High Mesa Water Facility

Encana Oil & Gas (USA) Inc.

Form 28 Supplemental Information

December 2013

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1. 908.a: Applicability

1.1. Current COGCC Status

High Mesa Water Facility (HIMWF) is currently operating under an existing Form 28, Permit #149013 issued in 2005 (see Appendix 1). The intent of this submittal is to update the existing Form 28 to meet the current standards set by the Colorado Oil & Gas Conservation Commission (COGCC).

There are four (4) earthen pits associated with this facility, as listed in Table 1. A Form 4 and a Form 42 will be filed prior to construction of the additional ponds (estimated to be between 2015 and 2017).

Table 1: Associated Earthen Pit Permits

COGCC Facility ID	Encana Name	Construction Date
TBD	Lower Pond	2005
TBD	Middle Pond	2005
TBD	Upper Pond (South)	2005
TBD	Upper Pond (North)	2005
TBD	Future Ponds (4)	2015 – 2017

1.2. Facility Objectives

HIMWF is a non-commercial, centralized E&P waste management facility for the treatment of E&P waste for Encana Oil & Gas (USA) Inc. (Encana) operations in the Piceance Basin area of Garfield County, Colorado. The objectives of HIMWF are to:

- Treat and recycle produced and flowback water within the Piceance Basin.
- Minimize environmental impact by:
  - Maximizing the use of recycled water;
  - Following Best Management Practices (BMPs);
  - Minimizing environmental liability by operating the facility in accordance with all permits; and
  - Minimizing the cost of managing water within the Piceance Basin.

This facility is authorized to receive the following influent:

- Flowback and produced water from Encana operated wells in the South and North Piceance Sub-Business Units (SBUs).

Flowback and produced water from other oil and gas operators may be received by this facility on a case-by-case basis, through a Colorado Oil & Gas Conservation Commission (COGCC) Rule 502.b variance request and approval with a water sharing agreement in place. No third-party influent will be accepted if doing so violates HIMWF's status as a non-commercial facility.

2. 908.b.(1), (2) & (3): Contact Information & Legal Site Description

See attached Form 28 in Appendix 1. Statement of Authority for land is provided in Appendix 2. A survey plat is provided in Appendix 3, Page 1.

3. 908.b.(4): Topography, Geology and Hydrology

3.1. General Site Description

The facility site lies south of the Colorado River on High Mesa. The nearest municipality is the Town of Parachute which is located approximately 4.0 miles northeast of the facility. The terrain is relatively flat and slopes down to the northwest. The elevation at the site is approximately 5,990 feet above sea level. A vicinity topographic map, a close-up topographic and a road map are provided in Appendix 4: Figure 1, Figure 2, and Figure 3. The location of the HIMWF is relatively remote.

3.2. Adjacent Land Use

Adjacent land is managed by the Bureau of Land Management, Daybreak Realty LLC, and Klebold, Larry A & Karen K. The land usage within a 1500 foot radius includes: natural gas exploration and production, livestock grazing and wildlife habitat. Based on identifying residences from aerial photos and using the Garfield County website to identify ownership, there are four (4) private residences within a one (1) mile radius of the site. An adjacent parcel map is provided in Appendix 4: Figure 3**.** The surrounding land uses are not adversely impacted by operation of the facility due to the remote location and some of the existing surrounding uses being similar to the water facility.

3.3. Topography

The HIMWF site is relatively flat with a gradual slope dipping roughly 4 degrees to the northwest (Appendix 4: Figure 2). The grade drops dramatically roughly 200 yards northwest of the facility. The site consists of sage brush, sparse juniper trees, and native grasses surrounding the facility. Drainage from the facility and the surrounding area flows to the northwest.

3.4. Geology

The site is located within the Piceance Basin. The Piceance Basin is a large, deep structural basin formed during the Laramide orogenic event of late Cretaceous age. Present structural relief between the Piceance Basin and the White River uplift is about 30,000 feet. The site is located on what has been termed the Ohio Creek Formation. The Ohio Creek Formation occurs stratigraphically between the underlying Upper Cretaceous Mesaverde Group and the overlying Paleocene Wasatch Formation. An unconformity separates the two. The Ohio Creek Formation has been placed either just above or just below this unconformity, depending on the scientist. The white, slightly pebbly sandstone of the Ohio Creek is a deeply weathered zone in Mesaverde rocks beneath the unconformity. Overlying conglomerate, which has been mapped as Ohio Creek by some, is a basal conglomerate of the Wasatch Formation in some places. The Tertiary claystone, mudstone, sandstone, siltstone and shales of the Wasatch and Ohio Creek formations are the dominant formations at HIMWF. Soils at the HIMWF are identified Potts loam, which is an alluvial soil derived from sandstone, shale and basalt.

3.5. Hydrology

Site-specific soil investigations indicate that there is no alluvial groundwater within 39 feet of the ground surface at, or in the vicinity of, the facility (see Section 10.1and Appendix 8). Soil borings drilled in the area were advanced to sandstone bedrock at 39 ft. below ground surface (bgs). Within two (2) miles of the HIMWF, there is one (1) small creek, three (2) intermittent creeks and the Colorado River. The surface water features are further discussed in Section 11.1.

3.6. Average annual precipitation

The average annual precipitation in the area is approximately 11.61 inches based on the Western Regional Climate Center records for Rifle, Colorado (Station #057031) (see Appendix 6).

3.7. Average annual evaporation

The average annual evaporation in the area is approximately 57.45 inches based on data from the Western Regional Climate Center evaporation pan data for Montrose, CO (see Appendix 6).

4. 908.b.(5).A: Site Plan

An overall site plan for the existing facility is provided in Appendix 3. Additional detail regarding the site structures and facilities is also provided in Appendix 3.

5. 908.b.(5).B: Survey Drawings

A site survey plan for the facility is shown in Appendix 3.

6. 908.b.(5).C: Access Control Measures

The facility is accessed via Parachute-Una Road and High Mesa road, which leads directly to HIMWF and a nearby compressor station, as shown in Appendix 4: Figure 1.

Card readers control truck traffic that drop off water into the facility from Encana's local operations.

HIMWF is manned 24 hours a day, 7 days a week. The site supervisor is responsible for tracking all visitors to the facility. Wildlife and domestic animal access to HIMWF are controlled through the following measures:

- Six (6) foot high chain link fence around all sides of the pond areas
- Two (2) foot high rodent mesh at base of pond perimeter fence
- Mesh or other coverings on all tank or building openings including vents, stacks, etc.
- Wildlife fencing around the entire flowback pit
- Flowback pit is covered with netting
- No pets are allowed on-site.

There is a grazing lease in section 25, which is owned by Encana near High Mesa, but the water facility fences prevent livestock from entering the pond and equipment areas.

HIMWF complies with Encana's wildlife protection policies, as outlined in the Migratory Bird Treaty Act and Other Wildlife Protection Requirements document (see Appendix 12). Inspection and maintenance of these control measures is conducted regularly, as discussed in the HIMWF O&M Manual (see Appendix 12).

