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Supplement Analysis

Supplement Analysis for the Proposed Upgrades to the Tank Farm Ventilation, Instrumentation, and Electrical Systems under Project W-314 in Support of Tank Farm Restoration and Safe Operations

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LIST OF TERMS

CDR	Conceptual Design Report
CFR	Code of Federal Regulations
DCRT	double-contained receiver tank
DOE	U.S. Department of Energy
DST	double-shell tank
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
HEPA	high-efficiency particulate air
LCF	latent cancer fatalities
LLMW	low-level mixed waste
LLW	low-level waste
MCC	motor control center
MEI	maximally exposed individual
MPS	master pump shutdown
NEPA	National Environmental Policy Act
PLC	programmable logic controller
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SST	single-shell tank
TWRS	Tank Waste Remediation System
WAC	Washington Administrative Code

SUPPLEMENT ANALYSIS OF PROJECT W-314

1.0 INTRODUCTION

The U. S. Department of Energy (DOE) and the Washington State Department of Ecology (Ecology) released the Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement, DOE/EIS-0189, (TWRS EIS) in August 1996 (DOE 1996b). The TWRS EIS Record of Decision (ROD) was signed on February 20, 1997 (62 FR 8693). The TWRS EIS analyzed the potential environmental consequences related to the management and disposal of radioactive, hazardous, and mixed waste from TWRS. The TWRS EIS developed representative alternatives to bound the full range of potential impacts that could occur.

The mission of the TWRS program is to store, treat, and immobilize highly radioactive tank waste in an environmentally sound, safe, and cost-effective manner. Within this program, Project W-314, Tank Farm Restoration and Safe Operations, has been established to provide upgrades in the areas of instrumentation and control, tank ventilation, waste transfer, and electrical distribution for existing tank farm facilities.

Requirements for tank farm infrastructure upgrades to support safe storage were being developed under Project W-314 at the same time that the TWRS EIS alternative analysis was being performed. Project W-314 provides essential tank farm infrastructure upgrades to support continued safe storage of existing tank wastes until the wastes can be retrieved and disposed of through follow-on TWRS program efforts. Section 4.0 provides a description of actions associated with Project W-314.

The TWRS EIS analyzes the environmental consequences from the entire TWRS program, including actions similar to those described for Project W-314 as a part of continued tank farm operations. The TWRS EIS preferred alternative was developed to a conceptual level of detail to assess bounding impact areas. For this Supplement Analysis, in each of the potential impact areas for Project W-314, the proposed action was evaluated and compared to the TWRS EIS evaluation of the preferred alternative (Section 5.0). Qualitative and/or quantitative comparisons are then provided in this Supplement Analysis to support a determination on the need for additional National Environmental Policy Act (NEPA) analysis. Based on this Supplement Analysis, the potential impacts for Project W-314 would be small in comparison to and are bounded by the impacts assessed for the TWRS EIS preferred alternative, and therefore no additional NEPA analysis is required (Section 7.0).

Guidance on the need to prepare a Supplemental EIS is provided in 10 Code of Federal Regulations (CFR) Part 1021.314 and 40 CFR Part 1502.9(c). When it is unclear whether or not a supplement to an EIS is required, DOE shall prepare a Supplement Analysis. The Supplement Analysis shall identify whether the agency is proposing substantial changes in the proposed action that are relevant to environmental concerns or if there are significant new circumstances or

information relevant to environmental concerns and bearing on the proposed action or its impacts. This Supplement Analysis describes and evaluates proposed actions to determine whether the potential impacts are bounded by the alternative analysis performed for the TWRS EIS.

2.0 ASSESSMENT APPROACH

The Project W-314 Conceptual Design Report (CDR) (WHC 1996b) was reviewed and the project was evaluated to determine if any of the potential impacts could be substantive. For each portion of the project, the CDR information was used to compare similar activities analyzed in the TWRS EIS.

In general, the activities, technologies, and equipment described for the upgrades would be similar to those that were defined for the TWRS EIS preferred alternative selected in the ROD. For example, the waste retrieval activities addressed in the TWRS EIS would require installing new piping, ventilation, electrical, and instrumentation equipment in the tank farms.

Infrastructure upgrades are necessary to meet regulatory compliance requirements and to support waste retrieval and current tank farm operations. These same requirements would exist during the detailed design and implementation of the TWRS EIS preferred alternative.

3.0 PURPOSE AND NEED

The purpose of Project W-314 is to ensure that the tank farm infrastructure will be able to support the continued safe management of tank waste and known future requirements. The capital improvements provided by this project will increase the margin of safety for tank farms operations and promote compliance with applicable State, Federal, and local regulations. Project completion will result in reduced equipment down-time, reduced health and safety risks to occupational workers, reduced operating and maintenance costs, and minimization of exposure to the environment from radioactive and/or hazardous material releases.

