

SECTION 2.3: INFRASTRUCTURE
BACKGROUND INFORMATION & ANALYSIS

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EXECUTIVE SUMMARY

The purpose of this report is to assess and evaluate the integrity of existing infrastructure on the Umatilla Chemical Depot (UMCD). The assessment team consisted of several engineers of various disciplines to assess the site wide infrastructure at UMCD, including the Umatilla Chemical Disposal Facility (UMCDF). Considerations are made for potential re-use of infrastructure after the Army has turned the base operation to another entity. Since the UMCD was originally constructed (about 1941), there have been many modifications, mostly in the administration area. Buildings have been added, expanded and demolished. Consequently, the roads and utilities to serve the functioning structures have changed.

This report presents the broad assessment of conditions of infrastructure across the Umatilla Chemical Depot. Unfortunately, drawings, specifications and other documentation describing as-built infrastructure and current conditions is almost non-existent according to Army personnel. Conclusions reached in this report are preliminary and require more in-depth physical examinations and inspections in order to support LRA reuse planning and decision making.

The evaluation team encountered certain limitations during the building and infrastructure inspection. Internal building utilities were mostly covered by walls and the team did not remove or demolish any barriers (e.g. walls) to make observations. The team additionally did not perform any tests for asbestos, lead-based paint, potential contaminants or condition of existing materials (e.g. pavement, structural integrity, wire insulation). The team consists of professionals with many years of design and construction experience that are able to identify potential discrepancies from current acceptable standards for safety and occupancy.

The team did make infrastructure observations beyond the original scope of work in an attempt to identify possible resources that may have value for future reuse, specifically, the electrical ground circuit, the airport runway and the gravel resources. While these may or may not have value for future use, the resources should be documented and considered.

This report contains the following infrastructure elements:

- ▶ Airport runway
- ▶ Electrical Ground Connectivity
- ▶ Electrical Power Distribution
- ▶ Gravel Resources
- ▶ Potable Water
- ▶ Roadways
- ▶ Railroad
- ▶ Storm Drainage
- ▶ Sanitary Sewer
- ▶ Umatilla Chemical Demilitarization Facility Infrastructure

The following sections summarize key observations and recommendations:

- **Runway** The runway is not currently usable but could be restored for light aircraft (one or two engine) if a land reuse alternative would be strengthened by having the capability. There would be a modest cost of ~\$50k to bring the existing runway up to date. The runway was decommissioned by the FAA when the power plant was built east of UMCD. The approximate 1 mile distance to the power plant stacks and their modest height in relation to required airplane glide slope are well below normal runway approaches; therefore the basis of permanent closure could be re-evaluated. Additional buildings would be needed because there are not structures surrounding the airfield. Extending the runway length by 800 feet would make it usable for light business jets.
- **Grounding Network** There is an extensive lightning protection grounding network throughout UMCD due to previous storage of explosives. The network has not been maintained. Restoring its function to a specific area of the site would require minor welding and replacement of wiring. The grounding system was originally installed to protect structures and ordinance against lightning strikes. It is unclear if this capability would be of significant benefit to other industrial users. However, it is a unique capability that could be available if needed by a particular reuse alternative.
- **Electrical Distribution** Much of the existing electrical distribution infrastructure at the UMCD (except UMCDF area) is old and degraded or damaged by a range fire. Much of this would need to be replaced if new facilities required increased capacity. The distribution system at UMCDF is in excellent condition. It includes two redundant 12MVA, 12.5 KV – 4160 V transformers and distribution switchgear and transformers that were installed in the 1990s. Umatilla Electrical Cooperative (UEC) has entered into negotiations with the LRA and Army to provide infrastructure improvements. Expansion of electrical capacity is well within the capability of UEC. Costs of the expansion will need to be negotiated with UEC by the developer of the resources.
- **Gravel Resources** Gravel is available from the Coyote Coulee area of the site. This resource has been used previously to support construction at the site. Having gravel available locally could potentially reduce construction costs. The Land Use Report (Section 2.1) describes the complexity of mineral rights which varies depending on which parcel of land the gravel resources are located on. It is clear that the gravel pit is not currently licensed and if used, would require permitting.
- **Potable Water Supply** There is adequate potable water supply for the existing level of use. Water samples meet state and federal requirements. The UMCD has a total of 7 wells with 5 functional. There are three elevated water towers with chlorination. The existing water towers were reconditioned in the mid 1980's and are judged still in good condition, although no internal inspections were conducted. Much of the piping system is over 60 years old. If additional capacity is required the system would need to be extensively upgraded, including but not limited to new access to off-site sources of water such as might be available through the Ports of Umatilla or Morrow. The system includes an unused 1,000,000 gallon ground reservoir and two modern ground level tanks at the UMCDF.
- **Road Conditions** There is insufficient information to demonstrate existing roads were constructed to meet county road requirements. The periphery and high use roadways are two-lane roadways measuring 24' wide. Shoulders on most roadways are absent and county right of way requirements may not be met. In order to meet county requirements for transfer of the road infrastructure to the counties, the roadways will require survey work and potential upgrading. Access roads to the igloos are often gravel road ways with pull-outs and not well maintained.

Developers of the property will need to finance the cost of access roads from the main roadways to each individual location. Additional core samples and road analysis would be required to certify that high use roadways would be adequate to support increased heavy traffic.

- **Railway** The siding rail yard to the south of the site is not currently connected to the Union Pacific railway running adjacent to the south boundary of the site. This prevents rail access to the entire UMCD. The rail yard would need to meet the Union Pacific specifications before it would be allowed to tie into the system. Tying in would require a significant investment in railroad switches needed for integration into the current system. The condition of the existing yard is questionable and would require significantly more engineering analysis to determine its capability to meet the Union Pacific standards. Across UMCD there is a variety of track weights in use. The Army representative stated there are approximately 50 miles of track on the UMCD, however this was not confirmed. Some UMCD railroad ties were observed to be in poor condition and requiring replacement. The extent of these conditions requires further study.
- **Storm Drains** The storm drain system is limited primarily to the administration area. The system relies on gravity flow. The entire piped drainage system is well beyond its useful life and will need to be replaced with any reuse. There are some dry wells across the site requiring environmental assessment. These issues are addressed in Section 2.4 the Environmental Assessment.
- **Sanitary Waste Water** The Depot facility sanitary waste water system is a localized system. It consists of a combination of localized septic tanks and drain fields. An Imhoff tank system currently services the Administration area of the facility. Sewage lines are vitrified clay and rely on gravity flow. There is a planned inspection of the drain field for the Imhoff tank system to characterize the conditions. The system is capable of handling the current existing load but may not be capable of handling significant changes in capacity if needed by reuse alternatives.
- **Natural Gas** There is a 4 inch natural gas line approaching UMCD from the northeast corner of UMCD. Pressures are reduced from 800 psi to required usage pressure. The capacity of the natural gas system could meet the needs of a small town (216 million BTU/hr). The Administration area uses propane tanks but could be fed by natural gas via an extension of a gas line under the freeway from the Lamb Weston line. Costs of extension of the natural gas line are estimated to be in the range of \$100,000 per mile plus \$5,000 per building.
- **UMCDF** The UMCDF is an isolated facility within the UMCD with its own infrastructure. There is excellent documentation and information about the UMCDF infrastructure. The electrical distribution system, storm water and sanitary waste water systems are relatively new. There are interconnected building security and fire alarm systems. The fire alert system includes smoke and heat security systems in each building which transmits back to the UMCD Administration area fire house. The telecommunication capability of the UMCDF will accommodate up to 69,000 lines. The system uses fiber optics from the UMCD Communications building to the UMCDF telephone and data switches. The infrastructure is in excellent condition. Documentation for specifications, capacities and drawings of individual systems may be requested and granted through the UMCDF site security field office, which are not easily obtained.