7. 908.b.(5).D: Fire Access

A fire access road with a minimum width of ten (10) feet has been provided adjacent to the active treatment areas, as shown in Appendix 3.

An additional buffer zone with a minimum width of ten (10) feet has been provided along the main access road at the site.

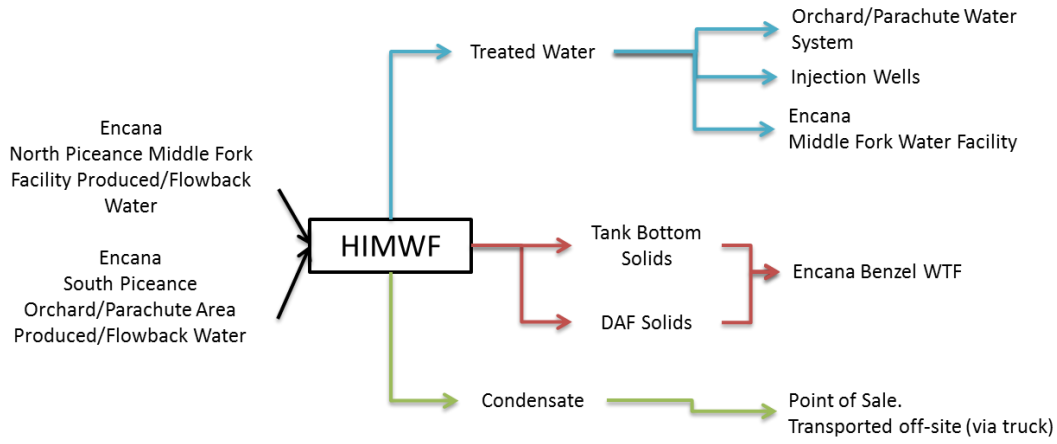
All new access roads are constructed with a four (4) inch course of Class 5 road base on top of a six (6) inch course of Class 2 road base. The facility pad surface was constructed with six (6) inch Class 2 base topped with four (4) inches of Class 5 and final (2) inch Class 6 road base to tighten the wear surface. A Fugitive Dust Control Plan has been provided in Appendix 5.

8. 908.b.(5).E: Surface Water Design

HIMWF has perimeter control BMPs that restrict run-on and eliminate the discharge of sediment and other pollutants. The BMPs include compacted earthen berms, dikes, and sediment basins. The site plan and drawings are found in Appendix 3. Additional surface water information is provided in Appendix 7: HIMWF Stormwater Management Plan and Appendix 15: HIMWF SPCC Plan .

9. 908.b.(6): Waste Profile

9.1. Waste Streams Schematic



9.2. South Piceance Orchard and Parachute Area Produced/Flowback Water

9.2.1. Estimated Volume

HIMWF is sized to treat up to 20,000 barrels per day (bpd) of produced/flowback water from Encana-owned wells in the South Piceance Orchard and Parachute field areas (see Appendix 11 for a list of contributing wells). The maximum throughput currently allowed by the CDPHE APCD Operating Permit is 7,300,000 bbl. per year.

New wells that are drilled within Encana's Orchard and Parachute Field areas will also contribute to HIMWF.

9.2.2. Characteristic Waste Profile

A material safety data sheet (MSDS) for produced water is included in Appendix 14. HIMWF influent is sampled monthly (see paragraph 9.7). Typical characteristics of this fluid are shown in Table 2.

Table 2: Typical Produced/Flowback Water Quality

Component	Typical Range (mg/l)	Average Value (mg/l)
TPH-GRO (C6-C10)	15-260	105
TPH (C10-C28)	73-470	251
Methanol	61-270	150
Total Suspended Solids (TSS)	82-110	92
BTEX	29-59	47

9.3. Treated Water

9.3.1. Estimated Volume

HIMWF on average treats roughly 6,500 bbls of water per day, although this number varies depending upon the water balance within the well field. The treated water is either pumped to support hydraulic fracturing operations in the field area, pumped to Encana's Middle Fork Water Facility (MFWF) or disposed of in Encana-owned injection wells (see the last page of Appendix 11 for a list of injection wells and their API/UIC numbers).

9.3.2. Characteristic Waste Profile

The treated water at HIMWF is sampled monthly (see paragraph 9.7). Typical characteristics of this fluid are shown in Table 3.

Table 3: Typical Treated Water Quality

Component	Typical Range (mg/l)	Average Value (mg/l)
TPH-GRO (C6-C10)	4-21	15
TPH (C10-C28)	66-120	91
Methanol	55-200	122
Total Suspended Solids (TSS)	73-140	99
BTEX	0-35	24

9.4. Tank Bottom and DAF Solids

9.4.1. Estimated Volume

The current sludge volume (without pressing) is estimated as 50 barrels (bbl.) of sludge per 3,500 bbl. of treated water. Thus, based on September 2013 throughput, HIMWF produced approximately 1,930 bbls of sludge. Sludge is gathered in the dedicated sludge tanks and hauled to filter press at Encana's Benzel WTF, as necessary. The High Mesa filter press output is approximately 2 cubic yards of solids per 100 bbls of sludge.

The maximum permitted throughput for the HIMWF is 7,300,000 bbl. per year. At this maximum permitted rate, the sludge volume produced would be roughly 104,285 bbl. per year prior to pressing. After press, roughly 2,086 cubic yards of solids would be output, assuming maximum permitted rate.

9.4.2. Characteristic Waste Profile

A sampling and characterization analysis of Encana's solid waste stream from HIMWF pressed material was undertaken in June 2013, as documented in Appendix 10.

9.5. Condensate

9.5.1. Estimated Volume

Influent to HIMWF has already been flashed at the well pad therefore the volume of condensate entering the site is low. The small condensate volume on-site is obtained by skimming the off-load tanks. The average volume of condensate produced at HIMWF is approximately 121 bbl. per month or 4

bpd (bbl per day). The current maximum volume allowed by the CDPHE APCD Operating Permit is 80 bpd.

The condensate is stored in the Oil Sales Tank prior to being sold and removed by truck. Although this material is included in the waste streams schematic it is not a "waste" as it is an industrial product that is sold for profit.

9.5.2. Characteristic Waste Profile

A condensate MSDS is included in Appendix 14.

9.6. Waste Disposal

All waste that is managed at HIMWF is E&P exempt. The waste characterization requirements for disposal depend on the waste profile criteria at each specific disposal facility. Encana transfers the contents of the sludge tanks from HIMWF to Encana's Benzel WF, where it is pressed on-site and then transported to a waste disposal facility. Ultimately, the waste is disposed of at one of the two facilities described in Table 4, both of which are permitted to accept E&P Exempt Wastes.

