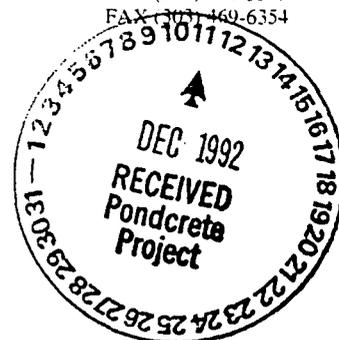




Environmental Technologies Group
ROCKY FLATS SOLARPOND/PONDCRETE PROJECT
452 BURBANK STREET
EG&G BUILDING 025
BROOMFIELD, COLORADO 80020
(303) 466-3573
FAX (303) 469-6354

December 11, 1992



Mr. Thomas D. Beckman
Contract Technical Representative
Solar Ponds Remediation Program
EG&G Rocky Flats, Inc.
Building 080
P. O. Box 464
Golden, Colorado 80402-0464

Subject: Rocky Flats Plant Solar Evaporation Ponds Stabilization Project
[WBS 431 PONDSLUDGE PROCESS TRAIN - DESIGN CRITERIA - HALLIBURTON
NUS ROCKY FLATS] BROWN & ROOT RESPONSE TO DOE - HQ-EM-453 COMMENTS
RF-HED-92-0861

Dear Mr. Beckman:

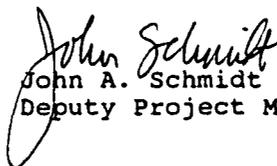
Enclosed for your review are BROWN & ROOT responses to comments concerning
DELIVERABLE 431 (Design Criteria).

In order to provide a more timely response, this response is being submitted
without the HNUS response to Items 11 and 16. This response will be submitted
separately.

Please contact me if you have any questions.

Sincerely,

HALLIBURTON NUS ENVIRONMENTAL
CORPORATION


John A. Schmidt
Deputy Project Manager

JAS/jg

Enclosure

cc: S. Heiman

A:LTRIBECKMAN9
RF-HED-92-0861



Brown & Root, Inc.

Post Office Box 3
Houston, TX 77001-0003

December 8, 1992

Letter No.: BAR-HED-0126
File No.: 230.431

Halliburton NUS Environmental Corporation
452 Burbank Street
Broomfield, Colorado 80020

ATTENTION: Ted Bittner

SUBJECT: Rocky Flats Solar Pond/Pondcrete
Waste Processing Project
Brown & Root Job No. JR-1198

REFERENCE: Deliverable 431
Design Criteria
HQ (EM-453) Comments
on Solar Evaporation Ponds Documents
F. R. Lockhart/E.M. Lee October 23, 1992

Dear Mr. Bittner:

We have reviewed the above referenced comments and attached hereto our response to them. Please note that two of the comments require a response by HNUS. We have annotated this for "Specific Comments" Item No's. 11 and 16.

We propose that all responses be reviewed and agreed to prior to the actual revision of the deliverable documents. This approach should result in a cost effective and timely reissue of the deliverables.

We regret the delay in responding to the comments. However, the late receipt of the comments coupled with HNUS' required staff reductions made it impossible to generate a detailed response until now.

RECEIVED
DEC - 9 1992
H. NUS ROCKY FLATS



Mr. T. A. Bittner
Halliburton NUS Environmental Corp.
BAR-HED-0126
File No.: 230.431
December 8, 1992
Page 2

If you have any questions, please contact me.

Very truly yours,

BROWN & ROOT, INC.



John R. Zak, P.E.
Project Manager

JRZ:fh

Attachment

cc: Y. F. Boutros
M. Gonzalez
W. C. Henderson
R. Joseph
L. M. O'Quinn
A. D. Varavadekar

RESPONSE TO "HQ (EM-453) COMMENTS
ON SOLAR EVAPORATION PONDS DOCUMENTS"
(REF. F.R. LOCKHART/E.M. LEE LETTER
DATED OCTOBER 23, 1992
WBS 431

The following responses are keyed to the subject titles and item numbers contained in the above referenced document. A copy of the document is attached hereto for easy reference.