AIRPORT/RUNWAY

Current Condition:

The remnants of a runway exist at the southeast corner of the base. The runway aligns generally in the northeast-southwest direction with the easterly 10,000 ft. clear zone crossing Interstate 82 and the westerly 10,000 ft. clear zone crossing Interstate 84. While the appearance of the runway is dismal, the actual condition is repairable without major reconstruction if the aircraft usage is to remain for light aircraft; single engine or possibly twin engine.

According to the plans, the airport and runway were constructed with the base construction around 1941. The airport was constructed with several buildings and a 3,200 ft. runway. At present, the buildings have been removed, although it is suspected certain utilities are still in the ground. Condition of the utilities is dubious and it should be anticipated any reconstruction will require installation of new utilities.

The runway was constructed by scraping the bare ground to its natural grade placement of 1-inch of crushed aggregate and a paved surface with a 1% cross slope for drainage. While the runway still exists, it has not been used for many years, primarily due to restricted base access and possibly restricted air space. The runway has significant cracking with weeds growing two to three feet tall that protrude from the cracks.

Since the runway is relatively short (by today's standards) it is assumed the runway could be used for light patrol aircraft, possibly single engine aircraft. Such aircraft does not require a structural runway or even pavement, although highly recommended. The pavement is an asset if it is restored. Restoration is not complicated. The weeds must be removed, herbicide added to the cracks, the cracks filled with a bituminous filler and possibly reseal (chip seal) the surface. The restoration would continue to accommodate light aircraft; single engine and possibly twin engine airplanes.

Documents available for review: The runway design drawings are available in the flat files in building No. 4.

Federal, state and local codes and standards: Licensing will be required through the Federal Aviation Administration for the airport to again become operational. Additionally, if the airport is to be an asset that the LRA will use to attract light personal and business aircraft, a greater review of the potential expansion capabilities will need to be conducted.

Inspection and observations (positive aspects, deficiencies and damage): As stated above the runway is in a deteriorated condition with limited cost for restoration. Availability of the runway for personal and business use could be an asset. The deficiencies and possible repairs scenario is stated in above.

Compliance to federal, state and local codes and standards: Because the past runway operation was a function of base security the past runway operation was not through the approval of the FAA. Any future reuse of the runway will require a purpose determination (e.g. a business and/or residential air park) and a thorough review of needed improvements. There does not appear to be any local code restrictions for airparks although, depending upon the use, Umatilla County may have some planning/zoning conditions.

Energy efficiency: N/A

Environmental conditions & compliance: Wildlife was observed at the runway. Proper future runway operation may require fencing that would restrict the antelope from crossing the landing area.

Renovation, expansion and feasibility: Expansion capability: The runway has limited expansion capabilities. While some lengthening of the runway may be possible, the runway is aligned between Interstate 82 and Interstate 84.

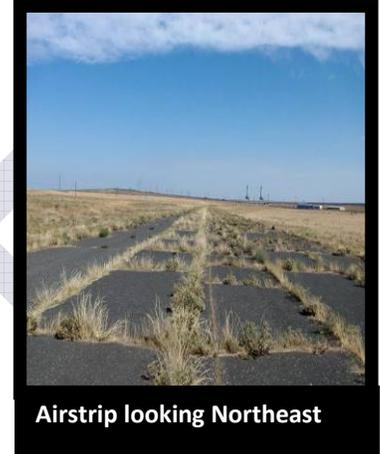
Feasibility & techniques for adaptive redevelopment: If the runway is to be an asset for redevelopment the purposes will need to be determined prior to reconstruction or expansion.

Surviving Re-use Alternatives (“Must-do” kills some alternatives): One possible reuse might be for emergency evacuation via aircraft for vehicle crashes along I-82 or I-84. Although there are several other airports in the vicinity, this particular runway (photo right) is immediately adjacent to the freeways.

Another reuse possibility might be for the development of a residential or business (or residential/business combined) airpark. For light aircraft, the UCD runway might prove to be attractive because of its proximity to locations such as: Spokane, Boise, Bend, Portland, Seattle or other metropolitan areas.

Costs of surviving re-use alternatives: Restoration is estimated to cost less than \$50,000. Reconstruction is to be determined after the future use(s) is determined.

Recommendations: Save it and use it.



Airstrip looking Northeast

ELECTRICAL GROUND SYSTEM

Current Condition:

A base wide electrical ground system exists and was used to transfer electrical storm strikes and static electricity away from explosives. The bond system is available to all buildings and terminates at the railroad tracks. The tracks are bonded together to transfer stray electrical currents from lightning strikes or static charges to the ground.

The ground system is in a deteriorated state. Ground wires have been broken and connectivity has been eliminated at various locations. Additionally, a portion of the railroad tracks (at the north east corner of the rail loop) have been removed. While the integrity of the full system has been compromised, the grounding system can still be used at various buildings. Each building needing a ground system in the future will need to have the system checked for electrical continuity.

Documents available for review: None found.

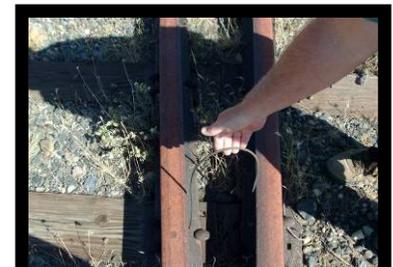
Federal, state and local codes and standards: N/A

Inspection and observations (positive aspects, deficiencies and damage): As noted above

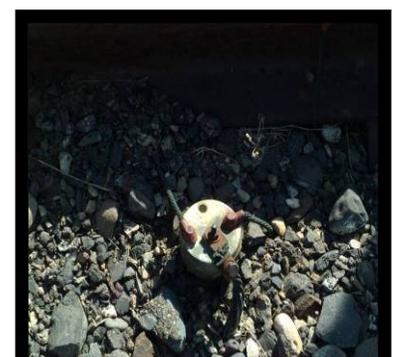
Compliance to federal, state and local codes and standards: N/A

Energy efficiency: N/A

Environmental conditions & compliance: N/A



Ground Cable Connection between Tracks



Broken Cable Connector

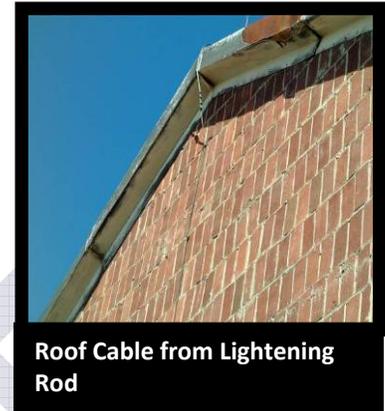
Renovation, expansion and feasibility: Expansion capability: The grounding system could be restored for each building

Feasibility & techniques for adaptive redevelopment: The future need for such an electrical ground system is questionable; however, prospective users should be made aware of this grounding system in order to generate ideas about possible reuse.

Surviving Re-use Alternatives (“Must-do” kills some alternatives): Maintain electrical ground connectivity where such reuse is appropriate.

Costs of surviving re-use alternatives: Cost of the ground system repairs is uncertain because of the potentially limited reuse. However, reconnection of the system at any building (assuming the system lacks continuity) is simply a matter of limited welding and possibly wire replacement.

Recommendations: Make future reuse business aware of the electrical ground system.