Table 4: Waste Disposal Facilities

Disposal Facility	Address	Testing Parameters	Testing Rate	Permit Number
R N Industries	244 West Hwy 40 PO Box 98 Roosevelt, UT 84066 (435) 722-2800	8 RCRA Metals VOC's (8260) TPH (GRO/DRO 8015)	One composite sample per 1,000 cubic yards.	NA E&P facility only – no permit number issued
ECDC (Permit # 9422R1)	1111 West Highway 123 PO Box 69 East Carbon City, Utah 94520 Phone: 435-888-4451	Generator must certify that it is RCRA exempt E&P Waste	None	9422R1

9.7. Water Quality Testing Program

The produced / flowback water influent stream and the treated water effluent stream are sampled monthly for hydrocarbon, methanol and BTEX content in accordance with EPA Approved Methods 8015 and 8260. A rolling twelve (12) month average is kept by Encana. If requested, this data can be reported to the COGCC once per year in accordance with Rule 908.f.

9.8. Naturally Occurring Radioactive Material (NORM)

A NORM sampling and analysis was undertaken in June 2013 (see Appendix 10). This report demonstrates that there are low levels of naturally occurring radionuclides in the samples. There is no evidence of man-made radionuclides in the samples. The material was found to be not hazardous under NRC or other state rules and is acceptable in ordinary landfills.

10. 908.b.(7).A: Facility Design and Engineering - Geology

10.1. Geotechnical Investigation

A geotechnical investigation was carried out in 2007 for HIMWF. This report is included as Appendix 8. The following geology is described by that report:

- 0 –12.5 ft. bgs: stiff to very stiff to hard dry silty clay with some gravel
- 12.5-16 ft. bgs: basalt boulder
- 16-25 ft. bgs: silty clay with some course sand
- 25-30 ft. bgs: slightly moist silty clay with some course sand and gravel
- 30-39 ft. bgs: slightly moist silty clay with interbedded fine-grained to coarse-grained sand
- 39 ft. bgs: sandstone bedrock, no groundwater
- No groundwater was encountered during the investigation

10.2. Structural Geology

See response to Rule 908.b.(4).

10.3. Geologic hazards

No significant geologic hazards have been mapped in the area of HIMWF. Most of the hazards identified in the area of Parachute/Battlement Mesa tend to be in surficial deposits and may include unstable slopes, debris flow and mud deposits, landslide deposits, slump blocks, solifluction, ground subsidence and some soil hazards. . A geologic hazards investigation was completed in 2013 which concluded that there are no apparent geologic hazards in the immediate vicinity of HIMWF. This report is included as Appendix 9.

11. 908.b.(7).B: Facility Design and Engineering – Hydrology

11.1. Surface water features

Local surface water features within two (2) miles are shown in Appendix 4: Figure 5. The site drains to the northwest, which ultimately discharges to the Colorado River. Within two (2) miles of the HIMWF, there is one (1) small creek (Spring Creek to the southwest), two (2) intermittent creeks (Dry Creek to the north and Pete and Bill Creek approximately ½ mile to the south/southwest), and the Colorado River. There is an additional unnamed intermittent drainage to the north.

11.2. Shallow ground water

There is no shallow ground water at the site (see section 3.5).

11.3. Major aquifers

The aquifer underlying the proposed site is the Mesaverde Aquifer (Groundwater Atlas of Colorado – Colorado Geological Survey – 2005) which is not typically the source for water supply wells south of the Colorado River. Very few details are provided on the hydrologic characteristics of the Mesaverde

aquifer, but the Williams Fork Formation (the upper most section of the Mesaverde Group) consists of lenticular, discontinuous sand bodies, as seen in out crop to the east and west of the basin. The Mesaverde Formation is also the source of most of the natural gas produced in the Piceance Basin.

11.4. Local water wells

There are three (3) water wells located within one (1) mile of the site boundary, as shown in Appendix 4: Figure 6. The nearest well is approximately two-thirds (2/3) mile away to the west, and roughly 300 feet lower in elevation with a measured depth to water of roughly 200 feet. Sampling of the three (3) wells will be undertaken by Encana in 2013, assuming access is granted and the wells are not dry. Results of this sampling will be provided in accordance with Rule 908.f.

11.5. Local Floodplains

The site is not located within a designated 100-year floodplain. The local floodplain for the Colorado River is shown in Appendix 4: Figure 4.

11.6. Shallow ground water quality

There is no shallow ground water at the site (see Section 3.5).

11.7. Impact potential

Potential impacts include increased runoff and degraded stormwater water quality due to development. Stormwater runoff quality is being addressed through the use of perimeter control BMPs such as check dams in ditches, revegetation, surface hardening, and sediment basins with outlet control (these perform like extended detention basins for low flows), among others specified within Encana's Stormwater Management Plan (SWMP), found in Appendix 7.

The current Spill Prevention, Control and Countermeasure (SPCC) Plan and Amendment (Appendix 15) demonstrate that the existing secondary containment systems are designed to contain the volume of the largest tank plus precipitation from a 25 year, 24 hour storm event. In addition to this design, two (2) feet of freeboard is maintained on all ponds. The SPCC plan also discusses some of the above listed controls and other measures taken to mitigate the potential impacts from a potential spill event. Stormwater and erosion control inspections are conducted at regular intervals during construction activities. The SPCC Plan is amended annually per EPA rules. Potential impacts to underground formations are mitigated through the use of pond liners.

12. 908.b.(7).C: Facility Design and Engineering – Engineering Data

This facility stores, treats and transfers produced / flowback water as well as residual hydrocarbons and solids. All solids are transferred to Encana's Benzel WF where they are pressed and then trucked off-site to a waste disposal facility. Drawings of the HIMWF are located in Appendix 3.

12.1. Process Description

12.1.1. Influent

Untreated water enters the facility from the following sources:

- Two (2) pipelines
- Truck off-loading on-site

A list of contributing wells and their API numbers is provided in Appendix 11. Flowback or produced water that enters the site is directed into one of the designated tanks or ponds.

This facility is authorized to receive the following influent:

- Flowback and produced water from Encana operated wells in the South and North Piceance SBUs.

Flowback and produced water from other oil and gas operators may be received by this facility on a case-by-case basis through a Colorado Oil & Gas Conservation Commission (COGCC) Rule 502.b variance request and approval with a water sharing agreement in place. No third-party influent will be accepted if doing so violates HIMWF's status as a non-commercial facility.

12.1.2. Treatment Overview

Water is treated on-site by a dissolved air flotation (DAF) process. Untreated water enters the DAF by pumping from the Off-Load Tanks or the Upper Pond (North).

Effluent from the DAF is directed through a series of filters to the Upper Pond (South), Middle Pond or Lower Pond depending upon available storage volumes and water balance requirements. Treated water can be transferred between the Upper Pond (South), Middle Pond or Lower Pond by pumping. Water is stored in these ponds until it is pumped off-site to support hydraulic fracturing or to be disposed of via underground injection.

12.1.3. Discharge for Hydraulic Fracturing

Water used to support hydraulic fracturing is pumped out of the Upper Pond (South), Middle Pond or Lower Pond via pipelines to:

- Orchard/High Mesa
- Middle Fork Water Facility.