4.0 PROJECT DESCRIPTION

Project W-314 focuses on capital improvements necessary for continued safe operation of existing double-shell tank (DST) facilities, double-contained receiver tanks (DCRTs), and selected single-shell tank (SST) systems. Design requirements for the project are defined in WHC-SD-W314-DRD-001, Rev. 1 (WHC 1996c). Portions of Project W-314 evaluated in this report included replacing instrumentation and ventilation systems and upgrading electrical power systems. Most of the activities associated with the proposed action involve replacing existing systems. The operational impacts of these systems, once installed or upgraded, have been analyzed in the TWRS EIS as a component of continued tank farm operations.

Ventilation System Upgrades

The Project W-314 ventilation system upgrades would include replacing existing primary exhaust ventilation systems for DST farms 241-AN, -AP, and -AW. Other ventilation upgrades

would include replacing the annulus ventilation system for DST farm 241-SY and replacing the exhaust ventilation systems support DCRTs 244-A and 244-S. Removal and disposal of existing ventilation equipment in these facilities would also take place.

The existing 241-AN Tank Farm primary ventilation system would be replaced to provide a new high-capacity exhaust filter train, new fans, a new stack, stack monitoring and control systems, and provisions for possible future hazardous effluent mitigation equipment. Enhanced features of the new ventilation system include the following.

- New dual exhaust trains consisting of isolation valves, electric heaters, demisters with flush capability, two stages of high-efficiency particulate air (HEPA) filters, test sections, adsorber housing, automatic control dampers, and exhaust fans.
- The new dual exhaust trains would be shielded by concrete walls and a removable metal roof. The new structure would not create an enclosure requiring ventilation.
- Provisions for future equipment such as carbon adsorbers.
- New exhaust stacks to enhance maximum dispersion of effluents including stack monitoring and sampling equipment required for regulatory compliance.
- Unfiltered leakage paths into the tanks would be sealed to reduce the potential for fugitive emissions and to improve the pressure control of the primary tank air inlet stations.
- A seal pot (i.e., a liquid reservoir in a condensate drain line used to prevent fugitive air emissions from the tank) would be located in a new drain pit adjacent to the primary exhaust train. Condensate from the primary ventilation line and drains between the various exhaust filter housing sections would be routed to the seal pot. Condensate overflow from the seal pot would gravity drain back to an appropriate tank.

The primary ventilation system upgrades for the 241-AP and 241-AW Tank Farms would be the same as those described for the 241-AN Tank Farm.

The existing annulus ventilation system for the 241-SY Tank Farm would be replaced with an improved system. The new annulus exhaust system would have a higher capacity and would be divided into two units allowing for backup capability during filter change out or a fan failure. The new equipment would consist of isolation valves, control valves, prefilters, HEPA filters, test sections, and fans with radial vane inlet dampers. A new stack and monitoring system would be provided. The new annulus supply system would provide redundant air intake stations for each individual tank. Each station would incorporate an electric heater for frost protection, a prefilter, a HEPA filter, and an isolation valve.

Ventilation system upgrades for the 244-A DCRT and the 244-S DCRT would include replacing the existing ventilation system equipment with new equipment located above grade. Outside air supply to the annulus would be provided through a system consisting of an intake plenum, an electric heater, a prefilter, a testable HEPA filter, and isolation valves. The equipment would be connected to existing ventilation piping. Exhaust equipment in the filter pits would be removed and a jumper installed to connect the new above grade equipment with existing ventilation piping. The new dual exhaust system would provide 100 percent backup and would consist of

motorized isolation valves, an electric heater, testable HEPA filters, housings for future carbon adsorbers, variable speed exhaust fans, and a stack with provisions for adding flow and record sampling devices. The new dual exhaust trains would be protected by concrete shielding walls and a removable metal roof.

Tank Farm Instrumentation and Control Systems Upgrades

The existing tank monitoring systems would be replaced and/or upgraded for measuring waste level, temperature, and vapor pressure. Primary ventilation instrumentation for all DSTs would be upgraded. Existing leak detection systems would be upgraded or replaced. The master pump shutdown (MPS) system would be upgraded.

Upgrades to the tank farm instrumentation and control systems for 241-AN, -AP, -AW, and -SY Tank Farms include replacing or installing the following types of equipment:

- Primary tank liquid level gages and liquid level high alarm probes
- Waste temperature measurement devices
- Vapor space pressure transmitters
- Waste transfer system valve positioning indicators
- Waste transfer and raw water flow meters
- Leak detection sensors that would detect the presence of liquid or radiation in the tank annulus, annulus exhaust air, leak detection pits, leak detection sumps, process pits, clean out boxes, and transfer line encasement piping
- The MPS system would be a subset of the tank farm local area network and would control the shutdown of waste transfer pumps in the event a leak or alarm condition was detected
- Ventilation system instrumentation hardware would be installed to monitor operational parameters and provide alarm outputs for selected operating parameters and ventilation system exhaust heaters would be installed.

