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MEETING NOTES

TO: Distribution

DATE: November 2, 1993

FROM: Philip Nixon

MEMO #: SP307:110493:01

PROJECT #: Solar Pond IM/IRA

ATTENDANCE:

Harlan Ainscough, CDH
Arturo Duran, EPA
Randy Ogg, EG&G
Mark Austin, EG&G
Phil Nixon, ES
Richard Henry, ES
Rich Stegen, ES
Ted Kearns, DOE/KMI
Frazer Lockhart
Peg Witherill DOE/SMS

DISTRIBUTION:

Attendees
L. Benson
A. Conklin
P. Breen
H. Heidkamp
K. Cutter
D. Myers
S. Stenseng
A. Fricke
B. Snyder
T. Kuykendall
T. Evans
B. Cropper
C. Montes
B. Wallace, EG&G (Admin. Record)
K. Ruger, EG&G
K. London, EG&G
R. Wilkinson
Steve Howard, DOD/SMS
Jim Hartman, DOE
Helen Belencan, DOE
Ernie O'Tool, DOE/MMES
Steve Paris, EG&G
Andy Ledford, EG&G

SUBJECT: Solar Pond IM/IRA Team Meeting

ADMIN RECORD

1) Original Process Waste Lines

Mark Austin provided background data that he had accumulated for the OU9 process waste lines that OU4 was considering annexing. The research conducted by ES demonstrates that some of the lines have already been flushed. Frazer Lockhart indicated that DOE research specifies that some of the lines are gravity flow. He also indicated that it is likely that lines were abandoned in-place if they had leaking problems. Pressure testing for leak determination will not be applicable on gravity flow lines because the lines were not designed to withstand pressure and could fail as a result of the testing.

Characterization of the lines was discussed. Harlan Ainscough specified that it is likely that enough soil characterization data has been collected to identify any major leaks. Arturo Duran requested that the analytical list from the OU4 RFI/RI be compared to the list of constituents in the process waste lines. If the lists are the same, then a case can be developed based on process knowledge to require no further characterization. ES is performing the comparison.

Frazer Lockhart indicated that DOE would likely endorse the transfer action, but they wanted to take the time to identify any associated impacts. Harlan Ainscough indicated that the transfer would be acceptable to the CDH. His concern was that the transfer should only include the lines that would be impacted by the closure, and maybe the formal transfer should be made after the closure/remediation strategy is selected. Harlan also indicated that the lines could be closed in-place under the recently promulgated debris rule. It was agreed that the official construction start could involve the removal or closure of the OU9 waste lines.

It was agreed that the carbon tetrachloride contamination that is identified in groundwater under the south berm of C Pond was originating from Buildings 777 and/or 779 and was not a COC for the OU4 IM/IRA. Therefore, OU4 will not be expected to remediate the carbon tetrachloride.

2) Preliminary Chemicals of Concern

Leigh Benson presented a revised list of PCOCs to the team and indicated that it did not change from the previous weeks list as a result of implementing the Gehan test. It was discussed that the results are based on historical data and the OU4 RFI/RI data. Frazer Lockhart indicated that DOE realized that the historical data could be very useful in contouring the extent of contamination, but that it may not be appropriate to make official decisions on COCs based on the non-validated historical data. Randy Ogg requested that ES identify if the maximum value of a PCOC was based upon historical data. Leigh Benson indicated that a computer program was currently being prepared to query this information from the database.

It was agreed that the 95% confidence interval should be used in comparison with the PRGs to determine the extent of the contamination. After the comparison has been made, ES will re-run the 95% confidence interval without the historical data on designated contaminants (as appropriate).

The issue of Tentatively Identified Compounds (TICs) was discussed. It was decided that only constituents that were on the OU4 RFI/RI analyte list could be COCs. It is expected that all the TICs will be eliminated by this screen since chemicals on the OU4 analyte list should not have included any TICs. In addition, the TICs could also be screened (if necessary) with respect to the historical data base. If a TIC is a COC due to the concentrations in the historical data, then it will be removed from the COC list.

3) Preliminary Remediation Goals

Phil Nixon specified that the issues identified last week were resolved. The dermal exposure pathway will be incorporated into the PRGs. The crop ingestion pathway will not be incorporated in the PRG calculation. Child and adult intakes will be incorporated into the PRG calculation for the onsite resident scenario. A forward cumulative risk calculation will not be necessary since the PRGs will include a conservative dermal exposure pathway, and will be modified to account for the cumulative risk. The PRGs will be modified with respect to specific target organs. Therefore, the devisor in the straight line methodology will be less than the total number of COCs. If a COC has an impact on multiple organs, then the PRG for the COC will be based on the lowest modified value from the multiple organs. **Phil Nixon will issue the teleconference notes from the issue resolution discussion to DOE and EG&G.** ES incorporated the radionuclide exposure equation from the most recent EPA guidance. The team agreed on this issue resolution. **ES will forward the radiological equations that will be used to CDH for review. In addition, ES will contact the EPA to determine the correct reference for the new radiological equation.**

Alexis Fricke reported that the PRGs are currently being calculated and that it looks like the dermal exposure pathway will have a significant impact on the results. The results of the modified PRG calculations should be ready for discussion at the next team meeting.

4) ARARs Development

Rich Stegen presented the proposed format for the ARAR analysis. A general table will be used in the detailed analysis of alternatives to identify potential location and action specific ARARs and to assess whether the alternatives can meet the ARAR requirements. Frazer Lockhart indicated that an IM/IRA was required to comply with ARARs to the extent practicable. A second location and action specific ARAR table will be generated for the selected alternative that specifies how the alternative will comply with the previously identified ARARs.

A separate table will be prepared to present the chemical specific ARARs and PRGs with a column to identify the proposed clean-up limit. It was decided that To-Be-Considered documents (TBCs) would not be considered for identifying potential clean-up standards. The clean-up standards will be driven by the PRG calculations and any promulgated standards. Groundwater protection standards will not be considered as chemical specific ARARs for the OU4 IM/IRA.

It was decided that chemical specific ARARs/TBCs for ecological receptors will not be considered in the OU4 IM/IRA. It was agreed that the ecology of the site is heavily modified by industrial activities. It was agreed that the ecological impacts would be minimal with respect to the OU4 IM/IRA, and that the PRGs for human health exposures would likely be more stringent than ecological TBCs. A qualitative assessment of the simplistic ecosystem will be addressed in the Overall Protection of Human Health and the Environment criteria (within the detailed analysis of alternatives). This assessment will focus on the potential for the COCs to biomagnify, and whether there is a completed exposure pathway.

The team was asked to bring any comments on the ARAR analysis format to the next team meeting because ES is currently performing the analysis.

5) Liner Issue

Harlan Ainscough stated that the CDH could allow contaminated media to be closed in-place without enacting the new landfill siting criteria for new landfills because the Hazardous Waste Siting Act only addresses hazardous waste and not contaminated media. The liners are considered hazardous waste due to the "mixture rule".

DOE is still assessing the regulatory basis for imposing the need to obtain a Certificate of Designation for leaving the liners in-place.

6) RCRA Closure Performance Standards

Phil Nixon indicated that Harlan Ainscough had provided comments. No other comments had been received. **The team was asked to bring comments to the next team meeting.**

7) Geology/Hydrogeology considerations relative to soil flushing

Richard Henry indicated that the ITS is an effective system when it is tied into the bedrock. However, not all of the systems trenches are tied into the bedrock. Therefore, there is the potential for leakage under the system. In addition, the permeability of the subsurface soils are typically in the 1.0x10-5 to 1.0x10-6 cm/day range with values as low as 1.0x10-9 cm/day. EPA guidance indicates that soil flushing is effective for soils that have a permeability of less that 1.0x10-4 cm/day. Therefore, it was decided that soil

flushing would not be considered for *insitu* soil remediation. Randy Ogg specified that the justification for deleting this technology be written up in the IM/IRA decision document.

8) RFI/RI Drilling Status

Randy Ogg reported that the drilling may start on November 3, 1993 if a second crane can pass the OSHA inspection. The crew is currently in the Pond B-North taking liner samples and surficial soil samples from beneath the liners.

Philip Nixon, Project Manager

Attachment 1
SP307-110493:01
Page 1 of 1

OPERABLE UNIT 4/SOLAR EVAPORATION PONDS

PHASE I RFI/RI & IM/IRA PROGRAM

NOVEMBER 9. 1993

AGENDA

SCHEDULE REVIEW-A. LEDFORD (8:00-8:30)

OU 9/OPWL UPDATE/STATUS-M. AUSTIN/S. HUGHES (8:30-9:00)

CHEMICALS OF CONCERN-L. BENSON (9:00-9:30)

BREAK (9:30-9:45)

ISOPLETH MAPS-P. NIXON (9:45-10:00)

PRELIMINARY REMEDIATION GOALS-A. CONKLIN (10:00-10:30)

ARARS-COMMENTS-R. STEGEN (10:30-10:45)

CLOSURE PERFORMANCE STANDARDS-COMMENTS (10:45-11:00)

TECHNOLOGY DEVELOPMENT-ES (11:00-12:00)

LUNCH (12:00-1:00)

RFI/RI DRILLING STATUS-R. HENRY (1:00-1:15)

PHASE II RFI/RI WORK PLAN COMPONENTS-R. OGG (1:15-1:30)

NEXT WEEKS MEETING SCHEDULED FOR MONDAY NOVEMBER 15, 1993 DUE TO "TIE" CONFERENCE

NEW ISSUES (1:30-1:45)

NEXT WEEKS AGENDA ITEMS (1:45-2:00)

Attachment 2
SP307-110493:01
page 1 of 1

Information on Phase II RFI/RI Program

Phase II RFI/RI Work Plan Outline:

Introduction (5-10 pages);

Data Summary (20-25 pages);

Data Quality Objectives (10-15 pages);

Field Sampling Plan (30-40 pages);

Baseline Risk Assessment (20-25 pages);

QA/QC section (20-25 pages);

Appendices

Schedule Considerations

Draft Phase II RFI/RI Work Plan Milestone (4/14/94) (working 3/25/94)

Final Phase II RFI/RI Work Plan Milestone (6/24/94) (working 5/16/94)

Note: Since the OU 4 Phase II RFI/RI Work Plan is an inclusion in the OU 4 IM/IRA Decision Document and the DD goes to the public for review and comment, it is anticipated that some minor revisions could be needed to satisfy the public. However, since work plans typically do not go to the public for review and comment, is assumed that at a minimum, conditional approval will be granted no later than the June 24, 1994 milestone. Phase II field activities are scheduled to commence approximately September 1994.

