CCR Rule – Siting Criteria
§257.63 Seismic Impact Zones

Dave Johnston Power Plant – Ash Pond

Prepared by:

Water & Environmental
TECHNOLOGIES

Prepared for:

PACIFICORP

Dave Johnston Power Plant

September 12, 2018

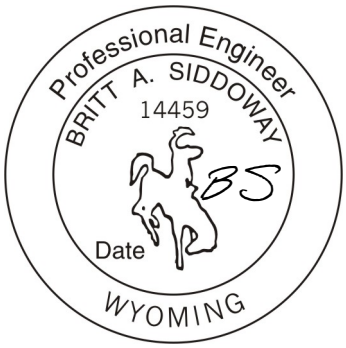
PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify, as a Professional Engineer in the State of Wyoming, that the information in this document was assembled under my direct supervisory control. This report is not intended or represented to be suitable for reuse by PacifiCorp or others without specific verification or adaptation by the Engineer.

I hereby certify as a Professional Engineer in the State of Wyoming that this report has been prepared in accordance with and meets the requirements of 40 Code of Federal Regulations §257.63. Dave Johnston Power Plant Ash Pond meets location criteria for Seismic Impact Zones.

Britt Siddoway — Digitally signed by Britt Siddoway, PE
Date: 2018.09.12 09:30:52 -06'00'

Britt Siddoway, P.E. — 9/12/2018 (Date)



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1.0 INTRODUCTION

PacifiCorp's Dave Johnston Power Plant is located about 5 miles southeast of Glenrock, Wyoming in Converse County. This report addresses the requirements of §257.63 – Seismic Impact Zones, as it pertains to the Ash Pond at the Plant. This report focuses on the current operating conditions of Dave Johnston Ash Pond.

Specifically, §257.63 states "New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in seismic impact zones unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site." The definition of a seismic impact zone is as follows: "Seismic impact zone means an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10g in 50 years."

2.0 EXISTING CONDITIONS

The physical location of the Dave Johnston Power Plant is Section 7, Township 33 North, Range 74 West in Converse County. Dave Johnston is a four-unit coal-fired electrical generation plant owned by PacifiCorp. Bottom ash is slurried to the Ash Pond and spent flue gas de-sulfurization (FGD) scrubber fluids are transported there during upset conditions at the plant. As a result, the Ash Pond is considered a coal combustion residual (CCR) unit (Figure 1). The Ash Pond was initially considered two CCR units – Ponds 4A and 4B. However, due to hydrogeologic and hydraulic communication between the two ponds, they are considered one CCR unit.

The inflows for the Ash Pond include bottom ash slurry from Units 1, 2, and 3, and rainfall that falls on portions of the site. A fixed drop-inlet culvert at the western end of the pond, as well as an emergency spillway box culvert in the southwest corner control the level in the pond. The Ash Pond discharges through a drop-inlet culvert into the 4 Clear Pond where the water is either pumped back to the plant for reuse, or flows to the North Platte River under NPDES Permit No. WY0003115.

3.0 SEISMIC EVALUATION

The Dave Johnston Ash Pond was evaluated using the U.S. Geological Survey (USGS) National Seismic Hazard Mapping Program (NSHMP) Unified Hazard Tool website, which was used to provide the design ground acceleration relating to the design seismic event. For the Dave Johnston Ash Pond site, the above return period is 0.1945g for a site on rock with an average shear wave velocity of 760 m/s in the top 30 m. Therefore, the pond is located within a seismic impact zone.

The structural stability of the pond, embankments, and liner sections are presented in the Periodic Safety Factor Assessment report (Tetra Tech) which has demonstrated these items are

resistant to the maximum horizontal acceleration as required. There are no other structural components which require analysis.

4.0 CONCLUSIONS

The Dave Johnston Ash Pond meets the requirements of §257.63 – Seismic Impact Zones, for an existing CCR surface impoundment.