Upgrades to the tank farm instrumentation and control systems would include installing a tank farm local area network that would gather specified tank farm data, display the data locally and at specified remote locations, interface with other projects and systems, and replace the existing MPS hardware. The system would be made up of multiple programmable logic controllers (PLCs) located in existing structures at the 241-A, -AN, -AP, -AW, -AY, -AZ, and -SY Tank Farms; the 242-A Evaporator; the 272-AW Building; the 244-A and 244-S DCRTs; and the Project W-211 instrumentation/control/electrical building at the 241-SY Tank Farm. Signal inputs and outputs would be made directly to the PLC or through input/output boxes distributed throughout the monitored local area.

Upgrades to the tank farm instrumentation and control systems for the 244-A and 244-S DCRTs would include replacing or installing the following equipment:

- Primary tank liquid level, temperature, and vapor space pressure measurement devices
- Leak detection sensors in the tank annulus, exhaust air, process pits, and waste transfer line systems

- The MPS system would be a subset of the tank farm local area network and would control the shutdown of waste transfer pumps in the event a leak or alarm condition was detected
- Ventilation system instrumentation hardware would be installed to monitor operational parameters and provide alarm outputs for selected operating parameters.

Electrical System Upgrades

Existing power for the primary ventilation systems would be modified and upgraded to provide backup power capabilities for primary ventilation systems in Tank Farms 241-AP, -AN, and -AW. Existing electrical equipment would be upgraded and/or replaced to support the DST and DCRT primary/annulus ventilation systems and the electrical power systems for SSTs to support interim stabilization operations.

Electrical service upgrades for the 241-AN, -AP, -AW, and -SX Tank Farms would include the following actions.

- A 480 volt alternating current (Vac), 3-phase, 3-wire, 60 hertz (Hz) power system would be provided to the primary ventilation system from the existing motor control center (MCC). A new circuit breaker would be installed to feed two enclosed combination magnetic starters and mini-power centers for the primary ventilation system. A mini-power center will be installed to supply 120 Vac power to a new instrumentation and control panel.
- The existing cathodic protection system would be modified to accommodate and protect new underground ventilation and process piping against galvanic corrosion. New anodes, test stations, anode distribution and junction boxes, permanent reference electrodes, and cables would be provided as required.

Electrical service upgrades in the 241-AX Tank Farm would include the following.

- The existing MCC would be replaced with a new MCC to accommodate the existing electrical load.
- A new mini-power center would be provided to supply 120 Vac power to the new instrumentation equipment and control panel. This mini-power center would be fed from the new MCC.
- An existing impressed current cathodic protection system would be modified to protect new process underground piping against galvanic corrosion.

Electrical system upgrades for the AZ Tank Farm would include the following.

- Replacing the existing MCC with a new MCC located inside the 241-AZ-801A Building.
- A new mini-power center would be provided to supply 120 Vac power to the instrumentation equipment and control panel. This mini-power center would be fed from the new MCC.
- The existing MCC and heater controllers would be replaced with new units.
- An existing impressed current cathodic protection would be modified to protect new process underground piping against galvanic corrosion.

Electrical service upgrades for the SST Farms would include the following.

- New pad-mounted transformers rated at 75 kilovoltampeare (kVA) (225 kVA for 241-C Tank Farm) would be provided to support a controlled, clean, and stable SST farm operations. The new transformers would be connected from the existing 13.8 kV overhead line and would feed new service distribution panelboards.
- A 480 Vac, 3-phase, 3-wire, 60 Hz power system would be provided from the new panel board to refeed existing tank farm lighting and for maintenance and miscellaneous needs as required. A new mini-power center would be provided to supply 120/240 Vac power for miscellaneous instrumentation systems.

Electrical service for the 244-A DCRT would include the following.

- A new panelboard would be provided to replace the existing power distribution center located inside the 244-A instrument enclosure. This new panelboard would be fed from the existing MCC1 located at 242-A Building and provide power to the new ventilation system, the existing load of the power distribution center, and the existing 244-A agitator, sump, and transfer pumps.
- A new mini-power center would be provided to supply 120 Vac power to the instrumentation and control panel. This mini-power center would be fed from the new panelboard.
- The existing feeder of the power distribution center would be disconnected and removed from the existing 100AF/50AT circuit breaker (Compartment D5) of the MCC-2 located in 244-AR Building.
- The existing feeders of the 244-A agitator, sump, and transfer pumps would be disconnected and removed from the existing MCC-1 located in the 242-A Building. New feeders from the new panelboard would be installed.

