



Department of Energy

Richland Field Office

P.O. Box 550

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92-LWB-042

JAN 12 1993

Mr. Paul T. Day
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Mr. David B. Jansen, P.E.
Hanford Project Manager
State of Washington
Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600



Dear Messrs. Day and Jansen:

EIGHTY PERCENT DESIGN REPORT FOR THE 200 AREA TREATED EFFLUENT DISPOSAL FACILITY COLLECTION SYSTEM

This letter transmits the Eighty Percent Design Report for the 200 Area Treated Effluent Disposal Facility Collection System (Project W-049H). This report is submitted to the U.S. Environmental Protection Agency and the State of Washington Department of Ecology (Ecology) to complete a commitment in the Project W-049H design-construction schedule. Copies of the design drawings were provided to Mr. Moses Jaraysi, Ecology, on December 4, 1992, and Mr. Gary Anderson, Ecology, on December 8, 1992. A copy of the design drawings were hand delivered to Mr. Doug Sherwood, EPA, on December 17, 1992, thus completing the package.

In February 1992, the U.S. Department of Energy, Richland Field Office (RL) submitted a design-construction schedule to comply with Milestone M-17-08A of the Hanford Federal Facility Agreement and Consent Order and a corresponding milestone in Section 4, Table 2 of Ecology Consent Order No. DE 91NM-177. The design-construction schedule identified dates for submittal of various design reports on the collection and disposal systems for Project W-049H. Submittal of the Eighty Percent Design Report completes the January 1993 commitment identified in the design-construction schedule for Project W-049H.

Final comments on the Eighty Percent Design Report have been requested as soon as possible so that any comments can be resolved and incorporated in the final design documents. This is necessary in order to maintain the schedule for the start of construction.

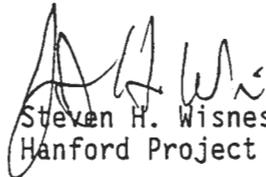
Messrs. Day and Jansen
93-LWB-042

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Should you have any questions, please contact Lance S. Mamiya of the Waste Management Division on (509) 376-1471.

Sincerely,


Steven H. Wisness
Hanford Project Manager

WMD:LSM

Enclosure

cc: G. Anderson, Ecology, w/encl
M. Jaraysi, Ecology, w/encl
D. R. Sherwood, EPA, w/encl
R. E. Lerch, WHC, w/o encl
R. W. Oldham, WHC, w/o encl
J. E. Thrasher, WHC, w/o encl
B. A. Austin, WHC w/o encl
M. Selby, Ecology, w/o encl



DESIGN REPORT

200 AREA TREATED EFFLUENT DISPOSAL FACILITY COLLECTION SYSTEM - 80% DESIGN REPORT

PROJECT W-049H

INTRODUCTION

The U.S. Department of Energy, Richland Field Office (RL) is in the process of obtaining Washington Administrative Code (WAC), WAC 173-216 waste water discharge permits for liquid effluents on the Hanford site. Pursuant to a schedule developed by the State of Washington Department of Ecology, the U.S. Environmental Protection Agency, Region X, and the RL agreed to submit an 80% design report in support of WAC 173-216 permitting activities for the 200 Area Treated Effluent Disposal Facility (TEDF), Project W-049H.

A portion of the Hanford Site is divided into the 200-West and 200-East Areas which are separated by approximately 5 miles. Project W-049H will provide a system to safely collect, convey, and discharge treated liquid effluent streams from various process facilities in the 200-West and 200-East areas.

INVESTIGATION AND RESEARCH PERFORMED TO OPTIMIZE THE DESIGN

Hanford site historical data was researched to identify areas having the highest potential of contamination. The collection system has been routed and located by use of the historical data researched and by investigating actual field conditions for both interferences and contaminated soil. KEH and WHC worked together in performing a two phase (surface and subsurface) soil characterization investigation. Based on the results of the above investigations the optimum proposed design location was determined for the collection system.