Attachment 3
SP307:110493:01
Page 1 of 2

Remedial Alternatives

I. No Further Action (1)
   A. Regrade and seed
   B. Post-closure monitoring

II. Containment of Contaminated Materials without Treatment
   A. Cover systems
      - Backfill and seed (2)
      - Temporary cover (3)
      - Engineered cover (4)
         - Cover alternatives 1-4
   B. Post-closure monitoring

III. Containment of Liners with Insitu Soil Treatment (5 & 8)
   A. Liners
      - No Treatment
      - Partial Dismantling and removal (hot spots)
   B. Insitu Soil Treatment
      - Soil flushing
      - Degradation
   C. Cover system
      - Backfill and seed
   D. Post-closure monitoring

IV. Removal of Contaminated Liners (Partial or Total) with Insitu Soil Treatment (6 & 7)
   A. Liners (total or hot spots)
      - Containerization
      - Size reduce and containerization
   B. Soils (total or hot spots)
      - No treatment
      - InSitu treatment
         - solidification/stabilization (liner must be removed)
         - soil flushing
         - degradation
         - thermal desorption (liner must be removed)
   C. Cover systems
      - Backfill and seed
      - Engineered Cover
         - cover alternatives 1&2
   D. Post-closure monitoring
   E. Liner Disposition
      - Disposal
      - Storage

V. Removal of Contaminated Materials (Partial or Total) With Exsitu treatment (9, 10, and 11)

   A. Liners (total or hot spots)
      - Containerization
      - Size reduce and containerization

B. Soils (total or hot spots)
   - Containerization
   - Exsitu treatment
     - solidification/stabilization
     - soil washing
     - solvent extraction
     - degradation
     - thermal desorption
C. Cover systems
   - Backfill and seed
D. Post-closure monitoring
E. Liner Disposition
   - Disposal
   - Storage
F. Soil Disposition
   - Disposal
   - Storage

Notes:

The (#) indicate the preliminary scenarios from Table 3-5.

The cover alternatives 1-4 are described in Section 3.3.2.12

DRAFT 11/5/93

Attachment 4
SP307:110493:01
Page 1 of 7

Rocky Flats OU 4

Carcinogens

Chemical	Background Concentration (mg/kg) MAX	PRG Future Resident (mg/kg)	PRG Contruction Worker (mg/kg)	PRG Future Worker (mg/kg)
Barium	195			
Beryllium	1.1	0.0135	0.131	0.12
Cadmium	1.5	347	19900	765
Cesium	255			
Chromium(III)	69.6			
Chromium (VI)	69.6	520	2990	115
Mercury	0.64			
Nickel	54.2			
Nitrate	0.0048			
Strontium	226			
Thallium				
Archlor 1254		0.000146	0.00481	0.000537
Cyanide				
1,1,1-Trichloroethane				
1,1,2,2-Tetrachloroethane		0.0238	0.572	0.0963
1,1,2-Trichloroethane		0.0759	1.88	0.303
1,1-Dichloroethane				
1,1-Dichloroethene		0.0344	0.826	0.139
1,2-Dichloroethane		0.227	5.45	0.917
1,2-Dichloropropane		0.07	1.68	0.283
1,3-Dichlorobenzene				
2-Butanone				
2-Hexanone				
4-Methyl-2-pentanone				
Acetone				
Benzene		0.744	17.6	3.02
Bromodichloromethane		0.0802	1.9	10.7
Bromoform		6.77	171	26.8
Bromomethane				
Carbon disulfide				
Carbon tetrachloride		0.035	0.854	0.14
Chlorobenzene				
Chloroethane				
Chloroform		0.85	19.8	3.47
Chloromethane		1.59	38.2	6.43
cis-1,3-Dichloropropene		0.0245	0.604	0.0979
Dibromochloromethane		2.89	1.23	0.194
Ethylbenzene				
Methylene chloride		0.68	15.9	2.77
Styrene				

DRAFT 11/5/93

Attachment 4
SP307110493.01
Page 2 of 7

Rocky Flats OU 4

Chemical	Background Concentration (mg/kg) MAX	PRG Future Resident (mg/kg)	PRG Contruction Worker (mg/kg)	PRG Future Worker (mg/kg)
Toluene				
Xylenes				
trans-1,2-Dichloroethene				
trans-1,3-Dichloropropene		0.136	1.33	1.22
Trichloroethene		0.434	10.4	1.75
Vinyl acetate				
Vinyl chloride		0.00251	0.0602	0.0101
1,2,4-Trichlorobenzene				
1,2-Dichlorobenzene				
1,4-Dichlorobenzene		0.0989	2.89	0.374
2,4,5-Trichlorophenol				
2,4,6-Trichlorophenol		8.35	27.3	3.54
2,4-Dichlorophenol				
2,4-Dimethylphenol				
2,4-Dinitrophenol				
2,4-Dinitrotoluene				
2,6-Dinitrotoluene		0.00328	0.115	0.0118
2-Chloronaphthalene				
2-Chlorophenol				
2-Methylnaphthalene				
2-Methylphenol				
2-Nitroaniline				
2-Nitrophenol				
3,3'-Dichlorobenzidine		0.0149	0.521	0.0537
3-Nitroaniline				
4,6-Dinitro-2-methylphenol				
4-Bromophenyl phenyl ether				
4-Chloroaniline				
4-Chlorophenyl phenyl ether				
4-chloro-3-methylphenol				
4-Methylphenol				
4-Nitroaniline				
4-Nitrophenol				
Acenaphthene				
Acenaphthylene				
Anthracene				
Benzoic acid				
Benzo(a)anthracene		0.000485	0.017	0.00175
Benzo(a)pyrene		0.000167	0.0107	0.000601
Benzo(b)fluoranthene		0.000504	0.0177	0.00189

DRAFT 11/5/93

Attachment 4
SP307:110493:4
page 3 of 7

Rocky Flats OU 4

Chemical	Background Concentration (mg/kg) MAX	PRG Future Resident (mg/kg)	PRG Contruction Worker (mg/kg)	PRG Future Worker (mg/kg)
Benzo(k)fluoranthene		0.00107	0.0374	0.00385
Benzyl alcohol				
Bis(2-chloroethoxy)methane				
Bis(2-chloroethyl)ether		0.0223	0.0164	0.2
Bis(2-chloroisopropyl)ether		0.00735	0.258	0.0265
Bis(2-ethylhexyl)phthalate		0.0891	2.89	0.328
Butyl benzyl phthalate				
Chrysene		0.0462	1.47	0.171
Dibenzofuran				
Dibenzo(a,h)anthracene		0.000826	0.029	0.00298
Diethyl phthalane				
Dimethyl phthalate				
Di-n-butyl phthalate				
Di-n-octyl phthalate		0.309	7.67	1.23
Fluoranthene				
Fluorene				
Hexachlorobenzene		0.000322	0.0113	0.00116
Hexachlorobutadiene		0.0286	1	0.103
Hexachlorocyclopentadiene				
Hexachloroethane		0.0367	1.29	0.133
Indeno(1,2,3-cd)pyrene		0.00264	0.0925	0.00953
Isophorone		60.9	1800	230
Naphthalene				
Nitrobenzene				
N-Nitrosodiphenylamine		0.0884	0.88	0.755
N-Nitrosodipropylamine		0.0000751	0.00279	0.000268
Pentachlorophenol		0.0198	0.577	0.0749
Phenanthrene				
Phenol				
Pyrene				

Attachment 4
SP307:110493:01
page 4 of 7

DRAFT 11/5/9

Chemical	Background Concentration (mg/kg)	PRG Future Resident (mg/kg)	PRG Contruction Worker (mg/kg)	PRG Future Worker (mg/kg)
Noncarcinogens				
Barium	195	108	3000	1030
Beryllium	1.1	12.3	411	108
Cadmium	1.5	2.47	82.2	21.5
Cesium	255			
Chromium(III)	69.6	4770	150000	42600
Chromium (VI)	69.6	23.8	752	213
Mercury	0.64	0.148	4.93	1.29
Nickel	54.2	35.7	1030	334
Nitrate	0.0048	230	7960	1540
Strontium	226	740	24700	12900
Thallium				
Archlor 1254		0.0504	1.61	0.672
Cyanide		9.86	329	86.1
1,1,1-Trichloroethane				
1,1,2,2-Tetrachloroethane				
1,1,2-Trichloroethane		9.06	266	91.6
1,1-Dichloroethane		124	3030	1280
1,1-Dichloroethene		6.25	153	64.3
1,2-Dichloroethane				
1,2-Dichloropropane		743000	45100000	5410000
1,3-Dichlorobenzene				
2-Butanone		2080	42500	26800
2-Hexonone				
4-Methyl-2-pentanone		868	21200	8930
Acetone		69.4	1700	714
Benzene				
Bromodichloromethane		25.8	624	268
Bromoform		12.1	308	121
Bromomethane		5.14	124	53.6
Carbon disulfide		218	5790	6420
Carbon tetrachloride		0.465	11.5	4.75
Chlorobenzene		5.53	166	50.6
Chloroethane		4640000000	282000000000	54100000000
Chloroform		7.51	179	78.6
Chloromethane				
cis-1,3-Dichloropropene		0.97	24.3	9.84
Dibromochloromethane		12.1	308	121
Ethylbenzene		66.5	1650	678
Methylene chloride		44.4	1070	463
Styrene		139	3400	1430
Tetrachloroethene		34.7	850	357
Toluene		139	3400	1430
Xylenes		6940	170000	71400