Electrical Service Upgrades for the 244-S DCRT would include the following.

- A new pad-mounted transformer rated at 75 kVA would be provided to replace the existing single-phase, pole-mounted transformers that are connected to the existing overhead line. This new transformer would be connected to the existing overhead 13.8 kV line and would feed the existing service distribution.
- New electrical service to the new DCRT ventilation system from the existing service distribution panelboard would be provided. A new mini-power center would be provided to supply 120 Vac power for the instrumentation and control panel. The mini-power center would be fed from an existing service distribution panelboard.

Electrical service upgrades for cathodic protection would involve modifying the existing rectifiers in Tank Farms 241-A, -AX, -AY, and -AZ to accommodate and protect the new process piping lines against galvanic corrosion. New anodes, test stations, anode distribution and junction boxes, permanent reference electrodes, and cables would be provided as required.

Waste Transfer System Upgrades

Scope changes in the proposed upgrades to the existing waste transfer system between Revision 0 (WHC 1996a) and Revision 1 (WHC 1996b) of the Project W-314 CDR included the addition of a new buried waste transfer line approximately 40 meters (130 feet) long from pump pit 241-AZ-01A to pump pit 241-AZ-02A. This new waste transfer line would be located within the fence line of the 241-AZ Tank Farm.

Demolition

Demolition of existing systems and equipment would take place under the proposed action. Existing seal pots and all underground electrical systems, process piping, and ventilation piping that would be replaced by Project W-314 would be placed in a safe configuration and abandoned in place unless otherwise noted. Primary tank instrumentation and control equipment would be removed and disposed of onsite. All instrumentation associated with the primary exhaust ventilation train would be removed with the ventilation train, including field-located aboveground equipment, conduit, and tubing. All associated relays, indicators, alarms, and recorders would be removed. The existing primary ventilation equipment would be removed and disposed of after the new ventilation equipment is in operation. Existing jumpers, cover blocks, and debris from the upgraded valve pits would be removed and disposed of onsite.

5.0 POTENTIAL ENVIRONMENTAL IMPACTS

The data used to support the Supplement Analysis were taken from the Project W-314 CDR (WHC 1996b). Sections 5.1 through 5.15 provide descriptions of the potential impacts of Project W-314 along with comparisons to the TWRS EIS.

The TWRS EIS preferred alternative included evaluating environmental impacts associated with continued operation of the tank farms, constructing and operating facilities to retrieve and treat tank waste, disposing of treated waste, and decontaminating and decommissioning facilities. Continued or current tank farm operations evaluated in the TWRS EIS included routine activities associated with operating and maintaining the tank farms. Technical data to support impact analysis for continued operations were developed based on current tank farm operations data and future activities based on the Multi-Year Program Plan (WHC 1995a). Additionally, the waste retrieval and transfer portion of TWRS EIS preferred alternative was based on conceptual level engineering data for waste retrieval and transfer from SSTs and DSTs to waste treatment facilities (WHC 1995c). The Project W-314 waste transfer system upgrades were addressed in the TWRS EIS, Volume One, Section 3.4.1.

5.1 RESOURCE REQUIREMENTS

The resource requirements for the proposed upgrades are expected to be minor compared to the resources identified in the TWRS EIS for the preferred alternative. The types of materials required for the upgrades would be similar to those identified for waste retrieval and transfer. The capital costs for the Project W-314 upgrades are approximately 4 percent ($233 million) of the capital cost estimated for the preferred alternative in the TWRS EIS. The capital costs include costs for design, materials, and construction. This comparison provides a perspective on

the relative size of the proposed upgrades and the resources required as compared to the TWRS EIS preferred alternative. Resource requirements for the TWRS EIS preferred alternative are described in Volume Two, Section B.11, Table B.11.0.2 of the TWRS EIS.

5.2 SOIL DISTURBANCES

No disturbances of previously non-disturbed soil would occur from implementing the instrumentation, new transfer line, ventilation, and electrical upgrades portion of Project W-314. Construction activities related to installing new ventilation, instrumentation, transfer lines, and electrical equipment would take place in currently disturbed tank farm areas.

5.3 AIR QUALITY

Small amounts of particulate and vehicular emissions would occur during the construction phases of the project. Fugitive dust generated during construction or related activities would be minimized in accordance with Washington Administrative Code (WAC) 173-400. The installation of new ventilation systems would involve construction activities associated with building concrete shielding walls, removing the existing ventilation equipment, constructing new drain pits, and installing the new equipment. The installation of the new transfer line would involve construction activities associated with building new buried waste transfer lines. Heavy construction equipment that was evaluated for the TWRS EIS preferred alternative included loaders, scrapers, and backhoes that would not be used extensively within the tank farms for Project W-314. The emissions from installing the electrical, instrumentation, and control equipment would be minor. The following comparison of annualized capital cost by Project W-314 to the annualized capital cost of the TWRS EIS preferred alternative can be made. The annualized capital cost for Project W-314 is $26 million/year from 1998 to 2007. The annualized capital cost for the TWRS EIS preferred alternative is $1,120 million/year in the 2006 to 2008 timeframe. The construction activities and emission rates for Project W-314 are then estimated as approximately 2 percent of the construction activities for the TWRS EIS preferred alternative.

