POWER RESOURCES

Smith Ranch - Highland
Uranium Project
P. O. Box 1210
Glenrock, Wyoming USA 82637
Casper: 307-235-1628
Douglas: 307-358-6541
Fax: 307-358-4533

July 9, 2003

ATTN: Document Control Desk
Ms. Susan Frant, Chief
Fuel Cycle Licensing Branch, NMSS
U.S. Nuclear Regulatory Commission
Washington, DC 20555

RE: Docket No. 40-8964, License SUA-1548, TAC No. L52512
Request to Combine Smith Ranch, Highland, Ruth/North Butte, and Gas Hills Licenses

Dear Ms. Frant:

As you are aware, the NRC is in the process of amending Power Resources, Inc. (PRI's) Smith Ranch license to combine the Smith Ranch, Highland, Ruth/North Butte, and Gas Hills Projects under one license (SUA-1548). In response to recent discussions between representatives of PRI and Mr. John Lusher, NRC Project Manager, PRI has revised Section 6.1 "Ground Water Restoration" of its previous submittal (Volume I of the Smith Ranch-Highland Uranium Project License Application) dated May 6, 2003 to provide an updated Ground Water Restoration Plan that will be utilized for all wellfields at the Smith Ranch-Highland Uranium Project.

Therefore, please find attached one copy of revised Chapter 6 along with necessary revisions to the Table of Contents (two pages) for insertion into Volume I of the Smith Ranch-Highland Uranium Project License Application. One additional copy is also being forwarded directly to Mr. Lusher.

If you or your staff have any questions, please call me at (307) 358-6541, ext. 62.

Sincerely,

Bill Kearney

W.F. Kearney
Manager-Health, Safety
& Environmental Affairs

WFK/sab

Attachment

cc: S.P. Collings w/o atta — R. Knode w/o atta — S.A. Bakken w/o atta
File SR 4.6.4.1 w/atta — J. Lusher, NRC Project Manager (Addressee Only) w/atta

NMSS01

CHAPTER 6
RECLAMATION PLAN

The objective of the Reclamation Plan is to return the affected ground water and land surface to conditions such that they are suitable for uses for which they were suitable prior to mining. The methods to achieve this objective for both the affected ground water and the surface are described in the following sections.

6.1 GROUND WATER RESTORATION

6.1.1 Water Quality Criteria

The primary goal of the ground water restoration efforts will be to return the ground water quality of the production zone, on a mine unit average, to the pre-injection baseline condition as defined by the baseline water quality sampling program which is performed for each mine unit. Should baseline conditions not be achieved after diligent application of the best practicable technology (BPT) available, PRI commits, in accordance with the Wyoming Environmental Quality Act and WDEQ regulations, to a secondary goal of returning the ground water to a quality consistent with the use, or uses, for which the water was suitable prior to ISL mining.

For the purposes of this application, the use categories are those established by the WDEQ, Water Quality Division. The final level of water quality attained during restoration is related to criteria based on the pre-mining baseline data from that wellfield, the applicable Use Suitability Category and the available technology and economics. Baseline, as defined for this project, shall be the mean of the pre-mining baseline data, taking into account the variability between sample results (baseline mean plus two standard deviations).

6.1.2 Restoration Criteria

The restoration criteria for the ground water in a mining unit is based on the baseline water quality data collected for each mine unit from the wells completed in the planned Production Zone (i.e., MP-Wells), on a parameter by parameter basis. All parameters are to be returned to as close to baseline as is reasonably achievable. Restoration Target Values (RTVs) are established for the list of baseline water quality parameters. The RTVs for the mining units shall be the mean plus two standard deviations of the pre-mining values. Table 5-1 of Chapter 5 entitled Baseline Water Quality Parameters lists the parameters included in the RTVs.

Baseline values will not be changed unless the operational monitoring program indicates that baseline water quality has changed significantly due to accelerated movement of ground water, and that such change justifies redetermination of baseline water quality. Such a change would require resampling of monitor wells and review and approval by the WDEQ.

Restoration success will be determined after completion of the stability monitoring period. At the end of stability, all constituent concentrations will meet approved standards and will not show strong trends in groundwater deterioration as a result of ISL activities. Upon regulatory approval of the stability monitoring results, the decommissioning of the wellfield will be started.

6.1.3 Ground Water Restoration Method

The commercial ground water restoration program consists of two stages, the restoration stage and the stability monitoring stage. The restoration stage typically consists of three phases:

1) ground water transfer;
2) ground water sweep;
3) ground water treatment.

