

Exhibit C.3 - Utility Systems

INTEC Utility Systems

System	System Description
Cathodic Protection System	INTEC has a passive cathodic protection network through most areas of the plant. A new cathodic upgrade project is currently under construction that will focus on the addition and upgrade of cathodic components in the higher risk areas of the facility.
Compressed Gas Systems	<p>Compressed and breathing air distribution systems supply select facilities within INTEC. The compressed air system originates in CPP-606 and includes approximately 10,400 lineal feet of distribution piping. The breathing air system originates in the same facility and includes approximately 3,000 lineal feet of distribution piping.</p> <p>INTEC also features separate oxygen and nitrogen distribution systems feeding various processing, support, and laboratory facilities. The nitrogen system includes 11,000 and 5,900 gallons vertical storage tanks and approximately 4,200 lineal feet of distribution piping. The oxygen system is comprised of 11,200 lineal feet of piping and two 11,000 gallons vertical tanks.</p> <p>There are currently eight 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.</p>
Electrical System	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 emergency 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. The exterior electrical distribution system has just undergone an extensive upgrade. Major facility service connections were also upgraded as needed. 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	The firewater system consists of two 480,000 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 23,250 lineal feet of cast iron 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	The potable water system is the largest water system with approximately 19,900 lineal feet of distribution piping. Two 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 13,171,000 gallons of potable water is produced annually. The potable water system also supplies the INEEL CERCLA Disposal Facility located southwest of INTEC.
Raw Water System	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 480,000 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 753,000,000 gallons. Three 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 14,100 lineal feet of distribution lines. The system also supplies the INEEL CERCLA Disposal Facility located southwest of INTEC.
RCRA Liquid Waste System	Approximately 11,200 lineal feet of stainless steel pipe, with secondary containment, are used for the transfer of liquid waste (usually dilute acid) to the INTEC tank farm, process equipment waste evaporator, or the CPP-601 deep tanks. These lines originate primarily in CPP-666, -603, -637, -640, -659, and CPP-684. The lines vary in size between 1-1/2" and 4", exclusive of the secondary containment.

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Sanitary Waste System	The sanitary sewer system is based upon a gravity fed network of 4 to 12 inch diameter pipelines totaling approximately 14,200 lineal feet. Due to the size of the system, five lift stations are necessary to transport the effluent to the sewage treatment plant. There are also five 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. The sanitary treatment plant was built in 1982 and has a capacity of 80,000 gallons per day through its four treatment lagoons and percolation trenches. A project is currently in design to allow the treated effluent to be discharged to the service waste system percolation ponds located west of INTEC in order to meet Waste Water Land Application Permit requirements. During the last year the sewage treatment plant produced approximately 1,620,000 gallons of effluent.
Service Waste System	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	The central boiler facility produces steam for both heating and process operation. Located in CPP-606, the facility contains four new 25,000 lb/hr oil-fired boilers that were replaced in 2001. A significant amount of the utility equipment has also been replaced or upgraded in the past decade. A project is currently being planned to replace the existing water softener system. 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. The facilities to the west are served via underground systems. In total, approximately 9,600 lineal feet of steam and condensate piping serve the various INTEC facilities. The office facilities to the north of CPP-606 are heated with electricity and are not provided with steam. CPP-606 produces approximately 147 million lbs of steam annually.
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	The INEEL site wide fiber optic telecommunications loop terminates in the CPP-602 dial room. 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 reverse osmosis system; and a water softener system fed from the reverse osmosis system, that supplies approximately 375,000,000 gallons of softened water annually. The treated water system includes approximately 5,100 feet of distribution lines.</p> <p>Demineralized water is used at INTEC for various plant process solutions, decontamination solutions, waste tank closed loop cooling, and the production of distilled water in several labs. The system consists of two portable skid-mounted units that can each produce 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 4,500 ft of distribution lines. Approximately 750,000 gallons of demineralized water is produced annually.</p>

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RWMC Utility Systems

System	System Description
Electrical Power Distribution System	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 12.5-kV main feeder line, which originates at the Scoville Substation in CFA. The power is transformed to lower voltages as needed for distribution to the various RWMC areas and facilities. Electrical power to BNFL facilities is independent of the rest of the RWMC area. In addition a 138-kV power line from the Scoville Substation supplies power to the BNFL Advanced Mixed Waste Treatment Facility (AMWTF), WMF-676. The 138-kV terminates to switchyard, where the power is stepped down as necessary for the AMWTF.
Fire Water Distribution System	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.
Potable Water Distribution System	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 150 pounds per square inch 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	<p>RWMC features three independent 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. Two 500-gallon tanks are located in the Subsurface Disposal Area supports the process needs for OCVZ Vapor Vacuum Extraction Unit A.</p> <p>In addition for information purposes, the AMWTP controls two propane tanks supporting process and heating needs. A 30,000-gallon propane tank (WMF-703), vaporizer shed, and remote filling station are located in the Transuranic Storage Area (TSA) near WMF-628. This system provides propane to heat WMF-636 and power a backup generator for WMF-636. 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.</p>
Sanitary Waste System	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 Transuranic Storage Area to the lagoons located south of RWMC. The sanitary wastewater from the Transuranic Storage Area 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 INEEL 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. BNFL Telecommunication services are provided independently from RWMC and the INEEL Telecommunications System.

