WBS: 1.2.6
QA: N/A

**Civilian Radioactive Waste Management System
Management and Operating Contractor**

**Title III Evaluation Report
for the
Surface Portion of the Non-Potable Water System**

BABDB000-01717-5705-00001 Rev. 1

September 28, 1998

Prepared for:

U.S. Department of Energy
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Under Contract Number
DE-AC08-91RW00134

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Prepared by:

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**TITLE III EVALUATION REPORT
SURFACE PORTION OF THE NON-POTABLE WATER SYSTEM
(BABDB000)**

1. OBJECTIVE

1.1 Introduction

This Title III Evaluation Report (TER) provides the results of an evaluation that was conducted on the Surface Portion of the Non-Potable Water System. This TER has been written in accordance with the *Technical Document Preparation Plan for the Mined Geologic Disposal System Title III Evaluation Reports* (BA0000000-01717-4600-00005 REV 02).

1.2 Objective

The objective of this evaluation is to provide recommendations to ensure consistency between the technical baseline requirements, baseline design, and the as-constructed Surface Portion of the Non-Potable Water System. Recommendations for resolving discrepancies between the as-constructed system, the technical baseline requirements, and the baseline design are included in this report. Cost and Schedule estimates are provided for all recommended modifications.

The report does not address items which do not meet current safety or code requirements. These items are identified to the CMO and immediate action is taken to correct the situation. The report does identify safety and code items for which the A/E is recommending improvements. The recommended improvements will exceed the minimum requirements of applicable code and safety guidelines. These recommendations are intended to improve and enhance the operation and maintenance of the facility.

1.3 Methodology

The methodology used in the Title III Evaluation Reports of the Surface Portion of the Non-Potable Water System consists of the following activities:

- A field investigation to inspect the as-constructed system.
- Comparison of the as-constructed system with the ESF design requirements (e.g., ESF design requirements, operational requirements, and S&H requirements) to determine if the as-constructed system satisfies the requirements.

- A review of Level 3 design documents, field investigation data, and as-constructed documentation to determine deviations between the design and as-constructed Surface Portion of the Non-Potable Water System.
- A review of operational requirements to determine if the as-constructed system is capable of performing/supporting the operational requirements;
- Development of recommendations to resolve discrepancies.

2. SCOPE

This TER covers the Surface Portion of the Non-Potable Water System. The Surface Portion of the Non-Potable Water System has the capability of providing water for the fire protection and all anticipated needs and services for testing and operation of the ESF including supplying water to the subsurface. The non-potable water storage tank has a capacity of 200,000 gallons, of which 144,000 gallons are dedicated to fire protection and 56,000 gallons are available for process water. It is a gravity feed system from the non-potable storage tank located on Exile Hill to the North Portal Pad.

A meter located outside J-13 Pump Station records water supplied to the system from the wells. Water meters are also provided upstream and downstream of Booster Pump Station. At Exile Hill, water meters are installed at main inlet pipe and at the outlet pipe of each tank. A meter located at the entrance to the North Portal Pad, records water usage for the underground.

Water is pumped from TK-001 at J-13 Pump Station to Water Tanks at Booster Pump Station (BPS) and then from the BPS to the Fire Water & Potable Water Tanks at Exile Hill. The baseline design water pumping system includes provision for both manual and automatic operations.

3. QUALITY ASSURANCE

The purpose of this TER is not to implement QA controls associated with the Surface Portion of the Non-Potable Water System. Rather, this document identifies those QA controls which continue to be applicable to the operation of the system. The implementation of QA control is specifically addressed in the design drawings and specifications for the Surface Portion of the Non-Potable Water System.

This evaluation does not comprise a QA design input. The Systems, Structures, and Components to which it applies are classified as conventional quality (Non-Q) in accordance with QAP-2-3, *Classification of Permanent Items*, and do not rely on or incorporate any QA controls identified within any applicable Determination of Importance Evaluation (DIE). Preparation of this evaluation is not subject to *Quality Assurance Requirements and Description* requirements. QA: None.

4. FIELD INSPECTION

4.1 **Summary:** All participants met at the J-13 well site where the walkdown started. From there the inspection team proceeded to the Booster Pump Station (BPS) then on to the water storage tank on Exile Hill. From Exile Hill the inspection team went to the North Portal Pad to complete the inspection tour. The inspection was mainly visual to check for compliance to the design drawings. All the valve vault manholes' covers were removed to allow inspection and a comparison was made with design drawings and actual installation.

4.2 **Date:** July 16, 1997

4.3 Participants:	Hector Montalvo	Mike Heiner
	Tony Saltikov	Russell Flye
	Gary Teraoka	Kerry Fredricks
	Ken Thurman	Derrick Wagg

4.4 **Records Reviewed:**

4.4.1 Drawings:

4.4.1.1	BABB00000-01717-2100-20010	North Portal Utility Plan
4.4.1.2	BABB00000-01717-2100-20028	Utility Plan
4.4.1.3	BABB00000-01717-2100-20029	Utility Plan
4.4.1.4	BABB00000-01717-2100-20030	Utility Plan
4.4.1.5	BABB00000-01717-2100-20031	Utility Plan
4.4.1.6	YMP-025-1-CIVL-PR117	Raw Water Supply Line
4.4.1.7	YMP-025-1-CIVL-PR118	Raw Water Supply Line
4.4.1.8	YMP-025-1-CIVL-PR119	Raw Water Supply Line
4.4.1.9	YMP-025-1-CIVL-PR120	Raw Water Supply Line
4.4.1.10	YMP-025-1-CIVL-PR121	Raw Water Supply Line
4.4.1.11	YMP-025-1-CIVL-PR122	Raw Water Supply Line
4.4.1.12	YMP-025-1-CIVL-PR123	Raw Water Supply Line
4.4.1.13	YMP-025-1-CIVL-PR124	Raw Water Supply Line
4.4.1.14	YMP-025-1-CIVL-PR125	Water Storage Tank Access Road
4.4.1.15	YMP-025-1-CIVL-PR126	Water Storage Tank Access Road
4.4.1.16	YMP-025-1-CIVL-PL119	Booster Pump Station
4.4.1.17	YMP-025-1-CIVL-PL121	Water Storage Tank
4.4.1.18	YMP-025-1-CIVL-PL127	Water Storage Tank
4.4.1.19	YMP-025-1-CIVL-PL140-02	Water Supply Line
4.4.1.20	YMP-025-1-7008-PL101	Booster Pump Station Bldg 7008 Piping Plan
4.4.1.21	YMP-025-1-7008-PL102	Booster Pump Station Bldg 7008 Piping

		Plan	
4.4.1.22	YMP-025-1-7008-ST101	Booster Pump Station Bldg 7008	
		Foundation Plan & Sections	
4.4.1.23	YMP-025-1-7008-ST102	Booster Pump Station Bldg 7008	
		Foundation Section & Details	

- 4.5 Results: The Surface Portion of the Non-Potable Water System pipe lines from the J-13 well up to the storage tank on Exile Hill are installed in accordance with the design drawings.
- The control system required for automatic operation of the transfer pumps at J-13 Well is not installed. The pumps are operated manually.
- The Booster Pump Station (BPS) foundation construction is incomplete. The baseline design booster pumps have been installed, but no electrical power and control system provided. Permanent power is available. Water is pumped to the Exile Hill by a temporary pump sitting on the ground which is manually operated. The building has not been erected and the structural steel framing and grating have not been installed over the pipe pit. The permanent piping is blanked off at both the outlet and inlet. Two valve vaults have been installed on each side of the station. Forms have been left on the inside of the vault on the east side and the pipe inlets of the vault on the west side have not been grouted.
- The storage tank area on Exile Hill is incomplete. The power circuit to Exile Hill is connected to a temporary power panel in the switchgear building. The valve vaults and all valves have been installed for manual operation. The chlorine system for the Potable water requirement is manually operated. The control instruments at Fire Water and Potable Water Tanks required for the automatic operations of the Booster Pumps at BPS, have not been installed.
- The firewater loop at the North Portal Pad is incomplete. The hydrant at the southwest corner of the Electrical Switchgear Building, has a fire hose connected to it that supplies water to the tracer tank, that feeds the subsurface water supply. Another hydrant, located east of the Electrical Switchgear Building supplies water to the truck fill stand.