During operations, the new ventilation systems would provide the Best Available Radionuclide Control Technology to minimize the release of radionuclides in accordance with WAC 246-247. The new ventilation systems may include new inlet and exhaust systems. New inlet ventilation systems would consist of air intake hoods, prefilters, HEPA filters, filter test sections, connecting piping from the inlet station to the primary tank, balancing valves, and pressure vacuum relief devices. The new exhaust ventilation systems would consist of dual exhaust trains with isolation valves that would provide operations with the capability to switch between trains for maintenance purposes. Dual exhaust trains would also provide a redundant backup in the event of an equipment failure. Each exhaust train would consist of electric heaters, demisters with flush capability, two stages of HEPA filters, test sections, adsorber housing, automatic control dampers, and exhaust fans. The adsorber housing would provide for the future addition of a carbon adsorber in the exhaust train if required for removal of hazardous effluents.

Operating emissions from the 241-AN, -AP, -AW, -SY Tank Farms and the 244-A and 244-S DCRTs would be the same or lower than the routine emissions estimates analyzed in the TWRS

EIS. This is based on having HEPA filters on both the existing ventilation systems and the replacement ventilation systems.

The No Action alternative evaluated in the TWRS EIS includes impacts from current routine tank farm emissions from all tank farm sources. Impacts from current routine tank farm emissions are shown in the TWRS EIS, Volume One, Section 5.3, Table 5.3.1. Current tank farm emissions represent the following percentage of State standards:

- Carbon monoxide emissions are 0.00016 percent.
- Radionuclide emissions are 0.0064 percent.
- Organic emissions are all less than 0.04 percent.

The replacement exhaust filter trains would be expected to reduce the potential for ventilation system accidents by replacing existing systems having questionable reliability with new equipment (see Section 5.12). One of the accident scenarios identified in the TWRS EIS (Volume One, Section 5.12) for the preferred alternative was a HEPA filter blowout. The postulation for this accident was that a ventilation heater failure could occur due to an electrical fault resulting in humid air plugging the HEPA filter followed by a filter blowout. The potential for this accident to occur would be reduced following the proposed action because the following deficiencies that have been identified with the existing ventilation systems (WHC 1997) would be corrected:

- Filter housing corrosion and/or seal leakage has been observed (241-AW and -AN).
- Electric heaters have questionable reliability (241-AN).
- Pressure controls are inadequate (241-AN and -AP).
- Ventilation systems are not capable of removing potential excess heat and moisture during waste retrieval.
- System flow capacities are inadequate for potential flammable gas release and 241-AW system is marginal to support current 242-A Evaporator operation.
- Exhaust fans and heaters have unreliable electrical circuits (241-AW only).
- The 241-SY annulus ventilation system was installed in 1976 and is approaching the end of its useful life. The system is difficult to maintain and there is corrosion evident in the system's plenums.
- The 244-A and 244-S DCRTs exhaust fans and electric heaters have questionable reliability and inadequate pressure controls because there are no air inlet filters, control valves, or pressure relief.

5.4 WATER QUALITY

Dust control measures used during construction or related activities would have no affect on surface water or groundwater.

The proposed upgrades would not result in the generation of radioactive effluent that would leave the tank farms. Condensate from the new ventilation systems would be collected and returned to the tanks using double-contained Resource Conservation and Recovery Act (RCRA)-compliant drain lines.

There would be no liquid effluent discharged to surface waters, and thus there would be no direct impacts to any surface waters.

5.5 ECOLOGICAL AND BIOLOGICAL IMPACTS

The proposed upgrades would not result in disturbances of any previously undisturbed shrub-steppe habitat in the 200 Areas, and therefore no ecological and biological impacts are anticipated. Analysis of ecological and biological impacts for the TWRS preferred alternative can be found in the TWRS EIS, Volume One, Section 5.4.

5.6 CULTURAL RESOURCES

The proposed upgrades would not result in disturbances of any previously undisturbed land in the 200 Areas, and therefore no cultural resource impacts are anticipated. Analysis of cultural impacts for the TWRS preferred alternative can be found in the TWRS EIS, Volume One, Section 5.5.

