CORRES. CONTROL
INCOMING LTR NO.

01222 RF 94

DUE DATE 4-8-94

ACTION Stiger

DIST.	LTR	ENC
BERMAN, H.S.		
CARNIVAL, G.J.		
COPP, R.D.		
CORDOVA, R.C.		
DAVIS, J.G.	X	X
FERRERA, D.W.		
FRANZ, W.A.		
HANNI, B.J.		
HEALY, T.J.		
HEDAHL, T.G.		
HILBIG, J.G.		
HUTCHINS, N.M.		
KELL, R.E.		
KIRBY, W.A.		
KUESTER, A.W.		
MAHAFFEY, J.W.		
MANN, H.P.		
MARX, G.E.		
McKENNA, F.G.	X	X
MORGAN, R.V.		
PIZZUTO, V.M.		
POTTER, G.L.		
SANDLIN, N.B.		
SATTERWHITE, D.G.		
SCHUBERT, A.L.		
SETLOCK, G.H.		
STIGER, S.G.	X	X
SULLIVAN, M.T.		
SWANSON, E.R.		
WILKINSON, R.B.		
WILSON, J.M.		
Setlock G	X	X
Peterman B	X	X
Nesta S	X	X
Hayes C.	X	X
Stovall K	X	X
Glover W	X	X

CORRES CONTROL	X	X
ADMN RECORD/080	X	X
PATS/T130G	X	X

Reviewed for Addressee
Corres. Control RFP

3/29/94 Am
DATE BY

Ref Ltr. #

DOE ORDER # 5400.1
5700.6

RF-46522 (Rev. 01/94)

States Government **Department of Energy**

Memorandum

Rocky Flats Office

Mar 29 10 51 AM '94

EG&G
ROCKY FLATS PLANT
CORRESPONDENCE CONTROL

MAR 28 1994

ER:BKT:03191

000023520

Quality Assurance Problems Associated with the Rocky Flats Plant Industrial Area Operable Units Environmental Evaluation

Sue Stiger, Associate General Manager
Environmental Restoration Management
EG&G Rocky Flats, Inc.

This memorandum is in response to EG&G memorandum SGS-073-94, dated February 1, 1994, and is a follow-up of the Department of Energy/Rocky Flats Office (DOE/RFO) memorandum ER:BKT:00626, dated January 12, 1994. General comments on your February 1, 1994 letter, are addressed in this cover memorandum, while specific comments are provided as an attachment.

We previously (ER:BKT:00626) identified quality assurance problems regarding: (1) the use of unapproved Standard Operating Procedures (SOPs) and not following approved SOPs; (2) the use of an unapproved Field Sampling Plan (FSP); (3) performing field work outside of the time window specified in the FSP; and (4) improperly corrected (and completed) field forms.

With regard to the use of unapproved SOPs, EG&G's response appears to be that: (1) the deviations were not significant, and (2) the limited ecological conditions in the industrial area favored not implementing the approved SOPs. We disagree with EG&G's rationale. Failure to use approved SOPs generated for all Interagency Agreement (IA) field activities jeopardizes the data that are collected as well as their defensibility. In addition, it allows both regulators and Natural Resource Trustees to reject the validity of that data. In the future, we request that EG&G follow approved SOPs for all field activities. If changes to an SOP are necessary, a technical memorandum to the RFI/RI workplan or a revision to the SOP should be submitted to DOE/RFO for approval prior to implementing unapproved methodologies along with changes to previously approved methodologies. EG&G does not have the authority to unilaterally change or reject SOPs.

We prefer to use FSP as opposed to the Site Survey Plan (SSP). The National Contingency Plan (NCP), 40CFR Part 300.430 (b) (8) (ii), states that the FSP shall include the number, type and location of samples. Thus, as stated under "General comments" in your memorandum, the "SSP" which was provided to identify the planned survey sites for the industrial area environmental evaluation is in actual fact an FSP. According to the NCP and the Rocky Flats Plant IA, the regulators are to approve FSPs. By implementing an FSP that was not approved by DOE/RFO, the Environmental Protection Agency (EPA) and Colorado Department of Health (CDH), EG&G has violated DOE/RFO's obligation to the NCP and the RFP IA. We request that EG&G, in the future, implement FSPs only after receiving approval from DOE/RFO, EPA and CDH. If a decision is made to implement an FSP not approved by

MAR 28 1994

EPA and CDH, the decision is for DOE/RFO to make, not EG&G. Further, timely submittal of FSPs must be made to DOE/RFO that allow adequate review periods.

The performance of RFI/RI field work outside of the time windows specified in the FSP and SOP compromises data quality objectives and legally invalidates the data. Possible reasons for such an action are immaterial. As stated above, a technical memorandum or a revision of the SOP should be submitted to DOE/RFO for approval prior to implementing unapproved RFI/RI field activities.

Under "General Comments", EG&G has stated that "Original field forms were appended ... for information only. Final transcribed forms were intended for submittal to the files, but never intended to be included in the IAEE Technical Memorandum ... ". It is further stated that the forms are being transcribed as a result of the parallel review by EG&G and will be submitted to DOE/RFO by February 15, 1994. The cover memorandum states that preliminary drafts of documents were provided to DOE/RFO for parallel review in order to provide better communication and reduce review periods. In addition, it implies a subtle threat that EG&G may reconsider providing preliminary drafts to DOE/RFO in the future. We are concerned that, "by accident", DOE/RFO was given an opportunity to review original field forms whereby serious quality assurance problems were identified. If only transcribed forms were submitted to DOE/RFO, the quality assurance problems would have gone unnoticed. Thus, we request that EG&G continue to provide DOE/RFO with preliminary drafts, including original copies of and access to field forms.

