



# Oregon

Kate Brown, Governor



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**To:** Oregon Energy Facility Siting Council

**From:** Sarah Esterson, Senior Siting Analyst

**Date:** November 30, 2018

**Subject:** Agenda Item D (Action Item) – Carty Generating Station – Council Review of Proposed Order on Request for Amendment 1 for the December 14, 2018 EFSC Meeting

**Attachments:** Attachment 1: Proposed Order on Request for Amendment 1  
Attachment 2: Comments on Proposed Order

## Background

The Oregon Energy Facility Siting Council (Council) issued a site certificate for the Carty Generating Station (facility) to Portland General Electric (certificate holder) on June 29, 2012, authorizing construction and operation of a natural-gas powered energy facility with a generation capacity up to 900 megawatts (MW) and related or supporting facilities. The site certificate authorized the facility to be constructed in two phases. The first phase, which was constructed and is operational, includes a 450 MW combined cycle combustion turbine and its associated components - a heat recovery steam generator, steam turbine generator, natural-gas fueled auxiliary boiler, and cooling tower cell. Additional related and supporting facilities in operation include the Grassland Switchyard, onsite 500 kV interconnection transmission line (Unit 1 to Grassland Switchyard), interconnecting water pipelines, sewer lines, liquid storage facilities, accessory buildings, utility lines, roads and temporary laydown areas.

The second phase originally authorized by the site certificate, including the second 450 MW combined cycle combustion turbine and its associated components, and related or supporting facilities, were not constructed by the applicable deadline (September 2016) and therefore, through the amendment request currently under review, the certificate holder acknowledges, and requests removal of conditions no longer applicable, that it no longer maintains authority to construct or operate these previously approved components.

The approved facility site boundary includes approximately 2,400 acres within Morrow and Gilliam counties.

The certificate holder submitted its initial Request for Amendment 1 (RFA1) in August of 2016. The initial RFA1 requested approval to:

- Increase the area within the site boundary from 2,400 to 2,918 acres
- Extend the construction start deadline for the second 450 MW natural-gas fired combined cycle combustion turbine generator (Unit 2) and its related or supporting facilities by two years
- Increase the nominal capacity of Unit 2 from 450 to 530 MW and total nominal capacity of the facility from 900 to 1,360 MW
- Construct and operate a 330-MW natural gas-fired, simple-cycle combustion turbine generator (Unit 3) and associated plant additions
- Construct and operate a 50-MW photovoltaic solar unit
- Construct and operate proposed related or supporting facilities including a 500 kV substation; interconnecting transmission lines and associated lattice steel structures; and, depending on final design, could include additional water pipelines, utility power lines, control and communication systems, and other support systems
- Amend Water Pollution Control Facilities Permit, as issued by Oregon Department of Environmental Quality but governed by site certificate, to allow disposal of solar panel washwater and,
- Amendment and removal of several site certificate conditions

On September 22, 2016, the certificate holder formally requested a temporary suspension of processing the initial RFA1. The certificate holder requested, on December 14, 2016, that the Department re-initiate review of the initial RFA1, as submitted in August 2016. On May 12, 2017, the certificate holder again requested that the Department suspend its review. On October 27, 2017, the certificate holder notified the Department of its intent to modify the amendment request by removing the request to extend the construction commencement and completion deadlines of previously approved but not yet constructed components including Unit 2 and its supporting facilities, and the 18 mile 500 kV transmission line. The certificate holder also indicated that the following components included in its initial RFA1 were no longer proposed: Unit 2 upgrade; and, the 330 MW natural gas-fired simple cycle combustion turbine generator (Unit 3) and its associated facilities.

The certificate holder submitted revised RFA1 in February 2018, currently under review. The revised RFA1 includes the following components:

- Construction and operation of a 50 megawatt (MW) photovoltaic solar unit on approximately 315 acres
- Construction and operation of a 2.25 to 3-mile 34.5 kilovolt (kV) interconnection transmission line

- Approval for five interconnection transmission line routing options and three interconnection options
- Use of temporary construction laydown and parking areas
- Removal of reference to previously approved but not yet constructed Unit 2, Unit 2 associated components, and Unit 2 related and supporting facilities
- Amendment of the site boundary (from 3,800 to 1,581 acres) to include the perimeter of proposed components and to allow flexibility during final design
- Amend Water Pollution Control Facilities Permit, as issued by Oregon Department of Environmental Quality but governed by site certificate, to allow disposal of solar panel washwater and,
- Amendment and removal of several site certificate conditions

Because the original amendment request was submitted in August 2016, the amendment review process is based on OAR 345, Division 27 in effect at the time that the amendment was initially submitted to the Department. Under those rules, the Department prepares and releases a proposed order only, not a draft proposed order, and there is only combined opportunity to submit written comments and requests for contested case on the proposed order. Under the old rules, there is not an opportunity for a public hearing. All other applicable rules, such as Council standards, are those in effect at the time the Council decides on the merits of the RFA.

On November 9, 2018, the Oregon Department of Energy (Department) issued its proposed order on revised RFA1, and also issued public notice of a public comment period and opportunity to request a contested on the proposed order. The comment period and opportunity to request a contested case extends from November 9 through December 10, 2018, representing a 30-day duration. The notice clarified that the revised amendment request and proposed order are being processed under the amendment rules in effect prior to October 2017, and included a copy of the old rules as an attachment.

To date, the Department has received 5 comments from the following reviewing agencies and Tribal Government: Oregon Department of Environmental Quality; Oregon Department of Geology and Mineral Industries; Oregon Department of State Lands; Oregon Department of Aviation; and Confederated Tribes of Warm Springs Reservation of Oregon. To date, public comments or requests for contested case on the proposed order have not been received.

This memo is intended to assist the Council in its review of the proposed order and comments received. Any additional comments or requests for contested case on the proposed order received prior to the December 10, 2018 comment deadline will be provided to Council in a supplemental staff report prior to the December 14, 2018 Council meeting.

The Department recommends that the Council find that with existing site certificate conditions and recommended new or amended site certificate conditions, the certificate holder has the ability to design, construct, and operate the facility, with proposed changes, in compliance with all Council standards.

### **Staff Evaluation of Amendment Request**

The Department evaluated the revised amendment request against each applicable Council standard, and considered comment letters received on the revised RFA1 from reviewing agencies and the public. As described in the proposed order, the Department recommends that the Council find that the components included in the revised RFA1 would not change the certificate holder's ability to design, construct, operate, and retire the facility in compliance with the following Council standards, subject to compliance with the existing site certificate conditions:

- Protected Areas
- Scenic Resources
- Recreation
- Waste Minimization
- Noise Control Regulations
- Removal Fill Law
- Water Rights

For the standards and regulations listed above, the proposed order does not recommend any new conditions or changes to existing conditions in the site certificate. The Department recommends that Council impose several new or modified conditions to ensure compliance with the remaining applicable EFSC standards, which are briefly described below.

- **General Standard of Review (Recommended New and Amended Conditions):**
  - Department recommends Council amend Conditions 4.1 and 4.2 to impose a 3-year construction commencement deadline, and 6-year construction completion deadline, from the effective date of the site certificate.
  - Department recommends Council impose Condition 6.26, consistent with Site Specific Condition at OAR 345-025-0010(5), to establish the length and width of the approved corridor applicable to the proposed 34.5 kV transmission line.
- **Organizational Expertise (Recommended New Condition):** Department recommends Council impose a condition requiring that, prior to construction, the certificate holder demonstrate that its third-party contractor obtains a limited water use license for construction-related water use and that, during construction, its third-party contractor maintain compliance with license conditions.
- **Soil Protection (Recommended Amended Condition):** Department recommends Council amend a condition to incorporate requirements applicable to disposal of solar panel washwater as proposed by the Oregon Department of Environmental Quality for the WPCF amendment included in the revised RFA1.

- **Structural Standard (Recommended Amended Condition):** Department recommends Council amend a condition requiring a pre-construction site-specific geotechnical investigation for the proposed site boundary expansion areas based on the certificate holder's proposed geotechnical actions represented in the amendment request to adequately characterize seismic and non-seismic site risks.
- **Land Use (Recommended New Condition):** Department recommends Council impose a new condition, consistent with Morrow County Zoning Ordinance Section 3.010(K)(3)(i), requiring that, prior to construction, the certificate holder record in the real property records a covenant not to sue with regard to generally accepted farming practices.
- **Retirement and Financial Assurance (Recommended Amended Condition):** Department recommends Council amend condition to update the amount necessary to decommission the facility, with proposed changes, and as necessary to be provided in a bond or letter of credit to the Department prior to construction.
- **Fish and Wildlife Habitat (Recommended Amended Conditions):**
  - Department recommends Council amend a condition, requiring implementation of a Revegetation and Weed Control Plan, removing reference to Gilliam County as there are no longer facility components approved to be located within this county. The Department, in consultation with Oregon Department of Fish and Wildlife (ODFW), also recommends amendments to the Revegetation and Weed Control Plan in efforts to better track and achieve revegetation success within temporarily disturbed habitat areas. The revised plan is included as an attachment to the proposed order.
  - Department recommends Council amend a condition requiring that, prior to construction, the certificate holder provide a habitat assessment of the habitat mitigation site demonstrating sufficient quantity and quality of habitat necessary to achieve compliance with ODFW's habitat mitigation goals.
- **Threatened and Endangered Species (Recommended Amended Condition):** Department recommends Council amend a condition specifying that pre-construction surveys be conducted for Lawrence Milkvetch and Washington ground squirrels.
- **Historic, Cultural and Archeological Resources (Recommended Condition Removal):** Department recommends Council remove conditions applicable to an archeological resource based on the certificate holder's subsequent evaluation and concurrence by the Oregon State Historic Preservation Office that there is no evidence of the site within the previously identified area.

- **Public Services (Recommended Amended and New Conditions):**
  - Department recommends Council amend a condition, based on certificate holder's representations, related to a Construction Traffic Management Plan to ensure minimization of potential traffic-related impacts on Tower Road.
  - Department recommends Council impose new condition, based on certificate holder's representation, that a Traffic Impact Assessment would be conducted if a pre-construction analysis identifies that more than 400 passenger equivalent trips per day would be generated, as required by MCZO Section 3.010(N).
  
- **Siting Standards for Transmission Lines (Recommended Amended Conditions):**

Department recommends Council amend a condition to reference an update in the National Electric Safety Code applicable to the proposed 34.5 kV transmission line

Based upon compliance with existing site certificate conditions, and recommended new, modified and removed site certificate conditions, the Department recommends in the proposed order that Council conclude that the facility, with proposed changes, would comply with the applicable Council standards, rules, and statutes.

### **Comments on the Proposed Order**

#### *Reviewing Agency and Tribal Government Comments*

- **Oregon Department of Environmental Quality:** Requested that Conditions 10.33 and 10.34, which apply to facility wastewater and evaporation ponds, not be removed from the site certificate, as they are substantially similar to conditions in the Water Pollution Control Facilities Permit (WPCF) – a permit governed by the site certificate. The Department recommends Council agree not to delete the conditions, but acknowledge that even if deleted, the certificate holder would be obligated to comply with the conditions in the WPCF (per a separate existing condition).
- **Oregon Department of State Lands:** Commented confirming that a wetland delineation concurrence had been issued for the amended site boundary area. The Department recommends Council consider changes to the proposed order unnecessary to address this comment.
- **Oregon Department of Geology and Mineral Industries:** Commented confirming concurrence with the characterization of seismic and non-seismic risks of the site and the certificate holder's demonstrated ability to design, construct and operate the proposed facility modifications to avoid such hazards. The Department recommends Council consider changes to the proposed order unnecessary to address this comment.
- **Oregon Department of Aviation:** Commented requesting that the proposed 34.5 kV transmission line be marked as it would be located in an aviation corridor. The Department notes that the proposed transmission line structures would be 70 feet in height, and would not require evaluation under the FAA Notice of Proposed Construction or Alteration (7460 review process) nor marking and lighting. However, if

the certificate holder voluntarily agrees to equip the proposed transmission line structures with marking, during the comment period, the Department would incorporate the representation into the discussion of the transmission line design.

- **Confederated Tribes of Warm Springs Reservation of Oregon:** Commented requesting that any new site boundary areas be surveyed for potential tribal resources. As described in Section III.K. *Historic, Cultural and Archeological Resources*, the certificate holder's consultant conducted a desktop review and conducted a field-based survey of the expanded site boundary for the proposed solar farm and related or supporting facilities. The results of those surveys were included in the revised RFA1 and are addressed in the proposed order.

Comments received on the proposed order are included as Attachment 2 to this staff report. As described above, any additional comments or requests for contested case received on the proposed order on or before the December 10, 2018 deadline will be provided to Council prior to the December 14, 2018 Council meeting in a supplemental staff report.

### **Staff Recommendations**

The Department recommends Council adopt the proposed order, with modifications, as the final order and grant an amended site certificate. Modifications include administrative conversion from "proposed order" to "final order" and procedural history updates; and, addressing comments received from ODEQ and undeleting Conditions 10.33 and 10.34. As noted, if additional comments or requests for contested case are received prior to the deadline, the Department will review and provide a supplemental staff report to the Council. If warranted, the Department may recommend additional modifications to the proposed order and in addition to the staff report, would present those to Council at the December 14 meeting.

### **Attachments**

Attachment 1: Proposed Order on Request for Amendment 1

Attachment 2: Comments on Proposed Order

**Attachment 1: Proposed Order on Request for Amendment 1**

**Attachment 2: Comments on Proposed Order**

## ESTERSON Sarah \* ODOE

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**From:** WANG Yumei \* DGMI  
**Sent:** Wednesday, November 14, 2018 4:50 PM  
**To:** ESTERSON Sarah \* ODOE  
**Cc:** WANG Yumei \* DGMI  
**Subject:** RE: Carty Generating Station, Request for Amendment 1 (50 MW Solar Farm) - Revised Exhibit H for Review - Urgent Request

Hello Sarah,

As discussed, I have reviewed Exhibit H including the attached Geotech report by Cornforth. All appears satisfactory.

More details:

They have completed borings, some seismic analyses, there are no major landslide concerns.

They have adequately addressed disaster resilience and future climate.

They have identified some geotech hazards including erosion and collapsible soils and will presumably address those.

They have stated that they will use the latest code, and will complete more Geotech work in the future.

They have not used lidar, but that wasn't considered state of practice by DOGAMI during the dogami consultation so it's ok esp considering the proposed development.

Yumei

Yumei Wang, P.E. | Resilience Engineer  
Oregon Department of Geology and Mineral Industries (DOGAMI)  
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**From:** ESTERSON Sarah \* ODOE  
**Sent:** Wednesday, November 14, 2018 3:22 PM  
**To:** WANG Yumei \* DGMI <Yumei.WANG@oregon.gov>  
**Subject:** FW: Carty Generating Station, Request for Amendment 1 (50 MW Solar Farm) - Revised Exhibit H for Review - Urgent Request  
**Importance:** High

Hi Yumei,

Could you review the attached exhibit and let me know if you have concerns on the evaluation of disaster resiliency and climate change?

Thanks,  
Sarah

**Sarah T. Esterson**

Energy Facility Siting Analyst  
Oregon Department of Energy  
550 Capitol St NE, 1<sup>st</sup> Floor  
Salem, OR 97301  
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**From:** ESTERSON Sarah \* ODOE

**Sent:** Tuesday, October 9, 2018 1:29 PM

**To:** WANG Yumei \* DGMI <[Yumei.WANG@oregon.gov](mailto:Yumei.WANG@oregon.gov)>

**Subject:** Carty Generating Station, Request for Amendment 1 (50 MW Solar Farm) - Revised Exhibit H for Review - Urgent Request

**Importance:** High

Hi Yumei,

The Oregon Department of Energy received from Portland General Electric a request for amendment of the Carty Generating Station Site Certificate on February 20, 2018, seeking review and approval from the Energy Facility Siting Council for the Carty Solar Farm, an approximately 50 MW solar PV unit (Carty Solar Farm). The Carty Solar Farm is proposed to be located in Morrow County.

For your information, the general procedural history of the CGS is as follows: the Carty Generating Station was previously approved by EFSC in 2011 to consist of up to two 450-megawatt combined-cycle gas generating turbines (Unit 1 and unit 2). Unit 1 was constructed and placed in service in July 2016. PGE did not construct Unit 2 before its construction deadline; Unit 2 and its corresponding 18-mile 500 kV transmission line to the Slatt Substation are no longer authorized for construction.

PGE, through its amendment request, is currently seeking to add the proposed Carty Solar Farm. The proposed Carty Solar Farm would occupy approximately 300 acres and would be located near the Boardman Coal Plant ash disposal area and south of the Carty reservoir. The amendment request can be downloaded from the ODOE website at:

<http://www.oregon.gov/energy/facilitysafety/facilities/Pages/CGS.aspx>.

We recently received an updated Exhibit H based on our current OAR 345 Chapter 21 requirements – which is provided for your review and comment. The attached document is ~50 pages. Please let me know if there is any possibility of obtaining your comments by October 18, 2018. Let me know if you would like to discuss.

Thanks in advance,  
Sarah

**Sarah T. Esterson**

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Oregon Department of Energy  
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## ESTERSON Sarah \* ODOE

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**From:** HARTMAN Heidi <heidi.m.hartman@state.or.us>  
**Sent:** Monday, November 26, 2018 12:16 PM  
**To:** ESTERSON Sarah \* ODOE  
**Subject:** RE: Carty Generating Station: Notice to Reviewing Agencies of Proposed Order on Request for Amendment 1 of the Site Certificate

Thanks Sarah for provided the new wetland delineation concurrence for the expansion area. I didn't see that I in our database when I looked. It looks it captured everything.

*Heidi Hartman*

Aquatic Resource Coordinator  
*Baker, Gilliam, Grant, Hood River, Jefferson, Morrow,  
Sherman, Umatilla, Union, Wallowa, Wasco & Wheeler Counties*  
[Oregon Department of State Lands](#)  
1645 NE Forbes Road, Suite 112  
Bend, OR 97701  
Office: 541-388-6060 | Fax: 541-388-6480 | Cell: 541-419-7650

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**From:** ESTERSON Sarah \* ODOE <Sarah.Esterson@oregon.gov>  
**Sent:** Monday, November 26, 2018 10:13 AM  
**To:** HARTMAN Heidi <Heidi.M.Hartman@dsl.state.or.us>  
**Subject:** RE: Carty Generating Station: Notice to Reviewing Agencies of Proposed Order on Request for Amendment 1 of the Site Certificate

Hi Heidi,

We received a wetland delineation concurrence from Andrea Downing on Sept 26, 2018 – WD 2018-0158 for PGE's proposed site boundary expansion areas. It was my understanding that all new site boundary areas had been evaluated.

Please confirm if you have identified that there are new site boundary areas that have not been evaluated by PGE and DSL.

Thanks,  
Sarah

**Sarah T. Esterson**  
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**From:** HARTMAN Heidi [<mailto:heidi.m.hartman@state.or.us>]

**Sent:** Monday, November 26, 2018 8:38 AM

**To:** ESTERSON Sarah \* ODOE <[Sarah.Esterson@oregon.gov](mailto:Sarah.Esterson@oregon.gov)>

**Subject:** RE: Carty Generating Station: Notice to Reviewing Agencies of Proposed Order on Request for Amendment 1 of the Site Certificate

Hi Sarah,

The site boundary changes are outside of the original wetland delineation boundaries that was concurred by DSL. The added areas outside of the concurred wetland delineation boundaries will need to be delineated and sent into DSL for review and concurrence. If the cumulative removal and/or fill is >50 cubic yards in waters of the state, a DSL permit will be required.

*Heidi Hartman*

Aquatic Resource Coordinator

*Baker, Gilliam, Grant, Hood River, Jefferson, Morrow,  
Sherman, Umatilla, Union, Wallowa, Wasco & Wheeler Counties*

[Oregon Department of State Lands](#)

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**From:** ESTERSON Sarah \* ODOE <[Sarah.Esterson@oregon.gov](mailto:Sarah.Esterson@oregon.gov)>

**Sent:** Tuesday, November 13, 2018 9:24 PM

**Subject:** Carty Generating Station: Notice to Reviewing Agencies of Proposed Order on Request for Amendment 1 of the Site Certificate

Good afternoon,

The Department provides notice to Reviewing Agencies of the issuance of a Proposed Order on Request for Amendment 1 (RFA1) of the Carty Generating Station Site Certificate, and of the opportunity to provide comments or request a contested case on the proposed order.

### **Background**

The Carty Generating Station is an approved, operational 450 MW natural-gas energy facility located in Morrow County. The facility has been operational since 2016. Portland General Electric (PGE or certificate holder) submitted an initial amendment request in August 2016 including the components described below, as well as an additional 330 MW simple cycle combustion turbine (Unit 3) and upgrades to the previously approved but not yet constructed second 450 MW combined cycle combustion turbine generator. PGE subsequently requested that the Department suspend review; revised its amendment request removing the natural-gas components; and, in February 2018, re-initiated review of a revised amendment request as described below.

## Summary of Amendment Request

PGE requests approval by the Energy Facility Siting Council to:

- Construct and operate a 50 megawatt solar photovoltaic unit;
- Construct and operate a 2.25 to 3 mile 34.5 kilovolt transmission line, with approval to use one of five routing options and one of three interconnection options;
- Use of temporary construction laydown and parking areas;
- Removal of reference to previously approved but not yet constructed Unit 2, Unit 2 associated components, and Unit 2 related or supporting facilities;
- Site boundary changes;
- Amendment to a Water Pollution Control Facilities permit; and,
- Amendment and removal of previously imposed conditions.

## Procedural Summary

The Department issued its Proposed Order on Request for Amendment 1 on November 9, 2018, initiating an opportunity to provide comments or request a contested case on the proposed order. The deadline for submitting comments or requests for contested case to the Department is 5:00 p.m. on December 10, 2018. Comments may be submitted in writing via email, mail or fax to my attention per contact information provided in the attached notice or email provided below.

Pursuant to OAR 345-027-0011, OAR 345-027-0050 thru – 0100 in effect prior to October 24, 2017 do not apply to amendment requests received prior to October 24, 2017. PGE's RFA1 was received in August 2016; therefore, the amendment request is processed under the amendment rules in effect prior to October 24, 2017.

## Attachments

Public Notice on Proposed Order on Request for Amendment 1.

RFA1, proposed order and public notice are available on the Department's project website at:

<https://www.oregon.gov/energy/Siting/Pages/CGS.aspx>

Thank you, and please do not hesitate to contact me with any questions.

## Sarah T. Esterson

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## ESTERSON Sarah \* ODOE

---

**From:** WILSON John P <John.P.WILSON@aviation.state.or.us>  
**Sent:** Wednesday, November 14, 2018 7:23 AM  
**To:** ESTERSON Sarah \* ODOE  
**Cc:** LAWYER Matthew A; CAINES Jeff  
**Subject:** RE: Carty Generating Station: Notice to Reviewing Agencies of Proposed Order on Request for Amendment 1 of the Site Certificate

Sarah,

On the kilovolt transmission line mention in the "Summary of Amendment Request". Would it be possible to ask that the transmission lines be marked?

This Region is an active aviation corridor between several airports in Oregon. By marking the line would enhance safety in an area that is getting very congested with wind turbine.

**JOHN P. WILSON Jr**

OREGON DEPARTMENT OF AVIATION  
AIRPORT & EMERGENCY OPERATIONS SPECIALIST



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"The biggest communication problem is we don't listen to understand. We listen to reply."

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## Sarah T. Esterson

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## ESTERSON Sarah \* ODOE

---

**From:** NADLER Carl <Carl.NADLER@state.or.us>  
**Sent:** Wednesday, November 14, 2018 4:29 PM  
**To:** ESTERSON Sarah \* ODOE  
**Cc:** BUTCHER Don; SKEEN Rod  
**Subject:** Comments on Amendment 1 Carty Generating Station Site Certificate  
**Attachments:** 70795-PER-PGEBOARDMA20130507.PDF; 70795-PER-PGEBOARDMA19860609.PDF; Permit Action Letter.pdf; FINAL\_OMM Plan\_June 2016.pdf; Plan Approval Ltr.pdf

Hi Sarah,

I'd like to comment on behalf of DEQ regarding Proposed Amendment 1 to the Carty Generating Station Site Certificate.

EFSC proposes to delete Paragraphs 10.33 and 10.34 from the Site Certificate. However, Paragraph 10.33 is substantially similar to WPCF Permit 100189, Schedule C, Condition 2. In addition, Paragraph 10.34 is substantially similar to WPCF Permit 100189, Schedule A, Condition 10. The WPCF permit is attached. Accordingly, DEQ objects to deletion of Paragraphs 10.33 and 10.34.

### Background

Prior to construction of Carty Generating Station Block 1, PGE planned to construct up to four new lined ponds for disposal of wastewater from Block 1 by evaporation. The company projected that four lined ponds would provide adequate capacity for the total wastewater from a single block without wastewater treatment (page 14 of the permit evaluation report, which is attached). In addition, PGE anticipated that as the design process progressed, the potential to discharge a portion or all of the wastewater from Carty Generating Station to Carty Reservoir, and the potential that additional wastewater treatment systems would be incorporated into the design, could result in a decrease in the total number and size of evaporation ponds.

With that information, DEQ drafted the WPCF Permit. As issued, Schedule A, Condition 10 of the permit limits the sources of wastewater from Carty Generating Station that PGE is allowed to discharge to the lined ponds. Schedule B, Condition 1.b requires PGE to routinely monitor the wastewater in the lined ponds based on the expected character of the wastewater permitted to be disposed in Schedule A, Condition 10. To ensure the Schedule B monitoring requirements were appropriate, Schedule C, Condition 2 required the company to submit a wastewater characterization to DEQ prior to discharge of wastewater treatment system wastewater to the lined ponds.

On June 22, 2016, prior to start-up of Carty Generating Station Block 1, DEQ received PGE's revised OM&M Plan. The plan stated that the lined holding ponds (previously referred to as evaporation ponds) at Carty Station would be operated on a continuous blowdown basis to Carty Reservoir (pages 12 and 13 of the revised OM&M Plan, which is attached). The company argued that because the lined ponds are not deemed a final disposal location for wastewater, additional monitoring of the water in the holding ponds will not be conducted. The company stated that if operation of the holding ponds changes in the future, such that one or both become evaporation ponds (i.e., if the holding ponds are isolated from the reservoir and used for evaporation as a primary disposal method), PGE will coordinate with DEQ to revise the OM&M Plan to reflect the monitoring and reporting requirements outlined in WPCF Permit (Schedule B, Condition 1.b). In other words, the current continuous blowdown configuration may be temporary. The company went on to say that during the permit-required annual OM&M Plan review, PGE will verify the characterization of wastewater stream and processes that discharge to the holding ponds. Additionally, PGE will coordinate with DEQ prior to disposal in the event of an unanticipated release of unpermitted waste to the holding ponds. PGE asserted that the impact on the reservoir by discharge from the holding ponds is monitored by monthly reservoir sampling and that DEQ will be contacted if permitted reservoir limits are exceeded. DEQ approved the OM&M Plan on June 22, 2016 with the

condition that any inconsistencies between the plan and the permit will be resolved in accordance with the permit. However, to my knowledge, DEQ has not received any characterization of the wastewater stream.

### Conclusions

DEQ objects to deletion of Paragraphs 10.33 and 10.34 because deleting those paragraphs from the Site Certificate will render the WPCF Permit inconsistent with the Site Certificate and potentially nullify the corresponding permit conditions. Furthermore, whether PGE operates the ponds as evaporation ponds or on a continuous blowdown basis, DEQ is the state agency responsible for permitting the wastewater facilities, and as such, necessarily needs to be able to regulate the wastes authorized for treatment and disposal in the permitted wastewater facilities and needs to be informed of the character of the wastewater discharged to those facilities.



global environmental solutions

Operations, Monitoring, and Maintenance Plan

Portland General Electric Company  
Boardman Power Plant and Carty Generating Station

SLR Ref: 108.00277.00066

June 2016



Operations, Monitoring, and Maintenance Plan

**PORTLAND GENERAL ELECTRIC COMPANY  
BOARDMAN POWER PLANT AND CARTY GENERATING  
STATION**

Prepared for:

**Portland General Electric Company**  
121 SW Salmon St.  
Portland, Oregon 97204

This document has been prepared by SLR International Corporation. The material and data in this report were prepared under the supervision and direction of the undersigned.

A handwritten signature in blue ink, appearing to read "Steve R. Hammer". The signature is fluid and cursive, written over a horizontal line.

Steven R. Hammer, P.E.  
Principal Engineer

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## **FIGURES**

FIGURE 1	Site Location Map
FIGURE 2	Site Plan
FIGURE 3A	Process Flow Diagram – Boardman Power Plant
FIGURE 3B	Process Flow Diagram – Carty Generating Station
FIGURE 4	Sample Locations

## **APPENDICES**

APPENDIX A	WPCF Permit – 100189
APPENDIX B	Procedures and Field Data Sheets
APPENDIX C	Proposed and On-going Projects

## ACRONYMS

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APHA	American Public Health Association
AV	Area Velocity
BOD <sub>5</sub>	Biochemical Oxygen Demand
GPD	Gallons Per Day
GPM	Gallons Per Minute
HDPE	High-Density Polyethylene
mg/L	Milligrams per Liter
MG	Million Gallons
MGD	Million Gallons per Day
MSL	Mean Sea Level
MW	Megawatt
ODEQ	Oregon Department of Environmental Quality
OM&M	Operations, Monitoring & Maintenance
PGE	Portland General Electric Company
SVOC	Semi-Volatile Organic Compounds
SLR	SLR International Corporation
s.u.	Standard Units
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTHMs	Total Trihalomethanes
VOC	Volatile Organic Compounds
WPCF	Water Pollution Control Facilities

# 1. INTRODUCTION

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SLR International Corporation (SLR) has prepared this Operations, Monitoring, and Maintenance (OM&M) Plan on behalf of Portland General Electric Company (PGE) for the Boardman Power Plant and Carty Generating Station (Site). The Sites are located at 73334 and 73396 Tower Road in Boardman, Oregon, as illustrated on **Figure 1**.

Development of an OM&M Plan is required as Compliance Condition 3 in Schedule C of the Oregon Department of Environmental Quality (ODEQ) Water Pollution Control Facilities (WPCF) Permit Number 100189. A copy of the WPCF permit has been included as **Appendix A**.

This OM&M Plan presents the following information:

- Background information describing the facilities
- An overview of the wastewater-generating processes and wastewater collection and distribution systems
- A description of procedures for the management and disposal of wastewater-derived solids
- A description of procedures to decrease parameter concentrations in Carty Reservoir in the event of an irrigation withdrawal limit exceedance

## 2. BACKGROUND

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PGE operates a coal-fired steam electric generating plant (Boardman Power Plant) and a natural gas-fired electric generating plant (Carty Generating Station) near Boardman, Oregon. The following description presents site information for the facilities. A site plan for the facilities has been included as **Figure 2**.

This OM&M Plan has been developed and certified for the following facilities:

<b>Owner:</b>	Portland General Electric Company
<b>Facility Name:</b>	Boardman Power Plant and Carty Generating Station
<b>City and State:</b>	Boardman, Oregon
<b>Facility Telephone Number:</b>	(541) 481-1200
<b>Environmental Coordinator:</b>	Amber Chapman – (541) 481-1233
<b>Facility Emergency Contact:</b>	Shift Supervisor – (541) 481-1256 (Boardman) Control Room – (541) 481-4461 (Carty)

The facility's environmental coordinator at the Site is responsible for implementing this OM&M Plan (see WPCF Permit Schedule D, Section 5).

### 2.1 FACILITY DESCRIPTIONS

#### 2.1.1 BOARDMAN POWER PLANT

The 617-megawatt (MW) Boardman Power Plant is located adjacent to Carty Reservoir on Sixmile Canyon, approximately 13 miles south-southwest of Boardman, Oregon. The plant was constructed in the late 1970s and was placed into operation on August 3, 1980.

In the power generating process, primarily low sulfur, sub-bituminous coal is burned to heat boiler water into steam under high pressure. The steam is then directed into a turbine where it is allowed to expand. As the turbine turns, it turns a generator, which produces electricity. Exhaust steam from the turbine expands further in a condenser, where it cools and water droplets are formed. The condensate (boiler water) is collected in a closed loop, further cooled, and returned to the boiler. To facilitate cooling of the boiler water, a separate cooling water cycle, which does not mix with the boiler water, removes heat from the boiler water in a heat exchanger. The heat exchanger transfers heat energy from the boiler water to the cooling water. Cooling water is then recirculated between Carty Reservoir (heat sink) and the heat exchanger.

#### 2.1.2 CARTY GENERATING STATION

The 440-MW Carty Generating Station is located immediately to the west of the Boardman Power Plant, approximately 13 miles south-southwest of Boardman, Oregon. The plant is scheduled to be operational in 2016.

The Carty Generating Station is a G-class power generating station that combines the output of two turbines. The first turbine uses natural gas to produce electricity and hot exhaust gas, which is directed to a heat recovery steam generator (HRSG). The HRSG uses the heat from the exhaust gas to turn water into steam, which is used by a steam turbine to produce additional electricity.

### **2.1.3 CARTY RESERVOIR**

Carty Reservoir was created during Boardman Power Plant construction by placing an earth-fill dam across Sixmile Canyon and excavating sediment and bedrock through the Rattlesnake Ridge Formation and into the Pomona Basalt to enhance reservoir capacity. At high pool (677 ft MSL), Carty Reservoir covers 1,450 acres and impounds 38,300 acre-feet of water. Makeup water for the reservoir is pumped 18 miles through a 60-inch diameter irrigation water pipeline from the Willow Creek pumping station off the Columbia River, which is operated by Threemile Canyon Farms.

In addition to using the reservoir for cooling, PGE circulates water for steam generation, ash transport, and other internal processes. Settling ponds are used to remove solid particles from some wastewaters prior to discharge to Carty Reservoir. Internal piping controls allow PGE flexibility in directing the waste streams.

Recirculation and evaporative cooling in the reservoir cause naturally-occurring minerals (dissolved solids) in the water to become concentrated.

### 3. WASTEWATER DISCHARGES

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**Figure 3a** and **Figure 3b** present simplified process flow diagrams for the wastewater streams at the Boardman Power Plant and Carty Generating Station, respectively.

Wastewater from the Boardman Power Plant is managed in the following locations:

- Carty Reservoir
- Lined Evaporation Ponds
- Lined Wash Water Pond
- Coal Yard Ponds
- Sewage Lagoons
- Settling Ponds

Wastewater from the Carty Generating Station is managed in the following locations:

- Carty Reservoir via Lined Holding Ponds
- Sewage Lagoons

The wastewater streams managed in each of these areas are described below. In general, monitoring and analysis procedures will be developed in accordance with the most recent methods published by the American Public Health Association (APHA).

#### 3.1 CARTY RESERVOIR

Carty Reservoir is a man-made impoundment with a surface area that can vary from less than 1,000 acres at low pool (664 ft MSL) to almost 1,500 acres at full pool (677 ft MSL). Water from Carty Reservoir is used to provide the Boardman Power Plant and Carty Generating Station with cooling water, fire water, and makeup water for the boiler. Additionally, low level processed Boardman Power Plant and Carty Generating Station wastewater is returned to the reservoir.

The use of the reservoir for cooling purposes for Boardman Power Plant represents the greatest single use. When the Boardman Power Plant is running, approximately 180,000 gallons per minute (GPM) are withdrawn at the intake structure, circulated through the plant cooling system, and returned to the reservoir at the discharge point. In addition, two intake pumps located adjacent to the Boardman intake structure pull up to 5,866 GPM for Carty Generating Station. The discharge line for the Carty Generating Station goes into the outfall at the Boardman Plant. The design of the reservoir is intended to promote maximum cooling by routing the water in a circular pattern around the reservoir.

In addition to Plant uses, PGE can supply irrigation water back to Threemile Canyon Farms from a pumping station located on the reservoir. The normal operating level for the reservoir is 665 to 668 ft MSL. PGE owns water rights for adding the makeup water necessary to maintain

the reservoir at the desired level. Makeup water is supplied by Threemile Canyon Farms from the Willow Creek pump station.

PGE is permitted to manage the following wastewater streams from operation of the Boardman Power Plant and Carty Generating Station in Carty Reservoir:

- Cooling water
- Water treatment wastewater
- Facility sumps and drains wastewater
- Laboratory and sampling wastewater
- Condensate and steam system blowdown (Boardman only)
- Evaporative cooling wastewater (Carty only)
- Equipment cleaning wastewater (excluding Boardman boiler cleaning wastewater until submittal of a waste characterization and written approval from ODEQ)
- Ash transport wastewater (Boardman only)
- Storm water (excluding storm water from the Boardman coal yard)

The limitations are based on protection of wildlife and groundwater and may be modified after submittal of a Hydrogeological Characterization Report (see Schedule C, Condition 5 of WPCF permit) and/or exceedance of a groundwater concentration limit (see Schedule A, Condition 2.c of WPCF permit).

All monitoring and sampling activities will be conducted per ES-209 Boardman Water Quality Sampling (example included in **Appendix B-1**). If ES-209 is revised between OM&M plan reviews an updated copy will be incorporated into the most recent version of the plan. Standard monitoring and sampling activities will include the following:

- Monthly reservoir samples for compliance demonstration will be collected at the Boardman Power Plant intake structure. This sample point is considered representative of overall reservoir quality due to the circulation effect of the cooling water.
- Monthly samples will be collected at the Willow Creek pumping station during months when water is being made-up to the reservoir.
- When PGE is supplying irrigation water to Threemile Canyon Farms, samples shall be collected twice monthly, except as required by Schedule B, Condition 2. Samples will be collected from a sample tap off of the irrigation withdrawal pumps.

The total monthly flows of makeup water to Carty Reservoir and irrigation withdrawal from Carty to Threemile Canyon Farms will be recorded.