5.7 SOCIOECONOMIC IMPACTS

The socioeconomic impacts for the proposed upgrades would be offset by Hanford Site downsizing. New employment that would typically occur during construction activities associated with Project W-314 would tend to translate into continued employment for approximately 60 workers associated with Project W-314 from the year 1998 to 2007. The socioeconomic impacts for the proposed upgrades are bounded by the analysis performed for the TWRS EIS because of the timing of the activities and the relative size of the proposed upgrades. The activities associated with the proposed upgrades would occur before the peak employment of 6,700 workers at year 2010 associated with the TWRS EIS preferred alternative. The workforce associated with Project W-314 is approximately 1 percent of the peak employment for the TWRS EIS preferred alternative. Analysis of the socioeconomic impacts for the TWRS preferred alternative are discussed in the TWRS EIS, Volume One, Section 5.6.

5.8 LAND USE

The proposed upgrades to the ventilation, instrumentation, electrical systems, and waste transfer piping would not result in any new land uses. All activities would be within the current tank farm boundaries in areas designated for waste management and disposal (DOE 1996a).

5.9 VISUAL RESOURCES

The replacement ventilation stacks that would be constructed during upgrades to the ventilation systems would be similar in size to the existing stacks, which are approximately 4.5 m (15 ft) high. Existing ventilation stacks that were replaced would be removed and disposed of following installation of the new stacks. Visual impacts would be minor and similar to the impacts that currently exist.

5.10 NOISE

Noise associated with routine construction would be expected to occur during construction activities. However, because the construction activities associated with the upgrades are

substantially smaller than construction activities analyzed in the TWRS EIS, the potential noise impacts would be expected to be smaller than the impacts assessed in the TWRS EIS for the preferred alternative selected in the ROD, Volume One, Section 5.9. The noise impacts evaluated in the TWRS EIS were based on cumulative noise levels from simultaneous operation of heavy construction equipment in the same location. This would not be expected to occur during Project W-314 construction activities.

5.11 ANTICIPATED HEALTH EFFECTS

The radiological and chemical emissions from installing the instrumentation, ventilation, and electrical upgrades for the proposed action would be the same as or lower than the routine emissions during continued operations for the TWRS EIS preferred alternative. The direct radiation exposure that workers would be expected to receive is based on estimated dose rates from values previously measured for similar activities at the Hanford Site multiplied by the number of person-years, in a radiation zone or in close proximity of a radiation zone, that are required to support the activity.

The collective direct radiation exposure that the worker population would receive from Project W-314 activities would be minor in comparison to those addressed in the TWRS EIS for the preferred alternative selected in the ROD. The person-years that would be required to support radiation zone construction activities associated with Project W-314 would represent approximately 2 percent (530 person-years) of the 19,000 person-years required to support continued operations radiological zone activities for the TWRS EIS preferred alternative.

An exposure rate of 14 mrem/year was assumed for radiological workers during construction and continued operations from the TWRS EIS, Volume Three, Appendix D, Section D.2.2.3. This is the historical average dose for Hanford Site tank farm workers that includes both inhalation and direct radiation exposure.

Routine risk from radiological exposure is expressed in terms of latent cancer fatalities (LCFs). To estimate the number of LCFs that would result from exposure to low dose rates of ionizing radiation, a dose-to-risk conversion factor of 0.0004 LCFs per person-rem was used to convert the calculated dose to a value of risk. This dose-to-risk conversion factor is recommended for radiological workers by the DOE Office of NEPA Oversight (DOE 1993).

The anticipated health risk to the involved radiological workers (tank farm workers) from radiological exposure during construction activities is calculated as follows:

(2% · 19,000 person-yrs) · (14 mrem/yr) · (1rem/1000 mrem) · (0.0004 LCF/person-rem) = 0.0021 LCFs.

The anticipated exposure to the noninvolved workers and the general public from continued operations after the improvements have been made would not exceed, and would potentially be less than, the exposures calculated in the TWRS EIS for the preferred alternative. The doses to

the noninvolved workers and the general public from all tank farms were calculated to be 0.00158 person-rem and 0.08 person-rem, respectively, in the TWRS EIS.

To estimate the number of LCFs that would result from exposure to low dose rates of ionizing radiation, dose-to-risk conversion factors of 0.0004 and 0.00005 LCFs per person-rem were used to convert the calculated doses to a value of risk for the noninvolved workers and general public, respectively. These dose-to-risk conversion factors are recommended for noninvolved workers and the general public by the DOE Office of NEPA Oversight (DOE 1993).

