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1801-11

Mr. Thomas C. Greengard
Manager of Environmental Restoration Programs
EG&G Rocky Flats, Inc.
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

Subject: Briefing on Solar Ponds

Dear Mr. Greengard:

I enclose for your review a draft copy of a Solar Pond briefing.

A quick overview of the status and plans for the Solar Ponds is provided in the briefing. A cost estimate of capital and expected long-term activities is also provided

I trust that this is adequate for your purposes. Please call if you have any questions or comments.

Sincerely,

Frank J. Blaha

DOTY & ASSOCIATES
Frank J Blaha, P E

cc R Ogg, EG&G

ADMIN RECORD

1801-11

SOLAR POND STATUS

Ponds

207A

This pond was emptied of process waste sludge and water in 1988. This pond was the most contaminated of the five solar pond cells. This pond currently contains pumped-back contaminated groundwater

207B

Solar Ponds 207B-North, Center and South were cleaned of process waste sludge and water in the late 1970's. Since that time they have contained treated sanitary wastewater, reverse osmosis backwash, reverse osmosis brine, and pumped-back contaminated groundwater. These ponds currently contain pumped-back contaminated groundwater from the Interceptor Trench Pump House System north of the solar ponds.

207C

This pond contains process waste and sludge.

Sludge in Ponds

Solar pond sludge contains the majority of contaminants present at Solar Ponds

The primary contaminants of the sludge are radionuclides, nitrate, some metals, and traces of Volatile Organic Compounds (VOCs).

Solar Pond sludge is being cleaned out of ponds. It is converted to Pondcrete and shipped offsite for disposal (NTS).

Shipments of Pondcrete to NTS are currently shut-down (since May 8, 1990) awaiting an Environmental Assessment for the disposal of mixed waste.

Water in Ponds

Inputs of process waste to Solar Ponds ceased in 1986

Contaminated groundwater is pumped back to solar pond 207B-North. Water is transferred from this solar pond to other solar ponds on an as-needed basis.

The primary contaminants of the water are radionuclides, nitrate, some metals, and traces of VOCs.

Total quantity of pumped back groundwater per year is not exactly known. Flow meter records for last two years are being reviewed for total flow and return period of certain events. Current estimate of pumped back water per year. 4 million gallons.

SOLAR POND STATUS (continued)

Water in the Solar Ponds is currently managed by forced and natural evaporation. The availability of the forced evaporators for use on Solar Pond water has been decreasing.

Seepage immediately downgradient of the Solar Ponds is bypassing existing collection systems. Immediate problems in these areas will be corrected. Activities are also underway to quantify the need for additional surface or groundwater collection near the Solar Evaporation Ponds. This plan is due to DOE on October 31, 1990.

Soils

Additional soils characterization is planned in the draft RCRA Facility Investigation/Remedial Action Workplans submitted to the State and EPA in June 1990. These workplans were prepared to address the requirements of the draft Inter-Agency Agreement. These activities, once implemented, should further define the problems at the Solar Ponds area.

Soils immediately adjacent to the Solar Ponds are generally contaminated with nitrate. Limited contamination with radionuclides, heavy metals and volatile organic compounds (VOCs) may be present in limited areas

Soils in the general Solar Pond area are contaminated with nitrate.

Groundwater

Additional groundwater investigations will be conducted on an as-needed basis and as necessary to comply with the draft Inter-Agency Agreement. The draft Inter-Agency Agreement does not start the groundwater investigation phase until soils and sources have been characterized.

Groundwater near the Solar Ponds is generally contaminated with nitrate. Contamination of limited areas with uranium and tritium has also been identified. Possible other radionuclides, heavy metals and VOCs may also be present in limited areas.

Contaminated groundwater collected by the Interceptor Trench Pump House system is contaminated by nitrate, uranium and traces of VOCs. The source of the VOCs may not be the Building 774 footing drain.

Contamination present in the valley fill material near North Walnut Creek may be from the Solar Ponds. However, the sand seams previously believed responsible for this contamination have been found not to exist. This issue is still under investigation.

SOLAR POND PLANS

Ponds

The removal of sludge and water will be followed by the demolition of the ponds. The waste generated from pond liner and base course demolition will probably be disposed offsite as a mixed low-level waste.

Following offsite disposal of Solar Pond liners and other materials, the Solar Pond area will require capping with a RCRA-type (multi-layer) cap.

Soils

Some soils immediately adjacent and underlying the Solar Ponds will require offsite disposal in order to more effectively control contamination in the Solar Pond area. These will be soils contaminated with heavy metals or radionuclides.