Unless EG&G's Quality Assurance staff can provide a reasonable argument why the Industrial Area operable units environmental evaluation survey is defensible from a quality assurance perspective, DOE/RFO requests that all Industrial Area environmental evaluation surveys be repeated in 1994 in accordance with an approved FSP, approved SOPs and quality assurance requirements. Funds used to repeat the surveys should not be sourced by DOE/RFO as this is a cost-avoidance issue. A possible alternative to repeating the field work is to select and convene an independent board to review the data and associated quality assurance. If this board determines that the data are scientifically valid, the written determination of the board can be submitted to the regulators and Natural Resource Trustees along with the data in appropriate technical memoranda. We request that EG&G provide DOE/RFO with a proposal to either: (1) utilize an independent board to evaluate the data validity or (2) repeat the surveys in 1994, by April 8, 1994. It should be noted that the independent board may not validate the data. In this case, the surveys will have to be repeated.

Questions or concerns regarding this memorandum should be directed to either Steve Slaten at extension 5921 or Bruce Thatcher at extension 3532 of my staff.

Jesse Roberson
Acting Assistant Manager for
Environmental Restoration

Attachments

cc w/Attachments:
M. Silverman, OOM, RFO
L. Smith, OOM, RFO
F. Lockhart, ER, RFO
S. Slayton, ER, RFO
B. Thatcher, ER, RFO
A. Anders, ER, RFO
D. George, ER, RFO
D. Sargent, AMSPA, RFO
S. Olinger, AMESH, RFO
J. Adams, AMA, RFO
M. Roy, OCC, RFO
S. Stiger, EG&G
G. Setlock, EG&G

INFORMAL MEMORANDUM

DATE: March 11, 1994

TO: Bruce Thatcher, AMER

FROM: D.F. George, AMER (BOR)

SUBJECT: Comments on responses for IAEE.

The following comments are in response to the 2/1/1993 memo from S.G. Stiger to M.H. McBride, Subject: Response to Comments on the IAOUEE.

First, we disagree with the statement Ms. Stiger makes concerning the status of the original document at the time of review. The original transmittal letter provided no indication that the original IAEE document was an initial draft for review and comment. The transmittal only indicated the document to be a draft. It is not uncommon for EG&G to send draft reports to DOE, with no intent on ever making them "final". Secondly, the memo made no indication that DOE was requested to review and comment on the document or that it was an "information only "copy.

Under the general comments, the inclusion of the draft forms in the "draft" report makes little difference from a QA point of view. The forms, and the way they were completed were incorrect, and did not meet QA requirements. These documents are QA documents, regardless of whether they were attached to the report or not. In reality, the forms should havebeen filled out icorrectly in the field, and not be "transcribed".

The issue of the incorrect use of the SOP's stands. Unapproved SOP's were used. If there were only minor differences in the SOP's, then why not use the approved version? Did they really need the increased flexiblity of the "new " document ? Two things could have been done to alleviate this problem - Work to the approved procedure or have the new procedure approved prior to use. No effort was made to do the latter.

As to the use of an unapproved FSP, why write the document if you aren't going to use it. If the Contractor goes to all of the work and cost to prepare a document, it seems prudent to go through the approval process prior to the document's use. Still, the unapproved FSP was used, which is a QA non conformance.

The specific responses to comments appear more in order. Comment 21 is still applicable since EG&G accepted poor quality contract work. This work was done using the above unapproved documents accepted with the poor quality of the field forms.

DOE agrees with the findings presented in the ERM QA surveillance report, which verify our comments.

MEMORANDUM

TO: B. K. Thatcher, DOE,RFO/ERD

FROM: D. A. Anders, AEI (DOE,RFO/ERD)

DATE: 23 February 1994

SUBJECT: Response to the Response from EG&G to Comments on the Rocky Flats Industrial Area Environmental Evaluation - Phase I. February 1, 1994

Per your request, I have reviewed the EG&G Response to Comments on the Rocky Flats Industrial Area Environmental Evaluation - Phase I, dated 1 February 1, 1994, and have the following comments and concerns.

Re: General Comments

1. First paragraph. The fact that the "IAAEE FSP and the Phase I Data Summary were forwarded to DOE/ERD as a courtesy for information purposes only" is appreciated. However, the following sentence indicates that the "documents were undergoing parallel review by EG&G", which implies that DOE/ERD was also supposed to review the documents at that time.

2. The statement that "(o)riginal field forms were appended to the Phase I Data Summary, again for information only" does not negate the fact that these field forms were poorly and improperly prepared, and out of compliance with established field protocols and SOPs.

3. Third paragraph. If a "draft version of SOPs dated 1992 was used instead of the approved version dated 1991", where were these SOPs earlier in the process? These were delivered to DOE/RFO on 14 February 1994, after being specifically requested, and included Sampling of Vegetation[1], Sampling of Small Mammals[2], and Sampling of Birds[3]. Where is the memo, guidance, etc. to authorize this change? It is assumed that this was given verbally (see Specific Comments, Comment 1: NON-C of the Response to Comments.) However, Section 4.6 of the revised SOPs states that "trapping should be conducted during the appropriate seasons as specified in the FSP . . . (but) . . . deviations from specified schedules may be granted through written direction from the responsible EG&G Project Manager". DOE/RFO should have been advised of this guidance, either oral or written, as it was a departure from the authorized SOPs.

4. The statement that "the only variations of the draft SOPs from the approved SOPs consist of the specified number of traps, the length of trapping, and personnel qualification requirements (and) (a)ll other significant aspects of the draft SOPs are the same as for the approved SOPs" is not supported by a comparison of the two documents (Memo to Bruce Thatcher, 2/23/94, attached). In fact, the number of traps, length of trapping (4 days), and personnel qualifications are almost identical.

5. Fourth paragraph, the second issue. Was there a "misunderstanding that the copy of the draft FSP . . . was a formal FSP requiring DOE/RFO and agency approval"?

The FSP lists DOE as the author. Doesn't the "author" have to concur / approve of any document under its authorship? As part of the RFI/RI, under Section VI of the IAG[4], DOE is responsible for technical memorandums and other documentation pursuant to the cleanup of RFP.

6. The statement that "the IAEE followed all requirements of the formally approved TM for Operable Unit 9" is not entirely accurate. A comparison of the two documents revealed a number of discrepancies. Bruce, please see the 24 January 1994 memorandum to you dedicated to a comparison of the TM IAEE *vs.* the OU9 TM (EEWP) for specifics (attached).

