CORRES CONTROL
OUTGOING LTR NO

DE ORDER# 5400.1

14 RF 11444

45190

DIST	LTR	ENC
MARAL M E		
URLINGAME A H	X	X
USBY W S		
RANCH D B		
ARNIVAL G J		
AVIS J G		
ERRERA D W		
RAY R E		
EIS J A		
LOVER W S		
OLAN P M		
ANNI B J		
ARMAN L K		
EALY, T J		
EDAHL, T		
ILBIG J G		
UTCHINS, N M		
ACKSON D T		
ELL R E		
UESTER, A W		
ARX G E		
McDONALD, M M		
McKENNA, F G		
MONTROSE, J K		
MORGAN, R V		
POTTER, G L		
PIZZUTO, V M		
RISING T L		
SANDLIN, N B		
SCHWARTZ, J K		
SETLOCK, G H		
STEWART, D L		
STIGER, S G	✓	
TOBIN, P M		
VOORHEIS, G M		
WILSON, J M		
C. A. BICKER	✓	✓
M. L. HOGG	✓	✓
N. A. HOLSTEEN	✓	✓
R. A. KREHBIEL	✓	✓
CORRES CONTROL	X	X
ADMN RECORD/080	✓	✓
TRAFFIC		
PATS/T130G		

CLASSIFICATION

UCNI		
UNCLASSIFIED	✓	
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE

CLASSIFICATION RE[illegible]ER PER CLASSIFICATION OFFICE

IN REPLY TO RFP CC NO
N/A

ACTION ITEM STATUS
☐ PARTIAL/OPEN
☑ CLOSED

LTR APPROVALS

ORIG & TYPIST INITIALS
RAR [redacted]/EB

EG&G ROCKY FLATS

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94-RF-11444

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EXPOSURE SCENARIOS FOR THE OPERABLE UNIT (OU) 6 POND AREAS OF CONCERN (AOC) - SGS-596-94

Action Transmit position paper to agencies

In response to a request from Jen Pepe (formerly from the Department of Energy, Rocky Flats Field Office (DOE, RFFO)), EG&G has prepared the attached position paper on exposure scenarios for the OU6 pond AOCs The purpose of this paper is to clarify the exposure scenarios for the pond AOCs in the Walnut Creek Priority Drainage, OU6 During the OU6 data aggregation meeting with the U S Department of Energy (DOE), U S Environmental Protection Agency Region VIII (EPA), and Colorado Department of Public Health and Environment (CDPHE) on June 30, 1994, EPA indicated that the appropriate "No Action" risk assumption for the ponds would be that the structures had failed or been removed, allowing sediments to dry and become surficial soils The pond sediments would then be addressed in the Human Health Risk Assessment (HHRA) of the Phase 1 RCRA Facility Investigation/Remedial Investigation (RFI/RI) using a residential soil exposure scenario

Since the meeting on June 30, 1994, there have been two major developments that will impact the appropriateness of addressing the OU6 pond sediments in the HHRA as residential soils (1) the request to list Preble's Meadow Jumping Mouse (PMJM) as an endangered or threatened species and (2) the Board of County Commissioners of Jefferson County resolution expressing the concern about any efforts to change the land use of the Rocky Flats Environmental Technology Site (Site) buffer zone from its current status as undeveloped open space

Due to these recent developments, it is inappropriate to assume that the "No Action" risk assumption for the ponds would be that the structures had failed or been removed, allowing sediments to dry and become surficial soils Rather, DOE will assume that the ponds will remain intact and will be addressed using a recreational exposure scenario New HHRA equations have also been developed that can accommodate this scenario Agency approval is needed for this new approach in order to continue with the finalization of the Exposure Assessment Technical Memorandum for OU6 Further delay in addressing this issue could impact the schedule for the completion of the human health risk assessment

DOCUMENT CLASSIFICATION REVIEW WAIVER PER CLASSIFICATION OFFICE

EXPOSURE SCENARIOS FOR THE OU6 POND AREAS OF CONCERN

The purpose of this paper is to clarify the exposure scenarios for the pond areas of concern (AOCs) in the Walnut Creek Priority Drainage, Operable Unit No 6 (OU6) During the OU6 data aggregation meeting with the U S Department of Energy (DOE), U S Environmental Protection Agency Region VIII (EPA), and Colorado Department of Public Health and Environment (CDPHE) on June 30, 1994, EPA indicated that the appropriate "No Action" risk assumption for the ponds would be that the structures had failed or been removed, allowing sediments to dry and become surficial soils The pond sediments would then be addressed in the human health risk assessment (HHRA) of the Phase II RCRA Facility Investigation/Remedial Investigation (RFI/RI) using a residential soil exposure scenario Since the June 30th meeting there have been two major developments that will impact the appropriateness of addressing the OU6 pond sediments in the HHRA as residential soils