These phases are designed to optimize restoration equipment used in treating ground water and to minimize the volume of ground water consumed during the restoration stage. PRI will monitor the quality of ground water in selected wells as needed during restoration to determine the efficiency of the operations and to determine if additional or alternate techniques are necessary. Online production wells will be sampled for uranium concentration and for conductivity to determine restoration progress on a pattern-by-pattern basis.

The sequence of the activities will be determined by PRI based on operating experience and waste water system capacity. Not all phases of the restoration stage will be used if deemed unnecessary by PRI.

A reductant may be added at any time during the restoration stage to lower the oxidation potential of the mining zone. Either a sulfide or sulfite compound may be added to the injection stream in concentrations sufficient to reduce the mobilized species, or with the approval of the WDEQ, PRI will employ bioremediation as a reduction process.

Reductants are beneficial because several of the metals, which are solubilized during the leaching process, are known to form stable insoluble compounds, primarily as sulfides. Dissolved metal compounds that are precipitated by such reductants include those of arsenic, molybdenum, selenium, uranium and vanadium.

Once restoration activities have returned the average concentration of restoration parameters to acceptable levels and following concurrence from the WDEQ that restoration has been achieved in the mining area, the stability monitoring stage will begin. This stage consists of monitoring the restored wellfield for six months following successful completion of the restoration stage. Following the stability monitoring stage, PRI will make a request to the regulatory agencies that the wellfield is restored.

6.1.3.1 Ground Water Transfer

During the ground water transfer phase, water will be transferred between a wellfield commencing restoration and a wellfield commencing mining operations. Also, a ground water transfer may occur within the same wellfield, if one area is in a more advanced state of restoration than another.

Baseline quality water from the wellfield commencing mining will be pumped and injected into the wellfield in restoration. The higher TDS water from the wellfield in restoration will be recovered and injected into the wellfield commencing mining. The direct transfer of water will act to lower the TDS in the wellfield being restored by displacing affected ground water with baseline quality water.

The goal of the ground water transfer phase is to blend the water in the two wellfields until they become similar in conductivity. The water recovered from the restoration wellfield may be passed through ion exchange (IX) columns and/or filtered during this phase if suspended solids are sufficient in concentration to present a problem with blocking the injection well screens.

For the ground water transfer between wellfields to occur, a newly constructed wellfield must be ready to commence mining. Therefore this phase may be initiated at any time during the restoration process. If a wellfield is not available to accept transferred water, ground water sweep or some other activity will be utilized as the first phase of restoration.

The advantage of using the ground water transfer technique is that it reduces the amount of water that must ultimately be sent to the waste water disposal system during restoration activities.

6.1.3.2 Ground Water Sweep

Ground water sweep may be used as a stand-alone process where ground water is pumped from the wellfield without injection causing an influx of baseline quality water from the perimeter of the mining unit, which sweeps the affected portion of the aquifer. The cleaner baseline water has lower ion concentrations that act to strip off the cations that have attached to the clays during mining. The plume of affected water near the perimeter of the wellfield is also drawn inside the boundaries of the wellfield. Ground water sweep may also be used in conjunction with the ground water treatment phase of restoration. The water produced during ground water sweep is disposed of in an approved manner.

The rate of ground water sweep will be dependent upon the capacity of the waste water disposal system and the ability of the wellfield to sustain the rate of withdrawal.

6.1.3.3 Ground Water Treatment

Either following or in conjunction with the ground water sweep phase water will be pumped from the mining zone to treatment equipment at the surface. Ion exchange (IX), reverse osmosis (RO) or Electro Dialysis Reversal (EDR) treatment equipment will be utilized during this phase of restoration.

Ground water recovered from the restoration wellfield will be passed through the IX system prior to RO/EDR treatment, as part of the waste disposal system or it will be re-injected into the wellfield. The IX columns exchange the majority of the contained soluble uranium for chloride or sulfate. Additionally, prior to or following IX treatment, the ground water may be passed through a de-carbonation unit to remove residual carbon dioxide that remains in the ground water after mining.

At any time during the process, an amount of reductant sufficient to reduce any oxidized minerals may be metered into the restoration wellfield injection stream. The concentration of reductant injected into the formation is determined by how the mining zone ground water reacts with the reductant. The goal of reductant addition is to decrease the concentrations of redox sensitive elements through reduction of these elements.