Monitoring for Carty Reservoir includes the following items and parameters:

### Carty Reservoir WPCF Monitoring Requirements

Items and Parameters	Minimum Frequency	Sample Type/Action
<b>Boardman Power Plant Cooling Water Recirculation*</b>		
As, B, Cd, Ca, Cr, Cu, Fe, Mg, Hg, K, Na, V, Se, Zn, Bicarb Alk, Total Alk, Cl <sup>-</sup> , F <sup>-</sup> , NO <sub>3</sub> , SiO <sub>2</sub> , SO <sub>4</sub> , TDS, Cond, pH, TTHMs	Monthly	Grab
<b>Makeup water</b>		
Total flow (MG)	Monthly	Record
Flow meter calibration**	Annually	Written verification
<b>Effluent (Irrigation withdrawal)***</b>		
Total flow (MG)	Monthly	Record
Flow meter calibration****	Annually	Written verification
TDS, As, Cr, pH, SAR	Twice monthly, except as required by Schedule B, Condition 2	Grab
<b>Carty Reservoir</b>		
Water elevation	Monthly	Measure and record

\* Sample point is in the recirculation line (intake) from Carty Reservoir to the Boardman Power Plant.

\*\* The makeup water flow meter is a GE Sentinel LCT. Flow meter calibration will be completed per the manufacturer's recommended practice in Chapter 8 of the manufacturer's User Manual.

\*\*\* Sample point is at intake to irrigation withdrawal pump.

\*\*\*\* The irrigation withdrawal flow meter is a GE Panametrics Digitalflow DF868. Calibration of the flow meter will be conducted per the manufacturer's recommended practice in Chapter 1 of the Manufacturer's Service Manual.

The following WPCF permit limitations apply in Carty Reservoir at the intake of the recirculation line from Carty Reservoir to the Boardman Power Plant and at the intake of the irrigation withdrawal pump, during withdrawal for irrigation:

#### Carty Reservoir WPCF Permit Limits

Parameter	Limitations (Sample Maximum)	
	Recirculation Line	Irrigation Withdrawal Pump
Chloride	100 mg/L	--
Sulfate	200 mg/L	--
Sodium	150 mg/L	--
Arsenic	0.01 mg/L	0.0063 mg/L
Boron	0.5 mg/L	--
Copper	0.1 mg/L	--
Cadmium	0.005 mg/L	--
Calcium	500 mg/L	--

### Carty Reservoir WPCF Permit Limits

Parameter	Limitations (Sample Maximum)	
	Recirculation Line	Irrigation Withdrawal Pump
Chromium	0.05 mg/L	0.0025 mg/L
Magnesium	250 mg/L	--
Bicarbonate Alkalinity	500 mg/L	--
Fluoride	1 mg/L	--
Nitrate	10 mg/L	--
Total Dissolved Solids (TDS)	500 mg/L	320 mg/L
Mercury	0.002 mg/L	--
Zinc	0.1 mg/L	--
pH	9.4 s.u.	9.4 s.u.
Oil sheen	No visible	--
Sodium Adsorption Ratio	--	1.66

## 3.2 LINED EVAPORATION PONDS

Two lined evaporation ponds are used for disposal of Boardman Power Plant wastewater that would either (a) have the potential to impair the use of reservoir water for plant operations or (b) have the potential to concentrate constituents above the permitted levels. There is no discharge from the lined evaporation ponds; water in the ponds evaporates.

PGE is permitted to manage the following wastewaters from operation of the Boardman Power Plant in the lined evaporation ponds:

- Water treatment wastewater
- Facility sumps and drains wastewater
- Laboratory and sampling wastewater
- Condensate and steam system blowdown
- Equipment cleaning wastewater (excluding boiler cleaning wastewater until submittal of a waste characterization and written approval from ODEQ)
- Storm water

One, 20-inch diameter pipeline conveys flows to the evaporation ponds north of the main power block building. The two ponds consist of one, 1-acre lined pond and one, 10-acre lined pond. The 20-inch pipeline conveys flows from three sumps within the power block area. During normal plant operations only one of the three sumps is directed to discharge to the evaporation ponds, the other two being directed to settling ponds at the south side of the plant. In addition, one pump within the power block may be directed to the evaporation ponds through the 20-inch pipeline; however this is rarely done during normal operations.

Flow measurement within the 20-inch diameter pipeline to the lined evaporation ponds is accomplished with an Area Velocity (AV) type flow meter, the Teledyne ISCO 2150 Area Velocity Module. The 2150 AV Module allows for measurement of variable flows expected within the pipeline due to flows only occurring when upstream sumps are pumping.

The 2150 AV Module can utilize variable frequency recording, allowing the unit to record data at a relatively infrequent rate (5 min. interval) when it does not sense water within the pipe. The sensor can then switch to a higher frequency recording rate (1 min. interval) when water is present. Variable frequency recording provides improved data clarity without exceeding the available data storage within the module.

Samples of pond water are collected from the locations shown on **Figure 4**. Freeboard in the ponds is monitored at the location illustrated on **Figure 4**. The ponds are typically operated such that they are hydraulically connected, thus the water elevation is the same in both ponds. If operation changes such that the ponds are not hydraulically connected, then freeboard will be measured in each pond separately.

Monitoring for the lined evaporation ponds includes the following items and parameters:

#### **Lined Evaporation Ponds WPCF Monitoring Requirements**

<b>Items and Parameters</b>	<b>Minimum Frequency</b>	<b>Sample Type/Action</b>
Each Pond *		
Total flow to pond (MG)	Quarterly	Record
Flow meter calibration **	Annually	Written verification
As, Cd, Cr, Hg, TDS, Oil & Grease, TTHMs***, pH	Quarterly	Grab
Freeboard****	Weekly	Measure and record
Perimeter inspection	Daily	Observation

\* PGE has a designated sampling station at each pond from which representative samples may be collected. Alternatively, if a sampling point downstream of all possible flow additions becomes available, flow to Boardman Power Plant's two lined evaporation ponds may be measured at a single location.

\*\* Calibration of the Teledyne Isco Model 2150 Area Velocity Flow Module and Sensor will be conducted per manufacturer's instruction (section 3.3.1 of the manufacturer's Manual).

\*\*\* Total trihalomethanes

\*\*\*\* Freeboard measurement location is displayed on **Figure 4**.

All monitoring and sampling activities will be conducted per JP-2776: Lined Evaporation Pond Inspection & Flow Readings Procedure and recorded on JP-2776: Lined Evaporation Pond Data Sheet. Flow meter readings will be recorded on JP-3012: Evaporation Pond Data Sheet (copy included in **Appendix B-2**). If JP-2776 is revised between OM&M plan reviews an updated copy will be incorporated into the most recent version of the plan.

### 3.3 LINED WASH WATER POND

A small lined pond adjacent to the vehicle wash and fueling area at the Boardman Power Plant is used to contain and dispose of vehicle wash water and storm water runoff from the fueling area. There is no discharge from the lined pond. Water in the pond evaporates. There are no monitoring requirements for discharges to the lined wash water pond.

Wash water derived from washing exterior surfaces only of vehicles and equipment may be disposed in storm water swales provided chemicals, soaps, and detergents are not used and washing is restricted to the exterior of the vehicle or equipment. Disposal of engine, transmission, or undercarriage wash water is not permitted in storm water swales.

### 3.4 COAL YARD PONDS

Water is used in the Boardman Power Plant coal yard to wash coal conveyor transfer point enclosures. Wastewater is collected, treated in a closed system to remove fine coal particles, and reused. Treatment consists of adding a flocculent to the wastewater and allowing the fine particles to settle in a clarifier. Treated wastewater is stored in concrete lined basins for reuse.

Wash water from coal yard operations must be collected for treatment in the Boardman Power Plant coal yard ponds and reused in the coal yard. There are no monitoring requirements for discharges to the coal yard ponds. Coal yard storm water is allowed to percolate and/or runoff; however, storm water from the coal yard is prohibited from entering Carty Reservoir.

In May 2013, ODEQ approved disposal of air pollution control wash water (Trona mill wash water) in the bottom ash system and approval for Trona mixed with fly ash and bottom ash to the ash disposal landfill (copy of email approval included as **Appendix C-1**)

### 3.5 SEWAGE LAGOONS

Boardman Power Plant's and Carty Generating Station's domestic wastewater (sewage) must be disposed of in the Boardman Power Plant sewage lagoons. The approved average dry weather design flow for the facility is 10,500 gallons per day (GPD).

Freeboard in the ponds is monitored at the location illustrated on **Figure 4**. The ponds are typically operated such that they are hydraulically connected, thus the water elevation is the same in both ponds. If operation changes such that the ponds are not hydraulically connected, then freeboard will be measured in each pond separately. If the lagoons are isolated they each have their own freeboard reading, and the maximum operating levels of each are as follows:

- South Lagoon – 676.39'
- Middle Lagoon – 675.03'

If the lagoons are connected by the cross over pipe;

- Max operating level – **675.03'**

### **3.5.1 BOARDMAN POWER PLANT SEWAGE DISCHARGE**

There are two sewage systems which discharge to the onsite sewage lagoon system for Boardman Power Plant operation. One system services the power block area and miscellaneous structures west of the coal yard, and one services the buildings at the west side of the coal yard area; both systems discharge to the onsite sewage lagoons northeast of the power building.

Flow from the power block area is monitored at a monitoring station with a Parshall flume and sampling point, located as shown on **Figure 4**. The flow meter is an ISCO Model 2150 flow meter. PGE has developed a standard protocol for cleaning the flume of particulates, as described in the Sewage Flume Function Test (copy included in **Appendix B-3**). If the Sewage Flume Function Test is revised between OM&M plan reviews an updated copy will be incorporated into the most recent version of the plan.

Flow from the coal yard is within too low of a range to effectively monitor with conventional open channel flow measurement systems, and so PGE monitors domestic water usage at facilities that discharge wastes to the coal yard sanitary sewage system. Four locations have been identified as being served by the sewer system, primarily consisting of bathrooms and showers. Four water meters have been installed at these locations:

- One, 1-inch diameter Sensus iPERL™ installed within the Auto Shop
- Two, 1-½-inch diameter Sensus OMNI™ R2 meters, one within the Railcar Maintenance Facility and one within the Reclaim Electrical Building
- One, 2-inch diameter Sensus OMNI™ R2 meter within the Personnel Facility Building

### **3.5.2 CARTY GENERATING STATION SEWAGE DISCHARGE**

Carty Generating Station's domestic wastewater (sewage) will be disposed of in the Boardman Power Plant sewage lagoons. The sewage system at Carty Generating Station includes a Metro-Rail prefabricated lift station utilizing a Hydromatic NCLOG-4 submersible sewage pump with a mechanical level control (float switch) and an S33i sump pump that are controlled by a PumpSaver ISS-105 IS Super Cell relay and pump controller. A Rosemount 8732E Magnetic Flowmeter System is located in a prefabricated steel flow meter vault at ground level adjacent to the lift station. A 4-inch underground pipeline connects the Carty Generating Station sewage lift station to a discharge point in the southeast corner of the South Lagoon at the Boardman Power Plant. The location of the lift station and flow meter are presented on **Figure 4**.

Monitoring for the sewage lagoons include the following items and parameters:

## Sewage Lagoons WPCF Monitoring Requirements

Items and Parameters	Minimum Frequency	Sample Type/Action
Influent*		
Total flow (MGD)	Daily	Record
Flow meter calibration **	Annually	Written verification
pH	2/week	Grab/field composite
BOD <sub>5</sub>	Quarterly	Composite***
TSS	Quarterly	Composite***
Overflow to seepage cell****		
Total flow (MGD)	Daily	Record
Flow meter calibration **	Annually	Written verification
Quality chlorine used	Daily	Measurement
Chlorine residual	Daily	Grab
pH	2/week	Grab/field measurement
<i>E. coli</i> bacteria	Monthly	Grab
BOD <sub>5</sub>	Quarterly	Composite***
TSS	Quarterly	Composite***
TKN	Quarterly	Grab
NO <sub>3</sub> -N	Quarterly	Grab
Lagoon Site		
Freeboard	Weekly	Measure and record
Perimeter inspection*****	Daily	Observation

\* Sample point for Boardman Power Plant sewage is in discharge to lagoons, except that flow from Boardman Power Plant coal yard sewage collection system may be measured by monitoring domestic water usage of facilities that discharge wastes to the coal yard sewage collection system. The BOD<sub>5</sub>, TSS, and pH monitoring results of domestic sewage from Boardman Power Plant power block are deemed representative of BOD<sub>5</sub>, TSS, and pH from Boardman Power Plant sewage collection systems. Sample point for Carty Generating Station sewage is at lift station.

\*\* Calibration of the Teledyne Isco Model 2150 Area Velocity Flow Module and Sensor will be conducted per manufacturer's instruction in Section 3.3.1 of the manufacturer's User's Manual. Calibration of the Sensus iPERL is per American Water Works Association (AWWA) procedure C700 and calibration of the OMNI R<sup>2</sup> flow meters will be conducted per AWWA C701. Calibration of the Rosemount 8732E Magnetic Flowmeter System will be conducted per manufacturer's instruction in the manufacturer's User's Manual.

\*\*\* Composite samples must consist of no fewer than 6 samples collected over a 24-hour period and apportioned according to the volume of flow at the time of sampling.

\*\*\*\* Under current configuration, overflow to seepage cell does not occur. The sewage system is currently being evaluated for modifications, and will likely be limited to one sewage lagoon (no overflow to the seepage cell).

\*\*\*\*\* A perimeter inspection is a sight surveillance of the lagoon dikes looking for the presence of badgers, muskrats, ground hogs, or other rodents whose burrowing activities could threaten the structural integrity of a dike.

All monitoring and sampling activities will be conducted per JP-2774: Sewage Lagoon Inspection & Flow Readings Procedure and recorded on JP-2774: Sewage Lagoon Data Sheet (examples included in **Appendix B-4**). If JP-2774 is revised between OM&M plan reviews an updated copy will be incorporated into the most recent version of the plan.

It is unlikely that sufficient sewage will be generated at the plant to require the use of the unlined evaporation/seepage cell. If its use is necessary, prior to allowing overflow or discharge into the unlined evaporation seepage cell, sanitary sewage must receive at least the equivalent of secondary treatment and disinfection and meet the following limitations:

**Permit Limits When Third Cell (Evaporation Cell) is Used**

Parameter	Limitations	
<i>E. coli</i> bacteria	Must not exceed 126 organisms per 100 mL monthly geometric mean. A single sample must not exceed 406 organisms per 100 mL*	
	Annual Average (mg/L)	Maximum (mg/L)
NO <sub>3</sub> -N	7	10
Total Nitrogen**	10	15

\* If a single sample exceeds 406 organisms per 100 mL, then five consecutive re-samples may be taken at intervals no greater than four-hours beginning within twenty-eight (28) hours after the original sample was taken. If the log mean of the five re-samples is less than or equal to 126 organisms per 100 mL, a violation will not be triggered.

\*\* Total Nitrogen in this permit limitation equals Total Kjeldahl Nitrogen (TKN) + Nitrate Nitrogen (NO<sub>3</sub>-N) and is applicable only when discharge occurs to the third unlined cell.

Boardman Power Plant and Carty Generating Station domestic wastewater must be disposed in the Boardman Power Plant sewage lagoons. The south and middle sanitary lagoons clay liners were replaced with impervious liners in the fall of 2014. A copy of the Sanitary Sewage Lagoon Relining Project Specifications is included in **Appendix C-2**.

### **3.6 BOARDMAN POWER PLANT SETTLING PONDS**

PGE discharges wastewater from the Boardman Power Plant oil/water separator, raw water filter, activated carbon filter, bottom ash handling system surge tank, pre-treatment area sump, water treatment area sump, and liquid waste sump to two, unlined settling ponds. Effluent from the settling ponds is pumped to the Carty Reservoir. There are no monitoring requirements for discharges to the settling ponds.

### **3.7 CARTY GENERATING STATION HOLDING PONDS**

Engineering plans for two additional lined industrial holding ponds constructed at Carty Generating Station were approved by ODEQ on June 16, 2014 (copy of the approval letter included as **Appendix C-3**). The Carty Generating Station holding ponds were lined with a high-density polyethylene (HDPE) geomembrane liner per the specifications included as **Appendix C-4**.

The lined holding ponds at Carty Generating Station will be operated on a continuous blowdown basis to Carty Reservoir while the station is in operation. Discharge rates to Carty Reservoir are

estimated to be between 121 and 375 GPM based on ambient conditions and Plant load. Flow in and out of the lined ponds will be controlled to generally maintain an approximately four foot water level in the ponds in order to ensure the liner is properly weighted and stays in place. The lined ponds are designed to allow for an additional volume (1.5 feet minimum freeboard) to account for maintenance to the pumps or pipeline or other unexpected shutdowns. The excess water would be pumped to Carty Reservoir once repairs are completed. In addition, there are isolation valves between the pumps and the ponds to allow for isolation and draining of the ponds for liner inspection or repairs, as needed.

The lined holding ponds at Carty Generating Station are a continuation of the system that conveys wastewater from Carty Generating Station to Carty Reservoir. The holding ponds are not deemed a final disposal location for wastewater from Carty Generating Station; therefore, additional monitoring of the water in these ponds will not be conducted. If operation of the holding ponds changes in the future, such that one or both become evaporation ponds (i.e., if the holding ponds are isolated from the reservoir and used for evaporation as a primary disposal method), PGE will coordinate with DEQ to revise the OM&M plan to reflect the monitoring and reporting requirements outlined in WPCF Schedule B, Condition 1.b. During the permit required annual OM&M plan review PGE will verify the characterization of wastewater streams and processes that discharge to the holding ponds. Additionally, PGE will coordinate with DEQ prior to disposal in the event of an unanticipated release of unpermitted waste to the holding ponds. The impact on the reservoir by discharge from the holding ponds is monitored by monthly reservoir sampling; the Department will be contacted if permitted reservoir limits are exceeded.

## **4. MANAGEMENT AND DISPOSAL OF SOLIDS**

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### **4.1 BIOSOLIDS FROM THE SEWAGE LAGOON**

Per the WPCF, prior to removal and beneficial reuse of accumulated sewage sludge, PGE must submit a biosolids management plan to ODEQ and receive ODEQ approval of the plan.

### **4.2 OTHER SOLIDS**

All solids disposal will be conducted per applicable rules and regulations and approval by DEQ, if required. If solids will be generated by a construction, operation, or maintenance activity, PGE will develop a plan for solids/sludge removal, stockpiling in lined stockpiles with a means to capture and treat liquids, waste characterization of the solids, and then disposal.

In the past, disposal of solids derived from the settling ponds has occurred in the ash disposal area after appropriate characterization of priority pollutant total metals (Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, Zn), VOCs, SVOC, and TPH. With ODEQ approval, PGE will continue this practice. Waste characterization results will be submitted to ODEQ for review and approval prior to disposal of solids from all ponds, sumps and settling basins and disposal of any material other than coal ash in the ash disposal landfill.

Established procedures for disposal of coal ash are described in the Boardman Power Plant Ash Disposal Plan.

## 5. PROCEDURES FOR IRRIGATION WITHDRAWAL LIMIT EXCEEDANCE

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The WPCF permit requires that procedures be established to decrease parameter concentrations in the Carty Reservoir to prevent an exceedance of the irrigation withdrawal water quality limits. Evaporation results in water loss from the Carty Reservoir. Adequate water levels and water quality in the Carty Reservoir are managed by adding makeup water to the reservoir by Threemile Canyon Farms from the Willow Creek pump station. Makeup water is typically added several times during the course of the year when Threemile Canyon Farms has excess capacity, i.e. when they don't need all of their water for irrigation.

To maintain parameter concentrations below the limits, trigger levels have been established in the WPCF permit. The following table presents established trigger levels as per Schedule B, Condition 2 of the WPCF permit concerning irrigation withdrawal monitoring samples:

**Carty Reservoir WPCF Permit Irrigation Withdrawal Trigger Levels**

Parameter	Trigger Level
Total Dissolved Solids	280 mg/L
Arsenic	0.0055 mg/L
Chromium	0.0022 mg/L
pH	9.0 s.u.
Sodium Adsorption Ratio	1.44

If irrigation withdrawal monitoring results indicate that a trigger level has been exceeded, PGE must report the results to ODEQ within ten (10) calendar days of receipt of laboratory data and immediately implement the following OM&M Plan procedures to decrease parameter concentrations in the Carty Reservoir:

1. Increase the water level in the reservoir to 669.5 feet elevation by pumping makeup water into the reservoir.
2. Collect a reservoir water sample and analyze it to determine whether concentrations are below the trigger limits.
3. If concentrations in the reservoir sample are below the trigger limits after the reservoir has been filled to elevation 669.5 feet, then operation of the reservoir, including irrigation withdrawals, may return to normal.
4. If concentrations in the reservoir sample exceed the trigger limits after the reservoir has been filled to elevation 669.5 feet, coordinate with the farm to withdraw water from Carty Reservoir to an elevation of 665.6 to 666.5 feet. Then, refill the reservoir to elevation 669.5 feet, and repeat the process beginning with Step 2, above.

Reservoir addition and withdrawal must be coordinated with Threemile Canyon Farm. Reservoir withdrawals generally occur in fall, but with proper coordination can happen in the spring.

## 6. GROUNDWATER MONITORING PLAN

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Groundwater monitoring activities will be conducted per the existing groundwater monitoring plan (**Appendix B-5**) while the on-going hydrogeologic characterization is completed. Following the completion of the hydrogeologic characterization, the groundwater monitoring plan will be updated and submitted to the ODEQ for approval.

## 7. ANNUAL REPORTING

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The following section presents the annual reporting requirements for sampling and monitoring activities that are completed at the Site per the WPCF permit.

### Summary of Annual Reporting Requirements

Monitoring Point	Description	Reference
Facility-Wide	On or before March 1 of each calendar year, must submit an annual facility monitoring report to ODEQ	WPCF Permit Schedule B, Section 6
Sewage Lagoons	Monthly reporting must be submitted to ODEQ by 15 <sup>th</sup> day of the following month	WPCF Permit Schedule B, Section 5
	Designated "Supervisor" will be identified in monthly report	WPCF Permit Schedule D, Section 3
Lined Evaporation Ponds	On or before March 1 of each calendar year, must submit lined evaporation ponds monitoring results	WPCF Permit Schedule B, Section 6

PGE is required to meet the compliance dates that have been established in this schedule, unless alternative compliance dates have been approved in advance in writing by ODEQ. Either prior to or not later than 14 calendar days following any lapsed compliance date, PGE must submit a notice of noncompliance with the established schedule to ODEQ. Any reports of noncompliance must include a description of the cause of noncompliance.

## **FIGURES**

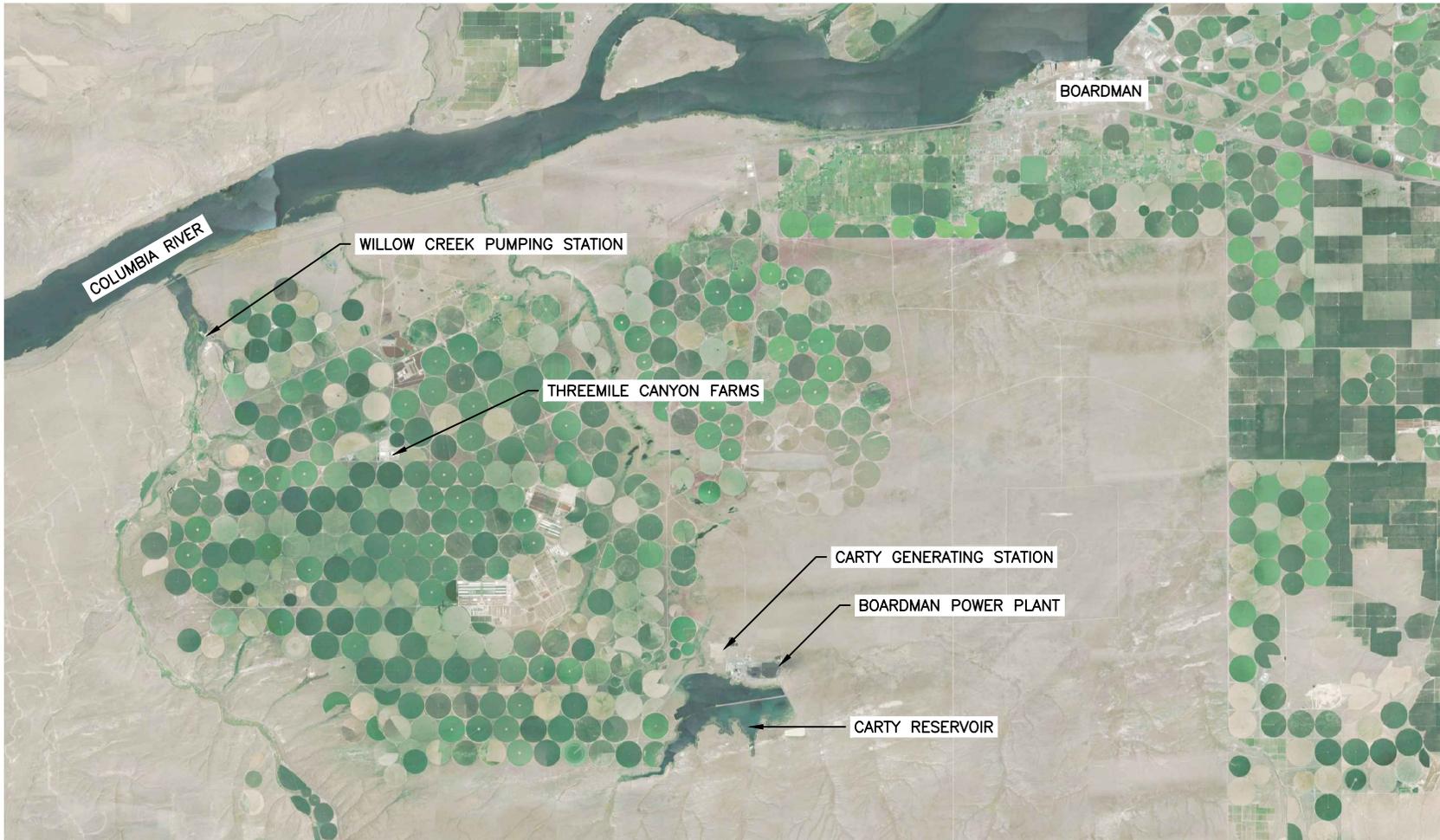
Figure 1: Site Location Map

Figure 2: Site Plan

Figure 3a: Process Flow Diagram – Boardman Power Plant

Figure 3b: Process Flow Diagram – Carty Generating Station

Figure 4: Sample Locations



LEGEND

AERIAL PHOTO FROM GOOGLE EARTH, JULY 2013

0 3 6 9 MILES

PGE BOARDMAN POWER PLANT AND CARTY GENERATING STATION  
 73334 AND 73396 TOWER ROAD  
 BOARDMAN, OREGON 97818

Report OPERATIONS, MONITORING, AND MAINTENANCE PLAN

Drawing SITE LOCATION MAP

Date Mar 21, 2016

Scale AS SHOWN

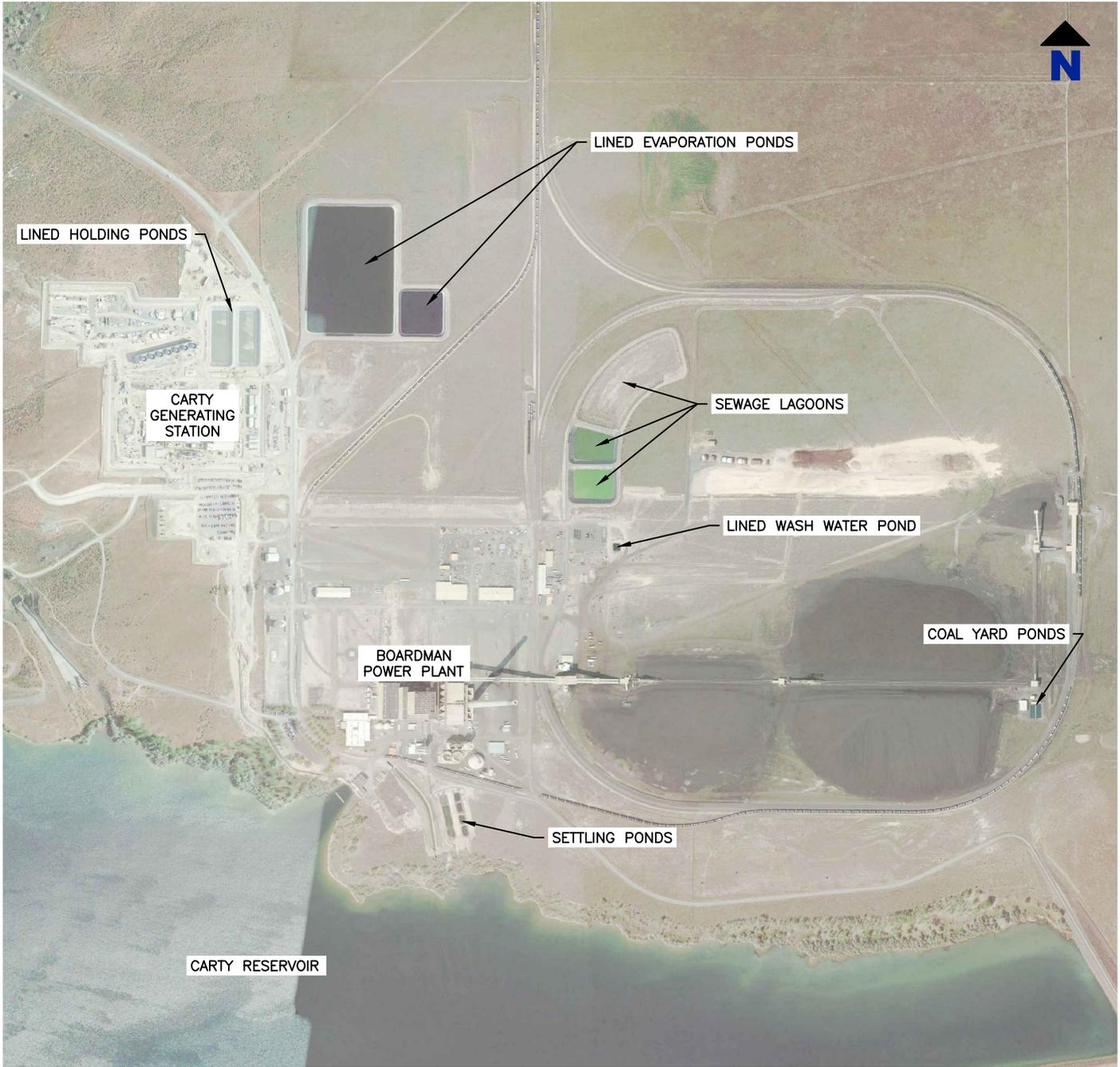
Fig. No. 1

File Name Boardman 2016

Project No. 108.00277.00047



THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.



LEGEND

AERIAL PHOTO FROM GOOGLE EARTH, MAY 2015

PGE BOARDMAN POWER PLANT AND CARTY GENERATING STATION  
73334 AND 73396 TOWER ROAD  
BOARDMAN, OREGON 97818

Report  
OPERATIONS, MONITORING, AND MAINTENANCE PLAN

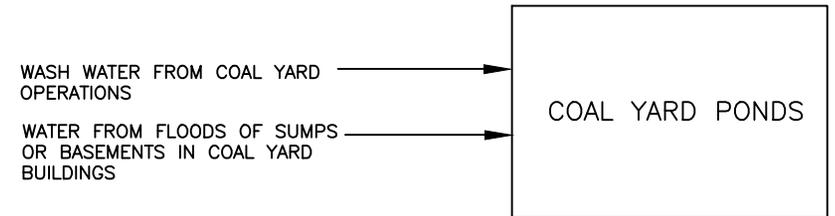
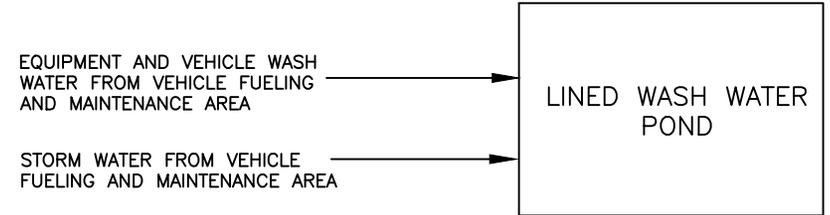
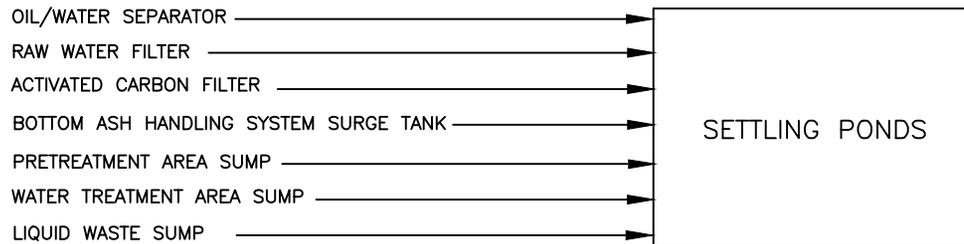
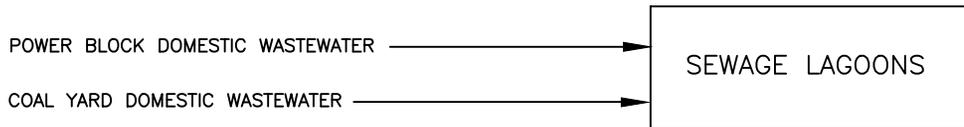
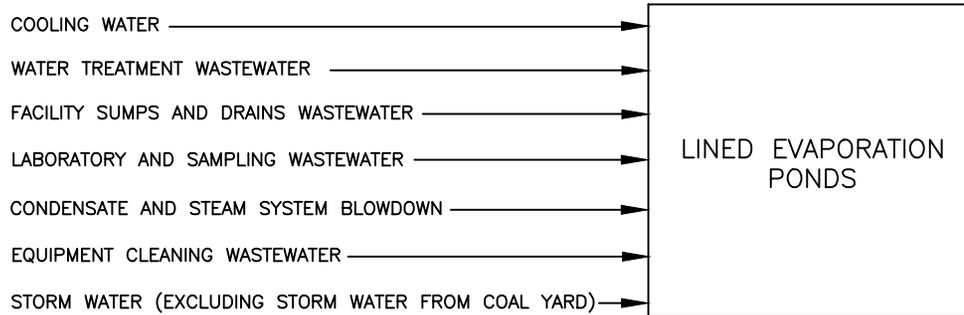
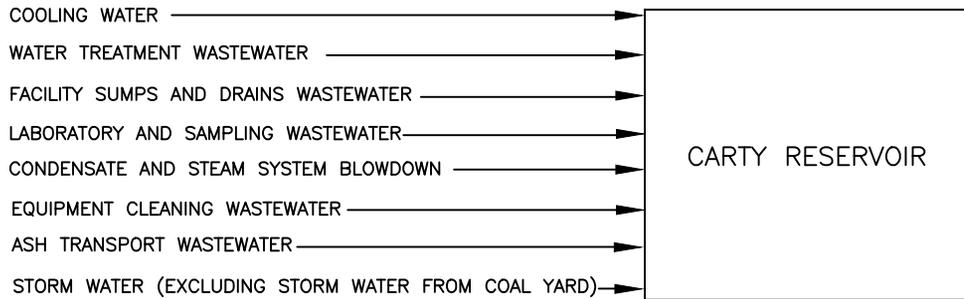
Drawing  
SITE PLAN

Date April 21, 2016  
File Name Boardman 2016

Scale AS SHOWN  
Project No. 108.00277.00047

Fig. No.  
2





PGE BOARDMAN POWER PLANT AND CARTY  
 GENERATING STATION  
 73334 AND 73396 TOWER ROAD  
 BOARDMAN, OREGON 97818

Report OPERATIONS, MONITORING, AND  
 MAINTENANCE PLAN

Drawing PROCESS FLOW DIAGRAM BOARDMAN  
 POWER PLANT

Date April 21, 2016

Scale AS SHOWN

Fig. No.

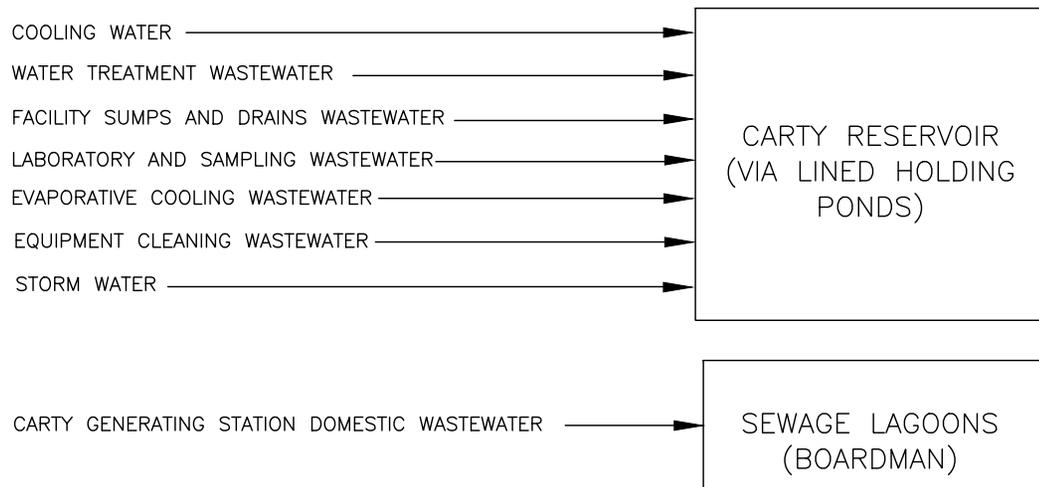
File Name Boardman 2016.2

Project No. 108.00277.00047

3a



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 LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.



PGE BOARDMAN POWER PLANT AND CARTY  
GENERATING STATION  
73334 AND 73396 TOWER ROAD  
BOARDMAN, OREGON 97818

Report OPERATIONS, MONITORING, AND  
MAINTENANCE PLAN

Drawing PROCESS FLOW DIAGRAM □ CARTY  
GENERATING STATION

Date April 21, 2016

Scale AS SHOWN

Fig. No.

