Coal Combustion Residual (CCR) Units
Initial Closure Plan

Compliance with CCR Rule
US EPA §257.102 Criteria for Conducting Closure or Retrofit of CCR Units

and corresponding

UDEQ Rule 315-319-102 Closure and Post-Closure Care - Criteria for Conducting the Closure or Retrofit of CCR Units

Intermountain Generating Facility
Delta, Utah

Prepared for:
Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, UT 84624

Prepared by:
Stantec Consulting Services, Inc.
8160 South Highland Drive
Sandy, UT 84093

Project No.: 203709098

October 13, 2016

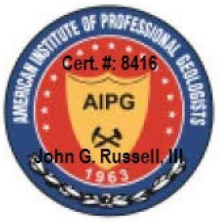
Sign-off Sheet and Signatures of Environmental Professionals

This document was prepared by Stantec Consulting Services Inc. (Stantec) for Intermountain Power Service Corporation (the "Client"). The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

We certify that this *Initial Closure Plan* satisfies the requirements of Coal Combustion Residuals (CCR) Rule § 257.102 and corresponding Utah Department of Environmental Quality (UDEQ) Rule Section R315-319-102.

Prepared by:

John G. Russell, III, CPG
Utah PG #5216074-2250
Sr. Hydrogeologist, Environmental Risk Manager



Reviewed by:

Mark Atencio, P.E.
Utah PE #191306-2202
Sr. Project Manager, Water/Wastewater

Table of Contents

LIST OF FIGURES

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this report to document Intermountain Power Service Corporation's (IPSC) anticipated Coal Combustion Residuals (CCR) unit *Initial Closure Plan* and associated closure program at IPSC's Intermountain Generating Facility (IGF) located approximately 10 miles north of Delta, Millard County, Utah. This closure plan addresses the elements prescribed by both the United States Environmental Protection Agency's (USEPA) *Criteria for Conducting Closure or Retrofit of CCR Units* in the Final CCR Rule (40 C.F.R.§257.102), as well as corresponding Utah Department of Environmental Quality (UDEQ) R315-319-102 *Closure and Post-Closure Care - Criteria for Conducting the Closure or Retrofit of CCR Units*.

This report details IPSC's objectives and anticipated generalized procedures for satisfying CCR unit closure protocol for IPSC's three (3) CCR-regulated units including (reference Figure 1 for locations):

- Combustion By-Products Landfill (CB Landfill, unlined);
- Bottom Ash Basin (UT00463; lined and larger than 40-acres); and
- Waste Water Basin (UT00468; lined and larger than 40-acres).

The CB landfill is underlain by native soils including unconsolidated sands and silts. Both surface impoundments are underlain by 60- to 80-mil High Density Polyethylene (HDPE) liners. Currently, IPSC anticipates closing each CCR unit with CCR being left in place. IPSC's *Initial Closure Plan* provides IPSC's preliminary conceptual design and approach for closing all three CCR units in accordance with the CCR Rule and UDEQ R315-319-102.

The IGF is an operating facility and will continue operation as a coal-fired facility until anticipated conversion to natural gas during the next decade or so. Currently, IPSC is evaluating and planning means for such anticipated conversion to natural gas. Numerous variable factors that may affect precise CCR unit closure protocol and timeframes will be influenced, in part, by future changes to IGF operations and land use during and following the conversion process. As indicated by the CCR Rule, this *Initial Closure Plan* should be considered a preliminary proposed closure approach that is subject to change, contingent upon variable factors associated with future changes to IGF operations and land use.

This report entails *conceptual design* elements for closure, as it is IPSC's intention to pursue final design, including details, specifications, and drawings, as soon as practicable. In accordance with the CCR Rule and UDEQ R315-319-102(b)(3) Amendment of a Written Closure Plan, this *Initial Closure Plan* will be amended to include final design elements and if site-specific conditions and IGF operations change. In turn, it is anticipated that such final design elements will be used during solicitation of bids for actual construction and CCR unit closure proceedings.

2.0 Anticipated CCR Unit Closure Program

This report section presents IPSC's anticipated approach for complying with the CCR Rule and UDEQ R315-319-102. Only those R315-319-102 sub-sections relevant to IPSC's proposed closure program are included below (i.e., specific to CCR **in place** closure).