Attachment 4
SP307:110493.01
page 5 of 7

DRAFT 11/3/93

Chemical	Background Concentration (mg/kg)	PRG Future Resident (mg/kg)	PRG Contruction Worker (mg/kg)	PRG Future Worker (mg/kg)
Noncarcinogens				
trans-1,3-Dichloropropene		1.04	25.5	10.7
Trichloroethene				
Vinyl acetate		3470	85000	35700
Vinyl chloride				
1,2,4-Trichlorobenzene		12.4	303	119
1,2-Dichlorobenzene		32.1	936	708
1,4-Dichlorobenzene			1730000000	173000000
2,4,5-Trichlorophenol		32.6	954	302
2,4,6-Trichlorophenol				
2,4-Dichlorophenol		8.14	238	226
2,4-Dimethylphenol		6.51	191	60.3
2,4-Dinitrophenol		16.3	477	151
2,4-Dinitrotoluene		0.795	26.8	6.9
2,6-Dinitrotoluene		0.397	13.4	3.45
2-Chloronaphthalene		6.36	214	55.2
2-Chlorophenol		40.7	1190	377
2-Methylnaphthalene				
2-Methylphenol		69.2	2080	632
2-Nitroaniline				
2-Nitropphenol				
3,3'-Dichlorobenzidine				
3-Nitroaniline				
4,6-Dinitro-2-methylphenol (dinoseb)		0.331	11.2	4.31
4-Bromophenyl phenyl ether				
4-Chloroaniline		7.95	268	0.69
4-Chlorophenyl phenyl ether				
4-Chloro-3-methylphenol				
4-Methylphenol				
4-Nitroaniline				
4-Nitrophenol				
Acenaphthene		4.77	161	41.4
Acenaphthylene				
Anthracene		596	20100	5170
Benzoic acid		7950	268000	69000
Benzo(a)anthracene				
Benzo(a)pyrene				
Benzo(b)fluoranthene				
Benzo(ghi)perylene				
Benzo(k)fluoranthene				
Benzyl alcohol		119	4020	1030
Bis(2-chloroethoxy)methane				
Bis(2-chloroethyl)ether				
Bis(2-chloroisopropyl)ether		11.4	383	98.6

Attachment 4
SP307:110493:01
page 6 of 7

DRAFT 7/13/93

Chemical	Background Concentration (mg/kg)	PRG Future Resident (mg/kg)	PRG Contruction Worker (mg/kg)	PRG Future Worker (mg/kg)
Noncarcinogens				
Butyl benzyl phthalate		3.81	1200	341
Chrysene				
Dibenzofuran				
Dibenzo(a,h)anthracene				
Diethyl phthalate		1910	60200	17000
Dimethyl phthalate		3400	107000	30400
Di-n-butyl phthalate		814	23800	7540
Di-n-octyl phthalate		3.81	120	34.1
Fluoranthene		3.18	107	27.6
Fluorene		11.4	2680	690
Hexachlorobenzene		0.0636	2.14	0.552
Hexachlorobutadiene		0.284	9.57	2.46
Hexachlorocyclopentadiene		4.63	156	40.2
Hexachloroethane		0.142	4.79	1.23
Indeno(1,2,3-cd)pyrene				
Isophorone		120	3490	1110
Naphthalene		15.9	536	138
Nitrobenzene		0.163	4.77	1.51
N-Nitrosodiphenylamine				
N-Nitrosodipropylamine				
Pentachlorophenol		10.7	309	100
Phenanthrene				
Phenol		814	23800	11300
Pyrene		59.6	2010	517

Attachment 4
SP307 110493 01
page 7 of 7

DRAFT 11/5/93

Radionuclides	Background Concentration (pCi/g) MAX	PRG Future Resident (pCi/g)	PRG Contruction Worker (pCi/g)	PRG Future Worker (pCi/g)
Example				
Americium 241	0.01	0.34	2.06	1.37
Gross alpha	38			
Gross beta	41			
Plutonium 239	40	0.492	2.51	1.98
Plutonium 240	40	0.492	2.51	1.98
Tritium	0.35			
Uranium 233	1.2	6.75	35.4	27.2
Uranium 234	1.2	6.84	35.6	27.6
Uranium 235	0.1	0.173	0.287	0.0989
Uranium 238	1.2	6.91	35.8	27.9

DRAFT

Summary Table of Contaminants of Concern (COCs) in Surficial Soil and Vadose Soil
OU4, Solar Evaporation Ponds, Closure IM/IRA–EA
Rocky Flats Plant, Golden, Colorado

NOTE: Bold face indicates those analytes that will be used to calculate risk–based preliminary remediation goals (PRGs); * = Analyte/max value detected under OU4 sampling programs conducted before the Phase I RI only.

Contaminant of Concern	Surficial Soil (0 – 3")						Vadose Soil (3" – 12')					
	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.
Inorganics (mg/kg)												
Barium				Not COC			156/165	0 – 50.1	0.12 – 11600*			40.6 – 195
Beryllium	23/53	1 – 5	1.1 – 9.6			0.44 – 1.1				Not COC		
Cadmium	36/53	1 – 5	1.1 – 380			0.6 – 1	85/155	0 – 5	0 – 550			1.1 – 1.5
Cesium*				Not COC			25/117	200	212 – 2410*			202 – 255
Chromium	52/53	2 – 10	4.2 – 48.4			9 – 22	148/165	0 – 10	0.01 – 780.5*			7 – 69.6
Mercury	24/53	0 – 0.2	0.05 – 1.8			0.06 – 0.08	80/149	0 – 0.3	0 – 10.8*			0.19 – 0.64
Nickel	20/53	8 – 20	10 – 180			10.7 – 19.1	88/160	0 – 20	0.01 – 474.5*			8.3 – 54.2
Nitrate/nitrite	62/78	0 – 0.2	0 – 2.94			0 – 0.0048	67/94	0 – 0.2	0 – 2.31			1.1E–6 – 3.1E–6
Strontium	34/53	5 – 57.8	22 – 510			20.9 – 109	139/163	0 – 234	0.02 – 354*			26.2 – 226
Thallium				Not COC			49/155	0 – 2	0 – 5.87*			--
Radionuclides (pCi/g)												
Americium–241	41/41	0 – 9.997	0.03 – 110			0.01 – 0.04	102/141	0 – 0.06	0 – 6.1			0.01
Gross alpha	42/42	0 – 4.9	8.56 – 390			14 – 28	78/79	0 – 5.1	5.1 – 490*			0 – 38
Gross beta				Not COC			39/39	0 – 6.5	10 – 120*			0 – 41
Plutonium–239/240	41/41	0 – 0.039	0.02 – 17			24 – 40	97/152	0 – 0.04	0 – 25			0
Tritium (pCi/ml)	14/39	0 – 4.1	0.04 – 1.3			0	133/170	0 – 0.59	0.11 – 62			0.02 – 0.35
Uranium–233/234	42/42	0 – 0.1	0.65 – 6.6			0.98 – 1.2	163/164	0 – 0.15	0 – 21			0
Uranium–235	31/42	0 – 9.987	0.02 – 0.53			0.02 – 0.04	77/121	0 – 0.1	0 – 0.87			0.1
Uranium–238	42/42	0 – 0.1	0.66 – 5.5			0.9 – 1.2	166/167	0 – 0.16	0 – 11			0.2 – 0.9
Volatile Organics (ug/kg)												--
												--
1,1,1–trichloroethane				Not COC			20/171	0 – 5	6 – 29			--
1,1,2,2–tetrachloroethane				Not COC			20/171	0 – 5	6 – 29			--
1,1,2–trichloroethane				Not COC			20/171	0 – 5	6 – 29			--
1,1–dichloroethane				Not COC			19/167	0 – 5	6 – 29			--
1,1–dichloroethene				Not COC			20/158	0 – 5	6 – 29			--
1,2–dichloroethane				Not COC			20/171	0 – 5	6 – 29			--
1,2–dichloropropane				Not COC			20/171	0 – 5	6 – 29			--
1,3–dichlorobenzene*				Not COC			8/35	0	330*	330*	0	--
2–butanone				Not COC			21/168	0 – 10	11 – 88*			--
2–hexanone				Not COC			21/168	0 – 10	11 – 58			--
4–methyl–2–pentanone				Not COC			21/167	0 – 10	11 – 58			--
Acetone				Not COC			59/159	0 – 12000	12 – 49000*			--
Benzene				Not COC			20/171	0 – 5	6 – 29			--
Bromodichloromethane				Not COC			20/171	0 – 5	6 – 29			--
Bromoform				Not COC			20/165	0 – 5	6 – 29			--
Bromomethane				Not COC			21/171	0 – 10	11 – 58			--
Carbon disulfide				Not COC			20/171	0 – 5	6 – 29			--
Carbon tetrachloride				Not COC			20/171	0 – 5	6 – 29			--

Attachment 5
SP307.110493.01
page 1 of 4

Summary Table of Contaminants of Concern (COCs) in Surficial Soil and Vadose Soil (continued, page 2)
OU4, Solar Evaporation Ponds, Closure IM/IRA–EA
Rocky Flats Plant, Golden, Colorado

DRAFT

NOTE: Bold face indicates those analytes that will be used to calculate risk–based preliminary remediation goals (PRGs); * = Analyte/max value detected under OU4 sampling programs conducted before the Phase I RI only.