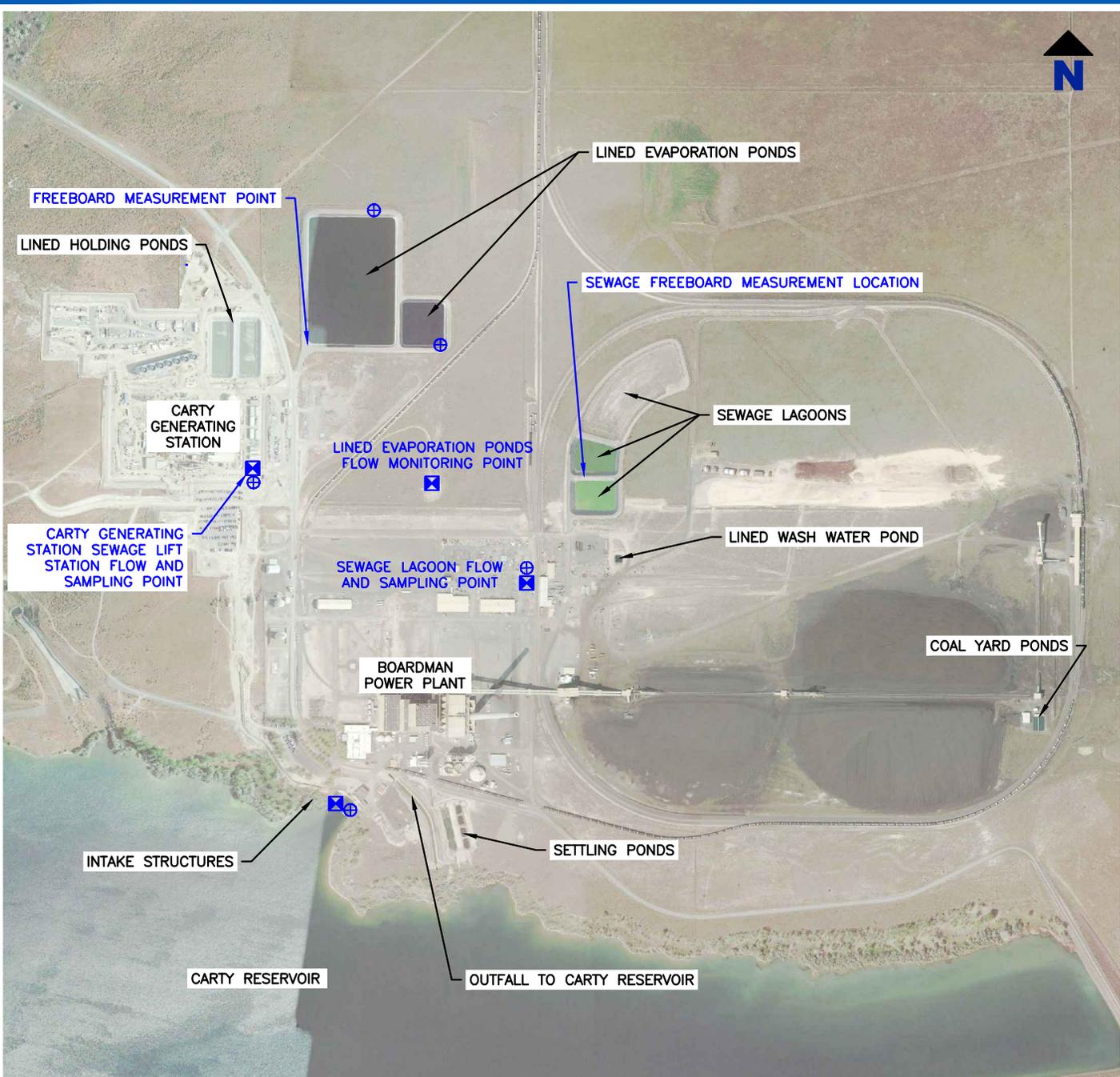
File Name Boardman 2016 2

Project No. 108.00277.00047

3 □



THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL  
LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.



**LEGEND**

AERIAL PHOTO FROM GOOGLE EARTH, MAY 2015

- ⊠ FLOW METER
- ⊕ MONITORING AND SAMPLING POINT



**PGE BOARDMAN POWER PLANT AND CARTY GENERATING STATION**  
 73334 AND 73396 TOWER ROAD  
 BOARDMAN, OREGON 97818

Report  
**OPERATIONS, MONITORING, AND MAINTENANCE PLAN**

Drawing  
**SAMPLING LOCATIONS**

Date	May 19, 2016	Scale	AS SHOWN	Fig. No.	<b>4</b>
File Name	Boardman 2016	Project No.	108.00277.00047		

# **APPENDIX A**

**WPCF PERMIT - 100189**



# Oregon

Kate Brown, Governor

## Department of Environmental Quality

Eastern Region - Pendleton Office

800 SE Emigrant Ave, Suite 330

Pendleton, OR 97801

Phone: (541) 276-4063

Fax: (541) 278-0168

Relay Service: 711

November 4, 2015

Mr. David Rodgers  
Portland General Electric Co.  
73334 Tower Road  
Boardman, OR 97818

### PERMIT ACTION

Re: WQ - Morrow County  
PGE - Boardman Plant  
WPCF 100189; File 70795

Dear Mr. Rodgers:

This permit action letter is intended to modify Portland General Electric's (PGE's) Water Pollution Control Facilities (WPCF) permit by removing a condition that requires PGE to apply for a solid waste permit.

DEQ issued WPCF Permit 100189 to PGE on May 2, 2013. At that time, DEQ anticipated that promulgation of EPA's Coal Combustion Residuals (CCR) Rules at a future date would require that PGE obtain a solid waste permit from DEQ's Land Quality Division. Accordingly, DEQ included a requirement in Schedule A, Condition 20 of the WPCF permit requiring PGE to apply for a solid waste permit, if and when PGE's coal ash becomes subject to the CCR Rule. However, the new rule, as promulgated, does not require that PGE have a solid waste permit. Therefore, by this letter, Schedule A, Condition 20 is modified as follows.

20. Management and disposal of Boardman Power Plant ash must be conducted in accordance with this permit and the Boardman Power Plant Ash Disposal Plan. Except as provided for in the Boardman Power Plant Ash Disposal Plan, disposal of wastes other than coal ash is prohibited in the ash disposal landfill. If management and disposal of coal ash becomes subject to requirements established by the Environmental Protection Agency or the Department during the term of this permit, or any administrative extension of the term of the permit, the new regulatory requirements control over any inconsistent provisions in the Boardman Power Plant Ash Disposal Plan and this permit. ~~At that time, the Permittee will be required to apply for a permit from the Department's Land Quality Division. If the Land Quality Division issues a permit, the ash disposal requirements in this permit will no longer apply.~~

All other conditions of the permit remain unchanged. If you have any questions regarding this permit action, please contact Carl Nadler at (541) 298-7255, ext. 227 or John Straughan at (541) 278-4611.

Sincerely,

Don Butcher  
Water Quality Permit Manager

cc: Carl Nadler, DEQ  
Lissa Druback, DEQ  
John Straughan, DEQ  
✓ Lenna Cope, PGE  
Amber Chapman, PGE  
Duane Kilsdonk, EFSC





# Oregon

John A. Kitzhaber, MD, Governor

## Department of Environmental Quality

Eastern Region - Pendleton Office

700 SE Emigrant Ave, Suite 330

Pendleton, OR 97801

Phone: (541) 276-4063

Fax: (541) 278-0168

Relay Service: 711

May 2, 2013

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**

**RECEIVED**

MAY 6 2013

**ENVIRONMENTAL SERVICES**

Arya Behbehani-Divers  
Portland General Electric Company  
121 SW Salmon St., 3WTCBRO5  
Portland, OR 97204

Re: Waste Disposal Permit  
File No. 70795  
Site Loc. PGE Boardman Plant  
73334 Tower Rd., Boardman, Oregon  
Morrow County

Enclosed is your renewed Water Pollution Control Facilities (WPCF) permit number 100189.

This permit will be considered the final action on permit application number 971051.

If you are dissatisfied with the conditions or limitations of this permit, you have 20 days to request a hearing. The request for a hearing must be made in writing and state the grounds for the request.

You are urged to carefully read the permit and take all possible steps to comply with conditions established. Should you have any questions regarding this permit please contact Carl Nadler in the Eastern Region – Columbia Gorge office at (541) 298-7255, ext. 227.

Sincerely,

Cheryll Hutchens-Woods  
Water Quality Manager  
Eastern Region

CHW:jmr  
Enclosure

cc: Amber Chapman, PGE (w/enc.)  
Sue Oliver, Oregon Department of Energy (w/enc.)



**WATER POLLUTION CONTROL FACILITIES PERMIT**

Department of Environmental Quality  
Eastern Region  
700 S.E. Emigrant Avenue, Suite 330, Pendleton, OR 97801  
Telephone: (541) 276-4063  
Issued pursuant to ORS 468B.050

**FACILITY:**

Portland General Electric Co.  
121 SW Salmon St.  
Portland, OR 97204

**SOURCES COVERED BY THIS PERMIT:**

<u>Type of Waste</u>	<u>Method of Disposal</u>
Industrial Wastewater	Seepage and Evaporation
Domestic Wastewater	Seepage and Evaporation
Coal Ash	Land Disposal

**PLANT TYPE AND LOCATION:**

Boardman Power Plant  
(Coal-fired electricity generation)  
Carty Generating Station  
(Gas-powered electricity generation)

**RIVER BASIN INFORMATION:**

Basin: Umatilla  
Sub-Basin: Middle Columbia / Lake Wallula  
LLID: 1198031456823 RM 10  
County: Morrow

Tower Road  
Boardman, Oregon

Nearest surface stream which would receive  
wastewater if it were to discharge: Sixmile Canyon

**Treatment System Class: Level I**

Issued in response to Carty Generating Station and Boardman Power Plant Application No. 971051 received September 11, 2009.

Pursuant to ORS 469.378, a land use compatibility determination is not required for this permit and the permit is conditioned on a land use determination by the Energy Facility Siting Council.

Cheryll Hutchens-Woods  
Cheryll Hutchens-Woods, Water Quality Manager  
Eastern Region

May 2, 2013  
Date

**PERMITTED ACTIVITIES**

Until this permit expires or is modified or revoked, the Permittee is authorized to construct, install, modify, or operate a wastewater collection, treatment, control and disposal system in conformance with all the requirements, limitations, and conditions set forth in the attached schedules as follows:

	<u>Page</u>
Schedule A - Waste Disposal Limitations not to be Exceeded.....	2-5
Schedule B - Minimum Monitoring and Reporting Requirements.....	6-9
Schedule C - Compliance Conditions and Schedules.....	10-12
Schedule D - Special Conditions.....	13-16
Schedule E - Not Applicable.....	--
Schedule F - General Conditions.....	17-20

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon Administrative Rule, any other direct or indirect discharge to waters of the state is prohibited, including discharge to an underground injection control system.

## SCHEDULE A

### Waste Disposal Limitations

1. Direct discharge to surface waters is not permitted.
2. The Permittee must manage all wastewater in a manner that will prevent:
  - a. The creation of odors, fly and mosquito breeding or other nuisance conditions;
  - b. A violation of the Department's Groundwater Quality Protection Rules (Oregon Administrative Rules (OAR) Chapter 340, Division 40); and,
  - c. A violation of any permit-specific groundwater concentration limits, established pursuant to OAR 340-040-0030, which will be incorporated into this permit by modification.
3. All activities pertaining to the management, treatment, and disposal of the authorized wastes<sup>1</sup>, as well as wastewater-derived solids from ponds, sumps and settling basins, must be conducted in accordance with the approved Operations, Monitoring and Maintenance (OM&M) Plan (see Schedule C, Condition 3), and any amendments to the plan approved in writing by the Department. No changes may be made in the approved OM&M Plan without written approval from the Department.
4. The Permittee must not exceed the minimum freeboard established by design specifications for all ponds and sewage lagoons.
5. Unless otherwise approved in writing by the Department, the Permittee is permitted to manage and dispose only the following wastes from operation of the Boardman Power Plant in Carty Reservoir:
  - a. Cooling water
  - b. Water treatment wastewater
  - c. Facility sumps and drains wastewater
  - d. Laboratory and sampling wastewater
  - e. Condensate and steam system blowdown
  - f. Equipment cleaning wastewater (excluding boiler cleaning wastewater until after submittal of a waste characterization and written approval from the Department)
  - g. Ash transport wastewater
  - h. Storm water (excluding storm water from the coal yard)
6. Unless otherwise approved in writing by the Department, the Permittee is permitted to manage and dispose only the following wastes from operation of the Carty Generating Station in Carty Reservoir:
  - a. Cooling water
  - b. Water treatment wastewater
  - c. Facility sumps and drains wastewater
  - d. Laboratory and sampling wastewater
  - e. Evaporative cooling wastewater
  - f. Equipment cleaning wastewater
  - g. Storm water

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<sup>1</sup> Excluding Boardman Power Plant coal ash, which must be managed in accordance with the Ash Disposal Plan.

7. The following limitations<sup>2</sup> must not be exceeded in Carty Reservoir at the intake of the recirculation line from Carty Reservoir to the Boardman Power Plant:

Parameter	Limitations (Sample Maximum)
Chloride	100 mg/L
Sulfate	200 mg/L
Sodium	150 mg/L
Arsenic	0.01 mg/L
Boron	0.5 mg/L
Copper	0.1 mg/L
Cadmium	0.005 mg/L
Calcium	500 mg/L
Chromium	0.05 mg/L
Magnesium	250 mg/L
Bicarbonate Alkalinity	500 mg/L
Fluoride	1 mg/L
Nitrate	10 mg/L
Total Dissolved Solids (TDS)	500 mg/L
Mercury	0.002 mg/L
Zinc	0.1 mg/L
pH	9.4 s.u.
Oil sheen	No visible

8. The following limitations must not be exceeded in Carty Reservoir at the intake of the irrigation withdrawal pump, during withdrawal for irrigation:

Parameter	Limitations (Sample Maximum)
Total Dissolved Solids	320 mg/L
Arsenic	0.0063 mg/L
Chromium	0.0025 mg/L
pH	9.4 s.u.
Sodium Adsorption Ratio	1.66

9. Unless otherwise approved in writing by the Department, the Permittee is permitted to manage and dispose only the following wastes from operation of the Boardman Power Plant in the Boardman Lined Ponds, if disposal of such wastewater into Carty Reservoir would impair the use of the reservoir water for plant operation or it is required to maintain reservoir constituent concentrations below permit limitations after implementation of irrigation withdrawal action requirements that are required by Schedule B, Condition 2:
- Water treatment wastewater
  - Facility sumps and drains wastewater
  - Laboratory and sampling wastewater
  - Condensate and steam system blowdown
  - Equipment cleaning wastewater (excluding boiler cleaning wastewater until after submittal of a waste characterization and written approval from the Department)
  - Ash transport wastewater
  - Storm water

<sup>2</sup> Limitations are based on protection of wildlife and groundwater and may be modified after submittal of a Hydrogeologic Characterization Report (see Schedule C, Condition 5) and/or exceedance of a groundwater concentration limit (see Schedule A, Condition 2.c).

10. Unless otherwise approved in writing by the Department, the Permittee is permitted to manage and dispose only the following wastes from operation of the Carty Generating Station in lined ponds constructed in accordance with plans that are approved by the Department (see Schedule C, Condition 2):
  - a. Water treatment wastewater
  - b. Facility sumps and drains wastewater
  - c. Laboratory and sampling wastewater
  - d. Evaporative cooling wastewater
  - e. Equipment cleaning wastewater
  - f. Storm water
11. Equipment and vehicle wash water and storm water from the vehicle fueling and maintenance areas from the Boardman Power Plant must be disposed in the Boardman Power Plant's lined pond adjacent to the vehicle wash and fueling area. However, wash water derived from washing exterior surfaces only of vehicles and equipment may be disposed in storm water swales provided chemicals, soaps, and detergents are not used and washing is restricted to the exterior of the vehicle or equipment. Disposal of engine, transmission or undercarriage wash water is not permitted in storm water swales.
12. Vehicle wash water from the Carty Generating Station must be disposed in a lined pond constructed in accordance with plans that are approved by the Department (see Schedule C, Condition 2). However, wash water derived from washing exterior surfaces only of vehicles and equipment may be disposed in storm water swales provided chemicals, soaps, and detergents are not used and washing is restricted to the exterior of the vehicle or equipment. Disposal of engine, transmission or undercarriage wash water is not permitted in storm water swales.
13. The Permittee is permitted to manage and dispose of fire protection system wastewater and facility construction and commissioning wastewater in storm water swales or Carty Reservoir, provided chemicals, soaps, and detergents are not used.
14. Disposal of rinse water from concrete mixer trucks chutes and exteriors is permitted on site. Disposal of concrete mixer washout is not authorized by this permit.
15. Boardman Power Plant domestic wastewater (sewage) must be disposed in the Boardman Power Plant sewage lagoons. Carty Generating Station sewage is permitted to be disposed in the Boardman Power Plant sewage lagoons after reconditioning the clay liners or demonstrating clay liner integrity by conducting a leak test and submitting a long term plan to the Department to ensure the integrity of the clay lined cells (see Schedule C, Condition 2). The approved average dry weather design flow for the facility is 10,500 GPD.

16. Prior to overflow into the unlined evaporation/seepage cell, sanitary sewage must receive at least the equivalent of secondary treatment and disinfection and meet the following limitations:

Parameter	Limitations	
<i>E. coli</i> bacteria	Must not exceed 126 organisms per 100 ml monthly geometric mean. A single sample must not exceed 406 organisms per 100 ml <sup>3</sup>	
	Annual Average (mg/L)	Maximum (mg/L)
NO <sub>3</sub> -N	7	10
Total Nitrogen <sup>4</sup>	10	15

17. Wash water from coal yard operations must be collected for treatment in the Boardman Power Plant coal yard ponds and reused in the coal yard. Wash water that floods sumps or basements in the coal yard buildings due to equipment failure and must be removed to repair the equipment may be pumped out of the basements or sumps and onto the coal pile or into storm water swales that remain inside the coal yard boundaries and do not discharge to Carty Reservoir.
18. Air pollution control wastewater may be approved for disposal in lined evaporation ponds, coal yard or ash disposal area after submittal of a waste characterization and written approval from the Department.
19. Storm water from the coal yard and ash disposal landfill must not be discharged to Carty Reservoir.
20. Management and disposal of Boardman Power Plant ash must be conducted in accordance with this permit and the Boardman Power Plant Ash Disposal Plan. Except as provided for in the Boardman Power Plant Ash Disposal Plan, disposal of wastes other than coal ash is prohibited in the ash disposal landfill. If management and disposal of coal ash becomes subject to requirements established by the Environmental Protection Agency or the Department during the term of this permit, or any administrative extension of the term of the permit, the new regulatory requirements control over any inconsistent provisions in the Boardman Power Plant Ash Disposal Plan and this permit. At that time, the Permittee will be required to apply for a permit from the Department's Land Quality Division. If the Land Quality Division issues a permit, the ash disposal requirements in this permit will no longer apply.

<sup>3</sup> If a single sample exceeds 406 organisms per 100 ml, then five consecutive re-samples may be taken at intervals no greater than four-hours beginning within twenty-eight (28) hours after the original sample was taken. If the log mean of the five re-samples is less than or equal to 126 organisms per 100 ml, a violation will not be triggered.

<sup>4</sup> Total Nitrogen in this permit limitation equals Total Kjeldahl Nitrogen (TKN) + Nitrate Nitrogen (NO<sub>3</sub>-N).

**SCHEDULE B**

**Minimum Monitoring and Reporting Requirements** (unless otherwise approved in writing by the Department).

1. **Facilities Monitoring**

The Permittee must monitor the facilities in accordance with the following Department approved plans: OM&M Plan, Groundwater Monitoring Plan, Ash Disposal Plan and Boardman Power Plant Water Quality Management Program, and any amendments to the plans and program approved in writing by the Department. Monitoring must include the following items and parameters:

a. Boardman Power Plant Sanitary Lagoons

Items and Parameters	Minimum Frequency	Sample Type/Action
<b>Influent<sup>5</sup></b>		
Total flow (MGD)	Daily	Record
Flow meter calibration	Annually	Written verification
pH	2/week	Grab/field measurement
BOD <sub>5</sub>	Quarterly	Composite <sup>6</sup>
TSS	Quarterly	Composite <sup>6</sup>
<b>Overflow to seepage cell<sup>7</sup></b>		
Total flow (MGD)	Daily	Record
Flow meter calibration	Annually	Written verification
Quantity chlorine used	Daily	Measurement
Chlorine residual	Daily	Grab
pH	2/week	Grab/field measurement
<i>E. coli</i> bacteria	Monthly	Grab
BOD <sub>5</sub>	Quarterly	Composite <sup>6</sup>
TSS	Quarterly	Composite <sup>6</sup>
TKN	Quarterly	Grab
NO <sub>3</sub> -N	Quarterly	Grab
<b>Lagoon Site</b>		
Freeboard <sup>8</sup>	Weekly	Measure and record
Perimeter inspection <sup>9</sup>	Daily	Observation

<sup>5</sup> Sample point is in discharge to lagoons, except that flow from Boardman Power Plant coal yard sewage collection system may be measured by monitoring domestic water usage of facilities that discharge wastes to the coal yard sewage collection system. And, except that BOD<sub>5</sub>, TSS and pH monitoring results of domestic sewage from Boardman Power Plant power block may be deemed representative of BOD<sub>5</sub>, TSS and pH from Boardman Power Plant coal yard sewage collection system.

<sup>6</sup> Composite samples must consist of no less than 6 samples collected over a 24-hour period and apportioned according to the volume of flow at the time of sampling.

<sup>7</sup> Required only when overflow occurs. Sample point is at overflow to seepage cell

<sup>8</sup> Freeboard is measured from lowest point on containment structure

<sup>9</sup> A perimeter inspection is a sight surveillance of the lagoon dikes looking for the presence of badgers, muskrats, ground hogs or other rodents whose burrowing activities could threaten the structural integrity of a dike.

b. Lined Evaporation Ponds (Boardman Power Plant and Carty Generating Station)

Items and Parameters	Minimum Frequency	Sample Type/Action
Each Pond <sup>10</sup>		
Total Flow to pond (MG)	Quarterly	Record
Flow meter calibration	Annually	Written verification
As, Cd, Cr, Hg, TDS, Oil & Grease, TTHMs <sup>11</sup> , pH	Quarterly	Grab
Freeboard	Weekly	Measure and record
Perimeter inspection	Daily	Observation

c. Carty Reservoir

Items and Parameters	Minimum Frequency	Sample Type/Action
Effluent <sup>12</sup>		
Total flow (MG)	Monthly	Record
Flow meter calibration	Annually	Written verification
As, B, Cd, Ca, Cr, Cu, Fe, Mg, Hg, K, Na, V, Se, Zn, Bicarb Alk, Total Alk, Cl <sup>-</sup> , F <sup>-</sup> , NO <sub>3</sub> , SiO <sub>2</sub> , SO <sub>4</sub> , TDS, Cond, pH, TTHMs	Monthly	Grab
Make-up water		
Total flow (MG)	Monthly	Record
Flow meter calibration	Annually	Written verification
Irrigation withdrawal <sup>13</sup>		
TDS, As, Cr, pH, SAR	Twice Monthly, except as required by Schedule B, Condition 2	Grab
Carty Reservoir		
Water elevation	Monthly	Measure and record

d. Coal Ash

Items and Parameters	Minimum Frequency	Sample Type/Action
Ash transferred off site Bottom Economizer Fly	Annual	Record volumes and recipients
Ash disposed on site Bottom Economizer Fly	Annual	Record volumes

2. **Irrigation Withdrawal Action Requirements**

<sup>10</sup> The Permittee must designate and maintain a sampling station at each pond from which representative samples may be collected, except that flow to Boardman Power Plant's two lined evaporation ponds may be measured at a single location downstream of all possible flow additions.

<sup>11</sup> Total trihalomethanes

<sup>12</sup> Sample point is in the recirculation line (intake) from Carty Reservoir to the Boardman Power Plant

<sup>13</sup> Sample point is at intake to irrigation withdrawal pump

If irrigation withdrawal monitoring results indicate that a trigger level in the following table has been exceeded, the Permittee must:

- a. Report the results to the Department within ten (10) calendar days of receipt of the laboratory data;
- b. Immediately implement Operations, Monitoring and Management (OM&M) Plan (see Schedule C, Condition 3) procedures to decrease parameter concentrations in Carty Reservoir; and,
- c. Immediately begin monitoring the exceeded parameter(s) in accordance with the approved OM&M Plan until concentrations return to below trigger level(s).

Parameter	Trigger Level
Total Dissolved Solids	280 mg/L
Arsenic	0.0055mg/L
Chromium	0.0022mg/L
pH	9.0 s.u.
Sodium Adsorption Ratio	1.44

### 3. **Groundwater Monitoring**

The Permittee must monitor groundwater in accordance with a Department-approved Groundwater Monitoring Plan and any amendments to the plan approved in writing by the Department.

### 4. **Groundwater Monitoring Resampling Requirements<sup>14</sup>**

- a. If monitoring indicates that a concentration limit has been exceeded at a compliance point, the Permittee must immediately resample the monitoring well. The results of both sampling events must be reported to the Department within 10 calendar days of receipt of the laboratory data.
- b. If monitoring indicates a significant increase (increase or decrease for pH), as defined in the Groundwater Monitoring Plan, in the value of a parameter monitored, the Permittee must immediately resample unless otherwise approved in writing by the Department. If the re-sampling confirms a change in water quality, the Permittee must:
  1. Report the results to the Department within ten (10) calendar days of receipt of the laboratory data; and
  2. Prepare and submit to the Department within thirty (30) calendar days a plan for developing a preliminary assessment unless another time schedule is approved by the Department.

### 5. **Monthly Reporting Procedures – Boardman Power Plant Sanitary Lagoons**

Monitoring results must be reported on approved forms. The reporting period is the calendar month. Reports must be submitted to the Department's Eastern Region Pendleton Office by the 15th day of the following month.

Monitoring reports must identify the name, certificate classification and grade level of each principal operator designated by the Permittee as responsible for supervising the wastewater treatment system

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<sup>14</sup> OAR 340-040-0030(5) requires resampling after a significant increase (increase or decrease for pH). In addition, resampling is appropriate after a concentration limit exceedance and prior to a remedial investigation and feasibility study, which is required by OAR 340-040-0030(6).

during the reporting period. Monitoring reports must also identify the treatment system classification as found on page one of this permit.

Monitoring reports must include a record of all applicable equipment breakdowns and bypassing.

6. **Annual Reporting Requirements**

On or before March 1 of each calendar year, the Permittee must submit an annual facility monitoring report to the Department that summarizes all wastewater and ash facilities operations and monitoring results for the preceding year. Following approval, annual reporting and data analyses must be in accordance with the approved OM&M Plan, Groundwater Monitoring Plan, Ash Disposal Plan and Boardman Power Plant Water Quality Management Program, and any amendments to the plans and program approved in writing by the Department.

## SCHEDULE C

### Compliance Conditions and Schedules

#### 1. Boardman Power Plant Sewage Lagoons

Prior to discharge of sanitary sewage from Carty Generating Station to the Boardman Power Plant sewage lagoons, the Permittee must submit a work plan to the Department to remove vegetation from the clay lined cells and either leak test the clay-lined cells<sup>15</sup> or recondition them.

The leak test plan must be implemented in accordance with Department approval and the results must be submitted to the Department. If the Department gives written notification to the Permittee that reconditioning of the clay liners is required, the Permittee must submit a clay liner reconditioning work plan to the Department. The reconditioning plan must be implemented in accordance with Department approval.

In addition, prior to discharge of sanitary sewage from Carty Generating Station to the Boardman Power Plant sewage lagoons, the Permittee must submit a long term plan to the Department to ensure the integrity of the clay-lined cells. The plan may include evaluating system capacity requirements and modifying the system accordingly. The plan must be implemented in accordance with Department approval.

#### 2. Wastewater Treatment System Wastewater - Carty Generating Station

Prior to discharge of wastewater treatment system wastewater to lined evaporation ponds that are proposed to be constructed for Carty Generating Station, a wastewater characterization must be submitted for Department review and approval.

#### 3. Operations, Monitoring and Management Plan

Not later than 90 days after permit issuance, the Permittee must submit a facility Operations, Monitoring and Management (OM&M) Plan to the Department for review and approval. The plan must include, but is not limited to, management and disposal of wastewater-derived solids from ponds, sumps and settling basins, as well as procedures to decrease parameter concentrations in Carty Reservoir in the event of an irrigation withdrawal limit exceedance (see Schedule B, Condition 2).

The Permittee must review the OM&M Plan annually and submit a revised plan, whenever it is revised, to the Department for review and approval.

Following submittal of the plan or a revised plan, the Department will approve it, approve it with conditions, or disapprove it. If approved, the plan must be implemented in accordance with the Department approval. If disapproved, the Department will provide an approved plan or a minimum of 30 days to submit a revised plan.

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<sup>15</sup> Guidelines for estimating pond leakage are available from the Department at: <http://www.deq.state.or.us/wq/rules/div052/guidelines/estleak.pdf>. For ponds less than two acres, the following guidelines may be used: <http://www.deq.state.or.us/wq/rules/div052/guidelines/altestleak.pdf>. Use of the guidelines is recommended to expedite Department review and approval of the work plan.

**4. Biosolids Management Plan**

Prior to removal and beneficial reuse of accumulated sewage sludge, the Permittee must submit a Biosolids Management Plan to the Department and receive Department approval of the plan. The plan must be developed in accordance with Oregon Administrative Rule 340, Division 50, "Land Application of Domestic Wastewater Treatment Facility Biosolids, Biosolids Derived Products, and Domestic Septage". The plan must be implemented in accordance with the approval.

**5. Hydrogeologic Characterization**

Not later than 120 calendar days after permit issuance, unless otherwise approved in writing by the Department, the Permittee must submit to the Department, for review and approval, a work plan for completing a Hydrogeologic Characterization at the Boardman Power Plant/Carty Reservoir site. The work plan must address evaluation of conditions up- and down-gradient of each and every wastewater impoundment (including lined ponds, unlined settling basins and coal yard wastewater basins). The work plan must also address evaluation of Carty Reservoir as a source of potential impacts to groundwater from arsenic, vanadium and alkalinity in the immediate vicinity of the reservoir. The Permittee must implement the work plan as approved.

Prior to construction of any wastewater impoundment specifically for the Carty Generating Station, the Permittee must submit to the Department, for review and approval, a work plan for completing a Hydrogeologic Characterization in the vicinity of the proposed wastewater impoundment. The Permittee must implement the work plan as approved.

**6. Groundwater Monitoring Plan**

- a. Not later than ninety (90) days from Department approval of the Hydrogeologic Characterization, unless otherwise approved in writing by the Department, the Permittee must submit a Groundwater Monitoring Plan to the Department for review and approval. Upon Department approval, the Groundwater Monitoring Plan must be implemented.
- b. In conjunction with submittal of the Groundwater Monitoring Plan, the Permittee must propose a submittal date for a Water Quality Analysis Report. The proposed date for report submittal must be the earliest practicable date after completion of nine (9) quarters of groundwater monitoring (to enable the Permittee to establish background groundwater conditions).

**7. Water Quality Analysis Report**

Not later than the date approved by the Department under Schedule C, Condition 6.b., the Permittee must submit to the Department for review and approval a Water Quality Analysis Report. The Water Quality Analysis Report must include, but not be limited to identification of background and compliance wells, determinations of background groundwater quality, analyses of existing water quality data and existing impacts, and analyses of potential impacts from facility activities. Concurrent with submittal of the Water Quality Analysis Report, the Permittee must:

- a. Propose site-specific concentration limits pursuant to OAR 340-040-0030(3) for the Department's consideration; and,
- b. Apply for any concentration limit variances proposed pursuant to OAR 340-040-0030(4).

8. Not later than 90 days after burning coal from any new source other than western sub-bituminous, the Permittee shall submit a waste characterization of the resulting ash to the Department. The characterization must include: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc.
9. The Permittee is required to meet the compliance dates that have been established in this schedule, unless alternative compliance dates have been approved in advance in writing by the Department. Either prior to or not later than 14 calendar days following any lapsed compliance date, the Permittee must submit to the Department a notice of noncompliance with the established schedule. Any reports of noncompliance must include the cause of noncompliance.

## SCHEDULE D

### Special Conditions

1. Prior to constructing or modifying wastewater management, treatment and disposal facilities, detailed plans and specifications must be submitted to, and approved in writing by, the Department.
2. All biosolids must be managed in accordance with the Department-approved biosolids management plan and the site authorization letters issued by the Department. Any changes in solids management activities that significantly differ from the operations specified under the approved plan require the prior written approval of the Department.

There are no approved sites for application of the Permittee's biosolids as of the date of permit issuance. All new biosolids application sites must meet the site selection criteria set forth in OAR 340-050-0070 and must be located within Morrow County. Property owners adjacent to any newly approved application sites must be notified, in writing or by any method approved by the Department, of the proposed activity prior to the start of application. For proposed new application sites that are deemed by the Department to be sensitive with respect to residential housing, runoff potential or threat to groundwater, an opportunity for public comment must be provided in accordance with OAR 340-050-0030.

This permit may be modified to incorporate any applicable standard for biosolids use or disposal promulgated under section 405(d) of the Clean Water Act, if the standard for biosolids use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or controls a pollutant or practice not limited in this permit.

3. The Permittee must comply with Oregon Administrative Rules (OAR), Chapter 340, Division 49, "Regulations Pertaining To Certification of Wastewater System Operator Personnel" and accordingly:
  - a. The Permittee must have its wastewater system supervised by one or more operators who are certified in treatment system operation at grade level I or higher.

**Note: A "supervisor" is defined as the person exercising authority for establishing and executing the specific practice and procedures of operating the system in accordance with the policies of the Permittee and requirements of the waste discharge permit. "Supervise" means responsible for the technical operation of a system, which may affect its performance or the quality of the effluent produced. Supervisors are not required to be on-site at all times.**

- b. The Permittee's wastewater system may not be without supervision (as required by Special Condition 3.a. above) for more than thirty (30) days. During this period, and at any time that the supervisor is not available to respond on-site (i.e. vacation, sick leave or off-call), the Permittee must make available another person who is certified treatment system operation at grade level I or higher.
- c. The Permittee is responsible for ensuring the wastewater system has a properly certified supervisor available at all times to respond on-site at the request of the Permittee and to any other operator.
- d. The Permittee must notify the Department of Environmental Quality in writing within thirty (30) days of replacement or redesignation of certified operators responsible for supervising wastewater system operation. The notice must be filed with the Water Quality Division,

Operator Certification Program (811 SW Sixth, Portland, OR 97204). This requirement is in addition to the reporting requirements contained under Schedule B of this permit

- e. Upon written request, the Department may grant the Permittee reasonable time, not to exceed 120 days, to obtain the services of a qualified person to supervise the wastewater system. The written request must include justification for the time needed, a schedule for recruiting and hiring, the date the system supervisor availability ceased and the name of the alternate system supervisor(s) as required by 3.b. above.
4. An adequate contingency plan for prevention and handling of spills and unplanned discharges must be in force at all times. A continuing program of employee orientation and education must be maintained to ensure awareness of the necessity for good in-plant control and proper action in the event of a spill or accident.
  5. An environmental supervisor must be designated to coordinate and implement all necessary functions related to maintenance and operation of waste management, treatment, and disposal facilities. This person must have access to all information pertaining to the generation of wastes in the various process areas.
  6. The Permittee must notify the Department's Eastern Region office at (541) 276-4063 in accordance with the response times contained in the General Conditions of this permit in the event of any malfunction of the wastewater system to enable coordination of corrective action between the Permittee and the Department.
  7. **Monitoring Well Management/Maintenance**
    - a. The Permittee must protect and maintain each groundwater monitoring well identified in the Groundwater Monitoring Plan so that samples can be collected that are representative of actual conditions.
    - b. All monitoring well abandonment, replacement and installation must be conducted to comply with the Water Resources Department Rules (OAR Chapter 690, Division 240) and with the Department of Environmental Quality's Guidelines for Groundwater Monitoring Well Drilling, Construction, and Decommissioning. All monitoring well repairs, abandonments, replacements and installations must be documented in a report prepared by an Oregon-registered geologist.
    - c. If a monitoring well identified in the Groundwater Monitoring Plan becomes damaged or inoperable, the Permittee must notify the Department in writing within 14 days. The written notification must describe the problem that occurred and the remedial measures that have been taken to date to correct the problem. In addition, the Permittee must submit a written final report within 60 days following the notification, unless otherwise approved in writing by the Department, which must include a description of the problem, the remedial measures taken to correct the problem, and the measures taken to prevent recurrence. The Department can require the replacement of inoperable monitoring wells.<sup>16</sup>
    - d. All new and replacement monitoring well locations and designs related to the Groundwater Monitoring Plan must be approved in writing by the Department prior to well installation. Well logs and well completion reports must be submitted to the Department within thirty (30)

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<sup>16</sup> Monitoring well operability will be determined by the Department on a case-by-case basis.

days of well installation. Reports must include land survey drawings that depict actual location of all monitoring wells, land application areas, and surface waters.

- e. Modification and/or abandonment plans for any wells identified in the Groundwater Monitoring Plan must be submitted to and approved in writing by the Department prior to modification and/or abandonment of any existing monitoring well.

## 8. Definitions

*Water treatment wastewater* means wastewater derived from the Boardman Power Plant water treatment system, including wastewater from demineralization and regeneration of the demineralization media, make-up water demineralization (including regeneration) and condensate polishing (including regeneration), the raw water filter and activated carbon filter. It also includes Carty Generating Station neutralization tank wastewater and multi-media filtration wastewater.