All or some portion of the restoration recovery water can be sent to the RO unit. The use of an RO unit 1) reduces the total dissolved solids in the contaminated ground water, 2) reduces the quantity of water that must be removed from the aquifer to meet restoration limits, 3) concentrates the dissolved contaminates in a smaller volume of brine to facilitate waste disposal, and 4) enhances the exchange of ions from the formation due to the large difference in ion concentration. The RO passes a high percentage of the water through the membranes, leaving 60 to 90 percent of the dissolved salts in the brine water or concentrate. The clean water, called permeate, will be re-injected, stored for use in the mining process, or sent to the waste water disposal system. The permeate may also be de-carbonated prior to re-injection into the wellfield. The brine water that is rejected contains the majority of dissolved salts in the affected ground water and is sent for disposal in the waste system. Make-up water, which may come from water produced from a wellfield that is in a more advanced state of restoration, water being exchanged with a new mining unit, water being pumped from a different aquifer, the purge of an operating wellfield or a combination of these sources, may be added prior to the RO or wellfield injection stream to control the amount of "bleed" in the restoration area.

The reductant (either biological or chemical) added to the injection stream during this stage will scavenge any oxygen and reduce the oxidation-reduction potential (Eh) of the aquifer. During mining operations, certain trace elements are oxidized. By adding the reductant, the Eh of the aquifer is lowered thereby decreasing the solubility of these elements. Regardless of the reductant used, a comprehensive safety plan regarding reductant use will be implemented.

If necessary, sodium hydroxide may be used during the ground water treatment phase to return the ground water to baseline pH levels. This will assist in immobilizing certain parameters such as trace metals.

The number of pore volumes treated and re-injected during the ground water treatment phase will depend on the efficiency of the RO in removing Total Dissolved Solids (TDS) and the success of the reductant in lowering the uranium and trace element concentrations.

6.1.3.4 Restoration Monitoring

During restoration, lixiviant injection is discontinued and the quality of the ground water is constantly being improved back to near baseline quality, thereby greatly diminishing the possibility and relative impact of an excursion. Therefore, the monitor ring wells (M-Wells), overlying aquifer wells (MO or MS-Wells), and underling aquifer wells (MU or MD-Wells) are sampled once every 60 days and analyzed for the excursion parameters, chloride, total alkalinity (or bicarbonate) and conductivity. Water levels are also obtained at these wells prior to sampling.

In the event that unforeseen conditions (such as snowstorms, flooding, equipment malfunction) occur, the WDEQ will be contacted if any of the wells cannot be monitored within 65 days of the last sampling event.

6.1.4 Restoration Stability Monitoring Stage

Following concurrence from the WDEQ that restoration has been achieved in the mining area, a six month stability period is assessed to show that the restoration goal has been adequately maintained. The following restoration stability monitoring program is performed during the stability period:

1. The monitor ring wells (M-Wells) are sampled once every two months and analyzed for the UCL parameters, chloride, total alkalinity (or bicarbonate) and conductivity; and

2. At the beginning, middle and end of the stability period, the MP-Wells will be sampled and analyzed for the parameters in Table 5-1 of Chapter 5.

In the event that unforeseen conditions (such as snowstorms, flooding, equipment malfunction) occur, the WDEQ will be contacted if any of the M-Wells or MP-Wells cannot be monitored within 65 days of the last sampling event.

6.1.5 Well Plugging

Wellfield plugging and surface reclamation will be initiated once the regulatory agencies concur that the ground water has been adequately restored and determined stable. All production, injection and monitor wells and drillholes are abandoned in accordance with WS-35-11-404 and Chapter VIII of the WDEQ-LQD Rules and Regulations to prevent adverse impacts to ground water quality or quantity.

Wells will be plugged and abandoned in accordance with the following program.

1. When practicable, all pumps and tubing are removed from the well.
2. All wells are plugged from total depth to within 5 feet of the collar with a nonorganic well abandonment plugging gel formulated for well abandonment and mixed in the recommended proportion of 10 to 20 lbs per barrel of water, to yield an abandonment fluid with a 10 minute gel strength of at least 20 lbs/100 sq ft and a filtrate volume not to exceed 13.5 cc.
3. The casing is cut off at least two feet below the ground surface. Abandonment fluid is topped off to the top of the cut-off casing.
4. A cement plug is placed at the top of the casing, and the area is backfilled, smoothed, and leveled to blend with the natural terrain.

As an alternative method of well plugging, a dual plug procedure may be used where a cement plug will be set using slurry of a weight of no less than 12 lbs/gallon into the bottom of the well. The plug will extend from the bottom of the well upwards across the first overlying aquitard. The remaining portion of the well will be plugged using a bentonite/water slurry with a mud weight of no less than 9.5 lbs/gallon. A 10-foot cement top plug will be set to seal the well at the surface.

