## STEAM PLANT ADDITIONS:

**Naughton U2 Flue Gas Desulfurization System: (Reference page 8.6.20)**
This environmental improvement project is the construction of a flue gas desulfurization (FGD) system for Naughton Unit 2. The FGD system involves constructing the following components:

- Interconnection at the electrostatic precipitator
- A flue gas transport system, including ductwork and booster fan
- SO2 absorber systems
- Reagent storage and preparation systems
- Makeup water treatment systems
- Electrical systems, including replacement of the auxiliary and start-up transformers
- Control systems, including upgrade of the existing, interfacing local control networks
- FGD waste disposal systems
- Makeup water supply system modifications
- Boiler reinforcement
- New stack and fiberglass flue (shared with Unit 1)

**Naughton U1 Flue Gas Desulfurization System: (Reference page 8.6.20)**
This environmental improvement project is the construction of a flue gas desulfurization (FGD) system for Naughton Unit 1. The FGD system involves constructing the following components:

- Interconnection at the electrostatic precipitator
- A flue gas transport system, including ductwork and booster fan
- SO2 absorber systems
- Reagent storage and preparation systems
- Makeup water treatment systems
- Electrical systems, including replacement of the auxiliary and start-up transformers
- Control systems, including upgrade of the existing, interfacing local control networks
- FGD waste disposal systems
- Makeup water supply system modifications
- Boiler reinforcement
- New stack and fiberglass flue (shared with Unit 2)

**Dave Johnston U4 SO2/PM Emission Controls: (Reference page 8.6.20)**
This environmental improvement project is to install a dry flue gas desulfurization system with fabric filter on the Dave Johnston Unit 4. This project is in response to the State of Wyoming's review of the Best Available Retrofit Technology (BART). This review requires installation of appropriate emission controls.

**Hunter U1 SO2 Upgrades: (Reference page 8.6.20)**
This project is to convert the existing flue gas desulfurization system to handle higher sulfur coal by adding forced oxidation, reagent preparation and waste disposal equipment.

**Jim Bridger U2 Turbine HP/IP/LP Upgrade: (Reference page 8.6.20)**
This project is for the retrofit of the Jim Bridger Unit 2 steam turbine with a new steam turbine utilizing the latest "dense pack" design technologies. These design technologies improve the

efficiency of converting steam to mechanical work thereby increasing electrical generation capability without additional unit heat input or steam flow. This project will replace the high, intermediate and low pressure turbine rotors and corresponding inner shells increasing the electrical generation output. The steam turbine will be installed in the currently scheduled spring 2013 outage.

**Hunter U3 Turbine Upgrade HP/IP/LP: (Reference page 8.6.20)**
This project is to upgrade the high pressure, intermediate pressure and low pressure turbines to increase the turbine/generator output. Increased output with no increase in fuel input or operating cost will improve heat balance and decrease unit cost for electricity produced. Recent advances in steam turbine design technologies have increased the efficiency of new steam turbines. These new design technologies are transferable to steam turbine retrofits. The steam turbine retrofit designs improve turbine efficiency which increases generator output with no increase in boiler heat input or emissions.

**Hunter U2 SO2 Project: (Reference page 8.6.20)**
This environmental improvement project includes the upgrade of the sulfur dioxide ($SO_2$) removal system, the scrubber waste handling system and the reagent preparation system. A conversion of the electrostatic precipitator into a pulse jet fabric filter or baghouse for the control of particulate matter is in construction under a separate project. PacifiCorp has committed to certain environmental improvement projects to permit Hunter Unit 2 for future operation.

**Hayden Coal Unloading Facility: (Reference page 8.6.20)**
The project scope includes the permitting, design, and construction of a rail spur and a coal unloading facility at the Hayden Station. The project is designed and constructed in accordance with the Routt County Special use Permit and its conditions and mitigation agreements, Union Pacific Railroad Standards and Requirements, and Colorado Department of Transportation Standards, Requirements and agreements.

**Naughton U2 Low NOx Burner: (Reference page 8.6.20)**
This environmental improvement project is for the installation of low nitrogen oxides burners (LNB) and separated over-fired air (SOFA) in the Naughton Unit 2 boiler. This in-furnace combustion modification is designed to reduce NOx emissions produced in the boiler during the coal combustion process. The project consists of design, fabrication and installation of one level of SOFA, modifications of wind box components related to combustion and installation of LNB.