*Facility sumps and drains wastewater* means wastewater from Boardman Power Plant and Carty Generating Station sumps and drains. Wastewater from the Boardman Power Plant pretreatment area sump, water treatment area sump, liquid waste sump, water treatment area floor drains and system shut-down drains are included in this category. An oil water separator provides treatment for wastewater from selected Boardman Power Plant facility sumps and drains.

*Laboratory and sampling wastewater* means wastewater from chemical waste drains and laboratory/sample room sink drains and includes discarded water samples, lab equipment wash water and spent reagents. The pH is approximately 9 s.u. and the volume is approximately 200 to 300 gallons per day.

*Condensate and steam system blowdown* means Boardman Power Plant boiler blowdown.

*Equipment cleaning wastewater* means wash water from cleaning the coal gallery and ash transport system, as well as boiler cleaning wash water, boiler acid cleaning wastewater and chemical cleaning wastewaters.

*Equipment and vehicle cleaning wastewater* means wastewater from cleaning heavy construction equipment, landscape maintenance equipment and on-road vehicles.

*Ash transport wastewater* means wastewater that overflows from the ash transport system to the settling ponds, including wastewater from the bottom ash handling system surge tank.

*Evaporative cooling wastewater* means Carty Generating Station cooling tower blowdown.

*Fire protection system wastewater* means fire suppression system test water that is sourced from the domestic water supply or Carty Reservoir.

*Facility construction and commissioning wastewater* means the following wastes from the construction of Carty Generating Station: water supply system testing and commissioning wastewater, hydrostatic testing wastewater, and water supply lines flushing wastewater.

*Air pollution control wastewater* means baking soda grinding wash water from the Boardman Power Plant. Volume is estimated to be between 50 to 200 gallons per day.

9. The Department may reopen the permit at any time to include new or revised waste disposal limitations, monitoring and reporting requirements, compliance conditions and schedules, and special conditions.

## SCHEDULE F

### WPCF GENERAL CONDITIONS – INDUSTRIAL FACILITIES

#### SECTION A. STANDARD CONDITIONS

1. Duty to Comply with Permit

The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and grounds for an enforcement action. Failure to comply is also grounds for the Department to modify, revoke, or deny renewal of a permit.

2. Property Rights and Other Legal Requirements

Issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other rights, or any infringement of federal, tribal, state, or local laws or regulations.

3. Liability

The Department of Environmental Quality or its officers, agents, or employees may not sustain any liability on account of the issuance of this permit or on account of the construction or maintenance of facilities or systems because of this permit.

4. Permit Actions

After notice by the Department, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including but not limited to the following:

- a. Violation of any term or condition of this permit, any applicable rule or statute, or any order of the Commission;
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.

5. Transfer of Permit

This permit may not be transferred to a third party without prior written approval from the Department. The Department may approve transfers where the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of this permit and the rules of the Commission. A transfer application and filing fee must be submitted to the Department.

6. Permit Fees

The permittee must pay the fees required by Oregon Administrative Rules.

#### SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

At all times the permittee must maintain in good working order and properly operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to comply with the terms and conditions of this permit.

2. Standard Operation and Maintenance

All waste collection, control, treatment, and disposal facilities or systems must be operated in a manner consistent with the following:

- a. At all times, all facilities or systems must be operated as efficiently as possible in a manner that will prevent discharges, health hazards, and nuisance conditions.
- b. All screenings, grit, and sludge must be disposed of in a manner approved by the Department to prevent any pollutant from the materials from reaching waters of the state, creating a public health hazard, or causing a nuisance condition.
- c. Bypassing untreated waste is generally prohibited. Bypassing may not occur without prior written permission from the Department except where unavoidable to prevent loss of life, personal injury, or severe property damage.

3. Noncompliance and Notification Procedures

If the permittee is unable to comply with conditions of this permit because of surfacing sewage; a breakdown of equipment, facilities or systems; an accident caused by human error or negligence; or any other cause such as an act of nature, the permittee must:

- a. Immediately take action to stop, contain, and clean up the unauthorized discharges and correct the problem.
- b. Immediately notify the Department's Regional office so that an investigation can be made to evaluate the impact and the corrective actions taken, and to determine any additional action that must be taken.
- c. Within 5 days of the time the permittee becomes aware of the circumstances, the permittee must submit to the Department a detailed written report describing the breakdown, the actual quantity and quality of waste discharged, corrective action taken, steps taken to prevent a recurrence, and any other pertinent information.

Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this permit or liability for failure to comply.

4. Wastewater System Personnel

The permittee must provide an adequate operating staff that is duly qualified to carry out the operation, maintenance, and monitoring requirements to assure continuous compliance with the conditions of this permit.

5. Public Notification of Effluent Violation

If effluent limitations specified in this permit are exceeded or an overflow occurs that threatens public health, the permittee must take such steps as are necessary to alert the public, health agencies and other affected entities (e.g., public water systems) about the extent and nature of the discharge in accordance with the notification procedures developed in accordance with General Condition B.6. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

6. Emergency Response and Public Notification Plan

The permittee must develop and implement an emergency response and public notification plan that identifies measures to protect public health from bypasses or upsets that may endanger public health. At a minimum the plan must include mechanisms to:

- a. Ensure that the permittee is aware (to the greatest extent possible) of such events;
- b. Ensure notification of appropriate personnel and ensure that they are immediately dispatched for investigation and response;
- c. Ensure immediate notification to the public, health agencies, and other affected entities (including public water systems). The response plan must identify the public health and other officials who will receive immediate notification;
- d. Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained;
- e. Provide emergency operations: and
- f. Ensure that DEQ is notified of the public notification steps taken.

**SECTION C. MONITORING AND RECORDS**1. Inspection and Entry

The permittee must at all reasonable times allow authorized representatives of the Department to:

- a. Enter upon the permittee's premises where a waste source or disposal system is located or where any records are required to be kept under the terms and conditions of this permit;
- b. Have access to and copy any records required by this permit;
- c. Inspect any treatment or disposal system, practices, operations, monitoring equipment, or monitoring method regulated or required by this permit; or
- d. Sample or monitor any substances or permit parameters at any location at reasonable times for the purpose of assuring permit compliance or as otherwise authorized by state law...

2. Averaging of Measurements

Calculations of averages of measurements required for all parameters except bacteria must use an arithmetic mean; bacteria must be averaged as specified in the permit.

3. Monitoring Procedures

Monitoring must be conducted according to test procedures specified in the most recent edition of **Standard Methods for the Examination of Water and Wastewater**, unless other test procedures have been approved in writing by the Department and specified in this permit.

4. Retention of Records

The permittee must retain records of all monitoring and maintenance information, including all calibrations, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. The Department may extend this period at any time.

**SECTION D. REPORTING REQUIREMENTS**1. Plan Submittal

Pursuant to Oregon Revised Statute 468B.055, unless specifically exempted by rule, construction, installation, or modification of disposal systems, treatment works, or sewerage systems may not commence until plans and specifications are submitted to and approved in writing by the Department. All construction, installation, or modification shall be in strict conformance with the Department's written approval of the plans.

2. Change in Discharge

Whenever a facility expansion, production increase, or process modification is expected to result in a change in the character of pollutants to be discharged or in a new or increased discharge that will exceed the conditions of this permit, a new application must be submitted together with the necessary reports, plans, and specifications for the proposed changes. A change may not be made until plans have been approved and a new permit or permit modification has been issued.

3. Signatory Requirements

All applications, reports, or information submitted to the Department must be signed and certified by the official applicant of record (owner) or authorized designee.

4. Twenty-Four Hour Reporting

The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) within 24 hours from the time the permittee becomes aware of the circumstances, unless a shorter time is specified in the permit. During normal business hours, the Department's Regional office must be called. Outside of normal business hours, the Department must be contacted at 1-800-452-0311 (Oregon Emergency Response System).

The following must be included as information that must be reported within 24 hours under this paragraph:

- a. Any unanticipated bypass that exceeds any effluent limitation in this permit;
- b. Any upset that exceeds any effluent limitation in this permit;
- c. Violation of maximum daily discharge limitation for any of the pollutants listed by the Department in this permit; and
- d. Any noncompliance that may endanger human health or the environment.

A written submission must also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:

- e. A description of noncompliance and its cause;
- f. The period of noncompliance, including exact dates and times;
- g. The estimated time noncompliance is expected to continue if it has not been corrected;
- h. Steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and
- i. Public notification steps taken, pursuant to General Condition B.6.

The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

**SECTION E. DEFINITIONS**

1. *BOD<sub>5</sub>* means five-day biochemical oxygen demand.
2. *TSS* means total suspended solids.
3. *FC* means fecal coliform bacteria.
4. *NH<sub>3</sub>-N* means Ammonia Nitrogen.
5. *NO<sub>3</sub>-N* means Nitrate Nitrogen.
6. *NO<sub>2</sub>-N* means Nitrite Nitrogen.
7. *TKN* means Total Kjeldahl Nitrogen.
8. *Cl* means Chloride.
9. *TN* means Total Nitrogen.
10. "*Bacteria*" includes but is not limited to fecal coliform bacteria, total coliform bacteria, and E. coli bacteria.
11. *Total residual chlorine* means combined chlorine forms plus free residual chlorine.
12. *mg/l* means milligrams per liter.
13. *ug/l* means micrograms per liter.
14. *kg* means kilograms.
15. *GPD* means gallons per day.
16. *MGD* means million gallons per day.
17. *Grab sample* means an individual discrete sample collected over a period of time not to exceed 15 minutes.
18. *Composite sample* means a combination of samples collected, generally at equal intervals over a 24-hour period, and based on either time or flow.
19. *Week* means a calendar week of Sunday through Saturday.
20. *Month* means a calendar month.
21. *Quarter* means January through March, April through June, July through September, or October through December.

## **APPENDIX B**

### **EXAMPLE PROCEDURES AND FIELD DATA SHEETS**

Appendix B-1: Carty Reservoir Monitoring and Sampling

Appendix B-2: Lined Evaporation Pond Monitoring and Sampling

Appendix B-3: Sewage Flume Function Test

Appendix B-4: Sewage Lagoon Monitoring and Sampling

Appendix B-5: Groundwater Monitoring and Sampling

## APPENDIX B-1

### CARTY RESERVOIR MONITORING AND SAMPLING

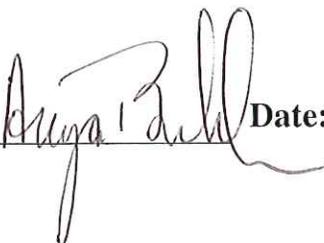
**PORTLAND GENERAL ELECTRIC COMPANY**  
**ENVIRONMENTAL SERVICES**

**PROCEDURE TYPE:** BOARDMAN OPERATIONS  
**NUMBER:** ES-209  
**TITLE:** Boardman Water Quality Sampling

REVISION 10

**Prepared By:** Steve Anderson  **Date:** 5-27-10

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**Approved By:** Arya Behbehani  **Date:** 6-1-10

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## 1.0 PURPOSE

Water quality is monitored in the Carty Reservoir cooling pond to assure that it meets the requirements of the designated beneficial uses (e.g., condenser cooling and irrigation). The water quality monitoring program at the Boardman Power Plant the Boardman Site Certificate Agreement with the Energy Facilities Siting Council (EFSC), the Boardman Plant Water Quality Monitoring Program approved by EFSC, and the DEQ's Water Pollution Control Facilities Permit.

## 2.0 REFERENCES

- 2.1 Boardman Plant Water Quality Monitoring Program, dated 10/14/04
- 2.2 Water Pollution Control Facilities Permit #100189.
- 2.3 Boardman Thermal Power Plant Site Certificate Agreement, dated 2/27/75.
- 2.4 APHA. 1985. Standard methods of the examination of water and waste water. 16th Edition. American Public Health Association. Washington, DC.

## 3.0 RESPONSIBILITIES

This instruction applies to all ES personnel involved in Carty water quality sampling.

## 4.0 DEFINITIONS/ABBREVIATIONS

Not applicable.

## 5.0 PROCEDURE

### 5.1 Equipment

- Portable pH meter with combination electrode (accuracy:  $\pm 0.05$ pH, range: 0-14 pH units) with appropriate buffer solutions to check calibration.
- Field conductivity meter and probe with automatic temperature compensation.
- One 1-liter linear polyethylene bottles and one HNO<sub>3</sub> preserved 500-ml linear polyethylene bottle per sample. Pre labeled bottles are provided by the contract laboratory.
- 5 – gallon plastic bucket.
- Cooler provided by the contract laboratory, and ice.
- Field data form, chain-of-custody (CoC) form from the contract laboratory, pencil,

marking pen, and clipboard.

## 5.2 Frequency

Routine samples shall be taken monthly at the Boardman Plant intake structure (sample ID "CI") on Carty Reservoir and the Three Mile Canyon (TMC) Farms pumping station (sample ID "BP") at the mouth of Willow Creek. A non-routine sample shall be taken at the irrigation withdrawal pumps (sample ID "IW") on the west arm of Carty during months when water is supplied to TMC for irrigation. Samples should be collected to facilitate timely processing at the contract laboratory, generally one of the first three working days of the week. Samples should also be collected such that they can be shipped the same day to the contract laboratory.

## 5.3 Methods

- 5.3.1 Prior to use, the field pH meter shall be calibrated using pH 7 and pH 10 buffers according to the vendors recommended calibration procedure. The calibration date shall be documented on the field data form.
- 5.3.2 Water quality samples are taken according to accepted standard methods (APHA 1985). Samples can be taken from the shore, however, wave-lap erosion areas are to be avoided if waters are turbid. Boots may be required to get far enough away from the shore. If adverse conditions prevail, a bucket of water is collected and the bottles filled by pouring from the bucket before immersing instruments or probes. If a bucket is used for sampling it shall be rinsed three times with water taken from the site before being filled for sampling.
- 5.3.3 At each sampling site, one 1-liter bottles and one 500-mL should be filled and properly labeled. **Note: the 500-ml bottles are preserved with nitric acid, use caution when handling and do not rinse these bottles.**
- 5.3.4 Measure pH, temperature, and conductivity at each sample location and record the data on the Water Sample Field Data Worksheet (Attachment A).
- 5.3.5 Put all sample bottles into the cooler along with sufficient ice or ice packs to keep them cold during transport. Transfer sample data from the worksheet to the CoC form. Retain the yellow copy of the CoC, put the original CoC in a sealable plastic bag and place it in the cooler with the samples. Tape the cooler closed, label it for delivery to the contract laboratory and leave it for pick up with PGE mail.

## 5.4 Analyses

Parameters listed in the Boardman Site Certificate, the Boardman Plant Water Quality

Monitoring Program, and the current Water Pollution Control Facilities Permit will be analyzed by the laboratory.

6.0 DIAGRAMS/ATTACHMENTS

- Attachment A - Water Sample Field Data Worksheet.

# Water Sample Field Data Worksheet

## PGE Boardman Plant Carty Reservoir

1. pH meter calibration date: \_\_\_\_\_
2. Sample collection date: \_\_\_\_\_
3. Sample data:

Sample ID	Time	Conductivity	pH	Temperature
BP				
CI				
IW				

4. Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Collected by: \_\_\_\_\_

## APPENDIX B-2

### LINED EVAPORATION POND MONITORING AND SAMPLING

## BOARDMAN COAL PLANT

**JP PROCEDURE: Lined Evaporation Pond Freeboard Inspection**

**JP NO. 2776**

**REV: 1**

**DATE: 03/05/2013**

**TYPE: Power Block Op's**

**APPROVED:**

**BRIEF: Inspect Lined Evaporation Pond Dikes & Record Freeboard**

**1. HAZARDS AND PRECAUTIONS:**

- 1.1. – Proper PPE Worn
- 1.2. – Eyes on Tasks

**2. CONDITIONS:**

- 2.1. – None

**3. REFERENCE:**

- 3.1. – Water Pollution Facilities Permit Procedure

**4. PRELIMINARY WORK:**

- 4.1. – Inspect Lined Evaporation Pond Area Dikes - Daily

**5. WORK TASKS:**

- 5.1. – Record Freeboard Measurement – Once Per Week

A. Location: Southwest Corner / just inside gate

- 5.2. – Inspect Lined Evaporation Pond Area Dikes - A perimeter inspection is a sight surveillance of the dikes looking for the evidence of badgers, muskrats, ground hogs or other rodents whose burrowing activities could threaten the structural integrity of the dike.

**6. POST WORK TESTS:**

- 6.1. – None

**7. RESTORE SYSTEM AND EQUIPMENT CONFIGURATION:**

- 7.1. – None

<b>Boardman Coal Plant Coalyard OP's</b>		<b>Lined Evaporation Pond</b>		
		PM: 26086	JP: 2776	
		WO#: _____		
Day	Date	Inspection*	Freeboard ** Once per week	Operator ***
Sun.			:Ft / :Inches	
Mon.			:Ft / :Inches	
Tues.			:Ft / :Inches	
Wed.			:Ft / :Inches	
Thur.			:Ft / :Inches	
Fri.			:Ft / :Inches	
Sat.			:Ft / :Inches	

\*A perimeter inspection is a sight surveillance of the lagoon dikes looking for the presence of badgers, muskrats, ground hogs or other rodents whose burrowing activities could threaten the structural integrity of the dike.

\*\* Once Per Week / Any Day – Record Data

\*\*\* Write a Work Order if problems are suspected.

<b>REMARKS:</b>
<hr/> <hr/> <hr/> <hr/> <hr/>
<b>REVIEW AND APPROVAL:</b>
Completed by (FEOIC): _____ Date: _____ Reviewed by (Shift supervisor): _____ Date: _____

**Send completed form to Environmental Services Specialist**

## APPENDIX B-3

### SEWAGE FLUME FUNCTION TEST

## SEWAGE FLUME FUNCTION TEST

Print a copy of the Flume Flow Chart

Have Operations open valve to flush the flume located in the laydown yard at manhole #8.

Once the flow has stabilized, push any sediment that is still settled before the flume downstream, then take a level measurement of the liquid at the center of the flume.

Compare the level that is measured with the display of the instrument. Adjust measurement as needed.

To adjust level,

- a) Press the "Go To Program Step" button
- b) Press "3"
- c) Press "Enter/Program Step"
- d) Press right arrow button to highlight "level"
- e) Press "Enter/Program Step"
- f) Using arrow keys, change level measurement value to coincide with your measurement
- g) Press "Enter/Program Step"
- h) Press "Exit Program"

Verify GPH measurement reading

- a) Convert the measurement from inches to tenths of a foot. (1/10 of a foot is equal to 1.2")
- b) Using the Flume flow chart, find the GPM that coincides with the level measurement (Head ft.)
- c) Multiply by 60 to get GPH
- d) Compare with the GPH that is displayed on the instrument to determine if value is reasonable (If it is not, further troubleshooting will be necessary)

Replace Manhole cover and have Operations close the valve used to flush the flume

## APPENDIX B-4

### SEWAGE LAGOON MONITORING AND SAMPLING

## BOARDMAN COAL PLANT

**JP PROCEDURE: Sewage Lagoon Inspection - Ph & Flow – ( Manhole 8 only )**

**JP NO. 2774**

**REV: 1**

**DATE: 03/05/2013**

**TYPE: Coal Yard Op's**

**APPROVED:**

**BRIEF: Inspect Lagoon Dikes & Record Flow**

**1. HAZARDS AND PRECAUTIONS:**

- 1.1. – Proper PPE Worn
- 1.2. – Eyes on Tasks

**2. CONDITIONS:**

- 2.1. – None

**3. REFERENCE:**

- 3.1. – Water Pollution Facilities Permit Procedure

**4. PRELIMINARY WORK:**

- 4.1. – Record Flow & Inspect Lagoon Area Dikes

**5. WORK TASKS:**

- 5.1. – Record Flow & Ph on ( FIR-4109 ) - ( Manhole 8 only )

- A. Location: Northeast of CY Mech Shop / In Laydown Area

- 5.2. – Record Freeboard Measurement: Once Per Week.

- A. Location: Northeast Corner / South Lagoon

- 5.3. – Inspect Sewage Lagoon Area Dikes - A perimeter inspection is a sight surveillance of the lagoon dikes looking for the evidence of badgers, muskrats, ground hogs or other rodents whose burrowing activities could threaten the structural integrity of the dike.

**6. POST WORK TESTS:**

- 6.1. – None

**7. RESTORE SYSTEM AND EQUIPMENT CONFIGURATION:**

- 7.1. – None

<u>Boardman Coal Plant Coal Yard</u>			<u>Sewage Lagoon Inspection / Flows Manhole 8</u>			
WO#: _____			<b>PM: 26087</b>		<b>JP: 2774</b>	
Date		Flow (Manhole 8 only) ( 1FIR-4109 )	pH	Inspection*	Freeboard** Once Per Week	Operator***
	Sun.	_____ : Total Gallons			: Inches	
	Mon.	_____ : Total Gallons			: Inches	
	Tue.	_____ : Total Gallons			: Inches	
	Wed.	_____ : Total Gallons			: Inches	
	Thur.	_____ : Total Gallons			: Inches	
	Fri.	_____ : Total Gallons			: Inches	
	Sat.	_____ : Total Gallons			: Inches	

\*A perimeter inspection is a sight surveillance of the lagoon dikes looking for the presence of badgers, muskrats, ground hogs or other rodents whose burrowing activities could threaten the structural integrity of the dike  
 \*\*Once per week, record data if water is visible, otherwise "dry"  
 \*\*\* Write a work request if problems are suspected.

<b>REMARKS</b>
<hr/> <hr/> <hr/> <hr/> <hr/>
<b>REVIEW AND APPROVAL:</b>
FEOIC Signature: _____ Date: _____ Shift Supervisor Signature: _____ Date: _____

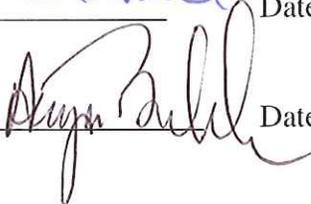
APPENDIX B-5  
GROUNDWATER MONITORING AND SAMPLING

**PORTLAND GENERAL ELECTRIC COMPANY**  
**ENVIRONMENTAL SERVICES**

**PROCEDURE:** OPERATIONS  
**NUMBER:** ES-216  
**TITLE:** Boardman Groundwater Sampling

REVISION 7

**Prepared By:** Steve Anderson  **Date:** 5-27-10

**Approved By:** Arya Behbehani  **Date:** 6-1-10

## 1.0 PURPOSE

Water quality of groundwater near the Boardman Plant is monitored to satisfy agency requirements of the Boardman Ash Disposal Plan, the Boardman Water Quality Monitoring Program, and the Water Pollution Control Facilities permit. The objective of the regulations is to show that groundwater in the ash disposal area is not being adversely impacted by plant operation.

## 2.0 REFERENCE

- 2.1 APHA. 1985. Standard methods of the examination of water and waste water. 16th Edition. American Public Health Association. Washington, DC.
- 2.2 PGE. 1980. Boardman Plant Ash Disposal Plan. PGE-3003, Rev. 3. Portland General Electric Company. Portland, Oregon.
- 2.3 PGE. 2004. Water Quality Monitoring Program for the Boardman Plant.
- 2.4 DEQ. Water Pollution Control Facilities Permit #100189.

## 3.0 RESPONSIBILITIES

This procedure applies to Environmental Services Department or Boardman Plant personnel involved in monitoring groundwater at the Boardman Plant.

## 4.0 DEFINITIONS/ABBREVIATIONS

None.

## 5.0 PROCEDURE

### 5.1 Equipment

- 5.1.1 Grundfos submersible pump.
- 5.1.2 Portable generator, at least 3500 watt capacity.
- 5.1.3 Well sounder and graduated line sufficient to measure 100 feet.
- 5.1.4 Portable pH, conductivity, and temperature meters.
- 5.1.5 Polyethylene bottles provided by laboratory, 2 per sample, with appropriate labels.
- 5.1.6 5-gallon plastic bucket.

Attachment A

BOARDMAN PLANT GROUNDWATER SAMPLE FIELD DATA

Well ID	Depth	Static Water Level	Vol.* Gal.	Mid Screen Depth	Volume 1 Data			Volume 2 Data			Volume 3 Data			Comments
					pH	Cond.	Temp.	pH	Cond.	Temp.	pH	Cond.	Temp.	
008	108'			98'										
052	70'			55'										
053	78'			68'										
120	69'			53'										
122	69'													
130	73'													

\* Volume = (Depth - Static Water Level) x 0.6528 gal/ft

pH meter calibration date: \_\_\_\_\_

Sampled by: \_\_\_\_\_

Sample Date: \_\_\_\_\_

## **APPENDIX C**

### **PROPOSED AND ON-GOING PROJECTS**

Appendix C-1: Email Approval for Air Pollution Wash Water Disposal

Appendix C-2: Sanitary Sewage Lagoon Relining Project Specifications

Appendix C-3: Approval of plans for holding ponds at Carty Generating Station

Appendix C-4: Specifications for High Density Polyethylene Geomembrane Liner

APPENDIX C-1

EMAIL APPROVAL OF AIR POLLUTION CONTROL WASH  
WATER DISPOSAL

## Chris Kramer

---

**From:** Amber Chapman [Amber.Chapman@pgn.com]  
**Sent:** October 01, 2013 10:30 AM  
**To:** Steven Hammer  
**Subject:** FW: Air pollution control washwater- characterization and disposal approval  
**Attachments:** EnProve-TR-MSDS.PDF

Please see below for email from DEQ

---

**From:** NADLER Carl [<mailto:NADLER.Carl@deq.state.or.us>]  
**Sent:** Thursday, May 09, 2013 11:28 AM  
**To:** Amber Chapman  
**Cc:** STRAUGHAN John; HILL Rick; HUTCHENS-WOODS Cheryll; DRUBACK Lissa  
**Subject:** FW: Air pollution control washwater- characterization and disposal approval

Hi Amber,

Disposal of Trona mill washwater in the bottom ash system is approved. In addition, I reviewed the proposal with John Straughan, DEQ Solid Waste Program, and disposal of Trona mixed with fly ash and bottom ash is approved for the ash disposal landfill. As always, please call with any questions. Thanks.

-Carl

---

**From:** Amber Chapman [<mailto:Amber.Chapman@pgn.com>]  
**Sent:** Wednesday, May 08, 2013 8:47 AM  
**To:** NADLER Carl  
**Subject:** Air pollution control washwater- characterization and disposal approval

Hi Carl,

How are things? They are going well here.

In accordance with Schedule A, condition 18 I am requesting Departmental approval for disposal of air control wastewater that will be generated from the Direct Sorbent Injection (DSI) process which will reduce sulfur dioxide emissions from the fossil fuel combustion process. The DSI process works by injecting milled Trona into the flue gas system where it reacts and capture the sulfur dioxide into a solid form. These particles are then collected in the electrostatic precipitator, and collected in the ash system. Trona is a mixture sodium carbonate and sodium bicarbonate which is milled on site prior to injection in order to create a larger surface area for the sulfur dioxide reaction to occur. However, during the milling process, a small buildup of Trona within the mills, which must be removed by rinsing the mills with water. This mixture will have a pH of between 5-10, and it is estimated that a maximum of fifty gallons per day of this waste will be generated with the plant operating at full load.

PGE would like permission to dispose of this rinsate into the bottom ash system. The system is a closed loop circulation of approximately a million gallons of water used to remove 3-4 tons/hour (bottom ash/slag) from the boiler during full load operation. Ultimately the bottom ash/slag is dewatered and disposed in the Ash Disposal area along with fly ash that will not be marketable after the startup of the Trona injection. The fly ash is approximately twelve tons/hour during full load operation.

Please let me know if you need any additional information. A MSDS of the Trona we are using (also known as EnProve-TR) is attached.

APPENDIX C-2

SANITARY SEWAGE LAGOON RELINING PROJECT



**Portland General Electric Company**  
121 SW Salmon Street, Portland, Oregon 97204

**Boardman Coal Plant  
Sanitary Sewage Lagoon Relining**

**June 23, 2014  
Revision 0**

**Portland General Electric  
Project Specifications  
Boardman Coal Plant  
Sanitary Sewage Lagoon Relining Project  
Boardman, Oregon**



Prepared By: Portland General Electric  
June 2014



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**Portland General Electric Company**  
121 SW Salmon Street, Portland, Oregon 97204

**Boardman Coal Plant  
Sanitary Sewage Lagoon Relining**

**June 23, 2014  
Revision 0**

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## **1.0 SUMMARY**

### **1.1 INTRODUCTION**

The following presents the scope of services required for completion of the Boardman Sanitary Sewage Lagoon Relining project (herein reference as “the Project”) by the Contractor. By undertaking this work, Contractor agrees to be bound by requirements of the work and requirements described herein.

### **1.2 GENERAL PLANT DISCRPTION**

Portland General Electric (PGE) owns and operates the 575 MW Boardman Coal Plant located approximately 15 miles southwest of the town of Boardman, Oregon. In addition, PGE is currently constructing a new 440 MW natural gas fired combined cycle plant known as the Carty Generating Station located directly adjacent and northwest of the Boardman Coal Plant. The Boardman facility has operated since coming online in 1980 and the Carty Generating Station is expected to enter commercial operation in 2016. The Carty Generating Station site has been sized to allow for future expansion of the project with the addition of a second combined cycle plant adjacent and to the west of the first.

Sanitary sewage effluent from the Boardman Coal Plant is currently treated via onsite sewage lagoons. Sewage effluent from the Carty Generating Station is also planned to be discharged to these existing onsite lagoons.

### **1.3 SITE DESCRIPTION & SITE ACCESS**

Onsite sewage lagoons serving the Boardman facility are located at the northeast corner of the facility property. Two of the three lagoons termed the South and Middle Lagoons are currently used for sanitary sewage disposal. Currently flows are directly to only the southern lagoon. Each of these two lagoons contains an impervious soil liner to be replaced under the scope of work of this project. The third and larger lagoon is currently unused and does not contain a liner system. Work in this lagoon is not part of the scope of work for this project.

Two sanitary sewage systems serving the Boardman facilities enter the South and Middle lagoons. Both systems are 6 inch diameter gravity sewer piping. A new 4 inch diameter pressure sewer system, serving the Carty plant, will be constructed by others to discharge to the south lagoon. Figure 1.3.1 and 1.3.2 depict the general arrangement of these systems with respect to the lagoons and Boardman structures.

Access to the Boardman plant is by use of Tower Road leading south from Oregon Interstate 84. The Contractor shall check-in with security staff upon arrival to the site, whereby they will be directed to the lagoon site directly east of the plant entrance. Upon departure from the site, the Contractor shall check-out with security staff or with plant operations staff during hours after 5PM.



*Figure 1.3.1 – Boardman Coal Plant and existing sewage lagoon vicinity*



*Figure 1.3.2 – General arrangement of existing Boardman sanitary sewage piping and new Carty sanitary sewage piping*



## **2.0 SCOPE OF WORK**

### **2.1 GENERAL**

Portland General Electric (PGE) is seeking to hire a safe, qualified, innovative contractor to procure and construct a new synthetic liner system for onsite sanitary sewage lagoons at the Boardman Coal Plant facility (the Contractor). The general scope of services is to provide construction and testing of the Project. This general description is not intended to be exhaustive. The Contractor is expected to supply all labor, equipment and materials not specifically noted as being furnished by others, but which are required to provide a complete, functional system as intended by the project drawings.

### **2.2 CODES AND PERMITS**

The Contractor shall comply with all local, County, State, and Federal ordinances governing this work. Where conflicts exist between any of the above-mentioned ordinances, the standard which is most stringent shall take precedence.

The Contractor shall be responsible for obtaining all required permits for work specified herein. PGE shall coordinate with ODEQ to insure all planned work and these specifications are approved prior to the start of work. No other ODEQ related permits (if needed) will be obtained by PGE.

When the work activities require inspections by agencies or authorities other than PGE, the Contractor shall schedule all inspections and notify the authorized PGE representative a minimum of 24 hours prior to the inspection being performed.

### **2.3 BIO-SOLIDS REMOVAL**

PGE has performed sampling of both the South and Middle lagoons to confirm the presence and extents of any bio-solids accumulated in the lagoons. The report is attached herein for reference by the Contractor. The Contractor shall provide all equipment and labor required for removal and disposal of bio-solids. Personnel performing bio-solids removal activities shall be trained and certified for handling of such materials. Contractor shall be responsible for obtaining all transportation and disposal permits from the appropriate local, County, and State authorities and shall keep an onsite manifest of all materials excavated and disposed of. All bio-solids shall be disposed of at an appropriate waste handling facility to be selected by the Contractor and approved by PGE. Contractor shall provide a bio-solids waste handling plan to PGE for review and approval 30 days prior to the start of any bio-solids handling.

At this time, only the South lagoon shall require removal of bio-solids. Any materials removed below elevation 674.00 in the South lagoon shall be assumed as bio-solids and shall be handled as such. Generation of such materials is assumed to occur via clearing and grubbing activities, as well as via final grading activities to re-establish lagoon topography as needed. PGE will provide an onsite environmental representative for any unforeseen occurrences and general surveillance of the work.



## **2.4 TEMPORARY FACILITIES**

Contractor shall submit a plan for temporary handling of sanitary sewage from the Boardman Power Building and Coal Yard areas. Table 2.4.1 itemizes expected daily effluent flows to be managed. Additionally, any wastewater handling systems employed by the Contractor shall be capable of handling an average flow rate of 10 gpm and peak flow rate of 200 gpm. Project drawing 1-C-0721-C02\_RevC identifies locations within each pipeline from the above-mentioned sources that shall be used for temporarily blocking flows to the lagoons.

*Table 2.4.1 - Expected daily sanitary sewage flows for temporary facility sizing*

<b>Source</b>	<b>Flow (gpd)</b>
Power Building	4500
Coal Yard	1000

Effluent flows may be discharged into the South lagoon area at any time, but shall not be discharged into the Middle lagoon area until completion of a new liner system within the lagoon. Collected wastewater may also be discharged offsite at an appropriate waste handling facility with proper transportation and disposal permits obtained by the Contractor.

Contractor shall submit a temporary sanitary sewage handling plan for PGE review and approval 30 days prior to the start of work.

## **2.5 EARTHWORK**

Contractor shall provide all equipment and materials necessary for excavation work as identified in this specification and the project drawings.

### **2.5.1 CLEARING AND GRUBBING**

Each lagoon site to be relined shall be cleared and grubbed of all organic and foreign materials deemed unacceptable for bedding of the liner by the liner manufacture. Clearing shall not remove more than 6 inches of existing materials unless required to adequately remove any materials unacceptable for bedding of the liner. Any areas cleared in excess of 6 inches shall be backfilled with sand and compacted per section 2.5.4. No liner installation work shall commence until clearing and grubbing has been sufficiently completed to PGE’s satisfaction.

Aside from materials deemed by PGE to be bio-solids, all material generated by clearing and grubbing shall be stockpiled onsite as directed by PGE. Material may not be used for backfill unless otherwise approved by PGE.

### **2.5.2 EXCAVATIONS**

Excavations shall be performed as required per the project drawings. Prior to any excavation activities, Contractor shall coordinate with PGE personnel to have all known existing utilities located and marked. When approaching existing utilities not planned for demolition, contractor



may use mechanical means for excavation to within 12 inches of the known utilities, and then shall manually excavate to expose piping, cables, conduit, etc. Upon visual identification of the utilities, contractor may again use a mechanical means for excavation with due care taken to prevent damage. Any damages shall be repaired by the Contractor immediately at the Contractors expense before any additional work may occur.

Excavations in excess of 4 feet deep shall have side slopes of at least 1.5H:1V unless other means for shoring are provided. When other means for shoring are to be used, Contractor shall submit to PGE, documentation qualifying the design of the shoring for the given use.

### **2.5.3 BACKFILL**

Backfill material shall be provided by the Contractor per the project drawings and as required for unforeseen conditions encountered during excavation activities. All backfill shall be free of organic or otherwise foreign materials. Standard proctor test results (ASTM D698) for any backfill material brought onsite by the Contractor shall be provided to PGE prior to delivery of the material. Unless otherwise noted in the project drawings, contractor shall use sand or an approved equal for general backfill and for all backfill around new and existing piping. Backfill shall be placed to within 12 inches top and bottom and side to side of all new and existing piping.

Contractor shall identify any request for onsite material sourcing in their proposal for PGE's consideration.

Backfill shall be placed in maximum 8 inch lifts and with each lift compacted per requirements set for in section 2.5.4.

### **2.5.4 COMPACTION REQUIREMENTS**

Contractor shall provide all necessary means for achieving compaction of backfill and existing grades as specified herein. Contractor shall be responsible for providing all needed water for compaction efforts. PGE can supply water from a nearby domestic water source to be trucked to the project site by the Contractor.

Upon completion of final grading, before placement of the liner system, all areas to support the liner system shall be compacted to 95% of maximum dry density as determined by the Standard Proctor test (ASTM D698). Unless otherwise noted in the drawings, all other areas of backfill, or areas exposed by excavation where no backfill will be placed, shall be compacted to 95% of maximum dry density. "Proof rolling" to determine compaction shall not be permitted.

Contractor shall obtain services of a third party testing agency to perform all proctor testing of backfill material (as necessary) and field density testing of compacted backfill. Testing intervals shall consist of one test per 1000 square feet of compacted area. In areas less than 1000 square feet, two tests minimum shall be performed. Intervals shall be spaced no less than 25 feet and no more than 50 feet apart. For multiple lifts of backfill, the area of each lift shall be considered for determination of testing intervals.



## **2.5.5 FINAL GRADING**

Final grading shall conform to the project drawings. Where excavation occurs in areas not detailed in the drawings, Contractor shall replace material to match existing grades.

## **2.5.6 DEWATERING**

Contractor shall provide means for dewatering existing lagoon sites or other excavations as necessary. Any water removed from either the Middle or South lagoon site shall be handled under similar requirements to be implemented for bio-solids handling (see section 2.3) and shall be disposed of offsite at an appropriate waste handling facility. Other dewatering activities outside the lagoon areas shall first be brought to PGE's attention as soon as possible then undertaken under supervision of onsite PGE environmental staff. Water removed from excavations outside the lagoon area shall be discharged to any of the three lagoon sites.