SOURCES

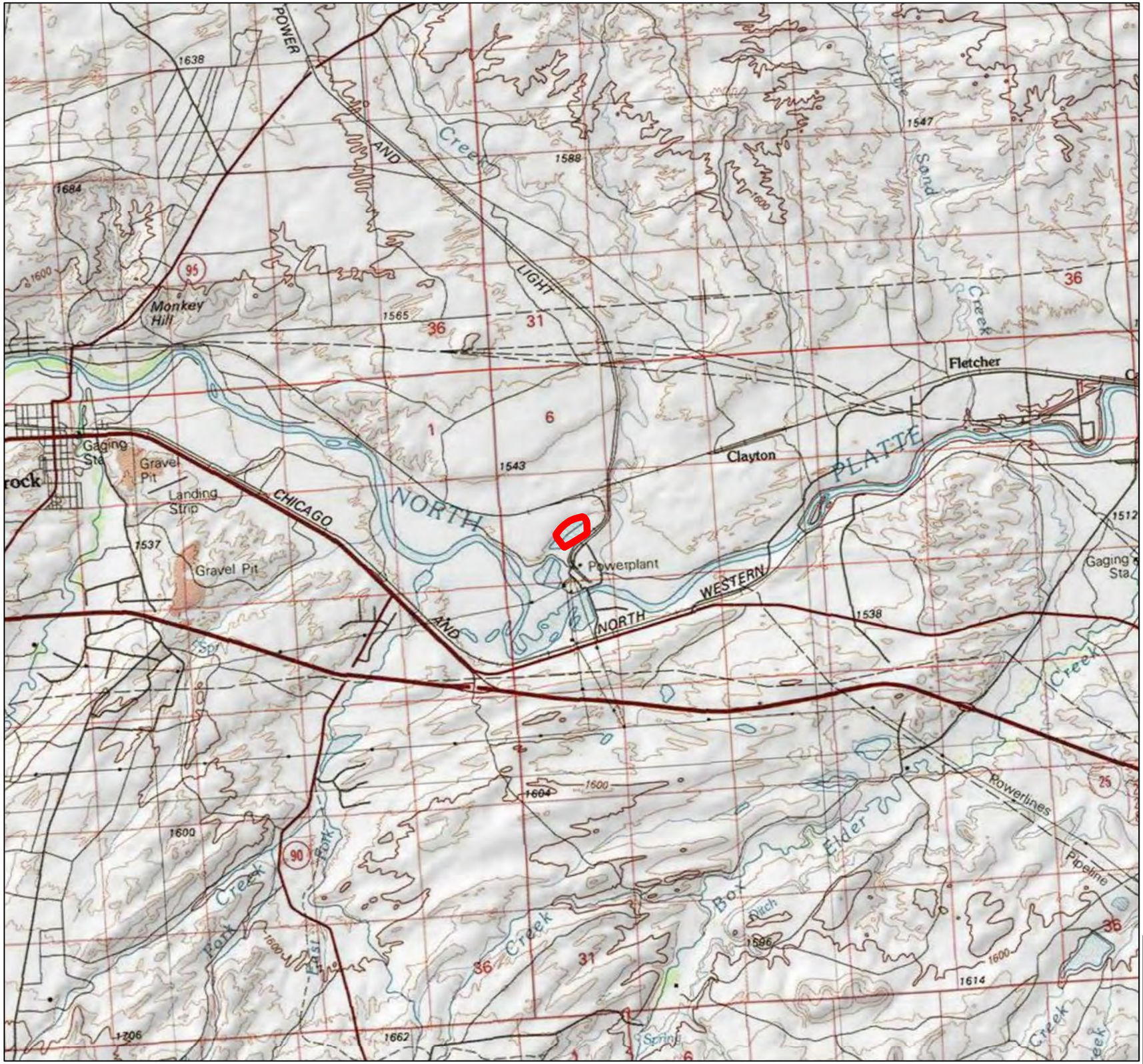
[1] USEPA, 2015. 40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. April 17, 2015. 201 pp.