ELECTRICAL POWER DISTRIBUTION

Current Condition:

The majority of infrastructure information gathered was the result of interviews and inspections. As-built drawings are not available and site information is mostly stored in the memories and experiences of site maintenance personnel. The limited documentation found has been unofficial.

As demonstrated in the map in the following pages (Figure 1: UMCD Power Grid) the Umatilla Electric Cooperative (UEC) currently owns the electrical distribution systems surrounding the depot, as well as the newer power grid located within the boundaries of the Umatilla Chemical Disposal Facility (UMCDF). It was determined by the LRA in October of 2009 that transfer of ownership of the Army’s existing system is negotiated with the UEC.

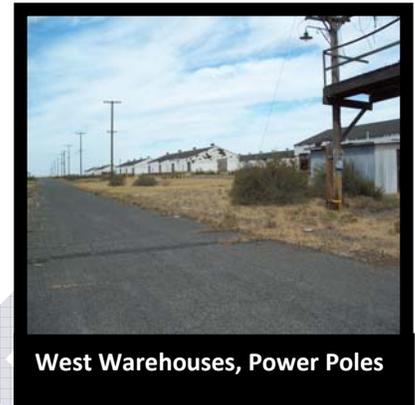
Much of the electrical distribution system to the south and west areas of the UMCD was installed in the early 1940's. Since the original installation, the system has experienced various missions and upgrades. Many of the areas are out of service and these either have no electrical service or have far exceeded the recommended 30 year life cycle.

Multiple power poles have been damaged by weathering, and in recent history, a brush fire charred many acres including the power distribution and phone lines. Distribution areas to the west warehouses that were damaged in the brush fire is being replaced or repaired by the Army. It is assumed remaining modifications and/or repair of the existing electrical distribution and transmission lines will be completed by the Umatilla Electric Co-Op (UEC) upon transfer. It is also assumed UEC will absorb the costs as part of their transfer negotiations. Per Mr. D. Hittle, the cost estimated for needed repairs is upwards of \$1.2M to re-feed. (UEC Letter, 2006)

Power feed to the north areas of UMCD is separately fed from two redundant feeds to the UMCDF substation, coming from Morrow County (north feed) and Umatilla County (east feed). The newer feeds supply power to the UMCDF Chemical Disposal Facility substation, consisting of two redundant 12.5MVA/14MVA-4160/2400V OA/FA transformers. (Photo right)



The third (south) power feed to UMCD is also fed by UEC at a distribution voltage 12.5KV, with maximum capacity of between 2-3 MVA (per UEC). This feed is currently fed and modified near the South Main Gate to function more reliably. The feed services the Administrative area, the 100 and 200 west warehouse areas (photo right) and 400 areas. The south UMCD power distribution system utilizes extremely old pole lines, and in some cases, underground replacement 12.5KV lines.



For future growth on the south side of UMCD, it is understood that the Umatilla Electric Coop will need to redesign these lines to a new configuration which may require one or more substations to supply additional loads. Additional growth on the North side of the site will also need a new conceptual review, depending on the proposed future growth or removal of loads.

Future usage of the site electrical medium voltage above ground and underground grid is dependent on future loads and their locations. Higher capacities will also depend on future demands. Additional UMCD southeast area distribution will be needed if commercial growth is added near I-82 at Westland Road. Currently there are limited loads used mostly for lighting at badging trailers at the Westland gate, but this is far short of future estimated commercial loads for this area.

It is estimated that light industrial usage must be added to the West Warehousing Areas requiring more available load and potentially a ring bus dual feed distribution system with redundant switching, which may be an extension of the existing northeast substation, depending on the potential load growth.

The following is a summary of observed site electrical infrastructure:

Service Area: South Feed to Admin Area

Components: Electrical Distribution South Feed (transformers, transmission, switchboards). This feeds the Admin. [Undergoing numbers of repair projects including replacement of fire damaged distribution and main feed re-closure modifications.]

Observations: Originally a 4160 Volt changed to a 12.5KV, done by re-insulating to go to higher voltage (piecemealed fixes). Estimated cost to re-feed is \$1.2M+; Includes badge area with single feed overhead line; tiny feeds

Age: Transformers are undersized and old

Service Area: Water well locations

Components: Emergency diesel generators

Observations: Various Well backup power (#1&2, #4 (225KW), #5 &6(300KW)

Age: Indeterminate

Service Area: North Area Switchyard

Components: Two 12.5/14 MVA OA/FA [Oa=oil cooled fa=forced air] transformers and two medium voltage Switchgear redundant buses; Medium Voltage Switchgear [Eaton Switchgear installed for the UMCD] (13.8KV to 4160 volt rated)

Observations: Switchyard is new and constructed to code

Age: Installed in the 1990's (New)

Service Area: North Area dual off-site power feeds to UMCD from Morrow and Umatilla Counties

Components: Electrical Distribution Lines North Feed

Observations: See discussions in paragraphs above (dual feed)

Age: 1990's (new)

Service Area: West 100 & 200 Warehouse Areas West Warehouses (also includes feed to Admin badge area)

Components: Power feed from south Admin area also feeds power to west warehouses

Observations: Lines are partially underground on the west warehouses area. These are upgraded as needed to keep in service.

Age: Old

Service Area: South Admin Area

Components: Communication – wire, wireless, fire alarm, security

Observations: Systems have been upgraded as needed to keep in service. The fire station and alarm systems appear to be maintained by the fire station personnel

Age: Installed in the 1990's (New)

Service Area: North UMCDF area

Components: Communication – wire, wireless, fire alarm, security

Observations: See discussions in the UMCDF section of this report

Age: Installed in the 1990's

Electrical Recommendations: Identifying future usages must be done prior to redistributing the electrical distribution systems. Given the limited South Feed's capacity very little growth can be done with the current system with additional upgrades which would probably be in the millions of dollars.

The north feed substation re-usage depends on the required removal of buildings and what loads are left. It does appear that this area could be redeveloped for light industrial.

UEC should be strongly considered to take over the electricity supply for the entire base in order to improve reliability and safety, as well as to provide a path forward for future uses of UMCD.

Note: *Additional Service Areas have been included in Appendix A*

GRAVEL RESOURCES

Current Condition:

There are natural gravel sources along the east ridge of Coyote Coulee. These gravel sources were first developed with the base construction and it is suspected that the gravel was used for road and railroad base, building foundation support and possibly as the aggregate source for concrete.

It appears that eons ago Coyote Coulee was a sizeable river as evidenced by large river gravel deposits along the eastern ridge. These deposits range from uniformly graded to variously graded deposits. The gravel is smooth water-worn stone and much of the deposit will require screening prior to surface use for roads or parking lots. There is evidence of past screening operations at older gravel pits that have not been used for many years. The larger unusable rock remains at piles in the older pits.

The pits are open (not fenced) and may be a gravel source, should the need arise. Depending upon the proposed use, the gravel may need to be crushed to promote locking qualities for a rock surface. The natural gravel deposits have been used through the base for various construction projects from original construction to present day. There is evidence throughout the base of gravel usage for roads and parking lots. The gravel may have also been used for the manufacture of concrete, foundation material and utility trench backfill.

Documents available for review: The Land Use Report (Section 2.1) describes the complexity of mineral rights which vary depending on the parcel of land the gravel resources are located on.

Federal, state and local codes and standards: Any gravel pit usage and aggregate crushing will need to comply with state mining and air quality laws.