**Naughton U1 Low NOx Burner: (Reference page 8.6.20)**
This environmental improvement project is for the installation of low nitrogen oxides burners (LNB) and separated over-fired air (SOFA) in the Naughton Unit 1 boiler. This in-furnace combustion modification is designed to reduce NOx emissions produced in the boiler during the coal combustion process. The project consists of design, fabrication and installation of one level of SOFA, modifications of wind box components related to combustion and installation of LNB.

**Dave Johnston U4 Finishing Superheater Replacement: (Reference page 8.6.20)**
This project involves complete replacement of the Dave Johnston Unit 4 finishing superheater assemblies and outlet header. The replacement is based on end of life issues resulting from long term overheat and gas pass pluggage issues due to a fuel change to PRB coal. Oxide scale thickness readings during the two previous overhauls indicate that tube failure rates will increase significantly over the next several years. The finishing superheater redesign will incorporate industry best practices when designing the assembly spacing. The current spacing is 6" which is conducive to pluggage with PRB coal ash; spacing will be increased to approximately 9". Because of the spacing change and the potential for surface area loss, this project must be completed in conjunction with the U4 – Platen Superheater Replacement project in order that the platen superheater can be used to gain back the lost surface area in the finishing superheater.

**Dave Johnston U4 Platen SSH Replace: (Reference page 8.6.20)**
This project involves complete replacement of the Dave Johnston Unit 4 platen superheater assemblies. The replacement is based on end of life issues resulting from long term overheat. Oxide scale thickness readings during the two previous overhauls indicate that tube failure rates will increase significantly over the next several years. Due to a potential surface area change in the finishing superheater a surface area design change may be necessary in the platen superheater area. The platen superheater re-design/replacement must be competed in conjunction with the finishing superheater re-design/replacement in order to maintain fire-side/steam-side compatibility.

**Huntington U2 Generator Stator Rewind: (Reference page 8.6.20)**
This project is to rewind the Huntington Unit 2 generator stator windings. These windings are nearing the end of their life. The stator winding insulation did not pass a recent full voltage DC (direct current) leakage test. The windings have been in-service for approximately 35 years. This project will insure the continued reliability of this generating unit and prevent a forced outage.

**Jim Bridger U2 Replace Cooling Tower: (Reference page 8.6.20)**
This project will replace cooling tower cells 1 through 10. These cells were last replaced in approximately 1990 and are nearing the end of their expected service life. Strength testing during 2009 on lumber from this tower confirms that the tower should reliably stand until 2013, but that the chances of significant structural failures increases dramatically if we extend replacement to the subsequent overhaul in 2017. Previous experience indicates that a main cooling tower structural member failure can destroy multiple cells on the tower and take a unit off-line for several days while sufficient repairs are made to get the tower back to partial operation.

**Hunter Adobe Wash Regulating Facility: (Reference page 8.6.20)**
This project provides funding to the Cottonwood Creek Consolidated Irrigation Company for construction of Adobe Wash Regulating Reservoir. This project provides for a firm, long-term and cost effective water supply for the Hunter Plant.

**Huntington U2 Boiler Finishing Superheat Pendants Repl: (Reference page 8.6.20)**
This project is to replace the Huntington Unit 2 boiler finishing superheat pendant assemblies and associated outlet header. These assemblies were supplied as original equipment when the boiler was erected and have been in service since unit startup in 1974. Original design criteria suggest that these assemblies should have a 25 to 30 year life span. In recent years boiler tube failures, particularly those caused by long term overheat and creep, have increased lending credence to the end of life scenario. The outlet header, as with the pendants, has a predicted finite life span. End of life predictions and industry history suggests that this header will not maintain a serviceable life thru the remainder of the projected unit life.

**Dave Johnston Replace Retro Cooling Tower: (Reference page 8.6.20)**
This project is to remove and replace the retro cooling tower at the Dave Johnston plant. The existing structure was built in the early 1970's, with the most recent internal structural repairs being made in 2004, when the fill was replaced by the original equipment manufacturer (OEM). The OEM made the recommendation that the tower be replaced in the near future. The replacement tower will be constructed from fiberglass reinforced plastic which will be resilient to the expansion and contraction encountered annually.

## HYDRO PLANT ADDITIONS:

**INU 4.1.1/4.1.2 Soda Springs Fish Passage: (Reference page 8.6.22)**
This project consists of the design and construction of a fish ladder, spillway improvement and fish screen and evaluation facility in order to meet resource agency design criteria to provide upstream and downstream fish passage for anadromous fish at Soda Springs dam. The project fulfills Section 47 of the FERC license that incorporates the North Umpqua Settlement Agreement Sections 4.1.1a-e and 4.1.2.