Phase one soil characterization activities included a surface investigation of the proposed pipeline routes in the 200 Areas and 600 Area. The route corridors were first surveyed and staked. These corridors were then surveyed with handheld detection instruments to determine the extent of possible surface contamination. The phase one soil characterization revealed no

surface contamination along the proposed pipeline routes or within the pump station areas.

The Phase Two soil characterization activities consisted of subsurface investigations at locations within the piping and pump station corridor where suspected underground contamination might exist. There were 72 - 6 foot deep bore holes drilled along the collection system pipe routes, and a 25 foot deep bore hole drilled at each pump station site. No subsurface contamination was encountered during this phase of the investigation along the proposed pipeline route or at the pump station sites.

As a final investigation the proposed pipe routes and pump station locations were scanned using ground penetrating radar in order to identify all buried obstacles in these areas capable of being detected with this survey method. The design reflects invert elevations for the obstacles identified by the scanning effort, and all additional information obtained from existing as-built drawings.

DESIGN DEVELOPMENT

As the design progressed beyond the 30% level, several minor changes were incorporated that are described below:

200W AREA COLLECTION SYSTEM: The proposed location for the T-plant tie in was moved to a point closer to T-plant. The current location for the end point of line "A" is at the southeast quadrant of the intersection of 23rd Street and Bridgeport Avenue. Line "A" is a gravity sewer that will carry the T-plant effluent along Bridgeport Avenue and tie into line "B" which picks up the effluent from the future 284-W BAT.

The gravity line from the 284-W was designated Line "F" in the 30% Design Report. That line has been re-designated as Line "B" in the final design. The LCU building for the PFP facility was relocated to a point on Line "C" and reconfigured to house the LCU as well as the existing monitoring equipment that currently services the PFP effluent line. A new fiberglass metering manhole was also added to Line "C" from PFP to facilitate flow monitoring on that line. Instrumentation of that Manhole will be done by PFP.

The 30% design report indicated that the pumps for the 200-West pump station would be 85 hp variable speed turbine pumps. During the definitive design process it was determined that a more desirable solution would be to use two pumps; a 20 HP pump for normal anticipated flows and a 60 hp pump for high flows. The 20 HP pump would provide discharges from the pump station of about 400 gpm and the 60 HP pump would provide flows of about 1000 gpm. These pumps are of the submersible type normally used in sewage service. The pump station is partitioned into two compartments of equal capacity with redundant pumping capability.

CROSS COUNTRY TRANSFER LINE: The cross country transfer line rises from the 200-West area, crosses the ridge between 200-West and 200-East approximately 100 feet above the 200-West pump station, then descends about 170 feet as it crosses the 200-East area to the point where it ties into the disposal system outfall sewer. The 30% design for this line included pressure sewer from the 200-West pump station to the ridge top in the 600 area and gravity sewer for that portion of the transfer line running from the high point down through the 200-East area. This would require line sizes ranging from 10 inch to as much as 24 inch. Due to the highly variable nature of the terrain, it was decided to treat the whole transfer line as a pressurized system. This allowed the use of 10 inch line throughout and required no more pump energy than if the system were combined pressure and gravity sewers using open channel design for the gravity portion. By treating the complete transfer line as a pressure or closed system, much greater flexibility for future operations exists. Because of the variable nature of the flow into the system, liberal use of air relief valves and vacuum valves was utilized. This allows good ventilation in the system during reduced flow when the system must drain by gravity and open channel flow conditions dominate. The cross country transfer line and pressure line "F" from pump station No. 2 near B-plant (Line "H" on 30% design report) are to be built to water system standards to insure system integrity.

200E COLLECTION SYSTEM: At the request of WHC, the HWVP tie in point has been moved from N40555, W54700 to a point near the 221-BF pump facility. HWVP will now share discharge line "E" from 221-BF (formerly line "J" in the 30% design report).

Line "F" from pump station No. 2 (formerly line "H" on the 30% design report) has been downsized to a 4" pressure line.