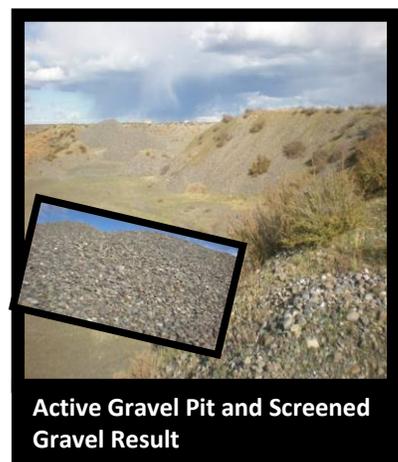
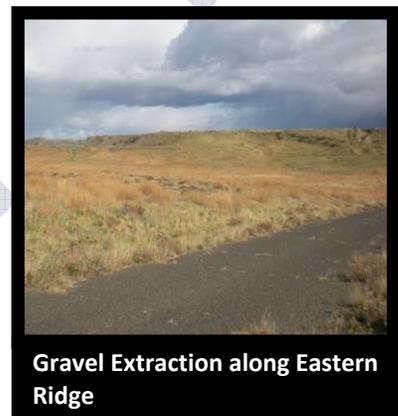
Inspection and observations (positive aspects, deficiencies and damage): Depending upon the reconstruction/renovation expansion needs for the base reuse, a gravel resource may prove to be an asset.

Compliance to federal, state and local codes and standards: Any gravel pit usage and aggregate crushing will need to comply with state mining and air quality laws. It is clear the gravel pit is not currently licensed and if used, would require permitting.

Energy efficiency: N/A

Environmental conditions & compliance: Any gravel pit usage and aggregate crushing will need to comply with state mining and air quality laws.

Renovation, expansion and feasibility: Expansion capability: Availability of adequate basalt gravel resources will need to be investigated. Expansion is dependent upon the needed quantity of product and state laws.



Feasibility & techniques for adaptive redevelopment: Basalt resources are available as a source for the production of crushed aggregate.

Surviving Re-use Alternatives (“Must-do” kills some alternatives): Commercial or on-base use options should be investigated.

Costs of surviving re-use alternatives: N/A

Recommendations: Investigate potential operation for mining naturally occurring aggregate as a gravel source for commercial or on-base use.

POTABLE WATER SUPPLY

Current Condition:

The potable water supply system at the Umatilla Army Depot is a stand-alone system consisting of a number of wells with water towers in select locations. Water is distributed throughout the required areas and to buildings in a combination of asbestos cement (ac) and PVC piping.

Within the Administration area, the piping material used for distribution to buildings changes from ac to cast iron for the majority of the area.

There are seven (7) wells on the facility, of which five (5) are functional. Submersible pumps of relatively new vintage service these wells. Original pump houses are utilized for well use and chlorination as the only water treatment for the facility. The first 2 photos show representative well and chlorination systems.

Three elevated water towers are located on the facility, numbers 21, 141, and 618 with respective capacities of 150K, 100K, and 120K gallons. (See photo Tank 141, next page) Tank 141 is in the warehouse area and provides water to tank 21 and Administration area.

This is a change from the original configuration to accommodate the loss of usable wells in the Administration area. All of the water towers are of double ellipsoid configuration.

The third tank resides on the north part of the facility and is tied into the old ammunition area as well as the Chemical Demilitarization area. This subsystem is also configured with a 21K gallon aboveground storage Tank. Two water storage tanks are separately located just to the north of UMCD for providing water just to that facility.

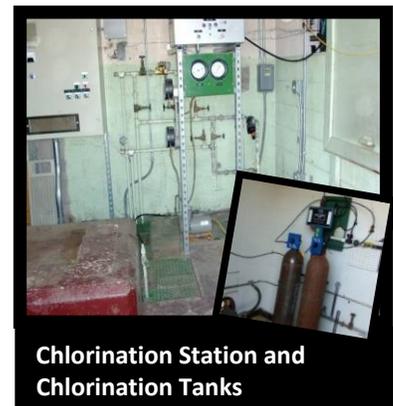
A large, above ground storage tank (1,000,000 gal) is present on site, and is not used due to the potential of contamination caused by low water usage. The tank could be re-used with modifications, as a fire protection reservoir if the need arose.

Fire hydrants are located within the Administration area and at other select locations within the facility branched from main distribution lines. While older, these units appeared to be in a maintained condition.

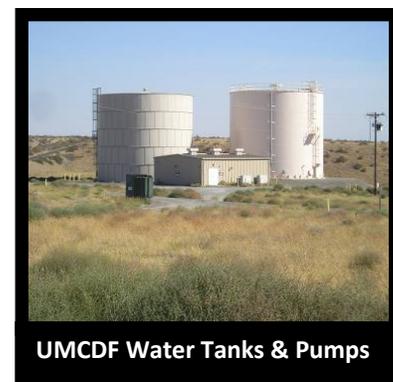
The Administration Area of the Umatilla Depot has a significant lawn sprinkler system which uses potable water for grounds maintenance.



Typical Well Head



Chlorination Station and Chlorination Tanks



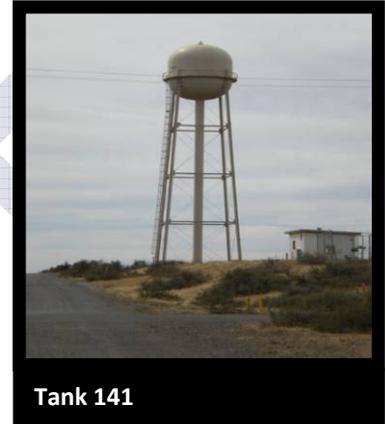
UMCDF Water Tanks & Pumps

This portion of the system was not reviewed in detail, other than to note its existence.

Documents available for review: Documents reviewed mostly consisted of facility drawings. Some of these were from original construction, containing significant detail. Others concerned later modifications and upgrades to the facility. A good as-built rendition of the facility potable water system was not seen.

Federal, state and local codes and standards: Periodic water testing is provided as necessary. Water is tested for conformance with federal and state drinking water standards.

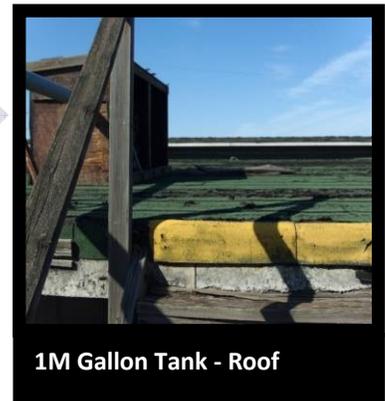
Inspection and observations (positive aspects, deficiencies and damage): The potable water system is in reasonably good condition, given the age of the facility. Wells and water towers have been maintained, with the three (3) water towers on site having been re-built in about 1986 according to maintenance personnel. Inspection of the wells and chlorination areas showed equipment to be in good working condition. The substitution of submersible pumps decreases overall maintenance requirements and increases reliability of the system in general.



Tank 141

Compliance to federal, state and local codes and standards: The system appears to be compliant, should no major modifications be required.

Energy efficiency: Energy efficiency of the system is reasonable given its age and the configuration to accommodate the two (2) wells in the administration area that no longer produce.



1M Gallon Tank - Roof

Environmental conditions & compliance: Chlorination areas appear to be maintained and in good working order.

Renovation, expansion and feasibility: Water use within the capacity of the existing system is feasible for support of the facility. Significant, if any additional draw from the aquifer would likely not be feasible. It is unknown at this time if water from other, off-site sources could be brought to the facility.

Surviving Re-use Alternatives (“Must-do” kills some alternatives): Re-use will need be compatible within the capacity of the existing system.