## **2.6 DEMOLITION**

Contractor shall perform demolition of existing lagoon facilities as shown on the project demolition plans (see drawing 1-C-0721\_C02\_RevC). Generally, demolition work will remove piping entering or exiting the lagoons to allow installation of new piping better designed for connection to the new lagoon liner system. Facilities not identified for demolition on the project drawings or herein shall be protected from damage during all work activities.

Demolition shall remove existing piping leading to both the South and Middle lagoons, up to new tie-in points identified in the project drawings, in such a manner so as to not damage existing piping beyond these tie-in points. Demolition of several items will require excavation work which shall comply with section 2.5.2 of this specification.

All materials generated during demolition work shall be disposed of offsite by the Contractor unless otherwise directed by PGE. Any hazardous materials not previously identified by PGE or the Contractor encountered during work activities shall be brought to PGE's attention for resolution of disposal requirements for such material.

## **2.7 LINER**

Contractor shall provide all materials, labor and equipment necessary for handling, placement, welding, sealing, and testing of a new 60 mil HDPE liner system. Contractor shall also provide a detailed installation plan including liner shop drawings and details for sealing the liner around new and existing structures and piping for PGE review and approval.

Liner material shall be installed in accordance with the manufacturer's requirements. The following list of manufactures is approved for use in this project. Contractor shall submit any request for alternatives to this list to PGE for review.

- GSE Lining Technology
- Poly-Flex, Inc.
- Agru America, Inc.



The liner shall be installed by crews experienced in the installation of HDPE sheets of the type and thickness specified. The onsite installation supervisor shall have supervised in the field or installed at least two million square feet of the HDPE liner. All seamers shall have at least 500,000 square feet of HDPE seaming experience.

Extreme care shall be taken during installation of the liner to be certain no damage is done to any part of the material. Dragging of the liner on the subgrade shall be avoided. Smoking and use of glass containers by installation personnel shall be prohibited. The liner shall be installed over the prepared subgrade to the limits indicated on the drawings. Liner panels shall be arranged to minimize field seaming. All liner panels over 25 square feet in area shall be designated with a panel number. The Contractor shall be responsible for assigning the number and shall locate the number near the middle of panels less than 50 ft in length and at both ends of panels over 50 ft in length. These numbers shall be noted on "as-built" drawings and daily progress reports. Any panel under 25 square feet shall be considered a patch and shall not require a panel number; these however will be identified (location and approximate size) on the "as-built" drawings.

The liner panels shall be arranged in a manner to minimize the number and length of field seaming. The liner panels shall be installed such that field seams run longitudinally down the embankment slope. The installation shall allow for thermal expansion and contraction of the liner. Adequate compensation for liner thermal effects and sheet stability shall be allowed for by the Contractor. Compensation strips shall be installed as required and shall be clearly noted on the "as-built" drawing. Panels shall be seamed on the same day they are installed. The Contractor shall provide temporary wind anchorage during liner installation.

### **2.7.1 VENTING**

Liners shall be provided with a means for venting beneath the liner. A selected vent system shall extend fully across the liner and terminate in a cut out in the liner located at least 5 feet above the maximum water surface elevation. Vents shall extend beneath the liners in both directions (east to west and north to south) and be spaced at no more than 50 feet on center. Details of the liner manufacturer recommended venting system shall be provided with liner shop drawings for PGE review and approval.

### **2.7.2 BALLASTING**

Contractor shall provide a manufacturer approved liner ballasting system for both lagoons to be lined. A ballast system using HDPE piping and 100psi sand slurry is preferred. During loading, transportation and unloading, every precaution shall be taken to prevent damage to the pipe. No pipe shall be dropped from cars or trucks, or allowed to roll down slides without proper retaining ropes. During transportation each pipe shall rest on suitable pads, strips, skids, or blocks securely wedged or tied in place. Any pipe damaged shall be replaced. Details of the liner manufacturer recommended ballasting system shall be provided with liner shop drawings for PGE review and approval.



### **2.7.3 EXISTING FACILITIES**

New liners shall be sealed to existing concrete structures within the lagoon areas not identified for demolition. Contractor shall provide manufacturer recommended plans for sealing the liners to existing structures with liner shop drawings for PGE review and approval. All portions of concrete walls, curbs and foundations that will come in contact with the liner shall be free of sharp edges or rough spots that can puncture or abrade the liner. Where necessary, the concrete shall be ground smooth by the Contractor.

### **2.7.4 TESTING**

Contractor shall provide a manufacturer's recommended testing plan for all installation steps undertaken onsite. The testing plan shall also consider destructive or non-destructive testing of samples from liner materials received prior to installation of the liner. Contractor shall be responsible for correcting any non-conforming materials discovered.

## **2.8 HDPE PIPING**

Contractor shall provide HDPE piping as identified in the project drawings. All HDPE piping shall be DR 17 and follow the NPS (also referred to as IPS) sizing system. Pipe shall be manufactured from a PE 3608 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D 3350 with a minimum cell classification of 345464C. Pipe shall have a manufacturing standard of ASTM F 714 and be manufactured by an ISO 9001 certified manufacturer. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

Butt fusion fittings shall be PE3608 HDPE, minimum cell classification of 345464C as determined by ASTM D 3350. Molded butt fusion fittings shall have a manufacturing standard of ASTM D 3261. Molded fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans. Fabricated fittings are to be manufactured using a Data Logger. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the Contractor's quality control records. Flanged and Mechanical Joint Adapters shall be PE 3608 HDPE, minimum cell classification of 345464C as determined by ASTM D 3350. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D 3261. Fittings shall have the same pressure rating as the pipe.

Contractor shall provide all equipment necessary for fusion welding piping onsite as needed. Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400-450 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint with weld strength equal to or greater than the tensile strength of the pipe itself. All field welds shall be made with fusion equipment equipped with a Data



Logger. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be recorded and provided to PGE for review.

## **2.9 COMISSIONING**

The Contractor shall be responsible for collecting and submitting to PGE, all QA/QC documents collected during the course of work including but not limited to;

- Liner manufacturer shop test reports
- Installed liner field test results
- Soil compaction test results
- HDPE pipe fusion logs for all fusion welds

Upon receipt of these documents, PGE shall have 5 days to review and accept the submitted documents. Contractor may not place a lagoon liner into service by removal of temporary sewage bypasses until approval of the QA/QC documents is received from PGE. Should PGE not provide comments within the above mentioned time period, Contractor may assume acceptance of the documents by PGE.

PGE shall be notified 24 hours prior to removal of any temporary sewage bypass systems installed by the Contractor.

Contractor shall also provide "as-built" liner shop drawings upon completion of the project. See section 2.7 for drawing details to be presented on "as-built" drawings.

## **3.0 CONSTRUCTION SCHEDULE**

Contractor shall submit for PGE review, a detailed Level IV schedule of all work activities expected to complete the project scope of work as identified in Section 2.0.

PGE encourages the timing of existing sewage system plugging and the installation of any needed sewage bypass systems to coincide with periods of low staffing. Typical staffing levels decrease on Friday and staffing levels are lowest Saturday through Sunday.

## **4.0 SAFETY REQUIREMENTS**

### **4.1 SAFETY AND HEALTH PLAN**

The Contractor shall implement and maintain a written Safety, Health, and Accident Prevention Program specifically applicable to the work. The Contractor's program shall meet the requirements of the codes and regulations and laws of federal, state, local, and other authorities having jurisdiction over Project work. The Contractor's Safety, Health, and Accident Prevention Program shall include disciplinary procedures and safety orientation training procedures applicable to Contractor personnel.



The Contractor's Safety, Health, and Accident Prevention Program shall be submitted for review by PGE 15 days prior to the start of the work at the project site. This review will not relieve the Contractor of his responsibility for safety and health, nor shall such review be construed as limiting in any manner the Contractor's obligation to undertake any action which may be necessary or required to establish and maintain safe working conditions respecting his work at the Project site. PGE reserves the right to require the Contractor to modify any portion of his Safety, Health, and Accident Prevention Program.

The Contractor shall immediately correct any unsafe conditions identified by PGE. In the event the Contractor fails to immediately correct such unsafe conditions, PGE may either have the unsafe conditions corrected by others at the Contractor's expense, or direct that the work be stopped in the area of the unsafe condition; however, this right to stop the work shall not give rise to any duty on the part of PGE to exercise this right.

#### **4.2 TRAINING**

PGE will provide contractor training for its Boardman site specific orientation. The contractor will be required to adhere to these procedures when conducting all onsite activities. This training will require approximately 2 hours for each Contractor on-site employee.

#### **4.3 CRANE/RIGGING INSPECTIONS**

All cranes/rigging in use on the project shall be inspected by a qualified person, prior to use onsite. Inspection results shall be recorded on a Crane/Rigging Inspection Report form which shall be available for review by PGE.

#### **4.4 CLEANLINESS**

The Contractor shall give special attention to keeping the work site clean and free from trash and debris. Trash, debris, and waste materials shall not be allowed to accumulate, and shall be removed from the site and disposed of by and at the Contractor's expense. Windblown trash shall NOT be permitted at any time.

Promptly upon completion of the Project, all Contractor-owned materials shall be removed from the site. All surfaces damaged by depositions of foreign materials such as oil, grease, weld spatter, and paint shall be restored to their original conditions.

If, during the course of the work, materials are spilled, it will be the Contractor's responsibility to clean up affected areas to the satisfaction of PGE. The Contractor shall be responsible for the disposal off-site of all removed materials, unless directed otherwise.

#### **4.5 UNFAVORABLE CONSTRUCTION CONDITIONS**

During periods of unfavorable weather, wet grounds, or other unsuitable construction conditions, the Contractor shall confine his operations to work which will not be affected adversely thereby. No portion of the work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by the Contractor to perform the work in a proper and satisfactory manner.



Contractor shall provide equipment and labor required for dust control during any site activities. PGE will provide onsite water upon request from the contractor.

#### **4.6 HAZARDOUS MATERIALS**

At this time, no known hazardous materials have been identified within the bounds of expected work activities under the project scope. Should the Contractor identify any potential hazardous materials sources, work at risk of exposure to hazardous material shall be stopped and notification shall be made to designated PGE representatives immediately. PGE shall provide testing and verification of potential hazardous materials and will direct the Contractor on procedures for management of any potentially hazardous materials.

#### **4.7 FIRE PROTECTION**

Combustible debris and waste materials shall be collected and removed from the site each day. Fuels, solvents, and other volatile or flammable materials shall be stored away from the construction and storage areas in well-marked, safe containers. Good housekeeping is essential to fire prevention and shall be practiced by the Contractor throughout the construction period.

Contractor shall not proceed with any welding, cutting, and or grinding work without notice provided to PGE prior to the start of work. Contractor shall request hot-work permits from PGE site representative prior to the start of the work where welding will be completed onsite.

#### **4.8 OIL/CHEMICAL CONTAINMENT**

Contractor shall provide secondary containment for all oil and chemical substances stored onsite. Secondary containment shall provide a containment of at least 150% of the volume of the substances stored. Should multiple volumes share a secondary containment vessel, such vessel shall be sized to 150% of the sum of all volumes contained. Contractor shall submit a statement of secondary containment measures that may be used onsite for PGE approval 15 days prior to the start of work.

#### **5.0 RECEIVING, HANDLING, AND STORAGE**

The Contractor shall have responsibility for receiving, handling, and storage of Contractor-furnished equipment and materials. See section 4.8 for containment of chemical or oil substances onsite.



The on-site storage location for liner material, provided by the Contractor to protect the liner from punctures, abrasions and excessive dirt and moisture, should have the following characteristics:

- level (no wooden pallets)
- smooth
- dry
- protected from theft and vandalism
- adjacent to the area being lined

## **6.0 REJECTED WORK AND MATERIALS**

The Contractor, upon written notice from PGE, shall remove from the premises all work and materials rejected as defective, unsound, improper, or in any way failing to conform to the requirements of the contract documents. The Contractor shall at his sole expense make good all work damaged by such removal and shall promptly replace materials damaged or improperly worked and re-execute work in accordance with the contract. The obligations of the Contractor under this section shall not extend to defective materials or equipment supplied by PGE, if any.

If the Contractor does not remove rejected work and materials within 10 days after written notice, the PGE may remove and replace such work and materials to then be at the expense of the Contractor.

## **7.0 WARRANTY**

Material shall be warranted, on a pro-rata basis against Manufacturer's defects for a period of 5 years from the date of liner installation. Installation shall be warranted against defects in workmanship for a period of 1 year from the date of liner installation completion.



## 8.0 SCHEDULE OF SUBMITTALS

The following summarizes all items to be submitted by the contractor before and during activities outline in Section 2.0.

- Complete proposal with clearly itemized pricing as outlined in Section 9.0 and proposed construction schedule as outlined in Section 3.0.
- Bio-Solids Waste Handling Plan **(30 days prior to the start bio-solids handling)**
- Plan for temporary handling of sanitary sewage flows from Boardman facilities **(30 days prior to the start of work)**
- Excavation shoring plans **(as required)**
- Proctor test results for any delivered fill material **(as required)**
- Detailed liner installation plan including;
  - Liner shop drawings detailing panel arrangements, liner venting plans, and liner ballasting plans.
  - Liner sealing details for connection to new and existing facilities
  - Liner manufacturer QA documentation
  - Liner material field testing plan
- Completed material QA/QC and testing documents for;
  - Liner (materials and any tested seals)
  - HDPE piping (fusion welds)
  - Soil compaction
- Safety, Health, and Accident Prevention Program as outlined in Section 4.0 **(15 days prior to the start of work)**
- “As-Built” shop drawings upon completion of the work.

## 9.0 BID SCHEDULE

Contractor shall structure and submit their estimate for the Project based upon the bidding scheduled attached.



**Portland General Electric Company**  
121 SW Salmon Street, Portland, Oregon 97204

**Boardman Coal Plant  
Sanitary Sewage Lagoon Relining**

**June 23, 2014  
Revision 0**

## **ATTACHMENTS**

Attachment 1 –

Characteristics of Sludge and Wastewater in Sewage Treatment Lagoon System at PGE Boardman; Prepared March 11, 2013 by Environmental Management Systems, Inc.

Attachment 2 –

Bidding Schedule

APPENDIX C-3

APPROVAL OF PLANS FOR HOLDING PONDS AT CARTY  
GENERATING STATION



# Oregon

John A. Kitzhaber, MD, Governor

## Department of Environmental Quality

Eastern Region - Pendleton Office

800 SE Emigrant Ave, Suite 330

Pendleton, OR 97801

Phone: (541) 276-4063

Fax: (541) 278-0168

Relay Service: 711

June 16, 2014

Amber Chapman  
Portland General Electric Co.  
PO Box 499  
Boardman, OR 97818

Re: WPCF #100189, File No. 70795  
Approval of plans for holding ponds at Carty Generating Station  
WQ – Morrow County

Dear Ms. Chapman,

We have reviewed and approved the engineering plans for the holding ponds at the Carty Generating Station. The plans were received on April 11, 2014, from Jennifer Manne, of Abengoa, for review per OAR 340-052, with updated information being received May 14, 2014. A LUCS was received.

### DESCRIPTION

Two 3.6 MG lined industrial wastewater holding ponds that discharge to Carty Reservoir

### CONDITIONS OF APPROVAL

- Construction shall be inspected and certified in writing as required by OAR 340-052.
- The existing O&M manual must be updated to reflect this project.

### RESPONSIBILITIES

The Department holds the facility responsible for ensuring the upgrades are constructed and operated in conformance with the Water Pollution Control Facility (WPCF) permit requirements.

Please call me at (541) 278-4608 if you have any questions regarding these conditions.

Sincerely,

Heidi B. Williams, P.E.  
Plan Review Engineer  
Eastern Region

Enc. (ENGCERT)

c: Jennifer Manne, ABEINSA EPC, 73396 Tower Road, Boardman, OR 97818  
Carl Nadler, DEQ, The Dalles  
WQ Source File



## APPENDIX C-4

# SPECIFICATIONS FOR HIGH DENSITY POLYETHYLENE GEOMEMBRANE LINER

**SPECIFICATION  
0006-ESP-ABE-00-55-0002  
HIGH DENSITY POLYETHYLENE GEOMEBRANE  
LINER**

**FOR THE  
CARTY GENERATING STATION UNIT 1**

**ABEINSA, EPC**

**S&L PROJECT NO.: 13137-001**

**ISSUE PURPOSE: FOR CONSTRUCTION  
REVISION 0**

**ISSUE DATE: 18 MARCH, 2014**





**SECTION 000107**

**CERTIFICATION OF SPECIFICATION PAGE**

**HIGH DENSITY POLYETHYLENE GEOMEMBRANE LINER**

**FOR THE  
CARTY GENERATING STATION**

**ABEINSA, EPC**

I certify that this Specification was prepared by me or under my supervision and that I am a registered professional engineer under the laws of the State of Oregon.



RENEWS: Dec 31, 2014



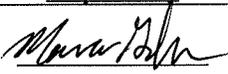
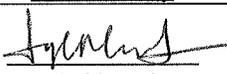
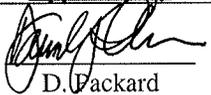
**SECTION 000108**

**ISSUE SUMMARY AND APPROVAL PAGE**

**HIGH DENSITY POLYETHYLENE GEOMEMBRANE LINER**

**ABEINSA, EPC**

This is to confirm that this Specification has been prepared, reviewed and approved in accordance with Sargent & Lundy's Standard Operating Procedure SOP-0407, Specifications, which is part of our Quality Management System.

<u>Rev.</u>	<u>Issue Purpose</u>	<u>Issue Date</u>	<u>Prepared By</u>	<u>Reviewed By</u>	<u>Approved By</u>	<u>Pages Affected</u>
0	Construction	18 March, 2014	 M. Galvan	 S. Ahmed	 D. Packard	All



**SECTION 319022**  
**HIGH DENSITY POLYETHYLENE GEOMEMBRANE LINER**

**PART 1 - GENERAL**

101.            EXTENT
- 101.1           This Specification Section defines the minimum requirements for material and installation of High Density Polyethylene (HDPE) Non-Textured Geomembrane to be used as an exposed single liner for the bottom and side slopes of a pond, all in accordance with the design drawings and as specified herein.
- 101.2           Work Included:
- 101.3           The work shall include, but not be limited to, the following items:
- a.            Manufacture, shipping, handling, and storage of geomembrane materials.
  - b.            Inspection and approval of surfaces to be lined.
  - c.            Placement and field seaming of geomembrane.
  - d.            Crest anchorage and attachment of the geomembrane to structures and penetrations.
  - e.            Non-destructive field testing of geomembrane seams.
  - f.            Removal of samples of geomembrane seams and transportation to an independent third party laboratory for destructive testing.
  - g.            Repair of defective geomembrane seams.
  - h.            Repair of defects in the geomembrane and locations where samples were taken.
  - i.            Visual inspection of the completed geomembrane liner.
- 101.4           Definition of Terms:
- a.            The following definition of terms shall apply throughout this Specification Section.
    - a1.           Purchaser: Abeinsa, EPC for Portland General Electric (PGE)
    - a2.           Earthwork Contractor: The contractor responsible for earthwork for the facility and for excavation and backfill of crest anchorage trenches.
    - a3.           Geomembrane Contractor: Responsible for supply and installation of all geomembrane and geotextile materials and unloading and storage of the materials.
    - a4.           Construction Quality Assurance (CQA) Contractor: The contractor responsible for all CQA work.
    - a5.           Construction Quality Assurance (CQA) Geomembrane Inspector: An inspector responsible for inspection of the Geomembrane Contractor's work.
    - a6.           Manufacturer: The Manufacturer responsible for manufacture of materials and for transporting materials to the site.



- 101.5 Qualifications:
  - a. Manufacturer:
    - a1. The Manufacturer shall be approved by the Purchaser.
  - b. Geomembrane Contractor:
    - b1. The Geomembrane Contractor shall be approved by the geomembrane Manufacturer for installation of the Manufacturer's products.
    - b2. The Geomembrane Contractor shall be approved by the Purchaser.

102. RELATED WORK SPECIFIED IN OTHER SECTIONS

102.1 Section 312201 - Earthwork

103. REFERENCE DOCUMENTS

103.1 Standards, specifications, manuals, codes and other publications of nationally recognized organizations and associations are referenced herein. Methods, equipment and materials specified herein shall comply with the specified and applicable portions of the referenced documents, in addition to federal, state or local agencies having jurisdiction.

103.2 References to these documents are to the latest issue date of each document, unless otherwise indicated, together with the latest additions, addenda, amendments, supplements, etc., thereto, in effect as of the date of Contract for the Work.

103.3 Abbreviations listed indicate the form used to identify the reference documents in the Specification text.

103.4 ASTM – ASTM International:

- a. A276 – Specification for Stainless and Heat Resisting Steel Bars and Shapes
- b. B633 – Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- c. D638 – Standard Test Method for Tensile Properties of Plastic
- d. D698 – Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
- e. D792 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- f. D1004 – Standard Test Method for Tear Resistance of Plastic Film and Sheeting
- g. D1505 – Standard Test Method for Density of Plastics by the Density-Gradient Technique
- h. D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
- i. D1603 – Standard Test Method for Carbon Black Content in Olefin Plastics
- j. D3895 – Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Colorimetry



- k. D4218 – Standard Test Method for Determination of Carbon Black Content of Polyethylene Compounds by the Muffle-Furnace Technique
  - l. D4354 – Standard Practice for Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing
  - m. D4833 – Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
  - n. D5199 – Test Method for Measuring Nominal Thickness of Geosynthetics
  - o. D5397 – Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
  - p. D5596 – Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
  - q. D5641 – Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber
  - r. D5721 – Standard Practice for Air-Oven Aging of Polyolefin Geomembranes
  - s. D5820 – Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes
  - t. D5885 – Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Colorimetry
  - u. D6392 – Standard Test Method for Determining the Integrity of Non-Reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
  - v. D6693 – Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
  - w. D7238 – Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus
- 103.5 GRI – Geosynthetic Research Institute:
- a. GM 6 – Standard Practice for Pressurized Air Channel Test for Dual Seamed Geomembrane
  - b. GM 11 – Accelerated Weathering of Geomembranes Using a Fluorescent UVA-Condensation Exposure Device
  - c. GM 13 – Standard Specification for Test Properties, Testing Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes
  - d. GM 14 – Standard Guide for Selecting Variable Intervals for Taking Geomembrane Destructive Seam Samples Using the Method of Attributes
- 103.6 FTM – Federal Test Method:
- a. FTMS 101C – Puncture Test Method 2065
104. SUBMITTALS
- 104.1 Contractor shall submit the drawings and data as specified below within 30 days prior to use. Contractor's drawings and data shall be submitted via electronic medium in a format compatible for importing into the Purchaser's information systems specified by the Purchaser.



- 104.2 Contractor shall submit status reports at regular intervals as specified by the Purchaser. The reports shall indicate the status of the schedule. The reports shall be submitted via electronic medium in a format compatible for importing into the Purchaser's information system specified by the Purchaser.
- 104.3 Submittals with the Bid Proposal:
- a. HDPE Geomembrane Material:
    - a1. Certification of Compliance from the Manufacturer of the HDPE geomembrane sheeting signed by its authorized representative, indicating that the material meets the criteria specified herein.
    - a2. One representative sample of each type of geosynthetic material.
    - a3. Manufacturer's Quality Control and Quality Assurance Policies and Procedures.
  - b. Warranty:
    - b1. Written warranties from the Manufacturer and the Geomembrane Contractor covering the quality of the material and workmanship as specified.
    - b2. The minimum period of warranty for materials shall be 20 years with first year non-prorated. The minimum period of warranty for installation shall be 5 years with the first year non-prorated.
    - b3. Warranty conditions proposed, including limits of liability, will be evaluated by the Purchaser in approving the liner Manufacturer and the Geomembrane Contractor.
  - c. Geomembrane Contractor:
    - c1. Geomembrane Contractor's name, address and telephone number.
    - c2. Geomembrane Contractor's qualifications.
    - c3. Installer's qualifications if the Geomembrane Contractor is proposing to subcontract installation work.
  - d. Testing Laboratory:
    - d1. Name, address, and telephone number of the off-site, independent third party laboratory that will perform destructive testing on cut samples of field seams.
    - d2. Laboratory's qualifications.
- 104.4 Submittals After Award of the Contract:
- a. Geomembrane Resin:
    - a1. Manufacturer's signed Certificate that the resin meets specification requirements.
    - a2. Manufacturer's signed Certification of the origin of the resin and that all resin is from the same manufacturer (Contractor's name, identification brand name, and number).
    - a3. Copies of Manufacturer and resin suppliers' QA/QC certificates. Certificates shall include a summary report of test results conducted to verify the quality of the resin used in each batch used to manufacture geomembrane for this project. As a minimum, the report shall include tests on specific gravity, melt flow index and percent carbon black.
  - b. Geomembrane Sheeting:



- b1. Signed certification that the properties of the manufactured sheeting meet specification requirements and are guaranteed by the Manufacturer.
- b2. Statement certifying that no post consumer resin (PCR) has been added to the formulation.
- b3. Copy of all of the geomembrane Manufacturer's Quality Assurance certificates. The certificates shall include documents of test results.
- c. Extrudate Resins or Rod for Seaming Geomembranes:
  - c1. Certification that all extrudate is the same resin type as the geomembrane and was obtained from the same resin supplier as the resin used to manufacture the geomembranes.
- d. Installation Data:
  - d1. Manufacturer's proposed geomembrane panel layout for each installation.
  - d2. Manufacturer's recommended procedures for making and testing seams if different from this Specification Section
  - d3. Manufacturer's recommended procedures for repairing damaged geomembrane sections and seams if different from this Specification Section
  - d4. Manufacturer's details of geomembrane liner anchorage, and attachment to structures and penetrations if different from this Specification Section and the details on the design drawings
- 104.5 Submittals After Construction is Complete:
  - a. Geomembrane Contractor:
    - a1. As-built panel layout.
    - a2. Drawing showing location of repairs and type of repairs made.
    - a3. Location of destructive tests.
    - a4. Results of destructive tests.
    - a5. Results of non-destructive tests.
- 105. QUALITY ASSURANCE
  - 105.1 Materials and construction procedures shall be subject to inspection by a Construction Quality Assurance Geomembrane Inspector

**PART 2 - PRODUCTS**

- 201. HIGH DENSITY POLYETHYLENE GEOMEMBRANE
  - 201.1 Manufacturers of HDPE Geomembrane Products:
    - a. The products of the following manufacturers meeting the requirements herein are acceptable:
      - a1. Agru America Manufacturing, Inc., 500 Garrison Road, Georgetown, SC 29440, Tel.: 800-373-2478.
      - a2. Polyflex, 2000 W. Marshall Drive, Grand Prairie, TX 75051, Tel.: 888-765-9359.



a3. GSE Lining Technology, Inc., 19103 Gundle Road, Houston, TX 77073, Tel.: 281-443-8564 or 800-435-2008.

a4. Other as approved by the Purchaser.

201.2 HDPE Geomembrane - General Requirements:

a. The HDPE geomembrane shall be manufactured from first quality, virgin resin. Blending of resins shall not be allowed. No recycled or reworked geomembrane may be used except edge trim generated during the manufacturing process (no more than 10%). No post consumer resin (PCR) of any type shall be added to the formulation.

b. The resin used to produce the geomembrane shall be formulated to be resistant to chemical and ultraviolet degradation.

c. The geomembrane shall be free of plasticizers.

d. The geomembrane shall be free of leachable additives.

e. During manufacture, each roll of geomembrane shall be continuously monitored across the width to assure uniformity of thickness. Thickness measurements shall meet the requirements of Table 1 for Non-Textured Geomembrane.

f. The geomembrane shall be free of factory seams.

g. The geomembrane shall be free from dirt, oil, foreign matter, scratches, cracks, creases, bubbles, blisters, pits, tears, holes, pores, pinholes, voids, undispersed raw material, any sign of contamination or other defects that may affect serviceability, and shall be uniform in color, thickness and surface texture.

h. The geomembrane shall be capable of being seamed in the field to yield seams that are as resistant to waste liquids as the sheeting.

i. The geomembrane shall be manufactured in the United States or Canada.

201.3 HDPE Non - Textured Geomembrane:

a. HDPE Non-Textured Geomembrane shall meet the requirements of Table 1.

b. The location of HDPE Non-Textured Geomembrane to be used for each installation shall be as shown on the design drawings.



**TABLE 1**  
**HIGH DENSITY POLYETHYLENE NON-TEXTURED**  
**GEOMEMBRANE REQUIREMENTS<sup>1</sup>**

<u>Property</u>	<u>Test Method</u>	<u>Polyethylene Base Compound</u>	<u>GEOMEMBRANE MINIMUM AVERAGE ROLL VALUE</u>		<u>Testing Frequency</u>
Nominal thickness, mil	--	--	60	80	---
<u>Resin Properties</u>					
Oxidative Induction Time (OIT), minimum average minutes					
Standard OIT or	D3895	140	--	--	200,000 lbs. of Resin
High Pressure OIT	D5885	400	--	--	200,000 lbs. of Resin
Oven Aging at 85° C	D5721	--	--	--	
Standard OIT (min avg), percent retained after 90 days or	D3895	100	--	--	one per formulation
High Pressure OIT (min avg), percent retained after 90 days	D5885	80	--	--	one per formulation
High Pressure OIT (min avg), percent retained after 1600 Hrs	D5885	50	--	--	one per formulation
<u>Analytical Properties</u>					
Density of base resin, g/cc minimum	D1505/D792	0.940	--	--	200,000 lbs. of Resin
Carbon black content, %	D1603 or D4218	2.0-3.0	--	--	20,000 lbs. of Resin
Carbon black dispersion for 10 different views	D5596	9 views in categories 1 & 2. One view in category 3	--	--	45,000 lbs. of Resin
<u>Mechanical Properties</u>					
Thickness, mils	D5199	--	--	--	One per roll
Average		--	60	80	
Lowest individual of 10 values		--	54	72	
Tensile properties, in each direction (minimum):	D638 or D6693 (Type IV Specimen at 2 in/minute)				
Tensile stress at yield, ppi minimum		--	132	176	20,000 lbs. of Resin
Elongation at yield, % minimum		--	13	13	20,000 lbs. of Resin
Tensile stress at break, ppi minimum		--	240	320	20,000 lbs. of Resin
Elongation at break, % minimum 2" gage length		--	700	700	20,000 lbs. of Resin
Tear resistance, lb (minimum avg)	D1004	--	45	60	45,000 lbs. of Resin
Puncture resistance, lb. (minimum avg)	D4833	--	108	144	45,000 lbs. of Resin
Bonded seam strength <sup>2</sup>	D6392	--	--	--	
Shear strength, ppi		--	121	162	
Peel adhesion (fusion), ppi		--	98	130	
Peel adhesion (extrusion), ppi		--	78	104	
<u>Environmental and Aging</u>					
<u>Effect on Properties</u>					
Stress Crack Resistance, hours (min)	D5397	--	300	300	per GRI GM10

Notes:

1. Requirements shown in this table meet the minimum requirements of GRI Standard GM13, adopted April 11, 2011 except for bonded seam strength.
2. Seam requirements.

- 201.4 Panel Layout
- a. Prior to manufacture of the geomembrane, a panel layout of the surface to be lined shall be made. Each panel to be used for the installation shall be given a numeric or alphanumeric identification number.
  - b. The panel identification number shall be related in writing to the manufacturing roll number that identifies the resin type, batch number, and date of production
  - c. The panel layout shall be made considering the following requirements:
    - c1. Panel lengths shall include slope gain and anchorage.
    - c2. Perpendicular tie-ins shall be made a minimum of 5 feet beyond the toe of the slope.
    - c3. A minimum of 6 inch overlap shall be allowed at double fusion welded seams.
    - c4. All field seams on slopes shall be oriented parallel to the slope (oriented along, not across the slope).
    - c5. The number of seams in corners or odd shaped geometric locations shall be minimized.
- 201.5 Packaging and Shipping:
- a. The geomembrane shall be shipped to the project site in rolls. No material shall be folded.
  - b. A label shall be attached or adhered to each roll of the geomembrane identifying the following:
    - b1. Manufacturer.
    - b2. Product Identification, which can be traced back to the origin of the base material (resin supplier's name, resin production plant, resin brand name type, resin brand number, and production date of the resin).
    - b3. Date of production of the geomembrane
    - b4. Roll identification number
    - b5. Geomembrane thickness and type
    - b6. Roll dimensions (length and width)
    - b7. Batch number
    - b8. Order number
    - b9. Panel number
- 201.6 Packaging and Transportation:
- a. Packaging and transportation shall be the responsibility of the Manufacturer, who shall retain responsibility until the geomembrane is accepted at the site by the Geomembrane Contractor.
202. MATERIALS FOR ATTACHMENT OF GEOMEMBRANE TO CONCRETE
- 202.1 Batten Strip:
- a. Batten strip material shall be hot rolled, annealed and pickled Type 306 L stainless steel in accordance with ASTM A276.



- b. Strips shall be 1/4-inch thick by 2 inches wide. Random lengths are acceptable.

202.2 Expansion Anchors:

- a. Expansion anchors shall be stud type with a single piece three section wedge and zinc plated in accordance with ASTM B633. Wedges shall be manufactured from ANSI Type 304 stainless steel. Hilti Kwik Bolt 3 Expansion Anchors, or equal, are acceptable.
- b. Minimum yield strength of 60,000 psi for wedge-type anchors and a minimum tensile strength of 65,000 psi for stud type anchors.
- c. Anchors shall be 3/8 inch diameter by 3 1/2-inch long.
- d. Washers for anchors shall be Type 18-8 stainless steel flat washers for 3/8 inch bolt size.

202.3 Neoprene Gasket:

- a. Neoprene gaskets shall be 1/4-inch thick by 2 inches wide closed cell neoprene sponge sealing strips. Operating temperature range of neoprene shall be -40° F to +220° F.
- b. Neoprene gaskets placed against concrete shall have a pressure sensitive adhesive on the side of the gasket placed against the concrete.

202.4 Mechanical Anchorage:

- a. Extruded HDPE mechanical anchorage, set in cast-in-place concrete structures for liner attachment, shall be per Manufacturer's standard.

**PART 3 - EXECUTION**

301. ONSITE HANDLING AND STORAGE

301.1 Receipt/Unloading:

- a. Unloading and storage of materials shall be the responsibility of the Manufacturer.
- b. The unloading and other handling of materials shall be performed by the Manufacturer to ensure that the material is handled with care and not damaged.

301.2 Storage:

- a. The Purchaser shall provide on-site storage space in a location near the area to be lined such that on-site transportation and handling are minimized. The Contractor shall be responsible for protecting stored material from theft and vandalism.
- b. The rolls of geomembrane shall be placed on a smooth surface free of rocks and standing water.

301.3 Inspection:

- a. Upon delivery of the material to the project site, the Geomembrane Contractor shall conduct a visual inspection of all rolls of geomembrane for damage or defects. This inspection shall be done without unrolling any rolls unless damage to the inside of a roll is found or suspected.
- b. Any damage or defects shall be noted and immediately reported to the Purchaser, the Manufacturer and to the carrier that transported the material. Any roll or portion thereof, which, in the judgement of the Purchaser, is seriously damaged, shall be removed from the project site and replaced with complying material at no additional cost to the Purchaser.

301.4 Testing of Manufactured Rolls

- a. Upon delivery of the HDPE geomembrane, the CQA Geomembrane Inspector shall ensure that conformance test samples are obtained and tested. Alternatively, conformance testing may be performed at the manufacturer's facility. The following tests shall be performed:
  - a1. Thickness per ASTM D5199
  - a2. Tensile strength and elongation per ASTM D638
  - a3. Puncture per FTM Standard 101C, Test Method 2065
  - a4. Tear resistance per ASTM D1004, Die C
- b. The following requirements apply to HDPE sample taking:
  - b1. The outermost wrap of the roll shall be cut and discarded
  - b2. The machine direction must be indicated with an arrow on all samples using permanent marker
  - b3. The frequency of testing shall be 1 per every acre of rolls in accordance with ASTM D4354 and as noted on the CQA plan
- c. All conformance test results shall be reviewed, accepted and reported to the Geomembrane Contractor and the Purchaser prior to the installation of the HDPE geomembrane
- d. All nonconformances of test results shall be reported to the Purchaser. The method of a resolution of such differences shall be per ASTM D4759

302. PREPARATION OF SURFACES TO BE LINED

302.1 General:

- a. The Earthwork Contractor shall be responsible for preparing and maintaining the surfaces to be lined as specified in the design drawings
- b. The Geomembrane Contractor shall confirm the conditions of the finished surfaces to be lined prior to placement of the liner.

302.2 Grading Requirements:

- a. The subgrade surface on which the lining is to be placed shall be graded to elevations on the design drawings. Subgrade preparation shall include placement of a minimum 12-inch thick layer of loess material placed in two 6-inch layers and compacted to a minimum dry density of 98 percent per ASTM D698.

302.3 Preparation of Concrete Surfaces:

- a. All portions of concrete walls, curbs and foundations that will come in contact with a geomembrane shall be free of sharp edges or rough spots that can puncture or abrade the geomembrane. Where necessary, the concrete shall be ground smooth by the Earthwork Contractor. Where specified on the design drawings, one or more layers of geomembrane scuff strips shall be placed between the concrete and the geomembrane to act as a protective layer for the liner.



302.4 Subgrade Acceptance:

- a. Subgrade shall be compacted and proofrolled prior to placing fill in accordance with the requirements of Specification Section 312201 Earthwork and design drawings.