1 On September 29, 1994, LeRoy W Carlson, U S Fish and Wildlife Service (FWS), sent a letter to Mark Silverman, DOE, regarding the relationship of the Rocky Flats Environmental Technology Site (RFETS) clean up efforts to the welfare of Preble's Meadow Jumping Mouse (PMJM) Through studies, the FWS has found that the RFETS population may be the only viable PMJM population remaining On August 19, 1994, the FWS received a petition requesting the listing of PMJM as an endangered or threatened species throughout its range and to designate critical habitat within a reasonable amount of time following the listing While PMJM as yet has no legal protection under the Endangered Species Act of 1973, FWS states in their letter that " it is within the spirit of the Act for federal agencies to consider project impacts to potentially candidate species It is the intention of the Service (FWS) to promote protection of this species before human-related activities adversely impact its habitat (open wet meadows/riparian) to a degree that it would need to be federally listed " Thus the FWS would like DOE to designate the RFETS buffer zone as a flora and fauna open space preserve In response to the FWS letter, DOE, RFFO developed an interim policy for PMJM which was issued October 4, 1994 These policies support the protection of the PMJM habitat

2 On September 8, 1994, the Board of County Commissioners of Jefferson County issued a resolution (No C94-654) expressing the concern about any efforts to change the land use of the RFETS buffer zone from its current status as undeveloped open space It is the position of this Board that "MAINTAINING, IN PERPETUITY, THE UNDEVELOPED BUFFER ZONE OF 'OPEN SPACE' AROUND ROCKY FLATS IS A CRITICALLY IMPORTANT ENVIRONMENTAL, SAFETY, AND HEALTH CONSTRAINT WHICH MUST BE REQUIRED AS PART OF ANY AND ALL ALTERNATIVE ACTIONS PROPOSED BY THE DEPARTMENT OF ENERGY "

Risk Assessment Guidance for Superfund (RAGS) states that " an assumption of future residential land use may not be justifiable if the probability that the site will support residential use in the future is exceedingly small" (EPA 1989) As can be seen from the positions of the

above two governmental agencies, both of which can ultimately play a role in restricting residential development in the RFETS buffer zone, it is unlikely that the OU6 ponds will be drained and that any dried sediments will be available to long term residential exposure In addition, this scenario is counter to EPA guidance for baseline risk assessment that requires "No Action" scenarios, i e , existing conditions to be addressed (EPA 1989) Therefore, to include the dry ponds scenario, it would also be necessary to show the true "No Action" scenario, which is leaving the ponds in place This will cause a duplication of effort that will likely impact costs and schedules

In further support of assuming that the ponds remain intact, draining of these ponds would likely require wetlands mitigation in accordance with the Clean Water Act Section 404(b)(1) guidelines and Executive Order 11990 A letter from Martin Hestmark, EPA to Richard Schassburger, DOE dated November 19, 1993, states that " even if no mitigations were required to comply with the substantive requirements of the Clean Water Act, wetland mitigation would be required to comply with the Executive Order " Although this EPA decision was provided for mitigation of wetland impacts associated with installing permanent surface water monitoring stations at RFETS, it would likely apply to the wetlands associated with the OU6 ponds

Although it is unlikely that the buffer zone will be developed as residential land use, there is a strong possibility that residential development would encroach upon the buffer zone boundaries Therefore, it is also possible that human receptors could be exposed to stream and shore pond sediments under the residential recreational exposure scenario Since an adequate site-wide methodology has not been developed for estimating human health risk and developing programmatic preliminary remediation goals (PPRGs) under this exposure scenario, this topic has been expanded to include the methodology proposed below Should this approach be acceptable to the agencies, it will be used to develop similar equations for an ecological worker exposure scenario in the exposure assessment technical memoranda (EATMs) PPRGs for these scenarios will be developed as appropriate in Technical Memorandum No 1 of the Feasibility Study (FS)

Methodology for Estimating Risk and PPRGs for Exposure to Sediments in OUs 5 and 6