5. OPERATIONAL REQUIREMENTS

5.1 System Description

Water serving the ESF originates from Well J-13, which is located approximately 4 miles southeasterly from the ESF North Portal Pad. This well is part of the NTS Water Supply System. Water is pumped from a depth of 3,488 feet into a 50,000 gallon storage tank (TK-001). The well pump is rated at 630 GPM.

Water is drawn from tank TK-001 at Well J-13 via a 14-inch pipeline/manifold. Raw (untreated) water is drawn from this manifold by two Transfer Pumps (PU-011 and 012) located at J-13 existing control station, which are started manually. Each pump is rated at 150 GPM. From these pumps, water is supplied to the ESF or to the Batch Plant/Truck Fill Station through manual isolation valves. Water is transferred to the ESF at approximately 4 miles via an 8" polyvinyl chloride (PVC) line to two forebay tanks, each with a capacity of 20,000 gallons. Water is transferred from these tanks to the 200,000-gallon fire/construction storage and the 50,000-gallon potable water tanks using a temporary pump rated at 150 GPM located on the ground near the Booster Pump Station.

The baseline design includes a programmable controller for manual and automatic operation of both Transfer and Booster Water Pumps.

The as-constructed water transfer system, is done through manual operations of the valves and pumps at J-13 and also the valves and a temporary pump at the Booster Pump Station. The transfer of water from the forebay tanks to the storage tanks are done daily.

5.2 Operational Parameters.

Equipment/Tanks	Rating/Capacity
J -13 Well (PU-001)	630 GPM
Transfer Pumps (PU - 011 & PU - 012)	150 GPM each
Booster Pumps (P-7008-1 & P-7008-2)	150 GPM each
J-13 Well Tank (TK-001)	50,000 Gallons
Booster Tanks (WT-7008-1 & WT-7008-2)	20,000 Gallons each
Fire Water Tank (PWT)	200,000 Gallons
Potable Water Tank (FWT)	50,000 Gallons

5.3 Operating Permit Requirements.

The operating permit requirements listed in Table 5.3-1 were extracted from the Water Supply Permit issued by the State of Nevada (Ref 9.5).

Table 5.3-1 Operating Permit Requirements

Operating Permit Requirements	Reference	Discussion
Per NAC 445.404, no cross connection may be made so that unsafe water, or water from a source which does not comply with this section may be discharged or drain into any drinking, culinary or ablutionary supply, which complies with NAC 445.370 to 445.420, inclusive (Ref 9.5).	Ref 9.5	These requirements have been met during construction and should continue being implemented during operations.

<p>Per NAC 445.410, Water distribution and sewage collection lines must be laid in separate trenches at least 10 feet apart. In well-drained dry ground where sewage flow is by gravity at greater than 2 feet per second, water lines may be in the same trench on undisturbed earth 6 feet horizontally and 3 feet vertically above the sewer line. Where the water line crosses less than 18 inches over the sewer line or storm drain line, or, when the water line crosses under the sewer or storm drain line, or where the horizontal separation, as required by the Public Water System Construction Regulations cannot be maintained because of physical obstructions (buildings), the water line must be protected by construction of the sewer or storm drain line by encasement with 4 inches, minimum of concrete. The concrete must extend for other than 90 degree crossing to the point at which the 10-foot separation between the water and sewer or storm drain line is achieved (Ref 9.5).</p>	<p>Ref 9.5</p>	<p>The design accounted for these conditions (depth of burial and layout) and the system was built in accordance with the design drawings, therefore these requirements have been met.</p>
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5.4 Operating Safety and Health Requirements:

The operation of the Surface Portion of the Non-Potable Water complies with the requirements of 29 CAR 1910 (Ref 9.18), 29 CAR 1926 (Ref 9.19), and Safety and Health Plan (Ref 9.20).

5.5 Operating Quality Assurance (QA) Controls.

The operating QA controls listed in Table 5.5-1 were extracted from Specification Section 01800 Maintenance and Operations of Surface Facilities, Document Number BAB000000-01717-6300-01800 Rev 01 (Ref. 9.4)

Table 5.5-1 Operating QA Controls

Operating QA Controls	Reference	Discussion
<p>The Constructor shall submit a procedure to the A/E for review and acceptance to periodically read (not less than weekly) all water supply/distribution meters at J-13 Well, Booster Pump Station, Exile Hill, supply inlets to each ESF surface building, and the North Portal tunnel entry to determine water usage. Water usage shall be measured and recorded in accordance with procedure YAP-2.8Q (Ref 9.7). For ESF facilities in which meters are not installed, the constructor shall use procedure described in Requirement 3 (Ref 9.17).</p>	<p>Ref 9.4</p>	<p>The procedure to periodically read (not less than weekly) all water supply/distribution meters at J-13 Well, Booster Pump Station, Exile Hill, supply inlets to each ESF surface building, and the North Portal tunnel entry to determine water usage has been accepted by the A/E (TCP - 2.35, Ref 9.8).</p>
<p>The Constructor shall submit a procedure to the A/E for review and acceptance to perform periodic visual observation (not less than weekly) during the first 90 calendar days following the completion of initial system leakage test(s) of the ground in the vicinity of the areas where water supply/distribution piping and components are present. Any leak, as indicated by wetting of the ground surface or unusually verdant vegetation shall be promptly repaired and an estimate of water loss shall be reported in accordance with procedure YAP-2.8Q (Ref 9.7).</p>	<p>Ref 9.4</p>	<p>The procedure to perform visual observation (not less than weekly) during the first 90 calendar days following the completion of initial system leakage test(s), of the ground in the vicinity of the areas where water supply/distribution piping and component are present, has been accepted by the A/E (TCP-2.43, Ref 9.9).</p>

<p>The Constructor shall submit a procedure to the A/E for review and acceptance to perform periodic visual observation (not less than once per calendar month) after the initial 90-day period. The procedure shall include reviews of weekly system usage records for evidence of leakage. If conclusive indication of system leakage is identified, a visual examination of the system shall be performed within the following 24 hours. Any leak shall be promptly repaired and an estimate of water loss shall be reported in accordance with procedure YAP-2.8Q (Ref 9.7). The process of weekly visual observation of system piping and components shall resume until either the leak is identified and repaired or the malfunctioning measuring device is identified and repaired/replaced. The system shall be shut down after four consecutive weeks with conclusive indication of system leakage.</p>	<p>Ref 9.4</p>	<p>The procedure to perform visual observation (not less than once per calendar month) after the initial 90-day period has been accepted by the A/E (TCP-2.43, Ref 9.9)</p>
<p>The Constructor shall submit a procedure to the A/E for review and acceptance to perform leak detection tests for the potable and non-potable water system piping and components (not less than once per quarter). The test can include securing all potable and non-potable water uses on the pad and observing the flow through the respective water supply header measuring devices. If the leakage from either system is in excess of 310 gallons per 24 hours period, the Constructor shall notify the A/E and the A/E shall perform an evaluation to determine impact and repair requirements.</p>	<p>Ref 9.4</p>	<p>The procedure to perform leak detection tests for the Potable and Surface Portion of the Non-Potable Water System piping and components (not less than once per quarter) has been accepted by the A/E (TCP-2.43, Ref 9.9).</p>

6. BASELINE REQUIREMENTS

6.1 ESFDR REQUIREMENTS - Comparison of the ESFDR to the as-constructed system.

Table 6-1 compares the as-constructed system configuration with the applicable requirements of the ESFDR. If the requirement is satisfied, a description of how the requirement is fulfilled is provided in the table. If the requirement was not satisfied, a recommendation is provided of how the system or requirements should be modified to resolve the noncompliance.