303. FIELD PLACEMENT OF THE GEOMEMBRANE LINER

303.1 General Requirements:

- a. Placement Procedure: The placement procedure used for the geomembrane liner shall include the conditions listed below.
- b. Weather:
  - b1. Geomembrane shall not be placed when the air temperature is above 104°F or below 41°F unless it can be demonstrated to the approval of the Purchaser by trial welds that acceptable welds can be made at the prevailing temperature. Trial welds shall be as described in Article 303.2.c.
  - b2. Geomembrane shall not be placed when there is any rainfall or snowfall, in the presence of excessive moisture due to fog or dew, in ponded water, on a frozen subgrade, or during high winds.
- c. Panel Layout:
  - c1. The panels shall be placed in accordance with the Manufacturer's panel layout drawing to ensure that they are placed in the proper direction for seaming.
  - c2. If panels are installed in a location other than indicated on the panel layout drawing, the revised location shall be indicated on an "as-built" layout drawing. The "as-built" record drawing shall be submitted to the Purchaser at the completion of the project.
- d. Panel Deployment:
  - d1. Only the panels that can be anchored and seamed together in one shift shall be unrolled.
  - d2. Unroll and layout panels in as close to the final position as possible. Pulling geomembrane panels should be minimized to reduce the chance of permanent tension.
  - d3. The methods and equipment used to deploy the panels shall not damage the geomembrane or the supporting surface.
  - d4. Wrinkles shall be minimized. However, enough slack shall be provided in both directions so that there will be no tension in the geomembrane at the lowest expected operating temperature.
- e. Precautions to Prevent Wind Damage:
  - e1. If possible, work shall be oriented in the direction of the prevailing wind.
  - e2. Provide adequate temporary loading and/or anchoring of the geomembrane by means that will not damage the geomembrane, to prevent uplift of the geomembrane by wind.
- f. Other Precautions to Prevent Damage:
  - f1. Protection of the geomembrane from damage due to foot traffic on the slopes shall be provided.
  - f2. Provisions of facilities for safe entrance and egress of employees from sloped depressions is required.

- g. Replacement of Damaged Geomembrane:
  - g1. Any area of a panel, which, in the judgement of the Purchaser, becomes seriously damaged (torn, twisted, or crimped permanently), shall be replaced at no additional cost to the Purchaser.
- 303.2 Field Seaming:
  - a. Method of Seaming:
    - a1. The primary welding procedure for seams shall be double wedge fusion welding.
    - a2. Extrusion welding shall be used only for repairs, detail work, and for seaming where double wedge fusion welding is not possible.
    - a3. The rods used for extrusion welding shall be the same type of resin as the geomembrane, unless otherwise approved by the Purchaser.
    - a4. The use of solvents or adhesives is not permitted.
  - b. General Requirements for Seaming:
    - b1. On slopes steeper than 10 horizontal to 1 vertical, seams shall be oriented parallel to the line of maximum slope (oriented up and down, not across the slope) when possible. No seams oriented across the slope shall be used unless approved by the Purchaser.
    - b2. Seams parallel to the toe of the slope shall be located a minimum of 5 feet from the toe.
    - b3. Seams parallel to the crest of the slope shall be located a minimum of 2 feet from the crest.
    - b4. Seams on the floor of the pond shall be overlapped so that the upslope sheet is positioned above the downslope sheet.
    - b5. Seaming shall extend to the outside edge of panels to be placed in the anchor trench. Seams at sheet corners of three or four sheets shall be completed with a patch having a minimum dimension of 24 inches, and extrusion welded to the parent sheets.
    - b6. All cross seams between the two rows of seamed panels shall be welded during the coolest time of the day to allow for contraction of geomembrane.
  - c. Trial Welds Prior to Beginning Seaming:
    - c1. Trial welds are required for pre-qualification of personnel, equipment and procedures for making seams on identical geomembrane material under the same climatic conditions as the actual field production seams will be made.
    - c2. Trial welds shall be made as follows:
      - c2.1 Prior to each seaming period.
      - c2.2 Every 4 to 5 hours (i.e., at the beginning of the work shift and after the lunch break).
      - c2.3 Whenever personnel or equipment are changed.
      - c2.4 When climatic conditions result in wide changes in geomembrane temperature.
      - c2.5 When requested by CQA Geomembrane Inspector for any seaming crew or piece of welding equipment if problems are suspected.



- c3. Once qualified by passing a trial weld, welding technicians shall not change parameters without performing another trial weld.
- c4. Trial welds shall be made on both double wedge fusion welds and on extrusion welds.
- c5. A test strip shall be prepared by joining two pieces of geomembrane, each piece shall be at least 6 inches wide. The length of double wedge fusion welded seams shall be a minimum of 10 feet long. The length of an extrusion welded seam shall be a minimum of 4 feet long. The CQA Geomembrane Inspector shall witness the fabrication of each test strip.
- c6. All test welds shall be tested by destructive testing. Testing can be done as soon as the seam cools.
- c7. A minimum of three one inch wide sample strips shall be cut from each test strip, one from each end and one from the middle. The location of each sample shall be selected by the CQA Geomembrane Inspector. The test strips shall be tested in peel at 2 inches per minute using a field tensiometer. The CQA Geomembrane Inspector shall witness all tests.
- c8. If any of the test specimens fail, a new test strip shall be fabricated and the tests repeated for the new strip. If additional specimens fail, the seaming apparatus and the seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and successful trial welds have been achieved.
- c9. The trial weld is considered acceptable if, when tested for peel adhesion using the field tensiometer, all three specimens meet the criteria specified in Table 1, respectively, for both the peel and shear under Bonded Seam Strength, or the three specimens exhibit Film Tear Bond (FTB) (yielding of the parent material before seam failure). In the case of double wedge fusion welded seams, both welds must pass in order to be considered acceptable.
- c10. If the specimens pass the tests, production seaming operations can begin.
- c11. The Contractor shall document all data on each trial weld, including:
  - c11.1 Date
  - c11.2 Time
  - c11.3 Operator
  - c11.4 Machine number
  - c11.5 Ambient temperature
  - c11.6 Operating temperature
  - c11.7 Speed setting
  - c11.8 Pass/Fail designation
- d. Preparation for Seaming:
  - d1. Prior to seaming, the surface of the geomembrane shall be wiped with a clean cloth to ensure that it is clean and free from moisture, grease, dust, dirt, and debris of any kind before seam welding is started.
  - d2. The panels shall be adjusted so that the seams are aligned to eliminate wrinkles and fish mouths. Where necessary, fish mouths and wrinkles shall be cut to achieve flat overlap.



- e. Seaming:
  - e1. Seaming shall be performed in accordance with the Manufacturer's accepted procedure.
  - e2. Double Wedge Fusion Welds:
    - e2.1 The panels shall be overlapped a minimum of 4 inches prior to welding.
    - e2.2 Vehicle mounted automated hot wedge welding apparatus shall be used to make the seam.
  - e3. Extrusion Fillet Welding:
    - e3.1 Geomembrane overlap shall be a minimum of 3 inches for extrusion welding.
    - e3.2 Geomembrane panels shall be temporarily bonded using a hot air device prior to extrusion welding.
    - e3.3 The edge of the geomembrane to be fillet welded shall be pre-beveled before heat-tacking the seam in place.
    - e3.4 The seam overlap shall be ground (abraded) no more than one hour prior to welding.
    - e3.5 Grinding shall be performed in accordance with the Manufacturer's instructions in a manner that does not damage the geomembrane.
    - e3.6 Grinding shall not extend more than 1/4 inch past the area to be covered with extrudate during welding.
    - e3.7 All grind marks shall be covered with extrudate.
    - e3.8 Geomembrane overlap shall be a minimum of 3 inches for extrusion welding.
- 303.3 Non-Destructive Field Testing – Geomembrane:
  - a. General:
    - a1. All non-destructive field testing shall be performed and documented by the Geomembrane Contractor.
    - a2. The CQA Geomembrane Inspector shall observe all non-destructive test procedures.
    - a3. One hundred percent of the seam length shall be tested using non-destructive procedures to check the continuity of the field seams. Non-destructive testing is not meant to qualify seam strength.
    - a4. Air pressure testing shall be performed in accordance with ASTM D5820 and GRI GM 6.
    - a5. Vacuum Box testing shall be performed in accordance with ASTM D5641 and as specified herein.
    - a6. Continuity testing shall be performed as seaming progresses or as soon as a suitable length of seam is available, not at the completion of all field seaming.
  - b. Double Wedge Fusion Welded Seams:
    - b1. Double fusion welded seams shall be tested using air pressure testing.
    - b2. The procedure for testing shall be as specified in GRI GM 6 for the type and thickness of geomembrane in use.
    - b3. The following test pressures are applicable to smooth HDPE. After an initial 2 minute pressure stabilization period, the pressure shall be maintained between 27 and 30 psi for 60 mil HDPE, and



30 and 35 psi for 80 mil HDPE. The pressure shall be sustained for a minimum of 5 minutes. The loss of pressure shall not exceed a maximum of 3 psi in 5 minutes. If the pressure does not stabilize in the first two minutes or the pressure loss exceeds the loss specified, the seam test shall be considered a failure.

- b4. The leak or suspected leak shall be located and repaired.
- b5. The repaired seam shall be re-tested as required until all leaks are identified, and repaired, and the seam passes a subsequent air pressure test.
- b6. When the geometry of a double wedge fusion weld makes air testing impossible or impractical, vacuum testing may be used to test the seam.
- c. Extrusion Welded Seams:
  - c1. Extrusion welded seams shall be tested using vacuum chamber testing in accordance with ASTM D 5641.
  - c2. The completed seam shall exhibit no leakage when tested between 4 and 8 psi minimum vacuum for approximately 10 seconds.
  - c3. If leaks are discovered during testing, they shall be located, marked, and repaired.
  - c4. The repaired area shall be re-tested and exhibit no leakage.
- d. Inaccessible Seams:
  - d1. Where extrusion welded seam locations make use of vacuum box testing impractical, then the electric wire method of testing shall be used or the seam shall be cap stripped as approved by the Purchaser.
  - d2. If cap stripping is approved by the Purchaser, the seams shall be cap stripped as described in Article 304.4, with strips of the same type and thickness of geomembrane being installed. The cap stripping shall be performed in the presence of the Purchaser.
  - d3. The electric wire test method shall consist of placing a 24 gauge copper wire 1/8 inch beneath the top sheet overlap of the two sheets prior to welding with the extruder. The wire shall be imbedded in the seam. After welding, a holiday spark detector, operating at 20,000 volts, shall be connected to one end of the wire and slowly moved over the length of the seam. A seam defect between the probe and the embedded wire shall result in an audible alarm indicating where the defect is located.
- e. Test Reports:
  - e1. Test reports for all air pressure tests shall contain all data specified in ASTM D5820 and GRI GM 6.
  - e2. Test reports for vacuum box testing shall contain all the data specified in ASTM D5641.
  - e3. Test reports for other types of non-destructive tests shall contain as a minimum for each test:
    - e3.1 Location
    - e3.2 Type of test
    - e3.3 Test parameters



- e3.4 Test data
- e3.5 Test number
- e3.6 Name of tester
- e3.7 Outcome of the test
- 303.4 Destructive Testing – Geomembrane:
  - a. Testing:
    - a1. Destructive testing shall be performed by an independent third party laboratory employed by the Geomembrane Contractor on samples cut from production welds in the field by the Geomembrane Contractor.
    - a2. Samples shall be taken by the Geomembrane Contractor to the third party laboratory and tested for shear strength and peel adhesion. For double wedge seam samples, both welds shall be tested for peel adhesion.
    - a3. The third party laboratory that will perform testing shall be identified by the Geomembrane Contractor with the bid proposal and agreed-to in writing by the Purchaser.
  - b. Location and Frequency:
    - b1. Test locations shall be determined after seaming. The location where the test samples shall be taken shall be marked by the CQA Geomembrane Inspector. Locations may be prompted by the appearance of excessive heating, contaminations, offset welds, or a suspected defect. Destructive test samples shall be taken at a minimum average frequency of one per every 500 linear feet of seam length.
    - b2. The Method of Attributes described in GRI GM 14 may be exercised to minimize the number of test samples taken if more than 100 destructive seam samples will be required based on the sampling strategy given in Article 303.4.b1.
    - b3. Each sample location shall be numbered and marked with permanent identification and the location of the sample and the locations shall be indicated on a plan drawing prepared and maintained by the Geomembrane Contractor. The following shall be recorded for each sample:
      - b3.1 Date and Time
      - b3.2 Ambient Temperature
      - b3.3 Seam Number and Location
      - b3.4 Welding Apparatus Used
      - b3.5 Name of Master Seamer
      - b3.6 Reason for Taking the Sample
      - b3.7 Size of Sample
      - b3.8 Test Results
      - b3.9 Name of Tester



- b4. Samples shall be cut by the Geomembrane Contractor. The CQA Geomembrane Inspector shall witness test sample cutting.
- b5. Test samples shall be cut every shift and taken by the Geomembrane Contractor to the third party laboratory the same day that the sample is prepared.
- c. Sample Size:
  - c1. The minimum sample size shall be 12 inches wide with a seam 16 inches long centered length wise in the sample. As agreed to with Purchaser, a sample may be increased in size to accommodate the requirements of the testing laboratory.
- d. Field Testing:
  - d1. A one-inch wide specimen shall be cut from each end of each sample for field testing.
  - d2. Each one-inch wide specimen shall be tested with a field tensiometer for peel adhesion.
  - d3. The CQA Geomembrane Inspector shall witness each field test.
  - d4. A test is considered acceptable if a specimen meets the criteria specified in Tables 1 and 2, respectively, for both peel and shear under Bonded Seam Strength or, exhibits Film Tear Bond (FTB). For double wedge fusion welds, both welds must pass the test. If either sample fails the field test, it shall be assumed that the seam will not pass the specified laboratory testing and the sample shall be given a fail designation.
- e. Laboratory Testing:
  - e1. Full size (12 inch minimum length) samples shall be taken to an independent third-party laboratory for testing.
  - e2. Samples shall be tested for shear strength and peel adhesion in accordance with ASTM D6392. Five specimens shall be tested for each test method. All samples shall meet minimum requirements for shear strength and peel adhesion given in Tables 1 and 2, respectively, under Bonded Seam Strength.
- f. Test Results:
  - f1. Verbal test results shall be given to the Geomembrane Contractor within 24 hours of receipt of the samples. Written results shall follow within one week.
  - f2. All test locations shall be marked with a pass/fail designation on the liner and on the drawings maintained by the Geomembrane Contractor for submittal to the Purchaser after construction is complete.
- g. Re-Testing if Failure Occurs:
  - g1. If a seam fails testing, one additional sample shall be taken 10 feet on each side of the location of the failed test. Additional samples shall continue to be taken at 10 foot intervals until tests show that seam strength is adequate and the zone in which the seam requires reconstruction is identified.
  - g2. All passing seams shall be bounded by two locations from which samples passing laboratory destructive tests have been taken.
  - g3. The entire seam length failing strength tests shall be reconstructed at no additional cost to the Purchaser.



- g4. If the length of reconstructed seam exceeds 150 feet, a sample shall be taken of the reconstructed seam every 150 feet and shall pass destructive testing.
- 303.5 Inspection – Geomembrane:
  - a. After seaming is complete, the Geomembrane Contractor and the CQA Geomembrane Inspector shall conduct a detailed walk-down to visually check all seams and non-seam areas of the geomembrane.
  - b. All defects, holes, blisters, tears, signs of damage during installation, areas of undispersed carbon and holes from destructive or non-destructive testing shall be marked and repaired.
- 304. REPAIR OF DEFECTS AND SEAMS - GEOMEMBRANE
- 304.1 Patching:
  - a. Patching shall be used to repair large holes, tears and destructive sample locations.
  - b. All patches shall be round, oval, or shall have rounded corners.
  - c. All patches shall be made of the base geomembrane material and shall extend a minimum of 3 inches beyond the edges of the defect.
  - d. Patches shall be extrusion welded to the base sheet.
- 304.2 Grinding and Welding:
  - a. Grinding and welding shall be used to repair sections of extruded fillet seams with small defects.
- 304.3 Spot Welding:
  - a. Spot welding shall be used to repair small tears, pinholes, or other minor localized flaws.
- 304.4 Capping:
  - a. Capping shall be used to repair lengths of extrusion welded seams with large defects and to repair double wedge fusion welded seams.
  - b. Cap strips shall be made with strips of the same type and thickness of geomembrane being installed. Strips shall extend a minimum of 6 inches beyond the weld, and shall have rounded corners.
  - c. Cap strips shall be extrusion welded to the base sheet.
- 304.5 Cut Out and Replacement:
  - a. When approved by the Purchaser, a length of defective seam may be cut out and replaced with a strip of new material seamed into place.
- 304.6 Verification of Repairs:
  - a. All repairs shall be non-destructive tested using one of the procedures described in Article 303.3.
  - b. Repairs, which pass the non-destructive test, shall be deemed acceptable.
  - c. Repairs of a seam in excess of 150 feet in length shall have one destructive seam test per 150 feet in length.



305. CREST ANCHOR TRENCH EXCAVATION AND BACKFILLING

305.1 Excavation and Shaping:

- a. Unless specified otherwise on the design drawings, the geomembrane liner shall be anchored in an anchor trench at the top of the slope. The anchor trench shall be excavated by the Earthwork Contractor to the lines and widths shown on the design drawings prior to placement of the liner.
- b. A slightly rounded corner shall be provided in the trench where the geomembrane adjoins the trench to avoid sharp bends in the geomembrane. No loose soil shall be allowed to underlie the geomembrane in the anchor trench.
- c. The anchor trench shall be adequately drained to prevent ponding or otherwise softening of the adjacent soils while the trench is open.

305.2 Backfilling:

- a. Anchor trench backfill shall be placed as shown on the design drawings by the Earthwork Contractor.
- b. Backfilling of the anchor trench shall occur during the morning or during extended periods of overcast skies when the liners are at their most contracted state.
- c. Backfill shall be placed in layers not exceeding 4 inches loose thickness and compacted using hand compaction equipment to a minimum of 95 percent of the maximum dry density as determined by ASTM D698 at optimum water content  $\pm$  2 percent.

306. ATTACHMENT TO CONCRETE

306.1 Geomembrane shall be attached to concrete using batten strips or to extruded HDPE mechanical anchorages set in cast-in-place concrete in accordance with details on the design drawings.

307. ATTACHMENT TO PIPE PENETRATIONS

307.1 Geomembrane shall be attached to pipe penetrations through the lining in accordance with details on the design drawings.

307.2 Prefabricated or field fabricated HDPE sleeves (pipe boots) used for attaching the geomembrane to the pipe shall be supplied by the Manufacturer.

END OF SECTION



# Oregon

Kate Brown, Governor

## Department of Environmental Quality

Eastern Region - Pendleton Office

800 SE Emigrant Ave, Suite 330

Pendleton, OR 97801

Phone: (541) 276-4063

Fax: (541) 278-0168

Relay Service: 711

November 4, 2015

Mr. David Rodgers  
Portland General Electric Co.  
73334 Tower Road  
Boardman, OR 97818

### PERMIT ACTION

Re: WQ - Morrow County  
PGE - Boardman Plant  
WPCF 100189; File 70795

Dear Mr. Rodgers:

This permit action letter is intended to modify Portland General Electric's (PGE's) Water Pollution Control Facilities (WPCF) permit by removing a condition that requires PGE to apply for a solid waste permit.

DEQ issued WPCF Permit 100189 to PGE on May 2, 2013. At that time, DEQ anticipated that promulgation of EPA's Coal Combustion Residuals (CCR) Rules at a future date would require that PGE obtain a solid waste permit from DEQ's Land Quality Division. Accordingly, DEQ included a requirement in Schedule A, Condition 20 of the WPCF permit requiring PGE to apply for a solid waste permit, if and when PGE's coal ash becomes subject to the CCR Rule. However, the new rule, as promulgated, does not require that PGE have a solid waste permit. Therefore, by this letter, Schedule A, Condition 20 is modified as follows.

20. Management and disposal of Boardman Power Plant ash must be conducted in accordance with this permit and the Boardman Power Plant Ash Disposal Plan. Except as provided for in the Boardman Power Plant Ash Disposal Plan, disposal of wastes other than coal ash is prohibited in the ash disposal landfill. If management and disposal of coal ash becomes subject to requirements established by the Environmental Protection Agency or the Department during the term of this permit, or any administrative extension of the term of the permit, the new regulatory requirements control over any inconsistent provisions in the Boardman Power Plant Ash Disposal Plan and this permit. ~~At that time, the Permittee will be required to apply for a permit from the Department's Land Quality Division. If the Land Quality Division issues a permit, the ash disposal requirements in this permit will no longer apply.~~

All other conditions of the permit remain unchanged. If you have any questions regarding this permit action, please contact Carl Nadler at (541) 298-7255, ext. 227 or John Straughan at (541) 278-4611.

Sincerely,

Don Butcher  
Water Quality Permit Manager

cc: Carl Nadler, DEQ  
Lissa Druback, DEQ  
John Straughan, DEQ  
Lenna Cope, PGE  
Amber Chapman, PGE  
Duane Kilsdonk, EFSC

Dept. of Environmental Quality  
Received

NOV 06 2015

ER-The Dalles





# Oregon

Kate Brown, Governor

Department of Environmental Quality

Eastern Region The Dalles Office

400 East Scenic Drive, Suite 307

The Dalles, OR 97058

(541) 298-7255

FAX (541) 298-7330

TTY 711

June 22, 2016

Mr. David Rodgers  
Portland General Electric Co.  
73334 Tower Road  
Boardman, OR 97818

Re: WQ - Morrow County  
PGE - Boardman Plant  
WPCF 100189; File 70795

Dear Mr. Rodgers:

DEQ received Portland General Electric's (PGE's) June 2016 revised Operations, Monitoring and Management (OM&M) Plan for the Boardman Power Plant and Carty Generating Station. PGE manages and disposes of wastewater and coal ash at the facilities under Water Pollution Control Facilities (WPCF) Permit 100189. Schedule C, Condition 3 of the permit requires submittal of the plan.

I reviewed the OM&M plan for DEQ and it is approved with the following condition.

- Any inconsistencies between WPCF Permit 100189 and the approved plan will be resolved in accordance with the permit.

Please let me know if you have any questions regarding the above approval. I can be reached at (541) 298-7255, ext. 227.

Sincerely,

Carl T. Nadler  
WQ Program

cc: Amber Chapman, PGE  
Lenna Cope, PGE  
Don Butcher, DEQ WQ Program  
Rick Hill, DEQ WQ Program  
Lissa Druback, DEQ SW Program  
John Straughan, DEQ SW Program



**WATER POLLUTION CONTROL FACILITIES PERMIT**

Department of Environmental Quality  
Eastern Region  
700 S.E. Emigrant Avenue, Suite 330, Pendleton, OR 97801  
Telephone: (541) 276-4063

Issued pursuant to ORS 468B.050

**FACILITY:**

Portland General Electric Co.  
121 SW Salmon St.  
Portland, OR 97204

**SOURCES COVERED BY THIS PERMIT:**

<u>Type of Waste</u>	<u>Method of Disposal</u>
Industrial Wastewater	Seepage and Evaporation
Domestic Wastewater	Seepage and Evaporation
Coal Ash	Land Disposal

**PLANT TYPE AND LOCATION:**

Boardman Power Plant  
(Coal-fired electricity generation)  
Carty Generating Station  
(Gas-powered electricity generation)

**RIVER BASIN INFORMATION:**

Basin: Umatilla  
Sub-Basin: Middle Columbia / Lake Wallula  
LLID: 1198031456823 RM 10  
County: Morrow

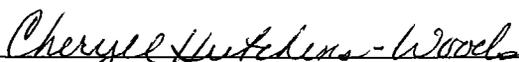
Tower Road  
Boardman, Oregon

Nearest surface stream which would receive  
wastewater if it were to discharge: Sixmile Canyon

**Treatment System Class: Level I**

Issued in response to Carty Generating Station and Boardman Power Plant Application No. 971051 received September 11, 2009.

Pursuant to ORS 469.378, a land use compatibility determination is not required for this permit and the permit is conditioned on a land use determination by the Energy Facility Siting Council.

  
Cheryll Hutchens-Woods, Water Quality Manager  
Eastern Region

May 2, 2013  
Date

**PERMITTED ACTIVITIES**

Until this permit expires or is modified or revoked, the Permittee is authorized to construct, install, modify, or operate a wastewater collection, treatment, control and disposal system in conformance with all the requirements, limitations, and conditions set forth in the attached schedules as follows:

	<u>Page</u>
Schedule A - Waste Disposal Limitations not to be Exceeded.....	2-5
Schedule B - Minimum Monitoring and Reporting Requirements.....	6-9
Schedule C - Compliance Conditions and Schedules.....	10-12
Schedule D - Special Conditions .....	13-16
Schedule E - Not Applicable .....	--
Schedule F - General Conditions.....	17-20

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon Administrative Rule, any other direct or indirect discharge to waters of the state is prohibited, including discharge to an underground injection control system.

**SCHEDULE A****Waste Disposal Limitations**

1. Direct discharge to surface waters is not permitted.
2. The Permittee must manage all wastewater in a manner that will prevent:
  - a. The creation of odors, fly and mosquito breeding or other nuisance conditions;
  - b. A violation of the Department's Groundwater Quality Protection Rules (Oregon Administrative Rules (OAR) Chapter 340, Division 40); and,
  - c. A violation of any permit-specific groundwater concentration limits, established pursuant to OAR 340-040-0030, which will be incorporated into this permit by modification.
3. All activities pertaining to the management, treatment, and disposal of the authorized wastes<sup>1</sup>, as well as wastewater-derived solids from ponds, sumps and settling basins, must be conducted in accordance with the approved Operations, Monitoring and Maintenance (OM&M) Plan (see Schedule C, Condition 3), and any amendments to the plan approved in writing by the Department. No changes may be made in the approved OM&M Plan without written approval from the Department.
4. The Permittee must not exceed the minimum freeboard established by design specifications for all ponds and sewage lagoons.
5. Unless otherwise approved in writing by the Department, the Permittee is permitted to manage and dispose only the following wastes from operation of the Boardman Power Plant in Carty Reservoir:
  - a. Cooling water
  - b. Water treatment wastewater
  - c. Facility sumps and drains wastewater
  - d. Laboratory and sampling wastewater
  - e. Condensate and steam system blowdown
  - f. Equipment cleaning wastewater (excluding boiler cleaning wastewater until after submittal of a waste characterization and written approval from the Department)
  - g. Ash transport wastewater
  - h. Storm water (excluding storm water from the coal yard)
6. Unless otherwise approved in writing by the Department, the Permittee is permitted to manage and dispose only the following wastes from operation of the Carty Generating Station in Carty Reservoir:
  - a. Cooling water
  - b. Water treatment wastewater
  - c. Facility sumps and drains wastewater
  - d. Laboratory and sampling wastewater
  - e. Evaporative cooling wastewater
  - f. Equipment cleaning wastewater
  - g. Storm water

---

<sup>1</sup> Excluding Boardman Power Plant coal ash, which must be managed in accordance with the Ash Disposal Plan.

7. The following limitations<sup>2</sup> must not be exceeded in Carty Reservoir at the intake of the recirculation line from Carty Reservoir to the Boardman Power Plant:

Parameter	Limitations (Sample Maximum)
Chloride	100 mg/L
Sulfate	200 mg/L
Sodium	150 mg/L
Arsenic	0.01 mg/L
Boron	0.5 mg/L
Copper	0.1 mg/L
Cadmium	0.005 mg/L
Calcium	500 mg/L
Chromium	0.05 mg/L
Magnesium	250 mg/L
Bicarbonate Alkalinity	500 mg/L
Fluoride	1 mg/L
Nitrate	10 mg/L
Total Dissolved Solids (TDS)	500 mg/L
Mercury	0.002 mg/L
Zinc	0.1 mg/L
pH	9.4 s.u.
Oil sheen	No visible

8. The following limitations must not be exceeded in Carty Reservoir at the intake of the irrigation withdrawal pump, during withdrawal for irrigation:

Parameter	Limitations (Sample Maximum)
Total Dissolved Solids	320 mg/L
Arsenic	0.0063 mg/L
Chromium	0.0025 mg/L
pH	9.4 s.u.
Sodium Adsorption Ratio	1.66

9. Unless otherwise approved in writing by the Department, the Permittee is permitted to manage and dispose only the following wastes from operation of the Boardman Power Plant in the Boardman Lined Ponds, if disposal of such wastewater into Carty Reservoir would impair the use of the reservoir water for plant operation or it is required to maintain reservoir constituent concentrations below permit limitations after implementation of irrigation withdrawal action requirements that are required by Schedule B, Condition 2:
- Water treatment wastewater
  - Facility sumps and drains wastewater
  - Laboratory and sampling wastewater
  - Condensate and steam system blowdown
  - Equipment cleaning wastewater (excluding boiler cleaning wastewater until after submittal of a waste characterization and written approval from the Department)
  - Ash transport wastewater
  - Storm water

<sup>2</sup> Limitations are based on protection of wildlife and groundwater and may be modified after submittal of a Hydrogeologic Characterization Report (see Schedule C, Condition 5) and/or exceedance of a groundwater concentration limit (see Schedule A, Condition 2.c).

10. Unless otherwise approved in writing by the Department, the Permittee is permitted to manage and dispose only the following wastes from operation of the Carty Generating Station in lined ponds constructed in accordance with plans that are approved by the Department (see Schedule C, Condition 2):
  - a. Water treatment wastewater
  - b. Facility sumps and drains wastewater
  - c. Laboratory and sampling wastewater
  - d. Evaporative cooling wastewater
  - e. Equipment cleaning wastewater
  - f. Storm water
11. Equipment and vehicle wash water and storm water from the vehicle fueling and maintenance areas from the Boardman Power Plant must be disposed in the Boardman Power Plant's lined pond adjacent to the vehicle wash and fueling area. However, wash water derived from washing exterior surfaces only of vehicles and equipment may be disposed in storm water swales provided chemicals, soaps, and detergents are not used and washing is restricted to the exterior of the vehicle or equipment. Disposal of engine, transmission or undercarriage wash water is not permitted in storm water swales.
12. Vehicle wash water from the Carty Generating Station must be disposed in a lined pond constructed in accordance with plans that are approved by the Department (see Schedule C, Condition 2). However, wash water derived from washing exterior surfaces only of vehicles and equipment may be disposed in storm water swales provided chemicals, soaps, and detergents are not used and washing is restricted to the exterior of the vehicle or equipment. Disposal of engine, transmission or undercarriage wash water is not permitted in storm water swales.
13. The Permittee is permitted to manage and dispose of fire protection system wastewater and facility construction and commissioning wastewater in storm water swales or Carty Reservoir, provided chemicals, soaps, and detergents are not used.
14. Disposal of rinse water from concrete mixer trucks chutes and exteriors is permitted on site. Disposal of concrete mixer washout is not authorized by this permit.
15. Boardman Power Plant domestic wastewater (sewage) must be disposed in the Boardman Power Plant sewage lagoons. Carty Generating Station sewage is permitted to be disposed in the Boardman Power Plant sewage lagoons after reconditioning the clay liners or demonstrating clay liner integrity by conducting a leak test and submitting a long term plan to the Department to ensure the integrity of the clay lined cells (see Schedule C, Condition 2). The approved average dry weather design flow for the facility is 10,500 GPD.

16. Prior to overflow into the unlined evaporation/seepage cell, sanitary sewage must receive at least the equivalent of secondary treatment and disinfection and meet the following limitations:

Parameter	Limitations	
<i>E. coli</i> bacteria	Must not exceed 126 organisms per 100 ml monthly geometric mean. A single sample must not exceed 406 organisms per 100 ml <sup>3</sup>	
	Annual Average (mg/L)	Maximum (mg/L)
NO <sub>3</sub> -N	7	10
Total Nitrogen <sup>4</sup>	10	15

17. Wash water from coal yard operations must be collected for treatment in the Boardman Power Plant coal yard ponds and reused in the coal yard. Wash water that floods sumps or basements in the coal yard buildings due to equipment failure and must be removed to repair the equipment may be pumped out of the basements or sumps and onto the coal pile or into storm water swales that remain inside the coal yard boundaries and do not discharge to Carty Reservoir.
18. Air pollution control wastewater may be approved for disposal in lined evaporation ponds, coal yard or ash disposal area after submittal of a waste characterization and written approval from the Department.
19. Storm water from the coal yard and ash disposal landfill must not be discharged to Carty Reservoir.
20. Management and disposal of Boardman Power Plant ash must be conducted in accordance with this permit and the Boardman Power Plant Ash Disposal Plan. Except as provided for in the Boardman Power Plant Ash Disposal Plan, disposal of wastes other than coal ash is prohibited in the ash disposal landfill. If management and disposal of coal ash becomes subject to requirements established by the Environmental Protection Agency or the Department during the term of this permit, or any administrative extension of the term of the permit, the new regulatory requirements control over any inconsistent provisions in the Boardman Power Plant Ash Disposal Plan and this permit. At that time, the Permittee will be required to apply for a permit from the Department's Land Quality Division. If the Land Quality Division issues a permit, the ash disposal requirements in this permit will no longer apply.

<sup>3</sup> If a single sample exceeds 406 organisms per 100 ml, then five consecutive re-samples may be taken at intervals no greater than four-hours beginning within twenty-eight (28) hours after the original sample was taken. If the log mean of the five re-samples is less than or equal to 126 organisms per 100 ml, a violation will not be triggered.

<sup>4</sup> Total Nitrogen in this permit limitation equals Total Kjeldahl Nitrogen (TKN) + Nitrate Nitrogen (NO<sub>3</sub>-N).

**SCHEDULE B**

**Minimum Monitoring and Reporting Requirements** (unless otherwise approved in writing by the Department).

**1. Facilities Monitoring**

The Permittee must monitor the facilities in accordance with the following Department approved plans: OM&M Plan, Groundwater Monitoring Plan, Ash Disposal Plan and Boardman Power Plant Water Quality Management Program, and any amendments to the plans and program approved in writing by the Department. Monitoring must include the following items and parameters:

a. Boardman Power Plant Sanitary Lagoons

Items and Parameters	Minimum Frequency	Sample Type/Action
Influent <sup>5</sup>		
Total flow (MGD)	Daily	Record
Flow meter calibration	Annually	Written verification
pH	2/week	Grab/field measurement
BOD <sub>5</sub>	Quarterly	Composite <sup>6</sup>
TSS	Quarterly	Composite <sup>6</sup>
Overflow to seepage cell <sup>7</sup>		
Total flow (MGD)	Daily	Record
Flow meter calibration	Annually	Written verification
Quantity chlorine used	Daily	Measurement
Chlorine residual	Daily	Grab
pH	2/week	Grab/field measurement
<i>E. coli</i> bacteria	Monthly	Grab
BOD <sub>5</sub>	Quarterly	Composite <sup>6</sup>
TSS	Quarterly	Composite <sup>6</sup>
TKN	Quarterly	Grab
NO <sub>3</sub> -N	Quarterly	Grab
Lagoon Site		
Freeboard <sup>8</sup>	Weekly	Measure and record
Perimeter inspection <sup>9</sup>	Daily	Observation

<sup>5</sup> Sample point is in discharge to lagoons, except that flow from Boardman Power Plant coal yard sewage collection system may be measured by monitoring domestic water usage of facilities that discharge wastes to the coal yard sewage collection system. And, except that BOD<sub>5</sub>, TSS and pH monitoring results of domestic sewage from Boardman Power Plant power block may be deemed representative of BOD<sub>5</sub>, TSS and pH from Boardman Power Plant coal yard sewage collection system.

<sup>6</sup> Composite samples must consist of no less than 6 samples collected over a 24-hour period and apportioned according to the volume of flow at the time of sampling.

<sup>7</sup> Required only when overflow occurs. Sample point is at overflow to seepage cell

<sup>8</sup> Freeboard is measured from lowest point on containment structure

<sup>9</sup> A perimeter inspection is a sight surveillance of the lagoon dikes looking for the presence of badgers, muskrats, ground hogs or other rodents whose burrowing activities could threaten the structural integrity of a dike.

b. Lined Evaporation Ponds (Boardman Power Plant and Carty Generating Station)

Items and Parameters	Minimum Frequency	Sample Type/Action
Each Pond <sup>10</sup>		
Total Flow to pond (MG)	Quarterly	Record
Flow meter calibration	Annually	Written verification
As, Cd, Cr, Hg, TDS, Oil & Grease, TTHMs <sup>11</sup> , pH	Quarterly	Grab
Freeboard	Weekly	Measure and record
Perimeter inspection	Daily	Observation

c. Carty Reservoir

Items and Parameters	Minimum Frequency	Sample Type/Action
Effluent <sup>12</sup>		
Total flow (MG)	Monthly	Record
Flow meter calibration	Annually	Written verification
As, B, Cd, Ca, Cr, Cu, Fe, Mg, Hg, K, Na, V, Se, Zn, Bicarb Alk, Total Alk, Cl <sup>-</sup> , F <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , SiO <sub>2</sub> , SO <sub>4</sub> , TDS, Cond, pH, TTHMs	Monthly	Grab
Make-up water		
Total flow (MG)	Monthly	Record
Flow meter calibration	Annually	Written verification
Irrigation withdrawal <sup>13</sup>		
TDS, As, Cr, pH, SAR	Twice Monthly, except as required by Schedule B, Condition 2	Grab
Carty Reservoir		
Water elevation	Monthly	Measure and record

d. Coal Ash

Items and Parameters	Minimum Frequency	Sample Type/Action
Ash transferred off site Bottom Economizer Fly	Annual	Record volumes and recipients
Ash disposed on site Bottom Economizer Fly	Annual	Record volumes

2. Irrigation Withdrawal Action Requirements

<sup>10</sup> The Permittee must designate and maintain a sampling station at each pond from which representative samples may be collected, except that flow to Boardman Power Plant's two lined evaporation ponds may be measured at a single location downstream of all possible flow additions.

<sup>11</sup> Total trihalomethanes

<sup>12</sup> Sample point is in the recirculation line (intake) from Carty Reservoir to the Boardman Power Plant

<sup>13</sup> Sample point is at intake to irrigation withdrawal pump

If irrigation withdrawal monitoring results indicate that a trigger level in the following table has been exceeded, the Permittee must:

- a. Report the results to the Department within ten (10) calendar days of receipt of the laboratory data;
- b. Immediately implement Operations, Monitoring and Management (OM&M) Plan (see Schedule C, Condition 3) procedures to decrease parameter concentrations in Carty Reservoir; and,
- c. Immediately begin monitoring the exceeded parameter(s) in accordance with the approved OM&M Plan until concentrations return to below trigger level(s).