Contaminant of Concern	Surficial Soil (0 – 3")						Vadose Soil (3" – 12")					
	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.
Volatile Organics (ug/kg)												
Chlorobenzene				Not COC			20/171	0 – 5	6 – 29			--
Chloroethane				Not COC			21/167	0 – 10	11 – 58			--
Chloroform				Not COC			19/170	0 – 5	6 – 29			--
Chloromethane				Not COC			21/171	0 – 10	11 – 58			--
cis–1,–3–dichloropropene				Not COC			20/171	0 – 5	6 – 29			--
Dibromochloromethane				Not COC			20/167	0 – 5	6 – 29			--
Ethylbenzene				Not COC			21/171	0 – 40000	6 – 42000*			--
Methylene chloride				Not COC			40/155	0 – 6000	6 – 10000*			--
Styrene				Not COC			20/171	0 – 5	6 – 29			--
Tetrachloroethene				Not COC			20/171	0 – 5	6 – 29			--
Toluene				Not COC			102/171	0 – 32	6 – 1200			--
Total xylenes				Not COC			20/171	0 – 5	6 – 29			--
trans–1,2–dichloroethene*				Not COC			12/13	0	25*	25	0	--
trans–1,3–dichloropropene				Not COC			20/167	0 – 5	6 – 29			--
Trichloroethene				Not COC			19/170	0 – 5	6 – 29			--
Vinyl acetate				Not COC			21/167	0 – 10	11 – 58			--
Vinyl chloride				Not COC			21/171	0 – 10	11 – 58			--
Semi–volatile Organics (ug/kg)												
1,2,4–trichlorobenzene*				Not COC			8/35	0	330*	330	0	--
1,2–dichlorobenzene*				Not COC			8/35	0	330*	330	0	--
1,4–dichlorobenzene	1/4	330	400	400	400	--	8/35	0	330*	330	0	--
2,4,5–trichlorophenol*				Not COC			8/35	0	1600*	1600	0	--
2,4,6–trichlorophenol*				Not COC			8/35	0	330*	330	0	--
2,4–dichlorophenol*				Not COC			8/35	0	330*	330	0	--
2,4–dimethylphenol*				Not COC			8/35	0	330*	330	0	--
2,4–dinitrophenol*				Not COC			8/35	0	1600*	1600	0	--
2,4–dinitrotoluene*				Not COC			8/35	0	330*	330	0	--
2,6–dinitrotoluene*				Not COC			8/35	0	330*	330	0	--
2–chloronapthalene*				Not COC			8/35	0	330*	330	0	--
2–chlorophenol*				Not COC			8/35	0	330*	330	0	--
2–methylnapthalene*				Not COC			8/35	0	330*	330	0	--
2–methylphenol*				Not COC			8/35	0	330*	330	0	--
2–nitroaniline*				Not COC			8/35	0	1600*	1600	0	--
2–nitrophenol*				Not COC			8/35	0	330*	330	0	--
3,3–dichlorobenzidine*				Not COC			8/35	0	660*	660	0	--
3–nitroaniline*				Not COC			8/35	0	1600*	1600	0	--
4,6–dinitro–2–methylphenol*				Not COC			8/35	0	1600*	1600	0	--

Attachment 5
SP307:110493.01
page 2 of 4

Summary Table of Contaminants of Concern (COCs) in Surficial Soil and Vadose Soil (continued, page 3)
OU4, Solar Evaporation Ponds, Closure IM/IRA–EA
Rocky Flats Plant, Golden, Colorado

DRAFT

NOTE: Bold face indicates those analytes that will be used to calculate risk–based preliminary remediation goals (PRGs); * = Analyte/max. value detected under OU4 sampling programs conducted before the Phase I RI only.

Contaminant of Concern	Surficial Soil (0 – 3")						Vadose Soil (3" – 12')					
	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.
Semi–volatile Organics (ug/kg)												
4–bromophenyl phenyl ether*				Not COC			8/35	0	330*	330	0	--
4–chloroaniline*				Not COC			8/35	0	330*	330	0	--
4–chlorophenyl phenyl ether*				Not COC			8/35	0	330*	330	0	--
4–chloro–3–methylphenol*				Not COC			8/35	0	330*	330	0	--
4–methyl phenol*				Not COC			8/35	0	330*	330	0	--
4–nitroaniline*				Not COC			8/35	0	1600*	1600	0	--
4–nitrophenol*				Not COC			8/35	0	1600*	1600	0	--
Acenaphthene*				Not COC			8/35	0	330*	330	0	--
Acenaphthylene*				Not COC			8/35	0	330*	330	0	
Anthracene*				Not COC			8/35	0	330*	330	0	--
Benzoic acid*				Not COC			8/24	0	1600*	1600	0	--
Benzo(a)anthracene	4/71	330 – 390	400 – 840			--	8/35	0	330*	330	0	--
Benzo(a)pyrene	5/71	370 – 590	470 – 900			--	8/35	0	330*	330	0	--
Benzo(b)fluoranthene	13/71	330 – 600	370 – 1400			--	8/35	0	330*	330	0	--
Benzo(ghi)perylene*				Not COC			8/35	0	330*	330	0	--
Benzo(k)fluoranthene	14/71	330 – 600	400 – 1500			--	8/35	0	330*	330	0	--
Benzyl alcohol*				Not COC			8/24	0	330*	330	0	--
Bis(2–chloroethoxy)methane*				Not COC			8/35	0	330*	330	0	--
Bis(2–chloroethyl)ether*				Not COC			8/35	0	330*	330	0	--
Bis(2–chloroisopropyl)ether*				Not COC			8/35	0	330*	330	0	--
Bis(2–ethylhexyl)phthalate	10/71	330 – 1400	400 – 24000			--	10/34	0 – 350	180 – 4600*			--
Butyl benzyl phthalate*				Not COC			8/35	0	330*	330	0	--
Chrysene	6/71	370 – 590	470 – 950			--	8/35	0	330*	330	0	--
Dibenzofuran*				Not COC			8/35	0	330*	330	0	--
Dibenzo(a,h)anthracene*				Not COC			8/35	0	330*	330	0	--
Diethyl phthalate*				Not COC			8/35	0	330*	330	0	--
Dimethyl phthalate*				Not COC			8/35	0	330*	330	0	--
Di–n–butyl phthalate*				Not COC			8/35	0	41 – 330*		0	--
Di–n–octyl phthalate*				Not COC			8/35	0	330*	330	0	--
Fluoranthene	14/71	360 – 600	420 – 1700			--	8/35	0	330*	330	0	--
Fluorene				Not COC			8/35	0	330*	330	0	--
Hexachlorobenzene*				Not COC			8/35	0	330*	330	0	--
Hexachlorobutadiene*				Not COC			8/35	0	330*	330	0	--
Hexachlorocyclopentadiene*				Not COC			8/35	0	330*	330	0	--
Hexachloroethane*				Not COC			8/35	0	330*	330	0	--
Indeno(1,2,3–cd)pyrene*				Not COC			8/35	0	330*	330	0	--
Isophorone*				Not COC			8/35	0	330*	330	0	--

Attachment 5
SP307:110493:01
page 30 of 4

Summary Table of Contaminants of Concern (COCs) in Surficial Soil and Vadose Soil (concluded, page 4)
OU4, Solar Evaporation Ponds, Closure IM/IRA–EA
Rocky Flats Plant, Golden, Colorado

DRAFT

NOTE: Bold face indicates those analytes that will be used to calculate risk–based preliminary remediation goals (PRGs); * = Analyte/max value detected under OU4 sampling programs conducted before the Phase I RI only.

Contaminant of Concern	Surficial Soil (0 – 3")						Vadose Soil (3" – 12")					
	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.
Semi–volatile Organics (ug/kg)												
Napthalene*				Not COC			8/35	0	330*	330	0	--
Nitrobenzene*				Not COC			8/35	0	330*	330	0	--
N–nitrosodiphenylamine*				Not COC			8/35	0	1600*	1600	0	--
N–nitrosodipropylamine*				Not COC			8/35	0	330*	330	0	--
Pentachlorophenol*				Not COC			8/35	0	1600*	1600	0	--
Phenanthrene	11/71	370 – 600	470 – 1200			--	8/35	0	330*	330	0	--
Phenol*				Not COC			8/35	0	330*	330	0	--
Pyrene	15/71	350 – 600	370 – 1600			--	8/35	0	330*	330	0	--
Pesticides/PCBs												
Arochlor–1254 (ug/kg)	5/55	0	190 – 11900			--				Not COC		
Cyanide (mg/kg)				Not COC			50/56	0 – 500	508 – 43000			--

Attachment 5
SP307:110493:01
page 4 of 4

Summary Table of Contaminants of Concern (COCs) in Surficial Soil and Vadose Soil
OU4, Solar Evaporation Ponds, Closure IM/IRA–EA
Rocky Flats Plant, Golden, Colorado

NOTE: Bold face indicates those analytes that will be used to calculate risk–based preliminary remediation goals (PRGs); * = Analyte/max value from OU4 sampling programs conducted before the Phase I RI only.