Table 6-1 ESFDR Requirements

ESFDR REQUIREMENTS		
ESFDR Requirement	Satisfied?	Description
<p>3.2.1.2.1.1.B (SURFACE CONDITIONS) Earthquake design parameters for surface facilities shall be calculated in accordance with the information in Appendix A, "Seismic Design Basis Loads for the Exploratory Studies Facility" (Ref 9.10).</p>	No	<p>The earthquakes design parameters in Appendix A (Ref 9.10) were used in the design of the Booster Pump Station facilities, including the water storage tank on Exile Hill. However, these design parameters are not applicable to buried piping and structures, as it does not produce any controlling loads.</p> <p>The installed equipment and piping, with the exception of the temporary booster pump and temporary piping connections, satisfied this requirement.</p> <p>Recommend: Do not complete construction, since the current and anticipated water requirements do not warrant completing the booster pump station and the State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required.</p> <p>Revise ESFDR Appendix A.1 Seismic design from UBC Code Zone 3 to Zone 2B.</p> <p>Operations and Maintenance should restrain the temporary booster pump to resist seismic forces to prevent personnel injury.</p>

<p>3.2.1.2.1.1.C (SURFACE CONDITIONS) The ESF surface facilities shall be designed to withstand 75 mph (high winds) prevailing winds with maximum gusts up to 97 mph.</p>	No.	<p>The Booster Pump Station is not complete, but it was designed to withstand a wind load of 80 mph @30 feet. The non-potable water tank and the forebay tanks were designed for a wind load of 100 mph in accordance with the American Water Works Association (Ref 9.12). Wind load does not apply to underground piping, vaults, and appurtenances. The as-constructed Surface Portion of the Non-Potable Water System meet applicable requirements except for the temporary booster pump which is not in compliance with requirements for wind restraint.</p> <p>Recommend: The current and anticipated water requirements do not warrant completing the booster pump station and the State of Nevada, Department of Human Resources has agreed that the system can continue to operate as it exists, with no permit change required. Operations and Maintenance should restrain the temporary booster pump to resist wind forces to prevent personnel injury.</p>
<p>3.2.1.2.1.1.D (SURFACE CONDITIONS) The ESF surface facilities and equipment shall be designed with appropriate grounding to withstand and minimize the potential for damage due to a direct lightning strike.</p>	Yes	<p>The Booster Pump Station grounding systems for the building have not been completed. The non-potable water tank, and the forebay tanks were constructed per design and have an appropriate grounding system. Grounding is not applicable to the underground piping, vaults, and other appurtenances. All other equipment including the temporary booster pump is grounded as required.</p>

<p>3.2.1.2.1.1.E (SURFACE CONDITIONS) The ESF surface facilities and equipment shall be designed to withstand maximum daily precipitation levels of 2.18 inches within a 24 hours period.</p>	No.	<p>The Booster Pump Station building has not yet been erected. Therefore, the pipe pit is subjected to flooding during a rain. The areas around the water tanks and valve box are graded, so that storm water drains away.</p> <p>Recommend: The current and anticipated water requirements do not warrant completing the Booster Pump Station. The State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required. Operations and Maintenance should use a portable sump pump to empty the pipe pit after a rain.</p>
<p>3.2.1.2.1.1.F (SURFACE CONDITIONS) The ESF surface facilities and equipment shall be designed to withstand and operate in temperatures ranging from a low of -14 degrees F to a high of 108 degrees F.</p>	Yes	<p>The Booster Pump Station building has not yet been erected, exposing the piping and equipment to the changes in temperature.</p> <p>Underground piping, vaults, and appurtenances are buried below the ground surface in accordance with the design drawings and are protected from this range of temperatures. This requirement applies to the non-potable and forebay tanks. The as-constructed Surface Portion of the Non-Potable Water System meet applicable requirements except for the temporary booster pump which is not in compliance with requirements for this range of temperatures.</p> <p>Recommend: Operations and Maintenance should provide a cover for the temporary booster pump assembly to protect it from this range of temperatures.</p>

<p>3.2.1.2.1.1.G (SURFACE CONDITIONS) The ESF surface facilities and equipment shall be designed to withstand maximum loads caused by snow fall of 10 inches maximum in a 24 hours period.</p>	Yes	<p>The Booster Pump Station building is not complete, but has been designed for a roof live load equivalent to 10 inches of snow. The as-constructed Surface Portion of the Non-Potable Water System meet applicable requirements except for the temporary booster pump which is not in compliance with requirements for snow loads.</p> <p>Recommend: Operations and Maintenance should provide a cover for the temporary booster pump assembly to protect it from snow loads.</p>
<p>3.2.1.2.1.1.H (SURFACE CONDITIONS) The ESF surface facilities and equipment shall be designed to withstand and operate in a relative humidity environment of 13 to 71%.</p>	N/A	<p>Relative humidity is not a consideration in the design of the Surface Portion of the Non-Potable Water System.</p>
<p>3.2.1.2.1.1.I (SURFACE CONDITIONS) The ESF surface facilities and equipment shall be designed to withstand the loads caused by a 100-year probable maximum flood local storm identified in the <i>Reference Information Base</i>, YMP/93-02 (Ref 9.13).</p>	Yes.	<p>The facilities are located out of the 100-year probable maximum flood area as specified on the design drawings.</p>

<p>3.2.1.2.1.1.J (SURFACE CONDITIONS) The ESF surface facilities and equipment shall be designed to withstand and operate in an environment with sand and dust.</p>	<p>Yes</p>	<p>The ESF surface facilities are designed to withstand and operate in an environment with sand and dust. The Booster Pump Station does not comply with these requirements, because the building has not yet been erected. The underground pipe, water tanks and vaults are not affected by sand and dust. The temporary booster pump is not in compliance with requirements for sand and dust restraint.</p> <p>Recommend: Operations and Maintenance should provide a cover for the temporary booster pump assembly to protect it from sand and dust.</p>
<p>3.2.1.2.2.A (SERVICE LIFE) The ESF non-permanent items shall be designed for a 25-year maintainable service life.</p>	<p>Yes</p>	<p>The Surface Portion of the Non-Potable Water System is a non-permanent system, designed and constructed for a 25-year service life, except for the Booster Pump Station building, which has not yet been erected. The current and anticipated water requirements do not warrant completing the booster pump station. The State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change. The as-constructed facilities including the temporary booster pump can be maintained for 25 years.</p>
<p>3.2.1.2.2.B (SERVICE LIFE) The ESF permanent items shall be designed for a 150-year maintainable service life.</p>	<p>N/A</p>	<p>The Surface Portion of the Non-Potable Water System is considered a part of the temporary facilities, not a permanent item.</p>

<p>3.2.1.2.3.A (ESF CONSTRAINTS) ESF construction and operation activities shall be evaluated and monitored as necessary for the purpose of assessing the effects of those activities on the future suitability of the site for a potential repository.</p>	Yes.	ESF construction and operation activities were evaluated in the surface DIE and will continue to be monitored.
<p>3.2.1.2.3.B (ESF CONSTRAINTS) Tracers, fluids, and materials to be used at the ESF shall first be reviewed for potential adverse impacts to waste isolation and site characterization testing. These substances are subject to establishments of controls, and shall only be used following review and approval, and only in those areas where use has been approved. Such substances include, but are not limited to the following: Concrete and other cementitious materials, such as shotcrete and grout; Ground support materials, including chemical/resin anchorages; Water and any additives to water for identification (tracers) or construction; Hydrocarbons and solvents; Organic materials and combustible materials.</p>	Yes	Materials used for the non-potable water system have been approved and the quantities reported is accordance with YAP-2.8Q (Ref 9.7) Tracers, Fluids, and Materials Data Reporting and Management.
<p>3.2.1.2.3.C (ESF CONSTRAINTS) The presence of combustible materials underground during construction and operation shall be controlled and limited.</p>	N/A	The Surface Portion of the Non-Potable Water System is a surface facility item.

