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# NV ENERGY REID GARDNER STATION ADMINISTRATIVE ORDER ON CONSENT FACT SHEET

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December 2021

## Location

The NV Energy-owned Reid Gardner Generating Station (Station) is located near Moapa, Nevada. The now-decommissioned facility is situated about 52 miles northeast of Las Vegas and became commercially operational in 1965.

The plant formerly operated four coal-fired, power-generating units. Units 1-3 were permanently shut down on December 31, 2014. Unit 4 was permanently shut down on March 11, 2017. Demolition of the facility began in 2017 and was completed in July 2020.



## Background

The Station is located within the Moapa Valley, which is a relatively flat-bottomed desert valley that includes the Muddy River, a spring-fed perennial stream that runs through the Station property. Prior to 1964, the area was native desert or irrigated pastureland. A ranch is operated on the

land east of the Station. The Station property also includes land on a mesa, to the south, that is elevated more than 100 feet above the valley. The Bureau of Land Management (BLM) owns most of the vacant surrounding land to the north and south of the Station, but there are some parcels of vacant private property just north and northwest of the Station. At its closest point, land owned by the Moapa Band of Paiutes is located approximately 500 feet to the west and northwest of the NV Energy property line and residences are located approximately one-quarter mile northwest.

Details of the remediation project including maps, reports, and associated documentation are available for public inspection at the Document Repository located at:  
Moapa Town Library  
1340 East Highway 168  
Moapa, NV 89025  
Phone: (702) 864-2438  
or from the NDEP

The Station received its non-potable process water supply from a combination of off-site groundwater wells and an off-site surface water withdrawal from the Muddy River. The water was combined and collected on-site in raw water storage ponds. Water supply will continue to be needed during the site closure process for dust control, earthwork and site restoration activities.

Water was previously used on-site for process cooling, air emission reductions, steam generation and other uses. To reduce water usage, the Station recycled its water as much as possible. When the dissolved salts in the recycled water became too high for additional reuse, the water was discharged to evaporation ponds. There were no surface water

discharges of wastewater from the Station, as the plant is a zero wastewater discharge facility.

The evaporation ponds were originally designed and constructed according to engineering practices and regulations in effect at the time. Some early ponds, for example, used clay material in the liners and berms which allowed some water containing elevated concentrations of dissolved salts to migrate through the pond bottoms and into the area's groundwater. This has necessitated remediation (clean-up) activities in cooperation with the State of Nevada.

## Regulatory Oversight

The Nevada Division of Environmental Protection (NDEP), Bureau of Corrective Actions has primary authority and responsibility for regulatory oversight of groundwater and soil characterization and corrective action activities at the Station.

In May 1997, the NDEP issued an Administrative Order (Order) requiring NV Energy to submit a site-wide plan and schedule to eliminate the migration of contaminants into the groundwater. NV Energy completed compliance with four of the six requirements of the 1997 Order by 2008. The remaining two requirements of the 1997 order, relating to investigation and cleanup of groundwater contamination, were superseded by the Administrative Order on Consent (AOC) in 2008 entered into by NV Energy and the NDEP.

As part of the 1997 order, evaporation ponds 4B-1, 4B-2, 4B-3, 4C-1, 4C-2, E-1, E-2 and F were relined with two layers of high-density polyethylene (HDPE) equipped with interstitial leak-detection. Ponds 4A, D, and G were permanently taken out of service between 1999 and 2008. In 2011, NV Energy constructed and operated two new HDPE double-lined evaporation ponds (M-5 and M-7) on the mesa. which were taken out of service in April 2021 and will be closed in in the next two years.

The AOC calls for NV Energy to continue with environmental contaminant characterization activities and to identify corrective action measures, as necessary, for soil and groundwater at the Station. Moreover, the AOC calls for the implementation and long-term operation and maintenance of NDEP-approved corrective actions. calls for NV Energy to continue with environmental contaminant characterization

activities and to identify corrective action measures, as necessary, for soil and groundwater at the Station. Moreover, the AOC calls for the implementation and long-term operation and maintenance of NDEP-approved corrective actions.

In addition to the groundwater impacts associated with the former on-site ponds, other isolated areas of soil and/or groundwater contamination have been identified at the Station. These areas are being addressed through implementation of the AOC by characterizing the impacts and then, as appropriate, through implementation of NDEP-approved corrective actions.