**ILR 4.4 Swift Fish Collector: (Reference page 8.6.22)**
This project fulfills the conditions specified in Section 4.4 of the Lewis River Settlement Agreement. The agreement stipulates that PacifiCorp must construct and start up a downstream fish collection and transport facility at the Swift Dam to provide: collection, handling, sorting and transportation of juvenile salmonids, adult steelhead and bull trout fish within four and one-half years after the issuance of a new Federal Energy Regulatory Commission license.

**ILR 4.3 Merwin Upstream Collect/Transport: (Reference page 8.6.22)**
This project fulfills the conditions specified in Section 4.3 of the Lewis River Settlement Agreement. The Lewis River Settlement Agreement stipulates that PacifiCorp must construct and start up an upstream fish collection and transport facility at the Merwin Dam to provide; collection, handling, sorting and transportation of adult salmon and steelhead fish within four and one-half years after the issuance of a new Federal Energy Regulatory Commission license.

**Ashton Dam Seepage Control: (Reference page 8.6.22)**
This project is to reconstruct much of the Ashton dam for the purpose of remediating internal seepage and erosion conditions that threaten the stability and safe operation of the dam. The dam

has experienced sinkhole activity at various locations throughout its history which is a result of seepage induced internal erosion of dam materials. The FERC required PacifiCorp Energy to convene and fund a Board of Consultants to review the construction and performance history of the dam and to engage in the identification and development of a satisfactory engineering design for remediation.

**IRO Prospect Instream Flow / Automation: (Reference page 8.6.22)**
This project insures compliance regulatory obligations under Section 401 of the federal Clean Water Act and the new Federal Energy Regulatory Commission license by constructing facilities to reliably release, monitor, and record instream flows below the dams and powerhouses of the Prospect Nos. 1, 2, and 4 hydroelectric projects. The project includes the design, permitting, and construction of automated instream flow release facilities, plant control systems, and associated communications equipment at the Prospect hydroelectric projects.

**Slide Creek Overhaul: (Reference page 8.6.22)**
This project replaces the major operating components at the Slide Creek hydro facility including; turbine runner, generator and station service breakers, exciter, protective relays, governor, control system, station service transformer, generator step-up transformer (GSU), battery bank, penstock gate actuator, stop log slots, stop logs, hoist and draft tube refurbishment (new concrete).

**INU 4.1.1 (f)/6.9 Slide Tailrace Barrier: (Reference page 8.6.22)**
The design, collaboration, permitting, construction and evaluation of an exclusion barrier across the Slide Creek plant tailrace at the North Umpqua Hydroelectric Project to reduce false attraction, delay and potential injury of anadromous fish. This project includes the design, collaboration, permitting and construction of a plant enhancement for bypassing canal flows during plant unit trips. The Federal Energy Regulatory Commission license identifies these projects as conditions in paragraphs D, E, G, H and I of the commission's orders.

**INU 6.1 Lemolo 2 Reroute to Toketee: (Reference page 8.6.22)**
This project is for the design and construction of a diversion structure, pipeline intake, pipeline, and outfall structure at the Lemolo No. 2 development. The purpose of this project is to eliminate ramping in the full-flow reach of the North Umpqua River between the Lemolo 2 powerhouse and Toketee Lake. The project fulfills Paragraph 47 of the Federal Energy Regulatory Commission license that incorporates the North Umpqua Settlement Agreement Sections 5.4 and 6.1.

**ILR 10.2 Swift Land Fund: (Reference page 8.6.22)**
This project is to acquire interests in land for the protection and management of wildlife habitat. Land purchase actions to be directed per the Lewis River Terrestrial Coordination Committee. This project will comply with the requirements of the Lewis River Settlement Agreement and Section 4(e) of the Federal Power Act as required in the Federal Energy Regulatory Commission license.

## OTHER PLANT ADDITIONS:

**Currant Creek U2 CSA Variable Fee 24k – CTB MI: (Reference page 8.6.23)**
This project is to remove and replace the gas turbine combustion, hot gas path section and inspect the compressor section parts in accordance with the long term maintenance plan. The program parts include: baskets, nozzle assemblies, combustor transition parts, support housing components, blades, vanes and ring segments.

**Currant Creek U1 CSA Variable Fee 24k – CTA MI: (Reference page 8.6.23)**
This project is to remove and replace the gas turbine combustion, hot gas path section and inspect the compressor section parts in accordance with the long term maintenance plan. The program parts include: baskets, nozzle assemblies, combustor transition parts, support housing components, blades, vanes and ring segments.