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TAN Area Utility Systems

System	System Description
Compressed Gas Systems	A recently completed compressed gas tank farm provides storage and distribution of hydrogen, nitrogen, and propane to the TAN manufacturing complex. But, these systems are not provided to the CTS facilities in the ICP scope of work.
Electrical Power Distribution System	Electricity comes to the Contained Test Facility through the Technical Support Facility substation via the INEEL sitewide 138 kV three phase power loop. At the substation the supply is transformed to 13.8 kV for distribution throughout the area. The power is transformed to lower voltages as needed to meet the requirements of the various area facilities.
Water Systems (CTF/LOFT)	The Contained Test Facility (LOFT) is supplied with potable, process, and fire water from two deep wells with a 300,000 gallon storage tank for potable and fire water, and a 250,000 gallon tank providing process and fire water. Fire water systems have been disconnected.
Sewer and Process Drain Systems	Area sewer and process waste systems are drained to a three celled sewage lagoon complex, approximately 10 acres in size. These systems are not in service.
Telecommunication System	The INEEL site-wide fiber optic telecommunications loop terminates in the Technical Support Facility dial room. The Contained Test Facility communications lines are distributed in either underground conduit network, direct buried cable, overhead, or a combination thereof. Alarms (security, life safety, etc.) are also supported by the telecommunications system.
Steam and Condensate System (CTF/LOFT)	The primary source of heat at the Contained Test Facility (LOFT) is the steam and condensate system. This is an oil fired system with oil supplied from two 48,000 gallon storage tanks. However, heating has been disconnected fro CTF buildings because the fire water system has also disconnected.
Cathodic Protection	A passive cathodic protection network extends throughout the Technical Support Facility area.
Sewer, Process Drain, and Storm Water Drain Systems	Approximately 3,700 feet of sewer piping and 1,500 feet of process drain piping exist throughout the plant, ranging in size from 4 to 8 inches. Effluent transported by these systems flows to the sewage treatment plant prior to discharge. The storm water collection system discharges to settling ponds.
Steam and Condensate System (TSF)	Steam, the primary source of heat at the Technical Support Facility, is distributed via almost 11,000 feet of steam and condensate lines. The steam is produced by an oil fired boiler system which is fed from a 190,000 gallon oil storage tank. There are currently 10 Technical Support Facility buildings heated with steam, but the 150,000 + square foot TAN 607 is by far the dominant heat demand on the system. Steam is currently supplied to TAN-603, -604, -607, -628, -636, -653.
Water Systems (TSF)	Potable, process, and fire water are supplied from two deep well pumps and a single 500,000 gallon storage tank. All three are on the same distribution system, comprised of about 15,500 feet of piping, with pipe sizes ranging from 2.5 to 10 inches in diameter. Demineralized water is produced where needed by individual systems.

Exhibit C.3 - Utility Systems

TRA Utility Systems

System	System Description
Electrical Power Distribution System	Electricity comes to the TRA substation via the INEEL site wide 138 kV three phase power loop. At the substation the supply is transformed to 13.8 kV and 2.4 kV for distribution throughout the plant. The power is transformed to lower voltages as needed to meet the requirements of the various area facilities. TRA is in the process of upgrading the Engineering Test Reactor power distribution system which will take switch gear in TRA-648 out of service.
Water Systems	Potable, process, make-up, raw and fire water are supplied from three active deep well pumps. The various water systems are supported by three 500,000 gallon storage tanks, a 150,000 gallon overhead tank, and a recently constructed 1,000,000 gallon firewater storage tank. Potable water at the ETR complex is supplied only to TRA-642, the reactor building. A fire sprinkler system is active in TRA-642 and TRA-643.
Sewer, Process Drain, and Radioactive Liquid Waste Systems	These systems are connected to both ETR and MTR and will have to be cut and capped as the reactor complexes are demolished and removed.
Telecommunications and Alarms Systems	The INEEL site wide fiber optic telecommunications loop terminates in the TRA-614 dial room. Within TRA communication services are provided via an underground conduit network, direct buried cable, overhead lines, or a combination thereof. Alarms (security, life safety, paging, etc.) are also supported by the telecommunications system. The systems are active in the both ETR and MTR.
Compressed Gas Systems	Both plant air and instrument air are distributed throughout TRA from TRA-609. The piping ranges from 1 inch diameter instrument air lines to 4 inch diameter plant air lines. The system is connected to both MTR and ETR and will need to be cut and capped as the reactor complexes are demolished and removed.

Exhibit C.3 - Utility Systems

PBF Utility Systems

System	System Description
Electrical Power Distribution System	Electrical power comes to PBF from the Scoville Substation located at CFA. The 138 kV power is received at the PBF-608 substation located south of the Control Area, transformed to 13.8 kV, and distributed to the various buildings. In the PBF reactor area electricity is supplied only to PBF-620 (reactor building).
Fire Water Distribution System	Fire water sprinkler system is active in PBF-620.
Potable Water Distribution System	Potable water is supplied only to PBF-620 through the same system as the fire water. Water is supplied from tank PBF-768 located at the nearby control area.
Sewer System	Septic tank system in PBF-620.
Telecommunication System	The current system between facilities and its connection to the rest of the INEEL communication network is provided over twisted pair copper wire. The telephone, alarm and emergency notification systems are functional in PBF-620.
ARA Utility Systems	
Electrical Power Distribution System	Electrical power is supplied to the CERCLA storage units at the old ARA.