

Exhibit C.14-5 – ICP Utility Systems

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Mod 312
C.14-5INTEC Utility Systems

System	System Description
Cathodic Protection System [Systems Design Description (SDD)-33 was last updated 5/10/2005]	INTEC has a passive cathodic protection network through most areas of the plant. The system reduces the corrosion of High Level Waste containment systems, Nuclear Fuel Storage vaults, and Plant Utility systems consisting of direct-buried metallic pipes and containment structures located at INTEC. The cathodic protection system includes 16 rectifiers protecting the tanks, vaults, and underground piping, with 160 test bond stations, 80 junction boxes, approximately 720 anodes, and over 800 test points.
Compressed Gas Systems (SDD-63 was last updated 3/18/2008)	. The compressed air distribution system (CADS) originates in CPP-606 and includes approximately 10,400 lineal feet of underground distribution piping. The INTEC CADS produces dry, oil-free compressed air that is supplied to the various INTEC buildings and structures. Compressed air operates process equipment instrumentation and maintenance tools. Compressed air is used for instruments, airlifts, jets, spargers, maintenance tools, and most heating, ventilation, and air conditioning systems. There are currently five propane tank locations at INTEC. The majority are used primarily for heating smaller storage areas, shops, etc. during winter months. The others are used for boiler start up, lab gas, and propane powered machinery. Each facility has its own locally installed tank. Total usage of propane approximates 25,000 gallons per year.
Electrical System (SDD-2 was last updated 2/16/05)	Redundant 13.8 kV service to INTEC is provided from the double ended INEEL 138 kV Substation 2 located just west of the perimeter fence to two 13.8 kV substations located within the fence, one each in the northwest section and the east central sections of the plant. 13.8 kV service is further distributed to seven 480/277 V double-ended load centers and three 2.4 kV double-ended substations and continues to various power centers located throughout the plant. Three 2.4 kV generators provide stand-by power to the distribution system for key and essential operations. Generally, lighting is provided at 120V, and 480/277V is provided for equipment power in most of the facilities at INTEC. There are approximately 18,500 lineal feet of high voltage (above 600V) duct bank associated with the INTEC system. The low voltage (less than 600V) distribution system consist of more than 26,000 lineal feet of underground duct bank and 2,700 lineal feet of direct burial distribution cable.
Fire Water System (SDD-50 updated 1/11/2011)	The firewater system consists of two 623,926 gallon on-grade water storage tanks. These tanks were built in 1990 and are fed from two diesel-driven raw water wells located adjacent to the tanks. The distribution system includes approximately 10.8 km (6.7 mi) of cast iron, steel, bond strand and pvc piping varying between 4” and 12” in diameter and serving all but a few of the facilities at INTEC. This system also provides firewater to the INEEL CERCLA Disposal Facility located southwest of INTEC.
Potable Water System (SDD-61 was last updated 2/7/2005)	The potable water system consists of approximately 13,000 active lineal feet of distribution piping. Two submersible potable water deep well pumps draw raw water from the aquifer beneath INTEC and transported it to CPP-1769 where it is treated by an automated tablet calcium hypo chlorite system. After treatment the water is pumped to two 10,000-gallon storage tanks. Three potable water booster pumps feed INTEC’s potable water distribution system. An estimated 6,000,000 gallons of potable water is produced annually. The potable water system also supplies the INL CERCLA Disposal Facility located southwest of INTEC and the Integrated Waste Treatment Unit located on the east side of INTEC.
Raw Water System [SDD-67 (INTEC Process Water)]	Two 14-inch vertical turbine raw water well pumps, approximately 500 feet deep, are located about 200 feet inside the north perimeter and supply water to two approximately 800,000 gallon firewater storage tanks (not part of raw water system). The overflow from these tanks fill 630,000 and 580,000 gallon raw water storage vessels. The total annual raw water consumption is approximately 200,000,000 gallons. Three electric and one diesel raw water service pumps transfer the water from the storage vessels to CPP-606 for processing into treated (softened) and demineralized water. The raw water system includes approximately 8,000 active lineal feet of distribution lines. The system also supplies the INL CERCLA Disposal Facility located southwest of INTEC.