## TRANSMISSION PLANT ADDITIONS:

**Mona – Limber – Oquirrh 500/345 kV line: (Reference page 8.6.24)**
As part of the Energy Gateway Program (Gateway Central), the Mona – Oquirrh project will construct a new transmission line approximately 100 miles in length between Mona/Clover Substations and Oquirrh Substation. The line is being built to maintain adequate transmission capacity for network load and reliability. A new single circuit 500 kilovolt transmission line will be constructed from the Mona/Clover Substations near Mona, Utah to the future Limber Substation near Tooele, Utah which is between Mona and Oquirrh. This line segment will be approximately 65 miles in length and will initially be energized at 345 kilovolts. A 35 mile double circuit 345 kilovolt line will be constructed from the future Limber Substation to the existing Oquirrh Substation in West Jordan, Utah.

**Clover Substation: (Reference page 8.6.24)**
This projects builds a new 345/138 kV substation approximately three miles south of Mona, Utah. The substation will be constructed in a breaker and a half configuration on the 345 kV bus in a ring configuration on the 138 kV bus. Clover Substation will intercept a number of existing PacifiCorp owned transmission lines; the existing Sigurd - Mona No.1 345 kV line and the Sigurd – Mona No.2 345 kV line will both be looped into the Clover Substation. There will be a short transmission segment connecting the Clover Substation with the Mona-Limber-Oquirrh 500/345 kV transmission line.

**Terminal Substation -Replace 345/138 kV Transformers and Breakers: (Reference page 8.6.24)**
This project replaces the two existing 345-138 kV transformers at Terminal Substation (#9 and #10) and four 138 kV breakers. Specific details of this project include the following:

- Replacement of Terminal transformer #9 (421 MVA) with a 700 MVA transformer
- Replacement of Terminal transformer #10 (448 MVA) with a 700 MVA transformer
- Replacement of breaker L180 with a breaker with continuous rating of 3000A (40 kA fault rating)
- Replacement of 138 kV breakers CB101, CB115, and CB116 with breakers with a fault rating of 63 kA

**Lake Side 2 Interconnect: (Reference page 8.6.24)**
The interconnection of the Lake Side 2 generation facility into the existing 345kV Camp Williams-Hunter/Emery transmission line will require the construction of a new 345kV point of interconnection substation. The point of interconnection substation shall be configured to accommodate a six (6) breaker ring bus layout with three (3) breakers installed for this project. The substation will be located adjacent to the existing Lake Side Generating facility. Equipment replacement, control modifications and communications upgrades will also be required at the Camp Williams, Emery, Sigurd, Dynamo, and Timp substations and the Salt Lake and Portland control centers.

**Southwest Wyoming-Silver Creek 138 kV Line Phase I: (Reference page 8.6.24)**
This project will rebuild approximately 70 miles of 46 kilovolt transmission line to 138 kilovolts, build the new Croydon substation (near Henefer, Utah), convert the Coalville substation to 138 kilovolts, and convert the remaining single phase 46 kilovolt substations along the route to 12.47 kilovolt (distribution). Phase I includes rebuilding the transmission line from the Evanston, WY area down to the Devils Slide, UT area.

**Dave Johnston - Casper 230 kV Rebuild: (Reference page 8.6.24)**
North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) requirements for path operation are the drivers for rebuilding the Dave Johnston – Casper 230 kilovolt #1 line, and the re-conductor of the Dave Johnston – Casper 230 kilovolt #2 line. The scope of this project will also include installing new breakers at Dave Johnston and Casper Substations along with related equipment for termination of #1 and #2 lines.

**Nibley: New 138-12.5 kV Substation and Rebuild 7 Miles Transmission: (Reference page 8.6.24 & 8.6.25)**
This project will build a new 138-12.5 kV, 40 MVA substation with three 12.5 kV feeders, rebuild a seven mile section of 46 kV line to 138 kV and add two 138 kV circuit breakers at the Green Canyon substation.

**Ben Lomond 345/138 #2 transformer 450 MVA: (Reference page 8.6.24)**
This project will add a second 345-138 kV 400 MVA transformer at the Ben Lomond substation using a transformer from Terminal substation. The Ogden area is fed by the Ben Lomond and Syracuse substations which feed the 138 and 46 kV sub-transmission systems. The Ben Lomond substation has two 230-138 kV, 299 MVA transformers and one 345-138 kV, 448 MVA transformer. The Syracuse substation has one 345-138 kV, 394 MVA transformer. There are no mobile transformers that can be used to back up these large transformers.