7. "All three phases of the IAEE completed to date represent sub-phases within Phase I of the OU9 TM". I have difficulty finding support for this statement. Section 9.0 Environmental Evaluation of the OU9 TM states that the EE will consist of three components: (1) survey for migratory bird foraging, breeding, and nesting habitat; (2) survey for presence of threatened and endangered species or their critical habitat; and (3) an ecotoxicological investigation to determine the potential for biotic fugacity. (1) and (2) were to be accomplished during Phase I; (3) was to be restricted to OU9, scheduled to be the RFI/RI Phase II (Section 9.5), and it was recognized that the data might be too OU-specific for inclusion in other IA OU RFI/RI documents. Section 9.5.1 describes the objectives of Phase II (e.g., developing site-specific Conceptual Exposure and Conceptual Biota Transport models, selection of COCs and target taxa) which correspond to the contents of the Phase III Data Summary document.

8. In spite of the title of the document, this is not an "Environmental Evaluation", but an "Environmental Survey". It is understood that the IA is a highly disturbed habitat, and that a full EE is not practicable. Perhaps the title should be changed prior to the Final.

Re: New Comments

1. It is still unclear why the number of trapnights was limited to three in the small mammal survey of the IAEE in that both the original SOPs and the revised SOPs indicate that four is required (Section 4.10[2]). Was this a unilateral decision on the part of the subcontractor, or was verbal / written permission extended by EG&G?

2. Pelage dye was to be used to identify mammalian individuals in the event of recapture (original and revised SOPs). This was not mentioned in the text, and at the meeting with Rust, EG&G, and DOE on 1/6/94, a specific question on this was answered that no pelage dye was used. How then, were the "recaptures" determined?

3. Why was "subadult" used in the identification of mammalian classes in the IAEE? Both SOPs (original and revised) specify identification of "adult" or "juvenile" only.

4. Why was Robbins *et al.* (1966) used as the avian field reference in the IAEE? Both the original and revised SOPs state clearly that Peterson (1990) was to be used, and (revised) if any other field guide was used, it must be cross-referenced to Peterson. (In the original, Robbins *et al.* 1990 was also referenced, but not the 1966 edition.) This was not done in the IAEE.

5. Both the authorized the revised SOPs call for surveying each plot / transect of four separate mornings. Only three observation periods (10/28, 11/4, and 11/8) occurred.

6. The authorized SOPs (Section 6.2.3) require "at least four sample plots or two belt transects within each specific habitat type to be sampled", and the revised SOPs (Section 6.1) also use this language. In the IAEE Bird Survey[5], there were two observation points in Figure 4 (West Railroad), three in Figures 1 (East Drainage), 2 (North Pond and Seep) and 3 (Northwest Drainage), and 5 in Figures 5A and 5B (West Area). The Northwest Drainage potentially contains the greatest numbers and species of birds, since it is comprised of both tall and short marsh, riparian shrub, deciduous woodland, and mesic grassland. If this study is repeated, closer attention should be paid to following the prescribed number of observation points.

7. Section 6.2.9 in the Revised SOPs states that field forms should be signed and dated to indicated review and accuracy. None of the bird or vegetation field forms were signed / dated for these studies[5].

8. Both the authorized and the revised SOPs describe the methods of delineating plant cover. Section 2.0 Identification of Habitat Types of the IAEE[6] states that the authorized (EG&G SOP 5.11) version was used. However, this method was not explained in the IAEE text, nor was it was adhered to. Specifically:

   • as noted above (# 15), the vegetation field sheets were not signed / dated.

   • no botanical references were cited.

   • three methods are described in 5.11 (point-intercept transects, belt transects, and production plots) but were neither described nor apparently used for the study.

   • aquatic macrophytes were neither inventoried nor collected for tissue samples.

   • 5.11 (Section 6.2) states that terrestrial RFP vegetation surveys "will include the collection of quantitative data for cover, dominance, frequency, diversity, richness, height, production, and density". Section 3.0 of the IAEE indicates that only "species richness, estimated plant foliar cover, and species dominance" were components of the study. However, even these were not discussed in the text.

   • the abundance class code as defined in the SOPs was used sporadically and inconsistently on the field sheets, and abundance information was not incorporated into the text. "Dominance" and "dominant species" are mentioned in the text, but not quantified, and no supporting information for what the criteria to establish "dominance" was indicated in the field notes.

   • 5.11 of the authorized SOPs lists Weber (1976) as the field reference text; the revised SOPs emphasizes that both Weber (1976) and Carter (1988) be utilized, and that any additional sources used "will be cross-referenced to Weber and Carter to assure consistency". The IAEE does not mention <u>any</u> field reference used, neither in the text nor in Section 6.0 References. Several of the specific epithets do not agree with Weber / Carter, nor with any of the other reference books that I consult. nor with EG&G's RFP vegetation list. For example, I was unable to find "rush (*Juncus articulatus*)", soft rush (*Juncus effusus*), and "Crack Willow (*Salix fragilis)*" on the EG&G list. For consistency and comparability of

data from across the plantsite, the established standard (i.e., the EG&G list) must be followed. Niering and Olmstead list *J. effusus* as an Eastern wildflower, and it is unlikely that it would be found on the RFP plantsite; it is not found on the EG&G RFP plant list.

• on Table 3.1, "Crack Willow" is misnamed "Creek Willow"; possibly should be Coyote willow, as indicated on the EG&G plant list[7].

• on Table 3.1, Coyote Willow and Sandbar Willow are both listed, although these are generally considered by some field botanists to be the same plant (*Salix exigua*); Sandbar willow is *S. exigua interior*. In the EG&G vegetation species list, only "Coyote" is given; Weber lists *S. interior* as sandbar willow.

• Section 6.3.1 of 5.11 states that two components are necessary for a qualitative survey: a comprehensive species list for each community type gathered by "traversing the entire study area at least monthly throughout the growing season"; and describing "abiotic features such as substrate, topography, and soil moisture that could influence composition and structure". Given the short time frame of the study, the first was not possible; the second was not addressed in the IAEE text.