We would like to point out that the WBS 431 Deliverables reflect the results of the design criteria meetings held jointly with HNUS and EG&G in late January 1992 and certain additional guidelines from EG&G. The pond sludge facilities designed by Brown & Root have been designed to meet these criteria to the best of our ability. However, if criteria changes are required, we will be pleased to discuss the contemplated changes, assess their impact on the facilities and provide whatever services are required to meet the new requirements.

The comments ranged from pertaining to just A/B Pond Criteria, C Pond/Clarifier Criteria and both criteria. Those applying to A/B Pond criteria and C Pond/Clarifier have been so noted. Where no notation is provided the comment applies to both criteria.

Once the responses are agreed to by HNUS, the WBS 431 Deliverables for A/B Ponds and C Pond/Clarifier can be revised and additional required engineering etc. can be addressed.

Critical Issues

Item No.s 1 and 2 don't seem to be applicable for a design criteria document. It seems more appropriate to cover these issues in start up and operating procedures and in the process control plan.

General Comments

Item No. 1 - We agree that a site plan would be helpful and should be included in both criteria deliverables. We suggest the use of the Rocky Flats Area Plot Plan that was provided by EG&G previously (8-1/2" x 11"). This plot plan would be appropriately annotated and referenced in Section 1.2 and would be inserted after the text and just before the Appendix tab. (Note: This plan is already contained in Appendix D, Exhibit C.)

Item No. 2 - Excavation is prohibited by EG&G. Section 2.4.11 was a reference to use of fill material. It was our original intention to include required specifications for fill material on the civil drawings. However, EG&G was reluctant to use any substantial amount of fill.

The module design criteria requires no point loading and stipulates 1000 pounds per square foot maximum soils loading. Installation in the field must insure that the uniform support/loading criteria is met with cribbing if required.

We propose that Section 2.4.11 be revised accordingly.

Item No. 3 - No comment

Item No. 4 - Design criteria meetings were held with an EG&G representative in late January 1992. These meetings were held to establish a design criteria for all disciplines before facilities detailed design commenced. The use of 100% diesel generator power was established at that time.

We can certainly develop a cost to prepare a study to compare the cost of diesel generated power with an on-site power facility. However, the short duration of this project would have a significant impact on the economics. Also, we have been told by EG&G that sufficient existing power was not available for this project either on or near 750 and 904 Pads. Therefore, either a new power generating facility would be required for a temporary operation or some power lines would need to be run from other plant areas to 750 and 904 Pads.

We propose to not change the criteria at this point. EG&G should develop a scope of work for a power study if they feel it is warranted.

Item No. 5 - We agree

Item No. 6 - We specifically addressed this issue with HNUS and EG&G. It was decided in the above referenced design criteria meetings that heat tracing was not a requirement (Ref. EF-650.01.11-1-A Electrical Design Criteria, Section 3.5) primarily due to the short duration of the project and the spring/summer operating schedule for pond sludge processing. We need direction from HNUS if there is a change in the operating schedule and criteria.

Item No. 7 - The existing criteria (Section 3.6 and Appendix F Process Control Philosophy) reflect decisions made in the above referenced design criteria meetings. If there is a change agreed to by HNUS, we need specific direction regarding what telephone service (number and types of lines, etc.) and where. We also need specifics on tie-in points to EG&G's telephone system.

It was recently stated by HNUS that the system provided by Halliburton Services would also be used for A/B Pond processing. Therefore, our current scope of services does not include any telephone system.

Specific Comments:

Item No. 1 - This applies to A/B Pond Criteria. Per EG&G, it is no longer acceptable to use any paving or to perform cut and fill work on site. Each module has secondary containment that will capture rain water, therefore run off area won't be significantly affected. Therefore, an assessment of the existing storm water system capacity should not be required.

Item No. 2 - This applies to A/B Pond Criteria. Paving is no longer applicable for the project. The criteria will be revised accordingly.