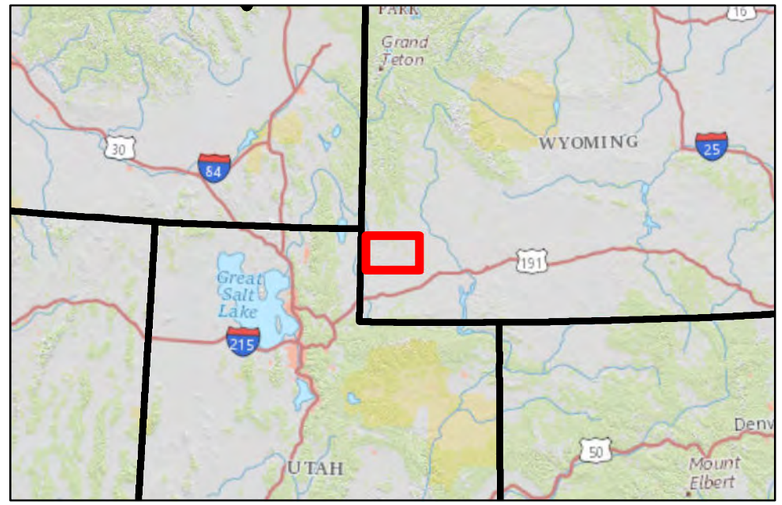
[2] Tetra Tech, CCR Rule Design Criteria, Periodic Structural Stability Assessment, September 30, 2016.

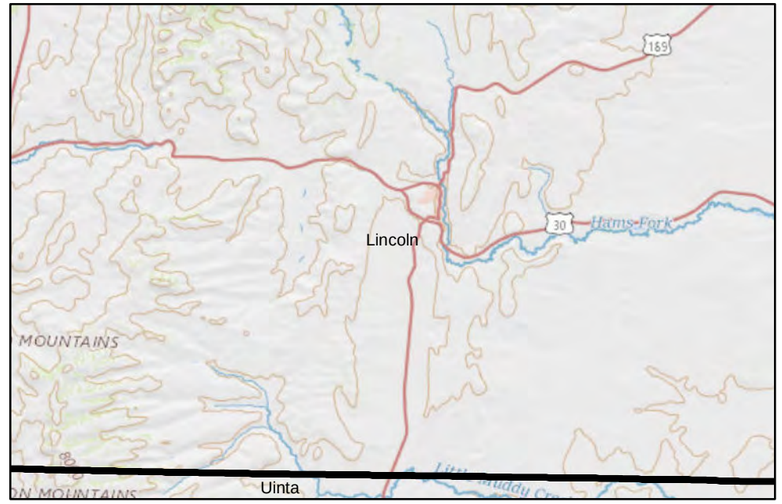
REVISIONS

Revision Number	Date	Revision Made (description)	By Whom
0	9/12/2018	Initial Issue	WET

FIGURES







Legend

CCR UNIT

Feet

0 2,500 5,000 10,000

N W E S

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WET Water & Environmental Technologies