• the species codes stated in the Assignment of Species Codes were not followed (Appendix A, approved SOPs; SOP EE.14 in revised).

• the only form indicated as being used (in text and Appendix A) for vegetation sampling in the IAEE was 5.10 Relevé Survey Data Form. Use of Forms 5.10A (Point-Intercept Data), 5.10B (Belt Transect Data), 5.10C (Production Plot Data), and 5.0D (Terrestrial Site Description) was also required by the authorized SOPs.

• the species described in Section 3.0 of the IAEE as "dominant" annuals / forbs have no supporting evidence in either the text or field notes (12 pages of field notes). For example, sunflower (*Helianthus annus*) is listed as a "dominant" species (page 3-1), but in the field notes, it is given a cover class of "+" (few) and "r" (rare) at 3 sites; Russian-thistle (*Salsola iberica*) is not shown on any page of the field notes (although I know it is a noticeable component of RFP vegetation); and klamath weed (*Hypericum perforatum*) is given a cover class of "+" at 3 sites. White sage (*Artemisia ludoviciana*), noted as "3" (25 - 50% cover) in the Northwest Drainage, is not even mentioned in the text detailing this area. This is only a partial listing of the errors of omission / misinformation that I observed, and is, to me, indicative of hurried and careless work.

REFERENCES

1 EG&G. 1992. Sampling of Vegetation. EG&G Rocky Flats Plant EMD Manual Ecology SOP. Manual 5-21000-OPS. Procedure No. EE.10, Rev. 0. October 19, 1992.

2 EG&G. 1992?. Sampling of Small Mammals. EG&G Rocky Flats Plant EM Operating Procedures Manual. Manual Number 4-11000-OPS. Procedure No. EE.6, Rev. 1, Draft B. (Effective date was blank.)

3. EG&G. 1992?. Sampling of Birds. EG&G Rocky Flats Plant EM Operating Procedures Manual. Manual No. 4-11000-OPS. Procedure No. EE.7, Rev 1, Draft B. (Effective date was blank.)

4 EPA and CDH. 1991. Rocky Flats Interagency Agreement. United States Environmental Protection Agency Region VIII and the State of Colorado *In the Matter of* United States Department of Energy, Rocky Flats (Colorado) Site. Federal Facility Agreement and Consent Order CERCLA-VIII-91-3, RCRA (3008[h])-VIII-91-07. State of Colorado Docket #91-01-22-01.

5 DOE. 1993. Addendum to the Phase I Data Summary Industrial Area Environmental Evaluation. Rocky Flats Plant Industrial Area (Operable Unit Nos. 8, 9, 10, 12, 13 and 14). DRAFT. November 1993.

6 DOE. 1993. Phase I Data Summary Industrial Area Environmental Evaluation. Rocky Flats Plant Operable Unit Nos, 8, 9, 10, 12, 13, and 14. DRAFT. October 1993.

7 Harrington, Fred. 1993. Rocky Flats Plant Species List and Species Codes. Memorandum. FAH-GEN-93-072. July 29, 1993.

RECOMMENDATIONS

1. In responding the response statement from EG&G, I reexamined more thoroughly the IAEE documents reviewed earlier, most especially the vegetation data. Major concerns exist with the quality of these data. The more I investigated, the more convinced I have become that DOE should question the validity , accuracy, and consistency of these vegetation data. Specifically, I would recommend that DOE,RFO:

   • demand that EG&G re-visit the vegetation data for OUs 2, 5, 6, 7, and 8 for which Ms. Tiglas was the principal investigator.

   • insist that those data sheets now archived by the subcontractor (S.M. Stoller) be made available immediately to DOE,RFO and EG&G, and that these field data sheets be examined thoroughly for both scientific validity and concurrence with approved QA/QC standards and the SOPs under which the work was to be performed.

   • be aware that comparisons of the approved SOPs and the contents of the vegetation survey portion of the IAEE do not correspond, which indicate an unwillingness on the part of the field investigator to abide by established protocols and approved written direction.

   • insist that the vegetation survey be re-accomplished in conformance with established SOPs and QA/QC standards

MEMORANDUM

TO: B. K. Thatcher, DOE,RFO/ERD

FROM: D. A. Anders, AEI (DOE,RFO/ERD) DAA

DATE: 23 February 1994

SUBJECT: Comparison of authorized SOPs and revised Draft SOPs.

Per your request, I have reviewed and compared authorized SOPs [1] *vs.* the EG&G revised Draft SOPs for Sampling of Vegetation[2], Sampling of Small Mammals[3], and Sampling of Birds[4], and have the following comparisons, comments, and concerns.

Comparison. In general, the authorized original SOPs and the revised SOPs are very similar:

Mammal sampling

- trapnights: approved states trapping "should be run for at least four consecutive nights"; revised, "preferred that four consecutive trapping nights be performed concurrently with the reference areas".

- personnel requirements: identical except that original requires periodic performance audits, and personnel failing the audit will be re-trained.

- field forms: original, 5.0A (Biota Field Sample), 5.0D (Terrestrial Site Description), 5.0E (Qualitative Survey / Relative Abundance Data), and 5.6A (Small Mammal Live-Trapping Data); revised, EE.6A (Small Mammal Live Trapping Data).

Bird survey

- field guide(s): both list Peterson (1990)[5] as field guide. Authorized also lists Robins *et al.* (1990)[6]. Revised states that if other field guide is used, must be cross-reference with Peterson.

- sampling points: both require "at least four sample plots or two belt transects with the area of interest".

- forms: Authorized has 6, Revised 4. Authorized: 5.7A (Songbird Plot Sample Data), 5.7B (Songbird Belt Transect Data), 5.7C (Bird Nesting Record), 5.7D (Raptor Nest Observation Data), 5.0E (Qualitative Survey / Relative Abundance Data), 5.0D (Terrestrial Site Description). Revised: EE.7A (Songbird Breeding Plot Data), EE.7B (Songbird Belt Transect Data), EE.7C (Bird Nesting Record), EE.7D (Raptor Nest Observation Data). In general, the Revised forms are superior to the Authorized.