2.1 R315-319-102(a)

Closure of a CCR landfill, CCR surface impoundment, or any lateral expansion of a CCR unit shall be completed either by leaving the CCR in place and installing a final cover system or through removal of the CCR and decontamination of the CCR unit, as described in Subsections R315-319-102(b) through (j).

At this time, it is anticipated that all three CCR units will be closed by leaving CCR in place. As such, each unit will be closed generally in accordance with measures prescribed by the CCR Rule and UDEQ R315-319-102(d) Closure Performance Standard When Leaving CCR in Place. Specific details are addressed in following report section R315-319-102(d).

2.2 R315-319-102(b)(iii)

If closure of the CCR unit will be accomplished by leaving CCR in place, a description of the final cover system, designed in accordance with Subsection R315-319-102(d), and the methods and procedures to be used to install the final cover. The closure plan shall also discuss how the final cover system will achieve the performance standards specified in Subsection R315-319-102(d).

Final cover system compliance is detailed in following report section R315-319-102(d).

2.3 R315-319-102(b)(iv)

An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit.

The following estimates have been made by IPSC in this regard:

CCR Unit	Est. Max. Inventory
- CB Landfill	16,500,000 cubic yards (cy)
- Bottom Ash Basin (UT00463)	5,000,000 cy
- Waste Water Basin (UT00468)	1,300,000 cy

2.4 R315-319-102(b)(v)

An estimate of the largest area of the CCR unit ever requiring a final cover as required by Subsection R315-319-102(d) at any time during the CCR unit's active life.

The following estimates have been made by IPSC in this regard:

CCR Unit	Est. Max. Areal Extent
CB Landfill	199-acre footprint
Bottom Ash Basin (UT00463)	101-acre surface area
Waste Water Basin (UT00468)	51-acre surface area

2.5 R315-319-102(b)(vi)

A schedule for completing all activities necessary to satisfy the closure criteria in Section R315-319-102, including an estimate of the year in which all closure activities for the CCR unit will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to close the CCR unit, including identification of major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of CCR surface impoundment closure, or installation of the final cover system, and the estimated timeframes to complete each step or phase of CCR unit closure. When preparing the written closure plan, if the owner or operator of a CCR unit estimates that the time required to complete closure will exceed the timeframes specified in Subsection R315-319-102(f)(1), the written closure plan shall include the site-specific information, factors and considerations that would support any time extension sought under Subsection R315-319-102(f)(2).

Estimated closure schedules for each CCR unit at the IGF are provided below. Based on current design information, it is estimated that closure of each unit can be accomplished within the timeframe provided for by the CCR Rule and UDEQ R315-319-102(f)(1).

2.5.1 COMBUSTION BY-PRODUCTS LANDFILL

Rule-Specified Timeframes for Closure of CCR Landfills

In accordance with the CCR Rule and UDEQ R315-319-102(e)(1)(i) Initiation of Closure Activities, the owner or operator of a CCR unit shall commence closure of the CCR unit no later than 30 days after the date on which the CCR unit receives the known final receipt of waste, either CCR or any non-CCR waste stream. In accordance with R315-319-102(f)(i) Completion of Closure Activities, the owner or operator of an existing CCR landfill must complete closure within six (6) months of commencing closure activities. Thus in total, R315-319-102 permits an approximate timeframe of seven (7) months for closure of an existing CCR landfill subsequent to final receipt of CCR waste - as well as a maximum extension time of two (2) additional years under certain conditions specified by R315-319-102(f)(2)(ii)(C) Maximum Time Extensions.

Anticipated Sequential Milestones and Schedule for Closure of the Combustion By-Products Landfill

Each cell of the landfill is filled in two 2-foot horizontal lifts of combustion by-products and then compacted to 90 percent standard proctor density (SPD). The compacted material hardens to a consistency similar to concrete and as such requires no dewatering or stabilization.

Currently, the landfill includes storm water run-on and runoff control features designed for a 50-year storm event. As the landfill is constructed above natural grade, runoff from the area outside the landfill is diverted around the landfill by a diversion berm. The existing berm and runoff control design is anticipated to be satisfactory for the same use following emplacement of the final cover and closure of the landfill. Reference Figure 2 for the location of the outer perimeter storm water diversion berm for the landfill.