6.2 SURFACE RECLAMATION AND DECOMMISSIONING

6.2.1 Introduction

All lands disturbed by the mining project will be returned to their pre-mining land use of livestock grazing and wildlife habitat unless an alternative use is justified and is approved by the state and the landowner, i.e. the rancher desires to retain roads or buildings. The objectives of the surface reclamation effort is to return the disturbed lands to production capacity of equal to or better than that existing prior to mining. The soils, vegetation and radiological baseline data will be used as a guide in evaluating final reclamation.

Following regulatory approval of ground water restoration in any given wellfield, and at least 12 months prior to the planned commencement of facility decommissioning or surface reclamation in a wellfield area, PRI will submit a final (detailed) decommissioning plan to the NRC for review and approval. This section provides a general description of the proposed facility decommissioning and surface reclamation plans for the SR-HUP.

6.2.2 Surface Disturbance

The primary surface disturbances associated with solution mining are the sites containing the Central Processing Plants, Satellite Facilities, and evaporation ponds. Surface disturbances also occur during the well drilling program, pipeline installations, road construction. These more superficial disturbances, however, involve relatively small areas or have very short-term impacts.

The Smith Ranch Central Processing Plant and Main Office Complex is located within the historic Bill Smith Mine site. Therefore, construction of the facilities for ISL mining did not create any new disturbance areas. Disturbances associated with the evaporation ponds, ion exchange Satellites and field header buildings, will be for the life of those activities and topsoil will be stripped from the areas prior to construction. Disturbance associated with drilling and pipeline installation are limited, and are reclaimed and reseeded as soon as weather conditions permit. Vegetation will normally be reestablished over these areas within two years. Disturbance for access roads is also limited as a network of roads is already in place to most wellfield areas and throughout the project area.

The on-site Smith Ranch solid waste landfill site will be closed in a manner that is consistent with the closure requirements for Construction/Demolition Landfills provided in the WDEQ Solid and Hazardous Waste Rules and Regulations. All current and closed disposal cells located onsite have been, or will be, closed with six inch evenly compacted soil cover and a three foot loose soil cover. Any newly constructed solid waste disposal landfill will be closed in a similar manner as the existing landfill.

6.2.3 Topsoil Handling and Replacement

In accordance with WDEQ-LQD requirements, topsoil is salvaged from building sites (including Satellite buildings), permanent storage areas, main access roads, graveled wellfield access roads and chemical storage sites. Conventional rubber-tired, scraper-type earth moving equipment is typically used to accomplish such topsoil salvage operations. The exact location of topsoil salvage operations is determined by wellfield pattern emplacement and designated wellfield access roads within the wellfields, which are determined during final wellfield construction activities. It is estimated that a maximum of 200 acres of topsoil will be salvaged, stockpiled, and reapplied throughout the life of the project.

As described in Appendix D-7 SOILS, topsoil thickness varies within the permit area from non-existent to several feet in depth. Topsoil thickness is usually greatest in, and along drainages where material has been deposited and deep soils have developed. Therefore, topsoil stripping depths may vary from 0 to up to several feet in depth, depending on location and the type of structure being constructed. In cases where it is necessary to strip topsoil in relatively large areas, such as a major road or building site, the field mapping and SCS Soil Surveys will be utilized to determine approximate topsoil depths. The extent of topsoil stripping and stockpiling for the remainder of the project's life will be very limited as no new major facilities or roads will require construction.

Salvaged topsoil is stored in designated topsoil stockpiles. These stockpiles are generally located on the leeward side of hills to minimize wind erosion. Stockpiles are not located in drainage channels. The perimeter of large topsoil stockpiles may be bermed to control sediment runoff. Topsoil stockpiles are seeded as soon as possible after construction with the permanent seed mix. In accordance with WDEQ-LQD requirements, all topsoil stockpiles are identified with a highly visible sign with the designation "Topsoil."

During mud pit excavation associated with well construction, exploration drilling and delineation drilling activities, topsoil is separated from subsoil with a backhoe. When use of the mud pit is complete, all subsoil is replaced and topsoil is applied. Mud pits only remain open a short time, usually less than 30 days. Similarly, during pipeline construction, topsoil is stored separate from subsoil and is replaced on top of the subsoil after the pipeline ditch is backfilled. The success of revegetation efforts at the site show that these procedures adequately protect topsoil and result in vigorous vegetation growth.