Sampling of Vegetation

- field guide(s): both list Weber (1976)[7] as a reference. The Revised also lists Carter (1988)[8] and states specifically that all nomenclature must be cross-referenced to Weber / Carter.

- forms: both require EE.10A (Point-Intercept Vegetation Cover Data), EE.10B (Belt Transect Data), EE.10C Production Plot Data), EE.10D (Relevé Survey Data); the authorized also lists forms 5.0A (Biota Field Sample) and 5.0D (Terrestrial Site Description)

- procedures: both require the use of point-intercept and belt transects, production plots (for sampling of standing biomass), and qualitative community surveys of both terrestrial and aquatic vegetation.

Comments / Concerns.

1. As indicated above, although both documents are similar, there are some differences. In general, the revised draft SOPs are more detailed and more clearly defined in the text, and require fewer forms for documentation.

2. At this point, however, only the original SOPs are authorized and have been approved by the Agencies and EG&G.

3. The IAEE did not follow closely either of these documents. For specifics, please see B. Thatcher memo of 02/23/94 (attached), re: Response to the Response from EG&G to Comments on the Rocky Flats Industrial Area Environmental Evaluation - Phase I. DRAFT. February 1, 1994.

A more detailed comparison between the two documents is given below:

Sampling of Small Mammals

EMD Operating SOPs	Revised SOPs
• Purpose: to establish standard methods of community survey and tissue collection of small mammals in conjunction with the EE process at RFP. "This SOP should be consulted during the preparation and execution of any specific FSP for implementing an EE but does not include all the information required for an FSP (e.g., sample size, sample location, statistical approach)."	• Purpose: to establish standard methods for community surveys and tissue collection of small mammals at RFP.
• Scope: (essentially same as Revised)	• Scope: (essentially same as original)
• Responsibilities: Personnel should be instructed in the used of sampling apparatus and identification of species likely to be encountered; at least one person on each field crew should have minimum of. in biology + 2 yrs field experience in small mammal studies; all should have OSHA; performance audits will be conducted; persons failing will be retrained.	• Responsibilities: (Section 5.2, Revised below, very similar to original)
• References: (identical to Revised)	• References: (identical to original, with addition of ref. to original)
• Equipment: (listed)	• Equipment: (omitted until 5.5, below)
• General Considerations and Limitations: (consisted of 3 general paragraphs, re: live-trapping, environmental factors that might influence trapping, addition of specific statistical approach to FSP.	• Limitations and Precautions: (more specific and detailed than original) 4.1 health and safety plan required 4.2 field sampling crew supervisor to complete CCS Field Form (010-06-03-64) 4.3 MSDSs will be provided for sample preservatives 4.4 trapping method of choice for collecting community, etc. data 4.5 field identification guide will be Burt and Grossenheider 4.6 trapping to be conducted during appropriate season specified in FSP; deviations granted via written direction from EG&G PM 4.7 live-trapping preferential 4.8 whole-body tissue analysis to be used; if elevated whole-body
Inventory	
concentrations	

	of COCs observed, subsequent trapping may be necessary 4.9 QA/QC sampling requirements as specified in work plan 4.10 capture success influenced by environmental factors outside of investigator's control; "four consecutive trapping nights be performed concurrently with the reference areas"; if trapping interrupted, additional night(s) will be added; comparison of abundance and richness based on concurrent surveys to minimize variables.
• Prerequisites: (see Responsibilities, above)	• Prerequisites: 5.1 personnel will be instructed in all phases of trapping; controlled copy of FSP shall be available to field personnel 5.2 at least 1 person will have M.S. in biology + 2 yrs. field experience or B.S. in biology + 4 or more yrs field experience 5.3 all personnel meet site-specific H&SP 5.4 EG&G PM will obtain all required permits (Procedure 3-21000-ADM-21.02, EM Field Activity Auth. Req. 5.5 Equipment (listed); same as original
• Community Surveys: (information similar to revised, but more generally written) No. of traps: large grid: 100, 10 x 10; small grid: 25, 5 x 5 Distance apart: 5 m Polyester ball for bedding traps shut when gently tapped	• Procedure: (very similar to original, but more specifically itemized) No. of traps: 25, 5 x 5; 50, 5 x 10; or 10 - 20 Distance apart: 5 m Polyester ball only if cold weather shut when gently tapped; do not face west due to possibility of strong winds; shade to be provided in hot weather complete Form EE.5C; if weather changes, do another EE.5C also
classify as "adult" or "juvenile"	classify as "adult" or "juvenile"; record on Form EE.6A; use 5-21000-OPS-EE.14, Assgnmt. of Species Codes
use pelage dye for recapture	use pelage dye for recapture, mark on Form EE.6A
Forms indicated are 5.0A, 5.6A, 5.0D, and 5.0E Copies of forms retained by field subcontractor; data entered into RFEDS	Form indicated is EE.6A Forms to be signed, dated; submitted to field sampling data manager for entry into RFEDS
• Tissue Collection: collected on last	• Tissue Collection: as specified in FSP;

night of trapping; only adults and non-lactating females	only adults and non-lactating adult females; use clean plastic bag for each, decon trap if req. by FSP; specific details for sample analyses; complete, sign, date Form EE.1A for each sample; assign unique number; Chain-of-Custody procedures
• Documentation: info should be in field notebook and on Forms 5.0A, 5.6A, 5.0D, and 5.0E	• Disposition: original field data forms, copies of C-O-C, and field logbook to EG&G PM in accordance with 5-21000-OPS-FO.2 Transmittal of Field QA Records; when this is done, EG&G PM signs, dates Records Trans. Form, submited field data records to EM Records Center (3-21000-ADM-17.01, Quality Records Mgmt.