Contaminant of Concern	Surficial Soil (0 – 3")						Vadose Soil (3" – 12')					
	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.
Inorganics (mg/kg)												
Barium				Not COC			156/165	0 – 50.1	0.12 – 11600*			40.6 – 195
Beryllium	23/53	1 – 5	1.1 – 9.6			0.44 – 1.1				Not COC		
Cadmium	36/53	1 – 5	1.1 – 380			0.6 – 1	85/155	0 – 5	0 – 550			1.1 – 1.5
Cesium*				Not COC			25/117	200	212 – 2410			202 – 255
Chromium	52/53	2 – 10	4.2 – 48.4			9 – 22	148/165	0 – 10	0.01 – 780.5*			7 – 69.6
Mercury	24/53	0 – 0.2	0.05 – 1.8			0.06 – 0.08	80/149	0 – 0.3	0 – 10.8*			0.19 – 0.64
Nickel	20/53	8 – 20	10 – 180			10.7 – 19.1	88/160	0 – 20	0.01 – 474.5*			8.3 – 54.2
Nitrate/nitrite	62/78	0 – 0.2	0 – 2.94			0 – 0.0048	67/94	0 – 0.2	0 – 2.31			1.1E–6 – 3.1E–6
Silicon	53/53	21 – 100	463 – 11300			--	82/82	21 – 100	360 – 14000			--
Sulfide				Not COC			53/78	10 – 10.7	10.7 – 20.3			2.0E–5 – 0.043
Strontium	34/53	5 – 57.8	22 – 510			20.9 – 109	139/163	0 – 234	0.02 – 354*			26.2 – 226
Thallium				Not COC			49/155	0 – 2	0 – 5.87*			--
Radionuclides (pCi/g)												
Americium–241	41/41	0 – 9.997	0.03 – 110			0.01 – 0.04	102/141	0 – 0.06	0 – 6.1			0.01
Gross alpha	42/42	0 – 4.9	8.56 – 390			14 – 28	78/79	0 – 5.1	5.1 – 490*			0 – 38
Gross beta				Not COC			39/39	0 – 6.5	10 – 120*			0 – 41
Plutonium–239/240	41/41	0 – 0.039	0.02 – 17			24 – 40	97/152	0 – 0.04	0 – 25			0
Tritium (pCi/ml)	14/39	0 – 4.1	0.04 – 1.3			0	133/170	0 – 0.59	0.11 – 62			0.02 – 0.35
Uranium–233/234	42/42	0 – 0.1	0.65 – 6.6			0.98 – 1.2	163/164	0 – 0.15	0 – 21			0
Uranium–235	31/42	0 – 9.987	0.02 – 0.53			0.02 – 0.04	77/121	0 – 0.1	0 – 0.87			0.1
Uranium–238	42/42	0 – 0.1	0.66 – 5.5			0.9 – 1.2	166/167	0 – 0.16	0 – 11			0.2 – 0.9
Volatile Organics (ug/kg)												
1,1,1–trichloroethane				Not COC			20/171	0 – 5	6 – 29			--
1,1,2,2–tetrachloroethane				Not COC			20/171	0 – 5	6 – 29			--
1,1,2–trichloroethane				Not COC			20/171	0 – 5	6 – 29			--
1,1–dichloroethane				Not COC			19/167	0 – 5	6 – 29			--
1,1–dichloroethene				Not COC			20/158	0 – 5	6 – 29			--
1,2–dichloroethane				Not COC			20/171	0 – 5	6 – 29			--
1,2–dichloroethene +				Not COC			8/171	5	6 – 29			--
1,2–dichloropropane				Not COC			20/171	0 – 5	6 – 29			--
1,3–dichlorobenzene*				Not COC			8/35	0	330*	330*	0	--
1,3–dioxolane, 2,2–dimethyl–+	1/1	0	120	120		--				Not COC		
2H–1–benzopyran–2–one+	3/3	0	1600 – 2500	2500		--				Not COC		
2–butanone				Not COC			21/168	0 – 10	11 – 88*			--
2–hexanone				Not COC			21/168	0 – 10	11 – 58			--
2–pentanone +	2/2	0	2700 – 3200	3200		--	1/1	0	710	710	710	--
4–methyl–2–pentanone				Not COC			21/167	0 – 10	11 – 58			--
Acetone				Not COC			59/159	0 – 12000	12 – 49000*			--
Alpha–pinene (ACN)+	2/2	0	1300	1300		--				Not COC		
Benzene				Not COC			20/171	0 – 5	6 – 29			--

Attachment 6
SP307.110493.01
page 1 of 5

Summary Table of Contaminants of Concern (COCs) in Surficial Soil and Vadose Soil (continued, page 2)
OU4, Solar Evaporation Ponds, Closure IM/IRA–EA
Rocky Flats Plant, Golden, Colorado

NOTE: Bold face indicates those analytes that will be used to calculate risk-based preliminary remediation goals (PRGs); * = Analyte/max value from OU4 sampling programs conducted before the Phase I RI only.

Contaminant of Concern	Surficial Soil (0 – 3")						Vadose Soil (3" – 12')					
	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.
Volatile Organics (ug/kg)												
Benzenesulfonamide,4-methyl+	1/1	0	270	270		--				Not COC		
Bromodichloromethane				Not COC			20/171	0 – 5	6 – 29			--
Bromoform				Not COC			20/165	0 – 5	6 – 29			--
Bromomethane				Not COC			21/171	0 – 10	11 – 58			--
Butane, 1,1'-[oxybis(2,1-eth+				Not COC			1/1	0	330	330	330	--
Carbon disulfide				Not COC			20/171	0 – 5	6 – 29			--
Carbon tetrachloride				Not COC			20/171	0 – 5	6 – 29			--
Chlorobenzene				Not COC			20/171	0 – 5	6 – 29			--
Chloroethane				Not COC			21/167	0 – 10	11 – 58			--
Chloroform				Not COC			19/170	0 – 5	6 – 29			--
Chloromethane				Not COC			21/171	0 – 10	11 – 58			--
***cis*–1,–3–dichloropropene**				Not COC			20/171	0 – 5	6 – 29			--
Cyclohexane, 2-butyl-1,1,3-t+				Not COC			1/1	0	700	700	700	--
Cyclopentasiloxane, decamethyl+				Not COC			1/1	0	920	920	920	--
Cyclotrisiloxane, hexamethyl+				Not COC			1/1	0	430	430	430	--
Decanal+				Not COC			2/2	0	15 – 83			--
Dibromochloromethane				Not COC			20/167	0 – 5	6 – 29			--
Ethanol, 2-butoxy-, phosphate+				Not COC			1/1	0	590	590	590	--
Ethylbenzene				Not COC			21/171	0 – 40000	6 – 42000*			--
Hexanal+				Not COC			4/4	0	12 – 31			--
Methane+	1/1	0	1300	1300		--	4/4	0	130 – 470			--
Methylene chloride				Not COC			40/155	0 – 6000	6 – 10000*			--
Octane+	1/1	0	190	190		--	1/1	0	310	310	310	--
Pentadecane+				Not COC			1/1	0	170	170	170	--
Stigmast-5-en-3-ol+	1/1	0	1200	1200		--				Not COC		
Styrene				Not COC			20/171	0 – 5	6 – 29			--
Tetrachloroethene				Not COC			20/171	0 – 5	6 – 29			--
Toluene				Not COC			102/171	0 – 32	6 – 1200			--
Total xylenes				Not COC			20/171	0 – 5	6 – 29			--
trans–1,2–dichloroethene*				Not COC			12/13	0	25*	25	0	--
trans–1,3–dichloropropene				Not COC			20/167	0 – 5	6 – 29			--
Trichloroethene				Not COC			19/170	0 – 5	6 – 29			--
Vinyl acetate				Not COC			21/167	0 – 10	11 – 58			--
Vinyl chloride				Not COC			21/171	0 – 10	11 – 58			--
(z)14-tricosenyl formate+	1/1	0	1500	1500		--				Not COC		
Semi–volatile Organics (ug/kg)												
1,2,4–trichlorobenzene*				Not COC			8/35	0	330*	330	0	--
1,2-benzenedicarboxylic acid+	1/1	0	610	610		--				Not COC		
1,2–dichlorobenzene*				Not COC			8/35	0	330*	330	0	--
1,4–dichlorobenzene	1/4	330	400	400	400	--	8/35	0	330*	330	0	--
1H-cyclopropa[a]naphthalene+				Not COC			1/1	0	420	420	420	--
2,4,5–trichlorophenol*				Not COC			8/35	0	1600*	1600	0	--
2,4,6–trichlorophenol*				Not COC			8/35	0	330*	330	0	--

Attachment 6
SP307:110493.01
Page 2 of 5

Summary Table of Contaminants of Concern (COCs) in Surficial Soil and Vadose Soil (continued, page 3)
OU4, Solar Evaporation Ponds, Closure IM/IRA–EA
Rocky Flats Plant, Golden, Colorado

NOTE: Bold face indicates those analytes that will be used to calculate risk-based preliminary remediation goals (PRGs); * = Analyte/max. value from OU4 sampling programs conducted before the Phase I RI only.

Contaminant of Concern	Surficial Soil (0 – 3")						Vadose Soil (3" – 12")					
	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.
Semi-volatile Organics (ug/kg)												
2,4-dichlorophenol*				Not COC			8/35	0	330*	330	0	--
2,4-dimethylphenol*				Not COC			8/35	0	330*	330	0	--
2,4-dinitrophenol*				Not COC			8/35	0	1600*	1600	0	--
2,4-dinitrotoluene*				Not COC			8/35	0	330*	330	0	--
2,5-hexanedione+	3/3	0	110	110		--				Not COC		
2,6-dinitrotoluene*				Not COC			8/35	0	330*	330	0	--
2-chloroethyl vinyl ether*+				Not COC			12/36	0	50*	50	0	--
2-chloronapthalene*				Not COC			8/35	0	330*	330	0	--
2-chlorophenol*				Not COC			8/35	0	330*	330	0	--
2-methylnapthalene*				Not COC			8/35	0	330*	330	0	--
2-methylphenol*				Not COC			8/35	0	330*	330	0	--
2-nitroaniline*				Not COC			8/35	0	1600*	1600	0	--
2-nitrophenol*				Not COC			8/35	0	330*	330	0	--
3,3-dichlorobenzidine*				Not COC			8/35	0	660*	660	0	--
3-hexene-2,5-dione+	10/10	0	160 – 1400			--	7/7	0	180 – 1000			--
3-nitroaniline*				Not COC			8/35	0	1600*	1600	0	--
3-penten-2-one+	1/1	0	6100	6100		--				Not COC		
4,6-dinitro-2-methylphenol*				Not COC			8/35	0	1600*	1600	0	--
4-bromophenyl phenyl ether*				Not COC			8/35	0	330*	330	0	--
4-chloroaniline*				Not COC			8/35	0	330*	330	0	--
4-chlorophenyl phenyl ether*				Not COC			8/35	0	330*	330	0	--
4-chloro-3-methylphenol*				Not COC			8/35	0	330*	330	0	--
4-methyl phenol*				Not COC			8/35	0	330*	330	0	--
4-nitroaniline*				Not COC			8/35	0	1600*	1600	0	--
4-nitrophenol*				Not COC			8/35	0	1600*	1600	0	--
9,10-anthracenedione+	1/1	0	210	210		--				Not COC		
9,12,15-octadecatrienal+	1/1	0	340	340		--				Not COC		
9-hexadecenoic acid+	1/1	0	2000	2000		--				Not COC		
9-octadecenoic acid+	2/2	0	640 – 840	840		--				Not COC		
Acenaphthene*				Not COC			8/35	0	330*	330	0	--
Acenaphthylene*				Not COC			8/35	0	330*	330	0	
Anthracene*				Not COC			8/35	0	330*	330	0	--
Benzoic acid*				Not COC			8/24	0	1600*	1600	0	--
Benzo(a)anthracene	4/71	330 – 390	400 – 840			--	8/35	0	330*	330	0	--
Benzo(a)pyrene	5/71	370 – 590	470 – 900			--	8/35	0	330*	330	0	--
Benzo(b)fluoranthene	13/71	330 – 600	370 – 1400			--	8/35	0	330*	330	0	--
Benzo(ghi)perylene*				Not COC			8/35	0	330*	330	0	--
Benzo(k)fluoranthene	14/71	330 – 600	400 – 1500			--	8/35	0	330*	330	0	--
Benzyl alcohol*				Not COC			8/24	0	330*	330	0	--
Bis(2-chloroethoxy)methane*				Not COC			8/35	0	330*	330	0	--
Bis(2-chloroethyl)ether*				Not COC			8/35	0	330*	330	0	--
Bis(2-chloroisopropyl)ether*				Not COC			8/35	0	330*	330	0	--
Bis(2-ethylhexyl)phthalate	10/71	330 – 1400	400 – 24000			--	10/34	0 – 350	180 – 4600*			--
Butyl benzyl phthalate*				Not COC			8/35	0	330*	330	0	--
Chrysene	6/71	370 – 590	470 – 950			--	8/35	0	330*	330	0	--
Dibenzofuran*				Not COC			8/35	0	330*	330	0	--

