A portion of the used oil stored at this facility is transferred to a 500-gallon used oil tank inside the shop, and burned for energy recovery in a space heater that has a maximum capacity of less than 0.5 million btu per hour, is vented to outside air, and only burns used oil generated by the FCSWDD or do-it-yourself oil changers. Used oil space heaters are "exempt from the requirement to obtain a permit or any requirement to obtain a waste management authorization" under the provisions of Chapter 1, Section 1(l)(xix) of the WSWRR.

- Used Paint – The maximum capacity of the used paint storage area will be less than 500 gallons. Used paint will be stored in the "container" used by the generator to transport the waste, and stored in bermed areas that are lined with a single layer of 6-mil plastic to contain incidental spills and leaks. The storage or wastes in a container is "exempt from the requirement to obtain a permit or any requirement to obtain a waste management authorization" under the provisions of Chapter 1, Section 1(l)(xii) of the WSWRR.

5.5 POTENTIAL IMPACTS TO SURFACE WATER AND GROUNDWATER

This facility is located approximately 9 miles southeast of Riverton, Wyoming. The annual precipitation rate in Riverton, Wyoming for the period of record (1907-2010) is less than 9 in/yr (DRI 2010). The mean annual evapotranspiration rate (1951-1990) for Riverton is approximately 37 in/yr (Pochop et al 1992), which is generally available within the periods of highest precipitation (DRI 2010). A 25-year, 24-hour precipitation event in this area is expected to generate approximately 2.3 inches of precipitation, while a 100-year, 24-hour precipitation event is expected to generate approximately 3.0 inches of precipitation (NOAA 1973).

Surface water run-on will be diverted around the facility by surface water control structures to reduce the amount of surface water that can contact wastes. The working face of the facility will be confined to the smallest practical area to limit the potential for precipitation to contact wastes. Routine and intermediate cover will be graded to prevent standing or running water form coming in contact with wastes or ponding over filled areas. Surface water run-off from the facility will be routed through surface water control structures, and be allowed to discharge to natural erosional drainages adjacent to the facility. The closest unnamed ephemeral surface water features are approximately 2,000 ft east, south, and west of the facility (Figure 1-1). As noted in Section 3.2 of this document, the closest perennial surface water feature is Beaver Creek, which is approximately 3 miles from the facility. Based on the relatively low precipitation rates and the significant distances to surface water, the facility is not expected to pose a significant threat to surface water.

One of the most common mechanisms by which landfills impact groundwater involves infiltration of precipitation in quantities such that the field capacities of the routine, intermediate, and/or final cover system, the wastes are exceeded. Precipitation that comes into contact with wastes becomes leachate, which can migrate to groundwater. The infiltration of precipitation can also contribute to the generation of landfill gas, which can create and explosion hazard and transport contaminants. The Hydrologic Evaluation of Landfill Performance (HELP) model (Version 3.07) was used to provide a general estimate of the amount of precipitation that may infiltrate routine, intermediate, and final cover, contact wastes, and generate leachate or landfill gas. The HELP model was developed for the U.S. EPA by the U.S. Army Corps of Engineers Waterways Experiment Station (Schroeder et al 1994 and 1994B). It is a quasi-two dimensional deterministic water budget model that is recommended by the U.S. EPA and the WDEQ/SHWD to compare the relative performance of various final cover designs. The HELP model is generally considered to provide conservative (i.e., maximum or higher than actual) predictions of leachate generation potential in arid environments (Benson and Pliska 1996; Burnley 1997; Fayer and Gee 1997; Khire et al 1997; Kowakewski 1999; WDEQ 1998C).

Chapter 2, Section 7(d)(ii) of the Wyoming Solid Waste Rules and Regulations (WDEQ, 1998B) prescribes minimum final cover specifications for disposal units that received municipal solid wastes after October 9, 1991, including:

- 6 inches of uncompacted topsoil (top)
- 24 inches of barrier soils with a permeability less than or equal to the permeability of the bottom liner or natural subsoils, or a permeability of 1×10^{-5} cm/sec, whichever is less
- Any daily cover (6 inches) or intermediate cover (12 inches) already in place

Current WDEQ/SHWD policy also requires frost protection for barrier layers constructed with compacted soils. The maximum estimated frost depth for this area is approximately 54 inches (Curtis and Grimes 2004; Appendix P). The prescriptive final cover system, therefore, requires an additional 48 inches of unclassified fill between the barrier layer and the topsoil layer. Based on the range of soil types identified at the facility (Section 4.3), HELP soil type 13, which is associated with a USCS classification of SC, was selected to represent the general characteristics of the soil that will be used to construct the topsoil and frost protection layers.

It was assumed that the soils that underlie waste disposal units have a permeability of $1x10^{-7}$ cm/sec or less (Section 4.3). As per Solid Waste Guideline #13 "Final Cover Specifications", the associated permeability specification for the barrier layer should be $1x10^{-7}$ cm/sec. HELP model soil type 16 was selected to represent the general characteristics of the soil that will be used to construct the compacted barrier.