DAVE JOHNSON POWER PLANT

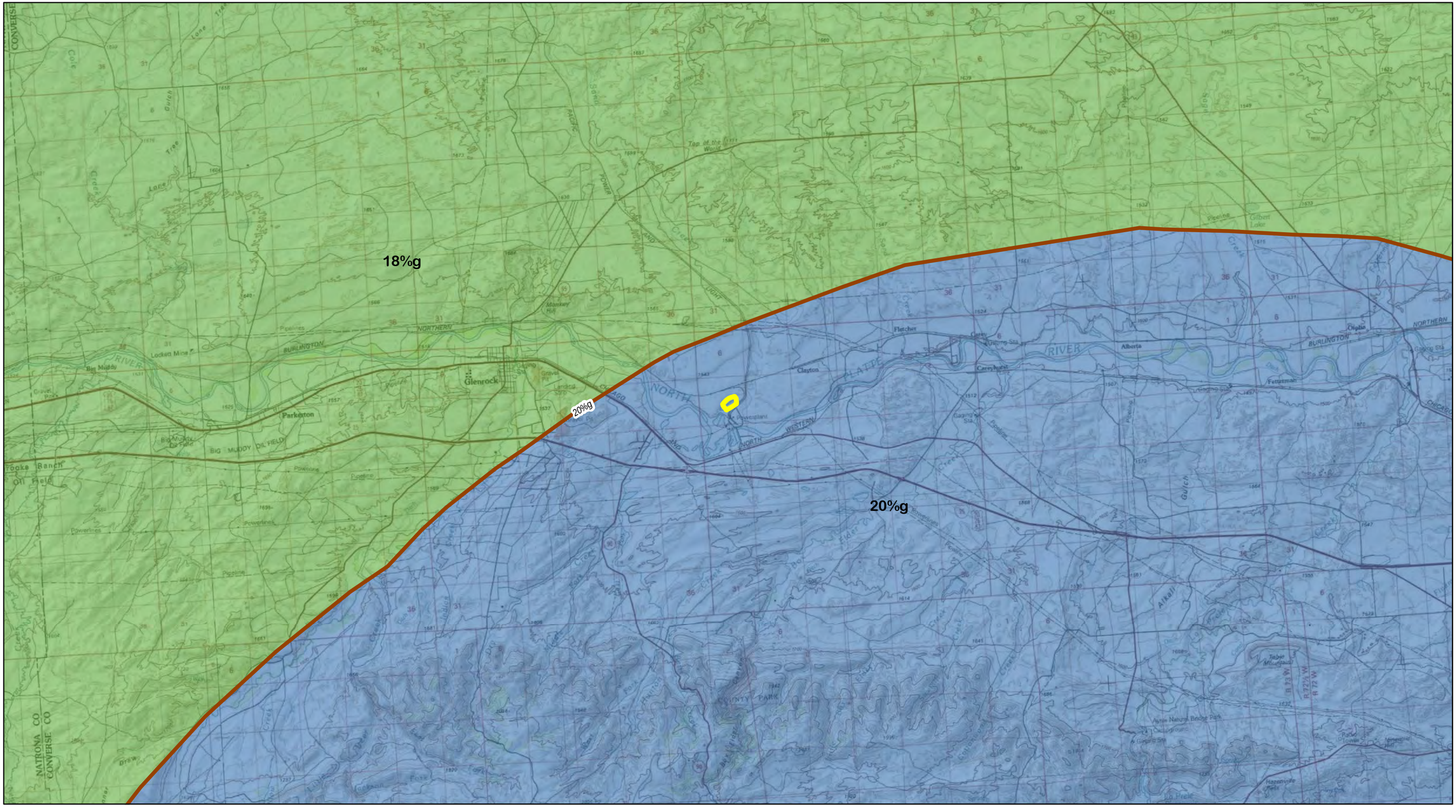
Ash Pond

Job#: PERCM90

Date: 9/11/2018

FIGURE 1

Path: M:\PERC_CCR\PERCM90\vicintymaps.mxd, Author: jleprowse



DAVE JOHNSON POWER PLANT

Ash Pond
Seismic Impact Zone

Job#: PERCM90

Date: 9/11/2018

FIGURE 2

Path: M:\PERC_CCR\PERCM90\seismicimpact.mxd, Author: jleprowse

ATTACHMENT 1

U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (v4.1

Spectral Period

Peak ground acceleration

Latitude

Decimal degrees

42.839023

Time Horizon

Return period in years

2475

Longitude

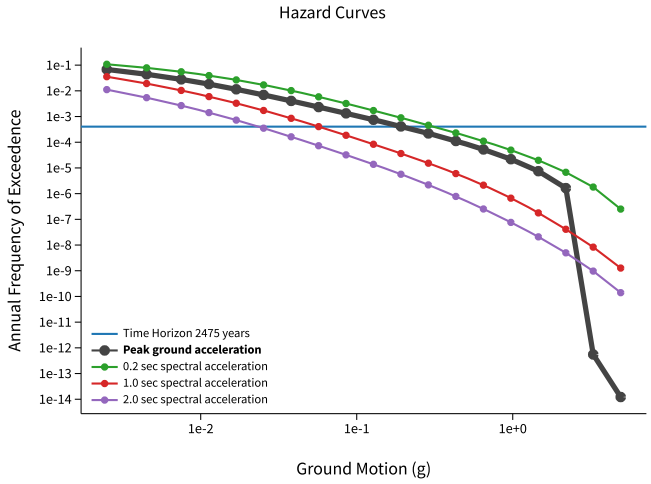
Decimal degrees, negative values for western longitudes