12.1.4. Discharge to Injection Wells

Water which cannot be reused within Encana's water system due to the near-term water balance is disposed of via underground injection or pumped to Encana's Middle Fork Water Facility.

12.1.5. Solids Handling

Sludge that accumulates in the Off-Load Tanks is pumped into the Sludge Tanks. Sludge from the DAF unit is pumped into the DAF Sludge Tank. When the sludge tanks are full the contents are pumped out and transported off-site to Encana's Benzel WF for sludge pressing operations.

12.1.6. Condensate Handling

Condensate that accumulates in the Off-Load Tanks is pumped through an Oil-Water Separator to recover the oil. After separation, the oil flows into the Oil Sales Tank while the produced water returns to one of the Off-Load Tanks. When the Oil Sales Tank reach an appropriate level the condensate is sold and transported off-site.

12.2. Permanent Structures and Equipment

An overall site plan for the proposed facility is shown in Appendix 3.

12.2.1. Buildings

The following metal buildings are located at HIMWF:

- DAF Building
- MCC Building
- Office
- Injection Pump Station Building
- Pump Station No. 4 Building
- Power Control Building

12.2.2. Engineered Steel Tanks

The following engineered steel tanks are located at HIMWF:

- Two (2) 5,000 bbl. Off-Load Tanks

The tanks are constructed of stainless steel and are not internally coated.

12.2.3. Standard Steel Tanks

The following standard steel tanks, which comply with API 12F: Specification for Shop Welded Tanks for Storage of Production Liquids, are located at HIMWF:

- One (1) 500 bbl. Oil Sales Tank
- Three (3) 500 bbl. Sludge Tanks
- One (1) 500 bbl. Fresh Water Tank
- One (1) 500 bbl. Surplus Tank (not in use)

12.3. Ponds

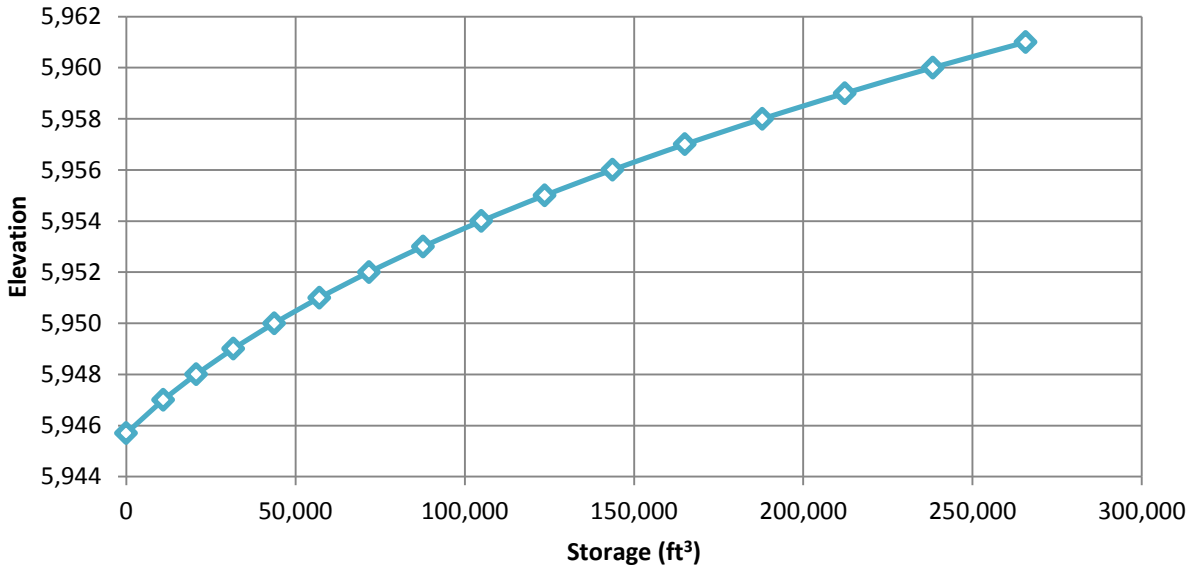
Storage volume details for each pond are shown in the following section. Details of the pond liners, covers, dimensions and leak detection system are included in Appendix 3.

12.3.1. Upper Pond (South)

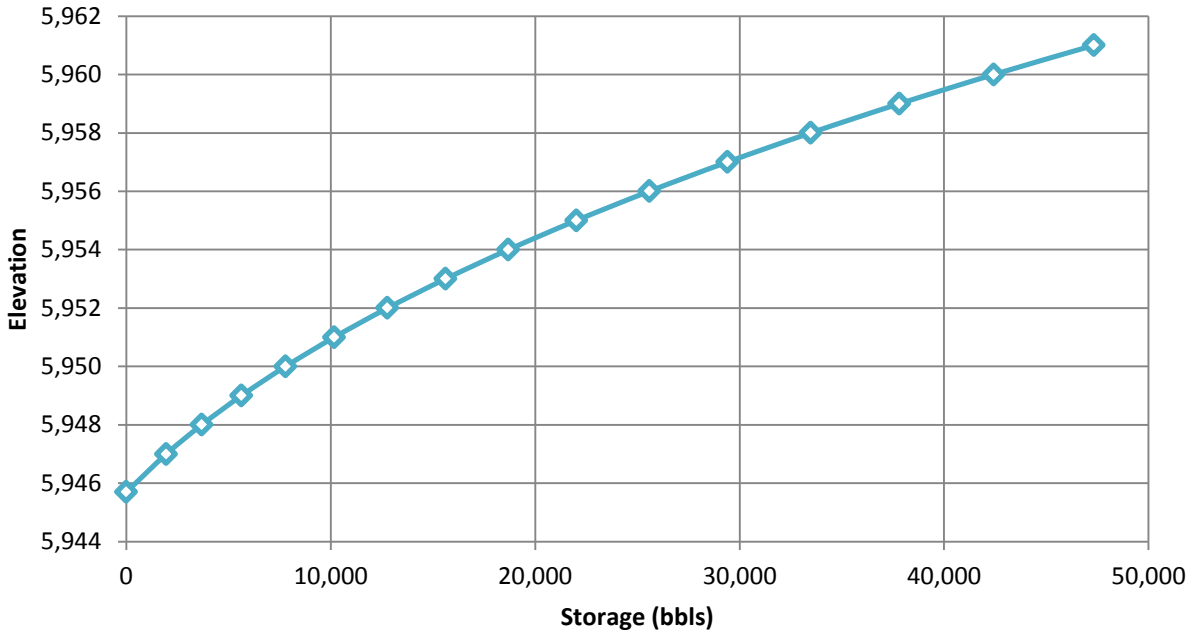
Table 5: Upper Pond (South) Stage-Storage Data