<p>3.2.1.2.3.D (ESF CONSTRAINTS) Within the Conceptual Controlled Area Boundary, the quantity of water used in surface site preparation, construction, and operations shall not exceed an average of two gallons per square yard of application per day, when averaged over five years (excluding water used to mix concrete or shotcrete) or an amount as determined by analysis. The amount of water used for subsurface construction and operation shall be consistent with the amount determined by analysis.</p>	<p>Yes</p>	<p>This requirement is only required during construction and is covered under Specification No. 01500, "Temporary Surface Construction Facilities " (Ref 9.14).</p>
<p>3.2.1.2.3.E (ESF CONSTRAINTS) Spills shall be cleaned up to the extent practical. Spilled material and contaminated material (including soil) shall be disposed of in accordance with federal and state requirements, and unrecovered spills will be reported in accordance with tracers, fluids, and materials procedures.</p>	<p>Yes.</p>	<p>All spills and contaminated soils are immediately cleaned up and disposed in accordance with federal and state requirements. Procedure TCP-3.2 (Ref 9.15) is used to implement the spills clean up. Unrecovered spills are reported in accordance with YAP-2.8Q (Ref 9.7)</p>
<p>3.2.1.2.3.F (ESF CONSTRAINTS) Dust, vibration, and traffic near sensitive areas shall be controlled during design, construction, and operation (e.g., testing, environmental).</p>	<p>N/A</p>	<p>There are no sensitive areas near the Surface Portion of the Non-Potable Water System.</p>
<p>3.2.1.2.3.G (ESF CONSTRAINTS) All excavation blasting shall be designed to control overbreak to minimize impacts to waste isolation and/or site characterization testing.</p>	<p>N/A</p>	<p>Blasting was not used in the construction of the Surface Portion of the Non-Potable Water System.</p>
<p>3.2.1.2.3.H (ESF CONSTRAINTS) All explosives and blasting agents shall be obtained from a qualified supplier, per 27 CFR 55, to limit adverse impacts on in situ site characterization and to limit blasting residue.</p>	<p>N/A</p>	<p>No explosives or blasting agents were used.</p>

<p>3.2.1.2.3.I (ESF CONSTRAINTS) Surface construction and/or the location of surface facilities shall avoid the impoundment of surface water which would have adverse effects on the ability of the site to isolate waste.</p>	Yes.	The Surface Portion of the Non-Potable Water facilities that are above and below ground are constructed and will be maintained so impoundment of surface water is not a problem.
<p>3.2.1.2.4.A (COMPLIANCE) The ESF shall be designed in compliance with the applicable requirements contained in the Uniform Building Code.</p>	No	<p>A Booster Pump Station was designed in compliance with the Uniform Building Code, but it was not completed per this original design. The water storage tanks have been constructed per the design drawings. Therefore, they meet the requirements contained in the Uniform Building Code (Ref 9.11). The as-constructed Surface Portion of the Non-Potable Water System meet applicable requirements, except the temporary booster pump which is not in compliance with requirements for wind and seismic restraint.</p> <p>Recommend: The current and anticipated water requirements do not warrant completing the booster pump station. The State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required. Operations and Maintenance should restrain the temporary booster pump to resist seismic and wind forces, to prevent personnel injury.</p>
<p>3.2.1.2.4.B (COMPLIANCE) The ESF shall be designed in compliance with the applicable requirements contained in ACI 318 Building Code Requirements for Reinforced Concrete Code.</p>	Yes.	The Booster Pump Station building foundations and equipment foundations, water tank foundations and all the related components have been designed and constructed in accordance with the design drawings, therefore they meet this requirement

<p>3.2.1.2.4.C (COMPLIANCE) The ESF shall be designed in compliance with the applicable requirements contained in DOE Order 6430.1A.</p>	Yes.	The Surface Portion of the Non-Potable Water System has been designed and constructed per the applicable requirements contained in DOE Order 6430.1A.
<p>3.2.1.2.4.D (COMPLIANCE) The ESF shall be designed in compliance with the applicable requirements contained in DOE Order 5480.7A.</p>	Yes.	<p>The Surface Portion of the Non-Potable Water System was designed in accordance with DOE Order 5480.7A "Fire Protection."</p> <p>Recommend: Section 3.2.1.2.4.D of the ESFDR should be changed to read DOE Order 420.1 "Facilities Safety" and will be applied to design changes or new design since DOE Order 5480.7A has been canceled (Summary of Recommendations, 7.3).</p>
<p>3.4.5.1.2.A The surface utility systems shall not restrict foot, vehicular, or ramp portal and/or shaft collar traffic; obstruct ventilation; or cause health and safety concerns.</p>	Yes	<p>The as-constructed surface utility systems are built according to design specifications.</p> <p>These requirements have been met.</p>
<p>3.4.5.1.2.B The surface utilities shall be designed to provide the minimum utility services such as power, non-potable water, fire protection water, communications, and sanitary waste, to each surface facility building.</p>	Yes	<p>Design analyses were performed to determine the Surface Portion of the Non-Potable Water System for the Switchgear Building, Change House, proposed Operations Building, proposed Shop Building, proposed Warehouse, and proposed Guard House. The analyses were in accordance with these requirements (Ref 9.21& 9.22).</p> <p>The Surface Portion of the Non-Potable Water was constructed as designed.</p>

<p>3.4.5.1.2.C The service facilities and equipment required for maintaining and installing underground services shall be provided to support ESF operation and in situ site characterization.</p>	<p>Yes.</p>	<p>Service facilities and equipment for installing the Surface Portion of the Non-Potable Water System were provided during construction. Service facilities and equipment for maintaining the system shall also be provided after the system is turned over to operations.</p>
<p>3.4.5.1.2.D The surface utilities shall be designed to provide the minimum utilities identified in the surface utility analysis.</p>	<p>Yes</p>	<p>Design analyses were performed to determine the Surface Portion of the Non-Potable Water System for the Switchgear Building, Change House, proposed Operations Building, proposed Shop Building, proposed Warehouse, and proposed Guard House. These analyses are in accordance with this requirement.</p> <p>The completed portion of the Surface Portion of the Non-Potable Water was constructed as designed. The temporary system supplies the requirement of the surface utility.</p>
<p>3.4.5.1.2.E An analysis shall be conducted by the design organization to determine what utilities are required for the surface facilities.</p>	<p>Yes</p>	<p>A Building Code Analysis was performed for the Switchgear Building, Shop Building, Change House Building, proposed Operations Building, and the proposed Warehouse Building to determine Surface Portion of the Non-Potable Water System are in accordance with these requirements.</p>
<p>3.4.5.3.1.A (SURFACE WATER) The water system shall provide adequate resistance to water hammer and other destructive events as well as protective devices to prevent loss of water into the site.</p>	<p>Yes.</p>	<p>Pressure relief valves have been provided, in accordance with the design drawing, to minimize the effects of water hammer and other destructive events. Block valves, sectional valves and altitude valves have been provided to prevent loss of water into the site.</p>

3.4.5.3.1.B (SURFACE WATER) Protection shall be provided to ensure separation of potable and non-potable water systems.	Yes.	Vertical and horizontal separations between potable and non-potable water systems have been maintained. Where required crossing clearance could not be achieved, non-potable water lines have been encased in concrete.
3.4.5.3.1.C (SURFACE WATER) Non-potable water lines shall be clearly marked to prevent consumption of the non-potable water by personnel.	Yes.	The potable water lines are Blue colored PVC and Surface Portion of the Non-Potable Water System lines is White colored PVC. This is part of the design and the system was built in accordance with the design drawing.
3.4.5.3.1.E (SURFACE WATER) Tracers added to the water system shall be of a composition and concentration compatible with the waste water disposal system.	N/A	Tracers are required only for water used on subsurface construction.
3.4.5.3.1.F (SURFACE WATER) Permanent records of water use shall be maintained.	Yes.	The Surface Portions of the Non-Potable Water System usage is measured by meters and are read weekly and records kept by the Project.
3.4.5.3.1.G (SURFACE WATER) All tracers and substances added shall be approved, as specified in the <i>Tracers, Fluids, and Materials Management Procedure</i> , to ensure that they will not significantly compromise site characterization testing, repository testing, or waste isolation.	N/A	No tracers are applied to the Surface Portion of the Non-Potable Water System.
3.4.5.3.1.H (SURFACE WATER) Piping or other appropriate control measures shall limit possible water inflow to the ESF following a pipe rupture.	Yes.	By pass and shut off valves are installed per the design drawings. These requirements have been met.

