Monsanto Training Program

The attached list of topics and outlines to be presented to the Monsanto Trainees are submitted for your comments and suggestions. The names of individuals listed with some of the topics are only tentative, since none of the men have been approached on the matter.

The first seven discussions are of a general nature and should be of benefit to persons other than the 100 Area trainees. The last sixteen topics contain material specifically for the 100 Area operation.

The lectures would be of greater permanent value, if the persons giving the talks could be persuaded to prepare and issue to the trainees complete notes on the subject covered.

No definite time for starting this program can be chosen until the remainder of the trainees are on the plant.
1. History of Project - M.D. Whitaker
   a) Mass and Energy
   b) Atomic Theory - 1932-1934
   c) Fermi - 1934 suspected U and Pu
   d) Hahn - Strassman - 1939 - Fission
   e) Compton Investigation - 1941
   f) West Stands Pile - Dec. 2, 1942
   g) He and water cooled piles
   h) Separation of Pu

2. Review of Fundamentals - E.O. Wollen
   a) Coulombs Law - Electric Field Strength of a Charged Particle.
   b) Atomic Structure - protons, neutrons and electrons, forces within
      the nucleus
   c) Particles - Gamma Beta, Alpha, Neutrons, Neutron
   d) Particle detection - Electroscope, Chambers, C-M-tubes
   e) Relationship - Definitions - Conversions

3. Nuclear Chemistry - C.D. Coryell
   a) Natural Radioactive Cyds.
   b) Artificial Radioactive Cyds.
   c) Isotopes
   d) Decay Chains - Mechanics of Decay
   e) Seeborg's tables

4. Nuclear Physics - L.B. Horst
   a) Cross Section
   b) Resonance Levels
   c) Induced activities
   d) Piles - Sigma, Exponential and Chain Reacting
   e) Pile Theory
5. Radiation Hazards - L.L. Mott or K.Z. Morgan
   a) Biological effects
   b) Tolerance of various particles
   c) Shielding for various particles
   d) Energy of particles
   e) Health-Physics Group responsibilities
   f) Clean up of contamination

6. Pile Construction - J.P. Sinclair
   a) General Description
   b) Design Limitations
   c) Mattress plates
   d) Raw Materials - Graphite and Uranium Slugs - (General)

7. Plant Organization - M.D. Whitaker
   a) Medical
   b) Research - Technical
   c) Operating - Service - Maintenance - Power, etc.
   d) Research Coordination - 100 Area
   e) Security

8. Pile Operation (100 Area Group) - 100 Area Group
   a) Rod Movements - In Hours - Evaluation of Rods
   b) Control Points
   c) Variables - Air, Metal, Pressure, etc.
   d) Limits - Metal Temperature - Air Exit Temperature - Back Well Pressure
   e) Procedure for start up - running - shutdown of operation
   f) Pile Loading - Charging and Discharging

9. Cooling System
   a) Original Fans
   b) New Fans - Difficulties Experienced
c) Air Handled

d) Air Flow and Power Relations

10: Pile Shielding

a) Temperature Limitations
b) Experimental Holes
c) Charging Holes
d) Rod Holes
e) Scanning Holes

11: Controls - Method of Operation - Construction - 100 Area Group

a) Shim Rods
b) Regulating Rods
c) Safety Rods
d) Safety Tubes

12: Control Circuits - Wiring and Trip Circuit Mechanics - 100 Area Group and Instrument Group

a) Hydraulic System
b) #1 Safety Circuit
c) #2 Safety Circuit

13: Instrumentation - 100 Area Group Instrument Group

a) Temperature Measurements
b) Air Flow
c) Pile Intensity
d) Function and Location of Each Instrument
e) Instrument Calibration

14: Determination of Power and Energy Output - 100 Area Group

a) Chambers - #1 Only
b) Thermopiles - L and E Integrator
c) Energy by Heat Output Calculations
d) Energy by Foul Measurements
15. Utilities and Services - 100 Area  100 Area Group
   a) Electric Power
   b) Steam
   c) Water
   d) Air
   e) Sewage Disposal

16. Fuel Physics - L.B. Borst
   a) Experimental Program
   b) Neutron Distribution
   c) Rod Calibration
   d) Foil Measurements
   e) Neutron Flux
   f) Neutron Reactions

17. Raw Materials - 100 Area Group
   a) Graphite Testing
   b) Uranium Testing
   c) Slags Testing - (R and A welded)
      Hydrogen Tested
      Deflection Tested
      Borst Test

18. Metal Accounting - Methods  100 Area Group
   a) Vault
   b) Pile
   c) Canal
   d) Shipping
   e) Monthly Inventory
Product Accounting 100 Area Group

a) Neutron Distribution
b) Position Factor
c) Pile Coordinates
d) IBM Machines

Broken Slugs

a) Scanning
b) Removal
c) Contamination - Clean up Methods

Operating Problems

a) Poison
b) Ice in Pitot Section
c) Water in Pile
d) Plugged Discharge Chute
e) Broken Stringers, etc.
f) Postum Production
g) Myralloy Cans
h) Canal Contamination and Cleaning

Shipping Methods - 100 Area Group

a) Containers available
b) Shielding Requirements
c) Procedure - Paper Work

d) Metal Temperatures and Air Plugs
e) New Slugs and Loading
f) "H" Beam Installation

g) New Fans

h) Additional Metal Added

i) Myrmelloy and Postum Production