Attachment 6
SP307:110493.01

Summary Table of Contaminants of Concern (COCs) in Surficial Soil and Vadose Soil (continued, page 4)
OU4, Solar Evaporation Ponds, Closure IM/IRA–EA
Rocky Flats Plant, Golden, Colorado

NOTE: Bold face indicates those analytes that will be used to calculate risk–based preliminary remediation goals (PRGs); * = Analyte/max value from OU4 sampling programs conducted before the Phase I RI only.

Contaminant of Concern	Surficial Soil (0 – 3")						Vadose Soil (3" – 12')					
	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.
Semi–volatile Organics (ug/kg)												
Dibenzo(a,h)anthracene*				Not COC			8/35	0	330*	330	0	--
Diethyl phthalate*				Not COC			8/35	0	330*	330	0	--
Dimethyl phthalate*				Not COC			8/35	0	330*	330	0	--
Di–n–butyl phthalate*				Not COC			8/35	0	41 – 330*		0	--
Di–n–octyl phthalate*				Not COC			8/35	0	330*	330	0	--
Fluoranthene	14/71	360 – 600	420 – 1700			--	8/35	0	330*	330	0	--
Fluorene				Not COC			8/35	0	330*	330	0	--
Heptane, 2,5–dimethyl–+	1/1	0	150	150		--				Not COC		
Hexachlorobenzene*				Not COC			8/35	0	330*	330	0	--
Hexachlorobutadiene*				Not COC			8/35	0	330*	330	0	--
Hexachlorocyclopentadiene*				Not COC			8/35	0	330*	330	0	--
Hexachloroethane*				Not COC			8/35	0	330*	330	0	--
Hexadecanoic acid +	27/27	0	170 – 2900			--	9/9	0	180 – 420			--
Hexanedioic acid +	3/3	0	700 – 9500			--	6/6	0	440 – 890			--
Hexanedioic acid, mono (2–eth+	1/1	0	1500	1500		--	2/2	0	270 – 880			--
Hexatriacontane +	1/1	0	650	650		--				Not COC		
Indeno(1,2,3–cd)pyrene*				Not COC			8/35	0	330*	330	0	--
Isomer of C11H10+				Not COC			2/2	0	270 – 460	460		--
Isomer of C11H22+				Not COC			1/1	0	250	250		--
Isomer of C12H4(Cl)5+	9/9	0	270 – 760			--				Not COC		
Isomer of C12H4(Cl)6+	6/6	0	280 – 820			--				Not COC		
Isomer of C13H28+				Not COC			1/1	0	500	500		--
Isomer of C13H28+				Not COC			2/2	0	150 – 190	190		--
Isomer of C14H30+				Not COC			1/1	0	180	180		--
Isomer of C15H24+	23/23	0	750 – 2400			--	7/7	0	380 – 2000			--
Isomer of C15(H24)O+	18/18	0	160 – 390			--	3/3	0	180 – 260			--
Isomer of C17H12+	1/1	0	350	350		--				Not COC		
Isomer of C17H14+	1/1	0	450	450		--				Not COC		
Isomer of C19H36O2+				Not COC			1/1	0	310	310		--
Isomer of C20H12+	6/6	0	250 – 1700			--				Not COC		
Isomer of C20H32+	2/2	0	320 – 350	350		--				Not COC		
Isomer of C4H6O2+				Not COC			1/1	0	150	150		--
Isomer of C5H8N2+				Not COC			1/1	0	170	170		--
Isomer of C5(H10)O+	1/1	0	1600	1600		--				Not COC		
Isomer of C6H12+	2/2	0	340	340		--				Not COC		
Isomer of C6(H10)O2+	1/1	0	250	250		--				Not COC		
Isomer of C6(H12)O+	1/1	0	560	560		--				Not COC		
Isomer of C7H14+	2/2	0	460	460		--				Not COC		
Isomer of C7H14O+	1/1	0	3900	3900		--				Not COC		
Isomer of C7H8+	2/2	0	2700	2700		--				Not COC		
Isomer of C7H8O2+	1/1	0	630 – 1700			--				Not COC		
Isomer of C8H10+	3/3	0	170 – 430			--				Not COC		
Isomer of C9H20+	20/20	0				--				Not COC		
Isophorone*				Not COC			8/35	0	330*	330	0	--

Attachment 6
SP307.1104930.1
page 4 of 5

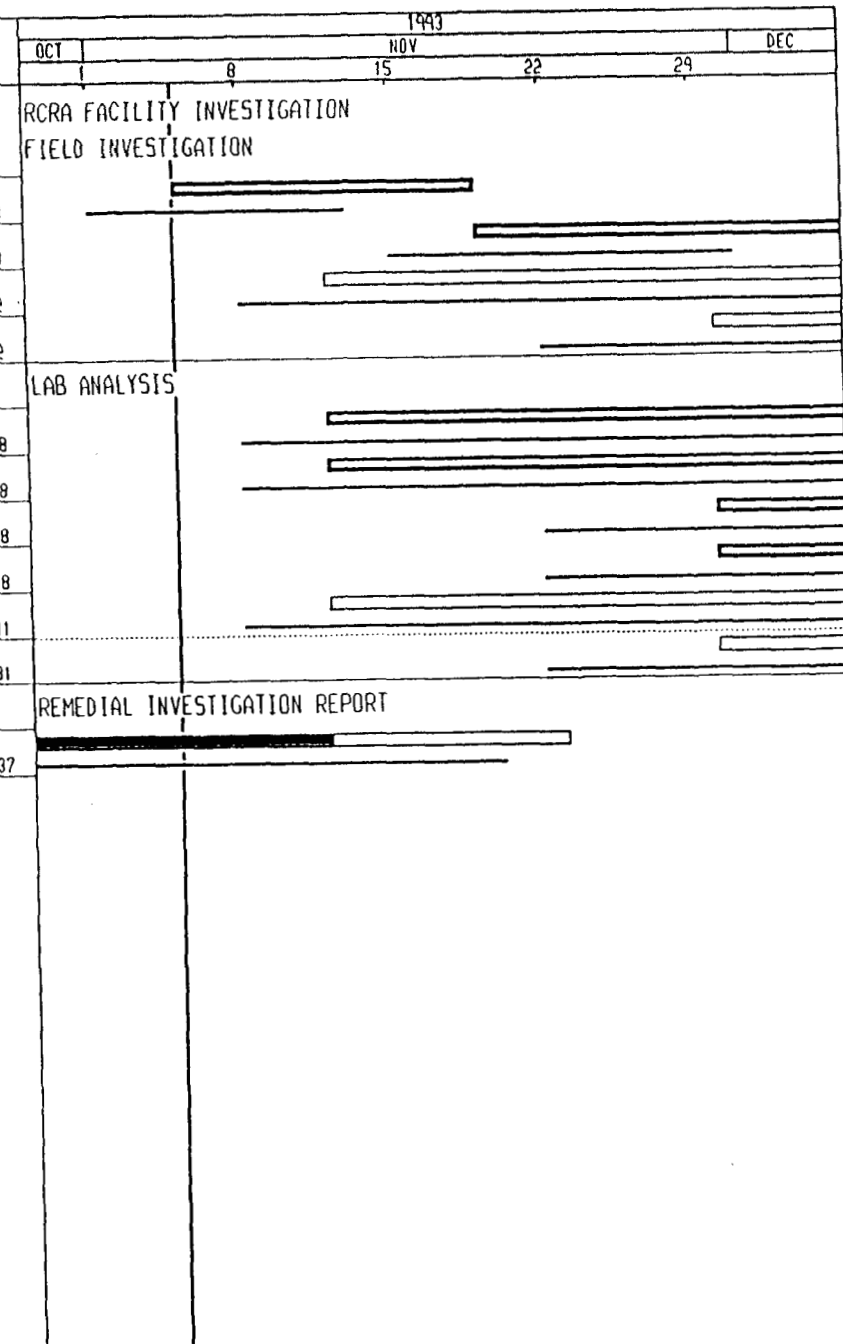
Summary Table of Contaminants of Concern (COCs) in Surficial Soil and Vadose Soil (concluded, page 5)
OU4, Solar Evaporation Ponds, Closure IM/IRA–EA
Rocky Flats Plant, Golden, Colorado

NOTE: Bold face indicates those analytes that will be used to calculate risk–based preliminary remediation goals (PRGs); * = Analyte/max value from OU4 sampling programs conducted before the Phase I RI only.