Line "G" from the future 200-East laundry facility (formerly line "K" on the 30% design report) has been moved to the west side of Baltimore Avenue. A major change was made in the routing of the transfer line at W50000. At this position the line changes direction, running northeast, picking up the diagonal portion of 8th Street, then continuing northeast to about W47700 where the line turns and runs east toward Canton Avenue. This routing eliminated several problems with the original routing through the tank farm area.

The line that served Purex was originally designated line I on the 30% design. This line has been re-designated as line H and has been moved to Canton Avenue. This eliminates potential problems with the W-105 encased line.

WSDOE 30% COMMENT RESOLUTION

WSDOE returned four comments from their review of the 30% design report. A brief review of these comments and our resolution follows:

1. Some flow values for existing piping are not shown at this time on the P&ID drawings. In some cases we did not have this information because the design flows given to KEH was for combined streams.
2. The laundry facility for 200-East has still not been formally removed from the project and a drawing sheet for the required line is included in the design package to maintain the capability to reactivate the B-503 project if required.
3. WS DOE was concerned about the four inch lines shown on the 30% design report. These lines were actually force mains and not gravity lines. All lines less than 8 inches diameter on the 80% design are force mains.
4. Pipe grades and invert elevations are shown on all lines.

CONSTRUCTION PLANNING

This project has been divided into two design packages, the collection system and the disposal system. The division of the two systems is made at the W-105 berm, east of the berm is the disposal system and west of the berm is the collection system. The design of the disposal system piping was not scheduled to be completed until July 1993. To facilitate pipeline construction of both the collection and disposal systems, the disposal piping design was accelerated and finished at the same time as the collection system piping. This allows both piping systems to be reviewed together and to be incorporated into a single construction bid package.

In an effort to expedite construction of the collection system (and disposal system piping) two horizontal encasements shall be installed in close proximity to the W-105 fibercast pipeline. One encasement will be installed along the W-049H H-Line just east of the 242-A Evaporator (running north & south), the other, along the cross country transfer line (running east & west) under Canton Avenue and the W-105 berm. The project team shall have the encasement in place prior to the start-up of the W-105 system.

The instrumentation and telecommunications (I&T) design is included in this 80% design review package as is the outfall sewer portion of the disposal system package. However, the collection system design will be divided into separate construction packages. Package No. 1 will contain all underground pipelines, pump stations (including in-line instrumentation in the pump stations), and local control unit enclosures. Package No. 2 will contain the installation of all local control units (LCU's), operational control systems (OCS's), and associated telecommunication tie-ins. The general construction package (Package No. 1) will begin April 1993, with the specialty construction package (Package no. 2) starting January 1994. There are two reasons for dividing the design into separate packages:

- 1) The LCU's and OCS's are long lead procurement items which Project C-018H will supply to W-049H. The delivery due date for this hardware is January 1994.

- 2) The W-049H instrumentation and telecommunication design must be compatible with C-018H. These two designs are on parallel schedules which does not afford W-049H the opportunity to fine tune the instrumentation design.

BODY OF REPORT

The body of this report consists of a construction specification and 124 drawings at the 80% design stage of the collection system, as listed below:

DRAWING NO.	TITLE
H-2-140320	SH 1 DRAWING LIST AREA MAP

CIVIL

H-2-140321	200W - 200E SITE
H-2-140322	200W SITE
H-2-140323	200E SITE
H-2-140324	TRANSFER LINE STA 0+00 TO STA 29+00
H-2-140325	TRANSFER LINE STA 29+00 TO STA 59+00
H-2-140326	TRANSFER LINE STA 59+00 TO STA 89+00
H-2-140327	TRANSFER LINE STA 89+00 TO STA 123+00
H-2-140328	TRANSFER LINE STA 123+00 TO STA 157+00
H-2-140329	TRANSFER LINE STA 157+00 TO STA 191+00
H-2-140330	TRANSFER LINE STA 191+00 TO STA 225+00
H-2-140331	TRANSFER LINE STA 225+00 TO STA 260+00
H-2-140332	TRANSFER LINE STA 260+00 TO STA 285+00
H-2-140333	TRANSFER LINE STA 285+00 TO STA 307+59.12
H-2-140334	LINE A STA 0+00 TO STA 31+33.01
H-2-140335	LINE B STA 0+00 TO STA 27+70.43
H-2-140336	LINE C STA 0+00 TO STA 8+53.07
H-2-140337	LINE D STA 0+00 TO STA 33+00
H-2-140338	LINE D STA 33+00 TO STA 65+99.19
H-2-140339	LINE E STA 0+00 TO STA 11+58.20
H-2-140340	LINE F STA 0+00 TO STA 21+15.06
H-2-140341	LINE G STA 0+00 TO STA 3+64
H-2-140342	LINE H STA STA 0+00 TO STA 28+06.55
H-2-140343	MISCELLANEOUS DETAILS
H-2-140344	MISCELLANEOUS DETAILS
H-2-140345	PUMP STATION NO. 1 SITE PLAN
H-2-140346	STRL PUMP STATION NO. 1 PLAN @EL 661
H-2-140347	STRL PUMP STATION NO. 1 PLAN @EL 652
H-2-140348	STRL PUMP STATION NO. 1 PLAN @EL 627
H-2-140349	STRL PUMP STATION NO. 1 SECTIONS AND DETAILS
H-2-140350	STRL PUMP STATION NO. 1 MISCELLANEOUS DETAILS
H-2-140351	STRL PUMP STATION NO. 1 BUILDING PLAN
H-2-140352	STRL PUMP STATION NO. 1 BUILDING ELEV AND DETAILS
H-2-140353	CIVIL PUMP STATION NO. 2 SITE PLAN
H-2-140354	STRL PUMP STATION NO. 2 PLAN @EL 680.74
H-2-140355	STRL PUMP STATION NO. 2 PLAN @EL 669.24

CIVIL (cont'd)

H-2-140356	STRL PUMP STATION NO. 2 PLAN @EL 660.24
H-2-140357	STRL PUMP STATION NO. 2 SECTIONS AND DETAILS
H-2-140358	STRL PUMP STATION NO. 2 MISCELLANEOUS DETAILS
H-2-140359	STRL PUMP STATION NO. 2 BUILDING PLAN
H-2-140360	STRL PUMP STATION NO. 2 BUILDING ELEV AND DETAILS
H-2-140362	TRANSFER LINE SERVICE ROAD STA 0+00 TO STA 34+00
H-2-140363	TRANSFER LINE SERVICE ROAD STA 34+00 TO STA 68+00
H-2-140364	TRANSFER LINE SERVICE ROAD STA 68+00 TO STA 102+00
H-2-140365	TRANSFER LINE SERVICE ROAD STA 102+00 TO STA 136+00
H-2-140366	TRANSFER LINE SERVICE ROAD STA 136+00 TO STA 142+03.82
H-2-140367	DISPOSAL LINE SITE PLAN
H-2-140368	DISPOSAL LINE STA 0+00 TO STA 30+00
H-2-140369	DISPOSAL LINE STA 30+00 TO STA 60+00
H-2-140370	DISPOSAL LINE STA 60+00 TO STA 90+00
H-2-140371	DISPOSAL LINE STA 90+00 TO STA 112+61.12

PIPING & VESSELS

H-2-140375	LEGEND PIPING AND INSTRUMENTATION
H-2-140376	EFD 200 WEST
H-2-140377	EFD 200 EAST
H-2-140378 SH 1	P&ID PUMP STA #1
H-2-140378 SH 2	P&ID PUMP STA #1
H-2-140379 SH 1	P&ID PUMP STATION #2
H-2-140379 SH 2	P&ID PUMP STATION #2
H-2-140380	PIPING PLAN STA #1
H-2-140381	PIPING SECTIONS STA #1
H-2-140382	PIPING STA DETAILS STA #1
H-2-140383	PIPING PLAN STATION #2
H-2-140384	PIPING SECTIONS & DETAILS STATION #2
H-2-140385	PIPING SECTION PUMP STATION #2