A drainage ditch and a 30-foot wide access road are constructed within the diversion berm along the entire perimeter of the landfill to control storm water within the footprint of the landfill. All runoff from the landfill is routed by the drainage ditch to a HDPE-lined runoff retention basin for containment and ultimate disposal by evaporation. It is anticipated that the existing storm water control system will be used to the greatest extent practicable and amended on a localized scale where necessary to accommodate the final cover.

It is anticipated that the CB Landfill will be closed within seven (7) months following final placement of CCR in the unit, in accordance with the CCR Rule and UDEQ R315-319-102(f)(i) Completion of Closure Activities. IPSC anticipates completing all three of the following tasks in advance of final CCR placement within the landfill:

- Final unit closure design will have already been approved by the UDEQ;
- IPSC will have contracted a Construction Contractor; and
- Final cover borrow materials will be located on the IGF property.

Following final placement of CCR within the landfill, subsequent sequential closure tasks are anticipated to include:

1) Re-contouring of final combustion by-product material to accommodate the final cover is anticipated to require an approximate timeframe of one (1) month.

   In light of the physical characteristics of the CCR material, in conjunction with ongoing compaction between lifts, it is anticipated that the CCR material as-placed (i.e., in-situ) will not require additional stabilization. The re-contouring of the final/uppermost CCR lift will include compaction prior to installation of the final cover.

2) Installation of the final cover is anticipated to require an approximate timeframe of five (5) months.

3) Revegetation (native plant seed drilling) is anticipated to require no more than one (1) month.

2.5.2 TWO CCR SURFACE IMPOUNDMENTS

Rule-Specified Timeframes for Closure of Lined CCR Bottom Ash Basin and Waste Water Basin

In accordance with the CCR Rule and UDEQ R315-319-102(e)(1)(i) Initiation of Closure Activities, the owner or operator of a CCR unit shall commence closure of the CCR unit no later than 30 days after the date on which the CCR unit receives the known final receipt of waste, either CCR or any non-CCR waste stream. In accordance with R315-319-102(f)(ii) Completion of Closure Activities, the owner or operator of an existing CCR surface impoundment must complete closure within five (5) years of commencing closure activities. Thus in total, R315-319-102 permits an approximate timeframe of five (5) years and one month for closure of an existing CCR surface impoundment subsequent to final receipt of CCR waste - as well as a maximum extension time of 10 additional years under certain conditions specified by R315-319-102(f)(2)(ii)(B) Maximum Time Extensions.

Anticipated Sequential Milestones and Schedule for Closure of Lined CCR Bottom Ash Basin and Waste Water Basin

Currently, the impoundments include storm water control features designed for a 50-year storm event. Since the impoundment outer berms are constructed above natural grade, runoff from the area outside the impoundments is diverted around the impoundments. The existing runoff control design is anticipated to be satisfactory for the same use following emplacement of the final covers and closure of the impoundments. Reference Figure 2 for the locations of the outer perimeter storm water diversion berms for the surface impoundments.

It is anticipated that the two impoundments will be closed within five years and one month following final placement of CCR in the units, in accordance with the CCR Rule and UDEQ R315-319-102(f)(i) Completion of Closure Activities. IPSC anticipates completing each of the following tasks in advance of final CCR placement within each impoundment:

- Final unit closure design will have already been approved by the UDEQ;
- IPSC will have contracted a Construction Contractor.

Future design will entail evaluation of the following example variables that will influence final closure approaches, construction equipment, and implementation timeframes: in-situ CCR material moisture content and shear strength properties, geosynthetic reinforcement properties, density and drainage capacity of fill materials, geometry of the advancing front of the fill soil placement, sequenced construction lift thicknesses, total weight, and contact pressure of construction equipment.

Conceptual design indicates that the following generalized, sequential closure tasks will be implemented following final placement of CCR within each unit:

1) De-watering of standing water contained within the impoundments with water being pumped and discharged to the 60- to 80-mil HDPE-lined Evaporation Basin complex. It is possible that de-watering may commence in advance of final CCR placement in one or both impoundment units.