Sampling of Birds

EMD Operating SOPs	Revised SOPs
• Purpose: to establish standard methods for quantitative survey in conjunction with the EE process; use to prepare FSP; general description of RFP birds, breeding seasons	• Purpose: to establish standard methods for quantitative songbirds surveys and qualitative bird surveys to assess patterns of species occurrence, abundance, and richness; use to prepare FSP; general description of RFP birds / breeding
• References: (similar to revised)	• References: (similar to original, with addition of two C. S. Robbins papers)
• Equipment: (listed)	• Equipment: (listed in 5.6, below; changes from original included optional mist net, tape measure not 50-m fiberglass as shown in original, field thermometer in °C)
• Considerations and Limitations: First ¶ and 4.1 of Revision are identical Second ¶ and 4.3 very similar. Lists Peterson 1990 as field guide.	• Limitations and Precautions: 4.2 lists Peterson 1990 as field guide 4.3 states that QA/QC sampling requirements specified in work plan / FSP; songbird surveys conducted May - mid-June, other times by written direction of EG&G PM 4.4 states surveys to be conducted under favorable weather conditions
• Responsibilities and Qualifications: personnel should be instructed and skilled identification of songbird species; at least	• Prerequisites: 5.1 personnel instructed and skilled in identification of songbird species; con-

one person on each crew to have M.S. in biology, 2 yrs field experience, and ability to i.d. songbird vocalizations; at least one familiar with vegetation; meet OSHA re-
exp.;
quirements; performance audits; failures must re-train

trolled copy of FSP available to field personnel
5.2 at least one person with M.S. in bio,
2 yrs field exp. or B.S. with 4 yrs

all with ability to i.d. songbirds and estimate distance and direction by songs; at least one member familiar with veg.
5.3 all field personnel meet site-specific H&SP
5.4 EG&G PM must obtain permits, etc.
5.5 walk-through of area 1 wk prior to survey
5.6 equipment (see Equipment, above)

- Execution of Protocols: verbiage is very similar for both documents

- Instructions: similar to original, but is more detailed and specific in revised. Section 6.2.9 states that "signing and dating the data form verifies that the information entered has been reviewed and has been determined to be accurate".

Sampling of Vegetation

EMD Operating SOPs

- Purpose /Scope: verbiage is very similar in both documents. Original states that its
not
purpose to establish methodology to be
used in conjunction with the RFP EE process

- Responsibilities and Qualifications: very similar to revised, and to "Small Mammals" and "Birds"

- Equipment: similar, but not as detailed as revision; does specify "50-m fiberglass" measuring tape, and "1-m" measuring stick

- References: less detailed than revision

- Execution of Protocols: similar verbiage

Revised SOPs

- Purpose / Scope: very similar to original, but revised is more detailed; does
mention RFP EE process

- Prerequisites: very similar to original and to other two sampling documents reviewed

- Equipment: adds "coolers, dry ice, ice or equivalent, 2.0 cm (0.25 in) x 1.5 meter (5.0 ft) steel rod with pointed end (or equivalent)"

- References: adds three references (Braun-Blanquet 1965, Carter 1988, Lincoln et al. 1982, Mueller-Dombois and Ellenburg 1974) and expands references from original SOPs

Limitations and Precautions: first several paragraphs are nearly identical. Adds that QA/QC sampling requirements are specified in work plan or FSP, and that plant nomenclature will follow Weber and Car-

ter. If other sources used, will be cross-referenced to Weber and Carter.

- Quantitative Community Surveys: similar verbiage, but less detailed. Outlines point-intercept transects, belt transects, and production plots. Aquatic marcrophyte studies limited to qualitative inventories and tissue collection.

- Procedures - Quantitative Community Surveys: Emphasis is given to the point-intercept method.

REFERENCES

1 EG&G. 1991. EMD Operating Procedures Manual No. 5-21000-OPS-EE Volume V: Ecology. EE.06 Sampling of Small Mammals; EE.07 Sampling of Birds; and EE.10 Sampling of Vegetation. May 1991.

2 EG&G. 1992. Sampling of Vegetation. EG&G Rocky Flats Plant EMD Manual Ecology SOP. Manual 5-21000-OPS. Procedure No. EE.10, Rev. 0. October 19, 1992.

3 EG&G. 1992? Sampling of Small Mammals. EG&G Rocky Flats Plant EM Operating Procedures Manual. Manual Number 4-11000-OPS. Procedure No. EE.6, Rev. 1, Draft B. (Effective date was blank.)

4. EG&G. 1992? Sampling of Birds. EG&G Rocky Flats Plant EM Operating Procedures Manual. Manual No. 4-11000-OPS. Procedure No. EE.7, Rev 1, Draft B. (Effective date was blank.)

4 EPA and CDH. 1991. Rocky Flats Interagency Agreement. United States Environmental Protection Agency Region VIII and the State of Colorado *In the Matter of* United States Department of Energy, Rocky Flats (Colorado) Site. Federal Facility Agreement and Consent Order CERCLA-VIII-91-3, RCRA (3008[h])-VIII-91-07. State of Colorado Docket #91-01-22-01.

5 Peterson, R. T. 1990. A Field Guide to Western Birds. Houghton Mifflin Co. Boston.

6 Robbins, C.S., B. Brun, and H. S. Zim. 1990. A Guide to Field Identification: Birds of North America. Golden Press. New York.

7 Weber, W. A. 1976. Rocky Mountain flora. Colorado Associated University Press. Boulder.

8 Carter, J. L. 1988. Trees and Shrubs of Colorado. Johnson Books. Boulder.

MEMORANDUM

TO: B. K. Thatcher, DOE,RFO/ERD

FROM: D. A. Anders, AEI

DATE: 24 January 1994

SUBJECT: Comparison of Technical Memorandum Industrial Area Environmental Evaluation Rocky Flats Plant Industrial Area Operable Unit Nos. 8, 9, 10, 12, 13 and 14. DRAFT. December 1993 *vs.* Technical Memorandum Operable Unit 9 Phase I RFI/RI Work Plan Section 9 Environmental Evaluation. REVISION. March 1992. [a.k.a. Environmental Evaluation Work Plan (EEWP)]

Per your request, I have compared the Tech Memo IAEE RFP IA OUs with the Tech Memo OU9 Work Plan (EEWP), and have the following comments and concerns:

GENERAL COMMENTS

1. The Tech Memo OU9 Work Plan (EEWP) of 20 March 1992 replaced Section 9.0 Environmental Evaluation of DOE's RFP Restoration Program for OU9[1], with the concurrence of DOE, EPA, CDH, and EG&G. This is the workplan referenced in Section 4.3.5 of the OU9 SOW.