<p>3.4.5.3.1.I (SURFACE WATER) The water supply, storage, and distribution systems, subsystems, and components shall have sufficient capacity to supply and distribute potable and non-potable water in accordance with all anticipated needs and services for ESF operation and testing.</p>	<p>Yes</p>	<p>The Booster Pump Station is not completed and water is supplied to the ESF by a temporary pump. The current and anticipated water requirements do not warrant completing the Booster Pump Station. The State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required. These requirements have been met.</p>
<p>3.4.5.3.1.J (SURFACE WATER) The water supply, storage, and distribution systems and subsystems shall meet the needs of fire protection during ESF operations under routine emergency and maximum credible firewater demand conditions.</p>	<p>Yes.</p>	<p>The water supply, storage, and distribution systems and subsystems have been sized to meet the maximum fire protection requirements and are constructed in accordance with the design.</p>
<p>3.4.5.3.1.L (SURFACE WATER) The non-potable water system shall provide water to the underground for ESF operations, fire protection systems, and ESF testing.</p>	<p>Yes.</p>	<p>Non-potable water has been provided to the underground for ESF operations, fire protection systems, and ESF testing by the Surface Portion of the Non-Potable Water system.</p> <p>The Subsurface Firewater System and the Subsurface Portion of the Non-Potable Water System are not taking the water per the design drawings. The source is from a fire hydrant. A hose is attached to the fire hydrant, which feeds a portable water tank that injects a tracer. This feeds two other tanks that furnish the water to the Subsurface Fire Water System and the Subsurface Portion of the Non-Potable Water System.</p> <p>This difference between construction and design has been addressed in the TER for the Subsurface Water System.</p>

<p>3.4.5.3.1.M (SURFACE WATER) The route of the water line shall be adequately marked to minimize the possibility of damage from future construction activities.</p>	Yes.	Detectable tape with lettering "Caution water line below" has been placed above water lines to minimize the possibility of damage from future construction activities.
<p>3.4.5.3.1.N (SURFACE WATER) The water distribution system shall be of sufficient size and capacity to simultaneously provide for fire protection and process water throughout the ESF, in accordance with all anticipated needs and services for testing and operation of the ESF.</p>	Yes.	The water distribution system has the capability of providing fire protection and all anticipated needs and services for testing and operation of the ESF since the non-potable water storage tank has a capacity of 200,000 gallons, of which 144,000 gallons are dedicated to fire protection and 56,000 gallons are available for process water.
<p>3.4.5.3.1.O (SURFACE WATER) The water system shall provide meters to monitor the surface and subsurface water usage (inflow).</p>	Yes.	The main Surface and Subsurface Portion of the Non-Potable Water System usage is measured by a meter located at the valve vault on Exile Hill and the actual Subsurface water usage is measured by a meter located at the entrance of the North Portal Pad. The water meters are read weekly and records kept by the Project.
<p>3.4.5.3.1.P (SURFACE WATER) All water used during operation and construction of the ESF shall be provided with chemical tracers except for potable drinking water, water used for fill compaction and general surface construction, water used for fire protection, and water used for surface dust suppression.</p>	N/A	Tracers are provided for water used for subsurface construction and will be addressed in the TER for the Subsurface Firewater System. No tracers are applied to the Surface Portion of the Non-Potable Water System.
<p>3.4.5.3.1.Q (SURFACE WATER) The water system shall be designed in compliance with all applicable requirements in the Biological Opinion.</p>	Yes.	Reactivity surveys were conducted prior to construction of the Surface Portion of the Non-Potable Water System to locate desert tortoises and their active burrows to decide whether the potential disturbance could be redesigned or relocated or the tortoise could be relocated. The system is constructed in accordance with the design, which meets this requirement.

3.4.5.3.1.R (SURFACE WATER) The Surface Water System shall be designed in compliance with all applicable requirements in the Potable Water Permit and the corresponding approval letter (9/3/93) of this permit.	Yes.	All design requirements for obtaining the Potable Water Permit have been satisfied (Ref 9.5).
3.4.5.3.1.S (SURFACE WATER) The Surface Water System shall be routed in compliance with the results of the archeological surveys performed as part of Stipulation 4 in the Programmatic Agreement Between the United States Department of Energy and the Advisory Council on Historic Preservation (December 1988).	Yes.	Preactivity surveys were conducted before construction of the Surface Portion of the Non-Potable Water System started to monitor archeological sites for damage or disturbance and initiates data recovery and excavation programs.
3.4.5.3.1.T (SURFACE WATER) The design of the Surface Water System shall comply with the applicable requirements in the Underground Injection Permit, NEV89031.	N/A	This permit does not apply to the Surface Portion of the Non-Potable Water System. It only applies to discharge from C-hole complex and other test holes.
3.4.5.3.1.U (SURFACE WATER) The surface water system shall have a minimum availability of 99.17%.	No	The Surface Portion of the Non-Potable Water System is currently providing the necessary ESF support to construction and testing activities as installed. If the as-constructed system fails, the current remedies to restore service is sufficient and therefore this availability requirement does not serve a useful purpose at this time. Recommend: Delete this ESFDR requirement.
3.4.5.3.1.V (SURFACE WATER) The amount of chronic water loss (subsurface infiltration) shall not exceed the amount determined by analysis.	Yes.	Controls, such as water balance calculations, are being applied to minimize the potential for chronic water losses (and consequent subsurface infiltration) from the Surface Water system (Supply/Distribution). Analysis has determined that 310 gallons is the amount of chronic water loss (Ref 9.10).

<p>3.5.7.1.A(WATER BOOST PUMP STATION) The water booster pump station shall be designed to maintain the minimum reserve capacity of water in the storage tank to support the potable and non-potable water needs and services for ESF operation and testing.</p>	Yes	<p>The system was designed in accordance with these conditions per the design drawings. The current and anticipated water requirements do not warrant completing the booster pump station. The State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required. These requirements have been met.</p>
<p>3.5.7.1.B (WATER BOOST PUMP STATION) The water booster pump station shall supply water to the potable and non-potable storage tank(s) with flow rates that ensure the water tanks are filled within the minimum time needed to support all the ESF anticipated water needs and meet all applicable fire protection standards.</p>	Yes	<p>The system was designed in accordance with these conditions per the design drawings. The current and anticipated water requirements do not warrant completing the booster pump station. The State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required. These requirements have been met.</p>
<p>3.5.7.1.C (WATER BOOST PUMP STATION) The water booster pump station shall supply water to the storage tanks to meet the needs of fire protection during the ESF operation under routine emergency and maximum credible firewater demand conditions.</p>	Yes	<p>The system was designed in accordance with these conditions per the design drawings. The current and anticipated water requirements do not warrant completing the booster pump station. The State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required. These requirements have been met.</p>
<p>3.5.7.1.D (WATER BOOST PUMP STATION) The water booster pump station shall provide a protective device to prevent loss of water into the site.</p>	Yes	<p>Block valves, a sectional valves and altitude valve, have been provided to prevent loss of water into the site. These requirements have been met.</p>

<p>3.5.7.1.E (WATER BOOSTER PUMP STATION) The amount of chronic water losses (Subsurface infiltration) shall not exceed the amount determined by the analysis.</p>	Yes	<p>Controls, such as water balance calculations, are being applied to minimize the potential for chronic water losses (and consequent subsurface infiltration) from the Surface Water system (Supply/Distribution). Analysis has determined that 310 gal. is the amount of chronic water loss (Ref 9.10).</p>
<p>3.5.7.1.F (WATER BOOSTER PUMP STATION) The water booster pump station shall provide meters to measure the quantity of water pumped into the storage tanks.</p>	Yes	<p>Water meters have been installed for the Surface Portion of the Non-Potable Water System. These requirements have been met.</p>
<p>3.5.7.1.G (WATER BOOSTER PUMP STATION) The pumping systems shall include provisions for both manual and automatic operations.</p>	No	<p>The pumping system is not complete. The Transfer Pumps at J-13 Well are operated manually. A temporary Booster Pump is installed at BPS to supply the storage tanks at Exile Hill. This temporary pump is also operated manually.</p> <p>Recommend: The as-constructed facilities are built according to design specifications. The current and anticipated water requirements do not warrant completing the Booster Pump Station. The State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required.</p> <p>Revise ESFDR to delete requirement for automatic operation.</p>
<p>3.5.9.1.A (WATER STORAGE TANK) The water storage tank(s) shall have sufficient capacity to supply and distribute potable and non-potable water in accordance with all anticipated needs and services for ESF operation and testing.</p>	Yes	<p>The water storage tanks are designed to provide the water for all ESF potable and non-potable water requirements. These requirements have been met.</p>