2) With standing water removed from the impoundments, to the greatest extent practicable, natural drying of CCR material is anticipated to be conducted during the late spring to early fall generalized timeframe.

3) Assuming drying occurs during the late spring to early fall timeframe, the optimal time for stabilizing near-surface CCR materials is anticipated to be during the fall, with October typically being one of the driest months on average.

3A) Bottom Ash Basin

In light of its physical characteristics, it is anticipated that the CCR material as-placed (i.e., in-situ) within the Bottom Ash Basin should require little to no additional stabilization. The CCR material in this specific CCR unit hardens to a consistency similar to concrete, when dry or of low moisture content, and as such requires no significant stabilization. In the event localized areas of CCR material within the Bottom Ash unit require enhanced stabilization, it is anticipated that drier CCR material from within the CRR unit will be intermixed, followed by compaction as practicable, to provide appropriate stabilization of any such localized area.

3B) Waste Water Basin

In light of its physical characteristics, it is anticipated that much of the CCR material as-placed (i.e., in-situ) within the Waste Water Basin will require supplemental stabilization before the final cover may be constructed. The CCR material in this specific CCR unit is considerably more fine-grained than bottom ash material (i.e., hyper-saturated, unconsolidated material that may pose elastic and localized consolidation settlement issues).

Once dried to the greatest extent practicable, it is anticipated that a pore water management system may be required at select locations within the CCR material to help intercept and remove residual moisture that may be generated during and following construction.

4) Installation of the final cover including revegetation (native plant seed drilling) is anticipated to require an approximate timeframe of several months. It is anticipated that a high-strength geosynthetic cap (to be determined during future design phases; a possible example: 60-mil HDPE) and overlying fill and final cap system will be installed to provide an appropriate long-term cover solution for the impoundments.

2.6 R315-319-102(d)(1)

(d) Closure performance standard when leaving CCR in place.

(1) The owner or operator of a CCR unit shall ensure that, at a minimum, the CCR unit is closed in a manner that will:

(i) Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere;

(ii) Preclude the probability of future impoundment of water, sediment, or slurry;

(iii) Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period;

(iv) Minimize the need for further maintenance of the CCR unit; and

(v) Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

Final design for closure of each CCR unit will be sufficient to satisfy each of the afore-listed criteria. For instance, construction of an appropriate final cover atop each CCR unit will satisfy afore-listed criteria R315-319-102(D)(1)(i), (ii), and (iv), while appropriate de-watering and stabilization of CCR material within each unit, prior to installation of final cover, will satisfy afore-listed criteria R315-319-102(D)(1)(iii). It is IPSC's intent to close each CCR unit in accordance with R315-319-102(D)(1)(v).

2.7 R315-319-102(d)(2)

(2) Drainage and stabilization of CCR surface impoundments. The owner or operator of a CCR surface impoundment or any lateral expansion of a CCR surface impoundment shall meet the requirements of Subsections R315-319-102(d)(2)(i) and (ii) prior to installing the final cover system required under Subsection R315-319-102(d)(3).

(i) Free liquids shall be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues.

(ii) Remaining wastes shall be stabilized sufficient to support the final cover system.

Final design for closure of each CCR impoundment will be sufficient to satisfy each of the afore-listed criteria. For instance, sequential de-watering will remove free liquids from each CCR impoundment to the greatest extent practicable, followed by stabilization, and then installation of the final cover. Stabilization of CCR material will be sufficient to provide appropriate support for each final cover system.

2.8 R315-319-102(d)(3)(i)

(3) Final cover system. If a CCR unit is closed by leaving CCR in place, the owner or operator shall install a final cover system that is designed to minimize infiltration and erosion, and at a minimum, meets the requirements of Subsection R315-319-102(d)(3)(i), or the requirements of the alternative final cover system specified in Subsection R315-319-102(d)(3)(ii).

(i) The final cover system shall be designed and constructed to meet the criteria in Subsections R315-319-102(d)(3)(i)(A) through (D). The design of the final cover system shall be included in the written closure plan required by Subsection R315-319-102(b).

(A) The permeability of the final cover system shall be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1 x 10^{-5} cm/sec, whichever is less.

(B) The infiltration of liquids through the closed CCR unit shall be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.