The HELP model was used to evaluate the performance of the following prescriptive design:

- 6-inch vertical percolation layer
  - HELP classification 13 / USCS classification SC
  - $k = 3.3x10^{-5}$ cm/sec
- 48-inch vertical percolation layer
  - HELP classification 9 / USCS classification SC
  - $k = 3.3x10^{-5}$ cm/sec
- 24-inch barrier layer
  - HELP classification 16
  - $k = 1.0x10^{-7}$ cm/sec
- 18-inch vertical percolation layer (i.e., routine/intermediate cover)
  - HELP classification 13
  - $k = 3.3x10^{-5}$ cm/sec

Default climatic data for Riverton, Wyoming was used to generate 30 years of synthetic climatic data for Riverton, Wyoming. Thirty-year normalized monthly precipitation and temperature data for Riverton (NOAA 2001) and growing season data (April 6 to October 6) for Riverton (Pochop et al 1992) were used to adjust the default climatic data and generate the synthetic climatic data. Averages of the long-term (1930-1996) wind and relative humidity data for Riverton were also used (NOAA 1998). The following assumptions were used as input to the HELP model simulation of the prescriptive final cover system for this facility:

- A "poor" stand of grass, an average surface slope of 4%, and an average slope length of 650 feet were used to calculate SCS runoff curve numbers.
- The maximum leaf area index for established vegetation at this site was conservatively estimated to be 1.0. An LAI of 1.0 is at the lower end of the value recommended by the HELP User's Guide for a poor stand of grass (Schroeder 1994a), and below mean values for desert (1.31) and grassland (1.71) environments (Scurlock 2001).
- The maximum evaporative zone depth was assumed to be 48 inches. This estimate is considered to be conservative because it is less than the maximum reported rooting depths associated with the proposed vegetation described in Section 7.4.5 of this document.

The HELP model was also used to estimate the amount of precipitation that will pass through 6 inches of routine cover (over active fill areas), and 18 inches of routine and intermediate cover (over inactive fill areas). Modeling of the routine and intermediate cover scenarios assumed bare ground conditions (i.e., no vegetation). Summary output reports of the HELP modeling scenarios are provided in Appendix EE, and summarized in Table 5-5. Research completed in support of the U.S. EPA's Alternative Cover Assessment Program (ACAP) suggests that annual flux (i.e., infiltration) rates in the range of 3 to 10 mm per year are reasonable performance objectives for a final cover system in a semi-arid environment. The referenced HELP modeling for the Sand Draw Landfill predicts that both the prescriptive final cover system and the combination of routine and intermediate cover will exceed the ACAP performance recommendations for final cover systems. The referenced HELP modeling of the Sand Draw Landfill predicts that just 6 inches of routine cover will provide performance that is relatively close to the ACAP performance recommendations for final cover systems.

The potential for future impacts to groundwater can also be evaluated with respect to existing groundwater conditions at the Sand Draw Landfill, which has been operating for approximately 28 years and has not completed closure over previously-filled areas. The following information summarizes the data and statistical analysis for the last six quarterly groundwater monitoring events at the Sand Draw Landfill:

- Limited detections of typically mobile VOCs have been reported above laboratory reporting limits. Acetone has been detected twice in well R-9D, at 25 μg/L in October 2009, and at 140 μg/L in January 2010. The groundwater protection standard for acetone is 32,000 μg/L, which is based on a drinking water equivalent level (DWEL) calculated by the WDEQ.

- The balance of VOC detections have been qualified as estimated values below the laboratory reporting limit (RL, a.k.a. the practical quantitation limit, or PQL) and the method detection limit (MDL). None of the VOC detections below the laboratory reporting limit is near the associated groundwater protection standard.
- No statistically significant increasing trends in the concentrations VOCs have been identified.
- Limited indications of statistically significant differences between the concentrations of naturally-occurring geochemical parameters in up- and down-gradient wells have been identified.
- Limited indications of statistically significant increasing trends in the concentrations of naturally-occurring geochemical parameters (e.g., nitrate and calcium) have been identified.
- Statistical analysis of the concentrations of naturally-occurring constituents in up-gradient wells indicate multiple exceedances of standards for Class I "Domestic", Class II "Agriculture", and Class III "Irrigation" groundwater.
- Statistical analysis of the concentrations of naturally-occurring constituents in down-gradient wells suggests that up-gradient wells indicate multiple exceedances of standards for Class I "Domestic", Class II "Agriculture", and Class III "Irrigation" groundwater.

In summary, the body of evidence summarized above indicates that the historical operation of the Sand Draw Landfill has not adversely affected the groundwater below the facility, and that the design, operating, and closure procedures described in this document will limit the potential for future adverse impacts to develop. Ongoing monitoring will be necessary to evaluate the long-term performance of the Sand Draw Landfill.

5.6 COVER MATERIAL

Bales will be stacked no more than three bales high. Subsequent layers of bales placed along the edge of fill areas will be offset by 2.5' x 3' x 5' bales to approximate a 6H:1V slopes, and loose wastes will be used to fill areas between the last bale in one layer, and the last bale in the overlying layer. The exposed horizontal surface of bales will be covered with routine cover at the end of each day the facility received baled waste, but the exposed vertical sides of bales will not be covered to facilitate continuation of the working face on the next day.

Loose wastes will be disposed by creating a working face between baled wastes. The size of the working face will be limited to the smallest practical area. Loose waste will be placed between bales in lifts that are nor more than 2 ft thick on slopes of 3H:1V or less, and then compacted by a minimum of three passes of a bulldozer or compactor (depending