6.2.4 Revegetation Practices

Revegetation practices are conducted in accordance with WDEQ-LQD regulations and the mine permit. During mining operations the topsoil stockpiles, and as much as practical of the disturbed wellfield and pond areas will be seeded with vegetation to minimize wind and water erosion. After topsoiling for the final reclamation, an area will normally be seeded with oats to establish a stubble crop, then reseeded with grasses the next growing season. A long term temporary seed mix may be used in wellfield and other areas where the vegetation will be disturbed again prior to final decommissioning and final revegetation. The long term seed mix consists of one or more of the native wheatgrasses (i.e. Western Wheatgrass, Thickspike Wheatgrass). Typical seeding rates are 12-14 lbs of pure live seed per acre.

Permanent seeding is accomplished with a seed mix approved by the WDEQ-LQD. The permanent mix typically contains native wheatgrasses, fescues, and clovers. Typical seeding rates are 12-14 lbs of pure live seed per acre.

The success of permanent revegetation in meeting land use and reclamation success standards will be assessed prior to application for bond release by utilizing the "Extended Reference Area" method as detailed in WDEQ-LQD Guideline No. 2 - Vegetation (March 1986). This method compares, on a statistical basis, the reclaimed area with adjacent undisturbed areas of the same vegetation type.

The Extended Reference Areas will be located adjacent to the reclaimed area being assessed for bond release and will be sized such that it is at least half as large as the area being assessed. In no case will the Extended Reference Area be less than 25 acres in size.

The WDEQ-LQD will be consulted prior to selection of Extended Reference Areas to ensure agreement that the undisturbed areas chosen adequately represent the reclaimed areas being assessed. The success of permanent revegetation and final bond release will be assessed by the WDEQ-LQD.

6.2.5 Site Decontamination and Decommissioning

When ground water restoration in the final mining unit is completed, decommissioning of the Central Processing/Office areas at both Smith Ranch and Highland and the remaining facilities (evaporation ponds, purge storage reservoirs, radium ponds) will be initiated. In decommissioning the processing plants, the process equipment will be dismantled and sold to another licensed facility, or decontaminated in accordance with Regulatory Guide 1.86 "Termination of Operating Licenses for Nuclear Reactors" and "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source or Special Nuclear Material". Materials that cannot be decontaminated to an acceptable level will be disposed in an NRC approved facility. After decontamination, materials that will not be reused or that have no resale value, such as building foundations, will be buried on-site.

The Central Processing/Office Areas will be contoured to blend with the natural terrain, surveyed to ensure gamma radiation levels are within acceptable limits, topsoiled, and reseeded per the approved Reclamation Plan.

After all liquids in the evaporation ponds, purge storage reservoirs, and/or radium ponds have evaporated or been disposed via a deep disposal well, or irrigation, the precipitated solids and pond liners will be removed and disposed in a licensed facility. The area will then be contoured to blend with the natural terrain, surveyed to ensure gamma levels are not exceeded, topsoiled, and reseeded per the approved plan.

Gamma surveys are also conducted during the decommissioning of each wellfield. Material identified during the gamma surveys as having contamination levels requiring disposal in a licensed facility will be removed, packaged (if applicable), and shipped to an NRC approved facility for disposal.

In the event that soil cleanup is required during decommissioning of facilities and wellfield areas, the cleanup criteria for radium and other radionuclides (uranium and thorium) will be based on the radium benchmark dose approach of 10 CFR 40, Appendix A, Criterion 6(6).

6.2.6 Final Contouring

Recontouring of land where surface disturbance has taken place will restore it to a surface configuration that will blend in with the natural terrain and will be consistent with the post mining land use. Since no major changes in the topography will result from the proposed mining operation, a final contour map is not required.

6.2.7 Financial Assurance

In accordance with existing NRC license conditions and WDEQ permit requirements, PRI maintains surety instruments to cover the costs of reclamation of each operation, including the costs of ground water restoration, the decommissioning, dismantling and disposal of all buildings, wastewater ponds and other facilities, and the reclamation and revegetation of affected areas. Additionally, in accordance with NRC and WDEQ requirements, an updated Annual Surety Estimate Revision is submitted to the NRC and WDEQ each year to adjust the surety instrument amount to reflect existing operations and those planned for construction or operation in the following year. After review and approval of the Annual Surety Estimate Revision by the NRC and WDEQ, PRI revises the surety instrument to reflect the revised amount.

PRI maintains several approved Irrevocable Letters of Credit in favor of the State of Wyoming for the various operations. Currently (February 2003), the amounts of these surety instruments are as follows:

Smith Ranch-Highland Uranium Project	
- Smith Ranch Facilities	$12,256,800
- Highland Uranium Project Facilities	$19,957,000
North Butte/Ruth Facilities	$157,700
Gas Hills Facilities	$617,400