Item No. 3 - This applies to A/B Pond Criteria. We reviewed geotechnical reports forwarded to us by EG&G. These reports did not address soils at grade, only subsurface soils. Since all of the solar pond equipment must be supported at grade on existing soils, these reports were not applicable to the projects' needs. Also requests for geotechnical studies relevant to the projects' needs were not approved. Therefore, the value of 1000 pounds per square foot was specified as the design criteria.

Item No. 4 - This applies to A/B Pond Criteria. Flush water connections are provided on the major transport lines in the A/B processing circuit to facilitate the unplugging of lines and to flush out the individual pieces of equipment (tanks, pumps, mixers, etc.). These

connections may be hard piped (as in the case of the flush line below the Slurry Surge Tank, S-04, or after the Mixer Feed Pump, P-03). Process water from the Process Water Pump, P-06, is used to provide the source of the pressurized flush water. In addition, a number of temporary flexible hose connections are provided for additional input of flush water to the system or to provide temporary drain lines. This flush water is directed either to the Cement Flush Water Sump, SU-02, or to the Dirty Water Separator, S-05, to be reintroduced back into the process water system after suspended solids removal. The flush water can be directed to purge the entire slurry handling, cement mixing, pumping and casting systems or can be short-circuited around or by-pass any unit operation using the temporary flush/drain connections. Temporary drains, depending on location will drain into either secondary containment or auxiliary containers.

Item No. 5 - This applies to A/B Pond Criteria. There will be no vacuum truck provided or used to reclaim, consolidate or transport the pond sludge during normal (i.e. by LEFCO a subcontractor to Halliburton) operations. These operations will be done using other systems provided by the subcontractor. However, a concept for final cleaning and removal of the last vestiges of sludge solids from the ponds by EG&G which used a vacuum truck (provided by EG&G) in this manner has been considered. This may still be considered one of the viable options for the final pond cleanup, not normal operations.

Item No. 6 - A major revision would involve changes such as those that impact safety (eg. triggers a HAZOP review) or impact on operability or reliability of the process. Page 4/14 states who may require reviews of various documents either stated in the procedure or

other documents that may be produced that are not covered in the procedure. These procedures apply to Brown & Root documents only.

No specific formal revisions are planned ahead of time, however, a mechanism is required and has been established to handle those if/when they develop.

Item No. 7 - No comment

Item No. 8 - We typically don't have a Quality Assurance Manager sign off on drawings. Drawings are produced by each discipline. No one person can be versed in the technical aspects of all disciplines. Our question is what would be gained by the QAM signature on construction drawings? Our Engineering Assurance reviews on selected documents are a means of ensuring the quality of the design effort.

Item No. 9 - The team leader is a certified quality auditor by the American Society of Quality Control. The auditor has been previously certified as an auditor under ANSI N45.2.23.

Item No. 10 - This applies to A/B Pond Criteria. The specific manufacturer or brand name of a single supplier of the flocculant was not specified since it was believed that this would constitute a constraint in trade and violate a potential low-bid procurement procedure. However, the type of flocculant, i.e. a very high charge cationic, high molecular weight co-polymerized polyacrylamide, defines the specification for the type of flocculant which could be supplied by more than one manufacturer. The flocculant would be added in a nominal proportion of 5.6 lbs/ton of dry solids in the sludge;

thus constituting 0.28 wt.% of the dry solids. For the typical stabilization mixture, the flocculant would constitute less than 0.02 wt.% of the final waste form.

All laboratory treatability formulation testing for Pond A/B sludge (Reference Deliverables 235A1 & 236A1: Section 2.2.2 Phase I, Section 2.2.3 Phase II and Section 2.2.4 Phase III) used flocculated and dewatered sludge as the initial feed material. Therefore, the treatability and verification tests on Pond A/B sludges include the impacts of the flocculating agent (i.e. Praestol 644BC).

Item No. 11

HNUS TO PROVIDE INPUT

Item No. 12 -

Documents such as the Process Design Criteria or the Process Design Assumptions were intended to be stand-alone documents and were issued with their issue number and date. Internal procedures were followed for review and quality assurance prior to original issue. Subsequent updates and reissue of these documents were reflected in the issue and date of the new versions. They were not part of a numbered project document tracking system (e.g. like specifications or drawings) which assigns a unique document number, presents the document in a specification header format and has a corresponding document control tracking sheet attached for updated and reissued versions. This can be done in this manner and the above documents entered into the document tracking system.