## Characterization Activities

NV Energy has reviewed hundreds of historical documents and existing soil and groundwater data to identify potential sources of soil and groundwater contamination at the Station. The Preliminary Source Area Identification and Characterization Report, summarizing this research, was finalized in July 2013. This report identified 35 potential source areas that are being investigated to evaluate if corrective action is necessary.

Many site-related chemicals at the Station are naturally occurring in soil and groundwater. Therefore, when soil and groundwater samples are collected at the Station, the constituents and concentrations must be evaluated to determine if they are naturally occurring or due to former Station activities. In order to complete these evaluations, NV Energy has evaluated naturally occurring background concentrations by the installation and sampling of monitoring wells and the collection of soil samples in areas that appear to be outside of Station impacts. A report summarizing the data, including a statistical evaluation of background concentrations, was issued on November 7, 2014. This report was partially accepted by the NDEP, pending additional groundwater characterization. NV Energy is currently preparing an addendum to the Background Conditions report based on additional data collected from several new wells.

In 2009, NV Energy began investigating a source area referred to as Waste Management Unit 7 (WMU-7). This area is located on the mesa and partially on land owned by the BLM. WMU-7 was previously used for disposal of solid waste from the

Station. NV Energy is currently pursuing purchase of this land.

Between 2014 and 2020, investigations were conducted to evaluate groundwater quality, site hydrogeology, and to gain a better understanding of the impact of ongoing remediation efforts in the pond areas. These investigations included the installation of approximately 100 new monitoring wells, 134 borings, 115 discrete groundwater sampling locations, surface and subsurface soil sampling. Additional studies were conducted in and along the Muddy River to evaluate potential interaction between on-site groundwater and the river. River transects were surveyed at 11 locations along the Muddy River as well as downstream of the Station and a total of 21 shallow piezometers or monitoring wells were installed to measure groundwater levels and constituent concentration data was collected adjacent to the river.

Additional characterization activities conducted between 2016 and 2020 have included investigations in the area of Hogan Wash, the ranch area east of the Station, the Units 1-3 Catch Basin, the former Unit 4 Treated Water Pond, former Unit 4 Cooling Tower, former coal pile areas, former Unit 1-2 emergency diesel generator, the former Unit 1-3 scrubbers, the former Unit 4 absorber, and the former Unit 4 settling pond.

Investigation Closed<sup>1</sup> determinations have been issued by the NDEP for the former Unit 4 Treated Water Pond, former Unit 4 Cooling Tower, former Units 1-3 Catch Basin and a reported previous waste disposal area on the eastern portion of the Station.

Characterization data reports have been submitted to the NDEP that present the results of the Hogan Wash, former Pond 4A, former 4B and 4C Ponds, former D, E, F, and G ponds and ranch area, and Muddy River area investigations that took place between 2014 – 2018.

Additional characterization reports that present the results of completed investigations in the former Unit 1-3 scrubber area, the former Unit 4 absorbers area, the former Unit 4 settling pond, and the former ash settling ponds and fly ash disposal areas in the north Station area are in progress.

The data collection and evaluation to date has led to the development of three tools used to

understand environmental conditions at the site. First, a Preliminary Geochemical Conceptual Site Model (CSM) was completed for the Station in 2015 to evaluate the role that geochemical mechanisms play in contaminant transport at the site. An updated Geochemical CSM is included in the CSM Report, described below.

Secondly, a three-dimensional computer model has been developed to visualize and evaluate the hydrogeologic and groundwater data. This model is being continually updated to better understand site conditions and the nature and extent of impacted groundwater, and to evaluate the need for corrective action.

And finally, information collected from these investigations is being evaluated and compiled into a Site-wide CSM Report currently under preparation. Decisions regarding the need for further site investigations or corrective actions will be based on the findings of the CSM.

In addition to these area-specific investigations, routine monitoring has been ongoing for over 20 years and will continue throughout the characterization and corrective action activities. The current monitoring network includes over 200 wells and eight surface water locations. This routinely-collected data is summarized in reports that are issued annually to the NDEP.