3.5.9.1.B (WATER STORAGE TANK) The water storage tank(s) shall provide the water for all ESF potable and non-potable water.	Yes	The water storage tanks are designed to provide the water for all ESF potable and non-potable water requirements. These requirements have been met.
3.5.9.1.C (WATER STORAGE TANK) The water storage tank(s) shall be sized to meet the needs of fire protection during operations under routine emergency and maximum credible firewater demand conditions.	Yes	The water storage tank's designs have been sized to meet the maximum fire protection requirements. These requirements have been met.
3.5.9.1.D (WATER STORAGE TANK) The water storage tank(s) shall have adequate volume for simultaneous normal peak usage and fire protection demands.	Yes	The water storage tank's designs have adequate volume for simultaneous normal peak usage and fire protection demands. These requirements have been met.
3.5.9.1.E (WATER STORAGE TANK) The water storage tank(s) shall provide devices to prevent loss of water into the site.	Yes	The as-constructed manually operated system includes block valves, sectional valves and altitude valves, installed to prevent overflows of storage tanks. These requirements have been met.
3.5.9.1.F (WATER STORAGE TANK) The water storage tank shall provide non-potable water to the water system for underground operation and testing.	Yes	The Surface Portion of the Non-Potable Water System has been providing water for underground operations and testing through the Subsurface Firewater System and the Subsurface Portion of the Non-Potable Water System. The current Subsurface Firewater System and the Subsurface Portion of the Non-Potable Water System will be addressed on a separate TER.
3.5.9.1.G (WATER STORAGE TANK) The water storage tank(s) shall be provided with meters to monitor the total amounts of water used for various operations.	Yes	Water meters have been installed for the Surface Portion of the Non-Potable Water System. These meters are read weekly and records are kept by the Project. These requirements have been met.

<p>3.5.9.1.H (WATER STORAGE TANK) Water storage tanks shall be located, or protection provided, to preclude water inflow to the ESF following a possible tank failure.</p>	<p>Yes</p>	<p>Bypass and shut-off valves are installed per the design drawings. The water storage tanks have been located so water originating from a breakage follows a drainage path away from the ESF North Pad and tunnel entrance. These requirements have been met.</p>
<p>3.5.9.1.I (WATER STORAGE TANK) The Water Storage Tank System shall be designed in compliance with all applicable requirements in the Potable Water Permit and the corresponding approval letter (9/3/93) of this permit (Ref 9.5).</p>	<p>Yes</p>	<p>All design requirements for obtaining the Potable Water Permit have been satisfied (Ref 9.5).</p>
<p>3.5.9.1.J (WATER STORAGE TANK) The amount of chronic water losses (Subsurface infiltration) shall not exceed the amount determined by the analysis.</p>	<p>Yes</p>	<p>Controls, such as water balance calculations, are being applied to minimize the potential for chronic water losses (and consequent subsurface infiltration) from the Surface Water system (Supply/Distribution). Analysis has determined that 310 gal. is the amount of chronic water loss (Ref 9.10).</p>

6.2 As-Constructed Deviations and Recommendations

Table 6-2 provides a summary of deviations between the as-constructed system and the A/E design drawings and specifications. Recommendations are provided for additional design activities and/or construction activities to resolve the deviations.

Table 6-2 As-Constructed Deviations and Recommendations

As-Constructed Deviations and Recommendations		
As-Constructed Deviations	Design Documents	Recommendations
The Transfer Pumps at J-13 Well are operated manually. The control systems for automatic operation of these pumps have not been installed.	Ref 9.16	Water is supplied to the ESF by manual operation. The pumps are operated during the day shift to meet the current water demand. The as-constructed facilities are built according to design specifications. Do not complete construction, since the current and anticipated water requirements do not warrant completing the Booster Pump Station and the State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required.

<p>Water is pumped from the Booster Pump Station to the Exile Hill by a temporary pump. The suction line of the temporary pump is connected to the common overflow pipes of the storage tanks and all the permanent piping bypassed. The main Booster Pumps have not been completely installed and the Booster Pump building is not erected. The control system for manual and automatic operations of the Booster Pumps have not been installed. Permanent powers for the Booster Pumps have not been connected.</p>	<p>Ref 9.1, 9.3 and 9.16</p>	<p>Water is supplied to the ESF by manual operation. The pumps are operated during the day shift to meet the current water demand. The as-constructed facilities are built according to design specifications. Do not complete construction, since the current and anticipated water requirements do not warrant completing the Booster Pump Station and the State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required. Operations and Maintenance should restrain the temporary booster pump to resist seismic and wind forces to prevent personnel injury.</p>
<p>The power to the Exile Hill is temporary. The control systems required for operations related to the Booster Pumps at BPS is not installed. The chlorine system at Exile Hill for the Potable water requirement is operated manually.</p>	<p>Ref 9.1 and 9.16</p>	<p>The temporary power for the Exile Hill shall remain as is. Water is supplied to the ESF by manual operation. The pumps are operated during the day shift to meet the current water demand. The as-constructed facilities are built according to design specifications. Do not complete construction, since the current and anticipated water requirements do not warrant completing the Booster Pump Station and the State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change required.</p>
<p>One of the two block valves that was to be installed in the line east of the Change House was not installed.</p>	<p>Ref 9.2</p>	<p>Do not install the second block valve. The system branch can be shutdown from the block valve east of the proposed operations building.</p>

The Surface Portion of the Non-Potable Water System was designed in accordance with DOE Order 5480.7A "Fire Protection."	N/A	Section 3.2.1.2.4.D of the ESFDR should be changed to read DOE Order 420.1 "Facilities Safety" and will be applied to design changes or new design since DOE Order 5480.7A has been canceled.
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7. SUMMARY OF RECOMMENDATIONS

- 7.1 Water is supplied to the ESF by manual operation. The pumps are operated during the day shift to meet the current water demand. The as-constructed facilities are built according to design specifications. Since the current and anticipated water requirements do not warrant completing the booster pump station and the State of Nevada Health Division, Bureau of Health Protection Services has agreed that the system can continue to operate as it exists, with no permit change, the system should remain as constructed. An evaluation of current operation costs (Attachment I) and construction completion costs (Attachment II) resulted in the recommendation not to complete the construction of the booster pump station. The confirming letter from the State of Nevada Health Division, Bureau of Health Protection Services is included as Attachment III.
- 7.2 Revise Section 3.2.1.2.4.D of the ESFDR to change DOE Order 5480.7A to DOE Order 420.1. This revision will be applied only to design changes or new design.
- 7.3 Do not install the block valve in the line east of the Change House.
- 7.4 Revise ESFDR Appendix A.1 Seismic design of ESF temporary facilities from UBC Code Zone 3 to Zone 2B.
- 7.5 Revise ESFDR Section 3.4.5.3.1 U to delete requirements.
- 7.6 Operations and Maintenance should restrain the temporary booster pump to resist seismic and wind forces to prevent personnel injury and should also provide a cover to protect this pump from weather elements such as sand, rain, snow, and temperatures ranging from a low of -14 degrees F to a high of 108 degrees F.

8. COST AND SCHEDULE ESTIMATE

- 8.1 There is no design work required for this system only minor construction work as stated in paragraph 7.6.
- 8.2 For information, cost estimates for completing the as designed Surface Portion of the Non-Potable Water System of **\$279,603.00** (Including controls system) is included as Attachment II. This work is not being recommended.