Costs of surviving re-use alternatives: Operational Costs would be minimal as long as existing buildings and their water supplies were adequate. Major changes may not be cost effective, since materials for underground lines may have to change (i.e., asbestos cement main lines)



Typical Hydrant & Field Hydrant

Recommendations: Where possible, some of the cast iron distribution lines within the Administration area should be assessed for remaining life. Much of this piping could be of original installation, over 60 years ago.

While certainly serviceable, the asbestos cement lines are typically no longer used for potable water distribution. While not necessarily required by code, it would be prudent to filter the potable water supply at each building to ensure that no asbestos material is entering the system. Any major modifications to the facility should include new water distribution piping, and filtration to modified buildings.

ROAD CONDITIONS

Current Condition:

Roadway pavement on the base roads are in fair to good condition. Over the years, since construction in the early 1940's, the road surfaces have been maintained by patching potholes, repairing edge raveling and chip sealing and repaving the surface. The roadway pavement width generally is twenty four feet with limited or non-existent shoulders. The main road network is two lane and the roadways in the "Igloo's" is a single lane with pullouts for passing traffic.

Even though the depth of aggregate base and pavement are unknown, the road section has been adequate in the past to support heavy loads of ordinance and military equipment. The current condition below the roadway surface is now known and would require core drilling and engineering analysis to determine the expected remaining life of the roadway if it were to again experience heavy traffic.

Documents available for review: Roadway plan and profile design sheets were not available for review however; cross-sections were available on certain building design drawings in building 4.

Federal, state and local codes and standards: If UMCD roads are to become a component of the county (Umatilla or Morrow) system, negotiations will need to occur with the appropriate elected officials. Because of the uncertainty of construction techniques and maintenance since construction, the Public Works Directors from both counties would need to accept responsibility of the road system. Additionally, it is unclear what right-of-way width would be required to accommodate the existing roads. To transfer rights-of-way to county ownership will require some level of survey expertise and documentation.

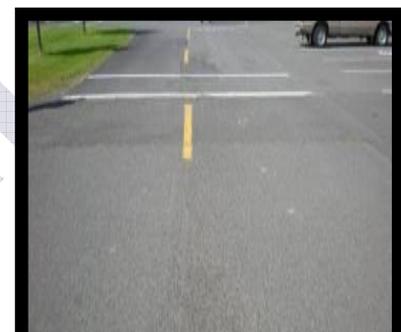
Because of the cost to bring existing rights-of-way to county standards, it may be desirable to transfer limited rights-of-way to the counties and keep the remainder in private ownership. If it is desirable to transfer certain but limited rights-of-way and roadways to county ownership, those certain rights-of-way will need to be identified and documents prepared (possibly quit claim or statutory deeds).

Roadways that support the Igloos may have limited value to county ownership while roadways that lead to warehouse or business functions may have more ownership interest by the counties.

Roadways and parking areas in the Administration Area lack definition between them. Roadway pavement and parking lot pavement often meet in ways that limit appropriate roadway access control. While there is limited curbing in the Administration Area



Typical Roadways



Typical Intersection



Administrative Area Streetscape

most of the parking areas have access from any point along the adjacent roadway. This style of operation may have been acceptable for a military base under one ownership; however, it lacks the type of traffic controls desired in a municipal operation.

Street lighting is very limited and usually attached to a building or in a parking area. There are dedicated street lights in the Administrative area. Stripping is effectively used for traffic control.

Inspection and observations (positive aspects, deficiencies and damage): The roadway pavement is in good condition. Base staff has repaired pavement damage, such as edge raveling or potholes, and kept the pavement in good condition. Additionally, there is evidence of a chip seal overlay on certain road pavements and the UCD base public works staff continues to contract with local paving companies for new pavement overlays.

Compliance to federal, state and local codes and standards: Some roads meet or exceed local standards while many do not. Some roads support two-lane, two-way traffic while other support one-lane, one-way traffic and have pullouts. Some roads have curbing with defined access while other lack definition. If a road network is to be turned over for public use, it will be necessary to define the system. Each county has a set of road construction standards.

Energy efficiency: N/A

Environmental conditions & compliance: N/A

Renovation, expansion and feasibility: Expansion capability: The road network can certainly be expanded, however, with expansion come additional maintenance and cost.

Feasibility & techniques for adaptive redevelopment: There is an adequate road network to all parts of the base, they are in good condition and ready for reuse with the present level of low-use. Heavy traffic use (e.g. high truck traffic to the west warehouse area) is expected to require redesign and reconstruction of existing roadways.

Surviving Re-use Alternatives (“Must-do” kills some alternatives): N/A

Costs of surviving re-use alternatives: N/A

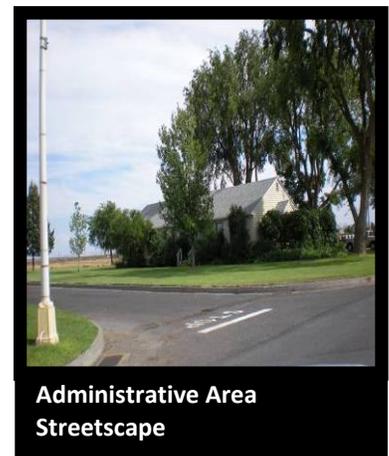
Recommendations: Determine an appropriate road network for reuse and establish a maintenance budget.



West Warehouse Area Road & Parking



Pavement Deterioration



Administrative Area Streetscape

RAILWAY

Current Condition:

Compared to the original 1941 construction and even to recent use (during Desert Storm) the rail system is in poor condition. There has been little if any maintenance for the last two to three decades. While the track base and ballast is still in place for most of the original rail system, it is suspicious that the ties have deteriorated to the point where complete track reconstruction needs to be considered prior to any reuse.

There is a variety of track weights on the system (60, 72, 75, 85 and 100 lb/yd) as determined by the original designers. Depending upon the need and location during any reuse consideration, new track of appropriate weight should be considered.

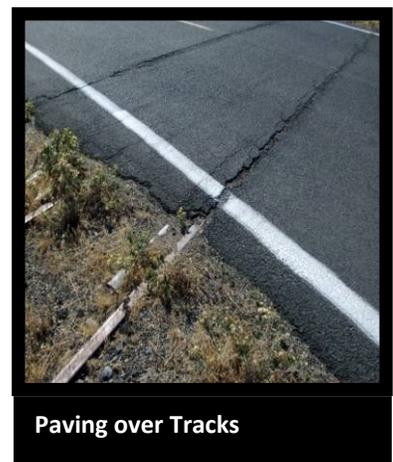
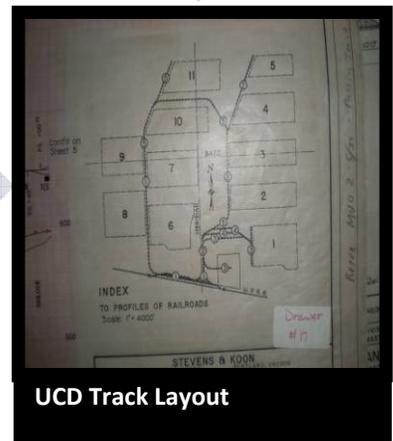
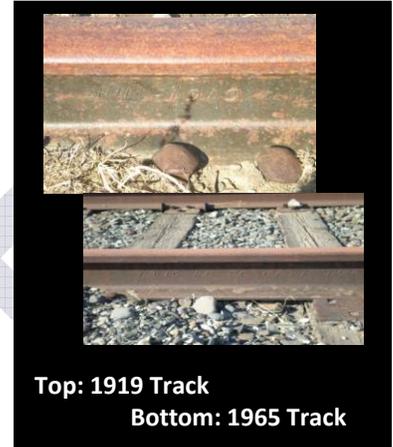
The track was originally constructed to support ordinance handling and storage on the base. Ordinance was transported to and from the "Igloos" via the rail system. After ordinance was manufactured it was transported to the Igloos via the rail system for storage; then transported from the Igloos off base for use. To support the ordinance transport and handling at the UMCD base there is, in excess of 50 miles of track, a locomotive (steam and diesel) storage (in building), a rail car repair facility, and docking adjacent to several warehouses in the Administration Area was a portion of the original 1941 construction. Additionally, there is a vast complex of warehouses (200 and 400 areas) with adjacent tracks.