Concurrent with the site characterization activities discussed above, a second set of areas, related to petroleum impacts, have also been investigated. In 1986, diesel fuel was discovered during a subsurface investigation at the Station. The fuel release was from underground product piping associated with a former 850,000-gallon diesel aboveground storage tank (AST) and former diesel underground storage tanks (USTs), identified as Source Area 14 (SA-14) former Underground Product Piping. The underground piping attributed to the release was removed from service and a diesel recovery system was installed. The diesel recovery system operated from 1986 to 2015 to pump out groundwater and diesel fuel floating on the groundwater in the area. The tanks and other structures associated with the former Free Product Recovery System were removed prior to Plant demolition activities.

NV Energy began an investigation in August 2014 to evaluate the extent and characteristics of

petroleum residuals after the extensive operation of the diesel recovery system. Field investigations included: advancing direct push borings to evaluate subsurface impacts with a high-resolution data gathering tool designed to identify Light Non-Aqueous Phase Liquid (LNAPL) in situ, advancing additional soil borings, installing and sampling monitoring wells, and evaluating the physical/fluid properties of the LNAPL. LNAPL is a term that refers to contaminants, such as diesel fuel, that are less dense than water and are generally less soluble.

Based on the petroleum residual data collected, an LNAPL assessment and CSM was developed and prepared. The objective of the LNAPL assessment is to build a more complete understanding of the nature, extent, mobility, and recoverability of LNAPL in the area of the Station diesel recovery system. The Draft LNAPL CSM was submitted to the NDEP in January 2019. Based on the draft LNAPL CSM results, a focused work plan is under development to assess and address localized areas of residual LNAPL. This work will be conducted in 2022. The results of the additional work will be incorporated into LNAPL CSM to determine the need for further site investigations or corrective actions.

## Remediation Activities

As mentioned earlier, petroleum-related impacts have been addressed at the Station since 1986 with the installation of a diesel recovery system. In addition to this groundwater corrective action, petroleum-impacted soils were removed in 2015 and 2016 in four areas where petroleum was stored or handled during plant operations. Over 10,000 cubic yards of soil were removed from the areas of the former Units 1-3 Lube Oil Rack, former Gasoline UST and Warehouse 1, former Free Product Recovery System, and former Vehicle Maintenance Area. All excavated soil was disposed off-site at a facility licensed to receive petroleum-contaminated soil.

In addition to the petroleum-related remediation at the site, closure activities in the pond areas have been undertaken. Between 2010 and 2017, over 2,000,000 cubic yards of pond solids and underlying soils were removed from former evaporation pond areas. All excavated materials were disposed of in HDPE-lined cells at the existing Mesa Landfill in accordance with all

permit requirements. Pond solids removal activities are summarized as follows:

- In 2010, approximately 400,000 cubic yards of pond solids and underlying soils were removed from former Ponds D and G.
- In 2012 and 2013, approximately 24,000 cubic yards of pond solids and underlying soils were removed from former Pond F.
- In 2014 and 2015, over 1,200,000 cubic yards of pond solids and underlying soils were removed from former Ponds 4A, 4C1, 4C2, and E2.
- In 2016 and 2017, over 400,000 cubic yards of pond solids and underlying soils were removed from former evaporation Ponds 4B1, 4B2, 4B3, and E1.

Beginning late 2021, NV Energy will complete soil and ash removal actions in the former coal pile areas, railroad ballast removal, and a petroleum soil removal action at the former diesel unloading area. Petroleum-impacted material will be disposed of at an offsite facility licensed to receive petroleum impacted soil. Other material will be disposed of in the existing Mesa Landfill in accordance with all permit requirements.

No Further Action<sup>2</sup> determinations have been issued by the NDEP for the Hydrogen Peroxide Tank Release, former Units 1-3 Lube Oil Rack, former Gasoline UST and Warehouse 1, former Diesel AST, former Free Product Recovery System and former Vehicle Maintenance Area.

Additional closure work and corrective actions are expected to be implemented in 2021 following completion of site characterizations and Plant demolition activities.

### Notes:

1. *The NDEP issues a determination of Investigation Closed if investigations have been conducted to determine that no release occurred or that a suspected release did not constitute a reportable condition requiring further evaluation.*
2. *The NDEP issues a determination of No Further Action if corrective actions have been completed and, based on final site conditions, no further evaluation or corrective action is necessary.*

# Community Liaisons for the Station:

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