(C) The erosion of the final cover system shall be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

(D) The disruption of the integrity of the final cover system shall be minimized through a design that accommodates settling and subsidence.

2.8.1 Combustion By-Products Landfill

Since the CB Landfill is not lined but rather underlain by native sand- and silt-rich soil, it is anticipated that the CB landfill will first be graded to the perimeter for appropriate storm water drainag prior to placement of a final cover system characterized by soil material with a vertical permeability no greater than 1×10^{-5} cm/sec. Proposed cover soil material will be characterized in advance to satisfy the criteria of being at least as impermeable as the native underlying sands and silts. Representative samples will be collected from materials proposed for use as cover for vertical permeability testing by a Utah-certified geotechnical engineering laboratory in this regard.

The final cover system will include an infiltration layer that contains a minimum of 18 inches of earthen material and an overlying erosion layer comprised of a minimum of 6 inches of earthen material, which could be sourced from both on or off-site borrow areas, that is capable of sustaining native vegetation.

The disruption of the integrity of the final cover system will be minimized through a final design that accommodates settling and subsidence. Final design and construction associated with backfilling, compaction, and storm water grading of the final cover system will accommodate settlement to minimize maintenance and repair of the cover subsequent to installation.

2.8.2 Two CCR Surface Impoundments

Since the two basins are underlain by 60- to 80-mil HDPE liners, it is anticipated that each of the two CCR surface impoundments will first be capped with material from the impoundment berms and import material, as necessary to provide appropriate stabilization, compaction, and storm water drainage prior to placement of an impermeable, geosynthetic layer such as 60-mil HDPE.

Atop the geosynthetic layer, each final cover system will include an infiltration layer that contains a minimum of 18 inches of earthen material and an overlying erosion layer comprised of a minimum of 6 inches of earthen material that is capable of sustaining native vegetation.

Final design and construction associated with backfilling, stabilization, compaction, and storm water grading of fill material above and below the geosynthetic layer will accommodate settlement and provide appropriate protection to the geosynthetic layer and overlying cover. Design and installation of the geosynthetic layer and overlying cover will satisfy geosynthetic

material stretch limitations and accommodate anticipated settlement, so as to minimize maintenance and repair of the cover subsequent to installation.

IGF PROPERTY BOUNDARY

Combustion By-Products Landfill

Bottom Ash Basin

Waste Water Basin

Non-CCR Regulated, Evaporation Basins

Sugarville

Woodrow

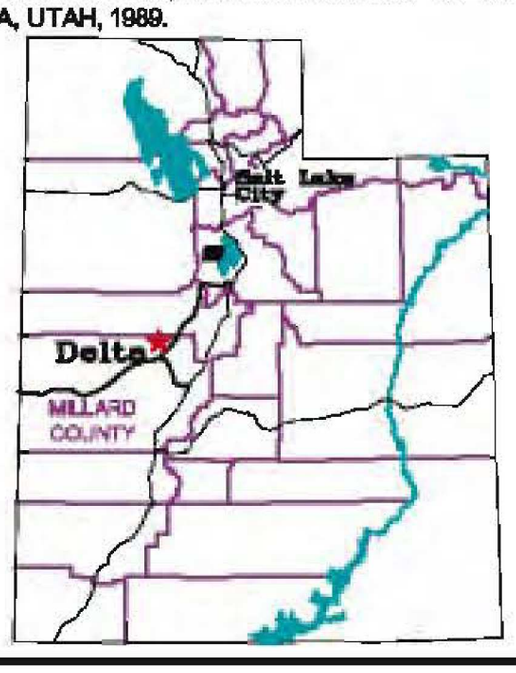
Flowing Wells

North Sugarville Reservoir

BASE FROM USGS 1:100,000 SCALE METRIC TOPOGRAPHIC MAPS: LYNNDAL, UTAH, 1979 AND DELTA, UTAH, 1989.