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RCRA Liquid Waste System	The RCRA-permitted INTEC Liquid Waste Management System (ILWMS) consists of the Process Equipment Waste Evaporator (PEWE) system, the Liquid Effluent Treatment and Disposal (LET&D) system, the Evaporator Tank System (ETS), and the Integrated Waste Treatment Unit (IWTU). These systems store and treat mixed radioactive hazardous waste; each system consists of a variety of tanks and a network of pipes. All tanks and piping are secondarily contained.
Sanitary Waste System (SDD-51 was last updated 3/20/2008)	The sanitary sewer system is based upon a gravity fed network of 4 to 12 inch diameter pipelines totaling approximately 9,000 active lineal feet. Due to the size of the system, seven lift stations are necessary to transport the effluent to the sewage treatment plant. There are also two active septic fields serving smaller support facilities located at various areas within INTEC. Additionally, the INEEL CERCLA Disposal Facility (ICDF), located outside the southwest corner of INTEC, pumps sanitary waste into the INTEC sanitary system manhole located on the west side of INTEC and the Integrated Waste Treatment Unit sends sanitary waste to the CPP-733 sewage lift station on the east side of INTEC. The sanitary treatment plant was built in 1982 and has a capacity of 80,000 gallons per day through its four treatment lagoons. The sewage from these lagoons is sent to a sewage lift station which pumps into the INTEC Service Waste system. It is then pumped to two infiltration ponds located approximately 2 miles southwest of INTEC and is regulated by a Wastewater Reuse Permit with the Idaho DEQ.
Service Waste System (SDD-129 was updated 2/4/2010)	The service waste system consists of a network of approximately 5,600 lineal feet of piping within INTEC with mains ranging from 8 to 20 inches in diameter. The laterals from the various facilities generally consist of 1-1/2 to 4 inch diameter lines and are made from carbon steel, stainless steel and Bondstrand. The laterals and smaller mains are gravity fed. Service waste is collected in a series of manholes and fed to CPP-797 where it is pumped via a redundant pumping system rated at 2080 gallons per minute. From CPP-797 the service waste is pumped through 14 and 16 inch diameter high-density polyethylene (HDPE) mains along the west side of INTEC where it is then routed via two 16 inch diameter HDPE lines to percolation ponds located approximately 11,000 feet west of the INTEC fence.
Steam and Condensate System (SDD-40 was last updated 3/29/2008)	The central boiler facility produces steam for both heating and process operation. Located in CPP-606, the facility contains four 24,000 lb/hr oil-fired fire-tube boilers that were installed in 2000. A significant amount of the utility equipment has also been replaced or upgraded in the past decade. The boilers are fed from three 400 gpm packed bed water softeners located in CPP-1647. Steam is distributed through a utility tunnel which exits the east end of the facility and serves the INTEC facilities to the south and east--including the Integrated Waste Treatment Unit. In total, approximately 8,000 lineal feet of active steam and condensate piping serve the various INTEC facilities. The office facilities to the north of CPP-606 (with the exception of CPP-1647) are heated with electricity and are not provided with steam.
Surface Drainage	Storm water within the confines of INTEC is controlled by a series of culverts, drainage ditches, and grading of the larger surface areas. This system contains and directs the flow of surface water into an evaporation pond located to the east of the plant. In total, there are approximately 42,000 lineal feet of trench and culvert in this system.
Telecommunication and Alarm Systems	CPP-1687 houses telephone room switching equipment, including electronic switchgear for copper and fiber optic cables used for the INL communications backbone. The INEEL site wide fiber optic telecommunications loop terminates in CPP-1687 dial room. The system at the INL provides critical communications links between and among operating areas at the INL and provides connections to external networks. The installed switchgear will manage and direct data, video, and communications for INL telephone, voice, data, security, fire alarm, and other communication systems. Communications and alarm lines are distributed in an underground conduit network with a minimal amount being distributed overhead.
Treated and Demineralized Water Systems	<p>The treated water system is comprised of a chemical addition system (anti-foulant) which is added to a stream of raw water feeding the plant treated water lines (with exception of the CPP-606 boilers), an inactive reverse osmosis system, and a water softener system which strictly supplies the CPP-606 boilers. . The treated water system includes approximately 2,400 feet of active distribution lines.</p> <p>Demineralized water is used at INTEC for various plant process solutions, decontamination solutions, and waste tank closed loop cooling. The system consists of two portable skid-mounted units that can each produce approximately 32 GPM of demineralized water. One unit is normally in use while the other is on standby. The processed demineralized water is stored in a 5,000 gallon stainless steel tank for distribution by two 100 GPM pumps through approximately 1,600 ft of active distribution lines.</p>