2. If the IAEE Tech Memo (Rust) was intended to fulfill the requirements of the OU9 Tech Memo EEWP, the EEWP should have been referenced. It was not, neither in the text nor in Section 7.0 References.

SPECIFIC COMMENTS

1. Basic requirements outlined in EEWP as indicated by Roman numerals, below. The numeral followed by an asterisk indicates how well the IAEE Tech Memo met this requirement.

   I.
   The EEWP consists of three components:
   (1) survey for migratory bird foraging, breeding, and nesting habitat, and the study was to yield a Final Habitat Survey Report.
   (2) survey for the presence of threatened and endangered species or their critical habitat to assure compliance with the Endangered Species Act (ESA) at 50 CFR 402; Final Biological Survey Report to be issued only if habitat suitable for the species was found within the IA.
   (3) ecotoxicological investigation to determine, in the absence of significant ecological values at OU9, the potential for biotic dispersal of contaminants from OU9 into adjacent watersheds, drainages, or operable units.
   I. *
   (1) Not documented in any of the seven Rust documents, including the IAEE. Numbers and species of birds only was indicated.

(2) Not documented in the IAEE, and no verbiage discussing this. A Ferruginous hawk was indicated as flying overhead in the Addendum[2].
(3) No ecotoxicological investigation was conducted. The IAEE FSP[3] stated on page 3 that "(d)uring Phase I of the IAEE only qualitative ecological field data will be collected, (n)o quantitative procedures will be used to estimate population densities or production of key species, . no tissue samples will be collected, and not toxicity testing or histopathological assessments will be conducted".

II.
Components (1) and (2) were to be accomplished during Phase I, and would include the entire IA; component (3) was to be restricted to the OU9 study area and delayed until Phase II. Information from components (1) and (2) was to be included intact in other industrial area operable unit RFI/RI documents to avoid needless duplication of effort.
II. *
(1) and (2) addressed marginally in Phase I[4], Phase II[5], and Addendum[2] documents, but not in IAEE Tech Memo.
(3) was to be accomplished in Phase II, but was not done.

III.
Section 9.4 Habitat and Biota Surveys (RFI/RI Phase I) of the EEWP outlines the ecological surveys for the IA, and adds to (1), (2), and (3) above:
- more comprehensive view of types and areal extent of OU9 habitat and vicinity;
- information on raptor, waterfowl, and passerine bird species;
- presence / absence of species of special concern nesting / breeding habitat.
- information on species, numbers, and movement patterns of small mammals;
- data on histopathology of selected tissues from small mammals and unfledged birds living in or near OU9.

III.*
First bullet: accomplished.
Second bullet: addressed (no waterfowl were observed, and songbirds were added).
Third bullet: not accomplished / addressed.
Fourth bullet: species and numbers addressed, movement patterns not.
Fifth bullet: not accomplished.

IV.
EG&G EE SOPs were to be followed.
IV.*
In general, EE SOPs were followed. Additionally, EG&G gave Rust the list of RFP species (plants, mammals, birds, fish, reptiles, and amphibians) to use in identification and nomenclature. In regard to SOPs, there may be a problem with the use of field logbooks and field notes (addressed in earlier reviews of this series of documents); the EG&G species lists were not used in the surveys. Instead, an outdated (1967) bird book was used, and no acceptable botanical references were cited.

V.
Section 9.4.4 Ecological Field Investigations states that:
- all surveys would be conducted between 1 April - 30 September 1992.
- surveys for *Spiranthes dilluvialis* would occur between the last week in July until the end of August

V.*
First bullet: Not accomplished. Botanical surveys[4] were conducted October 13 - 15, 1993; mammal surveys[4] October 14 - 16, 1993; and bird surveys on three occasions during October 28 through November 8, 1993[2].
Second bullet: Not accomplished, and not indication was made that this would be accomplished.

VI.
Section 9.4.4.2 birds indicated that:
• survey was to be performed to determine bird species present, their number, their general behavior, and habitat where observed.
• this was not to be performed if it was not possible to verify the existence of suitable migratory bird or raptor foraging habitat within the IA, (page 11, EEWP).
VI.*
First bullet: Generally accomplished (indicated on field notes, but not repeated in text).
Second bullet: Has "suitable migratory bird or raptor foraging habitat" be verified in the IA? The presence of prey species would indicate this possibility , but human activity might preclude foraging. However, text[2] indicated that a Ferruginous hawk was sighted flying over the IA.

VII.
Section 9.4.4.3 vegetation stated that:
• objectives were to assess the extent, quality, and structure of habitat available to migratory bird species, and to provide data for:
    (a) description of site vegetation characteristics
    (b) determination of impacts to plant communities
    (c) identification of potential exposure pathways
    (d) selection of target taxa for contaminant analysis during Phase II
    (e) identification of any protected plant species or habitats
• qualitative methods were to be used to determine plant species present by community type, as well as data on abiotic features, such as substrate, topography, and soil moisture
• the releve-method (sample-stand or species-list method) was to be used.
• EE SOP 5.10 was to be used to sample terrestrial and aquatic vegetation
• was not to be performed if it was not possible to verify the existence of suitable nesting / breeding habitat for migratory birds, raptors, other species of concern, or habitat suitable for *Spiranthes diluvialis*
VII.*
First bullet: "Extent" was accomplished (in Sections 3.0 and 4.0 of text and in Figures); "structure" addressed marginally; "quality" was not addressed. EG&G had requested that plant structure be examined, with basal, foliar, and canopy cover (as applicable) be indicated[7]. This was not done.
    (a) Addressed in Section 3.0 and Figures.
    (b) Not addressed.
    (c) Accomplished, via indirect references in Section 3.0, and in the food webs of Section 5.0.
    (d) Accomplished.
    (e) Not accomplished.
Second bullet: Qualitative measures were used, but no abiotic data was collected.
Third bullet: Releve method was used.
Fourth bullet: EG&G SOPs were cited, but not EE 5.10 specifically. 5.10 states that "(t)errestrial vegetation surveys at Rocky Flats will include the collection of

quantitative data for cover, dominance, frequency, diversity, richness, height, production, and density". None of these were discussed in any way in this document. The abundance class designations were generally not followed on the field notes (reference 4 only, not in this document) as indicated by 5.10. No aquatic vegetation was sampled.
Fifth bullet: Has this habitat been verified?