Contaminant of Concern	Surficial Soil (0 – 3")						Vadose Soil (3" – 12')					
	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.	Freq of Detect	Range of OU4 Detect Limits	Range of OU4 Detected Conc.	OU4 95% UCL (All Data)	OU4 95% UCL (Phase I RI Only)	Range of Backgrnd Conc.
Semi–volatile Organics (ug/kg)												
Napthalene*				Not COC			8/35	0	330*	330	0	--
Nitrobenzene*				Not COC			8/35	0	330*	330	0	--
Nonacosane+	1/1	0	1100	1100		--				Not COC		
Nonadecane+	1/1	0	530	530		--				Not COC		
N–nitrosodiphenylamine*				Not COC			8/35	0	1600*	1600	0	--
N–nitrosodipropylamine*				Not COC			8/35	0	330*	330	0	--
Octadecanoic acid+	1/1	0	570	570		--				Not COC		
Octocosane+	1/1	0	2300	2300		--				Not COC		
Pentachlorophenol*				Not COC			8/35	0	1600*	1600	0	--
Pentatriacontane+	1/1	0	1800	1800		--				Not COC		
Phenanthrene	11/71	370 – 600	470 – 1200			--	8/35	0	330*	330	0	--
Phenol*				Not COC			8/35	0	330*	330	0	--
Phenol, 2,6–bis(1,1–dimethyl+	2/2	0	190 – 220	220		--	3/3	0	340 – 6800			--
Phenol, 2–fluoro–+	1/1	0	1200	1200		--				Not COC		
Phenol, 4,6–di(1,1–dimethyl+	1/1	0	290	290		--				Not COC		
Phosphonic acid+	1/1	0	310	310		--				Not COC		
Propanoic+	1/1	0	1100	1100		--				Not COC		
Pyrene	15/71	350 – 600	370 – 1600			--	8/35	0	330*	330	0	--
Sulfur (mol.)+				Not COC			5/5	0	240 – 390			--
Tetratriacontane+	2/2	0	1600 – 1700	1700		--				Not COC		
Pesticides/PCBs												
Arochlor–1254 (ug/kg)	5/55	0	190 – 11900			--				Not COC		
Cyanide (mg/kg)				Not COC			50/56	0 – 500	508 – 43000			--

Attachment 6
SP307:110493:01
Page 5 of 5

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	ORIG DUR	REM DUR	TOTL FLT
40121221	DRILLING (207B NORTH)	5NOV93A	18NOV93	10	10	-18
40121222	DRILLING (207B CENTER)	19NOV93	6DEC93	10	10	-18
40121231	CORE LOGGING (207B NORTH)	12NOV93	25JAN94	45	45	72
40121232	CORE LOGGING (207B CENTER)	30NOV93	8FEB94	45	45	62
40131500	RAD (207B NORTH)	12NOV93	5JAN94	31	31	-8
40131600	NON RAD (207B NORTH)	12NOV93	5JAN94	31	31	-8
40131700	RAD (207B CENTER)	30NOV93	19JAN94	31	31	-18
40131800	NON RAD (207B CENTER)	30NOV93	19JAN94	31	31	-18
40132200	207B NORTH (VALIDATION)	12NOV93	9MAR94	76	76	41
40132300	207B NORTH (VALIDATION)	30NOV93	23MAR94	76	76	31
40141100	EXECUTED VERTICAL DRILLING (EVAL)	20FEB93A	22NOV93	187	7	37



Target Date 22OCT93
Plot Date 8NOV93
Data Date 5NOV93
Project Start 10DEC92
Project Finish 19JUN95

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Activity Bar/Early Dates
Critical Activity
Progress Bar
Target Dates
◇/P Milestone/flag Activity

DU4C

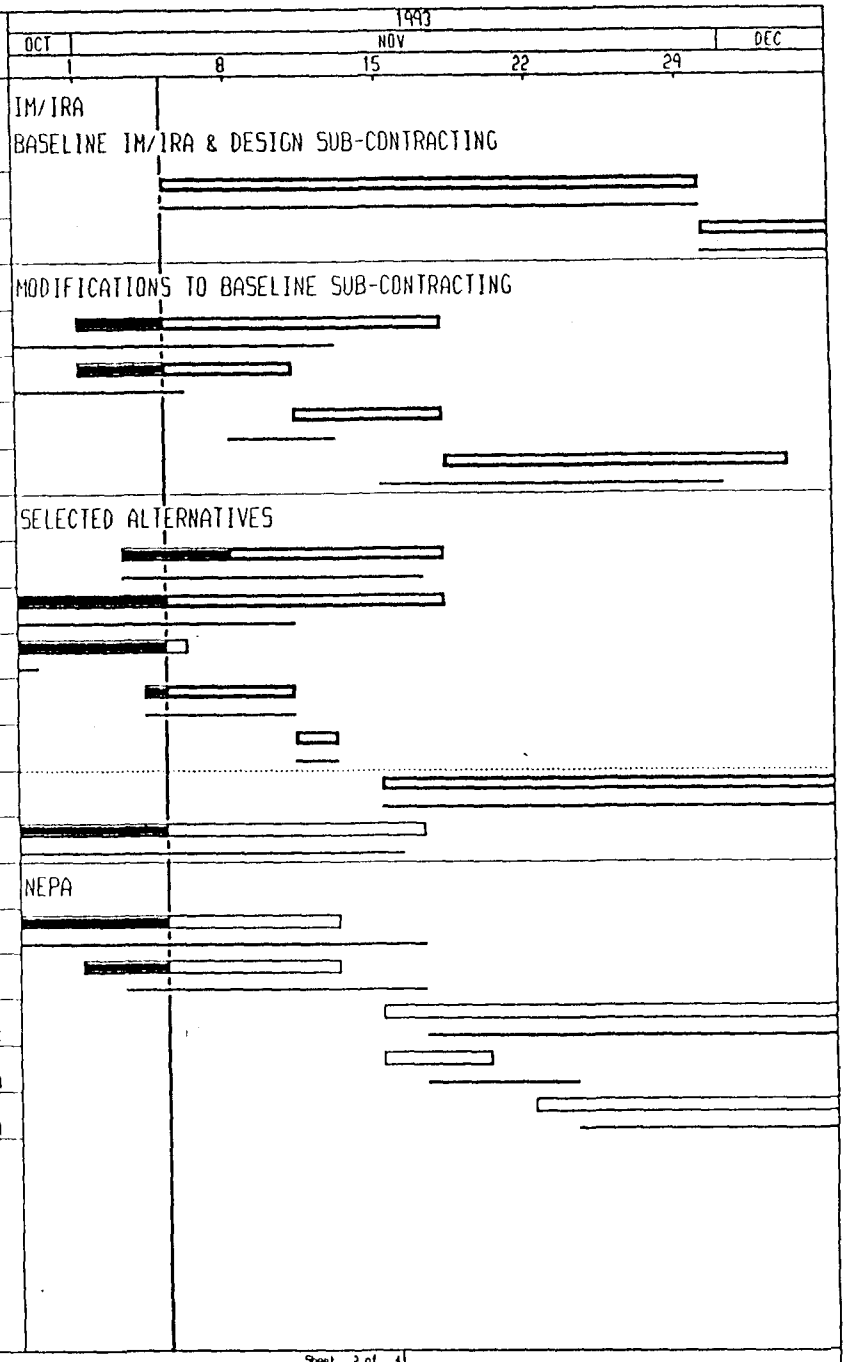
Sheet 1 of 4

EG&G ROCKY FLATS
RPOPOSED OU4 PHI IM SCHEDULE
OU4 1 MONTH LOOK AHEAD

Date	Revision	Checked	Approved

Attachment 7
SP307:110493:01
page 1 of 4

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	ORIG DUR	REM DUR	TOTL FLT
	IM/IRA					
	BASELINE IM/IRA & DESIGN SUB-CONTRACTING					
40216000	NEGOTIATIONS (BASELINE)	5NOV93	29NOV93	15	15	-18
40217000	AWARD (BASELINE)	30NOV93	13DEC93	10	10	-18
	MODIFICATIONS TO BASELINE SUB-CONTRACTING					
40221000	REQUEST FOR PROPOSAL (MOD)	1NOV93A	17NOV93	13	9	-17
40221100	SOW PKG (MOD)	1NOV93A	10NOV93	10	4	-17
40221200	PROCUREMENT INCLUSIONS (MOD)	11NOV93	17NOV93	5	5	-17
40222000	PROPOSAL (MOD)	18NOV93	3DEC93	10	10	-17
	SELECTED ALTERNATIVES					
40231000	RISK ANALYSIS	3NOV93A	17NOV93	10	8	0
40232000	PRELIMINARY REMEDIATION GOALS	13OCT93A	17NOV93	21	9	0
40233000	COC'S	23AUG93A	5NOV93	21	1	8
40235100	OBTAIN DOE ENDORSEMENT TO DOE GENERAL COUNCIL	4NOV93A	10NOV93	5	4	-14
40235200	INITIATE ANALYSIS OF REGULATIONS	11NOV93	12NOV93	2	2	-14
40235300	ANALYZE REGULATIONS	15NOV93	7DEC93	15	15	-14
40236000	ARAR DEVELOPMENT	23AUG93A	16NOV93	30	8	1
	NEPA					
40251000	ACTION DECRIPTION MEMORANDUM	20OCT93A	12NOV93	18	6	13
40251200	DOE/EGG REVIEW (ADM)	1NOV93A	12NOV93	10	6	13
40252000	ENVIRONMENTAL CHECKLIST	15NOV93	7DEC93	15	15	339
40252100	PREPARE (EC)	15NOV93	19NOV93	5	5	339
40252200	EGG/NEPA COMMITTEE REVIEW (EC)	22NOV93	7DEC93	10	10	339



Target Date 22OCT93
Plot Date 8NOV93
Data Date 5NOV93
Project Start 1DEC92
Project Finish 19JUN95

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Activity Bar/Early Dates
Critical Activity
Progress Bar
Target Dates
◇/P Milestone/Flag Activity