The anticipated health risk to the noninvolved workers that would be associated with radiological exposure during continued operations for the TWRS EIS preferred alternative is calculated as follows:

$$0.00158 \text{ person-rem} \cdot 0.0004 \text{ LCF/ person-rem} = 0.00000063 \text{ LCFs.}$$

The anticipated health risk to the general public that would be associated with radiological exposure during continued operations for the TWRS EIS preferred alternative is calculated as follows:

$$0.08 \text{ person-rem} \cdot 0.0004 \text{ LCF/ person-rem} = 0.00004 \text{ LCFs.}$$

The number of LCFs estimated for noninvolved workers and general public would not be affected by Project W-314. There would be no anticipated exposure from construction to the noninvolved workers or the general public.

5.12 ACCIDENTS

A spectrum of potential accidents associated with continued operations and tank waste retrieval operations were identified and listed in the TWRS EIS, Volume Four, Appendix E, Section E.1.1.1, Table E.1.1.1. Accidents identified in the TWRS EIS included ventilation, waste transfer, and electrical equipment failures. Improvements resulting from Project W-314 will enhance the safety of activities associated with continued operations and tank waste retrieval.

The dominant potential accident associated with continued waste storage operations for the TWRS EIS preferred alternative was a hydrogen deflagration in a waste storage tank with a 0.233 probability of occurrence (based on annual frequency and duration). Radiological exposures and corresponding LCF risks associated with this scenario were calculated in the TWRS EIS, Volume Four, Appendix E, Section E.11.2.3.2. The results are summarized as follows:

- All workers received a lethal dose of 7,310 rem.
- Maximally exposed individual (MEI) noninvolved worker received a lethal dose of 1,760 rem.
- Noninvolved workers = (24,700 person-rem) · (0.223) · (0.0004 LCF/rem) = 2.2 LCFs.

- MEI general public = (4.26 rem) · (0.223) · (0.0005 LCF/rem) = 0.00047 LCFs.
- General public = (3,720 person rem) · (0.223) · (0.0005 LCF/rem) = 0.41 LCFs.

The dominant potential accident associated with tank waste transfer operations was a spray release from a mispositioned jumper with a 0.303 probability of occurrence. Radiological exposures and corresponding LCF risks associated with this scenario were calculated in the TWRS EIS, Volume Four, Appendix E, Section E.11.2.3.1. The results are summarized as follows:

- All workers received a lethal dose of 1,330 rem.
- The MEI noninvolved worker received a lethal dose of 435 rem.
- Noninvolved workers = (16,400 person-rem) · (0.303) · (0.0004 LCF/rem) = 2.0 LCFs.
- MEI general public = (1.91 rem) · (0.303) · (0.0005 LCF/rem) = 0.00029 LCFs.
- General public = (4,010 person rem) · (0.303) · (0.0005 LCF/rem) = 0.61 LCFs.

The dominant potential accident associated with tank waste retrieval operations was a loss of filtration. It was postulated that a ventilation heater failure could occur due to an electrical fault resulting in humid air plugging the HEPA filter followed by filter blowout. The probability of occurrence was estimated to be 0.00027. Radiological exposures and corresponding LCF risks associated with this scenario were calculated in the TWRS EIS, Volume Four, Appendix E, Section E.11.2.3.3. The results are summarized as follows:

- All workers received a lethal dose of 3,260 rem.
- MEI noninvolved worker = (21.4 rem) · (0.00027) · (0.0008 LCF/rem) = 0.0000047 LCFs.
- Noninvolved workers = (916 person-rem) · (0.00027) · (0.0004 LCF/rem) = 0.0001 LCFs.
- MEI general public = (0.0922 rem) · (0.00027) · (0.0005 LCF/rem) = 0.000000013 LCFs.
- General public = (138 person rem) · (0.00027) · (0.0005 LCF/rem) = 0.000019 LCFs.

It is anticipated that upgrading the tank farm ventilation, instrumentation, and electrical systems would not introduce new significant hazards not already addressed in the TWRS EIS for the preferred alternative and would reduce the probability of occurrence of the accidents summarized earlier that were analyzed in the TWRS EIS. A reduced probability of occurrence would be expected because aging equipment would be replaced with new equipment built to the latest industry standards.

The number of occupational injuries, illnesses, and fatalities resulting from construction and operation activities are calculated based on DOE and DOE contractor incidence rates multiplied by the number of person-years required for an activity. The person-years that would be required to support construction activities for Project W-314 would be minor compared to the person-years required for the TWRS EIS preferred alternative. The person-years that would be required to support construction activities associated with Project W-314 would represent approximately 1 percent of the 48,200 person-years estimated for construction of the TWRS EIS preferred alternative. Operational injuries, illnesses, and fatalities from routine tank farm operations were

evaluated in the TWRS EIS and would be no higher and potentially would be less, following the proposed action.