Item No. 13 -

This applies to A/B Pond Criteria. The wording needs to be revised as follows: "..... is used to increase the slurry density of the pond sludges as reclaimed." to more precisely reflect the

operation. The slurry density will be increased relative to the density as reclaimed but will not exceed the terminal density in the BS Pond.

Item No. 14 - This applies to A/B Pond Criteria. The Surge Tank Heat Panels have been specified to supply 60 kW to the Surge Tank slurry. Depending on the percent solids in the dewatered sludge (15 to 25 wt.%) and the flow rate, the design temperature rise due to the heaters would be 30 to 40°F. Therefore, this would sustain a minimum of 60°F slurry temperature with 100% heater operation for the minimum feed slurry temperature of 30°F and the nominal, design slurry feed rate of 9.13 GPM. The temperature controller would turn the heat panels on and off to maintain a minimum slurry temperature control-point setting range between 50 and 70°F.

Item No. 15 - This applies to A/B Pond Criteria. The current A/B process design has the product from the Pug Mill Mixer discharging into a hopper feeding a positive displacement pumping system (e.g. the Morgen Pumper) which in turn pumps the stabilized pond sludge mixture to cast it into half crates. This pumping will provide additional mixing of the product. The ability of the proposed Qualtec Mixer which is a relatively-high-speed Pug Mill Mixer (about 90 rpm) to consistently produce well-mixed stabilized product over a range of waste loadings and water/pozzolan ratios was demonstrated during surrogate testing in May, 1992.

In these tests, several surrogate mixtures similar to the Pond A/B sludges with a range of viscosities and feed densities were mixed with a cement, flyash and lime mixture similar to that which will be used for the Pond A/B materials. Tests were conducted over

the projected target operating range of water/pozzolan ratios from 0.34 to 0.50/1. In all cases, samples taken of the discharge product and subsequently subjected to microscopic petrographic analysis showed the uniform and homogeneous mixing of the waste solids and pozzolan stabilization ingredients occurred. The conclusions from these surrogate tests (Reference: RF-HEH-092-074, June 10, 1992) was that the higher-speed Qualtec pug mill should achieve similarly-acceptable mixing using the actual Pond A/B sludge materials.

Item No. 16 -

HNUS TO PROVIDE INPUT

Item No. 17 -

This applies to A/B Pond Criteria. Based on a nominal working volume in the (4'W x 2.75'H x 8'L) Qualtec pug mill mixer of about 44 ft³ and at a nominal throughput of product of 7.5 tph, the projected product nominal volumetric rate would be 16.0 gpm or 2.2 ft³/minute. Therefore, the nominal material residence time in the mixer should be about 20 minutes. The mixer residence time in Section 2.3.5, Page 18 is apparently in error.

Item No. 18 -

This applies to A/B Pond Criteria. The number of potential process system shutdowns and wetted system flushes itemized in the "Note" in Section 2.3.6, Page 22, were the basis for design and sizing of the flushing systems including: the flush water piping sizes, the Cement Flush Water Sump, the Dirty Water Separator and the Process Water Tank. This schedule of potential shutdowns was provided by HNUS to represent a "worst case scenario" to serve as a basis for design. The infrequent emptying and flushing of the Area Sump was not included in the volumetric calculation of the Dirty Water Separator.