There are three siding rail yards along the southern boundary of the base. These yards are parallel with the main line of the Union Pacific Railroad (UPRR) and serve as rail car storage for transports between the UPRR and the base. The last usage of the siding yards was during Desert Storm and the system has not been maintained since. There are locations of obvious deterioration and prior to any reuse the integrity of the rail system to be used will need to be validated. Additionally a section of the on-base rail track has been removed at the north east corner of the rail loop. Other sections of track have been asphalt covered where roads and rail cross. Those crossings would need to be reconnected or reconstructed prior to reuse considerations that require the track layout.

In the more recent past, the rail connections (switches) between the UPRR main and the base have been removed. Consequently, the base rail system is isolated from rail usage and will need to be reconnected prior to reuse scenarios that include rail usage.

Documents available for review: There is a set of design drawings for the rail system and buildings in building 4.

Federal, state and local codes and standards: The rail system will need to meet Union Pacific design requirements where reuse involves connecting with the Union Pacific Railroad



Inspection and observations (positive aspects, deficiencies and damage): Even though in a neglected state, the rail system is mostly intact. Reconstruction and replacement of the rail system can be expensive so a full rail evaluation should be considered prior to reuse, to validate compatibility with the UPRR.

Compliance to federal, state and local codes and standards: The rail system needs to conform to UPRR standards.

Energy efficiency: Next to river (barge) freight, rail is an inexpensive method to manage bulk freight (e.g. grain, lumber, product transfer). To reduce truck traffic on the freeway system, reuse of the rail system should be considered. Additionally, most of the original rail loop still exists and that could be valuable for commodity transport.

Environmental conditions & compliance: Various products and chemicals have been transported on the rail system over time. An assessment of current conditions may be merited.

Renovation, expansion and feasibility: Expansion capability: Portions of the rail system have operational use potential even in its current condition. The rail condition needs to be reevaluated for any reuse or expansion.

Feasibility & techniques for adaptive redevelopment: The rail system provides great opportunity for bulk product handling. Reconstruction and reconnection of the rail loop could prove to be beneficial. The sidings and rail buildings have potential for engine and car refurbishing/reconstruction.

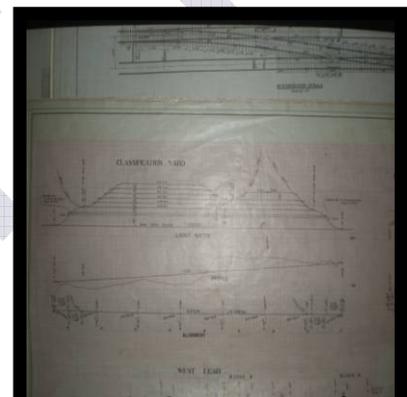
Surviving Re-use Alternatives (“Must-do” kills some alternatives): N/A

Costs of surviving re-use alternatives: N/A

Recommendations: The rail system is mostly intact and has potential for beneficial reuse. Reconnection to the Union Pacific Railroad should be considered and the rail system evaluated to determine its capability of handling current rail traffic.



Classification Yard



Classification Yard Drawing

STORM DRAINS

Current Condition:

The storm drainage system was installed with the original base construction about 1941. The piping in the Administration area provides for water to gravity flow (no pump stations) from the north to the south toward the southern property boundary. At the southern boundary is a 10 vitrified clay pipe that collects water from the Administration area and discharges to the west just south of the sewage treatment facility (Imhoff treatment and leach field).

There is limited storm drainage piping on the UMCD except in the Administration area. If drainage systems exist elsewhere they are limited and provide only for localized drainage. There is at least one underground injection well (dry well) on base at the Locomotive housing. The drywell design is shown with the Locomotive Housing (roundhouse) design drawings in building 4. The dry well appears to be designed to receive liquid waste from the maintenance pits in the Locomotive Housing and the dry well manhole is observable at the east end of the Locomotive Housing building. This dry well along with any others located on the base should be investigated for contaminants, and contaminants should be properly disposed.

While the Administration area has good drainage there are locations in the roadway where drainage puddles. This was observed from over irrigation of the landscaping.

Drainage facilities at other locations throughout the UCD were not observed except for the occasional culvert.

Coyote Coulee is the major natural topographic drainage basin on site. Because of the very low desert rainfall and summer observations there was no observable runoff, even at the Administration area storm drain outfall. Green vegetation was observable for a few feet in the drainage ditch between the outfall and Coyote Coulee. It is likely that Coyote Coulee does not experience any drainage runoff other than during snow melt conditions on frozen ground. Even then, the surface soils are very permeable and any water flow in the Coulee would likely be limited.

The entire piped drainage system is well beyond its useful life and will need to be replaced with any reuse.

Documents available for review: Specific design documents for the storm drainage system were not found. It is suspect that the system may have had limited design during construction. A schematic is available that provides the general layout of the Administration area storm drainage system. Since there are no manholes or access points to the collection system, all piping locations (horizontal locations and depth) must be verified. The collection system has been significantly modified from the original construction due to building additions and demolitions.

Federal, state and local codes and standards: Any new systems will need to comply with federal Clean Water Act and Oregon State Water Quality Act requirements. The Oregon State department of Environmental Quality will need to be consulted.



Storm Drain Inlet



Standing Irrigation Water



Storm Drain Outlet

Inspection and observations (positive aspects, deficiencies and damage): Although there have been failures in the administration area system due to root intrusion and failed piping, the system is still operational. The system is beyond its useful life and system replacement should be considered.

Compliance to federal, state and local codes and standards: Any new systems will need to comply with federal Clean Water Act and Oregon State Water Quality Act requirements. The Oregon State department of Environmental Quality will need to be consulted.

Energy efficiency: N/A

Environmental conditions & compliance: There is uncertainty concerning the potential of waste contaminants that may have been disposed through the storm drainage system. The environmental laws were quite different over the life of this infrastructure component. While discharges today are primarily from irrigation overflow and the occasional storm, disposal of liquids during the wars may have been different from today's discharges.

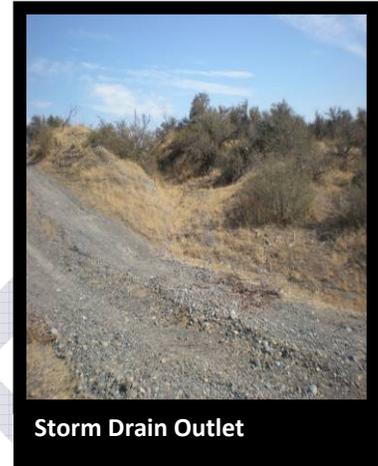
Renovation, expansion and feasibility: Expansion capability: It is recommended that the existing system not be expanded until there is a proper analysis of hydrologic site conditions and hydraulic condition of the piping. The existing system is beyond its design life and replacement needs to be a consideration.