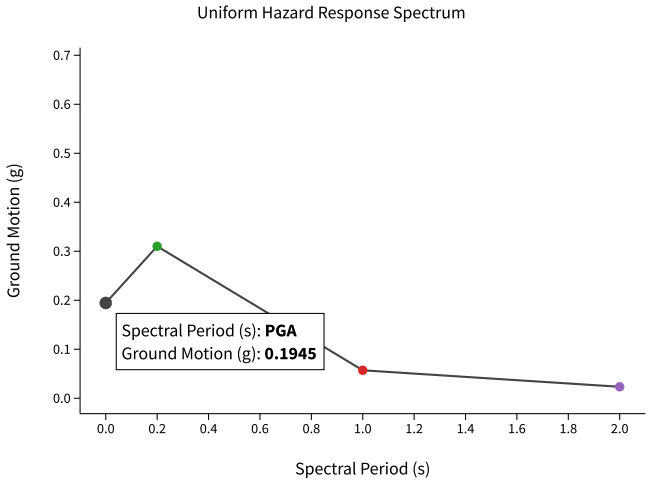
-105.783514

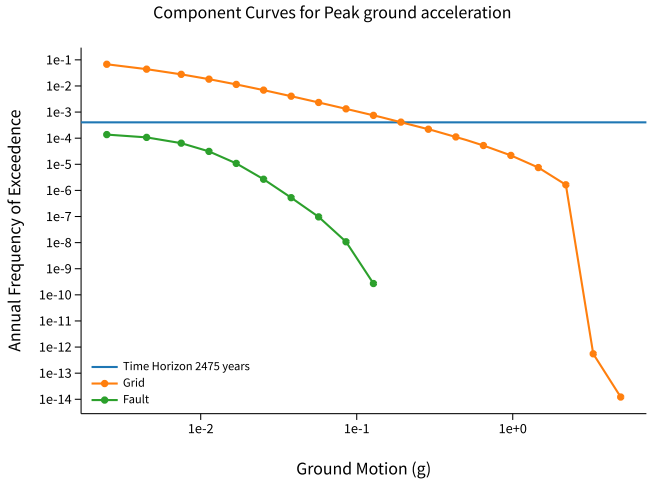
Site Class

760 m/s (B/C boundary)