Elevation (ft.)	Area (ft^2)	Depth (ft.)	Incremental Vol. (bbls)	Accumulated Vol. (bbls)	Accumulated Vol. (ft^3)
5,946		0	0	0	0
5,947	8,434	1	1,953	1,953	10,964
5,948	9,722	1	1,731	3,684	20,686
5,949	10,906	1	1,942	5,626	31,592
5,950	12,123	1	2,159	7,785	43,715
5,951	13,366	1	2,380	10,166	57,080
5,952	14,632	1	2,606	12,772	71,712
5,953	15,935	1	2,838	15,610	87,647
5,954	17,280	1	3,077	18,687	104,927
5,955	18,654	1	3,322	22,009	123,580
5,956	20,041	1	3,569	25,578	143,622
5,957	21,439	1	3,818	29,397	165,061
5,958	22,886	1	4,076	33,473	187,947
5,959	24,388	1	4,343	37,816	212,335
5,960	25,916	1	4,615	42,431	238,251
5,961	27,475	1	4,893	47,324	265,726

Graph 1: Upper Pond (South) Stage-Storage Curves (ft^3)



Graph 2: Upper Pond (South) Stage-Storage Curves (bbls)

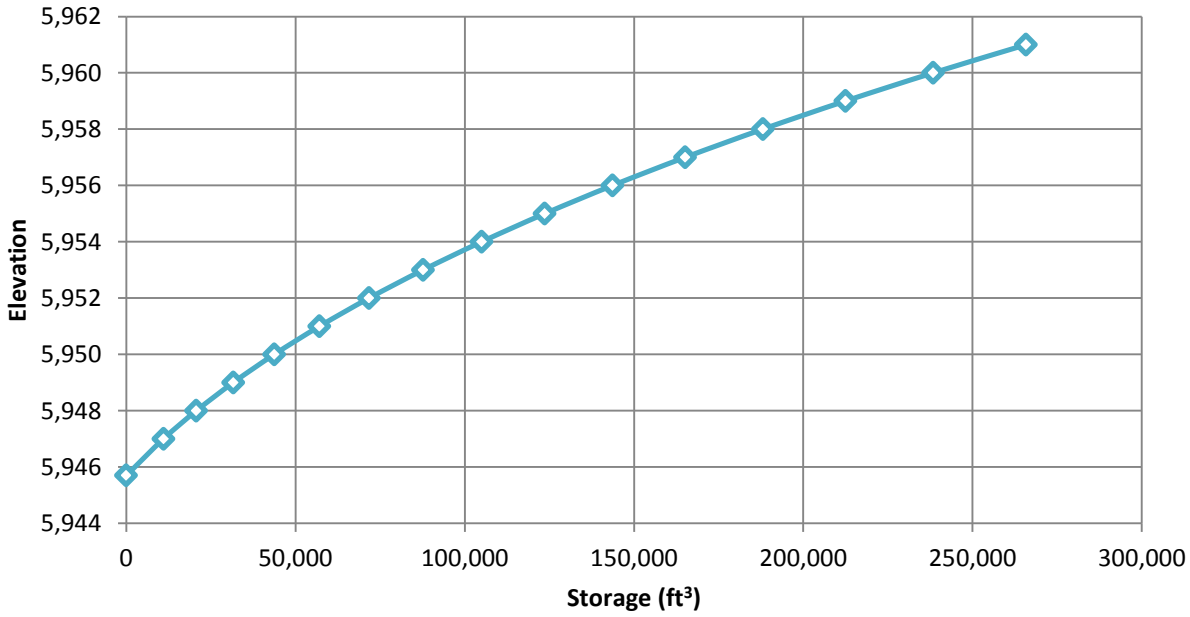


12.3.2. Upper Pond (North)

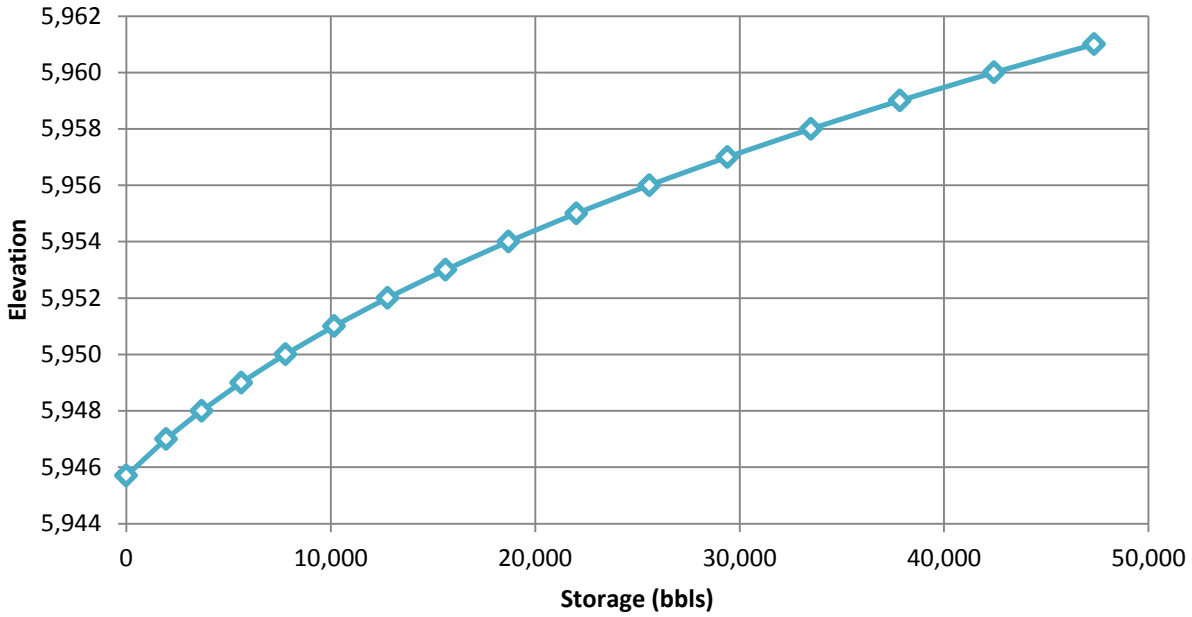
Table 6: Upper Pond (North) Stage-Storage Data

Elevation (ft.)	Area (ft^2)	Depth (ft.)	Incremental Vol. (bbls)	Accumulated Vol. (bbls)	Accumulated Vol. (ft^3)
5,946		0	0	0	0
5,947	8,445	1	1,955	1,955	10,979
5,948	9,718	1	1,731	3,686	20,697
5,949	10,900	1	1,941	5,627	31,597
5,950	12,116	1	2,158	7,785	43,714
5,951	13,366	1	2,380	10,166	57,080
5,952	14,646	1	2,608	12,774	71,726
5,953	15,954	1	2,841	15,615	87,680
5,954	17,284	1	3,078	18,694	104,964
5,955	18,639	1	3,320	22,013	123,604
5,956	20,040	1	3,569	25,582	143,644
5,957	21,479	1	3,825	29,407	165,122
5,958	22,932	1	4,084	33,492	188,054
5,959	24,398	1	4,345	37,837	212,452
5,960	25,902	1	4,613	42,450	238,354
5,961	27,465	1	4,891	47,341	265,819