INSTRUMENTATION

H-2-140378 SH 3	INSTM P&ID 200W EXST SIGNALS
H-2-140379 SH 3	INSTM P&ID 200E EXST SIGNALS
H-2-140388	INSTRUMENTATION KEY PLAN
H-2-140389 SH 1	ELEC/INSTM LIFT PLANS & ELEVATIONS PUMP STATION #1
H-2-140389 SH 2	ELEC/INSTM LIFT PLANS & ELEVATIONS PUMP STATION #2
H-2-140390 SH 1	ELEC/INSTM/CIVIL MONITORING STA DETAILS-TYPE ELF STREAM GEN
H-2-140390 SH 2	ELEC/INSTM MONITORING STA DETAILS-PFP EFL STREAM
H-2-140392 SH 2	ELEC/INSTM/INSTRL DETAILS & CABLE LIST LVL XMTR/SW MTG PUMP STA 1&2
H-2-140392 SH 3	ELEC/INSTM/INSTRL DETAILS & CABLE LIST RELAY ENCL-PUMP STA 1&2
H-2-140392 SH 4	ELEC/INSTM INSTRL DETAILS & CABLE LIST-PUMP STATIONS 1&2
H-2-140393 SH 1	ELEC/INSTM INTCON DIAGRAMS PUMP STATION #1
H-2-140393 SH 2	ELEC/INSTM INTCON DIAGRAMS PUMP STATION #2
H-2-140393 SH 3	ELEC/INSTM BLOCK DIAGRAM TEOF B-PLANT INTERFACE
H-2-140394 SH 1	INSTM SEQUENTIAL LOGIC DIAGRAM LEGEND AND ALARM TABLES
H-2-140394 SH 2	INSTM SEQUENTIAL LOGIC DIAGRAM PUMP STA #1 CONTROL
H-2-140394 SH 3	INSTM SEQUENTIAL LOGIC DIAGRAM LIFT STA #1 CONTROL
H-2-140394 SH 4	INSTM SEQUENTIAL LOGIC DIAGRAM LIST STA #1 CONTROL
H-2-140394 SH 5	INSTM SEQUENTIAL LOGIC DIAGRAM LIST STA #2 CONTROL

INSTRUMENTATION (cont'd)

H-2-140394 SH 6 INSTM SEQUENTIAL LOGIC DIAGRAM PUMP STA #2 CONTROL
H-2-140395 ELEC/INSTM PLAN, WIRING DIAGRAMS & MTG DET TEDF/PUREX INTFC
H-2-140396 ELEC/INSTM WIRING DIAGRAMS & MTG DET TEDF/PFP INTFC
H-2-140397 SH 1 ELEC/INSTM ELEMENTARY & CONN DIAGRAMS-PUMP STATION 1
H-2-140397 SH 2 ELEC/INSTM ELEMENTARY & CONN DIAGRAMS-PUMP STATION 2
H-2-140397 SH 3 ELEC/INSTM ELEMENTARY & CONN DIAGRAMS PUMP STATION 1
H-2-140397 SH 4 ELEC/INSTM ELEMENTARY & CONN DIAGRAMS PUMP STATION 2