VIII.
9.4.4.3.1 *S. diluvialis*
Directed surveys for this species were to be conducted at all points near OU9 or within the IA where potential habitat existed.
VIII.*
Not accomplished.

IX.
9.4.4.4 mammal population characterization states objectives were to:
- describe existing wildlife habitats in the area
- develop foodweb models, including contributions from vegetation
- identify potential contaminant pathways through trophic levels
- identify target taxa for collection and tissue analysis during Phase II
- provide a general description of the community.

IX.*
First bullet: Accomplished.
Second bullet: Accomplished.
Third bullet: Accomplished.
Fourth bullet: Accomplished.
Fifth bullet: Not accomplished.
Sixth bullet: Accomplished.

X.
9.4.5 Reports indicates that three discrete reports would be generated: (1) final habitat survey report, (2) final biological survey report, and (3) small mammal population technical memo.
X.*
Not accomplished.

XI.
Section 9.5 Ecotoxicological Investigation (RFI/RI Phase II) objectives were:
- development of a site-specific Conceptual Exposure Model to identify potential exposure pathways for on-site biota
- development of a site-specific Conceptual Biota Transport Model to identify potential biotic off-site transport pathways
- selection of biologically active COCs (target analytes)
- selection of representative target taxa
- direct measurement for target analytes within target taxa
- histopathological investigations of selected organs and tissues in order to develop baseline pathology data.

XI.*
First bullet: Accomplished. Mentioned in Section 2.0 Scope of Investigation as Task 2 - Data Collection /Evaluation and Conceptual Model Development (Phase I) and written up in Section 5.0 Exposure Assessment and Risk Characterization under 5.1 Development of a Conceptual Food Web and Pathway- Receptor Model.

Second bullet: Accomplished, under Section 5.2 Assumptions for the Pathways Model, and 5.3 Calculation of Bioaccumulation and Biomagnification Factors. However, PCBs, herbicides, and pesticides were not included as COCs. Additionally, the IAEE Tech Memo departed from the EEWP in the development of the foodweb (terrestrial food chains) in that it added "soil" as a component, and eliminated "insects" as a component. Aquatic habitats and aquatic insects, mentioned in the EEWP, were ignored in the IAEE TM.
Third bullet Accomplished (see "second bullet" above)
Fourth bullet: Not accomplished.
Fifth bullet: Not accomplished.

XII.
Section 9.5.2 Field Sampling of the EEWP states that the objectives of the Phase II field sampling program are to:
- collect tissue samples for measurement of target analyte concentrations in terrestrial organism
- collect site specific data on biota and important abiotic parameters
- collect tissue samples to support histopathological investigations
- provide data for verification and validation of the conceptual models

Sampling would be limited to mice and voles, cottontail rabbits, and birds.
XII.*
First and third bullets: Not accomplished.
Second and fourth bullets: Partially accomplished. No abiotic data was recorded in the text, but some is indicated on the field notes; without histopathological samples, verification and validation of the conceptual models will be less subject to verification / validation. Eggs and unfledged nestlings were to be collected during the specified April - May sampling period, but bird observation (no sampling) occurred in October. Because no histopathological data was collected, Section 9.5.4 Ecological Risk Assessment of the EEWP for the determination of bioaccumlation and fugacity cannot be reasonably assessed. Without this data, the remediation criteria described in Section 9.5.4.1 of the EEWP cannot be properly developed.

2. The only Phases that are referenced in the EEWP are I and II. Why has a Phase III[6] document been added at this juncture?

REFERENCES

[1] DOE. 1991. Rocky Flats Plant Environmental Restoration Program Phase I RFI/RI Work Plan. Original Process Waste Lines Operable Unit 9. DRAFT FINAL/ November 1991.

[2] DOE. 1993. Addendum to the Phase I Data Summary Industrial Area Environmental Evaluation. Rocky Flats Plant Industrial Area (Operable Unit Nos. 8, 9, 10, 12, 13 and 14). DRAFT. November 1993.

[3] DOE. 1993. Industrial Area Environmental Evaluation Field Sampling Plant. DRAFT FINAL. October 15, 1993.
- **note to Bruce: How can this be a Draft Final when this is the first time DOE has seen it? All others in this series are "Draft". -**

[4] DOE. 1993. Phase I Data Summary Industrial Area Environmental Evaluation. Rocky Flats Plant Industrial Area Operable Unit Nos. 8, 9, 10, 12, 13, and 14. DRAFT. October 1993.

[5] DOE. 1993. Phase II Data Summary Industrial Area Environmental Evaluation. Rocky Flats Plant Operable Unit Nos. 8, 9, 10, 12, 13, and 14. DRAFT. November 1993.

[6] DOE. 1993. Phase III Data Summary Industrial Area Environmental Evaluation. Rocky Flats Plant Industrial Area Operable Unit Nos. 8, 9, 10, 12, 13, and 14. DRAFT. December 1993.

[7] Personal communication, Fred Harrington, EG&G, 19 January 1994.

CONCLUSIONS AND RECOMMENDATIONS

1. It appears to me that the IAEE was not intended to conform to or reply to the EEWP, but is a new document, which basically summarizes the results of the study. In fact, the Table of Contents page bears this observation out.

2. The review I accomplished earlier on this document indicates a number of problems, and recommended not accepting it "as is". If it is intended to replace the EEWP, it is completely unacceptable, in my opinion, as it resembles the EEWP in only the most remote of ways.