Graph 3: Upper Pond (North) Stage-Storage Curve (ft^3)



Graph 4: Upper Pond (North) Stage-Storage Curve (bbls)

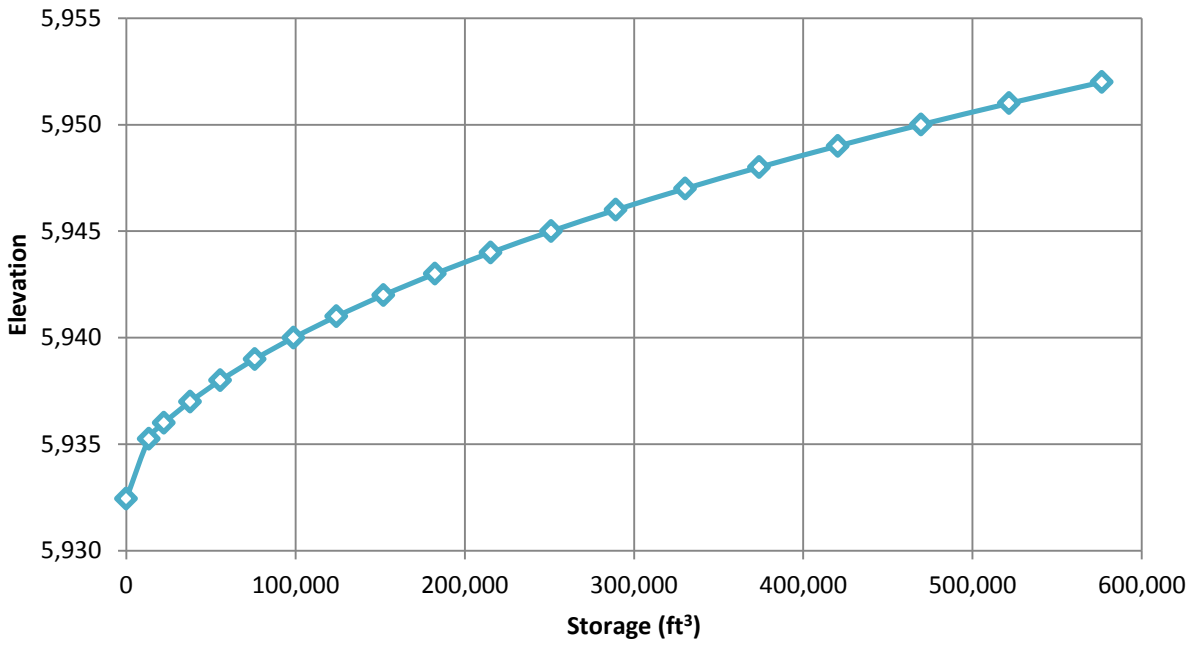


12.3.3. Middle Pond

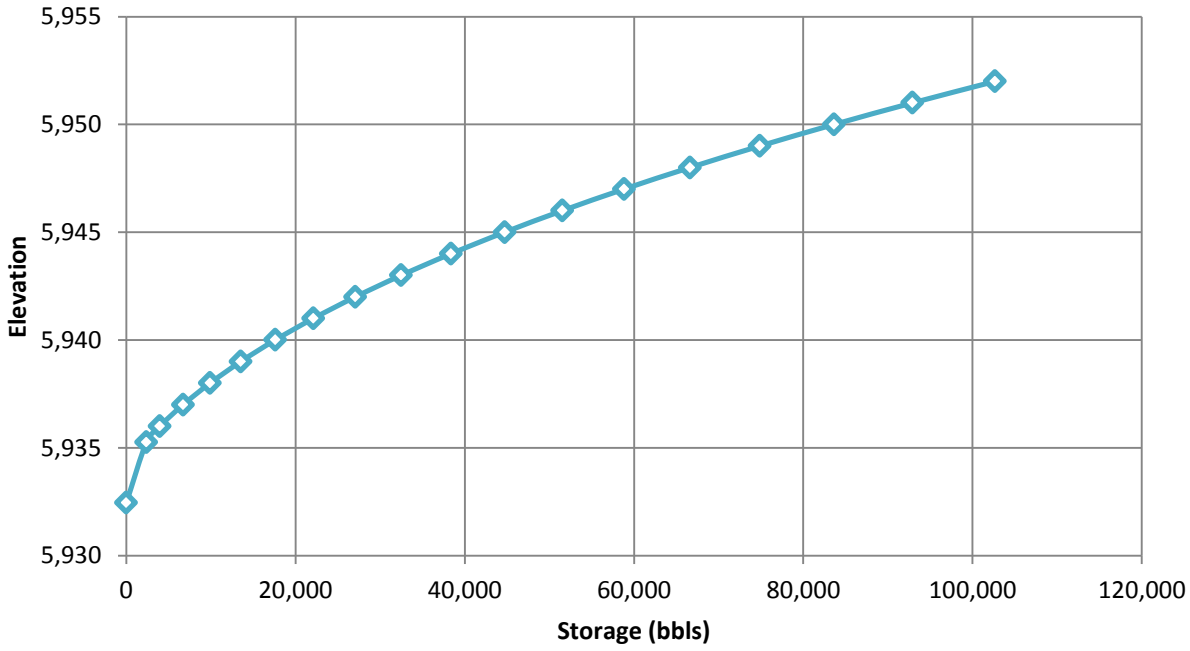
Table 7: Middle Pond Stage-Storage Data

Elevation (ft.)	Area (ft^2)	Depth (ft.)	Incremental Vol. (bbls)	Accumulated Vol. (bbls)	Accumulated Vol. (ft^3)
5,932		0	0	0	0
5,935	4,740	3	2,364	2,364	13,273
5,936	11,889	1	1,588	3,952	22,190
5,937	15,495	1	2,760	6,712	37,686
5,938	17,907	1	3,189	9,901	55,592
5,939	20,351	1	3,624	13,525	75,943
5,940	22,821	1	4,064	17,589	98,764
5,941	25,322	1	4,510	22,099	124,086
5,942	27,854	1	4,961	27,060	151,940
5,943	30,417	1	5,417	32,477	182,356
5,944	33,010	1	5,879	38,356	215,366
5,945	35,634	1	6,346	44,702	251,000
5,946	38,289	1	6,819	51,521	289,289
5,947	40,975	1	7,297	58,819	330,264
5,948	43,691	1	7,781	66,600	373,956
5,949	46,439	1	8,271	74,870	420,395
5,950	49,217	1	8,765	83,636	469,611
5,951	52,026	1	9,266	92,901	521,637
5,952	54,865	1	9,771	102,672	576,502

Graph 5: Middle Pond Stage-Storage Curve (ft^3)



Graph 6: Middle Pond Stage-Storage Curve (bbls)