ELECTRICAL

H-2-150094 SH 1 ELECTRICAL PUMP STATION 1 SITE PLAN, ONE LINE
H-2-150094 SH 2 ELECTRICAL PUMP STATION 1 POWER AND LIGHTING
H-2-150094 SH 3 ELECTRICAL PUMP STATION 1 POWER AND LIGHTING
H-2-150095 SH 1 ELECTRICAL 13.8KV OVERHEAD DIST PLAN/PROFILE PUMP STA 1
H-2-150095 SH 2 ELECTRICAL 13.8KV OVERHEAD DIST PLAN/PROFILE PUMP STA 1
H-2-150095 SH 3 ELECTRICAL 13.8KV OVERHEAD DIST TAKEOFF DET PUMP STA 1
H-2-150095 SH 4 ELECTRICAL 13.8KV OVERHEAD DIST TAKEOFF DET PUMP STA 1
H-2-150095 SH 5 ELECTRICAL 13.8KV OVERHEAD DIST TANGENT POLE DET PUMP STA 1
H-2-150095 SH 6 ELECTRICAL 13.8KV OVERHEAD DIST XFMR BANK PUMP STA 1
H-2-150095 SH 7 ELECTRICAL 13.8KV OVERHEAD DIST DOWN GUY DET PUMP STA 1
H-2-150096 SH 1 ELECTRICAL PUMP STATION 2 SITE PLAN ONE LINE
H-2-150096 SH 2 ELECTRICAL PUMP STATION 2 POWER AND LIGHTING
H-2-150096 SH 3 ELECTRICAL PUMP STATION 2 POWER AND LIGHTING
H-2-150097 SH 1 ELECTRICAL 13.8KV OVERHEAD DIST PLAN/PROFILE PUMP STA 2
H-2-150097 SH 2 ELECTRICAL 13.8KV OVERHEAD DIST TAKEOFF DET PUMP STA 2
H-2-150097 SH 3 ELECTRICAL 13.8KV OVERHEAD DIST XFMR BANK PUMP STA 2
H-2-150097 SH 4 ELECTRICAL 13.8KV OVERHEAD DIST DOWN GUY DET PUMP STA 2
H-2-150098 SH 1 ELECTRICAL LCU POWER SUPPLY PLAN & ONE LINE DIAGRAM
H-2-150099 SH 1 ELECTRICAL LCU POWER SUPPLY PLAN & ONE LINE DIAGRAM
H-2-150100 SH 1 ELECTRICAL LCU POWER SUPPLY XFMR BANK

HVACH-2-815107 HVAC PLANS & DETAILS

DRAWING PACKAGE NO. 2

H-2-140320 SH 2 DRAWING LIST AREA MAP
H-2-140391 ELEC/INSTM INSTALLATION DETAILS TYP EFL CAB-EFL STREAM GEN
H-2-140392 SH 1 ELEC/INSTM INSTALLATION DETAILS TYPE LCU CAB-PUMP STA 1 & 2
H-2-140398 SH 1 ELEC/INSTM ELEMENTARY & CONN DIAGRAMS-PUMP STATION 1
H-2-140398 SH 2 ELEC/INSTM ELEMENTARY & CONN DIAGRAMS-PUMP STATION 2
H-2-140398 SH 3 ELEC/INSTM ELEMENTARY & CONN DIAGRAMS-PUMP STATION 1
H-2-140398 SH 4 ELEC/INSTM ELEMENTARY & CONN DIAGRAMS-PUMP STATION 2

H-2-140399 SH 1 ELEC/INSTM INTCON DIAGRAMS-PUMP STATION 1
H-2-140399 SH 2 ELEC/INSTM INTCON DIAGRAMS-PUMP STATION 2
H-2-140399 SH 3 ELEC/INSTM INTCONNECTION DIAGRAMS PUREX

ELECTRICAL

H-2-815101 SH 1 ELECTRICAL TELECOMMUNICATIONS
H-2-815101 SH 2 ELECTRICAL TELECOMMUNICATIONS
H-2-815102 SH 1 ELECTRICAL TELECOMMUNICATIONS
H-2-815102 SH 2 ELECTRICAL TELECOMMUNICATIONS
H-2-815102 SH 3 ELECTRICAL TELECOMMUNICATIONS
H-2-815103 ELECTRICAL TELECOMMUNICATIONS EFT TRMTMT FACIL DETAILS

W-049H-C1 REV 0 CONSTRUCTION SPECIFICATION

CORRESPONDENCE DISTRIBUTION COVERSHEET

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