Feasibility & techniques for adaptive redevelopment: Ongoing use of the existing drainage system should occur with the understanding that failure due to root intrusion or piping collapse due to age has a high probability.

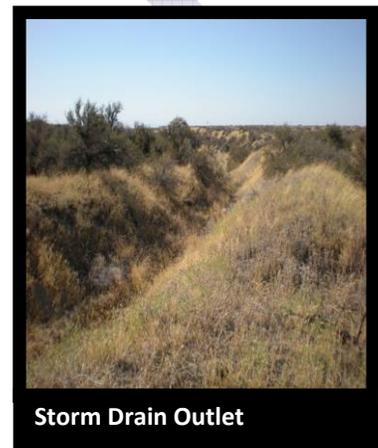
Surviving Re-use Alternatives ("Must-do" kills some alternatives):
N/A

Costs of surviving re-use alternatives: N/A

Recommendations: Replacement of the storm drainage system needs to be considered in the near term.



Storm Drain Outlet



Storm Drain Outlet

SANITARY WASTE WATER

Current Condition:

The Umatilla Army Depot facility sanitary waste water system is a local only system consisting of a combination of localized septic tanks and drain fields and an Imhoff tank system that currently services the Administration area of the facility. The original Imhoff tank system was installed as part of the facility construction in approximately 1941. The original system and a smaller one added later are located outside of the Administration area. They provide the bulk of the sanitary waste treatment for the Umatilla Army Depot. The Imhoff tank systems are generally square or rectangular concrete, double-level septic tanks with a settling compartment and a transfer slot to a sludge digestion compartment. Sludge can be removed via a withdrawal line or by pumping. The liquid effluent is removed near the surface and migrates to drain and leech field.

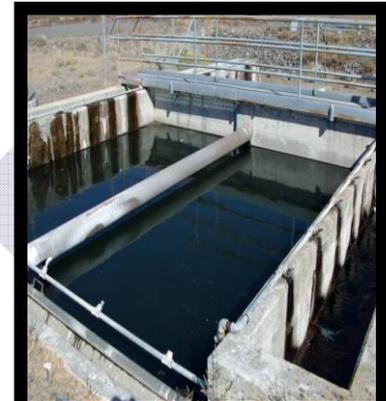
The original, larger Imhoff tank system was designed to be a “3000 man” system. It consists of two separate Imhoff tanks together, with sewage being directed into one side or the other such that only half of the system is in use at any one time. A gas vent and scum collection area is provided on the outer portion of the two nested tanks. As originally configured the larger system had a sludge withdrawal line leading to a sludge drying bed. The dried sludge could then be transported to a landfill or otherwise disposed of. Any rising sludge particles and gas are diverted to the gas vent and scum section where accumulated scum can be periodically removed via manual means. Based on original design information, the nominal size of the original Imhoff tank is 146,000 gallons. As it is now used, the inlet to the Imhoff half is switched periodically and the sludge is pumped for off-site disposal on an as-needed basis. Per interview with facility personnel, the usage demand on the larger Imhoff system is such that pumping of sludge is a very infrequent process, and it may only need to be done approximately every decade.

The smaller of the two Imhoff systems is a newer “200” man system that was installed later, and is currently available, but not in use at this time. Construction of this system is similar to the original, except that it is single tank system. Other than the 200 man designation, there was no size information available for the smaller tank.

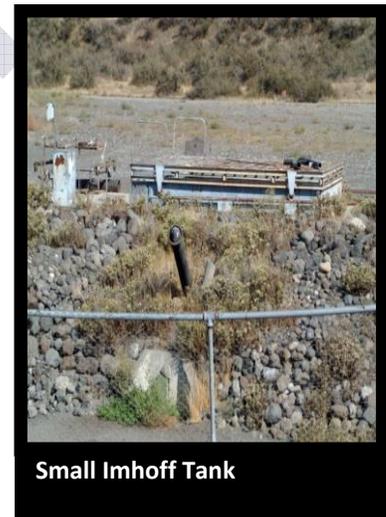
Sewage is gravity fed to the Imhoff tank systems via vitrified clay piping system. Some facility drawings show the sewer piping to asbestos cement (ac), but interviews with maintenance personnel lead to vitrified clay being the material of original construction.

In locations on the facility where new, smaller, septic systems have been installed, plastic (pvc) piping has been utilized. The same can be said where repairs have been made to original underground systems.

Documents available for review: Documents reviewed for sanitary sewer system mainly consisted of facility drawings, both original and modified/updated and are part of the facility records. While the



Large Imhoff Tank



Small Imhoff Tank

information is valuable both from a practical and historical value, there are some discrepancies that should be addressed.

Federal, state and local codes and standards: Sanitary waste water facilities at the Umatilla Army Depot are regulated and monitored by the Oregon Department of Environmental Quality (DEQ) via a permit with the Army. The permit was not available, but facility maintenance personnel provided information.

Inspection and observations (positive aspects, deficiencies and damage): The Imhoff tank area was inspected on September 16. The larger of the two systems is currently in use and seems to be functioning well. The amount of load on the system is estimated at less than 10 percent of the design capacity. There was no sewer gas smell emanating from the system in use, and scum buildup in the vent area was minimal.

The physical condition of the Imhoff tanks was fair overall, but good given their age. (See photos right and previous page) In some areas of the tanks there has been concrete deterioration that will require maintenance soon.

The drain field for the Imhoff tank systems was originally vitrified clay, according to site personnel. Activity in the area with heavy vehicles caused damage to the drain field, leading to the replacement of the vitrified clay lines with PVC. Surface observation shows the drain field to be good condition at this time.

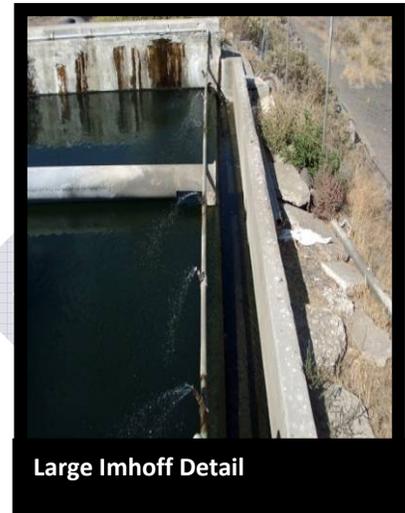
Given the load on the system, it appears to be adequate, or more than, under current conditions.

Overall condition of the underground piping throughout the sanitary sewer system at the Umatilla Army Depot is largely unknown at this time. A contract with a remote television surveillance contractor is scheduled for fall 2009 (probably October) to check condition of the lines. The results of this inspection will be very important in gauging the expanded re-use potential of the Depot Administration Area.

Compliance to federal, state and local codes and standards: The current Imhoff tank system is regulated by Oregon DEQ and according to maintenance personnel is meeting the needs of the facility and the regulators. The system seems to be adequate at the current loading density, though should facility use and man-loading change significantly, the existing Imhoff system could become overwhelmed. Strictly sanitary uses, it seems adequate, but would very likely not tolerate a significant influx of industrial components to the waste stream.

Energy efficiency: Currently, as in typical septic systems, the Imhoff tanks are gravity fed and regulated. Given their simplicity and loading, they appear to be reasonably energy efficient.

Environmental conditions & compliance: The Imhoff systems are currently under the cognizance of Oregon DEQ and appear to be meeting the necessary requirements. The age of the systems is a concern, regardless of their current condition and compliance. Their condition and performance will need to be carefully monitored for continued use.