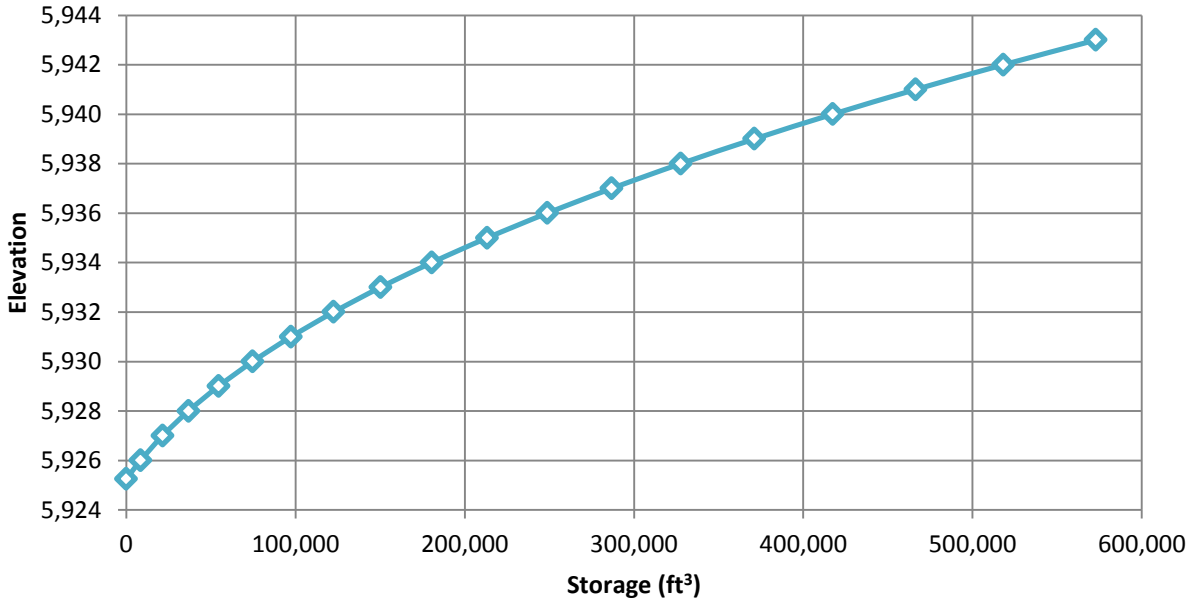


12.3.4. Lower Pond

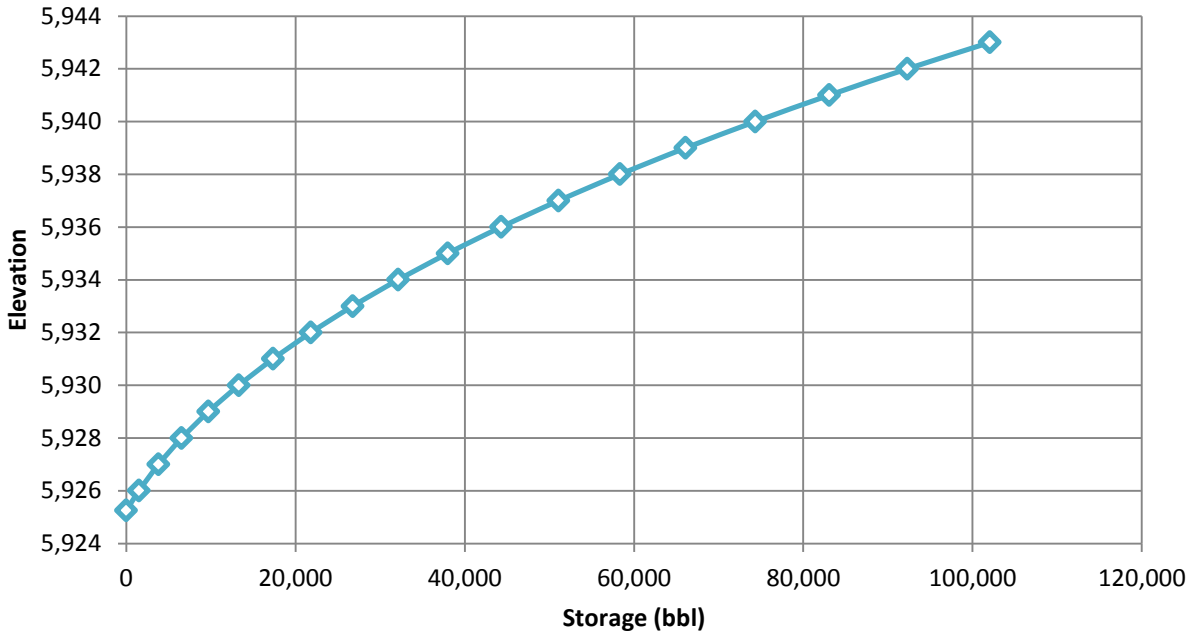
Table 8: Lower Pond Stage-Storage Data

Elevation (ft.)	Area (ft^2)	Depth (ft.)	Incremental Vol. (bbls)	Accumulated Vol. (bbls)	Accumulated Vol. (ft^3)
5,925		0	0	0	0
5,926	11,215	1	1,498	1,498	8,411
5,927	12,976	1	2,311	3,809	21,387
5,928	15,350	1	2,734	6,543	36,737
5,929	17,753	1	3,162	9,704	54,490
5,930	20,189	1	3,596	13,300	74,679
5,931	22,655	1	4,035	17,335	97,334
5,932	25,153	1	4,480	21,814	122,487
5,933	27,681	1	4,930	26,744	150,168
5,934	30,241	1	5,386	32,130	180,409
5,935	32,831	1	5,847	37,977	213,241
5,936	35,454	1	6,314	44,291	248,694
5,937	38,106	1	6,786	51,078	286,800
5,938	40,790	1	7,265	58,342	327,591
5,939	43,505	1	7,748	66,090	371,096
5,940	46,252	1	8,237	74,328	417,347
5,941	49,029	1	8,732	83,059	466,376
5,942	51,837	1	9,232	92,291	518,213
5,943	54,695	1	9,741	102,032	572,909

Graph 7: Lower Pond Stage-Storage Curve (ft^3)



Graph 8: Lower Pond Stage-Storage Curve (bbls)



12.4. Spill Containment

12.4.1. Secondary Containment Design

The majority of the storage provided at HIMWF is in below grade ponds. Secondary containment structures have been provided around all tanks. The secondary containment structures surrounding the tanks are lined with HDPE. Details of the secondary containment locations, sizing and design are located in the SPCC Plan for the site (see Appendix 15). This plan is regularly updated to accommodate any changes to the site.

12.4.2. Truck off-load pad

The truck off-load pad consists of a concrete apron sloped into a trench drain. The proposed design has been used successfully at HIMWF as well as numerous other truck off-load pads throughout Encana's operations. A detail of this design is provided in Appendix 3.