Hazard Curve





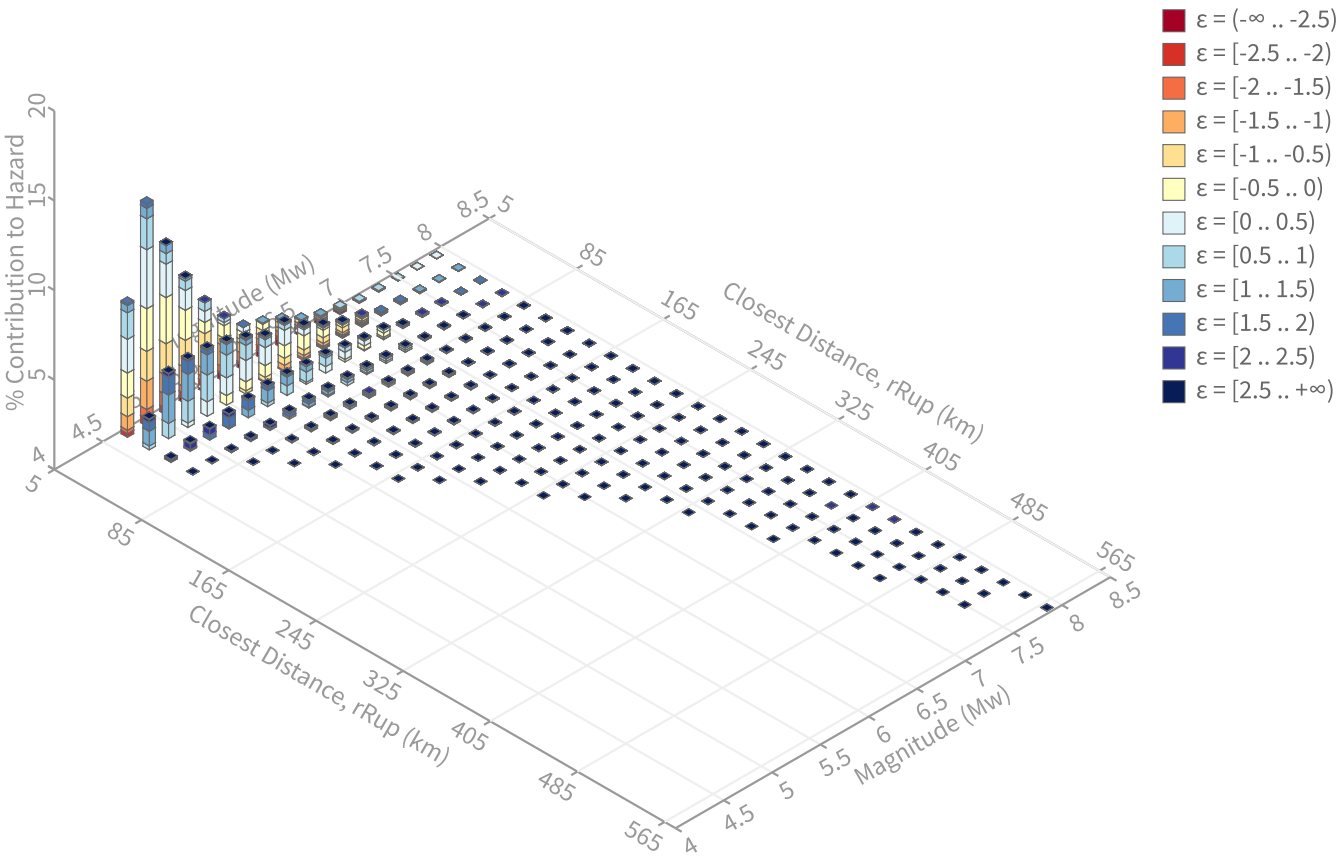


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.19447871 g

Recovered targets

Return period: 2473.4693 yrs
Exceedance rate: 0.00040429044 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 1.06 %

Mean (for all sources)

r: 27.65 km
m: 5.52
ε₀: 0.05 σ

Mode (largest r-m bin)

r: 12.29 km
m: 4.9
ε₀: -0.23 σ
Contribution: 12.39 %

Mode (largest ε₀ bin)