Large Imhoff Detail



Drain Field Area

Renovation, expansion and feasibility: Renovation and expansion of the current sanitary waste systems, other than required maintenance and permitting work, would not be considered economically or functionally feasible due to the age of the Imhoff systems. Other local septic systems on the facility should likely not be expanded beyond their current design loading in order to maintain compliance with standards in place when they were installed.

Surviving Re-use Alternatives (“Must-do” kills some alternatives): The existing sanitary sewer systems at Umatilla Army Depot appear to be adequate for the existing loading and service to which they are currently exposed. The biggest concerns for any of the existing systems would be a significant addition in loading, by increasing the overall long-term population of the facility, or adding facilities or processes that generated significant amounts of waste water.

Costs of surviving re-use alternatives: Minimal cost as long as loading of the system remains within its capabilities for both type of waste and capacity.

Recommendations: Re-use of the Umatilla facilities should have little effect on the existing sanitary waste systems, as long as population loading is not significantly increased or have significant effluent otherwise impacted. Should the population of the facility significantly increase or industrial or process systems installed at the facility, a new sanitary sewer treatment facility, with new transfer piping and infrastructure would be recommended. A new system could be sized to handle all Umatilla depot loading, as well as to handle potential expansion from other sources. This would be the most flexible and most costly option, but would provide a sanitary waste system for the long term, instead of a limited use of the present system.

NATURAL GAS

Note: *This assessment has been included in its entirety in Appendix A.*

UMCDF INFRASTRUCTURE

Current Condition:

The information in this report was obtained from Umatilla Chemical Agent Disposal Facility (UMCDF) documentation and drawings, interviews with key personnel, and a walk-down of the UMCDF footprint.

UMCDF List of Structures

- ▶ Personnel Support Building (PSB)
- ▶ Munitions Demilitarization Building (MDB)
- ▶ Maintenance Building
- ▶ Pollution Abatement System (PAS)
- ▶ MDB Exhaust Filtration System (FIL)
- ▶ Utility Building (PUB)
- ▶ Laboratory (LAB)
- ▶ Container Handling Building (CHB)
- ▶ Offices (10 office complexes with interconnecting manufactured units)
- ▶ Water Tanks Switchyard (previously mentioned)



Figure 2: UMCDF: Google Map

UMCDF Electrical Distribution System:

The UMCDF footprint is fed from a Umatilla Electric Cooperative substation that is receiving 12.5 KVA from both their Boardman feed and Umatilla feed to ensure backup power should one of the feeds fail. This is then dropped to 4160 VA and fed through redundant underground cables to the primary switchgear on the UMCDF footprint. From this point it is further dropped to 480V, 240V, and 120V by additional secondary transformers and switchgear as needed for each section of the plant and office modules. The switchgear are located outside the physical structure of the buildings. There is additional power switching panels internally in all the main processing structures for the structure that they are located within.

Primary Switchgear is Cutler Hammer 4160 VA that is updated and maintained on a regular basis by UMCDF personnel.

Secondary Switchgear is a mix of Cutler Hammer and Powell that is 480 VA, 240 VA, and 120 VA that also are updated and maintained on a regular basis by UMCDF personnel. The Secondary Switchgear feeds the balance of the plant through transformers and power panels located in each building.

Note: See paragraph in Appendix A regarding the Electrical Distribution System at the Munitions Demilitarization Building.

UMCDF Storm Water and Waste Water Systems:

The UMCDF footprint contains an independent storm water system with a collection pond that is totally independent of the Umatilla Chemical Depot (UMCD) system.

The UMCDF footprint contains an independent waste water system which is a septic system that is totally independent of the UMCD system.

UMCDF Parking Areas:

There are five designated parking areas all of which are gravel. The designated parking areas are currently labeled as follows:

1. Smaller Lower Parking Lot (West of the Personnel Support Building (PSB))
2. Larger Lower Parking Lot (Also West of the PSB)
3. Upper Parking Lot (South of Upper Modules near PSB)
4. Van Pool Parking Lot (South side of upper area modules)
5. North Parking Lot (Near the Sprung Structure area outside the double fence)

UMCDF Fire Alarm and Security System:

Each of the main buildings on the UMCDF footprint is connected internally with both smoke and heat security systems. Critical areas like the document control center also are protected with dry water sprinkler systems. The automatic Fire Alarm system communicates between UMCDF and UMCD Fire Department by radio system only.

Fire Alarm system has copper wire internally in the UMCDF modules and buildings with fiber optics between the buildings. The radio system to UMCD Fire Department for emergency response is monitored at the Entry Control Facility (ECF), UMCDF Control Room, UMCD Fire Department, and the UMCD Emergency Operations Center.

The equipment at UMCDF is current, updated and maintained on a regular scheduled basis by UMCDF maintenance personnel and subcontractors.

UMCDF Telephone System:

All UMCDF communications equipment is maintained by the UMCDF personnel; this includes telephone and computer network systems and is completely independent of the UMCD system.

Even though the UMCDF telephone and data trunk lines are independent of the UMCD telephone switch, the telephone and data interconnect to the Umatilla and Boardman telephone service centers is located within the UMCD communications building. The system uses fiber optics from the UMCD Communications building to the UMCDF telephone and data switches in the Personnel and Maintenance Building (PMB) LAN room inside the double fence.

Currently the UMCDF site has approximately 1000 (779 in use) telephone and data lines in use with an upgrade capability of up to 69,000 telephone and data lines with the Avaya model 8500 switch in use. The last upgrade to the system was in the last two to three years. There are six telephone trunk lines (T-1) going to the UMCDF telephone and LAN switching room in the PMB. Even though the UMCDF telephone and data trunk lines are independent of the UMCD telephone switch, the telephone and data interconnect to the Umatilla and Boardman telephone service centers is located within the UMCD communications building. The system uses fiber optics from the UMCD Communications building to the UMCDF telephone and data switches in the PMB LAN room inside the double fence.

Other UMCDF Communications System:

Communications Tower on UMCDF footprint next to PMB has site and UMCD a radio antenna and repeater systems. This structure is painted Aviation Orange and White and has a red strobe for night vision. This structure will have to be registered with the Federal Communications Commission and the Federal Aviation Administration as required by regulations once it is turned over. Under those regulations the tower did not originally require painting or the light, however, these regulations also state that if the tower is voluntarily painted and lit, it must be registered and maintained as if it was required originally. This can be done at little cost which involves just the time to process the online forms and the waiting period for the response from those agencies.

Radio maintenance is performed by UMCDF personnel and vendor representative personnel.

There is a second Communications Tower halfway between the UMCDF footprint and the Administration Area of UMCD. This tower appears to be in good repair as are the antennae on this tower. However, this has not been able to be verified by UMCD personnel yet, as of the date of this report; this information has not been made available by UMCD.

The central connection to the UMCDF site is in the PMB telephone and LAN room. There is a network drawing available that would completely describe the fiber and copper runs.

The PMB is where data lines outside the UMCDF are terminated. Fiber runs underground to mod 11 and branched to the upper modules from there. Fiber runs to the PSB and branched to the lower modules from there. There is not fiber at all modules. Short runs use copper from the fiber drop off mod.

There is "CAT 5e" copper premise wiring from a wiring closet in each of the modules. There are some copper runs inside the double fence longer than Ethernet specifications or that are carried over phone pairs. These are adapted with industry standard ADSL connectors.

The Computer Network System uses a combination of industry high quality "CAT 5" network cable within the modules and fiber optics between the modules and the Administration area telephone switch. CAT 5 is industry terminology for a special high quality, low loss, computer network cable that assists with preventing cross-talk between lines and loss of signal over longer distances.