It is anticipated that some soils contaminated only with nitrate can be remediated by collecting and treating groundwater for the time period necessary for nitrate to leach out.

Groundwater

It is anticipated that groundwater in the Solar Pond area will require collection and treatment for a minimum ten-year period.

Long-term management of pumped-back contaminated groundwater had previously been addressed by forced evaporation in the Building 374 Evaporators. Recent increased aqueous waste input to 374 makes this management alternative impossible without significantly upgraded evaporative capacity.

Other types of appropriate treatment methods for the pumped-back groundwater are currently under investigation

Groundwater monitoring at the Solar Pond area will be required for a minimum thirty year period.

Cost Estimate

The cost for construction of the Solar Pond cap is estimated at a minimum of approximately \$5,000,000. Current estimates for forced evaporation of water is \$.25 per gallon, or approximately \$1,000,000 per year assuming adequate evaporative capacity. Long-term monitoring costs are estimated at \$1,500,000 per year for thirty years (no adjustment for inflation)

SOLAR POND PLANS (continued)

RFI/RI Plan

Attached is the Executive Summary of the most recent workplan submitted for field investigations in the Solar Pond Area.

EXECUTIVE SUMMARY

This document presents the Work Plan for the Phase I RCRA Facility Investigation/ Remedial Investigation (RFI/RI) of the Solar Evaporation Ponds, which is a portion of Operable Unit 3, at the U S Department of Energy's (DOE) Rocky Flats Plant. This Phase I Work Plan has been prepared in accordance with the draft Interagency Agreement stipulated between DOE, the U.S. Environmental Protection Agency (EPA), and the Colorado Department of Health (CDH). The purpose of the Phase I RFI/RI is to review previous data and further characterize contaminant sources and contaminated soils associated with this waste management unit.

This Phase I RFI/RI will focus on the Solar Evaporation Ponds as the most probable source of contaminants and, concurrently, will concentrate on the areal extent of contaminated soils in the vadose zone. Subsequent phases will focus on groundwater, air, biota, and appropriate corrective/remedial studies, proposed plans, designs, and actions. The primary technical objective of this plan is to characterize the nature and extent of contaminants in material associated with the Solar Evaporation Ponds that include surficial soils and vadose zone, pond liquids and sediments, and pond liner and base course.

Following field investigations, a RFI/RI report will be prepared and will include a refined conceptual model, a Baseline Risk Assessment, and an Environmental Evaluation. The results of this report will be used as a decision tool for further investigations and to direct Interim Remedial Actions (IRA), if any are deemed appropriate. All responses to corrective action investigations and remedial design and construction will be implemented in accordance with the IAG and all appropriate guidance manuals.

Section 1--Introduction. This section is an explanation and overview of the Plan Provided in this section are the purpose and objectives of the Plan, regulatory background information, and an outline of the technical objectives of the Plan

Section 2--Site Description and Background This section contains descriptions of the Solar Evaporation Ponds, associated French Drain System and their operational history and past and current use Descriptions of site conditions are also provided that include the site geology, topography, surface water, groundwater, soil/vadose zone, and summary of previous investigations

Section 3--Initial Evaluation. This section presents the site conceptual model, based on information and data provided in Section 2 Phase I data needs associated with the conceptual model, preliminary identification of remedial alternatives, and baseline risk assessment are presented

Section 4--Field Investigation/Sampling Plan. This section contains the RFI/RI task descriptions and associated procedures and controls The scope of the field investigations include

- Sampling Solar Evaporation Pond liquids and sediments
- Sampling liquids from accessible points in the French Drain System
- Sampling soil/vadose zone material at 27 locations in the vicinity of the ponds
- Sampling pond liner, base course, and underlying vadose materials at 28 locations distributed within the ponds This task is held in obedience until all the ponds have been emptied of liquid and sediment

Section 5--Data Evaluation and Report. This section describes how the data collected during Phase I RFI/RI will be evaluated and includes a draft outline of the Phase I RFI/RI Report

Section 6--Phase I RFI/RI Schedule This section provides a timeframe and associated assumptions for the performance of the work presented in the Plan

Section 7--Bibliography This section lists the information sources that were used or are pertinent to preparation and production of the Plan

The figures and tables called out in the text of this document appear in **Appendices A and B**, respectively. **Appendix C** contains the statistical summaries of data from background geochemical studies (Rockwell International, 1989). **Appendix D** contains the Baseline Risk Assessment Plan. Also, three oversized plates (referred to in Section 2) are included in plastic sleeves at the back of this document