The injury/illness incidence rate assumed in the TWRS EIS for construction activities was 9.75 incidences/100 person-years. The fatality incidence rate assumed in the TWRS EIS for construction activities was 0.0032 fatalities/100 person-years. The injuries/illnesses and fatalities associated with construction accidents are calculated as follows:

Injury/illness = (4.82E+04 person-yr) · (1%) · 9.75 incidences/100 person-yr) = 47.
Fatalities = (4.82E+04 person-yr) · (1%) · 0.0032 fatalities/100 person-yr) = 0.015.

The injury/illness incidence rate assumed in the TWRS EIS for operation activities was 2.20 incidences/100 person-years. The fatality incidence rate assumed in the TWRS EIS for operations activities was 0.0032 fatalities/100 person-years. The injuries/illnesses and fatalities associated with operation accidents are calculated as follows:

Injury/illness = (8.37E+04 person-yr) · (1%) · 2.20 incidences/100 person-yr) = 18.4.
Fatalities = (8.37E+04 person-yr) · (1%) · 0.0032 fatalities/100 person-yr) = 0.027.

5.13 LONG-TERM ENVIRONMENTAL IMPACTS

Current tank farm operations as well as the TWRS EIS preferred alternative would operate low-level waste (LLW) and low-level mixed waste (LLMW) requiring onsite disposal. The proposed upgrades also would include disposal of LLW and LLMW from demolition of contaminated equipment in the tank farms. Current solid waste projections for Project W-314 include approximately 2,600 m^3 (92,000 ft^3) of LLW and LLMW. This is approximately 1 percent of the 30-year LLW volume forecast projected for the TWRS program including implementation of the TWRS EIS preferred alternative (WHC 1995b).

5.14 CUMULATIVE IMPACTS

The TWRS EIS described potential cumulative impacts (Volume One, Section 5.13) associated with implementing the preferred alternative and other actions at the Hanford Site. Because the potential impacts of Project W-314 are bounded by the impacts of the TWRS EIS preferred alternative, cumulative impacts would not be greater than those evaluated in the TWRS EIS.

5.15 ENVIRONMENTAL JUSTICE

For each of the areas of technical analysis presented in the TWRS EIS, a review of impacts to human health and the natural environment was conducted to determine if any potentially disproportionate and adverse impacts on minority populations or low-income populations would occur. Disproportionate impacts were defined as impacts that would affect minority and Native American populations or low-income populations at levels appreciably greater than their effects on nonminority populations or non-low-income populations. A summary of the environmental justice impact analysis is provided in the TWRS EIS, Volume One, Table 5.19.1.

Of the potential disproportionate and adverse impacts identified in the TWRS EIS, only socioeconomic impacts would be affected by Project W-314 and these would be minor (less than 1 percent) compared to the socioeconomic impacts for the TWRS EIS preferred alternative.

6.0 PERMITS, LICENSES, AND APPROVALS

The proposed upgrades would potentially require the same types of permits, licenses, and approvals identified in the TWRS EIS, Section 6.2. These include:

- Modifications to the Hanford Site Dangerous Waste Permit (WAC 173-303)
- Modification to the Sitewide Air Operating Permit (WAC 173-400, 173-460, 246-247, 173-480, and 40 CFR Part 61)
- Notice of Construction (WAC 173-400, 173-460, 246-247, 40 CFR Part 61).

7.0 DETERMINATION

Upgrades to the tank farms ventilation, electrical, and instrumentation systems, and revisions to the planned upgrades to the waste transfer system were reviewed to assess if 1) the upgrades would make substantial changes in the proposed actions for the TWRS EIS preferred alternative that are relevant to environmental concerns; or 2) there are significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts. The potential impacts for the upgrades would be very small in comparison to and are bounded by the TWRS EIS preferred alternative selected in the ROD (62 FR 8693).

Potential impacts from Project W-314 were discussed in Section 5.0 of this Supplement Analysis. The Project W-314 impacts compared to the TWRS EIS preferred alterative range from no impacts for land use and cultural resources to approximately 4 percent for resource requirements. Areas of potential environmental concerns included air emissions, anticipated health effects, and accidents. In each case the comparison of the impacts associated with implementing Project W-314 and the TWRS EIS preferred alternative demonstrated that the impacts of Project W-314 were not substantially changed from the impacts analyzed in the TWRS EIS.

Upgrades to the tank farm ventilation, instrumentation, and electrical systems, and planned upgrades to the waste transfer system proposed under Project W-314 do not pose potential environmental impacts that are substantially changed from those analyzed in the TWRS EIS, nor are there any significant new information or circumstances relevant to environmental concerns associated with the upgrades. Therefore, no additional NEPA analysis is required under 10 CFR Part 1021 or 40 CFR Parts 1500-1508.

Signed in Richland, Washington, this 6th day of ~~May~~ June 1997, for the U.S. Department of Energy.

John D. Wagoner,
Manager
Richland Operations Office

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