Parameter	Trigger Level
Total Dissolved Solids	280 mg/L
Arsenic	0.0055mg/L
Chromium	0.0022mg/L
pH	9.0 s.u.
Sodium Adsorption Ratio	1.44

**3. Groundwater Monitoring**

The Permittee must monitor groundwater in accordance with a Department-approved Groundwater Monitoring Plan and any amendments to the plan approved in writing by the Department.

**4. Groundwater Monitoring Resampling Requirements<sup>14</sup>**

- a. If monitoring indicates that a concentration limit has been exceeded at a compliance point, the Permittee must immediately resample the monitoring well. The results of both sampling events must be reported to the Department within 10 calendar days of receipt of the laboratory data.
- b. If monitoring indicates a significant increase (increase or decrease for pH), as defined in the Groundwater Monitoring Plan, in the value of a parameter monitored, the Permittee must immediately resample unless otherwise approved in writing by the Department. If the re-sampling confirms a change in water quality, the Permittee must:
  1. Report the results to the Department within ten (10) calendar days of receipt of the laboratory data; and
  2. Prepare and submit to the Department within thirty (30) calendar days a plan for developing a preliminary assessment unless another time schedule is approved by the Department.

**5. Monthly Reporting Procedures – Boardman Power Plant Sanitary Lagoons**

Monitoring results must be reported on approved forms. The reporting period is the calendar month. Reports must be submitted to the Department's Eastern Region Pendleton Office by the 15th day of the following month.

Monitoring reports must identify the name, certificate classification and grade level of each principal operator designated by the Permittee as responsible for supervising the wastewater treatment system

<sup>14</sup> OAR 340-040-0030(5) requires resampling after a significant increase (increase or decrease for pH). In addition, resampling is appropriate after a concentration limit exceedance and prior to a remedial investigation and feasibility study, which is required by OAR 340-040-0030(6).

during the reporting period. Monitoring reports must also identify the treatment system classification as found on page one of this permit.

Monitoring reports must include a record of all applicable equipment breakdowns and bypassing.

**6. Annual Reporting Requirements**

On or before March 1 of each calendar year, the Permittee must submit an annual facility monitoring report to the Department that summarizes all wastewater and ash facilities operations and monitoring results for the preceding year. Following approval, annual reporting and data analyses must be in accordance with the approved OM&M Plan, Groundwater Monitoring Plan, Ash Disposal Plan and Boardman Power Plant Water Quality Management Program, and any amendments to the plans and program approved in writing by the Department.

## SCHEDULE C

### Compliance Conditions and Schedules

#### 1. Boardman Power Plant Sewage Lagoons

Prior to discharge of sanitary sewage from Carty Generating Station to the Boardman Power Plant sewage lagoons, the Permittee must submit a work plan to the Department to remove vegetation from the clay lined cells and either leak test the clay-lined cells<sup>15</sup> or recondition them.

The leak test plan must be implemented in accordance with Department approval and the results must be submitted to the Department. If the Department gives written notification to the Permittee that reconditioning of the clay liners is required, the Permittee must submit a clay liner reconditioning work plan to the Department. The reconditioning plan must be implemented in accordance with Department approval.

In addition, prior to discharge of sanitary sewage from Carty Generating Station to the Boardman Power Plant sewage lagoons, the Permittee must submit a long term plan to the Department to ensure the integrity of the clay-lined cells. The plan may include evaluating system capacity requirements and modifying the system accordingly. The plan must be implemented in accordance with Department approval.

#### 2. Wastewater Treatment System Wastewater - Carty Generating Station

Prior to discharge of wastewater treatment system wastewater to lined evaporation ponds that are proposed to be constructed for Carty Generating Station, a wastewater characterization must be submitted for Department review and approval.

#### 3. Operations, Monitoring and Management Plan

Not later than 90 days after permit issuance, the Permittee must submit a facility Operations, Monitoring and Management (OM&M) Plan to the Department for review and approval. The plan must include, but is not limited to, management and disposal of wastewater-derived solids from ponds, sumps and settling basins, as well as procedures to decrease parameter concentrations in Carty Reservoir in the event of an irrigation withdrawal limit exceedance (see Schedule B, Condition 2).

The Permittee must review the OM&M Plan annually and submit a revised plan, whenever it is revised, to the Department for review and approval.

Following submittal of the plan or a revised plan, the Department will approve it, approve it with conditions, or disapprove it. If approved, the plan must be implemented in accordance with the Department approval. If disapproved, the Department will provide an approved plan or a minimum of 30 days to submit a revised plan.

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<sup>15</sup> Guidelines for estimating pond leakage are available from the Department at: <http://www.deq.state.or.us/wq/rules/div052/guidelines/estleak.pdf>. For ponds less than two acres, the following guidelines may be used: <http://www.deq.state.or.us/wq/rules/div052/guidelines/altestleak.pdf>. Use of the guidelines is recommended to expedite Department review and approval of the work plan.

#### 4. **Biosolids Management Plan**

Prior to removal and beneficial reuse of accumulated sewage sludge, the Permittee must submit a Biosolids Management Plan to the Department and receive Department approval of the plan. The plan must be developed in accordance with Oregon Administrative Rule 340, Division 50, "Land Application of Domestic Wastewater Treatment Facility Biosolids, Biosolids Derived Products, and Domestic Septage". The plan must be implemented in accordance with the approval.

#### 5. **Hydrogeologic Characterization**

Not later than 120 calendar days after permit issuance, unless otherwise approved in writing by the Department, the Permittee must submit to the Department, for review and approval, a work plan for completing a Hydrogeologic Characterization at the Boardman Power Plant/Carty Reservoir site. The work plan must address evaluation of conditions up- and down-gradient of each and every wastewater impoundment (including lined ponds, unlined settling basins and coal yard wastewater basins). The work plan must also address evaluation of Carty Reservoir as a source of potential impacts to groundwater from arsenic, vanadium and alkalinity in the immediate vicinity of the reservoir. The Permittee must implement the work plan as approved.

Prior to construction of any wastewater impoundment specifically for the Carty Generating Station, the Permittee must submit to the Department, for review and approval, a work plan for completing a Hydrogeologic Characterization in the vicinity of the proposed wastewater impoundment. The Permittee must implement the work plan as approved.

#### 6. **Groundwater Monitoring Plan**

- a. Not later than ninety (90) days from Department approval of the Hydrogeologic Characterization, unless otherwise approved in writing by the Department, the Permittee must submit a Groundwater Monitoring Plan to the Department for review and approval. Upon Department approval, the Groundwater Monitoring Plan must be implemented.
- b. In conjunction with submittal of the Groundwater Monitoring Plan, the Permittee must propose a submittal date for a Water Quality Analysis Report. The proposed date for report submittal must be the earliest practicable date after completion of nine (9) quarters of groundwater monitoring (to enable the Permittee to establish background groundwater conditions).

#### 7. **Water Quality Analysis Report**

Not later than the date approved by the Department under Schedule C, Condition 6.b., the Permittee must submit to the Department for review and approval a Water Quality Analysis Report. The Water Quality Analysis Report must include, but not be limited to identification of background and compliance wells, determinations of background groundwater quality, analyses of existing water quality data and existing impacts, and analyses of potential impacts from facility activities. Concurrent with submittal of the Water Quality Analysis Report, the Permittee must:

- a. Propose site-specific concentration limits pursuant to OAR 340-040-0030(3) for the Department's consideration; and,
- b. Apply for any concentration limit variances proposed pursuant to OAR 340-040-0030(4).

8. Not later than 90 days after burning coal from any new source other than western sub-bituminous, the Permittee shall submit a waste characterization of the resulting ash to the Department. The characterization must include: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc.
9. The Permittee is required to meet the compliance dates that have been established in this schedule, unless alternative compliance dates have been approved in advance in writing by the Department. Either prior to or not later than 14 calendar days following any lapsed compliance date, the Permittee must submit to the Department a notice of noncompliance with the established schedule. Any reports of noncompliance must include the cause of noncompliance.

**SCHEDULE D****Special Conditions**

1. Prior to constructing or modifying wastewater management, treatment and disposal facilities, detailed plans and specifications must be submitted to, and approved in writing by, the Department.
2. All biosolids must be managed in accordance with the Department-approved biosolids management plan and the site authorization letters issued by the Department. Any changes in solids management activities that significantly differ from the operations specified under the approved plan require the prior written approval of the Department.

There are no approved sites for application of the Permittee's biosolids as of the date of permit issuance. All new biosolids application sites must meet the site selection criteria set forth in OAR 340-050-0070 and must be located within Morrow County. Property owners adjacent to any newly approved application sites must be notified, in writing or by any method approved by the Department, of the proposed activity prior to the start of application. For proposed new application sites that are deemed by the Department to be sensitive with respect to residential housing, runoff potential or threat to groundwater, an opportunity for public comment must be provided in accordance with OAR 340-050-0030.

This permit may be modified to incorporate any applicable standard for biosolids use or disposal promulgated under section 405(d) of the Clean Water Act, if the standard for biosolids use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or controls a pollutant or practice not limited in this permit.

3. The Permittee must comply with Oregon Administrative Rules (OAR), Chapter 340, Division 49, "Regulations Pertaining To Certification of Wastewater System Operator Personnel" and accordingly:
  - a. The Permittee must have its wastewater system supervised by one or more operators who are certified in treatment system operation at grade level I or higher.

**Note: A "supervisor" is defined as the person exercising authority for establishing and executing the specific practice and procedures of operating the system in accordance with the policies of the Permittee and requirements of the waste discharge permit. "Supervise" means responsible for the technical operation of a system, which may affect its performance or the quality of the effluent produced. Supervisors are not required to be on-site at all times.**

- b. The Permittee's wastewater system may not be without supervision (as required by Special Condition 3.a. above) for more than thirty (30) days. During this period, and at any time that the supervisor is not available to respond on-site (i.e. vacation, sick leave or off-call), the Permittee must make available another person who is certified treatment system operation at grade level I or higher.
- c. The Permittee is responsible for ensuring the wastewater system has a properly certified supervisor available at all times to respond on-site at the request of the Permittee and to any other operator.
- d. The Permittee must notify the Department of Environmental Quality in writing within thirty (30) days of replacement or redesignation of certified operators responsible for supervising wastewater system operation. The notice must be filed with the Water Quality Division,

Operator Certification Program (811 SW Sixth, Portland, OR 97204). This requirement is in addition to the reporting requirements contained under Schedule B of this permit

- e. Upon written request, the Department may grant the Permittee reasonable time, not to exceed 120 days, to obtain the services of a qualified person to supervise the wastewater system. The written request must include justification for the time needed, a schedule for recruiting and hiring, the date the system supervisor availability ceased and the name of the alternate system supervisor(s) as required by 3.b. above.
4. An adequate contingency plan for prevention and handling of spills and unplanned discharges must be in force at all times. A continuing program of employee orientation and education must be maintained to ensure awareness of the necessity for good in-plant control and proper action in the event of a spill or accident.
5. An environmental supervisor must be designated to coordinate and implement all necessary functions related to maintenance and operation of waste management, treatment, and disposal facilities. This person must have access to all information pertaining to the generation of wastes in the various process areas.
6. The Permittee must notify the Department's Eastern Region office at (541) 276-4063 in accordance with the response times contained in the General Conditions of this permit in the event of any malfunction of the wastewater system to enable coordination of corrective action between the Permittee and the Department.
7. **Monitoring Well Management/Maintenance**
  - a. The Permittee must protect and maintain each groundwater monitoring well identified in the Groundwater Monitoring Plan so that samples can be collected that are representative of actual conditions.
  - b. All monitoring well abandonment, replacement and installation must be conducted to comply with the Water Resources Department Rules (OAR Chapter 690, Division 240) and with the Department of Environmental Quality's Guidelines for Groundwater Monitoring Well Drilling, Construction, and Decommissioning. All monitoring well repairs, abandonments, replacements and installations must be documented in a report prepared by an Oregon-registered geologist.
  - c. If a monitoring well identified in the Groundwater Monitoring Plan becomes damaged or inoperable, the Permittee must notify the Department in writing within 14 days. The written notification must describe the problem that occurred and the remedial measures that have been taken to date to correct the problem. In addition, the Permittee must submit a written final report within 60 days following the notification, unless otherwise approved in writing by the Department, which must include a description of the problem, the remedial measures taken to correct the problem, and the measures taken to prevent recurrence. The Department can require the replacement of inoperable monitoring wells.<sup>16</sup>
  - d. All new and replacement monitoring well locations and designs related to the Groundwater Monitoring Plan must be approved in writing by the Department prior to well installation. Well logs and well completion reports must be submitted to the Department within thirty (30)

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<sup>16</sup> Monitoring well operability will be determined by the Department on a case-by-case basis.

days of well installation. Reports must include land survey drawings that depict actual location of all monitoring wells, land application areas, and surface waters.

- e. Modification and/or abandonment plans for any wells identified in the Groundwater Monitoring Plan must be submitted to and approved in writing by the Department prior to modification and/or abandonment of any existing monitoring well.

## 8. Definitions

*Water treatment wastewater* means wastewater derived from the Boardman Power Plant water treatment system, including wastewater from demineralization and regeneration of the demineralization media, make-up water demineralization (including regeneration) and condensate polishing (including regeneration), the raw water filter and activated carbon filter. It also includes Carty Generating Station neutralization tank wastewater and multi-media filtration wastewater.

*Facility sumps and drains wastewater* means wastewater from Boardman Power Plant and Carty Generating Station sumps and drains. Wastewater from the Boardman Power Plant pretreatment area sump, water treatment area sump, liquid waste sump, water treatment area floor drains and system shut-down drains are included in this category. An oil water separator provides treatment for wastewater from selected Boardman Power Plant facility sumps and drains.

*Laboratory and sampling wastewater* means wastewater from chemical waste drains and laboratory/sample room sink drains and includes discarded water samples, lab equipment wash water and spent reagents. The pH is approximately 9 s.u. and the volume is approximately 200 to 300 gallons per day.

*Condensate and steam system blowdown* means Boardman Power Plant boiler blowdown.

*Equipment cleaning wastewater* means wash water from cleaning the coal gallery and ash transport system, as well as boiler cleaning wash water, boiler acid cleaning wastewater and chemical cleaning wastewaters.

*Equipment and vehicle cleaning wastewater* means wastewater from cleaning heavy construction equipment, landscape maintenance equipment and on-road vehicles.

*Ash transport wastewater* means wastewater that overflows from the ash transport system to the settling ponds, including wastewater from the bottom ash handling system surge tank.

*Evaporative cooling wastewater* means Carty Generating Station cooling tower blowdown.

*Fire protection system wastewater* means fire suppression system test water that is sourced from the domestic water supply or Carty Reservoir.

*Facility construction and commissioning wastewater* means the following wastes from the construction of Carty Generating Station: water supply system testing and commissioning wastewater, hydrostatic testing wastewater, and water supply lines flushing wastewater.

*Air pollution control wastewater* means baking soda grinding wash water from the Boardman Power Plant. Volume is estimated to be between 50 to 200 gallons per day.

9. The Department may reopen the permit at any time to include new or revised waste disposal limitations, monitoring and reporting requirements, compliance conditions and schedules, and special conditions.

**SCHEDULE F****WPCF GENERAL CONDITIONS – INDUSTRIAL FACILITIES****SECTION A. STANDARD CONDITIONS**1. Duty to Comply with Permit

The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and grounds for an enforcement action. Failure to comply is also grounds for the Department to modify, revoke, or deny renewal of a permit.

2. Property Rights and Other Legal Requirements

Issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other rights, or any infringement of federal, tribal, state, or local laws or regulations.

3. Liability

The Department of Environmental Quality or its officers, agents, or employees may not sustain any liability on account of the issuance of this permit or on account of the construction or maintenance of facilities or systems because of this permit.

4. Permit Actions

After notice by the Department, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including but not limited to the following:

- a. Violation of any term or condition of this permit, any applicable rule or statute, or any order of the Commission;
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.

5. Transfer of Permit

This permit may not be transferred to a third party without prior written approval from the Department. The Department may approve transfers where the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of this permit and the rules of the Commission. A transfer application and filing fee must be submitted to the Department.

6. Permit Fees

The permittee must pay the fees required by Oregon Administrative Rules.

**SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS**1. Proper Operation and Maintenance

At all times the permittee must maintain in good working order and properly operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to comply with the terms and conditions of this permit.

2. Standard Operation and Maintenance

All waste collection, control, treatment, and disposal facilities or systems must be operated in a manner consistent with the following:

- a. At all times, all facilities or systems must be operated as efficiently as possible in a manner that will prevent discharges, health hazards, and nuisance conditions.
- b. All screenings, grit, and sludge must be disposed of in a manner approved by the Department to prevent any pollutant from the materials from reaching waters of the state, creating a public health hazard, or causing a nuisance condition.
- c. Bypassing untreated waste is generally prohibited. Bypassing may not occur without prior written permission from the Department except where unavoidable to prevent loss of life, personal injury, or severe property damage.

3. Noncompliance and Notification Procedures

If the permittee is unable to comply with conditions of this permit because of surfacing sewage; a breakdown of equipment, facilities or systems; an accident caused by human error or negligence; or any other cause such as an act of nature, the permittee must:

- a. Immediately take action to stop, contain, and clean up the unauthorized discharges and correct the problem.
- b. Immediately notify the Department's Regional office so that an investigation can be made to evaluate the impact and the corrective actions taken, and to determine any additional action that must be taken.
- c. Within 5 days of the time the permittee becomes aware of the circumstances, the permittee must submit to the Department a detailed written report describing the breakdown, the actual quantity and quality of waste discharged, corrective action taken, steps taken to prevent a recurrence, and any other pertinent information.

Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this permit or liability for failure to comply.

4. Wastewater System Personnel

The permittee must provide an adequate operating staff that is duly qualified to carry out the operation, maintenance, and monitoring requirements to assure continuous compliance with the conditions of this permit.

5. Public Notification of Effluent Violation

If effluent limitations specified in this permit are exceeded or an overflow occurs that threatens public health, the permittee must take such steps as are necessary to alert the public, health agencies and other affected entities (e.g., public water systems) about the extent and nature of the discharge in accordance with the notification procedures developed in accordance with General Condition B.6. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

6. Emergency Response and Public Notification Plan

The permittee must develop and implement an emergency response and public notification plan that identifies measures to protect public health from bypasses or upsets that may endanger public health. At a minimum the plan must include mechanisms to:

- a. Ensure that the permittee is aware (to the greatest extent possible) of such events;
- b. Ensure notification of appropriate personnel and ensure that they are immediately dispatched for investigation and response;
- c. Ensure immediate notification to the public, health agencies, and other affected entities (including public water systems). The response plan must identify the public health and other officials who will receive immediate notification;
- d. Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained;
- e. Provide emergency operations: and
- f. Ensure that DEQ is notified of the public notification steps taken.

**SECTION C. MONITORING AND RECORDS**1. Inspection and Entry

The permittee must at all reasonable times allow authorized representatives of the Department to:

- a. Enter upon the permittee's premises where a waste source or disposal system is located or where any records are required to be kept under the terms and conditions of this permit;
- b. Have access to and copy any records required by this permit;
- c. Inspect any treatment or disposal system, practices, operations, monitoring equipment, or monitoring method regulated or required by this permit; or
- d. Sample or monitor any substances or permit parameters at any location at reasonable times for the purpose of assuring permit compliance or as otherwise authorized by state law...

2. Averaging of Measurements

Calculations of averages of measurements required for all parameters except bacteria must use an arithmetic mean; bacteria must be averaged as specified in the permit.

3. Monitoring Procedures

Monitoring must be conducted according to test procedures specified in the most recent edition of **Standard Methods for the Examination of Water and Wastewater**, unless other test procedures have been approved in writing by the Department and specified in this permit.

4. Retention of Records

The permittee must retain records of all monitoring and maintenance information, including all calibrations, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. The Department may extend this period at any time.

**SECTION D. REPORTING REQUIREMENTS**1. Plan Submittal

Pursuant to Oregon Revised Statute 468B.055, unless specifically exempted by rule, construction, installation, or modification of disposal systems, treatment works, or sewerage systems may not commence until plans and specifications are submitted to and approved in writing by the Department. All construction, installation, or modification shall be in strict conformance with the Department's written approval of the plans.

2. Change in Discharge

Whenever a facility expansion, production increase, or process modification is expected to result in a change in the character of pollutants to be discharged or in a new or increased discharge that will exceed the conditions of this permit, a new application must be submitted together with the necessary reports, plans, and specifications for the proposed changes. A change may not be made until plans have been approved and a new permit or permit modification has been issued.

3. Signatory Requirements

All applications, reports, or information submitted to the Department must be signed and certified by the official applicant of record (owner) or authorized designee.

4. Twenty-Four Hour Reporting

The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) within 24 hours from the time the permittee becomes aware of the circumstances, unless a shorter time is specified in the permit. During normal business hours, the Department's Regional office must be called. Outside of normal business hours, the Department must be contacted at 1-800-452-0311 (Oregon Emergency Response System).

The following must be included as information that must be reported within 24 hours under this paragraph:

- a. Any unanticipated bypass that exceeds any effluent limitation in this permit;
- b. Any upset that exceeds any effluent limitation in this permit;
- c. Violation of maximum daily discharge limitation for any of the pollutants listed by the Department in this permit; and
- d. Any noncompliance that may endanger human health or the environment.

A written submission must also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:

- e. A description of noncompliance and its cause;
- f. The period of noncompliance, including exact dates and times;
- g. The estimated time noncompliance is expected to continue if it has not been corrected;
- h. Steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and
- i. Public notification steps taken, pursuant to General Condition B.6.

The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

**SECTION E. DEFINITIONS**

1. *BOD<sub>5</sub>* means five-day biochemical oxygen demand.
2. *TSS* means total suspended solids.
3. *FC* means fecal coliform bacteria.
4. *NH<sub>3</sub>-N* means Ammonia Nitrogen.
5. *NO<sub>3</sub>-N* means Nitrate Nitrogen.
6. *NO<sub>2</sub>-N* means Nitrite Nitrogen.
7. *TKN* means Total Kjeldahl Nitrogen.
8. *Cl* means Chloride.
9. *TN* means Total Nitrogen.
10. "*Bacteria*" includes but is not limited to fecal coliform bacteria, total coliform bacteria, and E. coli bacteria.
11. *Total residual chlorine* means combined chlorine forms plus free residual chlorine.
12. *mg/l* means milligrams per liter.
13. *ug/l* means micrograms per liter.
14. *kg* means kilograms.
15. *GPD* means gallons per day.
16. *MGD* means million gallons per day.
17. *Grab sample* means an individual discrete sample collected over a period of time not to exceed 15 minutes.
18. *Composite sample* means a combination of samples collected, generally at equal intervals over a 24-hour period, and based on either time or flow.
19. *Week* means a calendar week of Sunday through Saturday.
20. *Month* means a calendar month.
21. *Quarter* means January through March, April through June, July through September, or October through December.

## WPCF PERMIT EVALUATION REPORT

Department of Environmental Quality  
Eastern Region - Pendleton Office  
700 SE Emigrant, Suite 330, Pendleton, OR 97801  
Telephone: (541) 276-4063

**PERMITTEE:** Portland General Electric Co.  
121 SW Salmon St.  
Portland, OR 97204

**FILE NUMBER:** Boardman Power Plant: 70795

**PERMIT NUMBER:** 100189

**SOURCE LOCATION:** Tower Road  
Boardman, Oregon

**SOURCE CONTACT:** Amber Chapman Telephone Number: 541-481-1233

**PERMIT WRITER:** Carl Nadler Telephone Number: 541-298-7255, ext. 227

**PROPOSED ACTION:** Renewal of a Water Pollution Control Facilities (WPCF) permit for the Boardman Power Plant and with permit coverage for the proposed Carty Generating Station

**SOURCE CATEGORY:** Industrial

**PERMIT APPLICATION DATE:** Boardman Power Plant: September 11, 2009

**PERMIT APPLICATION NUMBER:** Boardman Power Plant: 971051

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### INTRODUCTION

Portland General Electric Co. (PGE) operates a coal-fired steam electric generating plant (Boardman Power Plant) near Boardman, Oregon. The company currently holds expiring Water Pollution Control Facilities (WPCF) Permit 100189 and operates wastewater and ash disposal facilities at the plant under the expiring permit, applicable Federal law, the terms and conditions of a Site Certificate Agreement (administered by the Energy Facility Siting Council (EFSC) for the State of Oregon), and the laws of the State of Oregon that were in effect on the date of the Site Certificate Agreement. Pursuant to the Site Certificate Agreement, the Department of Environmental Quality (the Department) maintains authority to issue permits for the treatment and disposal of wastewater and the disposal of ash at the Boardman Power Plant.

The expiring WPCF permit was issued on January 11, 2005 with a December 31, 2009 expiration date. On September 11, 2009, the company submitted a WPCF permit renewal application along with supporting documentation to the Department. Therefore, in accordance with Oregon Administrative Rules that were in effect on the date of the Site Certificate Agreement, WPCF Permit 100189 was administratively extended until such time as the Department takes final action on the renewal application.

In 2009, PGE announced that it plans to construct a natural gas-fired combined cycle generating plant (Carty Generating Station) adjacent to the Boardman Power Plant. On April 28, 2010, the company submitted an

application for a new WPCF permit to construct and operate wastewater facilities at the new plant. In addition, PGE proposed to share some of the Boardman Power Plant wastewater facilities with Carty Generating Station. In Exhibit B, Section 4 of the Site Certificate Application for Carty Generating Station, PGE referenced a right to utilize Boardman Power Plant facilities in common with new generating units.

At this time, the Department proposes to renew the Boardman Power Plant WPCF permit and include provisions for the new Carty Generating Station wastewater facilities in it, rather than issuing separate permits for each plant. The application for a new WPCF permit for Carty Generating Station was withdrawn. This evaluation report addresses waste discharge limitations, minimum monitoring and reporting requirements, compliance conditions and schedules, and special conditions included in the proposed WPCF permit.

## FACILITY DESCRIPTIONS

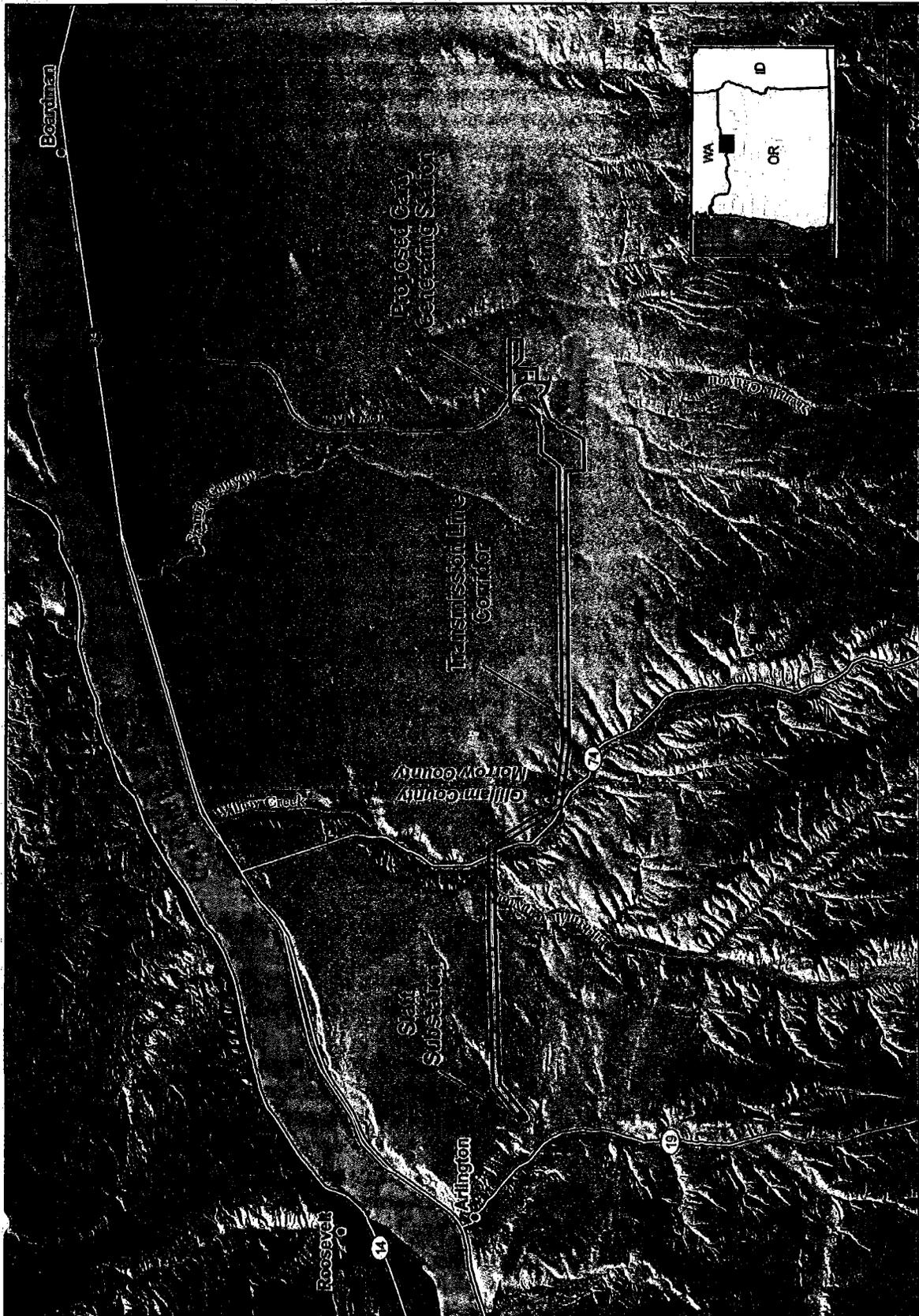
### Boardman Power Plant

The 617-megawatt (MW) Boardman Power Plant is located adjacent to Carty Reservoir on Sixmile Canyon, approximately 13 miles south-southwest of Boardman, Oregon (Sec. 34, T3N, R24E, W.M.). See Figure 1. The plant was constructed in the late 1970's and was placed into operation on August 3, 1980.

In the power generating process, primarily low sulfur sub-bituminous coal is burned to heat boiler water into steam under high pressure. The steam is then directed into a turbine where it is allowed to expand. As the turbine turns, it turns a generator, which produces electricity. Exhaust steam from the turbine expands further in a condenser, where it cools and water droplets are formed. The condensate (boiler water) is collected in a closed loop, further cooled, and returned to the boiler. To facilitate cooling of the boiler water, a separate cooling water cycle, which does not mix with the boiler water, removes heat from the boiler water in a heat exchanger. The heat exchanger transfers heat energy from the boiler water to the cooling water. Cooling water is then recirculated between Carty Reservoir (heat sink) and the heat exchanger.

Carty Reservoir was created during Boardman Power Plant construction by placing an earth-fill dam across Sixmile Canyon and excavating sediment and bedrock through the Rattlesnake Ridge Formation and into the Pomona Basalt to enhance reservoir capacity. At high pool (677 ft MSL), Carty Reservoir covers 1,450 acres and impounds 38,300 acre-feet of water, which is pumped from the Willow Creek Arm of the Columbia River. In addition to using the reservoir for cooling, PGE circulates water for steam generation, ash transport, and other internal processes. Settling ponds are used to remove solid particles from some wastewaters prior to discharge to Carty Reservoir. Internal piping controls allow PGE flexibility in directing the waste streams. Recirculation and evaporative cooling in the reservoir cause minerals (dissolved solids) that are naturally occurring in the water to become concentrated. Maximum allowable concentrations of specific chemical constituents in the reservoir are prescribed in the Site Certificate Agreement. In order to control mineral build up, the Site Certificate Agreement allows for agricultural irrigation of reservoir water. Carty Reservoir also provides year-round habitat for wildlife. However, PGE prohibits recreational use of the reservoir. Additionally, because Carty Reservoir has been determined to be a wastewater impoundment, direct discharge from the reservoir to surface waters is not permitted.

Figure 1



Shallow lagoons (ponds) are utilized for containment and disposal of other wastewaters from the Boardman Power Plant. See Figure 2. The expiring permit requires that wastewater must be disposed in the lined pond, if disposal of such wastewater into Carty Reservoir would impair the use of the reservoir for plant operation or result in exceedance of chemical constituent limitations in the Site Certificate Agreement. The expiring permit also provides that wastewater that is required to be disposed in the lined pond may be disposed in an unlined pond if the lined pond is full. However, PGE lined the unlined pond in 2007 and the company's current practice is to dispose of Boardman Power Plant wastewater in the two lined ponds, if it cannot be disposed in the reservoir.

Water is used in the coal yard to wash coal conveyor transfer point enclosures. Wastewater is collected, treated in a clarifier to remove solid particles and stored in concrete lined basins for reuse. Coal yard storm water is allowed to percolate and/or runoff.

A small, lined evaporation pond adjacent to the vehicle wash and fueling area is used to contain and dispose of vehicle wash water and storm water runoff from the fueling area.

Domestic sewage is treated and disposed in a three-cell facultative lagoon system.

As noted above, the Department regulates coal ash disposal under the expiring permit in an onsite landfill located southeast of Carty Reservoir. See Figure 3. The bottom of the landfill is approximately 8-feet above the highest water level in Carty. The landfill is surrounded by a dike which isolates it from the reservoir and which diverts natural runoff around. At peak production, the plant burns approximately 315 tons of coal per hour and generates approximately 16 tons of ash per hour, which consists of approximately 20% bottom ash and 80% fly ash. PGE sells a portion of the fly ash for beneficial re-use. Fly ash that is sold is stored in an on-site silo or on-site dome storage area; it is not disposed in the landfill.

In addition to ash, PGE has disposed of spent diatomaceous earth (DE) filter media in the landfill. PGE uses DE filter media to treat Carty Reservoir water prior to use in the plant. The Department has also approved disposal of settling pond solids and sandblast media from cleaning boiler tubes in the landfill. The expiring permit prohibited disposal of wastes other than coal ash in the ash disposal landfill, except as provided for in the Ash Disposal Plan. Under the proposed permit, if management and disposal of coal ash becomes subject to requirements established by the Environmental Protection Agency, or new regulations promulgated by the Department, the Permittee will be required to apply for a permit from the Department's Land Quality Division. If the Land Quality Division issues a permit, the ash disposal requirements in this proposed permit will no longer apply.

### Carty Generating Station

As proposed, Carty Generating Station will be a 900 MW natural gas-fired combined cycle generating plant located adjacent to Carty Reservoir and the Boardman Power Plant (Sec. 33 and 34, T3N, R24E, W.M.). See Figure 4. PGE proposes to construct Carty Generating Station in two blocks: each block will consist of a combination of one or more high efficiency combustion turbine generators (CTGs), heat recovery steam generators (HRSGs) and a steam turbine generator (STG). In the CTGs, exhaust gases from natural gas combustion will expand to turn a combustion turbine, which is connected to a generator to produce electricity. Because the exhaust gases exiting the CTGs will contain useful waste heat, they will be directed to HRSGs to generate steam to drive a STG. Steam exhausted from the STG will be condensed in a water-cooled condenser, with the resultant condensate returned to the HRSGs to produce additional steam. Water used for cooling in the water-cooled condenser will be routed to a cooling tower where the water will be cooled before being pumped back through the condenser.