- Item No. 19 - We agree with the comment
- Item No. 20 - Clarification is required regarding the wording. EG&G has specifically directed that for this project equipment itself should not be designed to resist seismic forces. However, equipment structural supports should be and have been designed to account for seismic forces.
- Item No. 21 - We agree with the comment
- Item No. 22 - We have used the projected area approach for all structures except ladders. Ladders have been calculated using the enclosed structure approach. We believe this approach is cost effective for this project where wind loads are high.
- Item No. 23 - W_x is the weight of mass at the level under consideration. F_x is integrated.
- Item No. 24 - No comment. If a change is required by HNUS, please provide specific direction.
- Item No. 25 - The construction work is not being subcontracted therefore this section should be changed to "Not Applicable".
- Item No. 26 - We agree.
- Item No. 27 - The high intensity discharge lighting voltage is 208 volts.
- Item No. 28 - Originally we intended to lay all the cables on the ground to minimize cost for a temporary installation. As the job progressed we found it to be impracticable to lay all the cables on the ground

in all the areas. The design criteria document will need to be revised to include "cable tray" as a distribution feeder as well as cables laid on the ground where possible.

Item No. 29 - This applies to A/B Pond Criteria. 500 MCM lugs are used on both the primary and the emergency generators. The MCC incoming line will also be equipped with 500 MCM lugs.

Item No. 30 - This applies to A/B Pond Criteria. A 400 ROZD primary and a 200 ROZD emergency generator are being leased for processing of Ponds A and B. Based upon the load profile and the starting sequence, IPS (the generator lessor) had already performed a loading calculation justifying the aforementioned generator sizes. A 750 KVA generator is not being supplied. The 400 ROZD prime unit's kw rating is 366 and KVA rating is 450. The 200 ROZD Emergency unit's standby kw rating is 200 and the KVA rating is 250. These values would be reflected in the design criteria accordingly.

Item No. 31 - This applies to A/B Pond Criteria. The size of the mains if required is 100 amps or less, depending upon the number of circuits in a given panel board.

Item No. 32 - This applies to A/B Pond Criteria. See Item No. 31.

Item No. 33 - This applies to A/B Pond Criteria. The size of the main breaker is 100 amp.

Item No. 34 - We agree.

Note: Brown & Root Inc's. instrumentation engineer utilized the instrumentation department's "standard-go-by" design criteria document, and prudently modified it with a cost effective approach to meet the requirements of the Rocky Flats project. The design criteria, as was issued to date, is applicable to "Pond Sludge Processing" only as of the date of issue. All items that are not currently applicable would be annotated as "Not Applicable" in the next revision of the design criteria.

Item No. 35 - These sections are not applicable to the project, since we have no analyzers on this project at this time. We will list these sections as "Not Applicable" in the next revision.

However, if we were to add analyzers for a specific reason in the future, applicable requirements will have to be met.

Item No. 36 - At Casting Station #1, braces would be installed on the half crate.

Item No. 37 - This applies to A/B Pond criteria. Surrogate testing results indicated that no vibration or mechanical packing would be required.

Item No. 38 - We do not understand the comment. However, we do want to clarify that all final vendor data (certified where possible) including the drawings will be issued to the field to facilitate construction activities.

Item No. 39 - Yes, we do agree that the tagging procedures must be adhered to, as explained in the instrument design criteria. It is the responsibility of the "Receiving Personnel" in the field to ensure that the tagging procedures are adhered to, as explained above.

Item No. 40 - At this time there are no analyzers on this project. We will list this section as "Not Applicable" in the next revision.

However, if we were to add analyzers for a specific reason, in the future, applicable requirements will have to be met.

Item No. 41 - B&R is not procuring any instrument panels on this project at this stage. We will list this section as "Not Applicable" in the next revision.



HALLIBURTON NUS

Environmental Corporation

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Broomfield, Colorado 80020
(303)466-3573
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11/9/92
John
This is do stuff
Ted gave me.
Jack

FAX COVER SHEET

DATE 11/9/92 TIME _____ A.M./P.M.
(11-4-92)

*Never
used it*

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME John Zak FAX NUMBER _____
COMPANY/LOCATION _____ NUMBER OF PAGES 98
(INCLUDING FAX COVER SHEET)

FROM Ted Bittner FAX NUMBER 9
COMPANY/LOCATION _____

COMMENTS: Just received this this morning. Almost
2 weeks old. I need to give a brief
letter on how we're going to address by
tomorrow.
Please review & help me with response.

*Regards
Ted Bittner*

C. C. J. Templar