13. 908.b.(8): Operating Plan

An active operations and maintenance (O&M) manual is available for HIMWF (see Appendix 12). Each subsection of Rule 908.b.(8) has been addressed within the HIMWF O&M Manual, as shown in Table 9, with the exception of Rule 908.b.(8).E: Emergency Response Plan. The forms associated with the O&M Manual are found in Appendix 12. The Emergency Response and Evacuation Plans are included in this Form 28 update submittal as Appendix 13.

Table 9: Location of Rule 908.b.(8) Compliance Information in HIMWF O&M Manual

Subsection of Rule 908.b.8	Description of subsection requirement	Corresponding Section of HIMWF O&M Manual
A	Method of treatment, loading rates, and application of nutrients and soil amendments	Section 2.3 Process Description
B	Dust and moisture control	Section 2.4 Dust Control
C	Sampling	Table 1.1 Measurement & Sampling Requirements
D	Inspection and maintenance	Section 6.0 Inspection & Maintenance Schedule
E	Emergency response and evacuation plans	None. See Form 28 submittal Appendix 13
F	Record-keeping	Section 5.5 Monitoring & Reporting Section 7.0 Encana Internal Reporting
G	Site security	Section 5.1 Site Security (Operator Responsibilities)
H	Hours of operation	Section 5.1 Site Security
I	Noise and odor mitigation	Section 2.5 Noise and Odor Mitigation
J	Final disposition of waste	Section 2.4 Process Description

14. 908.b.(9).A: Water Wells

See Section 11.4.

15. 908.b.(9).B: Monitoring Wells

There is no shallow ground water at the site (see section 3.5) and therefore there are no site-specific monitoring wells.

16. 908.b.(10): Surface Water Monitoring

There are no Classified Water Supply Segments within 2,640 feet of HIMWF therefore there is no regular sampling program in place for this location.

17. 908.b.(11): Contingency Plan

17.1. Site Safety / Evacuation Plan

A site specific safety and evacuation plan has been prepared for the facility (see Appendix 13). This plan includes directions to the site, emergency contact information, and designated muster points. This plan is kept on-site at all times.

17.2. Chemicals On-site

Limited quantities of polymer and coagulants used within the DAF process are stored on-site. These chemicals are detailed in Table 10. A Material Safety Data Sheet (MSDS) for each chemical is included in Appendix 14.

Table 10: Chemicals Stored On-Site

Category	Product Use	Product Name	Maximum On-site Volume
Coagulant	Water Clarification / Solids Conditioning Agent	ChemTreat P817E	2,350 gal
Polymer	Water Clarification Agent	ChemTreat P891L	425 gal

17.3. Spill Prevention, Control and Countermeasure Plan

A spill prevention plan is in place for the facility in accordance with EPA regulations. The latest version of the plan (updated in February 2013) is included in Appendix 15. The SPCC plan demonstrates that the secondary containment systems for the tanks are designed to contain the volume of the largest tank plus precipitation from a 25 year, 24 hour storm event. In addition, the ponds are constructed below grade and two (2) feet of freeboard is maintained in them at all times.

17.4. Emergency Response Plan

Encana requires that Emergency Preparedness and Emergency Response Plans (ERP) be in place at Division, Business Unit and Sub-Business Unit levels. These plans are kept current and are supported by training and resources to ensure decisive and effective incident response.

HIMWF is located in Encana's USA Division, South Rockies Business Unit (SRBU) and South Piceance Sub-Business Unit. The current Emergency Notification Chart for SRBU South Piceance is provided in Appendix 13 together with the USA Division Notification and Activation section of the USA Division ERP.

The USA Division ERP facilitates a coordinated response by Division personnel to any emergency situation related to seismic/exploration, construction, drilling, completion, workovers, operations, remediation, reclamation and support services. It describes the procedures which will be implemented, in whole or in part, if an emergency situation occurs during any phase of Encana USA Division operations including, but not limited to, the following types of incidents:

- Serious injury or fatality
- Vehicle related incident

- Major property or equipment damage
- Fire or explosion
- Spill, hazardous materials release, or product release
- Security threat or suspicious activity
- Natural occurrence

18. 908.d: Financial Assurance

Financial assurance, as required by Rule 904 and 907.d, is included in Appendix 16 of this submittal.

19. 908.e: Facility Modifications

Any future major modifications to the facility design, operations plan, permit data or permit conditions will be submitted to the COGCC for prior approval under a Form 4 Sundry notice and in accordance with Rule 908.e.

Any minor modifications to the facility design, operations plan, permit data or permit conditions (from entities other than the COGCC) will be included in the annual report submitted to the COGCC per Rule 908.f.

20. 908.f: Annual Permit Review

An annual HIMWF report will be submitted to the COGCC which will include:

- Types and volumes of solid waste exiting the facility
- Volume of water entering and exiting the facility
- Source water well additions
- Injection well additions
- Surface and/or ground water sampling results
- Any facility modifications, per Rule 908.e.

A rolling twelve month average of the facility influent and effluent water quality is retained by Encana and reported to the Colorado Department of Public Health and Environment (CDPHE) Air Pollution Control Division (APCD) as required for permit compliance. These reports will be available to the COGCC upon request.

21. 908.g.(1).A: Preliminary Closure Plan

HIMWF is expected to operate for twenty (20) years or greater. However, the facility could be closed earlier due to continuously changing natural gas market conditions.

At closure, the following tasks will be undertaken at HIMWF:

- Removal of the following items:
    - Industrial waste and chemicals including bottom solids, polymer and coagulants
    - Equipment including pumps, pipelines, motor control center, etc.
    - Steel tanks
    - Drainage controls
    - Other industrial components, as required by COGCC regulations at the time of closure
- Native soil sampling and analysis for Table 910-1 constituents
- Comparison of closure samples with baseline samples to determine if naturally occurring background concentrations have been exceeded.
- Completion of remediation activities required by soil sampling results.
- Site restoration to pre-facility conditions, including re-contouring and re-vegetating the site, redistribution of topsoil and reseeding.
- Site monitoring to verify that seventy (70) percent of the preexisting vegetation is achieved.
- Final reclamation in accordance with COGCC regulations at the time of closure.

Additional details regarding the revegetation plan are located in Appendix 17: HIMWF Closure and Reclamation Plan.

22. 908.g.(1).B: Preliminary Closure Cost

A closure cost estimate of $50,000 was prepared in 2005, with a Surety Detail updated in 2008 (Appendix 16: HIMWF Financial Assurance). The Closure and Reclamation plan is included in Appendix 17. A sundry and updated cost estimate of $1,000,000 was filed in 2010 (Appendix 18).

23. 908.g.(2): Final Closure Plan

A detailed Site Investigation and Remediation Workplan (Form 27) will be submitted to the COGCC for approval a minimum of sixty (60) days prior to closure of HIMWF.

24. 908.h: Other Permits and Notifications

The following permits and notifications to local governments and other agencies are provided as appendices to this submittal:

- Colorado Department of Public Health and Environment, Air Pollution Control Division
    - Construction Permit O6GA0811, Issued May 31st 2012 (Appendix 19).
- Garfield County
    - Special Use Permit (2010 Resolution) is included in Appendix 20