Figure 2

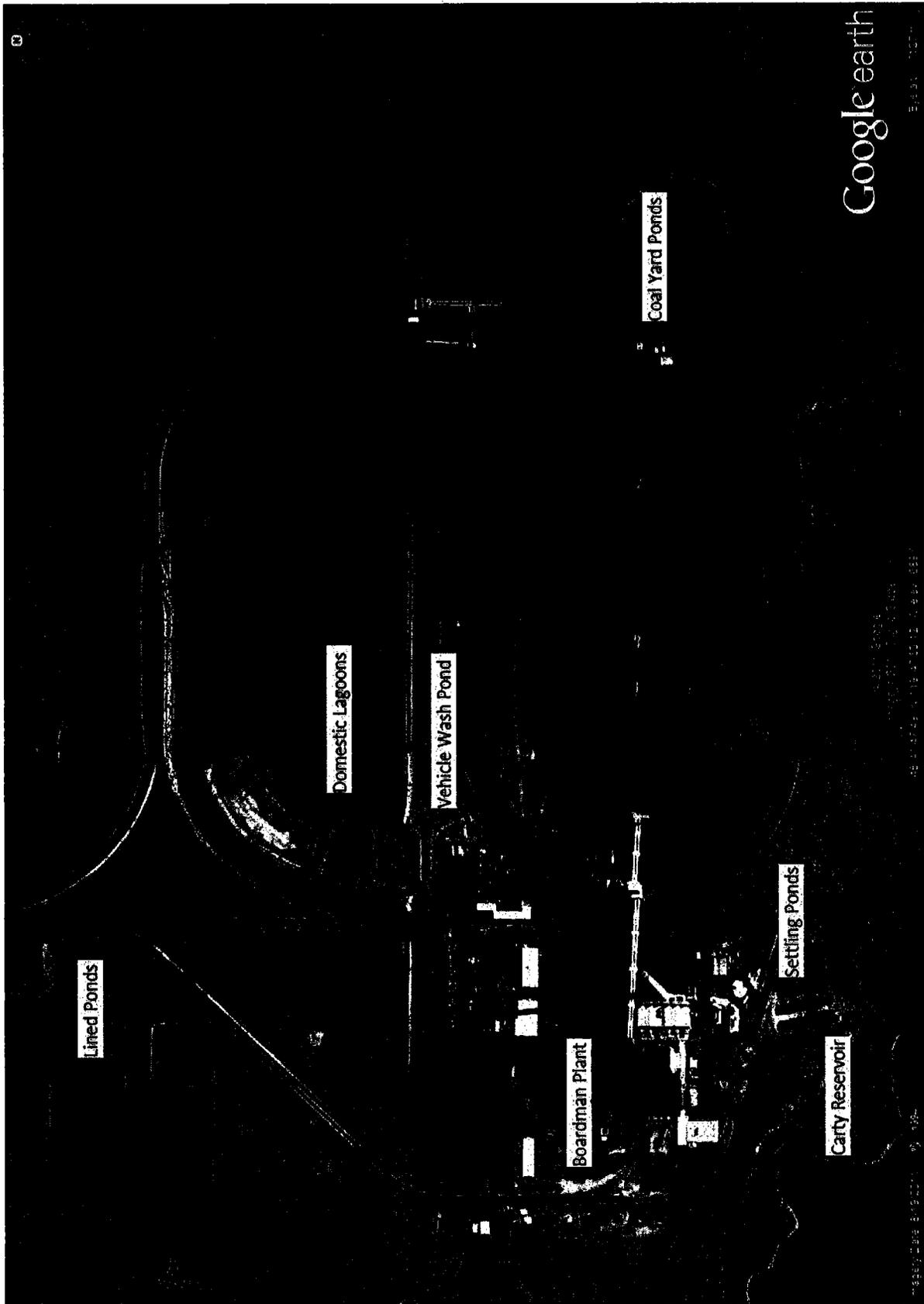
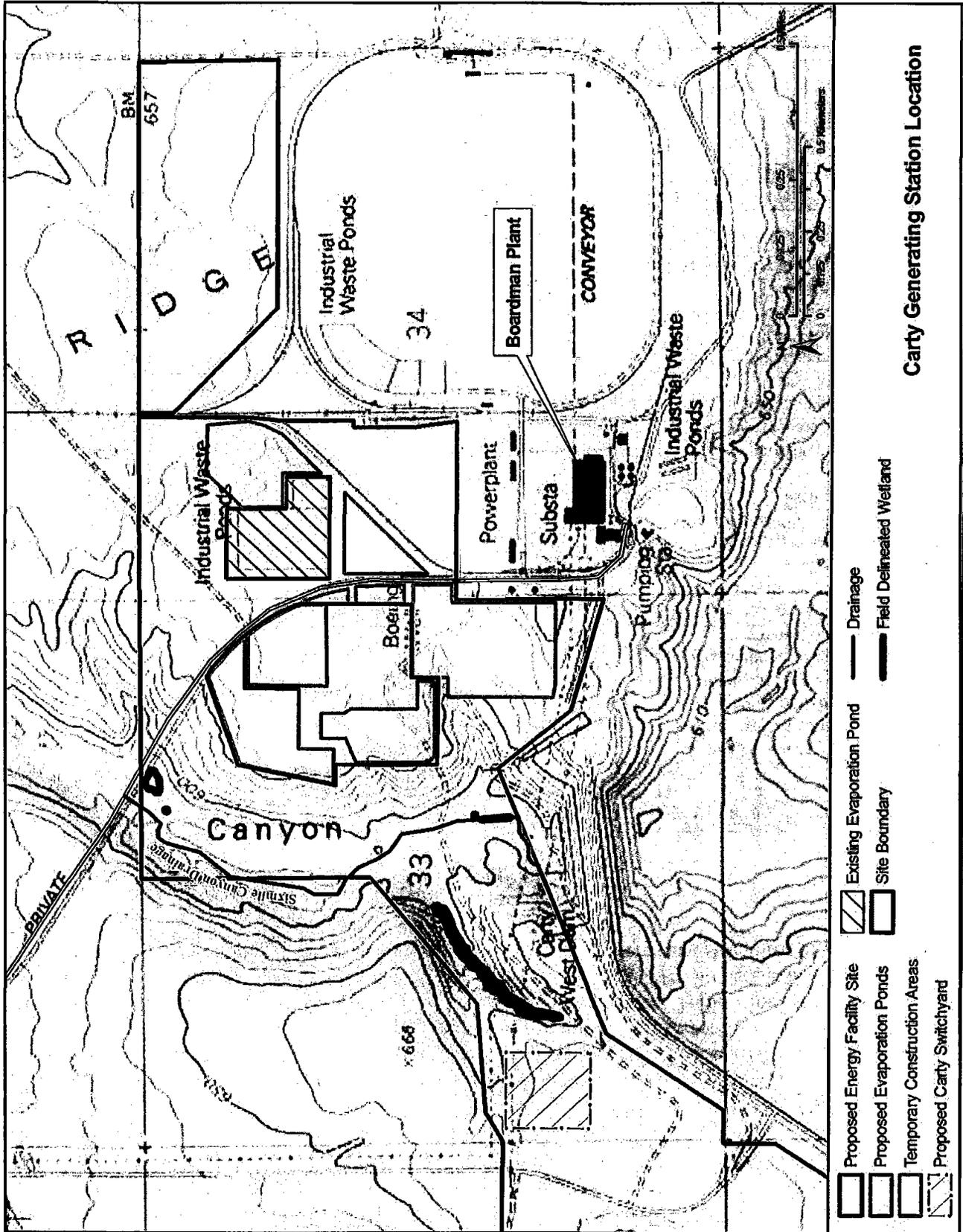


Figure 3



Figure 4



During construction of Carty Generating Station, wastewater will result from sanitary waste, storm water, testing and commissioning of water supply systems, hydrostatic testing, flushing of the water supply pipelines, washing equipment and vehicles, and washing concrete trucks after delivery of concrete loads. The amount of wastewater produced will vary depending on the number of construction workers and weather conditions.

During operation, Carty Generating Station will produce sanitary sewage, cooling tower blowdown, HRSG blowdown, demineralized water production wastes (from a reverse osmosis unit and neutralization tank), combustion turbine water wash wastes, plant and equipment drain wastes, service water (evaporative cooling), multimedia filtration backwash, and storm water. Table 1 indicates the estimated volumes of wastewater, based on a permanent staff of approximately 20 to 30 people and two blocks of combined cycle generation. Table 1 also indicates the disposal systems and structures for the associated wastewaters.

Table 1

Source of Wastewater	Under Annual Average Conditions, gallons per day <sup>1</sup>	Under Summer Conditions, gallons per day <sup>1</sup>	Disposal System and Structures
Sanitary Sewage	800 – 1440	800 – 1440	Routed to existing Boardman Plant sanitary waste treatment system during operation; portable toilets during construction and existing Boardman Plant sanitary system once permanent connection is made.
HRSG Blowdown	118,000	152,000	Used for cooling tower makeup water in Carty Generating Station, not directly discharged.
Reverse Osmosis Wastewater from Demineralized Water Production	32,000	43,000	Used for cooling tower makeup water in Carty Generating Station, not directly discharged.
Combustion Turbine Water Wash Wastes	6,000 gallons per year	6,000 gallons per year	Lined evaporation ponds or trucked off site for processing and disposal
Cooling Tower Blowdown	262,000	450,000	Lined evaporation ponds or returned to Carty Reservoir
Neutralization Tank Waste	10,000	13,000	Lined evaporation ponds or returned to Carty Reservoir
Plant and Equipment Drains	72,000	72,000	Lined evaporation ponds or returned to Carty Reservoir
Service Water – Evaporative Cooling Blowdown	0	9,000	Lined evaporation ponds or returned to Carty Reservoir
Multi-media Filtration Backwash	13,000	25,000	Lined evaporation ponds or returned to Carty Reservoir

<sup>1</sup> Unless otherwise noted.

## FACILITY PERMIT HISTORY

This section summarizes the Department's permit actions for the wastewater facilities and coal ash landfill at the Boardman Power Plant since 1981. There is no history for the Carty Generating Station because those facilities will be new.

<u>Effective Date</u>	<u>Action</u>
August 14, 1981	Permit issuance. The permit prohibited discharge to public waters and required PGE to treat or otherwise manage waste discharges to Carty Reservoir such that concentrations of chemicals in the reservoir do not exceed those authorized by the Site Certificate. Wastewater from sources such as boiler acid cleaning, chemical cleaning wastes and effluents from liquid chemical waste drains were required to be disposed in the lined pond. Wastes containing high total dissolved solids were required to be disposed in the unlined pond if they could not be discharged to Carty Reservoir due to concentrations of specific substances. Prior to discharge to the seepage cell, domestic wastewater was required to be treated with chlorine and to maintain a minimum chlorine residual of 1.0 mg/L after 60 minutes of contact. Ash disposal and groundwater monitoring near the ash disposal area were required to be in accordance with the Ash Disposal Plan. Monitoring results were required to be maintained and submitted to the Department upon request. Expiration date: March 31, 1986
June 9, 1986	Permit renewal. The permit was renewed essentially unchanged, except that it required submittal of monitoring results and notification to the Department prior to performing start-up of facility operations. Expiration date: May 31, 1991
January 11, 2005	Permit renewal. The permit prohibited direct discharge of wastewater and storm water to waters of the State and prohibited exceedance of the constituent limitations in the Site Certificate. Wastewater that could not be disposed in Carty Reservoir due to impairment of reservoir water uses was required to be disposed in the lined pond. If the lined pond was full, it was permitted to be disposed in the unlined pond. Expiration date: December 31, 2009

## COMPLIANCE HISTORY

This section summarizes the water quality compliance history for the Boardman Power Plant since the last permit renewal in 2005. There is no compliance history for the Carty Generating Station because it will be new.

### Inspections

The Boardman Power Plant wastewater facilities were inspected on January 31, 2012. No violations were documented during the inspection.

## Complaints

There have been no complaints regarding water quality issues or the WPCF permit at the Boardman Power Plant.

## Enforcement

On February 9, 2011, the Department issued Warning Letter (WL) ERP-11-008 for failure to contain storm water within the lined ash disposal area, as required by the Ash Disposal Plan. A large rainfall event occurred on December 28 and 29, 2010; and, due to the impermeability of the ash, the storm water collected in a low lying area within the ash disposal area until it overtopped a berm and created a washout. PGE drew down the remaining storm water by pumping it over the berm to prevent further washout. The company estimates that approximately 780,000 gallons of storm water were released from the disposal area. Process knowledge of the landfill constituents (primarily bottom, fly and economizer ash) do not indicate that any metals were leached from the ash disposal area during the event. Moreover, no discernable ash was observed outside the disposal area. It was a Class II violation. Class I violations are considered to be the most serious violations; Class III violations are the least serious. PGE repaired the dike and reshaped the surface of the landfill to contain storm water.

## ENVIRONMENTAL CONCERNS

Three environmental concerns have been considered by the Department at the Boardman Power Plant and Carty Generating Station facilities. The first concern involves potential impact to surface water either by wastewater discharge to surface water or by recharge of impacted groundwater to surface water. The second concern involves potential impact from seepage of untreated or inadequately treated wastewater (including landfill leachate) to groundwater. The third concern involves potential impacts to wildlife and other beneficial uses of Carty Reservoir wastewater. All three concerns have been addressed in the proposed WPCF permit.

## Environmental Media Considered Under Proposed Permit

### *Surface Water*

The nearest surface water is Sixmile Canyon, which is located in the Middle Columbia/Lake Wallula Subbasin of the Umatilla Basin. In accordance with OAR 340-041-0310(1), water quality in the Umatilla Basin must be managed to protect the designated beneficial uses shown in Table 310A, OAR Chapter 340, Division 41. Although Table 310A indicates designated beneficial uses for only the Umatilla and Willow Creek Subbasins, the Department assumes that designated beneficial uses of surface water in the greater Umatilla Basin will be the same as the Umatilla Subbasin, unless otherwise specified. The designated beneficial uses of surface water in the Umatilla Subbasin are: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, and hydro power. Applicable water quality standards can be found in OAR Chapter 340, Division 41.

In order to protect surface water, PGE is required under the proposed permit to routinely inspect the dikes and wastewater containment structures and monitor various wastewater parameters. Safety of the dam at Carty Reservoir is administered by the Department of Water Resources' Dam Safety Program.

## *Groundwater*

Groundwater Protection Rules can be found at OAR Chapter 340, Division 40. OAR 340-040-0020 requires that wastewater facilities be operated and maintained so that existing and potential uses of groundwater are not impaired. Existing and potential beneficial uses of groundwater downgradient of the Boardman Power Plant and Carty Generating Station include domestic use, livestock watering, crop irrigation, and recharge to Sixmile Canyon and the Columbia River.

OAR 340-040-0030(3) and (4) require the Department to establish groundwater concentration limits or concentration limit variance at permitted facilities. Concentration limits at existing facilities are established on a case-by-case basis and may be set between background water quality levels and the numerical groundwater quality reference levels, or guidance levels, listed in Tables 1 through 3 of the Groundwater Protection Rules, unless the background water quality is above those numerical levels. If the background water quality exceeds those numerical levels, then the concentration limit is required to be established at the background level. If a contaminant of concern is not listed in Tables 1 through 3, the permit-specific concentration limit is the background water quality level. At new facilities, concentration limits are established at the background water quality levels for all contaminants.

To ensure groundwater protection, the company will be required under the proposed permit to prepare a Hydrogeologic Characterization Report and propose concentration limits at downgradient locations. The Hydrogeologic Characterization must address groundwater conditions up- and down-gradient of each and every wastewater impoundment. Additional monitoring wells may be required and the permit will need to be reopened in the future to include groundwater concentration limits.

### Wastewater Facilities Covered Under the Proposed Permit

#### *Carty Reservoir*

The presence of many of the chemical constituents in Carty Reservoir may be explained by PGE's operations at the Boardman Power Plant. In addition to using the reservoir for cooling, PGE circulates wastewater for steam generation, bottom ash transport, and other internal processes. Recirculation and evaporative cooling cause minerals (TDS) that are naturally occurring in the Columbia River source water to become concentrated in Carty Reservoir. Sodium hypochlorite, which is used as a biofoulant and disinfectant to restrict the growth of organisms inside condenser tubes, may be the source of sodium and chloride concentrations. Copper may be expected to leach from the copper-based condenser tubes.

Regarding the proposed Carty Generating Station, PGE anticipates that there will be no cumulative degradation of the reservoir's quality from the two combined cycle blocks provided makeup water is pumped to the reservoir from the Columbia River, as in the past. Additionally, the company believes that the minimal effects of the wastewater discharges on the water quality of the reservoir show that it is not sensitive to changing river water quality, wastewater quality, wastewater quantity, or other conditions. PGE calculated the values in Table 2, which are based on discharge of Carty Generating Station wastewater to Carty Reservoir while at the same time there is no Columbia River makeup water being added.

Table 2

	Initial Reservoir Quality	Reservoir Quality After 30 Days	Reservoir Quality After 60 Days
Calcium, mg/L CaCO <sub>3</sub>	63	63	64
Magnesium, mg/L CaCO <sub>3</sub>	90	91	92
Sodium, mg/L CaCO <sub>3</sub>	87	88	89
Potassium, mg/L CaCO <sub>3</sub>	7	7	7
M-Alkalinity, mg/L	148	148	148
Sulfate, mg/L CaCO <sub>3</sub>	47	48	48
Chloride, mg/L CaCO <sub>3</sub>	44	44	45
Nitrate, mg/L CaCO <sub>3</sub>	0.2	0.2	0.2
Silica, mg/L	3.1	3.1	3.2
Conductivity	444	449	453
TDS, mg/L	261	264	266
Fluoride, mg/L	0.6	0.6	0.6
Iron, mg/L	0.11	0.11	0.11
Copper, mg/L	0.006	0.006	0.006
Zinc, mg/L	0.012	0.012	0.012
Arsenic, mg/L	0.005	0.005	0.005
Boron, mg/L	0.10	0.10	0.10
Cadmium, mg/L	<0.001	<0.001	<0.001
Chromium, mg/L	0.001	0.001	0.001
Mercury, mg/L	<0.0002	<0.0002	<0.0002

The combination of irrigation withdrawal and fresh water addition from the Columbia River is used control chemical concentration build-up in the reservoir. Although Carty Reservoir has been determined to be a wastewater impoundment (not waters of the State), local irrigators hold water rights on the wastewater in Carty Reservoir. For that reason, the Department is unable to regulate the wastewater irrigation process. Nevertheless, the Department does have authority to regulate wastewater at the intake to the irrigation withdrawal pump in Carty Reservoir. In order to protect groundwater at irrigation sites, the proposed permit establishes trigger levels for selected parameters at historic high concentrations and compliance limits at a percentage above those concentrations. As proposed, PGE will be required to immediately initiate concentration reduction measures if monitoring indicates that a trigger level has been exceeded. A permit violation will result if the compliance levels are exceeded. The Department believes that the proposed trigger levels and compliance limits are reasonable based on PGE's calculations and conclusion that there will be no cumulative degradation of the reservoir's quality from the two combined cycle blocks.

At 1,450 acres, Carty reservoir attracts water fowl and other wildlife. In order to protect wildlife and enhance other beneficial uses of Carty Reservoir wastewater, the Boardman Power Plant Site Certificate Agreement prescribed maximum allowable reservoir concentrations for selected parameters. To date, mean values of none of the reported parameters have exceeded the Site Certificate Agreement concentration limits. The Department recently consulted with Rick Kepler, Oregon Department of Fish and Wildlife, regarding the appropriateness of maximum allowable concentrations in light of present-day wildlife toxicology. According to Mr. Kepler, there is very little to go on with regards to whether the

current levels are affecting waterfowl, fish or the birds that prey on them, without having tissue samples, a study, or knowing the relationship between the concentrations in the reservoir and those in wildlife tissue.

Still, Carty Reservoir is an unlined wastewater pond and PGE estimates that it leaks at the rate of 2,700 acre-feet/year (1,700 gallons per minute). Seepage from the reservoir may potentially affect groundwater quality. PGE intercepts a portion of the seepage in a seepage collection system immediately below the dam and pumps it back into the reservoir. Approximately 323 acre-feet/year of seepage is collected this way and returned to the reservoir. PGE currently monitors groundwater in a single well below the dam.

Since Carty Reservoir leaks to groundwater and is in direct communication with the Rattlesnake Ridge aquifer, the Department reviewed the Site Certificate Agreement concentration limits in light of groundwater protection and placed the resulting values in Schedule A of the proposed permit as permit limits. In doing so, the limits for sodium, arsenic, cadmium, nitrate, TDS and mercury were reduced with respect to the existing Site Certificate Agreement. A limit for pH was added and the sodium adsorption ratio (SAR) limit was deleted. The revisions do not modify the Boardman Power Plant Site Certificate Agreement. Schedule B of the proposed permit requires vanadium and selenium monitoring in the reservoir because those parameters have been observed in groundwater nearby. Total trihalomethanes (TTHMs) are required to be monitored because of their occurrence as byproducts of chlorine disinfection. The Schedule A permit limits may need to be modified in the future after development of vanadium, selenium and TTHM data in the reservoir, submittal of a Hydrogeologic Characterization Report and/or exceedance of a groundwater concentration limit, in which case the permit will need to be reopened.

#### *Settling Ponds*

PGE discharges wastewater from the Boardman Power Plant oil water separator, raw water filter, activated carbon filter, bottom ash handling system surge tank, pretreatment area sump, water treatment area sump, and liquid waste sump to two unlined settling ponds for treatment. Treated effluent from the settling ponds is then pumped to Carty Reservoir. The company does not propose to share the settling ponds with Carty Generating Station.

The oil water separator provides treatment for wastewater from selected *Facility sumps and drains*, as defined in Schedule D, Condition 8 of the proposed permit. Wastewater from the pretreatment area sump, water treatment area sump and liquid waste sump are included in the *Facility sumps and drains* category. Wastewater from the raw water filter and activated carbon filter are included in the *Water treatment wastewater* category. Wastewater from the bottom ash handling system surge tank is included in *Ash transport wastewater*.

#### *Lined Ponds*

PGE maintains two lined ponds for disposal of Boardman Power Plant wastewater, if disposal of such wastewater into Carty Reservoir would impair the use of reservoir water for plant operation or result in a Site Certificate Agreement concentration limit exceedance. As noted above, the company had a lined pond and an unlined pond until 2007, at which time the unlined pond was lined. The company relined the original lined pond in 1996 by simply placing a new liner over the existing liner. A single monitoring well is located in the vicinity of the lined ponds. Although it is situated in a down-gradient position with respect to the lined ponds, it has never had sufficient water in it to sample.

Sources of wastewaters permitted for disposal in the Boardman Power Plant lined ponds include boiler acid cleaning (after submittal of a waste characterization and written approval from the Department), chemical cleaning, chemical waste drains, demineralization of Carty Reservoir water and regeneration of the

demineralization media, make-up water demineralization (including regeneration), condensate polishing (including regeneration), water treatment area floor drains, system shut-down drains, and laboratory/sample room sink drains. Boiler acid cleaning and chemical cleaning wastewaters are included in the *Equipment cleaning wastewater* category, as defined in Schedule D, Condition 8 of the proposed permit. Demineralization and regeneration of the demineralization media, make-up water demineralization (including regeneration) and condensate polishing (including regeneration) wastewaters are included in the *Water treatment wastewater* category. Chemical waste drains and laboratory/sample room sink drains are included in the *Laboratory and sampling wastewater* category. Water treatment area floor drains and system shut-down drains wastewaters are included in the *Facility sumps and drains wastewater* category.

PGE does not propose to share the Boardman Power Plant lined ponds with Carty Generating Station. Instead, the company has proposed locations for up to four new lined ponds. See Figure 4. The company projects that four lined ponds will provide adequate capacity for the total wastewater from a single block without wastewater treatment. As the design process progresses, the potential to discharge a portion or all of the wastewater from Carty Generating Station to Carty Reservoir, and the potential that additional wastewater treatment systems would be incorporated into the design, could result in a decrease in the total number and size of evaporation ponds. Moreover, the company says that the timing of the construction of evaporation ponds will depend on a number of factors, including the timing of construction of Blocks 1 and 2, any future changes to discharges to Carty Reservoir from the Boardman Power Plant, and other conditions that may affect water levels in Carty Reservoir.

The proposed permit requires that detailed plans and specifications must be submitted to, and approved in writing by, the Department prior to constructing wastewater management, treatment and disposal facilities. In addition, the permit requires PGE to submit a characterization of wastewater treatment system wastewater to the Department prior to discharge of such wastewater to lined evaporation ponds.

#### *Sewage Lagoons*

As noted above, domestic sewage from the Boardman Power Plant is treated and disposed in a three-cell facultative lagoon system. PGE says that the average dry weather design flow for the facility is 10,500 gallons per day (gpd). Actual flow from the Boardman Power Plant is considerably less than that and PGE proposes to use the excess capacity for disposal of Carty Generating Station domestic sewage. As constructed, the two stabilization cells are clay lined and the third cell is unlined to allow for seepage disposal. The facility is designed so that treated sewage that passes from the second to the third cell is disinfected with chlorine. However, the third cell has not been used and the integrity of the clay liners is in question due to the low flows from the Boardman Power Plant relative to the design flow.

The proposed permit requires treatment equivalent to secondary and establishes limits on *E. coli* bacteria, nitrate-nitrogen (NO<sub>3</sub>-N) and total nitrogen for protection of groundwater. Prior to discharge of Carty Generating Station sewage to the lagoons, PGE must submit a work plan to remove vegetation from the clay-lined cells and either leak test the cells or recondition them. In addition, the company must submit a long term plan to ensure the integrity of the clay-lined cells, which may include evaluating system capacity requirements and modifying the system capacity accordingly prior to discharge of Carty Generating Station sewage to the lagoons. The permit also requires PGE to have the system supervised by one or more operators who are certified in treatment system operation at grade level I or higher.

#### *Vehicle Wash Water Pond*

PGE maintains a small, lined evaporation pond at the Boardman Power Plant adjacent to the vehicle wash and fueling area. It is used to contain and dispose of vehicle wash water and storm water runoff from the fueling area. The company does not propose to share the facility with Carty Generating Station.

Vehicle wash water from the Carty Generating Station will be disposed in the lined ponds discussed above. In addition, equipment and vehicle cleaning wastewater from both Carty Generating Station and Boardman Power Plant may be disposed in storm water swales discussed below, provided chemicals, soaps, and detergents are not used and washing is restricted to the exterior of the vehicle or equipment. Equipment and vehicle cleaning wastewater means heavy construction equipment, landscape maintenance equipment and on-road vehicles.

#### *Coal Yard Ponds*

As noted above, water is used in the Boardman Power Plant coal yard to wash coal conveyor transfer point enclosures. Wastewater is collected, treated in a closed system to remove fine coal particles, and reused. Treatment consists of adding a flocculent to the wastewater and allowing the fine particles to settle in a clarifier. Treated wastewater is stored in concrete lined basins for reuse. PGE has not proposed to share the facilities with the Carty Generating Station.

Coal yard storm water is allowed to percolate and/or runoff. However, the proposed permit prohibits storm water runoff from the coal yard to Carty Reservoir.

#### *Storm Water Swales*

PGE plans to construct storm water swales at Carty Generating Station to prevent storm water from leaving the site. The company plans and the proposed permit allows disposal of wash water derived from washing exterior surfaces only of vehicles and equipment, fire protection system wastewater and facility construction and commissioning wastewater in the storm water swales, provided chemicals, soaps, and detergents are not used. Disposal of engine, transmission or undercarriage wash water is not permitted in storm water swales.

Equipment and vehicle cleaning wastewater is defined in Schedule D, Condition 8 of the proposed permit to mean heavy construction equipment, landscape maintenance equipment and on-road vehicles. Fire protection system wastewater is defined as fire suppression system test water that is derived from the domestic water supply or Carty Reservoir. Facility construction and commissioning wastewater means water supply system testing and commissioning wastewater, hydrostatic testing wastewater, and water supply lines flushing wastewater during construction of Carty Generating Station.

#### Ash Disposal Landfill

PGE currently monitors groundwater at three wells in the immediate vicinity of the ash disposal landfill. A fourth monitoring well has always been dry. Bicarbonate alkalinity and vanadium concentrations appear to have increased over time in all three wells, while chloride and nitrate concentrations appear to have decreased. Arsenic, selenium, sulfate, and total dissolved solids (TDS) concentration trends have varied over time and from well to well.

Nitrate and TDS display a regional presence. The Boardman Power Plant site straddles the southern boundary of the Lower Umatilla Basin Groundwater Management Area (LUBGWMA). The area has been designated as such by the Department because groundwater nitrate concentrations currently exceed 70% of the groundwater reference level (10 mg/L) in a widespread area. At concentrations greater than 10 mg/L,

orally ingested nitrate can be hazardous to infants. In the vicinity of the ash disposal landfill, nitrate concentrations have been reported to be as high as 66 mg/L.

The drinking water standard for TDS is 500 mg/L. Excess TDS is objectionable in drinking water because of physiological effects, unpalatable mineral tastes, and higher costs for water treatment. Physiological effects directly related to TDS include laxative effects principally from sodium sulfate and magnesium sulfate and the adverse affect of sodium on certain patients afflicted with cardiac disease and women with toxemia associated with pregnancy. At concentrations greater than 500 mg/L, TDS can have detrimental effects on sensitive crops. In the vicinity of the ash disposal landfill, TDS concentrations have been reported as high as 1073 mg/L.

Although the source has not been determined, the landfill is not suspected of contributing to the occurrence of the above parameters for the following reasons: 1) the landfill is lined with a one foot thick layer of hydrated, compacted fly ash to create an impermeable barrier and successive deposits of fly ash are hydrated and compacted daily to prevent wind erosion; 2) water loss from evaporation (51 in/yr) greatly exceeds additions from precipitation (9 in/yr) and dust control (0.5 in/yr); and 3) the bottom of the landfill is eight feet higher than Carty Reservoir at high pool.

### Other Wastewaters

#### *Coal Yard Sumps and Basements*

PGE has asked the Department for approval to dispose of water that floods sumps or basements in the coal yard buildings due to equipment failure by pumping the wastewater onto the coal pile or into storm water swales that remain inside the coal yard boundaries. The proposed permit allows the practice.

#### *Air Pollution Control Wastewater*

PGE has requested Department approval to dispose of Boardman Power Plant air pollution control wastewater in lined evaporation ponds, in the coal yard and in the ash disposal area. The company defined air pollution control wastewater as 50 to 200 gallons per day of baking soda grinding wash water. The Department asked the company for a waste characterization and, as proposed, the permit will allow the disposal if approved in writing by the Department.

#### *Concrete Mixer Wastewater*

Disposal of rinse water from concrete mixer trucks chutes and exteriors is generally permitted on construction sites. However, disposal of wastewater from cleaning the interiors of concrete mixer drums is not allowed without a permit. The Department expects concrete mixer washout to be disposed at facilities permitted for disposal of concrete mixer washout.

## **PERMIT DRAFT SUMMARY**

The following discussion pertains to selected portions of the proposed WPCF Permit.

### Face Page

The face page of the proposed WPCF permit identifies that PGE is permitted to dispose of industrial and domestic wastewater by seepage and evaporation and coal ash by land disposal. The permit will expire approximately ten years from the date of issuance.

### Schedule A – Waste Disposal Limitations

Schedule A establishes limits for management and disposal of wastewater and ash. Accordingly, only authorized wastes are permitted to be disposed. Moreover, discharge to surface water is prohibited and water quality standards for groundwater must not be violated. Wastewater management and disposal must be conducted in accordance with the Department approved OM&M Plan. Additional limitations pertain to pond freeboard, Carty Reservoir chemical concentrations, domestic lagoon wastewater parameters and wastewater solids management. Coal ash management and disposal must be conducted in accordance with the Boardman Power Plant Ash Disposal Plan.

### Schedule B - Minimum Monitoring and Reporting Requirements

Schedule B establishes minimum monitoring and reporting requirements. Authority for the Department to require periodic reporting by permittees is found at ORS 468.065(5). Self-monitoring requirements are the primary means of ensuring that permit limitations are being met. Minimum monitoring requirements for the sanitary lagoons, lined evaporation ponds, Carty Reservoir and coal ash operations are included in the permit. Schedule B requires the Permittee to take action to reduce concentrations of specific parameters in the irrigation withdrawal water, if monitoring indicates that concentrations exceed listed trigger levels.

The permit requires that groundwater monitoring be performed in accordance with the approved Groundwater Monitoring Plan and it requires resampling if groundwater monitoring results exceed concentration limits or indicate a significant increase (increase or decrease for pH) in the value of a parameter monitored. The reporting period for the sanitary lagoons is the calendar month and monitoring reports must be submitted to the Department's Pendleton Office by the 15<sup>th</sup> day of the following month. For all other monitoring, the reporting period is the calendar year and monitoring reports must be submitted to the Department by March 1 each year.

### Schedule C – Compliance Conditions and Schedules

Schedule C contains compliance conditions and schedules to allow the Permittee time to achieve compliance with permit requirements. For instance, Schedule C requires the Permittee to submit a work plan to remove vegetation from the clay lined sanitary lagoon cells and either leak test the clay-lined cells or recondition them prior to discharge of sanitary sewage from the Carty Generating Station. In addition, the Permittee must submit a long term plan to ensure the integrity of the clay-lined cells prior to discharge of sanitary sewage from the Carty Generating Station.

The Permittee is required to submit an OM&M Plan to the Department for review and approval. The plan must be reviewed annually and revisions must be submitted to the Department for approval whenever the plan is revised. Following submittal of the plan, or submittal of a revised plan, the Department will approve it, approve it with conditions, or disapprove it. If approved, the plan must be implemented in accordance with the Department approval. If disapproved, the Department will provide an approved plan or allow a minimum of 30 days for PGE to submit a revised plan.

Schedule C requires the Permittee to submit a Biosolids Management Plan to the Department for review and approval prior to the removal of biosolids for beneficial reuse. A Biosolids Management Plan is not required for landfill disposal.

In order to bring the facilities into compliance with the Groundwater Protection Rules (OAR Chapter 340, Division 40), the Permittee must submit a Hydrogeologic Characterization, a Groundwater Monitoring Plan and a Water Quality Analysis Report with proposed groundwater concentration limits.

Schedule C requires the Permittee to notify the Department of any lapsed compliance date that has been established by this schedule.

#### Schedule D - Special Conditions

Schedule D contains conditions pertaining to system operation and maintenance that are not addressed elsewhere in the permit. For instance, detailed plans and specifications must be submitted to the Department prior to constructing or modifying wastewater management, treatment and disposal facilities.

There are conditions pertaining to operation and management of the sanitary lagoons. For example, beneficial reuse of biosolids must be in accordance with the Department-approved Biosolids Management Plan and any new biosolids application sites must meet the site selection criteria in the Biosolids Rules (OAR 340-050-0070). Moreover, the Permittee must comply with the Operator Certification Rules (OAR Chapter 340, Division 49) and have the sanitary wastewater system supervised by one or more operators who are certified in treatment system operation at grade level I or higher.

Other conditions pertain to Department notification in the event of a malfunction and requirements to appoint an environmental supervisor, maintain an adequate contingency plan and educate employees regarding proper action in the event of a spill or accident. Conditions pertaining to management and maintenance of groundwater monitoring wells are also included.

Schedule D includes a glossary of terms used in the permit and it includes a reopener clause to clarify that the Department has authority to reopen the permit prior to expiration to include new or revised conditions.

#### Schedule F, WPCF General Conditions

These conditions are standard to all WPCF permits.

## ESTERSON Sarah \* ODOE

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**From:** Christian Nauer <christian.nauer@ctwsbnr.org>  
**Sent:** Tuesday, November 20, 2018 10:14 AM  
**To:** ESTERSON Sarah \* ODOE  
**Cc:** Robert Brunoe  
**Subject:** Re: Carty Generating Station: Notice to CTWS of Proposed Order on Request for Amendment 1 of the Site Certificate  
**Attachments:** PastedGraphic-1.pdf

Hi Sarah,

Thank you for the opportunity to comment on the Carty Generating Station: Notice to CTWS of Proposed Order on Request for Amendment 1 of the Site Certificate.

General Comment:

As the technical reviewer for National Historic Preservation Act (NHPA) Section 106 and other cultural resource issues for the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO), the CTWSRO Tribal Historic Preservation Office (THPO) has concerns with the potential effects to historic properties or cultural resources within the Project Area of Potential Effects (APE). The Project APE is within the areas of concern for the CTWSRO.

Project-specific Comment(s):

This office would like to comment that if there is a change in the site boundaries, there may be a need for additional efforts to identify, evaluate, and protect historic properties or cultural resources within the Project APE, consistent with Section 106 of the NHPA and other applicable regulations. If areas planned for development (including temporary letdown and parking areas) have not been previously surveyed for cultural resources, then they should be.

We would deeply appreciate it if you would continue to correspond with this office as this Project progresses.

Thanks again for your consideration, please contact me if you have any questions,

Christian Nauer, MS

Archaeologist  
Confederated Tribes of the Warm Springs Reservation of Oregon  
Branch of Natural Resources

[christian.nauer@ctwsbnr.org](mailto:christian.nauer@ctwsbnr.org)

Office 541.553.2026  
Cell 541.460.8448

Standard Disclaimers:

\*The Confederated Tribes of the Warm Springs Reservation of Oregon have reserved treaty rights in Ceded Lands, as well as Usual and Accustomed and Aboriginal Areas, as set forth through the Treaty with the Middle Tribes of Oregon, June 25, 1855.

\*Please know that review by the Tribal Historic Preservation Office does not constitute Government-to-Government consultation. Please ensure that appropriate Government-to-Government consultation is made with the Confederated Tribes of the Warm Springs Tribal Council.

On Nov 13, 2018, at 9:07 PM, ESTERSON Sarah \* ODOE <[Sarah.Esterson@oregon.gov](mailto:Sarah.Esterson@oregon.gov)> wrote:

Good afternoon,

The Department provides notice to the Confederated Tribes of the Warm Springs Reservation of Oregon of the issuance of a Proposed Order on Request for Amendment 1 (RFA1) of the Carty Generating Station Site Certificate, and of the opportunity to provide comments or request a contested case on the proposed order.

### **Background**

The Carty Generating Station is an approved, operational 450 MW natural-gas energy facility located in Morrow County. The facility has been operational since 2016. Portland General Electric (PGE or certificate holder) submitted an initial amendment request in August 2016 including the components described below, as well as an additional 330 MW simple cycle combustion turbine (Unit 3) and upgrades to the previously approved but not yet constructed second 450 MW combined cycle combustion turbine generator. PGE subsequently requested that the Department suspend review; revised its amendment request removing the natural-gas components; and, in February 2018, re-initiated review of a revised amendment request as described below.

### **Summary of Amendment Request**

PGE requests approval by the Energy Facility Siting Council to:

- Construct and operate a 50 megawatt solar photovoltaic unit;
- Construct and operate a 2.25 to 3 mile 34.5 kilovolt transmission line, with approval to use one of five routing options and one of three interconnection options;
- Use of temporary construction laydown and parking areas;
- Removal of reference to previously approved but not yet constructed Unit 2, Unit 2 associated components, and Unit 2 related or supporting facilities;
- Site boundary changes;
- Amendment to a Water Pollution Control Facilities permit; and,
- Amendment and removal of previously imposed conditions.

### **Procedural Summary**

The Department issued its Proposed Order on Request for Amendment 1 on November 9, 2018, initiating an opportunity to provide comments or request a contested case on the proposed order. The deadline for submitting comments or requests for contested case to the Department is 5:00 p.m. on December 10, 2018. Comments may be submitted in writing via email, mail or fax to my attention per contact information provided in the attached notice or email provided below.

Pursuant to OAR 345-027-0011, OAR 345-027-0050 thru – 0100 in effect prior to October 24, 2017 do not apply to amendment requests received prior to October 24, 2017. PGE's RFA1 was received in August 2016; therefore, the amendment request is processed under the amendment rules in effect prior to October 24, 2017.

### **Attachments**

Public Notice on Proposed Order on Request for Amendment 1.

RFA1, proposed order and public notice are available on the Department's project website at:

<https://www.oregon.gov/energy/Siting/Pages/CGS.aspx>

Thank you, and please do not hesitate to contact me with any questions.

**Sarah T. Esterson**

Energy Facility Siting Analyst  
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[Oregon.gov/energy](https://www.oregon.gov/energy)

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