9. REFERENCES

- 9.1 YMP-025-1-CIVL-PR117 Rev 2 Raw Water Supply Line Plan & Profile
 YMP-025-1-CIVL-PR118 Rev 1 Raw Water Supply Line Plan & Profile
 YMP-025-1-CIVL-PR119 to PR123 Rev 1 Raw Water Supply Line
 Plan & Profile
 YMP-025-1-CIVL-PR124 Rev 3 Raw Water Supply Line Plan & Profile
 YMP-025-1-CIVL-PR125 & PR126 Rev 3 Water Storage Tank Access Road,
 Waterline, Plan & Profile
 YMP-025-1-CIVL-PL119 Rev 3 Booster Pump Station Site Plan
 YMP-025-1-CIVL-PL121 Rev 4 Water Storage Tank Site Plan
 YMP-025-1-CIVL-PL127 Rev 3 Water Storage Tank Plans & Sections
- 9.2 BABB00000-01717-2100-20010 Rev 04 North Portal Utility Plan
 YMP-025-1-CIVL-PL140 Rev 02 Water Supply Plan
 BABB00000-01717-2100-20028 & 20029 Rev 05 Utility Plan
 BABB00000-01717-2100-20030 Rev 04 Utility Plan
 BABB00000-01717-2100-20031 Rev 03 Utility Plan
- 9.3 YMP-025-1-7008-ST101 Rev 2 Booster Pump Station Building 7008
 Foundation Plan & Section
 YMP-025-1-7008-ST102 Rev 1 Booster Pump Station Building 7008
 Foundation Section & Details
 YMP-025-1-7008-PL101 Rev 2 Booster Pump Station Building 7008
 Piping Plan
 YMP-025-1-7008-PL102 Rev 2 Booster Pump Station Building 7008
 Piping Sections
- 9.4 Specification Section 1800 Maintenance and Operations of Surface Facilities,
 Document Number BAB000000-01717-6300-01800 Rev 01
- 9.5 Letter dated Sept. 3, 1993 from the State of Nevada, Department of Human
 Resources
- 9.6 YMP Baseline Document, Exploratory Studies Facility Design Requirements
 Document, YMP/CM-0019, Rev 02 / ICN1
- 9.7 Tracers, Fluids, and Materials Data Reporting and Management, YAP-2.8Q,
 Rev 02/ ICN 0
- 9.8 Procedure No. TCP-2.35, Water Use and Accountability - Surface, Rev. 3A
- 9.9 Procedure No. TCP-2.43, Leak Detection & Mitigation for the Water
 Supply/Distribution System, Rev. OB
- 9.10 Exploratory Studies Facility Design Requirements Document, YMP/CM-
 0019, Rev 2/ICN 1, Appendix A, Seismic Design Basis Loads for the Exploratory
 Studies Facility

- 9.11 Uniform Building Code, 1994
- 9.12 American Water Works Association, D100-96
- 9.13 Reference Information Base, YMP/93-02, Rev 3, ICN 1
- 9.14 Temporary Surface Construction Facilities, Document No. BAB000000-01717-6300- 01500, Rev 01.
- 9.15 Procedure No. TCP-3.2, Spill/Release Response, Rev. 3
- 9.16 YMP-025-1-CIVL-C1108, Rev. 0, ESF Water System
YMP-025-1-CIVL-C1109, Rev. 0, ESF Water System
YMP-025-1-CIVL-C1110, Rev. 0, ESF Water System
- 9.17 Determination of Importance Evaluation for the Surface Exploratory Studies Facility, Document No. BAB000000-01717-2200-00106, Rev 01.
- 9.18 29 CFR 1910, 1997. Occupational Safety and Health Standards
- 9.19 29 CFR 1926, 1997. Safety and Health Regulations for Construction
- 9.20 Safety and Health Plan, YMP/90-37, Rev 3, ICN 1
- 9.21 Exploratory Studies Facility Package 1A Booster Pump Station, YMP-025-1-SP03, Rev 7
- 9.22 Water Supply Analysis, B00000000-01717-0200-00074, Rev 01
10. ATTACHMENT I - Fiscal Year 1997 Water Crew Cost
11. ATTACHMENT II - Construction Cost of Completing Surface Portion of the Non-Potable Water System
12. ATTACHMENT IIA - ESF Water System Flow Control I/O Requirements
ATTACHMENT IIB - ESF Water System Flow Control Diagram
ATTACHMENT IIC - Booster Pump Station Control Panel (RTU -1)
ATTACHMENT IID - Existing J-13 Transfer Pumps Control
ATTACHMENT IIE - Exile Hill Level Control Panel (RTU -3)
ATTACHMENT IIF - J-13 Well/Transfer Pumps Control Panel (RTU -2)
13. ATTACHMENT III - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT (YMP) POTABLE WATER SYSTEM PERMIT NY-0867-12NCNT.

ATTACHMENT I

Fiscal Year 1997 Water Crew Cost

Table 1 shows the actual cost of manual operation of both Non-Potable Water System and the Chlorination System for Fiscal Year 1997 (Ref. KIEWIT Cost Report, 1997).

CODE	Fiscal Year 1997	Hours	Labor	ST&S	Total Cost
5102.01	Non-Potable Water Operation Crew	1466	\$56,660.00 (\$59,257.00)	\$3352.00 (\$3352.00)	\$60,012.00 (\$62,609.00)
5103.01	Chlorination System Crew	180	\$7073.00 (\$7073.00)	\$1653.00 (\$1653.00)	\$8726.00 (\$8726.00)
	Total	1646			\$68,738.00 (\$71,335.00)

The total cost (adjusted for 1998) of manual operation is \$71,335.00 for one year. The projected cost would be \$356,675.00 over a period of five years without inflation factor.

The cost of instrumentation: \$279,603.00

The recovery of cost for automatic operation is 4 years.

Water Usage Requirements per Water Supply Analysis (DI: B00000000-01717-0200-00074):

1. Fire Protection Tank: Maximum demand is 1200 gpm at 120 minutes = 144,000 gallons. In the event of fire that depletes the emergency fire-fighting water from the tank, replacement is required to be refilled within eight hours.
2. Title 1 construction Water: Estimated at 35 gpm demand for a 24-hour period.
Total Demand = 50,400 gallons
3. Potable Water consumption: 50 gallons per capita at 400 maximum daily occupancy = 20,000 gallons. Storage of 2.5 days is required for domestic service, $20,000 \times 2.5 = 50,000$ gallons.

ATTACHMENT I

The Fire Water Tank (FWT) capacity is 200,000 gallons. The ESF Fire Emergency Water requirement is 144,000 gallons. Water for process and construction requirements is drawn from the FWT which is limited to 50,400 gallons/24 hour period. In the event that the process and construction water usage reach 50,400 gallons in a given day, water draw from the FWT shall be stopped. The FWT shall be replenished first and should be at a safe working level before resuming water usage. Note: The FWT is normally filled-up during the day shift on an 8 hour period.

Repository Construction Water usage:

The pipe line leading to the South Portal is capped at the Booster Pumps Station. The current water system operation is limited to the ESF North Portal requirements.

ATTACHMENT II							
Construction Cost of Completing SURFACE PORTION OF THE NON-POTABLE WATER SYSTEM							
CSI	Description		Total MH	Labor	Mat'l	Sub.	\$ Total
	Summary						
2	Site Work		351	\$7,433	\$4,176		\$11,609.00
3	Concrete		16	\$319	\$292		\$611.00
5	Metals		124	\$2,882	\$7,797		\$10,679.00
10	Control System (see NOTE 1)				\$71,900	\$7,880	\$79,780.00
13	Special Construction		220	\$5,128	\$24,440		\$29,568.00
15.4	Plumbing		40	\$2,000	\$17,910		\$19,910.00
15.8	Bldg HVAC		27	\$718	\$3,620		\$4,338.00
16	Electrical		847	\$22,518	\$29,120		\$51,638.00
	Subtotal Direct Cost		1625	\$40,998.00	\$159,255.00	\$7,880.00	\$208,133.00
	Sales Tax & Freight @12%	12%			\$19,110.60		\$19,110.60
	Subsistence@7.50/man/day	7.5	198	\$1,485.00			\$1,485.00
	Total Direct Cost		1823	\$42,483.00	\$178,365.60	\$7,880.00	\$228,728.60
	Labor Burden	48%		\$20,391.84			\$20,391.84
	Mat'l Handling	8%			\$14,269.25		\$14,269.25
	Procurement Recovery	2%			\$3,567.31		\$3,567.31
	Profit	5%		\$2,124.15	\$8,918.28		\$11,042.43
	G&A on Burden Labor	4%		\$815.67			\$815.67
	G&A Subcontract	10%				\$788.00	\$788.00
	Total Direct & Indirect Cost			\$65,814.66	\$205,120.44	\$8,668.00	\$279,603.10
	NOTE 1. The control system construction cost is based on the following Attachments:						
	a. Attachment II A						
	b. Attachment II B						
	c. Attachment II C						
	d. Attachment II D						
	e. Attachment II E						
	f. Attachment II F						

ATTACHMENT II A

ESF WATER SYSTEM FLOW CONTROL I/O REQUIREMENTS

1. Refer to Schematic 1: Booster Pump Station Control (RTU-1) Panel.

Included are the following:

Input signals:

- a. LT-2000, 4-20ma signal [NOTE 2] (alarms -LSHH,LSH, LSL & LSL)
- b. LT-2001, 4-20ma signal [NOTE 2] (alarms -LSHH,LSH, LSL & LSL)
- c. FT-2001, 4-20ma signal [NOTE 3] (FI & FQI, Flow Indication & Flow Totalizer at RTU-1)
- d. FT-2012, 4-20ma signal [NOTE 3] (FI & FQI, Flow Indication & Flow Totalizer)
- e. CRb auxiliary contact closure (seal-in relay)
- f. CRx contact closure from Exile Hill Level Control (RTU-3, via shielded pair cable).