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RWMC Utility Systems

System	System Description
Electrical Power Distribution System (SDD-304; updated 5/10/11)	The RWMC power distribution system consists of 12.5-kV and 480-volt distribution lines in underground duct banks, a sectionalizer, overhead lines, and load and power control centers. Power for RWMC is provided through a dedicated 138-kV main feeder line, which originates at the Scoville Substation in CFA and is stepped down to 12.5kV. The power is transformed to lower voltages as needed for distribution to the various RWMC areas and facilities. Electrical power to AMWTP facilities is independent of the rest of the RWMC area but can be connected together as an alternate power supply. . In addition a 138-kV power line from the Scoville Substation supplies power to the AMWTP (Advanced Mixed Waste Treatment Project), WMF-676. The 138-kV terminates to switchyard, where the power is stepped down as necessary for the AMWTP.
Fire Water Distribution System (SDD-150 updated 6/30/2011)	A deep well pump at the WMF-603 Pumphouse supplies the RWMC fire water system. The water is stored in a 250,000-gallon tank (WMF-727). The fire water system is isolated from the potable and industrial water systems. In the event of a pressure drop, two 2,000-gpm pumps, one powered by electricity and the other by a diesel engine, provide the required flow to the RWMC sprinkler system. A third 1,500-gpm pump, powered by electricity, located in WMF- 603, provides protection with a redundant water source from the 250,000-gallon potable water tank (WMF-709). In the event of a power outage and diesel pump failure, the pump in WMF-603 is powered by a standby generator. The water feeds an underground piping system of about 13,500 lineal feet that supplies water to buildings and hydrants around RWMC WMF-743 Pump House and fire water tank ties into the overall fire water system. The tank is 500,000 gallons in capacity.
Potable Water Distribution System [SDD-159 (potable water system) was updated 5/26/11 and SDD-154 (WMF-6030) was updated 5/26/2011]	A deep well pump at WMF-603 also supplies the potable water system. The water is stored in a 250,000-gallon tank (WMF-709). Two 250-gpm pumps in WMF-603 maintain water pressure at 125psi for the potable and industrial water demands of RWMC. The water feeds into an underground piping system approximately 10,125 lineal feet in length, which supplies potable and industrial water throughout the RWMC area.
Propane Distribution System (SDD-141 was updated 1/13/2009. SDD-142 for WMF-732 tank, was updated 1/13/2009)	RWMC features three permanent propane systems. A 500-gallon tank (WMF-738) and vaporizer are located in the Operations Support Area and supply a backup standby generator in WMF-603. A 12,000-gallon propane tank (WMF-732) and vaporizer are located just east of the WMF-637 Building, and supply two heating water boilers and a potable water boiler that resides in WMF-637. A 1,000-gal (LP-TK-4301) located to the north of the fire water tank FW-TK-4301 for heating the recirculating water for the fire water system. In addition to the permanent propane installations there are 12 temporary system; 22 1,000-gal tanks that supply heat to the ARP facilities and one 55-gal tank that supplies heat to the WMF-655 warehouse. In addition for information purposes, the AMWTP controls two propane tanks supporting process and heating needs. A 30,000-gallon propane tank (WMF-703), and vaporizer shed are located in the Transuranic Storage Area (TSA) near WMF-628. This system provides propane to heat WMF-610 and WMF-628 and power a backup generator for WMF-610. A 45,000-gallon propane tank (V-682-001) located to the south of WMF-676 supports process and heating needs of WMF-634 and WMF-676.
Sanitary Waste System (SDD-226 updated 6/14/2011)	The Sanitary Waste Water System is divided into three parts: the collection system, the lift/station/force main, and the lagoons. Sanitary waste water from the Administrative and Operable Unit 7-10 (Pit 9) areas are gravity fed to a lift station located in the parking lot south of the WMF-613 Office Building. The lift station and grinder pumps move the wastewater across the TSA to the lagoons located south of RWMC. The sanitary wastewater from the TSA and Operations Area is induced into the line by grinder pumps located near the source. All sanitary wastewater is discharged into the four sanitary wastewater lagoons.
Telecommunications System	The INL Telecommunications System provides voice, data, video and wireless communication services to RWMC through a combination of in-house and vendor resources and a set of core network services. Communication systems include telephone, radio, point-to-point data communications, and local and wide-area networks. Inter-RWMC telecommunication services are provided through the WMF-619 Communications Building. AMWTP telecommunication services are provided independently from RWMC and the INL Telecommunications System.