1 0 1 2 3 4 KILOMETERS

1 0 1 2 MILES



North

CCR-Regulated Units

Delta, Utah

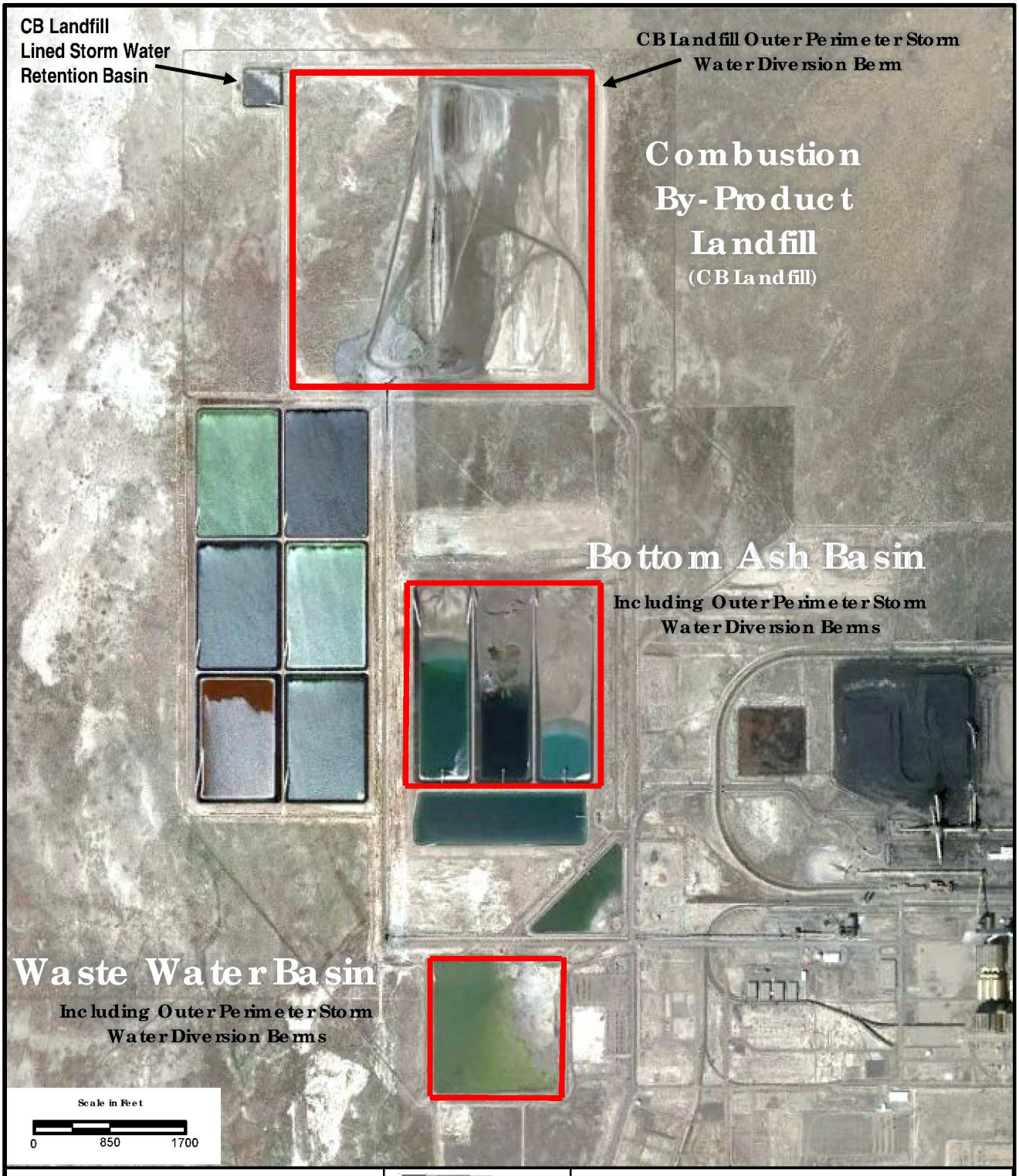
FIGURE 1

GENERAL SITE LOCATION MAP

Stantec

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	REVISION
JR	CP		1"=1000'		

drawings\ipsc-04\Fig2 Site Topographic Map.dwg



Legend

CCR Unit

N

INTERMOUNTAIN GENERATING FACILITY

FIGURE 2
Site-Specific Location Map

Stantec

DRAWN BY	JR
DATE DRAWN	9/30/2016
SCALE	1 in. approx. 1700 ft.
PROJECT	203709098.409