Output signal:

- a. CRb contact closure to J-13 Well & Transfer Pumps Control Panel (to RTU-2 via RF signal).

Electrical devices:

- a. CRb, CRb1, CRb2, CRc & CRd auxiliary relays
- b. HS-2002A & HS-2002B selector switches
- c. Start/Stop switches (2 set each)
- d. Pump run lights (2 each LED's)

2. Refer to Schematics 2 & 4: J-13 Well/Transfer Pumps Control (RTU-2) Panel.

Input signals:

- a. CRb contact closure from Booster Pump Station Control (RTU-1) Panel.
- b. LT-1002, 4-20ma signal [NOTE 2] (alarms -LSHH,LSH,LSL & LSL)
- c. FT-1007 is 4-20ma signal [NOTE 3] (FI & FQI, Flow Indication & Flow Totalizer)

Electrical Device: CRc auxiliary relay

ATTACHMENT II A

3. Refer to Schematic 3: Exile Hill Level Control (RTU-3) Panel.

Input signals:

- a. LT-3001, 4-20ma signal [NOTE 2] (alarms - LSHH, LSH, LSL & LSLL)
- b. LT-3002, 4-20ma signal [NOTE 2] (alarms - LSHH, LSH, LSL & LSLL)
- c. FT-3000, 4-20ma signal [NOTE 3] (FI & FQI, Flow Indication & Flow Totalizer)
- d. FT-3003, 4-20ma signal [NOTE 3] (FI & FQI, Flow Indication & Flow Totalizer)
- e. FT-3004, 4-20ma signal [NOTE 3] (FI & FQI, Flow Indication & Flow Totalizer)

Output signal: CRx contact closure to Booster Pump Control Station (RTU-1 Panel via shielded pair cable).

Electrical Devices:

- a. CRa, TRa & CRx auxiliary relays
- b. Chlorine Feed Motor run light (LED)
- c. Control valve status light (LED)

NOTES:

- 1. RTU-1, RTU-2 & RTU-3 are new control panel in NEMA 4X enclosures. All Relays including Selector Switches, Start/Stop PB & Run Lights are part of each corresponding RTU's. This devices are installed in each RTU enclosures.
- 2. All Level Transmitters are new. Alarms indications and control logic are part of each corresponding RTU's.
- 3. Existing direct reading Flow Meters shall be provided with new Transmitters. Flow indications & Flow totalizers shall be installed in each corresponding RTU enclosure.
- 4. RTU control panels shall be provided with 120vac power. Input and output terminals shall be provided for field wiring connections.

ESF WATER SYSTEM FLOW CONTROL DIAGRAM

J-13 WELL & TRANSFER PUMPS

BOOSTER PUMPS STATION

EXILE HILL TANKS

- NOTES: 1. All FT's are existing Flow Meters. (FI's & FQI's are Flow indication & Flow Totalizer)
2. RTU'S and RF instruments are new.
3. All LT's are new Level instruments.

BOOSTER PUMP STATION CONTROL PANEL (RTU-1)

J-13 Well/ Transfer Pumps Control Panel (RTU-2)

- Note: 1. Refer to schematic 2 (Page 2 of 4) for circuit connections.
2. Digital signal from RTU-1 Panel via RF Repeater (Refer to ESF Water System Flow Control Diagram & Schematic 1 for connection).

Department of Energy
Office of Civilian Radioactive Waste Management
Yucca Mountain Site Characterization Office
P.O. Box 30307
North Las Vegas, NV 89036-0307

SEP 11 1998

ATTACHMENT III
PAGE 1 OF 23 *Amc*
9/23/98

M. W. Harris, Manager
Environment, Safety and Regional Programs
Civilian Radioactive Waste Management System
Management and Operating Contractor
Yucca Mountain Site Characterization Project
1261 Town Center Drive, M/S 423
Las Vegas, NV 89134-6352

**YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT (YMP) POTABLE WATER
SYSTEM PERMIT NY-0867-12NCNT**

The YMP recently requested and received approval from the State of Nevada to maintain the potable water system for the Exploratory Studies Facility North Portal pad as it currently exists and to perform no upgrades to the system. The system should be operated as such and in accordance with the description in my August 21, 1998, letter to J. H. Larson (enclosure).

Necessary water sampling should continue to assure regulatory compliance. If changes to the potable water system are necessary in the future, the YMP must coordinate with Mr. Larson and his office to receive appropriate approval before any such changes are made.

Thank you for your assistance in this matter. If you have any questions or require any additional information, please contact either Scott A. Wade of my staff at (702) 794-5459 or Thomas H. Pysto of the Civilian Radioactive Waste Management System Management and Operating Contractor at (702) 295-5082.

Wendy R. Dixon
Assistant Manager for
Environment, Safety, and Health

AMESH: SAW-2684

Enclosure:
Ltr, 8/21/98, Dixon to Larson

Department of Energy
Office of Civilian Radioactive Waste Management
Yucca Mountain Site Characterization Office
P.O. Box 30307
North Las Vegas, NV 89036-0307

ATTACHMENT III
PAGE 2 OF 23 *Jan*
9/29/96

RECEIVED

AUG 24 1998

BUREAU OF HEALTH
PROTECTION SERVICES
LAS VEGAS

AUG 21 1998

CERTIFIED P 106 138 407

J. H. Larson, Public Health Engineer
State of Nevada
Health Division
Bureau of Health Protection Services
620 Belrose Street
Las Vegas, NV 89158

**YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT (YMP) POTABLE WATER
SYSTEM PERMIT NY-0867-12NCNT**

In accordance with the discussion held with you and our Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O) staff on July 28, 1998, we are requesting your concurrence with our proposal to maintain the potable water system for the Exploratory Studies Facility North Portal pad as it currently exists and to perform no upgrades to the system. The upgrades would have included automating the potable water system and the chlorinator system, as well as replacing the existing "temporary" booster pump station with a more permanent one. The current system functions properly and operates in compliance; therefore, we contend that upgrades to this system are unnecessary.

As you know, when the YMP Potable Water System Permit NY-0867-12NCNT was originally granted, it was understood that the YMP might make upgrades to the system at a later date. As a result, several items within the system were designated as temporary under the "temporary operational conditions" described in the YMP Potable Water System Operations and Maintenance Manual, Revision 1, dated July 1997. Although items such as the booster pump station carry a "temporary" designation, they continue to provide the same functionality as would an item carrying a "permanent" designation.

If you concur with the proposal as discussed, please sign the designated concurrence signature block at the end of this letter. We understand that if changes to the potable water system are deemed necessary in the future, we will coordinate these with your office to receive the appropriate approval prior to commencing any deviations to the current system

J. H. Larson

-2-

AUG 21 1998

If you have any questions or require any additional information, please contact either Scott A. Wade of my staff at (702) 794-5459 or Thomas H. Pysto of the CRWMS M&O at (702) 295-5082. Thank you for your assistance with this matter.

Wendy R. Dixon
Assistant Manager for
Environment, Safety, and Health

AMESH:SAW-2483

Concurrence:

8-26-98

J. H. Larson, Public Health Engineer
State of Nevada
Bureau of Health Protection Services