In order to support the FS for OUs 5 and 6, an approach needs to be developed to estimate risks for surface water and sediment independently and to estimate PPRGs for these media separately Currently in the EATMs, exposure to these media is combined in one scenario (surface water/suspended sediment ingestion) However, combining exposure to the two media does not support the FS since the media generally have different chemicals of concern and would require different remedial alternatives, if necessary In order to address this issue, exposure equations have been developed for direct exposure to sediment to support both the risk assessment and FS Equations to estimate exposure to surface water are already included in the EATMs The equations for exposure to sediment are conservatively based on a residential receptor exposed to sediments under a recreational scenario, even though the areas of concern (AOCs) for these OUs, in general, do not support residential land use scenarios

The following items indicate the conservative nature of the assumption of residential land use

1 Areas of Concern (AOCs) for OU6 that include sediments are the A- and B-series ponds and their associated streams These AOCs do not include sufficient land area to support a residential land use scenario AOCs for OU5 have not been delineated, but will likely not support residential use

2 The Jefferson County Board of County Commissioners has passed a resolution (Resolution No CC94-654, September 8, 1994) stating that the buffer zones must be left intact as "undeveloped open space," making it even less likely that residential land use would be plausible in these areas

The following equations are based on those presented in the PPRG document for exposure to surficial soils, but are adjusted to yield estimates for cancer risks or hazard quotients The equation for radionuclides is as follows

$$Risk_r = C \times ED \times [(EF \times IR_o \times SF_o \times 10^3\ g/mg) + (EF \times IR_i \times SF_i \times 10^3\ g/kg \times 1/PEF) + (SF_e \times (1-S_e) \times T_e)]$$

Where
- C = Radionuclide activity (pCi/g)
- ED = Exposure duration (30 years)
- EF = Exposure frequency (7 days/year)
- IR_o = Sediment ingestion rate (50 mg/day)
- SF_o = Oral cancer slope factor $(pCi)^{-1}$
- IR_i = Sediment inhalation rate (2 m^3/day)
- SF_i = Inhalation cancer slope factor $(pCi)^{-1}$
- PEF = Particulate emission factor (4 63E09 m^3/kg)
- SF_e = External exposure slope factor (risk/yr per pCi/g)
- S_e = Gamma shielding factor (0 2)
- T_e = Gamma exposure factor (0 3)

The equation for nonradionuclide carcinogens is as follows

$$Risk_{nc} = \frac{C \times ED \times EF \times [(IR_o \times SF_o \times 10^{-6}\ kg/mg) + (IR_i \times SF_i \times 1/PEF)]}{BW \times AT}$$

Where
- C = Chemical concentration (mg/kg)
- ED = Exposure duration (30 years)
- EF = Exposure frequency (7 days/year)
- IR_o = Sediment ingestion rate (50 mg/day)
- SF_o = Oral slope factor $(mg/kg\text{-}day)^{-1}$
- IR_i = Sediment inhalation rate (2 m^3/day)
- SF_i = Inhalation cancer slope factor $(mg/kg\text{-}day)^{-1}$
- PEF = Particulate emission factor (4 63E09 m^3/kg)

BW	=	Body weight (70 kg)
AT	=	Averaging time (25550 days)

The equation for noncarcinogenic compounds is as follows

$$\text{Hazard Quotient} = \frac{C \times ED \times EF \times [(IR_o \times 10^{-6}\ kg/mg \times 1/RfD_o) + (IR_i \times 1/PEF \times 1/RfD_i)]}{BW \times AT}$$

Where	C	=	Chemical concentration (mg/kg)
	ED	=	Exposure duration (30 years)
	EF	=	Exposure frequency (7 days/year)
	IR_o	=	Sediment ingestion rate (50 mg/day)
	RfD_o	=	Oral reference dose (mg/kg-day)
	IR_i	=	Sediment inhalation rate ($2\ m^3$/day)
	SF_i	=	Inhalation cancer slope factor (mg/kg-day)
	PEF	=	Particulate emission factor ($4.63E+09\ m^3$/kg)
	BW	=	Body weight (70 kg)
	AT	=	Averaging time (10950 days)

Conclusions

Due to recent developments, it is inappropriate to assume that the "No Action" risk assumption for the ponds would be that the structures had failed or been removed, allowing sediments to dry and become surficial soils. Rather, DOE will assume that the ponds will remain intact and will be addressed using a residential recreational exposure scenario. New HHRA equations have been developed that can accommodate this scenario.