**Oquirrh – Terminal 345 kV Line Phase 1: (Reference page 8.6.24)**
The Oquirrh – Terminal 345 kV Line will be approximately 14 miles in length between Oquirrh Substation and Terminal Substation. The existing transmission system has limited capability to deliver energy into the largest load center in Utah – the Wasatch Front including Salt Lake, Tooele, Davis, Weber, Cache and Box Elder counties. In addition to

meeting future energy requirements, this project is key to maintaining compliance with NERC and WECC reliability standards. Phase I which is included in this case, is for the installation of 138kV circuit breakers at the Terminal Substation.

**UDOT Mountain View Corridor Highway Relocation: I-80 to Camp Williams: (Reference page 8.6.24)**
This project will relocate and upgrade distribution and transmission facilities (both 138 kV & 345 kV) between the Camp Williams substation and 4100 South to accommodate the Utah Department of Transportation (UDOT) Mountain View Corridor highway project.

**Jerusalem-Ephraim Tap 46 kV Line Rebuild to 138 kV Construction: (Reference page 8.6.24)**
This project is to rebuild the Jerusalem to Ephraim tap 46 kV line to 138 kV raptor safe construction and conductor size capable of 266/305 MVA at 138 kV. The first 2 miles from Jerusalem will be constructed double circuit to allow the 46 kV feed to Fountain Green to remain at 46 kV when the line is converted to 138 kV. The remaining 12 miles will be single circuit construction. The line will continue to be operated at 46 kV initially and will be converted to 138 kV for future system needs. Switch 57A and switch 43A should be changed out to single contact vacuum bottle 138 kV raptor safe switches. There are 3 different 3 mile sections of distribution underbuild within the 14 miles. All three sections should have transmission pole strength for 1/0 ACSR three phase underbuild. Only the southern 2.8 mile section from the Ephraim tap north will have the existing distribution conductor changed out from 6 steel with no neutral to 1/0 ACSR with a neutral.

**COPCO II 230-115 kV Transformer TPL002: (Reference page 8.6.24)**
The Copco 2 substation, located in California, presently has two paralleled 230/115-kV transmission transformers, T-3604 rated at 125-MVA, and T-373187, rated at 250-MVA. This project is to replace the 125-MVA rated transformer, T-3604 in order to remain compliant with the NERC Reliability Standard TPL-002.

**City Creek Center: New 40 MW Development for PRI Phase II: (Reference page 8.6.24 & 8.6.25)**
The City Creek Center is a development in downtown Salt Lake City, Utah, that encompasses two and one half city blocks. The developed area also includes several building facilities that will remain unchanged that will need to be fed from the new power upgrades installed for the City Creek Center. This phase supports completion of the Third West distribution substation near the City Creek Center development and the associated 138 kV transmission lines. This phase also includes some transmission and distribution facilities to feed the final City Creek Center load requirements.

## DISTRIBUTION PLANT ADDITIONS:

**Skypark Build New 138-12.5 kV Substation:** **(Reference page 8.6.25)**
This project will construct the Skypark 138-12.5 kV, 40 MVA substation along with four feeders. It will also convert a five mile section of the 46 kV "B" line to 138 kV. This conversion requires several other 46 kV projects to keep the 46 kV system operational. The project will also build a 0.7 mile section of 138 kV line to connect the converted "B" line to the Parrish 138 kV bus, add three 138 kV breaker bays at the Parrish substation. The project will add a 46 kV circuit breaker at the North Salt Lake substation and connect the "B" 46 kV line from Gadsby to the new breaker.

**Fort Douglas-New 138-12.5 kV Sub & Transmission:** **(Reference page 8.6.25)**
This project is to install a new 138-12.5 kV, 40 MVA substation near Sunnyside and Foothill streets in Salt Lake City, Utah. This new substation will prevent loading concerns on the Research #1 and Hogle transformers. In addition, this project requires the conversion of the 46 kV Emigration Tap–Hogle line to 138 kV operation and installation of a 138 kV bay position and circuit breaker at McClelland substation to serve this new substation and help mitigate 46 kV line loading concerns.

**Copper Hills New 138-12 5kV Sub:** **(Reference page 8.6.25)**
This project will construct the new 30 MVA, 138-12.5 kV Copper Hills substation located near 8600 south and 7200 west in West Jordan, UT with the associated transmission and distribution. This project will mitigate overload on the #1 and #2 transformers at Hoggard Substation.