OU4C

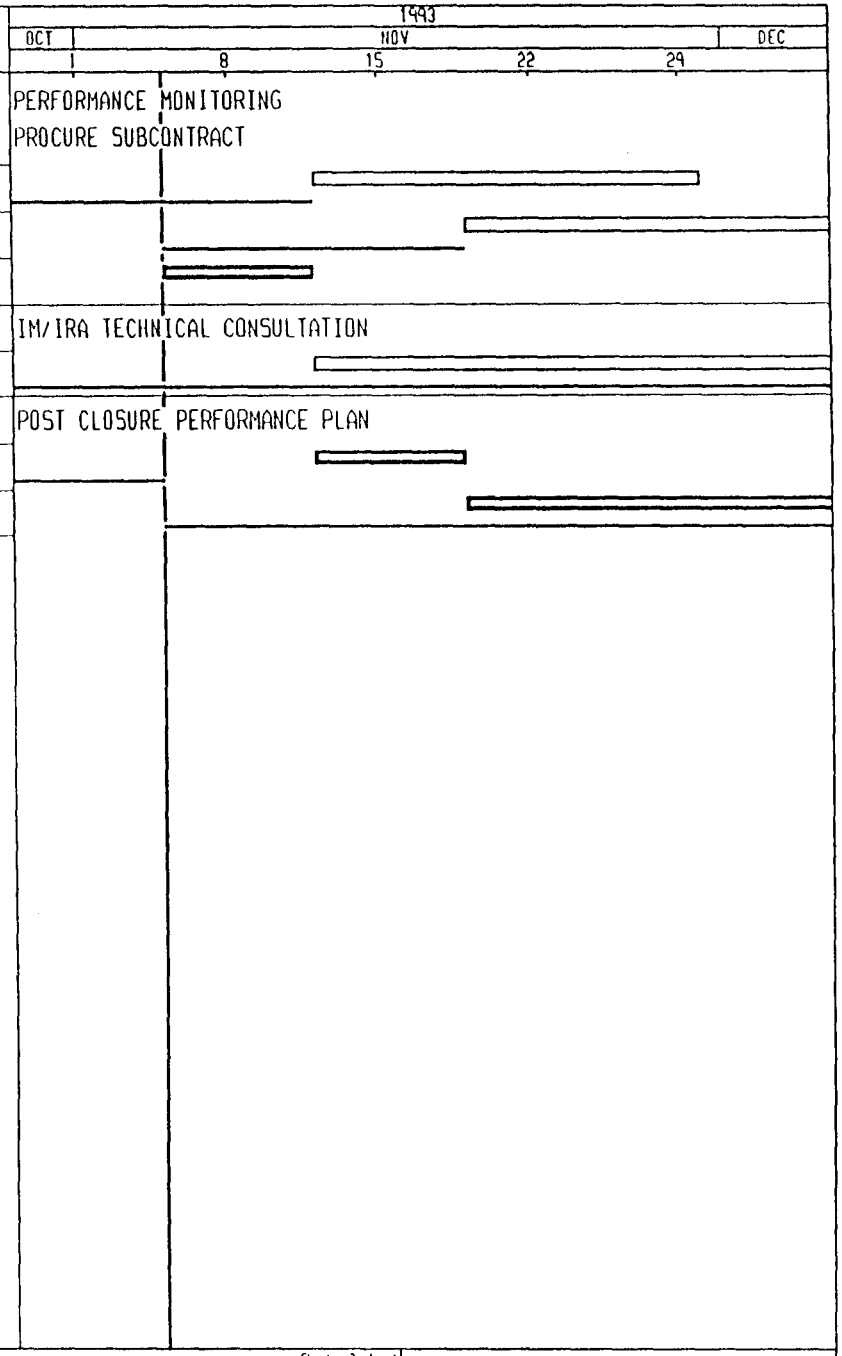
Sheet 2 of 4

EG&G ROCKY FLATS
RPOPOSED OU4 PHI IM SCHEDULE
OU4 1 MONTH LOOK AHEAD

Date	Revision	Checked	Approved

Attachment 7
SP307.1U49301
page 2 of 4

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	ORIG DUR	REM DUR	TOTL FLT
40613000	TECHNICAL EVALUATION	12NOV93	29NOV93	10	10	19
40614000	COST EVALUATION	19NOV93	6DEC93	10	10	19
40615000	LETTER CONTRACT	5NOV93	11NOV93	5	5	-11
40620000	IM/IRA/DD TECHNICAL CONSULTATION	12NOV93	21FEB95	313	313	35
40631000	IDENTIFICATION OF PERFORMANCE CRITERIA	12NOV93	18NOV93	5	5	-11
40632000	EVAL ALTERNATIVES TO MEASURE PERFRMNCE PARAMETER	19NOV93	20DEC93	20	20	-11



Target Date 22OCT93
Plot Date 8NOV93
Data Date 5NOV93
Project Start 1DEC92
Project Finish 19JUN95

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Activity Bar/Early Dates
Critical Activity
Progress Bar
Target Dates
◇/P Milestone/Flag Activity

OU4C

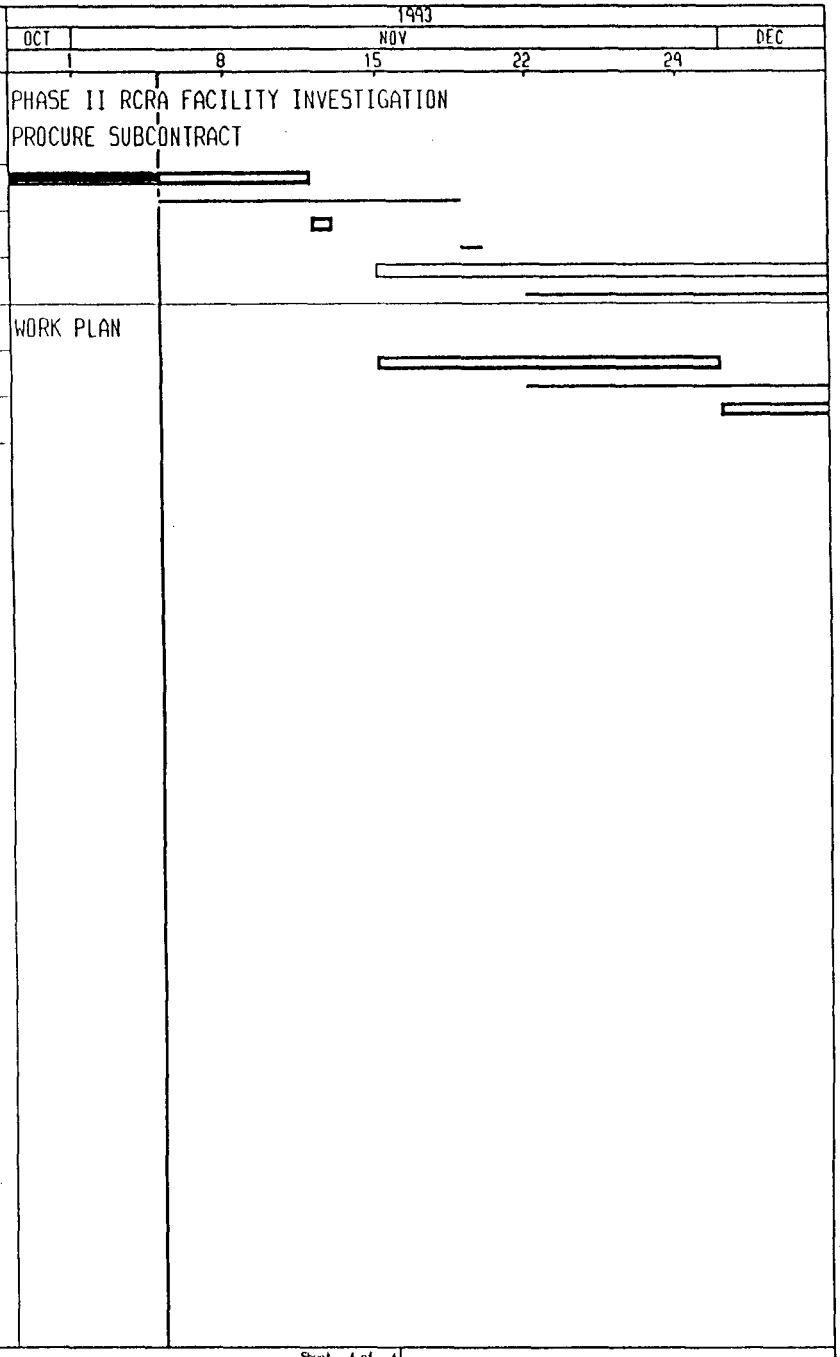
Sheet 3 of 4

EG&G ROCKY FLATS
RPOPOSED OU4 PHI IM SCHEDULE
OU4 1 MONTH LOOK AHEAD

Date	Revision	Checked	Approved

Attachment 7
SP 307.11X493.01
page 3 of 4

ACTIVITY ID	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	ORIG DUR	REM DUR	TOTL FLT
	PHASE II RCRA FACILITY INVESTIGATION					
	PROCURE SUBCONTRACT					
10714000	COST EVALUATION	29OCT93A	11NOV93	10	5	-17
10715000	LETTER CONTRACT	12NOV93	12NOV93	1	1	-17
10716000	NEGOTIATIONS	15NOV93	7DEC93	15	15	28
	WORK PLAN					
10721000	PROJECT SCOPING	15NOV93	30NOV93	10	10	-17
10722000	WORK PLAN DEVELOPMENT	1DEC93	16FEB94	50	50	-17



Target Date 22OCT93
Plot Date 8NOV93
Data Date 5NOV93
Project Start 1DEC92
Project Finish 19JUN95

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Activity Bar/Early Dates
Critical Activity
Progress Bar
Target Dates
◇ /P Milestone/Flag Activity

OU4C

Sheet 1 of 1

EG&G ROCKY FLATS
RPOPOSED OU4 PHI IM SCHEDULE
OU4 1 MONTH LOOK AHEAD

Date	Revision	Checked	Approved

Attachment 7
SP307.110493.01
page 4 of 4