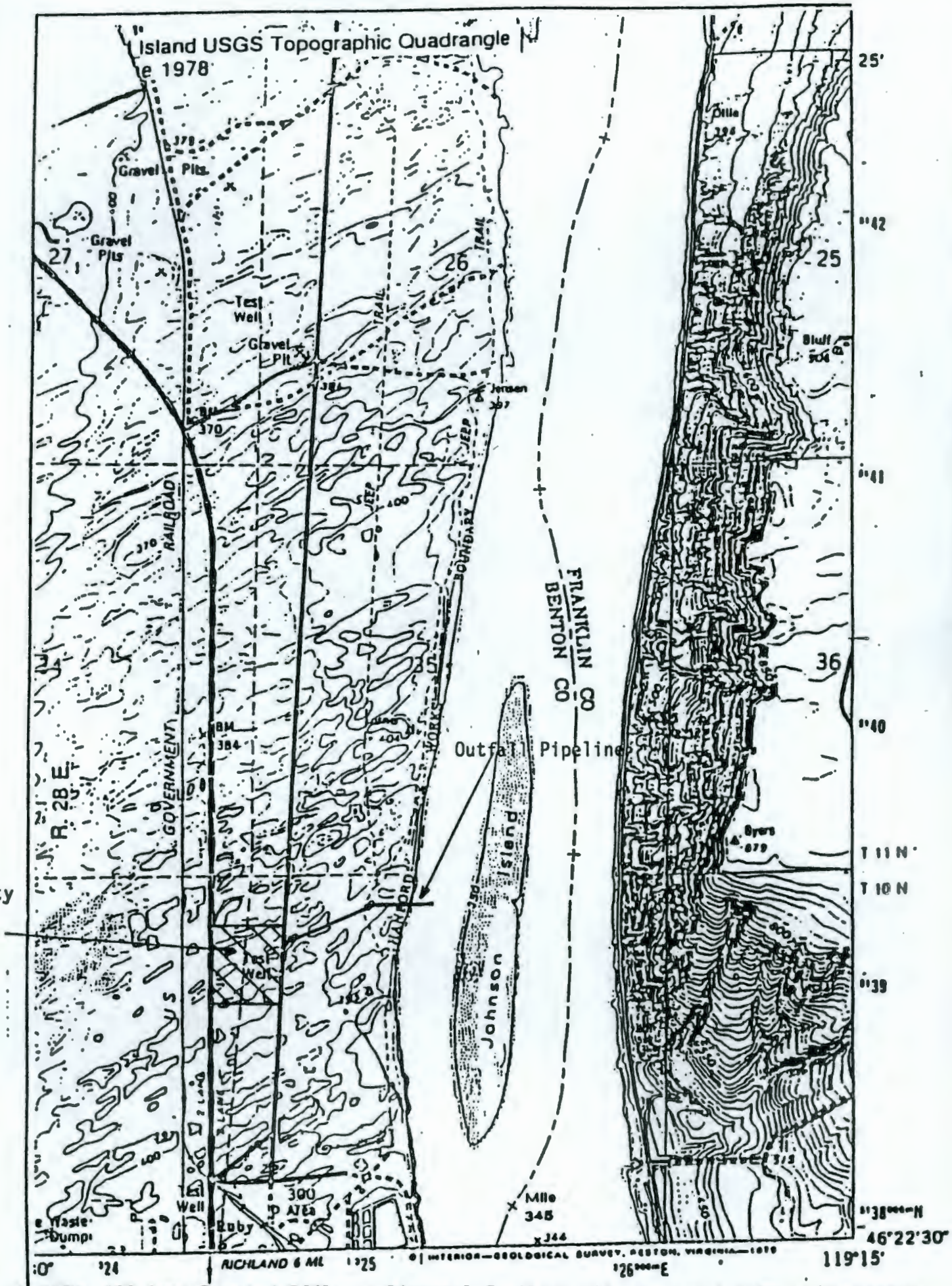
   1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

N. State Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Act.

# APPENDIX E - UP-DATED MAP SHOWING LOCATION OF TREATED EFFLUENT DISPOSAL FACILITY AND OUTFALL




L-045H, 300 Area Treated Effluent Disposal Facility Site Area and Outfall Pipleline