r: 15.42 km
m: 4.89
ε₀: 0.19 σ
Contribution: 3.29 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
SSCn Fixed Smoothing Zone 9 (opt)	Grid							24.82
PointSourceFinite: -105.784, 42.996		17.76	5.34	-0.03	105.784°W	42.996°N	0.00	5.31
PointSourceFinite: -105.784, 42.906		8.89	5.18	-0.96	105.784°W	42.906°N	0.00	4.18
PointSourceFinite: -105.784, 43.086		27.00	5.55	0.46	105.784°W	43.086°N	0.00	2.21
PointSourceFinite: -105.784, 43.041		22.38	5.44	0.26	105.784°W	43.041°N	0.00	2.14
PointSourceFinite: -105.784, 42.951		13.20	5.25	-0.42	105.784°W	42.951°N	0.00	1.91
PointSourceFinite: -105.784, 42.862		5.57	5.14	-1.51	105.784°W	42.862°N	0.00	1.68
PointSourceFinite: -105.784, 43.131		31.59	5.66	0.61	105.784°W	43.131°N	0.00	1.66
PointSourceFinite: -105.784, 43.176		36.16	5.76	0.73	105.784°W	43.176°N	0.00	1.09
PointSourceFinite: -105.784, 43.221		40.73	5.86	0.82	105.784°W	43.221°N	0.00	1.02
USGS Fixed Smoothing Zone 3 (opt)	Grid							24.82
PointSourceFinite: -105.784, 42.996		17.76	5.34	-0.03	105.784°W	42.996°N	0.00	5.31
PointSourceFinite: -105.784, 42.906		8.89	5.18	-0.96	105.784°W	42.906°N	0.00	4.18
PointSourceFinite: -105.784, 43.086		27.00	5.55	0.46	105.784°W	43.086°N	0.00	2.21
PointSourceFinite: -105.784, 43.041		22.38	5.44	0.26	105.784°W	43.041°N	0.00	2.14
PointSourceFinite: -105.784, 42.951		13.20	5.25	-0.42	105.784°W	42.951°N	0.00	1.91
PointSourceFinite: -105.784, 42.862		5.57	5.14	-1.51	105.784°W	42.862°N	0.00	1.68
PointSourceFinite: -105.784, 43.131		31.59	5.66	0.61	105.784°W	43.131°N	0.00	1.66
PointSourceFinite: -105.784, 43.176		36.16	5.76	0.73	105.784°W	43.176°N	0.00	1.09
PointSourceFinite: -105.784, 43.221		40.73	5.86	0.82	105.784°W	43.221°N	0.00	1.02
SSCn Adaptive Smoothing Zone 9 (opt)	Grid							24.76
PointSourceFinite: -105.784, 42.996		17.76	5.34	-0.03	105.784°W	42.996°N	0.00	5.28
PointSourceFinite: -105.784, 42.906		8.89	5.18	-0.96	105.784°W	42.906°N	0.00	4.04
PointSourceFinite: -105.784, 43.086		27.00	5.55	0.46	105.784°W	43.086°N	0.00	2.37
PointSourceFinite: -105.784, 43.041		22.38	5.44	0.26	105.784°W	43.041°N	0.00	2.15
PointSourceFinite: -105.784, 42.951		13.20	5.25	-0.42	105.784°W	42.951°N	0.00	1.70
PointSourceFinite: -105.784, 42.862		5.57	5.14	-1.51	105.784°W	42.862°N	0.00	1.67
PointSourceFinite: -105.784, 43.131		31.59	5.66	0.61	105.784°W	43.131°N	0.00	1.59
PointSourceFinite: -105.784, 43.176		36.16	5.76	0.73	105.784°W	43.176°N	0.00	1.34
PointSourceFinite: -105.784, 43.221		40.73	5.86	0.82	105.784°W	43.221°N	0.00	1.05
USGS Adaptive Smoothing Zone 3 (opt)	Grid							24.76
PointSourceFinite: -105.784, 42.996		17.76	5.34	-0.03	105.784°W	42.996°N	0.00	5.28
PointSourceFinite: -105.784, 42.906		8.89	5.18	-0.96	105.784°W	42.906°N	0.00	4.04
PointSourceFinite: -105.784, 43.086		27.00	5.55	0.46	105.784°W	43.086°N	0.00	2.37
PointSourceFinite: -105.784, 43.041		22.38	5.44	0.26	105.784°W	43.041°N	0.00	2.15
PointSourceFinite: -105.784, 42.951		13.20	5.25	-0.42	105.784°W	42.951°N	0.00	1.70
PointSourceFinite: -105.784, 42.862		5.57	5.14	-1.51	105.784°W	42.862°N	0.00	1.67
PointSourceFinite: -105.784, 43.131		31.59	5.66	0.61	105.784°W	43.131°N	0.00	1.59
PointSourceFinite: -105.784, 43.176		36.16	5.76	0.73	105.784°W	43.176°N	0.00	1.34
PointSourceFinite: -105.784, 43.221		40.73	5.86	0.82	105.784°W	43.221°N	0.00	1.05